



KENT
WASHINGTON

WATER SYSTEM PLAN

2019

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City of Kent Water System Plan

MAY 2019
FINAL SEPTEMBER 2019

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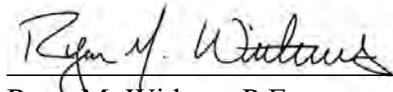
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CERTIFICATION

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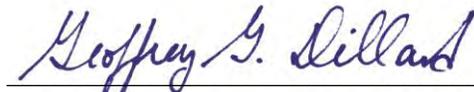
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ES | EXECUTIVE SUMMARY

PURPOSE OF THE WATER SYSTEM PLAN

The City of Kent'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 Kent 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. This WSP has been written to meet 10-year planning requirements.

The City's previous WSP was prepared in 2011. This updated 2019 WSP reflects King County's (County) population allocation to the City and the City's current Urban Growth Area (UGA), which are consistent with the City's 2015 *Comprehensive Plan* and the County's 2018 *Comprehensive Plan* updates. The WSP also reflects improvements and changes to the water system since the completion of the 2011 WSP.

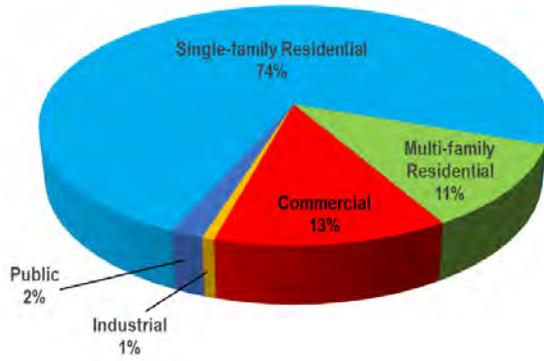
SUMMARY OF KEY ELEMENTS

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 program, a water quality monitoring plan, a wellhead protection program, and a cross-connection control program. A summary of the key issues related to these elements is provided in the following sections.

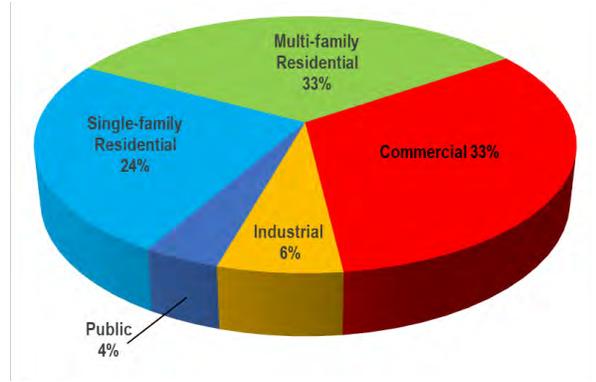
WATER SERVICE AREA

In 2016, the City provided water service to approximately 68,157 people throughout its water service area boundary, which extends beyond the City's corporate limits to include small areas of Auburn, Tukwila, and unincorporated King 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 City limits and designated retail water service area (i.e., where there are existing water mains). Requests for new water service outside of the City limits but within the UGA, where there are no existing water mains fronting the property, will only be granted upon extension of water service and completion of an annexation agreement.

In 2016, the City provided water service to an average of 14,907 connections, which were mainly comprised of single-family connections. Single-family connections represent approximately 74 percent of all accounts, but the single-family class only consumed 24 percent of all water supplied to the system in 2016.



2016 Water Connections



2016 Water Consumption

EXISTING WATER SYSTEM

The City’s water system initially dates to the latter part of the nineteenth century, when a spring was tapped on the East Hill to provide water to the Kent Water and Light Company. The City purchased the water system in 1892. In 1926, the City purchased the Kent Springs water source, and began developing the Clark Springs source in the 1930s. In the 2000s, the City partnered in the Tacoma Regional Water Supply System, which became the City’s third primary water source. The City has ten additional well sources; however, these wells are typically only used periodically to ensure they are regularly exercised due to the higher operation costs. A summary of the City’s supply sources is shown in **Table ES-1**.

Table ES-1
Supply Facilities Summary

Facility	Type	Supplies Water To	Year Installed	Use	Existing Capacity (gpm)	Water Treatment	Generator
208th Street/ 212th Street Wellfield	4 wells	240 Zone	1982, 2001	Active	3,500	Chlorination, Fluoridation, Manganese/Iron/Hydrogen Sulfide Removal, pH Adjustment	208th: None 212th: Hookup for portable generator
Armstrong Springs Wells	2 wells	CSTM/ KSTM	1982	Active	1,050	Chlorination, Fluoridation, pH Adjustment	On-site
Clark Springs	Infiltration gallery and collector, 3 wells	CSTM	1957, 1969	Active	5,400	Chlorination, Fluoridation, pH Adjustment	On-site generator partially powers facility
East Hill Well	1 well	590 Zone	1979	Active	1,900	Chlorination, Fluoridation, pH Adjustment	On-site
Garrison Creek Well	1 well	240 Zone	1981	Active	500	Chlorination, Fluoridation	On-site generator for SCADA system only
Kent Springs	Infiltration gallery, 3 wells	KSTM	1908, 1977, 2001	Active	3,680	Chlorination, Fluoridation, pH Adjustment	On-site generator
O'Brien Well	1 well	240 Zone	1951	Active	243	Chlorination, Fluoridation	None on-site, towed generator is used
Seven Oaks Well	1 well	CSTM/ KSTM	1982	Active	350	Chlorination, Fluoridation, pH Adjustment	None
Tacoma RWWS	Intertie	KSTM/ 590 Zone	2005	Active	8,778	Chlorination, Fluoridation, Filtration, Ozone Treatment, pH Adjustment ¹	Site has full backup power

¹ = pH adjustment occurs in Tacoma system and when RWSS water is directed through the KSTM to the Guiberson Reservoir.

The City's water system has nine storage facilities that provide storage directly to various zones in the system. 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)	Base Elev. (feet)	Overflow Elev. (feet)
6 Million Gallon #2 Reservoir	Garrison Creek Park	240 Zone	1969	Reinforced concrete below grade	6	Variable	212	240
Guiberson Reservoir	E Guiberson St and Kensington Ave S	240 Zone	Late 1930s	Reinforced concrete below grade	3	Variable	222	240
Reith Road Standpipe	Reith Rd S, just north of W Fenwick Park	354.5 Zone	1959	Steel	1.0	66	315.0	354.5
6 Million Gallon #1 Reservoir	98th Ave S and S 239th Pl	416 Zone	1967	Steel	6.0	146	370.0	418.0
125K Tank	98th Ave S and S 239th Pl	485 Zone	1958	Elevated steel	0.125	32	462.0 ¹	485.0
Cambridge Tank	S 264th St and Military Rd S	529 Zone	1959	Elevated steel	0.3	53.33	499.1 ²	529.0
3.5 MG Tank	124th Ave SE and SE 286th Pl	590 Zone	1978	Steel	3.5	74	483.4	592.9
640 Tank	SE 248th St and 124th Ave SE	590 Zone (Future: 640 Zone)	2011	Steel	4.0	75	523.0	595.0 (Future: 645.0)
Blue Boy Standpipe	112th Ave SE and SE 246th Pl	590 Zone	1965	Steel	0.97	42	499.7	593.8

1 = Ground elevation 386.8 feet.

2 = Ground elevation 441 feet.

The City's water system has six booster pump station facilities that provide supply to the 354.5 Zone, 485 Zone, 529 Zone, 575 Zone, 587 Zone, and 590 Zone. A summary of the City's pumping facilities is shown in **Table ES-3**.

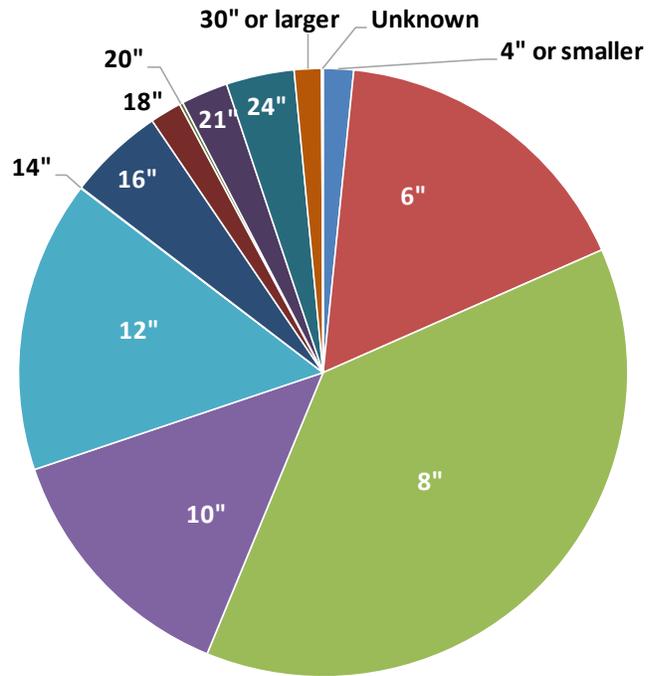
Table ES-3
Booster Pump Station Facilities Summary

Pump Station	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Existing Pumping Capacity (gpm)	Number of Pumps	Pump Type	Pump Motor Size (HP)	Generator
Pump Station #3	240 Zone	354.5 Zone	1959	1,800	2	Horizontal split case	(2) 50	On-site
Pump Station #4	354.5 Zone	529 Zone	1959	3,800	3	Horizontal split case	(2) 75 (1) 150	On-site
Pump Station #5	416 Zone	485 and 590 Zones	1975	6,350	4	Horizontal split case	(2) 125, (1) 40, (1) 40/125	On-site
Pump Station #6	529 Zone	587 Zone	1984	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator
Pump Station #7	529 Zone	575 Zone	1985	500	2	Horizontal	(2) 10	On-site
Pump Station #8	Highline Water District 560 Zone	587 Zone	1986	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator

The City's water system contains 284 miles of water main ranging in size from 1 inch to 36 inches in diameter. As shown in **Table ES-4**, most of the water main (approximately 85 percent) within the system is 12 inches in diameter or less. The remaining 15 percent of the water main is 14 inches in diameter or larger.

Table ES-4
Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	24,139	1.6
6	251,772	16.8
8	567,492	37.8
10	204,265	13.6
12	232,958	15.5
14	579	0.0
16	76,769	5.1
18	25,118	1.7
20	2,817	0.2
21	37,316	2.5
24	54,154	3.6
30 or larger	21,626	1.4
Unknown	1,203	0.1
Total	1,500,208	100%



PAST WATER USAGE

In general, the amount of water consumed by the City’s customers has increased approximately 13 percent since the year 2011. This is most likely the result of the 700 new service connections added to the system and the increased usage of water per connection of both commercial and multi-family residential customer classes. During this time, the average water use of single-family residential customers has remained relatively steady, at an average of 157 gallons per day per connection. **Table ES-5** lists the total amount of water supplied to the system from 2011 through 2016.

Table ES-5
Historical Water Supply

Year	Annual Supply (gallons)
2011	2,498,178,000
2012	2,566,823,000
2013	2,593,245,000
2014	2,659,170,000
2015	2,811,692,000
2016	2,818,790,000

FUTURE WATER DEMANDS AND WATER SUPPLY

Overall water demand within the City's system is expected to increase by approximately 14 percent of 2016 demand by the end of the 20-year planning period, without savings from the City's Water Use Efficiency program. The projected water demand and supply capacity data is shown graphically in **Chart ES-1**.

The existing and projected ERU data is shown graphically in **Chart ES-2**.

Chart ES-1
Future Water Demand and Supply Capacity

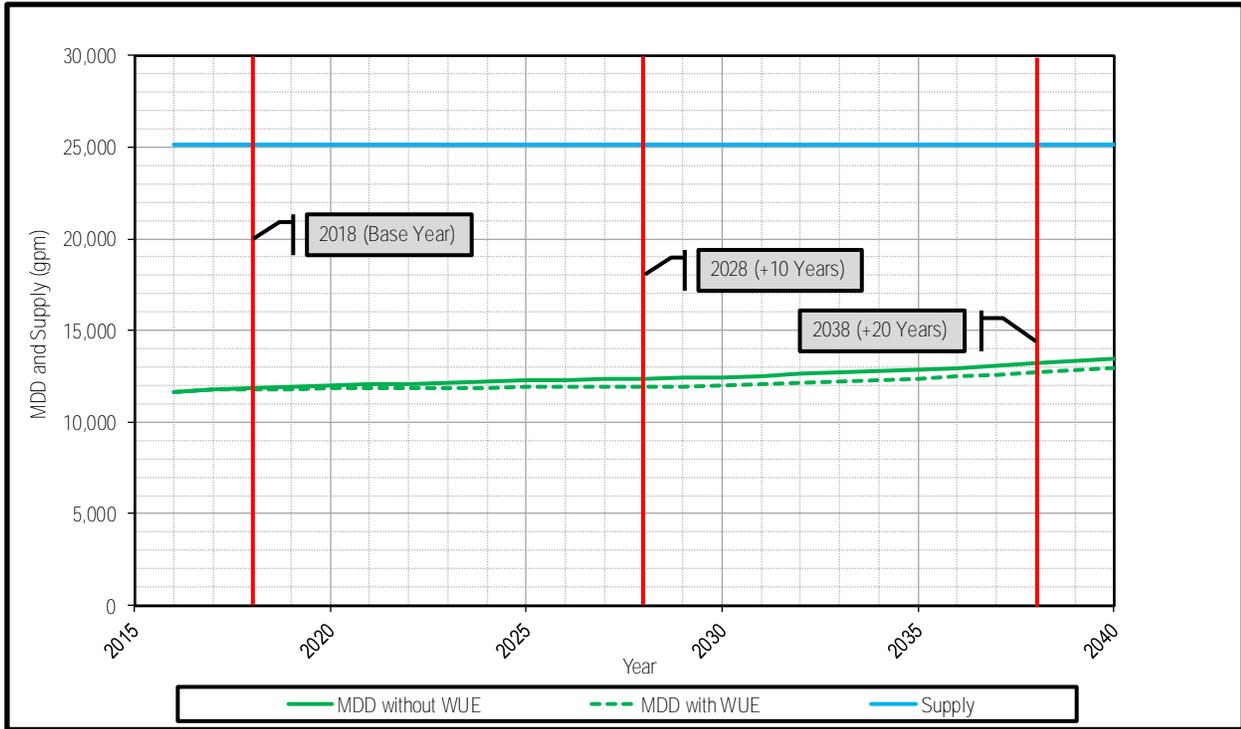
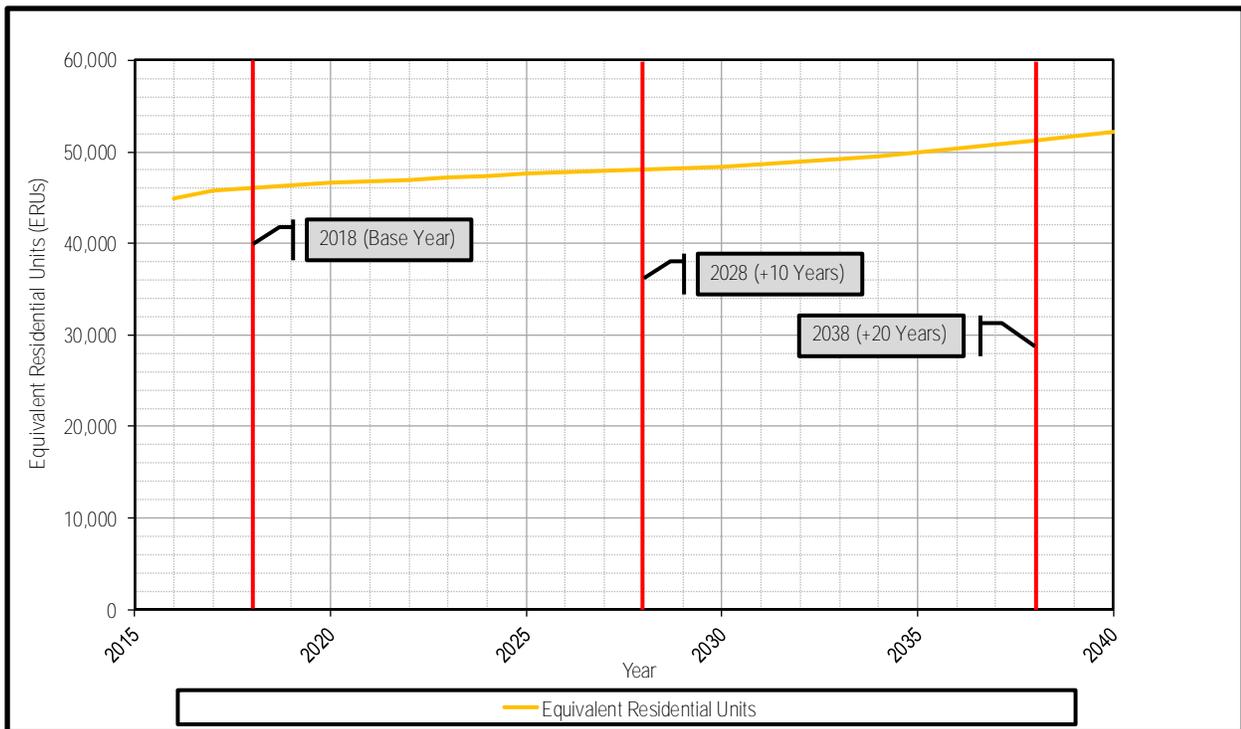


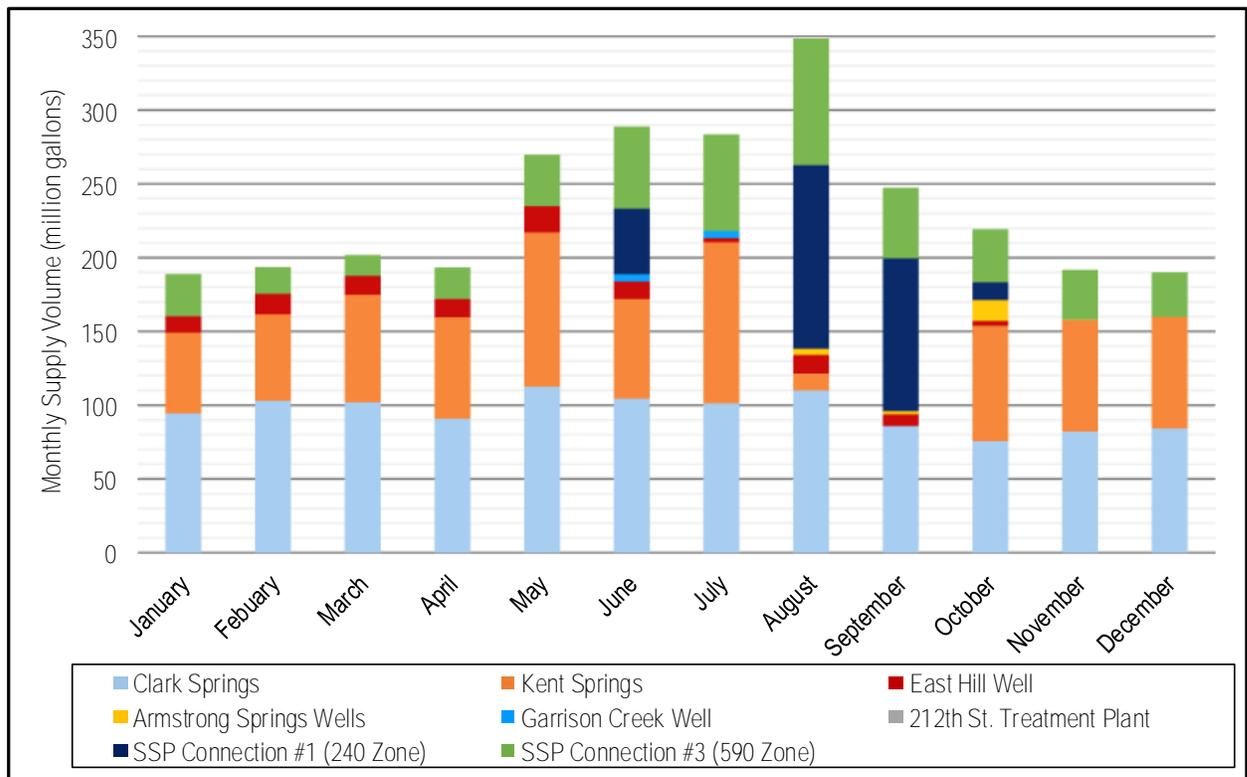
Chart ES-2
Future ERUs



WATER SOURCE AND QUALITY

Water supply in the City’s system is supplied predominantly from Kent Springs, Clark Springs, and the Tacoma Regional Water Supply System as shown in **Chart ES-3**. Water also can be supplied by ten other groundwater wells. The 208th Street/212th Street Wellfield consists of four wells, two wells are located at the Armstrong Springs site, and one well is located at each of the East Hill Well, Garrison Creek Well, O’Brien Well and Seven Oaks Well sites. As shown in **Chart ES-1**, the City’s water sources have sufficient capacity to meet the existing and projected needs of the water system through the 20-year planning period.

Chart ES-3
2016 Monthly Water Supply by Source



Water from all the City’s sources are chlorinated and fluoridated. In addition, aeration and sodium hydroxide pH adjustment are used at the Guiberson Reservoir site to treat blended Kent Springs and Tacoma water. The City also uses pH adjustment at the 212th Street Treatment Plant, Pump Station #5, and the East Hill Well.

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 technical seminars to keep abreast of the latest changes in the water industry and ensure a smooth and safe operation of the water system. The current staff of supervisory personnel and field crew, in which many are responsible for the water system and other utilities, have effectively operated and maintained the water

system in the past. As the water system expands in the future and continues to age, additional staff will also be required. The City plans to add staff to meet the increased requirements from system expansion as the budget allows.

The City has taken several steps to prepare for emergency situations. A vulnerability assessment and City-Wide Emergency Response Plans have been prepared that conform to the requirements of the Bioterrorism Act of 2002. The documents contain a vulnerability assessment of the City's water system facilities, a contingency operation plan for responding to emergency events, a list of water personnel responsible for making decisions in emergency situations, and other elements.

Additionally, a seismic vulnerability assessment was completed in 2017 that identifies the City's risk to seismic hazards and recommends mitigation to reduce the risk of failure due to those hazards. Results of the assessment were considered in the development of the water system capital improvement program. The Water Department also participated in a SCADA system vulnerability assessment with the City's IT Department and the Department of Homeland Security in 2017 and 2018. The recommendations from the assessment are being implemented by the City.

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 below.

- The City has sufficient water source capacity to meet the demands of existing and future customers until at least 2038.
- The O'Brien Well is not normally operated because sand is present inside the well screen and high levels of manganese are present in the groundwater. Improvements to provide 480-volt power to the site, redevelop the well, and provide treatment are included in **Chapter 9**.
- The City has sufficient water storage capacity to meet the demands of the existing and future customers until at least 2038.
- A new 587 Zone reservoir will be constructed by 2028 to provide redundancy in the West Hill operating area. The reservoir will be accompanied by a new BPS that will provide an additional 1,000 gpm of firm capacity to the West Hill operating area. The existing pump stations on the West Hill will be equipped with new PRVs to facilitate these operational changes in the service area.
- The Guiberson Reservoir was constructed in the 1930s, is nearing the end of its useful life and is in need of replacement.
- The easterly portion of the City's existing 590 Zone will be converted to a 640 Zone to resolve storage deficiencies in the 590 Zone and moderately low pressures in the conversion area.
- The 575 Zone will be converted to the 587 Zone to improve the level of service to the 575 Zone.
- Several areas of the system require water main replacements to resolve deficiencies related to high water velocities, aging water main, and undesirable materials.

PROPOSED WATER SYSTEM IMPROVEMENTS AND FINANCING PLAN

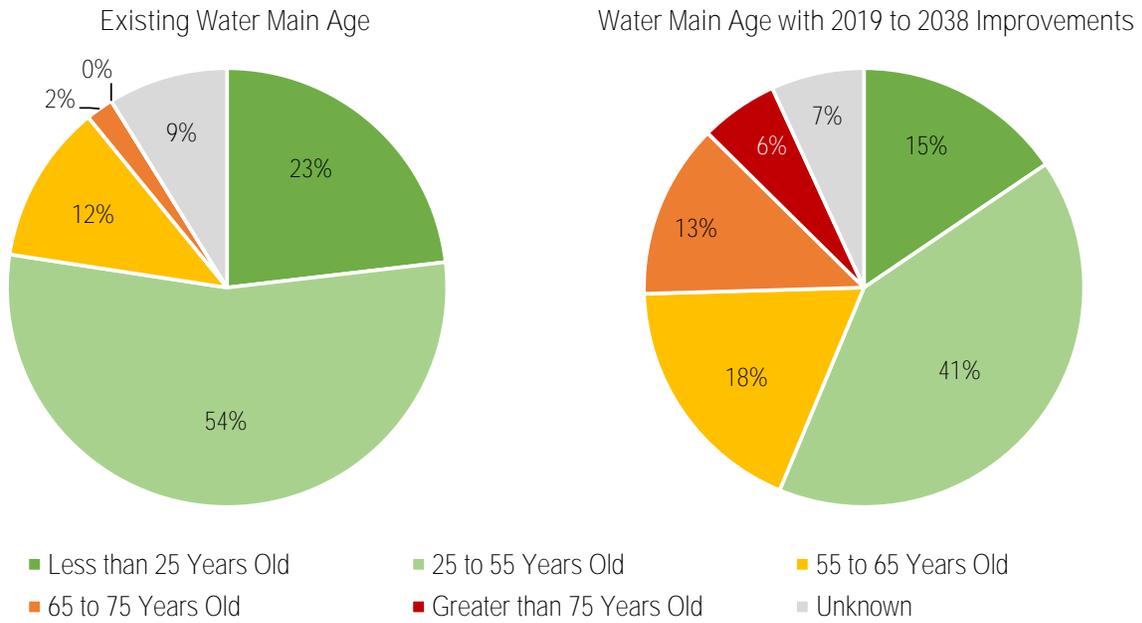
Improvements to the water system are necessary, primarily to resolve existing system deficiencies, but also to accommodate the increase in water demands from future growth. Improvements identified for the first 5 years of the capital improvement program (2019 through 2023) are estimated to cost approximately \$36,346,000, which results in an average expenditure of approximately \$7,269,200 per year. Improvements in the following 5 years (2024 through 2028) are estimated to cost approximately \$30,000,000, or approximately \$6,000,000 per year. The financial analysis is intended to illustrate the feasibility of funding the capital and non-capital improvements for the water system in the next 10 years. It is anticipated that projects identified in this WSP will be financed from cash on hand.

The combination of the historical financial data presented in **Chapter 10**, 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. In 2016, the city completed a water rate study and adopted a new rate structure for the water utility that addressed the operating and capital needs for the system. The current rate structure adopted a fund balance reserve policy that requires 20 percent of operating expenses balance that would be available for emergency situations. The City anticipates beginning another rate study in 2020 to be completed in 2022.

As the existing infrastructure continues to age, managing and funding the water system CIP is essential to maintaining a safe and reliable water supply for the City's customers. Based on the existing level of repair and replacement identified by the City for the water system CIP, the amount of water main in the system that is greater than 65 years old will increase from 2 percent to 19 percent by the end of the 20-year planning period, as shown in **Chart ES-4**. As funding becomes available, the City should consider a more aggressive water main repair and replacement program or continue to develop asset management strategies to address future infrastructure needs.

Chart ES-4
Existing and Future Water Main Age



1 | INTRODUCTION

WATER SYSTEM OWNERSHIP AND MANAGEMENT

The City of Kent (City) is a municipal corporation that owns and operates a public water system that covers the majority of its corporate boundaries and some areas outside the City’s corporate boundaries. 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	Kent Water Department
County	King
DOH System ID Number	381501
Owner Number	002950
Address	220 4th Avenue S, Kent, WA 98032
Contact	Mr. Sean Bauer, Water System Manager
Contact Phone Number	(253) 856-5610

OVERVIEW OF EXISTING SYSTEM

In 2016, the City provided water service to an average of approximately 14,907 customer connections, or 44,854 equivalent residential units (ERUs), within the City’s water service area. The City limits comprise an area of approximately 34.4 square miles, and the existing retail water service area is approximately 23.7 square miles. The 2016 population served by the water system was approximately 68,157, whereas the population residing in the City limits was approximately 124,500. Other areas within the City limits are within the water service areas of the City of Renton, Highline Water District, Soos Creek Water and Sewer District, and Lake Meridian Water District.

The City’s water supply is currently provided by 16 wells, 2 springs, and an intertie connection with the City of Tacoma (Tacoma). All City sources are chlorinated and fluoridated. The 208th Street/212th Street Wellfield is also treated for manganese, iron, and hydrogen sulfide removal. Water from the 208th Street/212th Street Wellfield, Armstrong Springs Wells, Clark Springs, East Hill Well, Kent Springs, Seven Oaks Well, and the Tacoma intertie are treated for pH adjustment. Water from the Tacoma intertie also receives filtration and ozone treatment in Tacoma’s system. The City is a partner with Tacoma, Lakehaven Water and Sewer District, and Covington Water District on the Second Supply Pipeline source. Water storage is provided by 9 reservoirs that have a total capacity of approximately 24.9 million gallons (MG). In addition, the City’s water system has 13 pressure zones, with 18 pressure reducing stations. The system

also has 6 booster pump stations and approximately 284 miles of water main. A summary of the 2016 water system data is shown in **Table 1-2**.

Table 1-2
2016 Water System Data

Description	Data
Water Service Population	68,157
Water Service Area	23.7 square miles
Total Connections	14,907
Total ERUs	44,854
Demand per ERU	172 gallons per day
Average Day Demand	5,348 gpm
Distribution System Leakage	6.0%
Maximum Day/Average Day Demand Factor	2.17
Peak Hour/Maximum Day Demand Factor	1.46
Number of Pressure Zones	13
Number of Wells	16
Number of Spring Sources	2
Total Capacity of City Sources	16,623 gpm
Tacoma Intertie Capacity	8,778 gpm
Number of Pump Stations and Total Capacity	6 (15,505 gpm)
Number of Reservoirs and Total Capacity	9 (24.9 MG)
Number of Pressure Reducing Stations	18
Total Length of Water Main	284 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 2011. 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; and
- 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 source, 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, and their estimated costs and implementation schedule.
- **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.

Capital Facilities 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.

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 Capital Facilities 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.

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

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.

Head Loss: 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.

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 240 Zone refers to the City’s lower pressure zone, which has a reservoir with an overflow elevation of 240 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.

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.

LIST OF ABBREVIATIONS

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

Table 1-3
Abbreviations

Abbreviation	Description
ADD	Average Day Demand
AMI	Advanced Metering Infrastructure
AWWA	American Water Works Association
CCR	Consumer Confidence Report
CIP	Capital Improvement Program
City	City of Kent
County	King County
CWD	Covington Water District
CWSP	Coordinated Water System Plan
CWSSA	Critical Water Supply Service Area
DBP	Disinfection Byproduct
DOH	Washington State Department of Health
DSL	Distribution System Leakage
EPA	U.S. Environmental Protection Agency
ERU	Equivalent Residential Unit
fps	feet per second
GMA	Growth Management Act
gpm	gallons per minute
HWD	Highline Water District
JOA	Joint Operating Agreement
LMWD	Lake Meridian Water District
LWSD	Lakehaven Water and Sewer District
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
psi	pounds per square inch
RCW	Revised Code of Washington
SCWSD	Soos Creek Water and Sewer District
SDWA	Safe Drinking Water Act
SEPA	State Environmental Policy Act
SOC	Synthetic Organic Chemical
SWTR	Surface Water Treatment Rule
Tacoma	City of Tacoma (Tacoma Public Utilities)
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 Kent'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

The City was incorporated in 1890. The water system's origins date to the latter part of the nineteenth century, when a spring was tapped on the East Hill to provide water to the Kent Water and Light Company. In 1891, the City granted a 25-year franchise to the Farmers Water Company and the Kent Water and Light Company to furnish water to the City. The City retained the option to purchase the water system, which it did one year later in 1892.

In 1892, the City financed the construction of a reservoir at the top of Kennebeck Street. Further improvements were made to the water system in 1910. In 1926, the City purchased the Kent Springs water source and began construction of the original Kent Springs Transmission Main 4 years later. In the 1930s, development of the Clark Springs source began and the Guiberson Reservoir was constructed.

In the 1950s, Pump Station #3 and Pump Station #4 were constructed to pump water to the Cambridge Tank and the Reith Road Standpipe on the West Hill to provide service to this area. The 125K Tank was also added near 98th Avenue South and South 239th Place. The City adopted its first Water System Plan (WSP) in 1955.

The 1960s saw the construction of the 6 Million Gallon (MG) #1 Reservoir, 6 MG #2 Reservoir, and Blue Boy Standpipe, as well as the completion of the transmission main from Clark Springs, which provided the City with redundant spring water sources and transmission mains.

In the 1970s, the 3.5 million-gallon (MG) Tank and Pump Station #5 were constructed. The East Hill Well was developed, the City of Renton (Renton) and City of Tukwila (Tukwila) interties were constructed, and the South 212th Street and South 208th Street wells were drilled. Chlorination was also added to Kent Springs.

In the 1980s, Pump Station #6 and Pump Station #7 were constructed to improve the level of service on the West Hill. Pump Station #8 also was constructed to provide an intertie with the Highline Water District (HWD). The Garrison Creek Well, Armstrong Springs Wells, and Seven Oaks Well also were developed to provide additional supply. Fluoridation was added to Clark Springs. The City became a member of the South King County Critical Water Supply Service Area (SKCCWSSA) to coordinate water planning efforts and began the process of obtaining additional supply from the City of Tacoma (Tacoma).

In the 1990s, the South 212th Street Iron and Manganese Treatment Facility was completed, and the City's first Water Conservation Plan was adopted. As a member of the SKCCWSSA, the

City participated in the development and adoption of the *South King County Coordinated Water System Plan* (CWSP). In addition, major transmission and distribution pipeline improvements were completed, and the Infrastructure Maintenance Management and Inventory System was brought online to assist with planned maintenance. Lead and Copper Rule treatment and siting studies were accomplished in accordance with Safe Drinking Water Act (SDWA) requirements, and seismic evaluations and upgrades were completed on the City's reservoirs and other distribution system infrastructure.

In the 2000s, the Tacoma Regional Water Supply System (RWSS) became the City's third primary water source. The City partnered with Tacoma, Covington Water District (CWD), and Lakehaven Water and Sewer District (LWSD) on this project and in doing so, added 12.64 million gallons per day (MGD) to the City's available supply. Seismic, security, and redundancy upgrades were also made to many of the City's facilities.

In the 2010s, the 640 Tank and additional upgrades were constructed in preparation for the creation of the new 640 Pressure Zone. The Guiberson Corrosion Control Facility was constructed, and additional seismic, security, and redundancy upgrades also have been constructed throughout the system.

RETAIL WATER SERVICE AREA

The City's retail water service area, which covers an area of approximately 23.7 square miles, is shown on **Figure 2-1**. The existing service area is predominantly contained within the City's incorporated boundaries, but also includes areas of the City of Auburn (Auburn), and unincorporated King County. The existing service area is approximately bordered by Interstate 5 (I-5) to the west, SE 304th Street to the south, S 180th Street to the north, and 128th Avenue SE to the east. Along the north-south axis of the system, the retail water service area is approximately 7.6 miles long. Along the east-west axis, the existing retail water service area is approximately 5.7 miles wide. The City will provide water service throughout the existing retail water service area in accordance with the Municipal Water Law's duty to provide service requirements. The existing retail water service area defines the place of use for each water right held by the City for municipal water supply purposes. The place of use can be updated through subsequent water system planning or engineering document submittals that are approved by the Washington State Department of Health (DOH).

Along with the existing retail water service area, Kent's city limits, neighboring city limits, the King County urban growth area (UGA) boundary, and Kent's Potential Annexation Areas (PAAs) are shown in **Figure 2-1**.

TOPOGRAPHY

The topography of the existing service area is lowest in the valley (20 feet) at the center of the city that runs north and south (Green River Valley), with the highest elevations on the east and west hillsides of the City, respectively called East Hill and West Hill. The highest existing service elevations are located on East Hill, at approximately 500 feet. The majority of the existing system is located within the Green River watershed.

GEOLOGY¹

The City is located in the southeastern part of the Puget Sound Lowland, which is a topographically low region between the Olympic Mountains and the Cascade Range. This area has been subjected to repeat episodes of advancing and retreating continental glaciation, as well as the deposition of sediment from rivers and streams flowing from the Cascade Range during periods when the continental glaciers were not present. The City's service area includes topographic uplands to the east (Covington Upland) and west (Des Moines Upland) flanking a wide, flat-bottomed north-south trending valley (Green River Valley). Downtown Kent is located on the eastern edge of the Green River Valley.

Bedrock, consisting primarily of sedimentary rock such as sandstone, siltstone, shale, and coal, is found below an elevation of approximately 400 feet below sea level beneath Downtown Kent. Bedrock crops out, or is found closer to ground surface, farther to the north and east of the City.

Above the bedrock are unconsolidated sediments that have been deposited during glacial and non-glacial periods over the past several hundred thousand years. Glacial sequences typically consist of advance outwash (sand), glacial till (unsorted mixture of silt, sand, and gravel), and recessional outwash (sand and gravel). Non-glacial sequences are typically alluvial (layered silt, sand, and gravel) and lacustrine (clay and silt) in nature. The glacial sequences that have been named in this area include the Double Bluffs Glaciation (greater than 100,000 years old), the Possession Glaciation (80,000 to 60,000 years old), and the Vashon Glaciation (23,000 to 10,000 years old). The non-glacial deposits include the Whidbey Interglaciation (100,000 to 80,000 years old), the Olympia Interglaciation (60,000 to 23,000 years old), and the Holocene age sediments (10,000 years old to present).

The upland areas (Des Moines Upland and Covington Upland) are glaciated drift plains that were shaped by the Vashon Glaciation. The most prevalent geologic unit at the ground surface on the drift plains are Vashon Glacial Till, which was laid down beneath the most recent continental glacier. The glaciated drift plains contain oblong north-south orientated hills and depressions created by the advance and retreat of the Vashon continental glacier over the area. In various locations the recessional outwash was deposited preferentially in the depressions; in other areas the recessional outwash streams incised into the glacial till and formed thicker recessional outwash channels.

The alluvial deposits on the uplands are typically very thin, whereas the alluvial deposits beneath the Green River Valley can be hundreds of feet thick.

All sediments older than the Vashon recessional outwash have been overridden by a glacier and compacted. This compaction means that those sediments more easily support foundations. Liquefaction susceptibility of these sediments, as presented by the Washington State Department of Natural Resources, range from very low to moderate. The Vashon recessional outwash deposits have low liquefaction susceptibility. The recent alluvium deposits can be loose and, where saturated, can be susceptible to liquefaction, which has implications for infrastructure. All alluvial deposits in the Green River Valley have medium to high liquefaction susceptibility.

Groundwater recharge to the City's sources primarily originates as precipitation. Groundwater flows both laterally (east to west) and vertically downward under the uplands, which are the

¹ Reference: Woodward, D.G., Packard, F.A., Dion, N.P., and Sumioka, S.S. 1995. *Occurrence and Quality of Ground Water in Southwestern King County, Washington*. U.S. Geological Survey. Water-Resources Investigations Report 92-4098.

recharge areas. Groundwater flow beneath the Green River Valley is generally downstream (north) and vertically upward since this is a regional discharge area.

The City's spring sources are primarily situated at locations where the Vashon recessional outwash aquifer, or older adjacent aquifers, are pinched or constricted, which forces the water to discharge from the aquifer.

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 DOH Water Facilities Inventory (WFI) form in **Appendix A**.

PRESSURE ZONES

The City serves customers within an elevation range from 20 feet above sea level in the valley running north and south through the middle of the system to approximately 500 feet above sea level on the east side of the system, also referred to as East Hill. This 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 13 different pressure zones, as shown in **Figure 2-1**. The pressure in each zone is regulated by reservoir levels, pressure reducing station settings and other control valve settings, pump settings, or a combination of these, as illustrated in the hydraulic profile (**Figure 2-2**).

Central Valley

240 Pressure Zone

The 240 Zone is the largest pressure zone in the City, serving the lowest elevations in the valley between the East Hill and West Hill. The Kent Springs Transmission Main (KSTM) terminates at the 240 Zone's Guiberson Reservoir, and can provide water to the zone from Kent Springs, the Armstrong Springs Wells, the Seven Oaks Well, and Tacoma. The zone also can be supplied directly with water from the O'Brien Well, the 208th Street/212th Street Wellfield, and the Garrison Creek Well. Pressures in the 240 Zone are established by the 6 MG #2 Reservoir and the Guiberson Reservoir. This zone currently serves customers within an elevation range between approximately 20 feet and 135 feet. There also are interties with Tacoma, Tukwila, Auburn, and Renton connected to the 240 Zone.

East Hill

271 Alvord Pressure Zone

The 271 Alvord Zone is supplied by one pressure reducing station from the 485 Zone that establishes pressures in the zone. This pressure zone currently serves customers within an elevation range between approximately 60 feet and 170 feet, and is located near the base of the East Hill, just north of Mill Creek, primarily between Alvord Avenue N and Hazel Avenue.

308 Hilltop Pressure Zone

The 308 Hilltop Zone is a very small zone supplied by one pressure reducing station from the 485 Zone that establishes pressures in the zone. This pressure zone currently serves customers within an elevation range of 120 feet and 130 feet. This pressure zone also is located near the base of the East Hill and only provides water to customers along 91st Avenue South.

339 Seattle Pressure Zone

Water is supplied to the 339 Seattle Zone by one pressure reducing station from the 485 Zone that establishes pressures within the zone. The 339 Seattle Zone is located on a small plateau near the base of East Hill, predominantly between Van De Vanter Avenue to the east and Scenic Way to the west. The zone currently serves customers within an elevation range between approximately 70 feet and 270 feet.

366 Stetson Pressure Zone

The 366 Stetson Zone is a small pressure zone located on the East Hill; this zone is supplied water by one pressure reducing station from the 485 Zone. The 366 Stetson Zone serves customers on the following four streets: Hazel Avenue N; Valley Place; Stetson Avenue; and Crest Place. This zone currently serves customers within an elevation range between approximately 170 feet and 230 feet.

368 Weiland Pressure Zone

Water is supplied to the 368 Weiland Zone by one pressure reducing station from the 485 Zone that establishes pressure in this zone. This zone currently serves customers within an elevation range between approximately 110 feet and 210 feet, and is located just north of Mill Creek along Canyon Drive and Weiland Street.

416 Pressure Zone

The 416 Zone is a very small zone that consists predominantly of the transmission main from the 416 Zone 6 MG #1 Reservoir to the 240 Zone 6 MG #2 Reservoir. The transmission main follows 98th Avenue S northwards from the 6 MG #1 Reservoir before crossing through several neighborhoods to the northwest until the main intersects S 218th Street, where it heads east to fill the 6 MG #2 Reservoir. There are a limited number of customers connected to the transmission main, and the City plans to transfer these customers to other pressure zones in the future. Elevations in this pressure zone range from approximately 80 feet to 380 feet. The Clark Springs Transmission Main (CSTM) terminates at the 6 MG #1 Reservoir, supplying water from Clark Springs, the Armstrong Springs Wells, and the Seven Oaks Well.

485 Pressure Zone

The 485 Zone is supplied with water from Pump Station #5 and three pressure reducing stations connected to the 590 Zone. Pressures in this zone are established by the 125K Tank. This zone currently serves customers within an elevation range between approximately 150 feet and 400 feet, and is located between S 218th Street at its northern extent, and East Maple Street to its southern extent.

590 Pressure Zone

The 590 Zone is the system's second largest pressure zone and serves the eastern portions of the water system. This zone is supplied water by a direct connection to the Tacoma RWSS at Point of Delivery (POD) #3, the East Hill Well, and Pump Station #5. Pressure is established by the Blue Boy Standpipe, the 3.5 MG Tank, and the 640 Tank. The 640 Tank was constructed to provide storage for a future 640 Pressure Zone but is operated in the 590 Zone until all necessary facilities are constructed for establishment of the 640 Zone. Customers in the 590 Zone are located in an elevation range between approximately 290 feet and 500 feet. The 590 Zone serves customers between SE 225th Place and SE 304th Street.

West Hill

354.5 Pressure Zone

The 354.5 Zone, the lowest West Hill pressure zone, is supplied water by Pump Station #3. A pressure reducing valve (PRV) at Pump Station #4 also allows the zone to be supplied from the higher elevation zones on the West Hill in a maintenance or emergency situation. The pressure in the 354.5 Zone is established by the Reith Road Standpipe. This zone currently serves customers within an elevation range between approximately 90 feet and 280 feet and is located primarily between Reith Road and Lake Fenwick Road.

529 Pressure Zone

Water is supplied to the 529 Zone by Pump Station #4. In an emergency situation, water can be supplied from the 587 Zone through the 42nd Avenue South PRV. Pressure in the zone is established by the Cambridge Tank, located in the southwest corner of the zone. The 529 Zone serves customers within an elevation range between approximately 280 feet and 430 feet and is located in the southwest corner of the system between Military Road South and Lake Fenwick Road South.

575 Pressure Zone

The 575 Zone is a small, closed pressure zone that is supplied water from Pump Station #7, which establishes the pressure in this zone. During a fire flow event exceeding the capacity of Pump Station #7, the pump station will shut off and the zone will be supplied through a check valve from the Cambridge Tank, which has an overflow elevation of 529 feet. The check valve is located at Pump Station #7. The 575 Zone is also located in the southwest corner of the City's system between S 268th Street and S 263rd Street. This zone currently serves customers within an elevation range between approximately 410 feet and 450 feet.

587 Pressure Zone

The 587 Zone is a closed pressure zone supplied water by Pump Station #6, which establishes the pressure in the zone. Like the 575 Zone, during a fire flow event exceeding the capacity of Pump Station #6, the pump station will shut off and the zone will be supplied from the Cambridge Tank, which has an overflow elevation of 529 feet, via two check valves. One check valve is located at the Pump Station #6 site, and the second is located near the intersection of Military Road South and S 259th Place. Pump Station #8 is also connected to the 587 Pressure Zone. This pump station provides water from the HWD intertie, which is available for emergency supply, fire flow, and maintenance purposes. Pump Station #8 provides the only

redundant supply to the West Hill pressure zones, which is otherwise supplied only by Pump Station #3. The 587 Zone is located in the southwest corner of the City's system, between S Reith Road and S 239th Place. This zone provides water to customers located at an elevation between approximately 330 feet and 450 feet.

SUPPLY FACILITIES

Introduction

Water in the City's system is supplied predominantly from Kent Springs, Clark Springs, and the Tacoma Second Supply Pipeline. The City utilizes its wells periodically to ensure that all sources are regularly exercised, but does not typically operate these sources due to their higher cost of operation compared to Kent Springs, Clark Springs, and the Tacoma intertie.

A summary of the City's sources of supply is shown in **Table 2-1**. Additional information on the City's sources of supply, water treatment, and water quality monitoring is contained in **Chapter 6**.

Table 2-1
Supply Facilities Summary

Facility	Type	Supplies Water To	Year Installed	Use	Existing Capacity (gpm)	Water Treatment	Generator
208th Street/ 212th Street Wellfield	4 wells	240 Zone	1982, 2001	Active	3,500	Chlorination, Fluoridation, Manganese/Iron/Hydrogen Sulfide Removal, pH Adjustment	208th: None 212th: Hookup for portable generator
Armstrong Springs Wells	2 wells	CSTM/ KSTM	1982	Active	1,050	Chlorination, Fluoridation, pH Adjustment	On-site
Clark Springs	Infiltration gallery and collector, 3 wells	CSTM	1957, 1969	Active	5,400	Chlorination, Fluoridation, pH Adjustment	On-site generator partially powers facility
East Hill Well	1 well	590 Zone	1979	Active	1,900	Chlorination, Fluoridation, pH Adjustment	On-site
Garrison Creek Well	1 well	240 Zone	1981	Active	500	Chlorination, Fluoridation	On-site generator for SCADA system only
Kent Springs	Infiltration gallery, 3 wells	KSTM	1908, 1977, 2001	Active	3,680	Chlorination, Fluoridation, pH Adjustment	On-site generator
O'Brien Well	1 well	240 Zone	1951	Active	243	Chlorination, Fluoridation	None on-site, towed generator is used
Seven Oaks Well	1 well	CSTM/ KSTM	1982	Active	350	Chlorination, Fluoridation, pH Adjustment	None
Tacoma RWWS	Intertie	KSTM/ 590 Zone	2005	Active	8,778	Chlorination, Fluoridation, Filtration, Ozone Treatment, pH Adjustment ¹	Site has full backup power

¹ = pH adjustment occurs in Tacoma system and when RWSS water is directed through the KSTM to the Guiberson Reservoir.

Water Treatment

All City water sources are chlorinated and fluoridated. In 2015, the Tacoma Green River filtration facility was completed, allowing for less-constrained use of the Tacoma supply. Aeration and sodium hydroxide pH adjustment are used at the Guiberson Reservoir site to treat blended Kent Springs and Tacoma water. The City also uses pH adjustment at the 212th Street Treatment Plant, Pump Station #5, and the East Hill Well.

212th Street Treatment Plant

The 212th Street Treatment Plant is located at 9001 S 212th Street and was put into service in 1993. The 212th Treatment Plant treats the water from the 208th Street/212th Street Wellfield. Like all of the City's well and spring sources, the water goes through a chlorination and fluoridation process. Pressure filters use potassium permanganate and greensand technology to remove iron, manganese, and hydrogen sulfide at this plant. The plant also introduces a pH adjustment with the addition of sodium hydroxide to reduce the corrosivity of the finished water on household plumbing and maintain compliance with the Lead and Copper Rule.

In 2008, the treatment plant received new programmable logic controller (PLC) upgrades. In 2016, a mag meter upgrade took place and a new auma valve control actuator was installed.

Water Supply

208th Street/212th Street Wellfield

The 208th Street/212th Street Wellfield consists of four wells – three on the 212th Street Treatment Plant site and one behind WinCo foods on S 208th Street – that supply water to the 240 Zone. The first wells were constructed in 1982, the treatment plant was brought online in 1993, and an additional well was constructed on the treatment plant site in 2001 to address a drought and declining capacity in Wells #1 and 2. The total capacity of the wellfield is approximately 3,500 gallons per minute (gpm). Interference between the three 212th Street Wells can sometimes affect the total capacity. In 2015, the 212th Street Well #3 received a motor replacement.



212th Street Treatment Plant Building

Because the 212th Street Treatment Plant is relatively expensive to operate compared to the City's spring sources and the Tacoma supply, the wellfield is typically only operated for around 2 weeks annually for exercise and operator familiarization.

Armstrong Springs Wells

The Armstrong Springs Wells are a wellfield located south of SE 272nd Street, immediately next to Jenkins and Cranmar Creek, south of Covington. The immediate surrounding area has been annexed into the City. The two wells were installed in 1982 and are approximately 80 to 90 feet deep. Permanent treatment facilities, which provide chlorination and fluoridation, were installed in 2002, and the chlorination equipment was upgraded in 2013. The wells are capable of producing approximately 1,050 gpm and can pump to either the CSTM or KSTM. Facilities at the termination points of the CSTM and KSTM provide pH adjustment. In 2016, a back-up power generator with motor control center (MCC) upgrades was installed, and the City made a

property purchase for the purpose of source protection. The property purchase consisted of 10 acres to the north of the wells, between the wells and Highway 516. The City has demolished all buildings on the property.

Clark Springs

The Clark Springs source is the easternmost City-owned source, located south of SE Kent-Kangley Road, east of Maple Valley, adjacent to Rock Creek. Like Kent Springs, the approximately 320 acres of property surrounding the Clark Springs source has been annexed to the City for municipal supply purposes. The Clark Springs water source consists of an infiltration gallery and collector, and three wells that supply water to the system via the CSTM. The water is treated with chlorine and fluoridation at the source, and is also treated at a pH adjustment facility located at the Pump Station #5 site. The total capacity of the source is approximately 5,400 gpm.

Constructed in 1957, the Clark Springs infiltration gallery and collector consists of a gallery of several hundred feet of 16-inch perforated steel pipe, lying horizontally 15 to 20 feet below ground surface and extending under Rock Creek. Water is collected in the gallery from a wide area and diverted to a chamber at the beginning of the CSTM. A valved section of 12-inch pipe extending beneath the Rock Creek channel to the southern side also is connected to the gallery. Like the Kent Springs source, the Clark Springs source experiences reduced capacity in the summer months as the aquifer levels decline.

The three Clark Springs wells, which are approximately 50 to 80 feet deep, were constructed in 1969 and rehabilitated in 1985 due to corrosion-related capacity reduction. Maintenance and rehabilitation of the pumps occurred in 2002. The area is subject to electrolysis problems that limit the remaining useful life of the wellfield. In 2008, a security fence was added around the infiltration gallery. Levee improvements were constructed to protect the infiltration gallery in 2008 and 2012. In 2009, the clearwell variable frequency drive (VFD) was replaced, and in 2010 the Well #2 pump received a VFD upgrade. Security improvements to the clearwell and a hood installation were completed in 2011, and a surge tank electrical upgrade was completed in 2012. In 2015, the Well #1 MCC was replaced.

Due to the close proximity of the Clark Springs sources to the Landsburg Mine site, over many years the City has advised the Washington State Department of Ecology (Ecology) of the City's serious concerns about the site and the efforts overseen by Ecology to address the site's environmental conditions. In recent years, the City submitted to Ecology comments in opposition to Ecology's cleanup action plan for the site, seeking further investigation/action at the site, and a cleanup action plan more protective of area groundwater, including the Clark Springs source aquifers. The City also has implemented various activities to increase monitoring and sampling at and near Clark Springs.

The Rock Creek Habitat Conservation Plan was completed in 2011.

East Hill Well

The East Hill Well was originally constructed in 1979. The well provides water directly to the 590 Zone and is located on 104th Avenue SE between SE 244th Street and SE 248th Street. The well pump and motor were replaced in 2000; a pH adjustment treatment facility was installed in 2003; and the well received new chlorination equipment in 2007. The source is also fluoridated. An on-site engine generator set for back-up power was installed in 2013. The well was redeveloped in 2017, and a new pump and motor were installed. The East Hill Well is capable of providing approximately 1,900 gpm to the system.



East Hill Well

Garrison Creek Well

Located at Garrison Creek Park on the same site as the 6 MG #2 Reservoir, the Garrison Creek Well supplies water directly to the 240 Pressure Zone. The original Garrison Creek Well, installed in 1981, lost capacity as a result of the 2001 Nisqually earthquake. The well was re-drilled in 2004.

Water from the Garrison Creek Well is typically pumped directly into the 6 MG #2 Reservoir but can be pumped to the distribution system. The water is chlorinated and fluoridated. The well is capable of providing approximately 500 gpm to the system.



Garrison Creek Well

Kent Springs

The Kent Springs source was originally constructed in 1908 and has been providing water to the City for over 100 years. The source is located near Black Diamond just north of Lake Sawyer, several miles east of the distribution system, in an area of approximately 75 acres that has been annexed into the City for municipal supply purposes. The source consists of a spring-fed infiltration gallery and a wellfield, both of which can provide water to the KSTM. The water from this source is treated with a chlorination and fluoridation process before being supplied to the City. New chlorination equipment was installed in 2015. Additionally, pH adjustment takes place at the Guiberson Reservoir site. The total capacity of the source is approximately 3,680 gpm.

Located at the base of a hillside where the springs discharge, the Kent Springs infiltration gallery was constructed in 1908, and remains in good condition. The gallery is constructed of several hundred feet of perforated concrete pipe buried up to 10 to 15 feet deep. During the warmer months, the capacity of the infiltration gallery drops, and the wellfield is utilized. In 2015, a gallery level sensor was installed.

The Kent Springs wellfield consists of three wells. Well #1 and #2 were drilled in 1977, and Well #3 was drilled during drought conditions in 2001. The wells are drilled to approximately 70 to 105 feet deep and experience a reduced capacity during the summer due to lower aquifer levels, which are speculated to be caused by increasing withdrawals from exempt wells in the area. This reduced capacity limits the ability of Kent Springs to respond to peak demand events during the summer. The wellfield is also subjected to significant corrosion problems, caused by the nearby Bonneville Power Administration power lines. In 2008, security fencing was added

around Wells #1, #2, and #3. Kent Springs currently has a small generator which cannot power the entire facility; a larger-capacity generator is anticipated to be installed in the near future.

O'Brien Well

The O'Brien Well was originally constructed in 1951 and re-drilled in 1999. The well is located in the 240 Zone, approximately ½ mile south of the 212th Street Treatment Plant. The O'Brien Well is an artesian well, and equipped with pumping equipment to deliver up to 243 gpm to the 240 Zone. The water produced from the well is chlorinated and fluoridated. Typically, the well is only operated during periods of peak demands to supplement the primary sources. However, the well has been experiencing water quality issues and is run only occasionally to exercise the source. No back-up power is available on site.



O'Brien Well

Seven Oaks Wells

The Seven Oaks Well was drilled in 1982 and is located near the intersection of 116th Avenue SE and SE Kent-Kangley Road. The water is treated with a chlorination and fluoridation process before it is sent into the City's distribution system. Water from the Seven Oaks Well can be pumped to either the CSTM or KSTM. Facilities at the termination points of these transmission mains provide pH adjustment. The well is capable of producing approximately 350 gpm but is run only occasionally to exercise the source.



Seven Oaks Well

Tacoma RWSS

In 1985, the City entered into an agreement wherein the City would share in the capital costs and operational and maintenance costs of what was previously referred to as the City of Tacoma's Green River Pipe Line No. 5 (also previously referred to as the Second Supply Pipeline or SSP), including portions of the water right and surface water storage behind the Howard Hansen Dam. Several other purveyors also participated in the project. The City's portion of the available capacity is 12.64 MGD, or approximately 8,778 gpm.

In 2005, the 34-mile-long pipeline began conveying water. Turbidity in the Green River has historically constrained use of the Tacoma supply to the months of June through September, resulting in the construction of the Green River filtration facility. With the completion of this facility in 2015, the Tacoma supply can now be utilized year-round. The City is required to accept a consistent flow rate from Tacoma, with a 1-week warning required to change this flow rate. Other City sources provide modulation in response to actual demands.

There are three City connections to the RWSS. The first, POD #1, is located at Kent Springs and supplies water to the KSTM. The second, POD #2, located near the intersection of 124th Avenue SE and SE 296th Street, has been left undeveloped. POD #2 currently consists of a manhole over the transmission main, which contains a tee with a blind flange. The third, POD #3, is located

near the 3.5 MG Tank, and can supply water to either the KSTM or the 590 Pressure Zone. In the future, POD #3 will provide water to the 640 Pressure Zone without the need for a booster pump station.

Water is filtered at the Green River filtration facility, chlorinated, fluoridated, adjusted for pH, and undergoes ozone treatment before it reaches the City. If RWSS water is directed to the KSTM, the water also undergoes a pH adjustment before entering the distribution system at the Guiberson Reservoir.

PUMP STATION FACILITIES

The City's water system has six booster pump station facilities that provide supply to the 354.5 Zone, 485 Zone, 529 Zone, 575 Zone, 587 Zone, and 590 Zone. A summary of the pumping facilities is shown in **Table 2-2**, and a detailed description of each facility is provided below.

Table 2-2
Booster Pump Station Facilities Summary

Pump Station	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Existing Pumping Capacity (gpm)	Number of Pumps	Pump Type	Pump Motor Size (HP)	Generator
Pump Station #3	240 Zone	354.5 Zone	1959	1,800	2	Horizontal split case	(2) 50	On-site
Pump Station #4	354.5 Zone	529 Zone	1959	3,800	3	Horizontal split case	(2) 75 (1) 150	On-site
Pump Station #5	416 Zone	485 and 590 Zones	1975	6,350	4	Horizontal split case	(2) 125, (1) 40, (1) 40/125	On-site
Pump Station #6	529 Zone	587 Zone	1984	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator
Pump Station #7	529 Zone	575 Zone	1985	500	2	Horizontal	(2) 10	On-site
Pump Station #8	Highline Water District 560 Zone	587 Zone	1986	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator

Pump Station #3

Originally constructed in 1959, and upgraded in 1979 to increase capacity, Pump Station #3 is located at the intersection of Reith Road and Lake Fenwick Road. Pump Station #3 has two 900 gpm pumps that supply water from the 240 Zone to the 354.5 Zone. Besides the emergency intertie with HWD, Pump Station #3 is the only pump station supplying water to the City's West Hill pressure zones.

Typically, only one of the two pumps are operated at a time. The pump station has an on-site engine generator set for back-up power supply. Upgrades of the automatic transfer switch and motor control center, as well as the installation of either soft starts or VFDs are planned for 2018.



Pump Station #3

Pump Station #4

Like Pump Station #3, Pump Station #4 was originally constructed in 1959. It has received upgrades in 1979, 1983, and 1997 to improve pumping capacity and reliability. Pump Station #4 has two 900 gpm pumps and one 2,000 gpm pump that supply water from the 354.5 Zone to the 529 Zone.

This station is located on the same site as the Reith Road Standpipe. If the standpipe and Pump Station #3 are taken offline for maintenance or an emergency situation, a PRV on site can supply water to the 354.5 Zone from the HWD intertie via the 529 Zone. Pump Station #4 currently has a back-up diesel engine that can directly drive the 2,000 gpm pump if electrical power is lost. The City plans to add a new engine generator set on site because it is difficult to find replacement parts for the aging diesel engine.



Pump Station #4

Pump Station #5

Located on the same site as the 6 MG #1 Reservoir and the 125K Tank, Pump Station #5 was constructed in 1975. The pump station has two 1,225 gpm pumps that supply water from the 416 Zone to the 485 Zone, and two dual-speed 1,950 gpm pumps that supply water from the 416 Zone to the 590 Zone. One of the 1,225 gpm pumps (Pump 2) is a dual speed pump that is also capable of supplying the 590 Zone. Two of these four pumps are used to supply water to the 485 Zone and the other two are used to provide water to the 590 Zone, alternating monthly which pumps are running. Back-up power is provided by an engine generator set inside the building. Control valve auma



Pump Station #5

replacements were installed in 2012. In 2015, an MCC upgrade took place, with soft starts for pumps 3 and 4. In 2016, the control vault for the 125K Tank was upgraded.

The Pump Station #5 building also contains a pH adjustment facility, which provides corrosion control for water supplied to the system through the CSTM. A PRV located inside the pump station also allows water to be supplied from the 590 Zone to the 416 Zone, and from here to the 240 Zone via the 6 MG #1 Reservoir to 6 MG #2 Reservoir Transmission Main. This provides a means for Tacoma water to be supplied to the 240 Zone and West Hill if the KSTM and CSTM are offline.

Pump Station #6

Originally constructed in 1984, Pump Station #6 is located in an underground vault near the intersection of South Reith Road and 38th Avenue South. Using three vertical turbine pumps, the booster pump station supplies water from the 529 Zone to the closed 587 Zone. One pump is typically running; the pumps alternate every 8 hours. If demands in the 587 Zone exceed approximately 1,220 gpm for 2 minutes, the pumps are automatically turned off and flow is provided by gravity through two check valves from the 529 Zone.

All of the pump motors are equipped with VFDs. Pump Station #6 is not equipped with on-site back-up power, but an emergency generator transfer switch was installed in 2011.



Pump Station #6

Pump Station #7

Pump Station #7 was built in 1985 and is located in an underground vault on the same site as the Cambridge Reservoir, just south of S 264th Street. This pump station is equipped with two pumps that supply water from the 529 Zone to the 575 Zone. Pump 1 (the station's small pump) was taken offline in 2009. If demands in the 575 Zone exceed approximately 450 gpm for 3 minutes, the pumps are automatically turned off and flow is provided by gravity through a check valve from the 529 Zone. Control modifications to include VFDs took place in 2009, and a new mag meter was installed in 2012. An on-site engine generator set was installed in 2012 to provide back-up power.



Pump Station #7

Pump Station #8

Pump Station #8 is an underground pump station that was built in 1986. It is located just east of I-5 on S 240th Street. The pump station is used in emergency situations to provide water from HWD to the 587 Zone and other West Hill zones. The pump station contains three identical 400 gpm vertical turbine pumps equipped with VFDs. The VFDs were replaced in 2008.



Pump Station #8

STORAGE FACILITIES

The City's water system has nine storage facilities that provide storage to various zones in the system. A summary of the storage facilities is shown in **Table 2-3**, and a detailed description of each facility is provided in the following sections.

Table 2-3
Storage Facilities Summary

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Base Elev. (feet)	Overflow Elev. (feet)
6 Million Gallon #2 Reservoir	Garrison Creek Park	240 Zone	1969	Reinforced concrete below grade	6	Variable	212	240
Guiberson Reservoir	E Guiberson St and Kensington Ave S	240 Zone	Late 1930s	Reinforced concrete below grade	3	Variable	222	240
Reith Road Standpipe	Reith Rd S, just north of W Fenwick Park	354.5 Zone	1959	Steel	1.0	66	315.0	354.5
6 Million Gallon #1 Reservoir	98th Ave S and S 239th Pl	416 Zone	1967	Steel	6.0	146	370.0	418.0
125K Tank	98th Ave S and S 239th Pl	485 Zone	1958	Elevated steel	0.125	32	462.0 ¹	485.0
Cambridge Tank	S 264th St and Military Rd S	529 Zone	1959	Elevated steel	0.3	53.33	499.1 ²	529.0
3.5 MG Tank	124th Ave SE and SE 286th Pl	590 Zone	1978	Steel	3.5	74	483.4	592.9
640 Tank	SE 248th St and 124th Ave SE	590 Zone (Future: 640 Zone)	2011	Steel	4.0	75	523.0	595.0 (Future: 645.0)
Blue Boy Standpipe	112th Ave SE and SE 246th Pl	590 Zone	1965	Steel	0.97	42	499.7	593.8

1 = Ground elevation 386.8 feet.

2 = Ground elevation 441 feet.

240 Zone

6 MG #2 Reservoir

The 6 MG #2 Reservoir, also referred to as the Garrison Creek Reservoir, is a 6.0 MG covered, underground reinforced concrete reservoir located in Garrison Creek Park. Sports courts are located atop its roof slab. The reservoir was constructed in 1969 and provides storage for the 240 Zone. The reservoir has a base elevation of 211.5 feet and an overflow elevation of 240 feet. The reservoir diameter is variable. The 6 MG #1 Reservoir to 6 MG #2 Reservoir Transmission Main terminates at the reservoir.



6 MG #2 Reservoir

Seismic improvements were made to the reservoir in 1999. Vent security improvements were constructed in 2008. The reservoir was last inspected and cleaned approximately 3 years ago. During that time, the overflow piping was also resealed. Hatch security improvements were constructed in 2016.

Guiberson Reservoir

The Guiberson Reservoir, constructed in the late 1930s as part of the Works Progress Administration (WPA) program, is a 3.0 MG covered, underground reinforced concrete reservoir located near the intersection of East Guiberson Street and Kensington Avenue South. The reservoir is the termination point for the KSTM and provides storage for the 240 Zone.



Guiberson Reservoir

The reservoir has a base elevation of 221.5 feet and an overflow elevation of 240 feet. A back-up generator was installed on site in 2009. A 12-inch-diameter bypass was installed in 2010, and a 10-inch flow control valve was installed in 2012.

Reservoir lining was installed in 2016, along with inlet manifold and security door improvements. The exterior metal walls were recently painted. To maintain compliance with the Lead and Copper Rule (LCR), pH adjustment of water from the KSTM occurs onsite both by aeration/spraying of the discharge to strip carbon dioxide, and by a sodium hydroxide pH adjustment process at the Guiberson Corrosion facility, which was installed in 2011.

354.5 Zone

Reith Road Standpipe

Installed in 1959, the Reith Road Standpipe is a 1.0 MG steel tank providing storage to the 354.5 Zone. The tank is located along Reith Road South, just north of West Fenwick Park. The tank has a base elevation of 315 feet, an overflow elevation of 354.5 feet, and a diameter of 66 feet.

The tank was last recoated in 1991, and received some fall protection equipment in 1997. Interior and exterior recoating, as well as additional fall protection, have been identified as future capital improvement projects. Following a seismic evaluation, repairs to the concrete ringwall and anchorage were completed in 2005. Access to the back of the tank is challenging due to close proximity to a steep slope; geotechnical consultants are evaluating the feasibility of constructing a retaining wall and road around the back of the tank to improve access.



Reith Road Standpipe

416 Zone

6 MG #1 Reservoir

The 6 MG #1 Reservoir is a 6.0 MG steel tank that was constructed in 1967 and is located on the same site as Pump Station #5 and the 125K Tank (approximately 98th Avenue South and S 239th Place). The reservoir is the termination point of the CSTM and the beginning point of the 6 MG #1 Reservoir to 6 MG #2 Reservoir Transmission Main. Water from the CSTM receives pH adjustment at Pump Station #5.

This reservoir is 146 feet in diameter, with a base elevation of 370 feet, and an overflow elevation of 418 feet. Following a seismic analysis, the reservoir received concrete ringwall and anchorage strap repairs in 2005; the exterior also was recoated at this time. The security fencing was upgraded in 2010.



6 MG #1 Reservoir

485 Zone

125K Tank

The 125K Tank is located near 98th Avenue South and S 239th Place, on the same site as the 6 MG #1 Reservoir and Pump Station #5, where it provides 125,000 gallons of storage for the 485 Zone. The 32-foot-diameter elevated steel reservoir was constructed in 1958. The ground elevation is approximately 387 feet, the base of the tank itself is 462 feet, and the overflow elevation is 485 feet. The tank received seismic repairs, a recoating, and some fall protection improvements in 1999. Additional seismic upgrades were added in 2008. A tank drain check valve was installed in 2012. While the interior is in good condition, the exterior will need to be stripped and recoated as a future capital improvement project.

**125K Tank**

529 Zone

Cambridge Tank

The elevated steel Cambridge Tank, constructed in 1959, provides approximately 300,000 gallons of storage to the 529 Zone, and provides fire flow storage to the 587 and 575 Zones, which are supplied water from the 529 Zone through check valves during fire flow conditions. The reservoir is located at approximately S 264th Street and Military Road South.

The 53.33-foot-diameter tank has a ground elevation of 441 feet, a tank base elevation of 499.1 feet, and an overflow elevation of 529 feet. Fall protection improvements were made in 1991 and 1997. Seismic improvements were completed in 2005, and tank overflow and drain improvements were completed in 2012. The tank is slated for interior/exterior recoating in the near future.

**Cambridge Tank**

590 Zone

3.5 MG Tank

The City's 3.5 MG Tank is located near the intersection of SE 286th Place and 124th Avenue SE, just north of Auburn Mountainview High School. The 74-foot-diameter steel tank, which provides storage for the 590 Zone, was constructed in 1978. The tank has a base elevation of 483.4 feet and an overflow elevation of 592.9 feet.

In 1999, the reservoir was cleaned and painted, and received fall protection modifications. A PAX mixer was installed in 2009. In 2012, a new supervisory control and data acquisition (SCADA) back-up power generator was installed. In 2016, a new drain vault flapper and control vault were installed, and flow meter was added, and fence security improvements were made.

**3.5 MG Tank**

640 Tank

The 640 Tank, completed in 2011, is the newest storage facility in the City's water system. It is located near the intersection of SE 248th Street and 124th Avenue SE. The 640 Tank is a 4.0 MG steel tank with a diameter of 75 feet, a base elevation of 523 feet, and an overflow elevation of 645 feet. The tank currently operates with a maximum level of 595 feet to provide storage for the 590 Zone, but will be used for storage in the future 640 Zone when other facilities for this zone are completed.

**640 Tank**

Blue Boy Standpipe

Constructed in 1965, the Blue Boy Standpipe is located at 112th Avenue SE and SE 236th Place and provides 0.97 MG of storage to the 590 Zone. This 42-foot-diameter reservoir has a base elevation of 499.7 feet and an overflow elevation of 593.8 feet. The last painting occurred in 1996, with an interior coating touch up in 2013. Fall protection was added in 1997. Seismic improvements, and overflow and drain line improvements were made to the reservoir in 2011. In 2012, piping and control vault improvements for the future 640 Zone were installed.

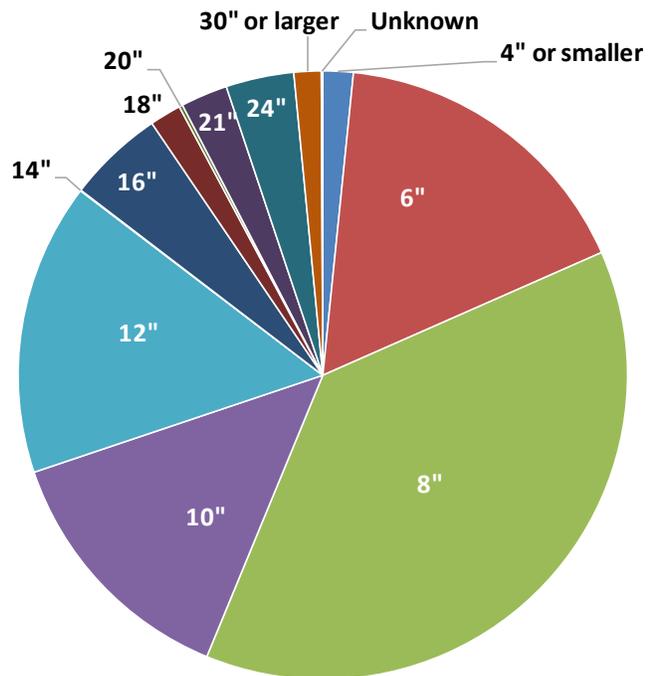
**Blue Boy Standpipe**

DISTRIBUTION AND TRANSMISSION SYSTEM

The City’s water system contains 284 miles of water main ranging from 1 inch to 36 inches in diameter. As shown in **Table 2-4**, most of the water main (approximately 85 percent) within the system is 12 inches in diameter or less. The remaining 15 percent of the water main is 14 inches in diameter or larger. The existing water main diameter is shown on the water system node diagram figures contained in **Appendix L**.

Table 2-4
Water Main Diameter Inventory

Diameter (Inches)	Length (Feet)	% of Total
4 or smaller	24,139	1.6%
6	251,772	16.8%
8	567,492	37.8%
10	204,265	13.6%
12	232,958	15.5%
14	579	0.0%
16	76,769	5.1%
18	25,118	1.7%
20	2,817	0.2%
21	37,316	2.5%
24	54,154	3.6%
30 or larger	21,626	1.4%
Unknown	1,203	0.1%
Total	1,500,208	100%

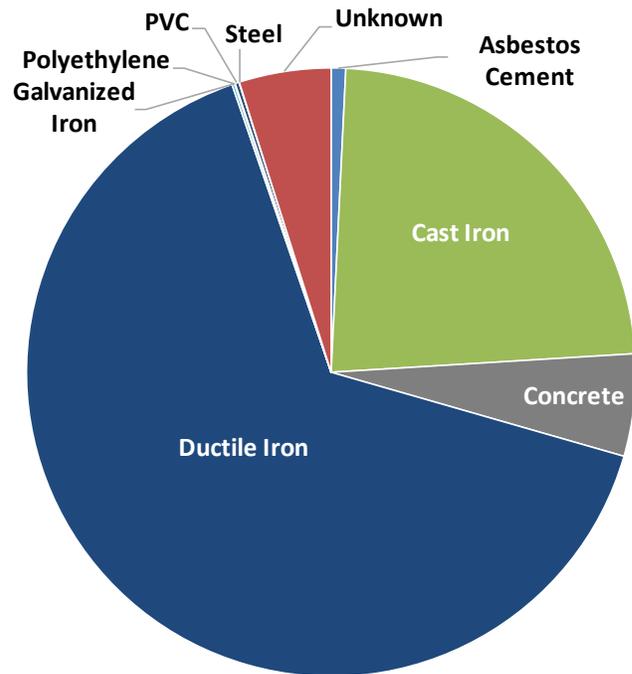


Water main in the City’s system is constructed of asbestos cement, cast iron, concrete, ductile iron, galvanized iron, polyethylene, polyvinyl chloride (PVC), and steel piping, with approximately 65 percent of the system constructed of ductile iron pipe. Approximately 5 percent of the water main in the system is constructed of unknown material. All new water main installations are required to use Class 52 ductile iron pipe in accordance with the City’s Standards for Water System Improvements. **Table 2-5** shows the City’s existing water main inventory by material.

In response to the Governor’s Directive 16-06 on lead, the City performed an assessment in 2016 to identify if any lead service lines or lead service components exist in the water system. The assessment found no lead service lines or lead service components present in the system.

Table 2-5
Water Main Material Inventory

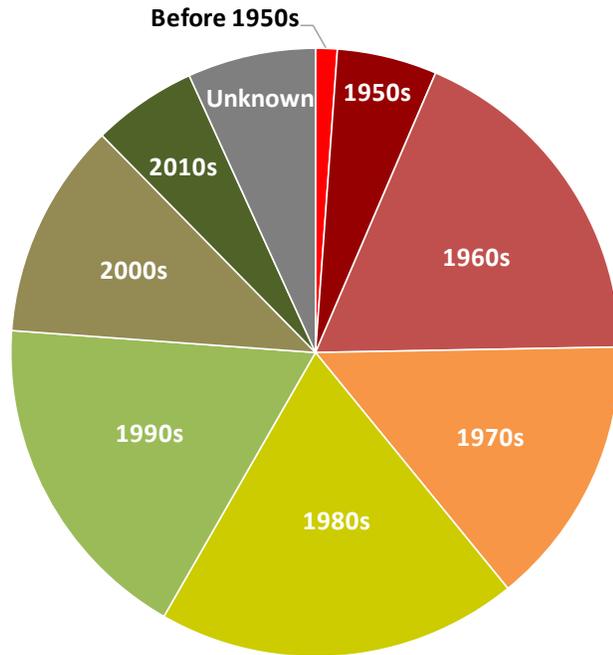
Material	Length (Feet)
Asbestos Cement	11,544
Cast Iron	348,899
Concrete	81,416
Ductile Iron	979,169
Galvanized Iron	2,041
Polyethylene	585
PVC	3,113
Steel	310
Unknown	73,131
Total	1,500,208



Per industry standard, the life expectancy of water main is generally 50 to 75 years, depending on a variety of piping, water quality, and soil conditions. Approximately 39 percent of the water main within the City’s system was constructed in the 1970s or before and is reaching or has reached its projected life expectancy. The remainder of the water main in the City’s water system (discounting water main of unknown installation year), was constructed in the 1980s or later and is generally in good condition. A detailed breakdown of the City’s water main installation inventory per year is shown in **Table 2-6**.

Table 2-6
Water Main Installation Year Inventory

Year Installed	Length (Feet)	% of Total
Before 1950s	17,225	1.1%
1950s	79,590	5.3%
1960s	273,899	18.3%
1970s	216,196	14.4%
1980s	287,572	19.2%
1990s	267,942	17.9%
2000s	172,410	11.5%
2010s	83,322	5.6%
Unknown	102,052	6.8%
Total	1,500,208	100%



Transmission Main

Clark Springs Transmission Main

Water supply from Clark Springs is delivered to the City through the CSTM, which is composed of 18-inch to 24-inch-diameter pipes. Water from the Armstrong Springs Wells and the Seven Oaks Well can also be delivered to the City through the CSTM. Much of the alignment is routed along SE Kent-Kangley Road. The CSTM is approximately 12 miles long and terminates at the 6 MG #1 Reservoir.

Kent Springs Transmission Main

The KSTM delivers water to the City from Kent Springs and RWSS POD #1 through a 24- to 36-inch supply line that is approximately 11 miles long. The KSTM and CSTM are parallel for part of their alignments. Water from the Armstrong Springs Wells and the Seven Oaks Well also can be delivered to the City through the KSTM. The KSTM terminates at the Guiberson Reservoir. The KSTM was originally constructed from wood and concrete pipe. A ductile iron replacement project was completed in 1997.

The CSTM has an 18-inch intertie with the KSTM at Kent Springs, a 12-inch intertie with the KSTM at the Armstrong Springs Wells, and 16-inch intertie with the KSTM at the intersection of 132nd Avenue SE and SE Kent-Kangley Road.

6 MG #1 Reservoir to 6 MG #2 Reservoir Transmission Main

Between the 6 MG #1 Reservoir and 6 MG #2 Reservoir there are approximately 1.7 miles of 16-inch transmission main. There are a limited number of service connections on this transmission main. The City plans to connect these customers to smaller-diameter distribution system piping as it is constructed in this area.

PRESSURE REDUCING, PRESSURE SUSTAINING, AND FLOW CONTROL 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.

Pressure reducing stations can serve multiple purposes. First, they can function as an active supply facility by maintaining a continuous supply of water into a lower zone that has no other source of supply. The pressure reducing stations that serve the 368 Weiland Zone, 366 Stetson Zone, 339 Seattle Zone, 308 Hilltop Zone, and 271 Alvord Zone are this type. Pressure reducing stations also can function as standby supply facilities that are normally inactive (no water flowing through them). The operation of this type of station is typically triggered by a decrease in water pressure on the downstream side of the station. A typical application of this function is a station that is needed to supply additional water to a lower zone during a fire flow situation only. The pressure setting of the control valve within the station allows it to remain closed during normal system operation and open only during high-demand conditions, like fire flows, to provide the additional supply needed.

Pressure sustaining stations are connections between adjacent pressure zones that allow water to flow from the higher pressure zone to the lower pressure zone, provided the pressure in the higher zone remains above a certain threshold. The City does not have any pressure sustaining stations.

Flow control stations allow water to flow from a higher pressure zone to a lower pressure zone at a regulated flow rate. The City has flow control stations at the Tacoma interties, but the valves are currently fully open.

The City's water system has a total of 18 pressure reducing stations, as shown in plan view in **Figure 2-1** and in profile view on **Figure 2-2**. A list of all pressure reducing stations and related data is contained in **Table 2-7**.

Table 2-7
Pressure Reducing Valve Station Summary

Station Name	Upper Pressure Zone	Lower Pressure Zone
218th St PRV	416 Zone	240 Zone
42nd Ave PRV	587 Zone	529 Zone
Pump Station #5 PRV	590 Zone	485 Zone
Alvord PRV	485 Zone	271 Alvord Zone
Hilltop PRV	485 Zone	308 Hilltop Zone
Seattle PRV	485 Zone	339 Seattle
Stetson PRV	485 Zone	366 Stetson Zone
Totem PRV	575 Zone	529 Zone
Weiland PRV	485 Zone	368 Weiland Zone
Woodland Way PRV	590 Zone	485 Zone
234th PRV	590 Zone	485 Zone
Park Orchard PRV	Future 640 Zone	590 Zone
Daniel PRV	Future 640 Zone	590 Zone
Millineum PRV	Future 640 Zone	590 Zone
Pump Station #4 PRV	529 Zone	354.5 Zone
RWSS POD #1 Kent Springs Tacoma Connection PRV	Tacoma RWSS	529 Zone
RWSS POD #3 KSTM Tacoma Connection PRV	Tacoma RWSS	240 Zone
RWSS POD #3 590 Tacoma Connection PRV	Tacoma RWSS	590 Zone

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 efficiently control a system 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 water system has a Headquarters telemetry control panel at the Public Works Building at 5821 South 240th Street. System facilities, including source, storage, and pumping, can be

controlled with the telemetry system. Repeaters are located on the East Hill and West Hill. Detailed, facility specific telemetry capabilities are included in **Chapter 8**.

WATER SYSTEM INTERTIES

Water system interties are physical connections between two adjacent water systems. Interties are normally 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 are typically supplying water at all times. Interties between the City and adjacent purveyors are shown on **Figure 2-4**.

Emergency Supply Interties

City of Auburn

The intertie between Auburn and the City, located near the intersection of 78th Avenue S and S 277th Street, has been active since 1991. Emergency two-way supply is provided through a 6-inch meter. The intertie capacity is 0.3 MGD and connects Auburn's 242 Pressure Zone with the City's 240 Zone. A copy of the intertie agreement is included in **Appendix B**.

City of Renton

The City's intertie with Renton, active since 1980, has a capacity of 2.6 MGD. Emergency two-way supply is provided through a 10-inch meter. The intertie is located near the intersection of S 180th Street and Lind Avenue SW. The intertie connects Renton's 196 Pressure Zone and the City's 240 Zone. A copy of the intertie agreement is included in **Appendix B**.

City of Tukwila

The City's intertie with Tukwila has been active since 1979 and provides a capacity of 3.4 MGD for emergency two-way supply and peak demands. A 10-inch meter connects Tukwila's 368 Pressure Zone with the City's 240 Zone. The intertie is located near the intersection of South Todd Boulevard and 68th Avenue South.

Highline Water District

The City's intertie with HWD has been active since 1995. The intertie is located near S 240th Street and I-5. The intertie's purpose is emergency two-way supply, fire flow, and supply during maintenance. A capacity of 1.5 MGD can be provided through an 8-inch meter. Water can be provided from HWD's 560 Pressure Zone to the City's 587 Zone via Pump Station #8. A copy of the intertie agreement and the 2018 long-term franchise agreement between the City and HWD are included in **Appendix B**. The 2018 long-term franchise agreement identifies the Retail Water Service Area (RWSA) boundary between the two systems.

Soos Creek Water and Sewer District

The City's emergency intertie with Soos Creek Water and Sewer District (SCWSD) has been active since 2001. The intertie has a capacity of 1.0 MGD, providing water from SCWSD's 627 Pressure Zone to the City's 590 Zone. The intertie is located near the intersection of

113th Avenue SE and SE 227th Place. A copy of the intertie agreement is included in **Appendix B**.

Lake Meridian Water District

Two 6-inch meters comprise the intertie with Lake Meridian Water District (LMWD), which has been active since 1962. The combined capacity of these meters is 2.0 MGD. The purpose of the intertie is emergency two-way supply, and provision of water to LMWD. The intertie connects LMWD's 590 Pressure Zone with the City's 590 Zone. The north meter is located on SE 256th Street west of 124th Avenue SE. The south meter is located near the intersection of SE 282nd Street and 124th Avenue SE.

Permanent Supply Interties

City of Tacoma

The City's permanent supply interties with Tacoma is described in the **Supply Facilities** section of this chapter.

WATER SERVICE AGREEMENTS

WATER SERVICE AREA AGREEMENT

The City's retail water service area is based on the 1989 CWSP. The current retail water service area agreement is included as **Appendix B**.

SOUTH KING COUNTY REGIONAL WATER ASSOCIATION JOINT OPERATING AGREEMENT

In January 1995, the City signed a Joint Operating Agreement (JOA) with Auburn, City of Black Diamond, CWD, and LMWD. The intent of the JOA signatories was to cooperatively provide the additional facilities needed to develop a South King County Subregional Water Supply System. The JOA is included in **Appendix B**.

SECOND SUPPLY PROJECT PARTNERSHIP AGREEMENT

In 1933, Tacoma established a priority date for its second water right diversion from the Green River. In 1963, Tacoma initiated efforts to develop what was referred to as Pipeline-5 and is now called the Second Supply Pipeline project. In 1985, the City contracted with Tacoma Public Utilities (TPU) to purchase 7.2 MGD of summer peaking water from the proposed RWSS project.

In 1995, TPU, Seattle Public Utilities (SPU) and its purveyors, and the South King County utilities of the City, CWD, LWSD, and LMWD, began nearly 5 years of discussions and negotiations regarding the framework, conditions, and costs of project participation. Significant changes to the contractual framework of the project, including the withdrawal of LMWD, occurred in the early stages of the project, and a complex and highly technical multi-party negotiation ensued.

In October, 2002, a final agreement was reached with TPU, the City, LWSD, and CWD. The agreement and all amendments are included in **Appendix B**. In the course of that final agreement, the City's share of the RWSS was increased to 12.64 MGD after SPU determined that it would no longer participate in the project. Water supply from the RWSS project became available to the City in 2007. The percent ownership of the RWSS project is detailed in **Table 2-8**.

Table 2-8
Regional RWSS Percent Ownership

Utility Partner	Percent Ownership
Tacoma Public Utilities	41.67% (15/36ths)
City of Kent	19.44% (7/36ths)
Covington Water District	19.44% (7/36ths)
Lakehaven Water and Sewer District	19.44% (7/36ths)

The RWSS source of supply is considered critical to the City's ability to meet short- and long-term demand needs. In this regard, the City has expended substantial financial resources on the RWSS project in reliance on the Ecology-approved water right and place of use documents issued to Tacoma, and the executed contracts.

In addition to the RWSS Partnership Agreement, Water Supply Agreements were signed by RWSS project participants. These Water Supply Agreements are included in **Appendix B**.

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. SSMA's 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 SSMA's 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. SSMA's 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 is responsible for providing water service to all customers in the City's water service area defined in the CWSP. Much of the area surrounding the City's service area is currently being served by large, stable water systems that are unlikely to be future satellite water systems operated by the City.

The City is not a certified SSMA and has no plans to assume such responsibility. The City does provide limited technical assistance, specifically water quality testing, to one small system in the Clark Springs watershed, the Ravensdale Mobile Home Park.

ADJACENT WATER SYSTEMS

Numerous 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 and other purveyor service areas.

Table 2-9 lists details of all purveyors shown on **Figure 2-3**.

Table 2-9
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
Cedar River Water and Sewer District	Northeast	10,026	4 interties, 1 groundwater well
City of Auburn	South	24,132	2 groundwater springs, 11 groundwater wells, 5 interties
City of Renton	North	17,400	1 groundwater spring, 13 groundwater wells, 4 intertie
City of Tukwila	North	4,036	5 interties
Covington Water District	East	18,500	12 groundwater wells, 8 interties
Highline Water District	West	27,870	5 groundwater wells, 5 interties
Lake Meridian Water District	East	5,269	7 groundwater wells, 8 interties
King County Water District 125	Northwest	6,746	5 interties
King County Water District 49	Northwest	6,902	4 interties
Lakehaven Water and Sewer District	Southwest	45,792	25 groundwater wells, 3 interties
Seattle Public Utilities	Northwest	173,833	1 intertie, 4 groundwater wells, 2 surface water source
Soos Creek Water and Sewer District	East	22,898	1 intertie

Eight major adjacent purveyors, which include Auburn, Renton, Tukwila, CWD, HWD, LWSD, SCWSD, and LMWD are described below in additional detail.

CITY OF AUBURN

Auburn's water service area is located to the south of the City. Auburn provides water to approximately 24,132 service connections. An intertie between the two water systems provides emergency two-way supply. Auburn is within the South King County Critical Water Supply Service Area, and thus is subject to the South King County CWSP.

CITY OF RENTON

Renton's water service area is located to the northeast of the City's water service area and includes a small area of the City of Kent. Renton provides water to approximately 17,400 service connections. An intertie between the two water systems provides emergency two-way supply. Renton is within the East King County Critical Water Supply Service Area, and thus is subject to the East King County CWSP.

CITY OF TUKWILA

Tukwila's water service area is located to the north of the City's water service area. Tukwila provides water to approximately 4,036 service connections. An intertie between the two cities provides water for emergency two-way supply and peak demands.

COVINGTON WATER DISTRICT

CWD is located to the east of the City's water service area, and surrounds the Kent Springs, Clark Springs, and Armstrong Springs Wells sources. While these sources and portions of the CSTM and KSTM are located in CWD's water service area, the two water service areas are not immediately adjacent. CWD provides water to approximately 18,500 service connections. CWD is a member of the Tacoma RWSS. CWD is located within the South King County Critical Water Supply Service Area; thus, it is subject to the South King County CWSP.

HIGHLINE WATER DISTRICT

HWD is located to the west of the City's water service area and provides water service to part of the Kent City limits on the West Hill. HWD provides water service to approximately 27,870 service connections and has an intertie with the City at Pump Station #8. The City executed an interlocal agreement in 2005 with HWD to adjust water service areas in the vicinity of the Kentview Development. A Long-Term Franchise Agreement was executed by the City and HWD in 2018. A copy is included in **Appendix B**. HWD is located within the South King County Critical Water Supply Service Area and is subject to the South King County CWSP.

LAKEHAVEN WATER AND SEWER DISTRICT

LWSD is located to the southwest of the City's water service area. Although boundaries are close, the City's and LWSD's water service areas are not immediately adjacent. LWSD provides water service to approximately 45,792 service connections.

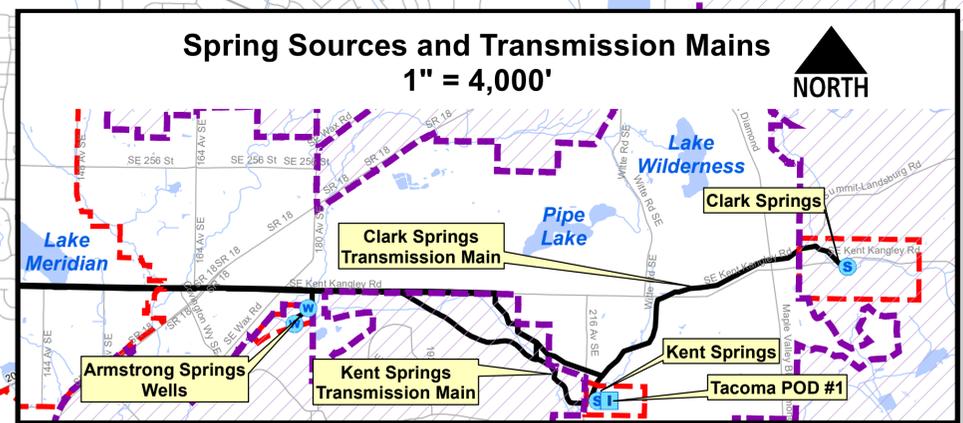
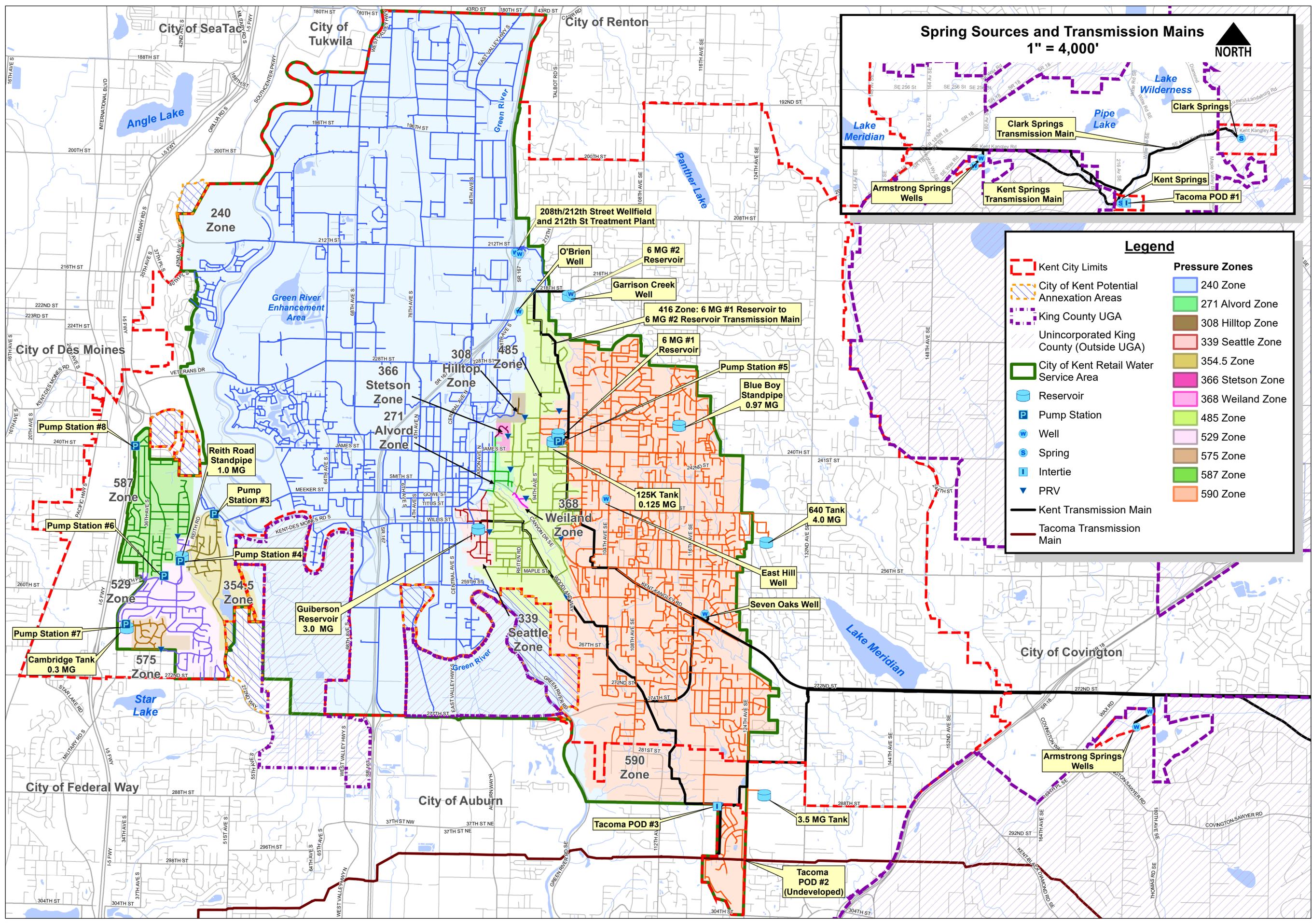
SOOS CREEK WATER AND SEWER DISTRICT

SCWSD is located to the east of the City's water service area and provides water service to a significant portion of the City, around Panther Lake. SCWSD has approximately 22,898 service connections, and an intertie with the City. SCWSD is located within the East King County Critical Water Supply Area, and thus is subject to the East King County CWSP.

LAKE MERIDIAN WATER DISTRICT

LMWD is located to the east of the City's water service area and provides water service to a significant portion of the City, around Lake Meridian. LMWD provides water service to approximately 5,269 service connections and has two interties with the City. LMWD is located within the South King County Critical Water Supply Service Area; thus, it is subject to the South King County CWSP.

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Legend

Kent City Limits	240 Zone
City of Kent Potential Annexation Areas	271 Alvor Zone
King County UGA	308 Hilltop Zone
City of Kent Retail Water Service Area	339 Seattle Zone
Reservoir	354.5 Zone
Pump Station	366 Stetson Zone
Well	485 Zone
Spring	529 Zone
Intertie	575 Zone
PRV	587 Zone
Kent Transmission Main	590 Zone
Tacoma Transmission Main	

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Figure 2-1
Existing Water System
City of Kent
2018 Water System Plan

1 inch = 2,000 feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2

J:\DATA\KEN117-100\GISMAPS\FIGURE 2-1 EXISTING SYSTEM.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4801 FEET

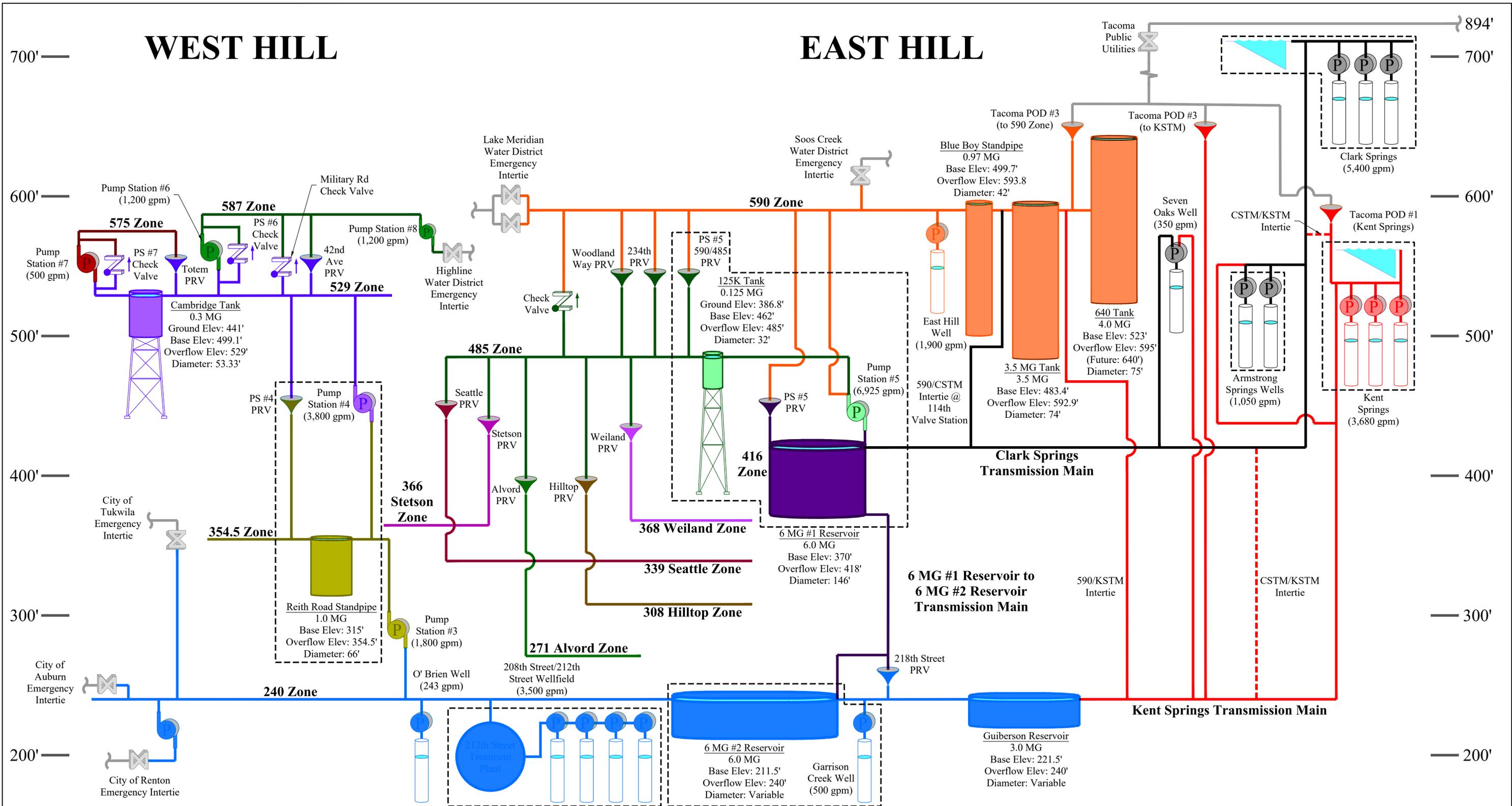


Figure 2-2: Existing System

**Hydraulic Profile for the
City of Kent
Water System Plan**

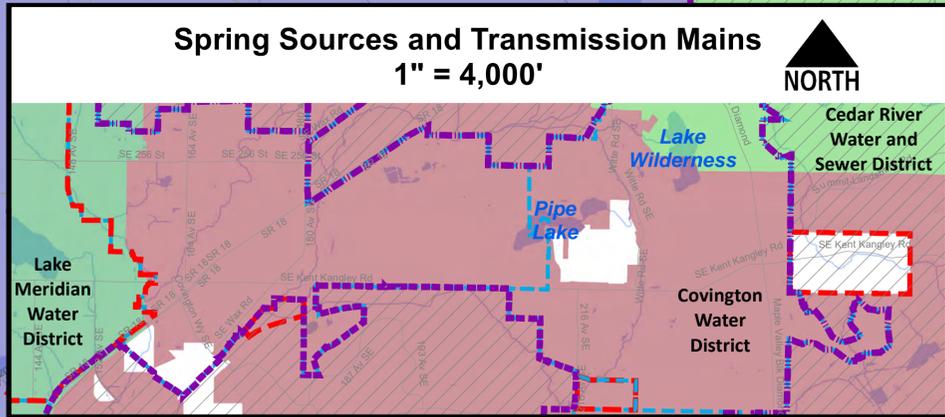
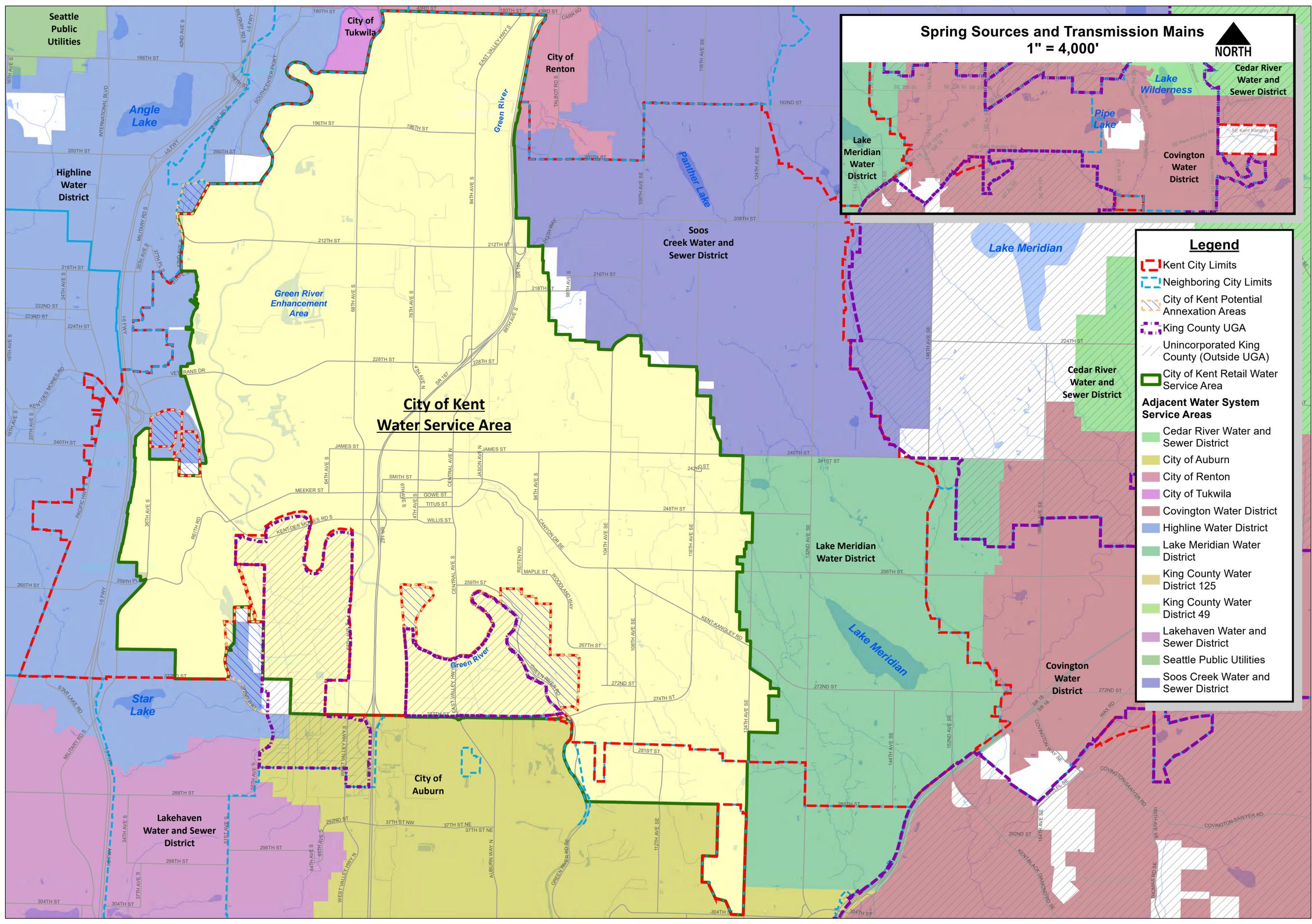
Date: September 6, 2018 Filename: KEN\117-100\CAD\KEN-HPX.DWG

Legend

240 Zone	368 Weiland Zone	590 Zone	Pressure Reducing Station
271 Alvard Zone	416 Zone	Clark Springs Transmission Main	Intertie
308 Hilltop Zone	485 Zone	Kent Springs Transmission Main	Check Valve
339 Seattle Zone	529 Zone	Booster Pump Station	Facilities at Same Site
354.5 Zone	575 Zone		
366 Stetson Zone	587 Zone		



100'



- Legend**
- Kent City Limits
 - Neighboring City Limits
 - City of Kent Potential Annexation Areas
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service Area
- Adjacent Water System Service Areas**
- Cedar River Water and Sewer District
 - City of Auburn
 - City of Renton
 - City of Tukwila
 - Covington Water District
 - Highline Water District
 - Lake Meridian Water District
 - King County Water District 125
 - King County Water District 49
 - Lakehaven Water and Sewer District
 - Seattle Public Utilities
 - Soos Creek Water and Sewer District

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Vicinity Map



Figure 2-3
Water Service Area and Adjacent Water Systems
City of Kent
2019 Water System Plan

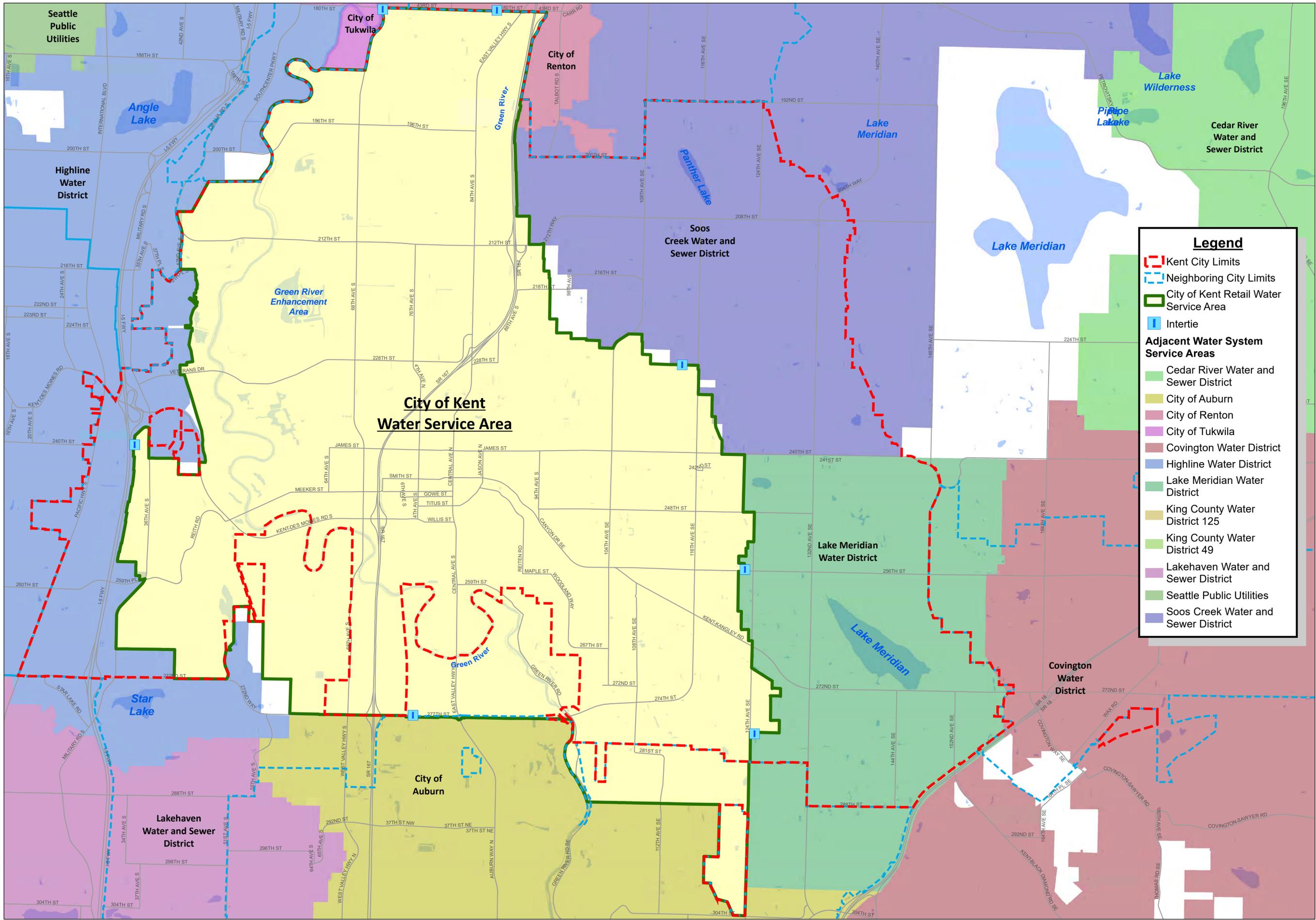


1 inch = 2,000 feet
 0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



J:\DATA\KEN117-100\GIS\MAPS\FIGURE 2-3 ADJACENT SYSTEM.MXD BY: DBRIGHT PLOT DATE: SEP 25, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET



Legend

- Kent City Limits
- Neighboring City Limits
- City of Kent Retail Water Service Area
- Intertie

Adjacent Water System Service Areas

- Cedar River Water and Sewer District
- City of Auburn
- City of Renton
- City of Tukwila
- Covington Water District
- Highline Water District
- Lake Meridian Water District
- King County Water District 125
- King County Water District 49
- Lakehaven Water and Sewer District
- Seattle Public Utilities
- Soos Creek Water and Sewer District

Vicinity Map



**Figure 2-4
Emergency Interties**

**City of Kent
2019 Water System Plan**



1 inch = 2,000 feet
 0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Z:\BOTH\DATA\KENT\17-100\GIS\MAPS\FIGURE 2-4 EMERGENCY INTERTIES.MXD BY: SPERKINS PLOT DATE: SEP 25, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEE

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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's 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
- Puget Sound Regional Council *VISION 2040 Part III: Multicounty Planning Policies*
- City of Kent *Comprehensive Plan*
- City of Kent *Midway Subarea Plan*
- City of Kent *Downtown Subarea Action Plan*
- City of Tukwila *Comprehensive Plan*
- City of Auburn *Comprehensive Plan*
- King County *Countywide Planning Policies*
- King County *Comprehensive Plan*
- South King County *Coordinated 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 King County (County) designate an Urban Growth Area (UGA) where most future urban growth and development will be directed. The county-wide 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 King County UGA boundaries in the vicinity of the City are shown on **Figure 3-1**.

Potential Annexation Areas

A Potential Annexation Area (PAA) is an area identified by King County and a City as expected to annex into that City during the 20-year planning period. The City has five PAAs, which are shown on **Figure 3-1**. Upon annexation, the City will be expected to provide services and utilities to the annexed area.

Consistency

The GMA requires planning consistency from two perspectives. First, it requires consistency of plans among 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 the implementation of the WSP be consistent with the comprehensive plans (RCW 36.70A.120).

The 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 C** from the City and King 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 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 City does not currently have any critical facilities located in a floodplain and does not plan to construct any new facilities within the floodplain in the future. The State Environmental Policy Act (SEPA) Checklist in **Appendix D** addresses other environmental concerns.

PUGET SOUND REGIONAL COUNCIL VISION 2040 PART III: MULTICOUNTY PLANNING POLICIES

The Puget Sound Regional Council (PSRC) is designated by the governor of the State of Washington as the Metropolitan Planning Organization (MPO) and Regional Transportation Planning Organization (RTPO) for the central Puget Sound region, defined as King, Kitsap, Pierce, and Snohomish counties. *VISION 2040* “is a shared strategy for moving the central Puget Sound region toward a sustainable future.” *Part III: Multicounty Planning Policies* contains six

major policy sections: Environment, Development Patterns, Housing, Economy, Transportation, and Public Services. Under each section, goals, policies, actions, and measures are identified. All of the City's functional plans are required to be consistent with the PSRC's *Multicounty Planning Policies*.

CITY OF KENT COMPREHENSIVE PLAN

The City of Kent's *Comprehensive Plan* was last updated in 2015. The plan was developed to describe the City's vision for 2035 and provide goals and policies for achieving it, 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 Land Use Plan Map (Figure LU-6), portions of which are shown in **Figure 3-1**, indicates geographically where certain types of uses may be appropriate. The Land Use Plan Map is a blueprint for development of an area, whereas the zoning map and zoning code are the regulatory means for implementing development.

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 Utilities, Transportation, and Capital Facilities Elements ensure that new development will be adequately served without compromising adopted levels of service, consistent with the principal of concurrency as defined in the GMA. The City's 2011 WSP was incorporated by reference into the Utilities Element of the *Comprehensive Plan*.

CITY OF KENT MIDWAY SUBAREA PLAN

The City of Kent's *Midway Subarea Plan* was adopted by the Kent City Council on December 13, 2011. The Midway Subarea is located along the extreme western portion of Kent and contains the commercial spine for Kent's West Hill residents. In the near future, it is anticipated that a light rail station will be constructed in this area, near Highline Community College. The *Subarea Plan* conveys a range of actions that prepares the area for high capacity light rail transit. In conjunction with the redevelopment of the area, it is anticipated that population and employment growth in the Midway Subarea will greatly exceed PSRC projections for the area.

CITY OF KENT DOWNTOWN SUBAREA ACTION PLAN

The City of Kent's *Downtown Subarea Action Plan* was adopted by the Kent City Council on November 19, 2013. The *Subarea Action Plan* recognizes that suburbanization has shifted economic activity away from Downtown and seeks to support proactive planning and public improvements to maintain Downtown's vitality. Goals, policies, and actions are conveyed in the *Subarea Action Plan* as a means for Downtown to pursue a dense, mixed-use urban center that complements transit.

CITY OF TUKWILA COMPREHENSIVE PLAN

The City of Tukwila's (Tukwila) *Comprehensive Plan* was last amended in 2015 and presents the goals for Tukwila's growth and development in the next 20 years. Tukwila's *Comprehensive Plan* considers zoning and development of major land use types, including residential neighborhoods, the Tukwila International Boulevard District, Tukwila South, Tukwila's urban center, and the manufacturing/industrial center. Tukwila's Comprehensive Land Use Map shows current and future land use designations for these land use types. The City's water system does not serve any customers within Tukwila's city limits.

Tukwila's *Comprehensive Plan* also provides guidance for economic development, housing, natural environments, shorelines, parks, recreation, and open space, utilities, transportation, and capital facilities.

CITY OF AUBURN COMPREHENSIVE PLAN

The City of Auburn's (Auburn) *Comprehensive Plan* was last adopted in December 2015, with land use comprising the first Element of the plan. The Land Use Element describes existing land uses, provides criteria for assigning land use types, and outlines policies for each use of land. The Land Use Element should be used in conjunction with Auburn's Comprehensive Plan Land Use Map (Map 1.1) to geographically understand zoning and land use activities allowed in certain areas. Auburn's land uses inside the southeast portion of the City's water service area are shown in **Figure 3-1**.

In addition to the Land Use Element, Auburn's *Comprehensive Plan* also contains six other Elements, including housing, capital facilities, utilities, transportation, economic development, and parks and recreation. These Elements are planned together to ensure Auburn will be adequately supported in future growth scenarios.

KING COUNTY COUNTYWIDE PLANNING POLICIES

The County's 2012 *Countywide Planning Policies* are a series of policies that address growth management issues in King County. The current version of the policies includes amendments ratified by June 25, 2016. For consistency with the PSRC *VISION 2040*, the *Countywide Planning Policies* are also organized into the policy sections of Environment, Development Patterns, Housing, Economy, Transportation, and Public Facilities and Services. Page 47 of the *Countywide Planning Policies* identifies specific policies related to water supply. All of the City's functional plans are required to be consistent with the County's *Countywide Planning Policies*.

KING COUNTY COMPREHENSIVE PLAN

The current version of the King County *Comprehensive Plan* was adopted in 2016, and last amended in 2018. Chapters include the following.

- Regional Growth Management Planning
- Urban Communities
- Rural Areas and Natural Resource Lands

- Housing and Human Services
- Environment
- Shorelines
- Parks, Open Space, and Cultural Resources
- Transportation
- Services, Facilities, and Utilities
- Economic Development
- Community Service Area Subarea Planning
- Implementation, Amendments, and Evaluation

The County's plan is focused on six guiding principles, as follows.

1. Creating Sustainable Neighborhoods
2. Preserving and Maintaining Open Space and Natural Resource Lands
3. Directing Development Towards Existing Communities
4. Providing a Variety of Transportation Choices
5. Addressing Health, Equity and Social and Environmental Justice
6. Achieving Environmental Sustainability

The County's *Comprehensive Plan* guides development and designates land use in unincorporated King County. County land use inside the City's future water service area is shown in **Figure 3-1**; the *Comprehensive Plan* can be referenced for County land use outside the future water service area.

SOUTH KING COUNTY COORDINATED WATER SYSTEM PLAN

The South King County *Coordinated Water System Plan* (CWSP), originally dated October 1989, was developed under direction from the County's Water Utility Coordinating Committee (WUCC), the County, and Seattle Water Department. The members of the WUCC represent the collective efforts of all public water systems with more than 50 service connections that provide service within the Critical Water Supply Service Area (CWSSA). The King County Council declared South King County a CWSSA on December 15, 1985.

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 the satellite system management program. As can be seen 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.

LAND USE

The existing retail water service area includes portions of the City, Auburn, Tukwila, and unincorporated King County, for a total of 23.7 square miles. The water service area's land use

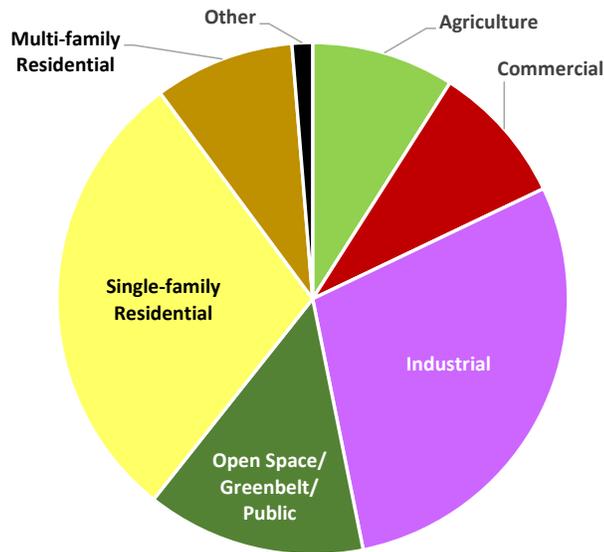
map, as shown in **Figure 3-1**, guides development and can be used to forecast future demands. Land use outside the City is designated by adjacent cities or the County, as shown in **Figure 3-1**.

Approximately 29.2 percent of the area within the current Water Service Area is designated for single-family residential use, as indicated in **Table 3-1**. Approximately 28.9 percent is designated for industrial use; approximately 13.9 percent is designated for open space/greenbelt/public use; approximately 9.0 percent is designated for agriculture; approximately 8.9 percent is designated for commercial use; approximately 8.9 percent is designated for multi-family residential use; and approximately 1.3 percent is other or undesignated use.

Table 3-1
Land Use Inside Water Service Area

Land Use Type	Acres	% of Total
Agriculture	1,368	9.0%
Commercial ¹	1,348	8.9%
Industrial ²	4,380	28.9%
Open Space/Greenbelt/Public ³	2,100	13.9%
Single-family Residential ⁴	4,418	29.2%
Multi-family Residential	1,344	8.9%
Other	196	1.3%
Total	15,154	100%

1 = Includes Mixed-use, Neighborhood Services, Transit Oriented Community, and Urban Center land use types.
 2 = Includes Tukwila Valley South land use type.
 3 = Includes Auburn Public Use District land use type.
 4 = Includes Mobile Home Park and King County Urban Residential Medium land use types.



POPULATION

HOUSEHOLD TRENDS

The City’s residential areas are comprised largely of single-family residences. In 2015, the City’s *Comprehensive Plan* estimated that there were approximately 44,932 housing units in the City. Of these, approximately 21,298 housing units (47.4 percent) were detached one-unit structures, approximately 21,792 housing units (48.5 percent) were one-unit attached or located in multi-unit structures, while approximately 1,842 housing units (4.1 percent) were mobile homes or other types. The City’s 2015 *Comprehensive Plan* update indicates an average household size of 2.9 persons.

EXISTING AND FUTURE CITY POPULATION

The City has experienced rapid population growth and extensive physical development since 2000. The population of the County increased by approximately 24 percent from 2000 to 2017, based on Washington State Office of Financial Management (OFM) estimates. The population of the City increased by approximately 60 percent during the same period. A significant portion of the City population increase is due to the 2010 annexation of the Panther Lake area into the City, which added approximately 25,458 residents. **Table 3-2** illustrates the historical population growth since 2000, with years 1990 and 1995 for reference.

Table 3-2
Population Trends within the City Limits

Year	Population
1990	37,960
1995	47,124
2000	79,524
2005	86,967
2010	92,411
2011	118,200
2012	119,100
2013	120,500
2014	121,400
2015	122,900
2016	124,500
2017	127,100

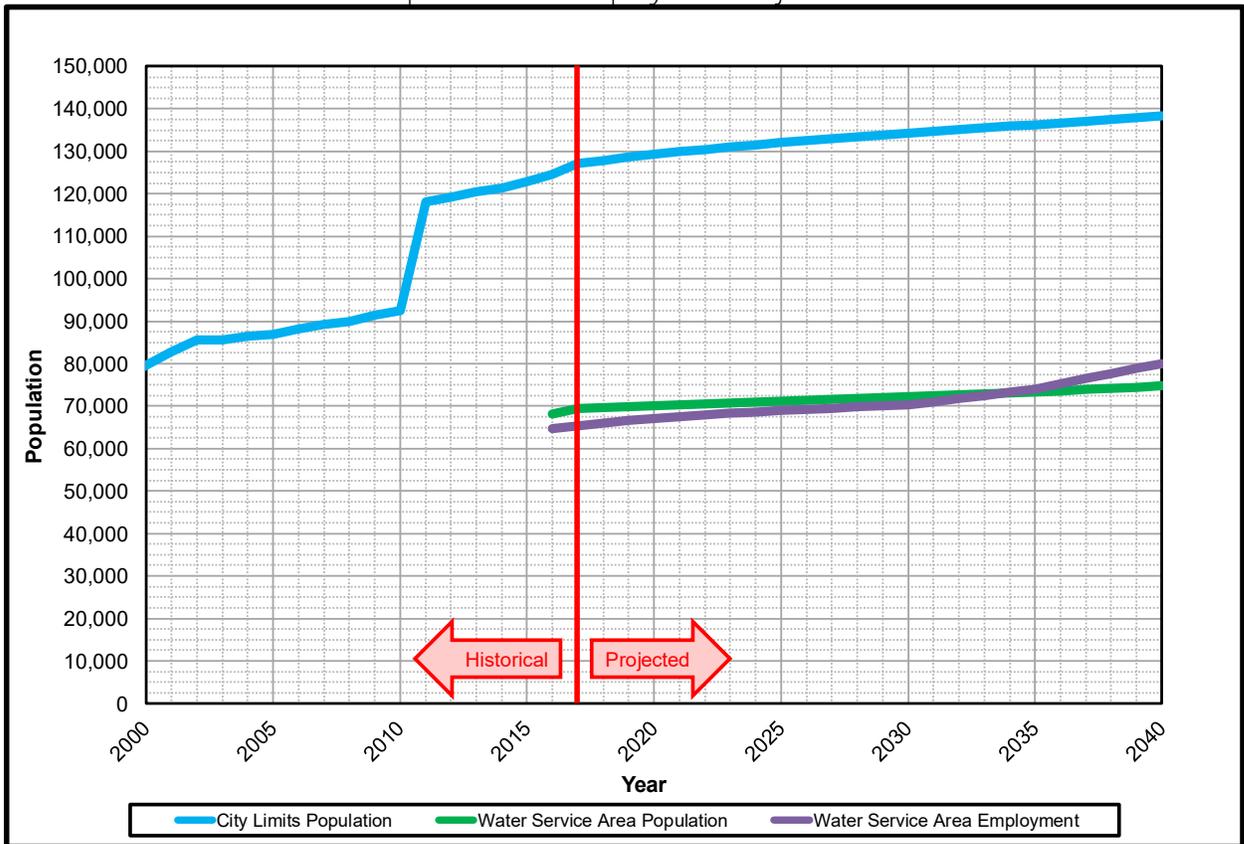
NOTE: The historical population represents the population within the City limits. The sources of the historical population numbers are the decennial census and OFM intercensal estimates.

Projected future growth for the City is shown in **Table 3-3**. Projections are based on Puget Sound Regional Council (PSRC) estimates for years 2020, 2025, 2030, 2035, and 2040. Projections from the *Midway Subarea Plan* were considered as part of the population projections, and were determined to be approximately equivalent to the population projections based on the PSRC projections within the City's retail water service area. Projected population for intermediate years was calculated by assuming a uniform population growth rate between data points. The total City population is expected to experience an average annual growth rate of approximately 0.4 percent between 2017 and 2038 (the planning horizon of the WSP). Population projections for the City are displayed in **Chart 3-1**.

Table 3-3
Water System Population and Employment Projections

Year	City Population	Water System Population	Water System Employment
Existing			
2016	124,500	68,157	64,755
2017	127,100	69,465	65,356
Projected			
2018	127,857	69,653	65,956
2019	128,615	69,841	66,557
2020	129,372	70,029	67,157
2021	129,923	70,259	67,530
2022	130,474	70,490	67,904
2023	131,024	70,721	68,279
2024	131,575	70,952	68,655
2025	132,126	71,183	69,031
2026	132,554	71,403	69,281
2027	132,982	71,622	69,529
2028 (+ 10 years)	133,411	71,842	69,777
2029	133,839	72,061	70,025
2030	134,267	72,281	70,274
2031	134,673	72,487	71,022
2032	135,078	72,693	71,770
2033	135,484	72,899	72,517
2034	135,889	73,105	73,265
2035	136,295	73,312	74,013
2036	136,727	73,596	75,227
2037	137,158	73,881	76,440
2038 (+ 20 years)	137,590	74,166	77,653

Chart 3-1
Population and Employment 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 currently serves part of the City limits, as well as small areas of Auburn, Tukwila, and unincorporated King County. There are areas within the City limits that are served by other water systems.

The existing population served by the water system, with the exception of areas of unincorporated King County, was calculated using OFM census block estimates from the Small Area Estimate Program for 2016 and 2017. Some census blocks were partially inside and partially outside the water service area boundary. To account for this, the percentage by area of these census blocks that were inside the water service area was calculated, and the total population of the census block was multiplied by this percentage. Population estimates for areas of unincorporated King County served by the water system were provided by King County. The estimated existing population served by the water system in 2016 is 68,157 and the estimated existing population served by the water system in 2017 is 69,465, as shown in **Table 3-3**.

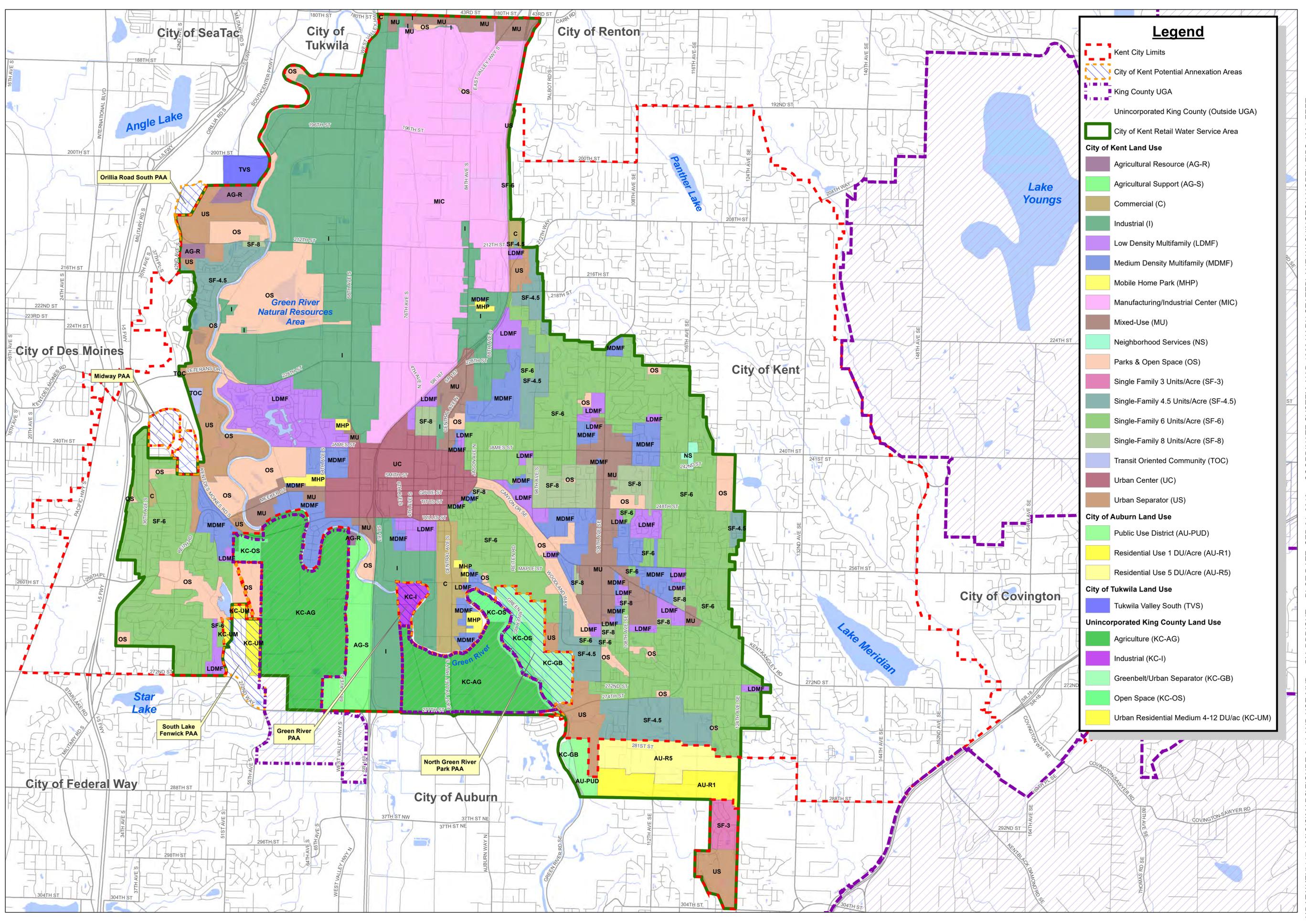
The projected future population of the water system, with the exception of areas of unincorporated King County, was calculated using Traffic Analysis Zone (TAZ) data from PSRC. As in the census block data used to calculate the existing water system population, the population of TAZs that were split by the water service area boundary were adjusted based on

the area of the TAZ within the water service area. Population projections from the *Midway Subarea Plan* were not utilized. The *Subarea Plan* identifies the potential for increased growth in the Midway Subarea above PSRC estimates. However, only approximately 3 percent of the Midway Subarea overlaps the retail water service area, so the impact of this potential increased growth on the water system population projections is expected to be minor. The City does not expect the retail water service area to increase during the 20-year planning period to contain a larger portion of the Midway Subarea.

To project the water system population forward, the estimated 2017 water system population from **Table 3-3** was utilized as a basis. PSRC TAZ population projections for 2020, 2025, 2030, 2035, and 2040 were utilized, and projected population for intermediate years was calculated by assuming a uniform population growth rate between data points. Population estimates provided by King County were used for the areas of the water system located in unincorporated King County. For the purposes of estimating demands, the population projections for the water system are presented in **Table 3-3**. The system is expected to provide service to approximately 74,166 people by 2038. Water system population projections are also shown in **Chart 3-1**.

WATER SYSTEM EMPLOYMENT

Because non-residential water use is a significant portion of the City's total water use, the total employment for the water system was calculated for use in demand projections. The existing and future number of employees working in the water service area, with the exception of areas of unincorporated King County, were calculated using census tract data available from PSRC. As in the calculations of water system population, the employment of census tracts that were split by the water service area boundary were adjusted based on the area of the census tract within the water service area. PSRC employment projections for 2015, 2020, 2025, 2030, 2035, and 2040 were utilized, and projected population for intermediate years was calculated by assuming a uniform employment growth rate between data points. Employment estimates for areas of unincorporated King County served by the water system were provided by King County. Employment projections from the *Midway Subarea Plan* were not utilized. Because only a small portion of the Midway Subarea overlaps the City's retail water service area and no expansion of the retail water service area in the Midway Subarea is anticipated during the 20-year planning period, the impact of this potential increased growth on the water system's total employment projections is expected to be minor. For the purposes of estimating demands, the employment projections for the water system are presented in **Table 3-3**. Employment projections are also shown in **Chart 3-1**.



Legend

- Kent City Limits
- City of Kent Potential Annexation Areas
- King County UGA
- Unincorporated King County (Outside UGA)
- City of Kent Retail Water Service Area

City of Kent Land Use

- Agricultural Resource (AG-R)
- Agricultural Support (AG-S)
- Commercial (C)
- Industrial (I)
- Low Density Multifamily (LDMF)
- Medium Density Multifamily (MDMF)
- Mobile Home Park (MHP)
- Manufacturing/Industrial Center (MIC)
- Mixed-Use (MU)
- Neighborhood Services (NS)
- Parks & Open Space (OS)
- Single Family 3 Units/Acre (SF-3)
- Single-Family 4.5 Units/Acre (SF-4.5)
- Single-Family 6 Units/Acre (SF-6)
- Single-Family 8 Units/Acre (SF-8)
- Transit Oriented Community (TOC)
- Urban Center (UC)
- Urban Separator (US)

City of Auburn Land Use

- Public Use District (AU-PUD)
- Residential Use 1 DU/Acre (AU-R1)
- Residential Use 5 DU/Acre (AU-R5)

City of Tukwila Land Use

- Tukwila Valley South (TVS)

Unincorporated King County Land Use

- Agriculture (KC-AG)
- Industrial (KC-I)
- Greenbelt/Urban Separator (KC-GB)
- Open Space (KC-OS)
- Urban Residential Medium 4-12 DU/ac (KC-UM)

This map is a graphic representation derived from the City of Kent Geographic Information System. It was designed and intended for City of Kent 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

Figure 3-1 Land Use City of Kent 2018 Water System Plan

1 inch = 2,000 feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

J:\DATA\KEN117-100\GIS\MAPS\FIGURE 3-1 LAND USE.MXD BY: DBRIGHT PLOT DATE: SEP 24, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4801 FEET

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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 Kent (City) must identify that water is available prior to issuing a building permit. If the property requesting water service is outside of the City limits, a "No Protest of Annexation and Declaration of Covenant" may be required by the City, as identified in the City's Instructions and Checklist for Certificate of Water Availability. 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.

CURRENT POPULATION AND SERVICE CONNECTIONS

WATER USE CLASSIFICATIONS

The City has divided all water customers into ten different classes for billing purposes. For planning purposes, the water customers have been combined into five different groups: 1) single-family residential; 2) multi-family residential; 3) commercial; 4) industrial; and 5) public. The public group includes City of Kent facilities, government, and schools billing classes. The demand analysis that follows will report on the water use patterns of these five user groups.

RESIDENTIAL AND EMPLOYMENT POPULATION SERVED

The residential population within the City limits was 124,500 in 2016, based on estimates from the Washington State Office of Financial Management (OFM). Since the City does not provide water service to all customers within the City limits, the actual population served by the City's water system is smaller. The 2016 residential population served by the City within the water service area is estimated to be approximately 68,157 in 2016, and 69,465 in 2017, as presented in **Chapter 3**.

Because non-residential water use is a significant portion of the City's total water use, the total employment for the water system was calculated to project the future water system demands. The existing and future number of employees working in the water service area were calculated using census tract data available from the Puget Sound Regional Council (PSRC) and data provided by King County. The 2016 employment population served by the City within the water service area is estimated to be approximately 64,755 in 2016, and 65,356 in 2017. The computation of the population served is discussed in **Chapter 3**, along with a more detailed discussion of the City's population and household trends.

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, average annual consumption, and average daily consumption per connection of each customer class for the City from 2011 through 2016. As shown in **Table 4-1**, the City provided water service to an average of 14,907 connections in 2016. Approximately 10,981 connections (74 percent) were single-family residential customers, 1,682 connections (11 percent) were multi-family residential customers, 1,883 connections (13 percent) were commercial customers, 98 connections (less than 1 percent) were industrial customers, and 263 connections (2 percent) were public customers.

Table 4-1
Average Annual Metered Consumption and Service Connections

Year	Customer Class					Totals
	Single-family Residential	Multi-family Residential	Commercial	Industrial	Public	
Average Number of Connections						
2011	10,339	1,674	1,846	97	252	14,207
2012	10,498	1,674	1,849	97	253	14,371
2013	10,631	1,678	1,859	98	253	14,518
2014	10,775	1,681	1,868	98	256	14,678
2015	10,872	1,681	1,874	98	259	14,783
2016	10,981	1,682	1,883	98	263	14,907
Average Annual Consumption (gallons)						
2011	591,332,522	774,421,604	705,851,696	183,370,704	95,741,008	2,350,717,534
2012	598,972,295	813,131,352	708,109,160	149,259,660	92,413,904	2,361,886,371
2013	599,690,973	806,081,452	724,312,336	148,935,776	95,972,888	2,374,993,425
2014	624,470,792	818,546,124	771,937,047	163,497,092	102,842,520	2,481,293,575
2015	642,706,284	838,680,040	809,905,976	168,551,328	115,714,852	2,575,558,480
2016	631,193,966	842,255,480	840,994,352	163,321,312	100,454,904	2,578,220,014
Average Daily Consumption Per Connection (gal/day/conn)						
2011	157	1,268	1,048	5,179	1,043	453
2012	156	1,327	1,047	4,204	1,000	449
2013	155	1,316	1,068	4,178	1,038	448
2014	159	1,334	1,129	4,571	1,102	463
2015	162	1,367	1,184	4,712	1,226	477
2016	157	1,368	1,220	4,557	1,043	474
Average	157	1,330	1,116	4,567	1,075	461

As shown in **Chart 4-1**, the single-family residential class represents approximately 74 percent of all connections, but only 24 percent of total system consumption, as shown in **Chart 4-2**. This is due to the lower consumption per connection of single-family residential customers as compared to other customer types. As shown in **Table 4-1**, single-family residential customers use an average of approximately 157 gallons per day (gpd) per connection, compared to multi-family customers that use an average of approximately 1,330 gpd per connection. Multiple units are typically served by one multi-family residential connection, resulting in additional consumption per connection compared to single-family residential connections. Multi-family residential consumption per connection is similar to the consumption of commercial and public customers that use an average of approximately 1,116 and 1,075 gpd per connection, respectively. Industrial customers use significantly more water with an average of approximately 4,567 gpd per connection. The higher consumption rate per connection of commercial, public, and industrial customers compared to single-family residential customers is expected since these customers include the system's highest individual water users.

Chart 4-1
2016 Water Connections by Customer Class

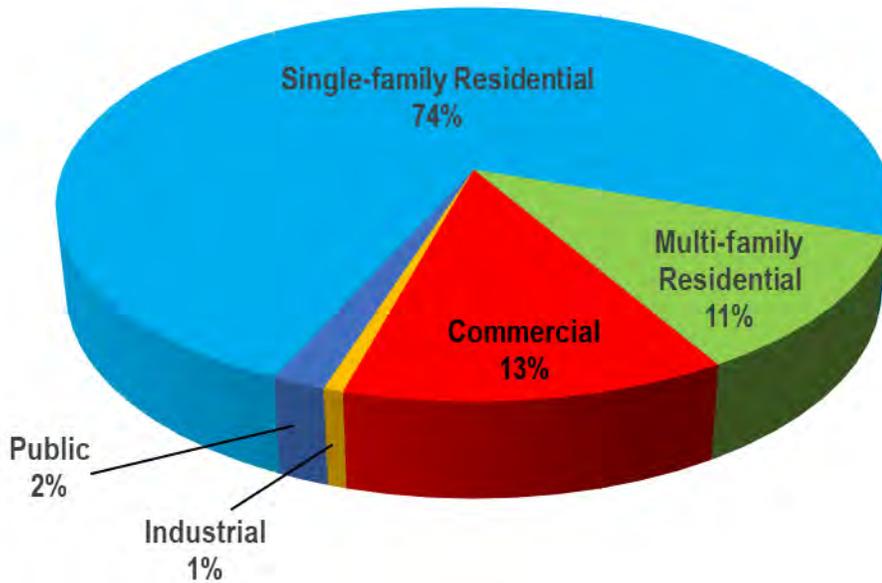


Chart 4-2
2016 Water Consumption by Customer Class

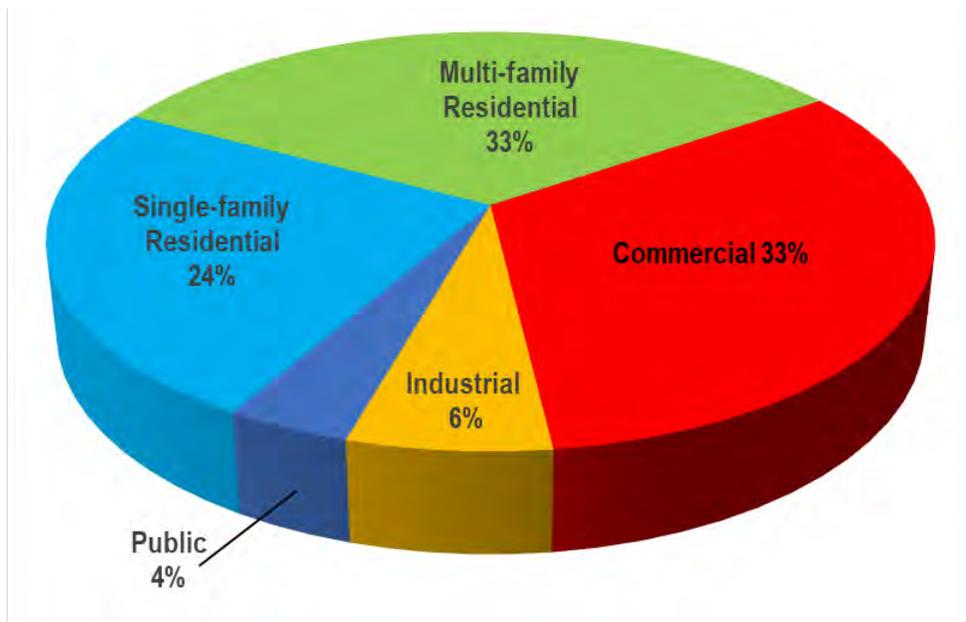


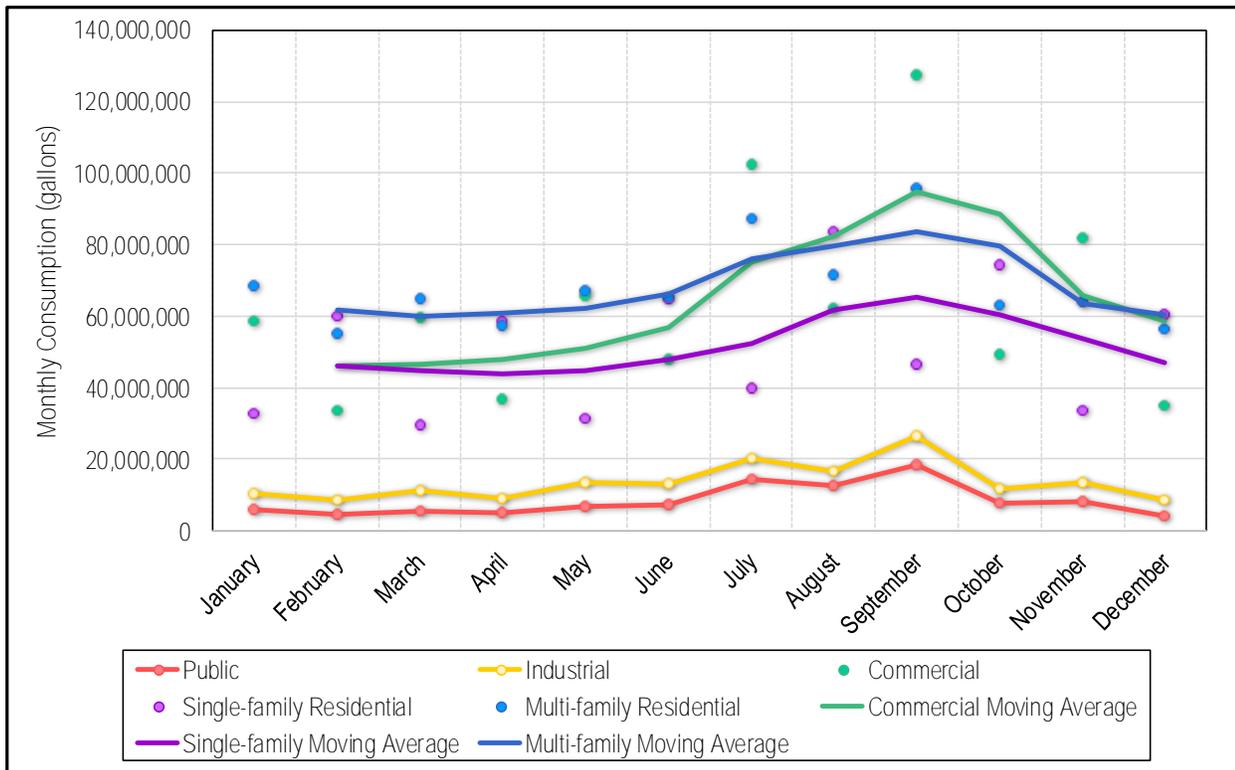
Table 4-2 shows the largest 20 water users of the system in 2016, and their total amount of metered consumption for the year. The total water consumption of these 20 water accounts represented approximately 14.2 percent of the system’s total metered consumption in 2016. The list of customer accounts in **Table 4-2** consists of water users from all customer classes except the single-family residential class, with the majority of the largest users considered commercial customers.

Table 4-2
Largest Water Users

Name	Address	Total Annual Consumption (gallons)
Danone Waters of North America	21608 85th Ave. S	52,190,700
Kings Command Foods, LLC	7622 S 188th St.	29,917,512
Air Gas	8008 S 222nd St.	26,700,149
Con Agra Foods	6320 S 190th St.	24,458,243
Aramark Uniform Services	7810 S 228th St.	23,679,523
King County Administration Building	401 4th Ave. N	22,599,339
Rexam Beverage Can Company	1220 2nd Ave. N	21,581,243
Mikron Industries	1136 6th Ave. N	20,869,099
Kent 228	8010 S 228th St.	16,743,603
Alsco	6906 S 204th St.	15,037,301
Northwest Center	22247 76th Ave. S	13,696,796
Oberto Sausage Company	7060 S 238th St.	12,315,895
Danone Waters of North America	21608 85th Ave. S	12,134,867
Boeing Defense and Space Group	20403 68th Ave. S	12,101,205
Smith Brothers Farms	26401 79th Ave S.	11,293,311
Northwest Center	22247 76th Ave. S	10,661,209
HYTEK Finishes Co.	8127 S 216th St.	10,401,635
Oberto Snacks, Inc.	7060 S 238th St.	10,211,631
Flow International	23316 64th Ave. S	9,900,442
Hume Investments, Inc.	25246 106th Ave. SE	9,863,787
Largest Water Users Total Consumption		366,357,488
Water System Total Metered Consumption		2,578,220,014
Large Water Users Percent of Total Metered Consumption		14.2%

Residential demand varies throughout the year, typically peaking in the hot summer months. Other customers often peak at different times or have different peaking factors because their uses and consumption patterns differ. The demand for all customers in the City generally peaks in the summer, as shown in **Chart 4-3**. Residential and commercial consumption have the largest peaks in the summer, as shown in **Chart 4-3**. Industrial and public consumption has less pronounced peaks, but also typically peaks in the summer, as shown in **Chart 4-3**. The City reads public and industrial meters monthly, and most residential and commercial meters every two months as shown in **Chart 4-3**. A two-period moving average trendline is shown for the customer classes that are read every two months to approximate the actual 2016 monthly consumption data. The consumption data are also shown as data points in **Chart 4-3**.

Chart 4-3
2016 Monthly Consumption by Customer Class



WATER SUPPLY

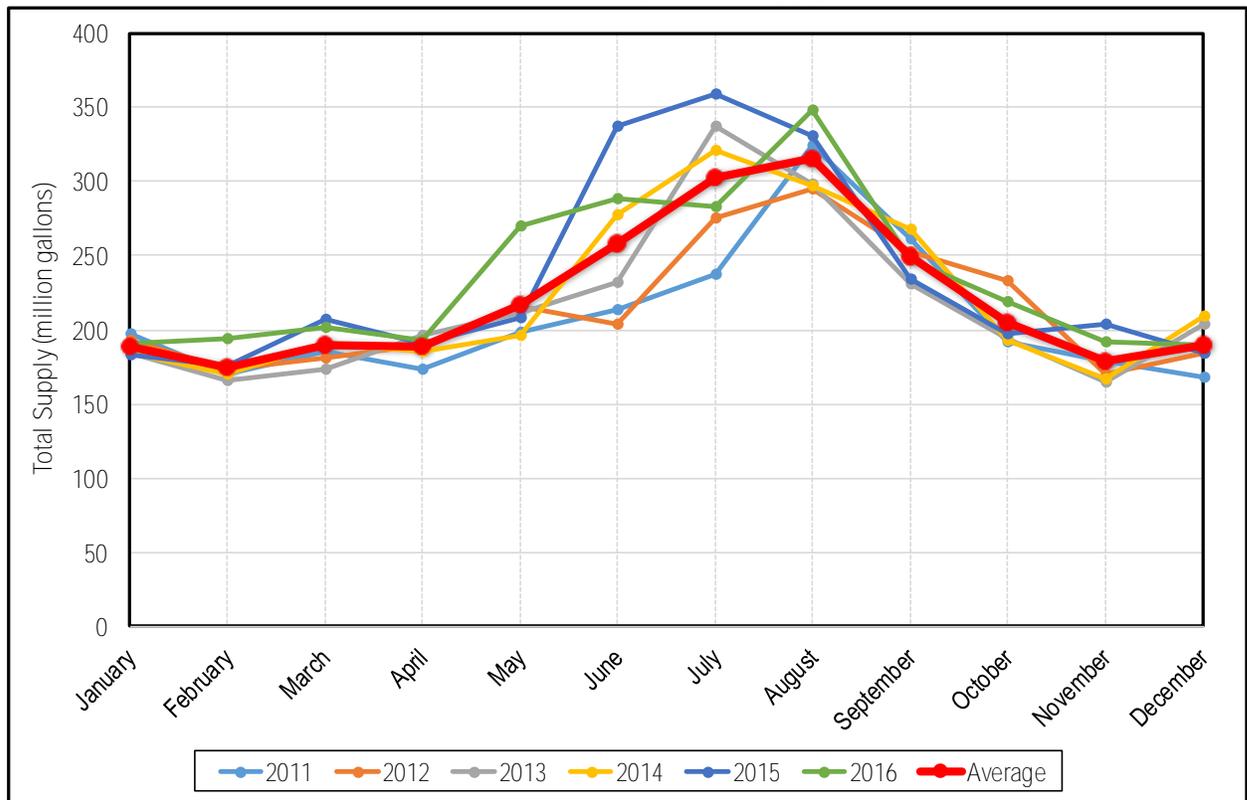
Water supply, or production, is the total amount of water supplied to the system, as measured by the meters at source of supply facilities. Water supply is different than water consumption in that water supply is the recorded amount of water put into the system and water consumption is the recorded amount 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 2011 through 2016.

Table 4-3
Historical Water Supply

Year	Annual Supply (gallons)
2011	2,498,178,000
2012	2,566,823,000
2013	2,593,245,000
2014	2,659,170,000
2015	2,811,692,000
2016	2,818,790,000

Like most other water systems, the City’s water use varies seasonally. **Chart 4-4** shows the historical amount of water supplied to the City’s system for each month from 2011 to 2016.

Chart 4-4
Historical Monthly Water Supply



As shown in **Chart 4-4**, water supply increases significantly during summer months, primarily due to irrigation. The City’s highest water use typically occurs in July and August. On average, the amount of water supplied during these 2 months is approximately 23 percent of the total supply for the entire year.

Chart 4-5 shows the monthly water supply by source for 2016. In 2016, the majority of water was supplied from the Clark Springs and Kent Springs, with smaller volumes coming from the East Hill Well, and the City of Tacoma’s Second Supply Pipeline (SSP) Connection

#1 (240 Zone) and SSP Connection #3 (590 Zone) sources. **Table 4-4** and **Chart 4-6** show the annual water supply by source from 2011 to 2016. In 2016, the City’s two primary sources, Clark Springs and Kent Springs, supplied 68 percent of the total supply to the system. The relative volume supplied from each of the City’s sources has been similar since 2011, but the volume of water consumed within the City has steadily inclined from 2011 to 2016. This is most likely the result of the 700 new service connections added to the system and the increased usage of water per connection of both commercial and multi-family residential customer classes. **Table 4-4** also presents the system-wide average day demand for 2011 through 2016.

Chart 4-5
2016 Monthly Water Supply by Source

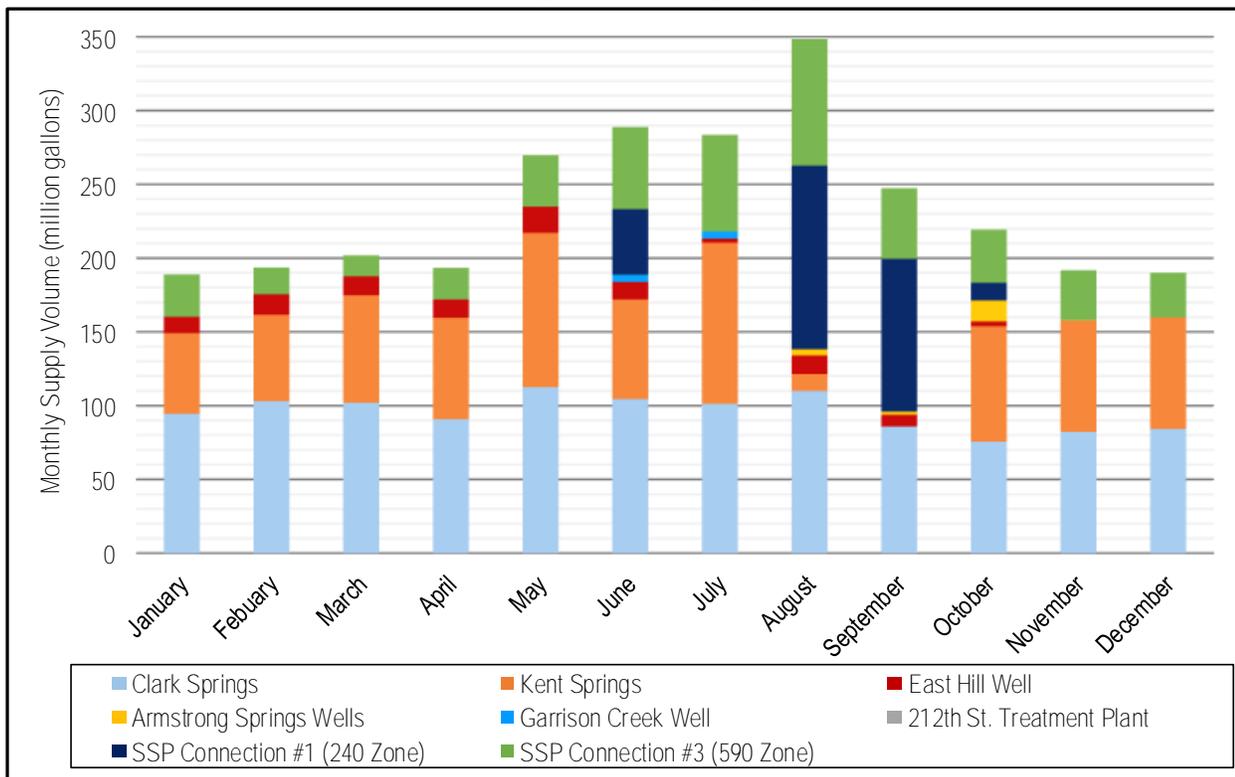


Table 4-4
Historical Supply by Source and System-wide Average Daily Demand

Annual Supply Volume (MG)													Average Day Demand (gpm)
Year	Clark Springs	Kent Springs	East Hill Well	Armstrong Springs Wells	Seven Oaks Well	Garrison Creek Well	212th St. Treatment Plant	SSP Conn. #1 (240 Zone)	SSP Conn. #3 (240 Zone)	SSP Conn. #3 (590 Zone)	Interties	Net Supply	
2011	1,375.9	743.8	125.5	79.8	0.0	6.4	0.0	0.0	0.0	166.4	0.3	2,498.2	4,753
2012	1,340.8	728.8	228.8	39.0	0.0	0.0	0.0	11.3	0.0	217.8	0.3	2,566.8	4,870
2013	1,297.8	751.5	183.3	88.8	0.0	0.1	0.0	0.0	0.0	271.7	0.2	2,593.2	4,934
2014	1,347.3	822.8	176.2	82.5	0.0	8.1	0.0	16.1	0.0	205.8	0.4	2,659.2	5,059
2015	1,188.3	809.7	158.7	97.5	1.7	17.5	98.7	82.3	0.0	357.2	0.0	2,811.7	5,349
2016	1,146.2	776.8	106.4	21.1	0.0	9.7	0.0	284.2	1.4	472.5	0.5	2,818.8	5,348

Chart 4-6
Annual Water Supply by Source

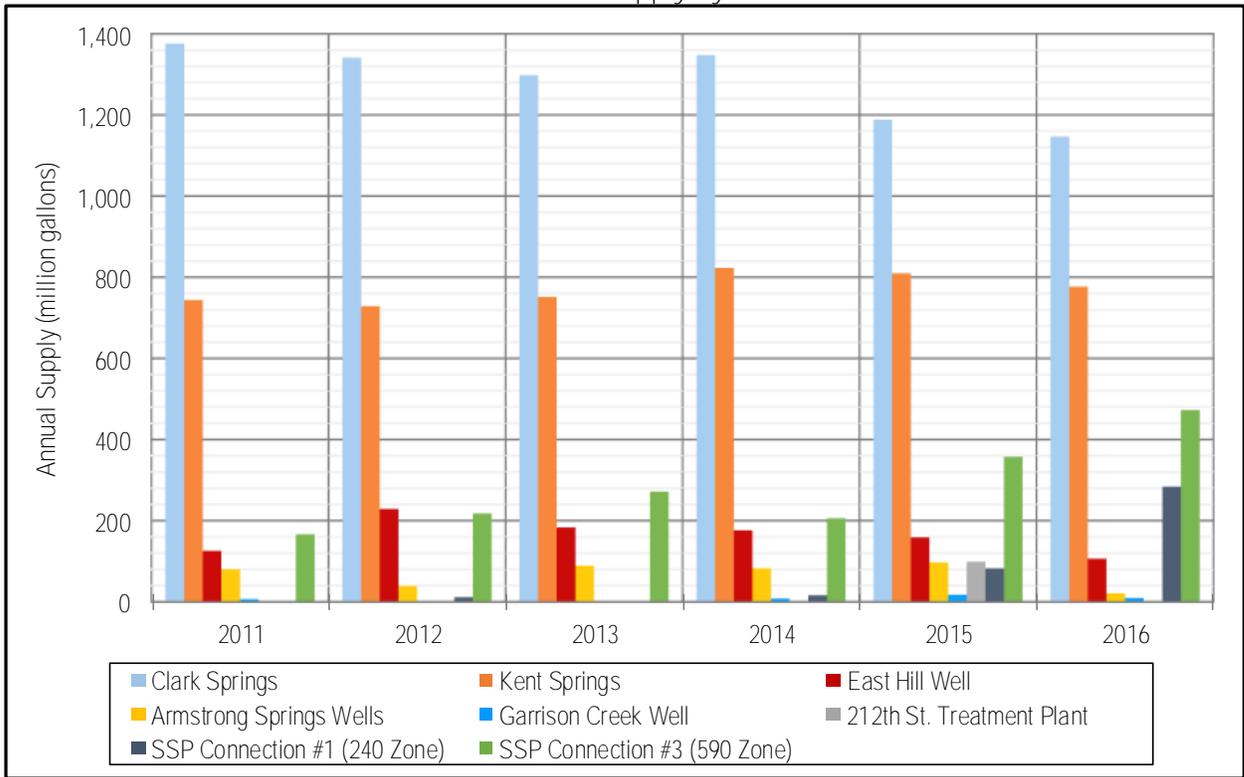


Table 4-5 shows the 2016 demand of each of the City’s 13 existing pressure zones. The demands are based on the City’s 2016 individual customer meter data. The City’s two largest pressure zones, the 240 and 590 Zones, account for approximately 89 percent of the total system demand. **Figure 2-1** in **Chapter 2** presents the City’s pressure zones.

Table 4-5
2016 Demands by Pressure Zone

Pressure Zone	2016 Annual Supply (gallons)	Average Daily Demand (gpm)	Percent of Total Demand
240	1,618,150,124	3,070	57.4%
271 Alvord	6,166,085	12	0.2%
308 Hilltop	215,708	0	0.0%
339 Seattle	5,887,243	11	0.2%
354.5	23,848,860	45	0.8%
366 Stetson	1,283,724	2	0.0%
368 Weiland	1,694,095	3	0.1%
416	0	0	0.0%
485	97,852,402	186	3.5%
529	77,623,224	147	2.8%
575	14,531,337	28	0.5%
587	72,225,269	137	2.6%
590	899,311,928	1,706	31.9%
Total	2,818,790,000	5,348	100.0%

Table 4-6 presents the computation of the existing system per capita demand based on 2016 data. As shown in the upper portion of the table, the residential population served by the City's water system in 2016 was approximately 68,157. This population served and the City's total residential water consumption in 2016 (total combined consumption of the single- and multi-family residential customer classes) were used to calculate the existing residential per capita demand of 65 gpd. The lower portion of the table presents the employment population served by the City's water system in 2016, which was approximately 64,755. This population served and the City's total employment water consumption in 2016 (total combined consumption of the commercial, industrial, and public customer classes) were used to calculate the existing employment per capita demand of 51 gpd.

Table 4-6
Existing Per Capita Demand

2016 Residential Population Served	
Calculated 2016 Residential Population Served	68,157
2016 Total Annual Residential Supply (gallons)	
2016 Total Annual Residential Supply (gallons)	1,610,934,886
Existing Residential Per Capita Supply (gal/day/capita)	65
2016 Employment Population Served	
Calculated 2016 Employment Population Served	64,755
2016 Total Annual Employment Supply (gallons)	
2016 Total Annual Employment Supply (gallons)	1,207,855,114
Existing Employment Per Capita Supply (gal/day/capita)	51

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 City has tracked water usage from flushing main lines and dead-ends since 2011, and many other authorized usage volumes. The amount of DSL in the City's system has been under 10 percent since 2011, as shown in **Table 4-7**. The City will continue to record authorized water usage and improve the reporting of additional authorized water uses. The City will also implement the WUE Program contained in **Appendix E**.

Table 4-7
Distribution System Leakage

Description	Year					
	2011	2012	2013	2014	2015	2016
Authorized Consumption (MG)						
Metered Customer Use	2,350.7	2,361.9	2,375.0	2,481.3	2,575.6	2,578.2
Public Works Hydrant Meters	31.7	31.7	31.1	62.6	50.7	43.1
Unidirectional & Dead End Flushing	1.8	1.7	3.0	2.0	1.8	1.7
Storm and Sewer Vector Meters	0.8	0.9	1.8	1.5	1.5	1.2
Routine Maintenance	4.9	5.6	1.9	5.7	1.4	1.5
Other Operations	10.3	5.8	15.4	7.8	7.3	13.3
KSTM Leak	11.0	26.3	11.0	11.0	11.0	11.8
Total Authorized Consumption	2,411.2	2,433.9	2,439.2	2,571.9	2,649.3	2,650.8
Total Supply (MG)						
Gross Supply (Finished Water)	2,498.2	2,566.8	2,593.2	2,659.2	2,811.7	2,818.8
Distribution System Leakage (MG)						
Total DSL Volume	87.0	132.9	154.1	87.3	162.4	168.0
Total DSL Percentage	3.5%	5.2%	5.9%	3.3%	5.8%	6.0%
Rolling 3-Year Average DSL Percentage	---	---	4.9%	4.8%	5.0%	5.0%
Adjusted DSL Percentage ¹	5.9%	8.0%	8.4%	6.7%	8.4%	8.5%

(1) The adjusted DSL percentage is based on the difference between metered consumption and net supply. The calculation does not include the DSL reduction associated with other authorized non-metered consumption.

The annual DSL percentages are applied to the consumption by water use classification as reported in **Table 4-1** to determine the net supply per water use classification. Supply per water use classification for 2011 through 2016 is summarized in **Table 4-8**. The net supply per water use classification is used in the equivalent residential unit (ERU) calculations to determine the number of ERUs for each customer class.

Table 4-8
Average Annual Supply by Customer Class

Year	DSL	Annual Supply (gallons)					Total Demand (i.e. Net Supply)
		Single-family Residential	Multi-family Residential	Commercial	Industrial	Public	
2011	5.9%	628,426,800	823,001,056	750,129,759	194,873,545	101,746,840	2,498,178,000
2012	8.0%	650,944,043	883,685,296	769,550,517	162,210,652	100,432,492	2,566,823,000
2013	8.4%	654,799,968	880,156,834	790,873,492	162,622,327	104,792,379	2,593,245,000
2014	6.7%	669,237,213	877,225,218	827,274,877	175,217,704	110,214,989	2,659,170,000
2015	8.4%	701,631,173	915,572,284	884,160,143	184,004,527	126,323,874	2,811,692,000
2016	8.5%	690,089,763	920,845,123	919,466,321	178,560,588	109,828,206	2,818,790,000

EXISTING EQUIVALENT RESIDENTIAL UNITS

The demand of each customer class can be expressed in terms of ERUs for demand forecasting and planning purposes. One ERU is equivalent to the amount of water used by a single-family residence. The number of ERUs represented by the demand of the other customer classes is determined from the total demand of the customer class and the unit demand per ERU from the single-family residential demand data.

Tables 4-9A and 4-9B present the computed number of ERUs for each customer class from 2011 through 2016. The demands shown are based on the consumption totals of each customer class and the authorized non-revenue water consumption shown in **Table 4-8**. The average demand per ERU from 2011 through 2016 (6-year average) was 171 gpd, which is slightly less than the average single-family residential demand in the Puget Sound area, which is typically between 200 and 300 gpd.

Table 4-9A
Equivalent Residential Units

Year	Average Number of Connections	Average Annual Demand (gallons)	Demand per ERU (gal/day/ERU)	Total ERUs
Single-family Residential (ERU Basis)				
2011	10,339	628,426,800	167	10,339
2012	10,498	650,944,043	169	10,498
2013	10,631	654,799,968	169	10,631
2014	10,775	669,237,213	170	10,775
2015	10,872	701,631,173	177	10,872
2016	10,981	690,089,763	172	10,981
Multi-family Residential				
2011	1,674	823,001,056	167	13,540
2012	1,674	883,685,296	169	14,251
2013	1,678	880,156,834	169	14,289
2014	1,681	877,225,218	170	14,124
2015	1,681	915,572,284	177	14,187
2016	1,682	920,845,123	172	14,653
Commercial				
2011	1,846	750,129,759	167	12,341
2012	1,849	769,550,517	169	12,411
2013	1,859	790,873,492	169	12,840
2014	1,868	827,274,877	170	13,320
2015	1,874	884,160,143	177	13,700
2016	1,883	919,466,321	172	14,631

Table 4-9B
Equivalent Residential Units

Year	Average Number of Connections	Average Annual Demand (gallons)	Demand per ERU (gal/day/ERU)	Total ERUs
Industrial				
2011	97	194,873,545	167	3,206
2012	97	162,210,652	169	2,616
2013	98	162,622,327	169	2,640
2014	98	175,217,704	170	2,821
2015	98	184,004,527	177	2,851
2016	98	178,560,588	172	2,841
Public				
2011	252	101,746,840	167	1,674
2012	253	100,432,492	169	1,620
2013	253	104,792,379	169	1,701
2014	256	110,214,989	170	1,775
2015	259	126,323,874	177	1,957
2016	263	109,828,206	172	1,748
System-wide Totals				
2011	14,207	2,498,178,000	167	41,099
2012	14,371	2,566,823,000	169	41,396
2013	14,518	2,593,245,000	169	42,102
2014	14,678	2,659,170,000	170	42,815
2015	14,783	2,811,692,000	177	43,567
2016	14,907	2,818,790,000	172	44,854
Average 2011 to 2016			171	

The average demand per ERU from 2011 through 2016 of 171 gpd will be used later in this chapter to forecast ERUs in future years based on estimated future demands. This demand per ERU value will also be used to determine the capacity (in terms of ERUs) of the existing system in **Chapter 7**.

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. ADD data are typically used to determine standby storage requirements for water systems. Standby storage is the volume of a reservoir used to provide water supply under emergency conditions when supply facilities are out of service. Water production records from the City's wells and spring

sources were reviewed to determine the system's ADD. The system's average day demand from 2011 through 2016 is shown in **Table 4-4**.

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 (i.e., peak day demand) conditions. Supply facilities (e.g., wells, springs, pump stations, interties) are typically designed to supply water at a rate that is equal to or greater than the system's MDD.

One-hour interval water production and reservoir level records from 2016 were reviewed to determine the system's MDD. The City's MDD occurred on Wednesday, August 17, 2016, when temperatures reached approximately 80 degrees Fahrenheit (°F). As shown in **Table 4-10**, the average demand of the system on August 17, 2016, or MDD, was 11,629 gallons per minute (gpm).

Table 4-10
Maximum Day Demands and Peaking Factors

Peak Demand Data		
Demand Type	Date	Demand (gpm)
Average Day Demand (ADD)	2016	5,348
Maximum Day Demand (MDD)	August 17, 2016	11,629
Peak Hour Demand (PHD)	August 17, 2016 9:00 PM - 10:00 PM	16,995
Peaking Factors		
Maximum Day Demand/Average Day Demand (MDD/ADD)		2.17
Peak Hour Demand/Maximum Day Demand (PHD/MDD)		1.46
Peak Hour Demand/Average Day Demand (PHD/ADD)		3.18

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, 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 are typically based on PHD data.

The PHD, like the MDD, is typically determined from the combined flow of water into the system from all supply sources and reservoirs. One-hour interval water production and reservoir level records were reviewed to evaluate the PHD. As shown in **Table 4-10**, the City's PHD, which occurred on August 17, 2016, from 9:00 p.m. to 10:00 p.m., was 16,995 gpm.

Table 4-10 also shows the peaking factors of the water system based on the ADD, MDD, and PHD data. The 2017 ADD was not available at the time of these analyses; therefore, the estimated 2016 ADD was used to estimate the peaking factors of the system. The MDD/ADD demand ratio of 2.17 is within the typical range of 1.2 to 2.5 for most Puget Sound area systems. The PHD/MDD ratio of 1.46 is within the typical range of 1.3 to 2.0 for most Puget Sound area systems. These peaking factors will be used later in this chapter in conjunction with projected ADDs, to project future MDDs and PHDs of the system.

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 high rate 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 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 is shown in **Table 4-11**. The water system analyses presented in **Chapter 7** are based on an evaluation of the water system for providing sufficient fire flow in accordance with these general planning-level fire flow requirements. The fire flow requirements shown in **Table 4-11** 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 systems provided. Improvements to increase the available fire flow to meet actual fire flow requirements greater than those shown in **Table 4-11** shall be the responsibility of the developer.

Table 4-11
General Planning-level Fire Flow Requirements

Land Use Category	Planning-level	
	Fire Flow Requirement (gpm)	Flow Duration (hours)
Agriculture	1,000	1
Open Space/Greenbelt/Public	1,000	1
Single-Family Residential	1,500	1
Multi-Family Residential	1,500	1
Commercial ¹	3,500	3
Industrial ²	3,250	4

1 = Includes Mixed-Use, Neighborhood Services, and Urban Center land use types.

2 = Includes King County Industrial and Manufacturing/Industrial Center land use types.

FUTURE WATER DEMANDS

BASIS FOR PROJECTING DEMANDS

Future demands were calculated from the results of the future per capita demand computations shown in **Table 4-6** 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 E**.

The calculated future per capita demand of 65 gpd was used for all residential demand projections without savings from WUE measures, and the calculated future per capita demand of 51 gpd was used for all employment demand projections without savings from WUE measures. The per capita demand was reduced to reflect the WUE goals and used as the basis for future water demand projections with implementation of the WUE Program. The City's WUE Program presents goals to reduce the multi-family residential consumption by 1 percent annually and reduce the public agency consumption by 0.5 percent in June through August on an annual basis. The City also has a continued goal to maintain DSL at 6 percent or less each year.

DEMAND FORECASTS AND CONSERVATION

Table 4-12 presents the projected water demand forecast for the City's water system. The actual demand data from 2016 is also shown for comparison purposes. The future ADDs were projected based on residential and employment population estimates for the given years and the estimated demand per capita values from **Table 4-6**. The future MDDs and PHDs shown were computed from the projected ADDs and the existing system peaking factors shown in **Table 4-10**. The future demand projections are also shown with and without estimated reductions in water use from achieving WUE goals.

Table 4-12
Future Water Demand Projections

Description	Actual		Projected												
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028 (+10 yrs)	2038 (+20 yrs)	2068 (+50 yrs)
Water Service Area Population Data															
Residential Population	68,157	69,465	69,653	69,841	70,029	70,259	70,490	70,721	70,952	71,183	71,403	71,622	71,842	74,166	82,705
Employment Population	64,755	65,356	65,956	66,557	67,157	67,530	67,904	68,279	68,655	69,031	69,281	69,529	69,777	77,653	114,053
Demand Basis Data (gal/day/capita)															
Residential ADD without WUE	65	65	65	65	65	65	65	65	65	65	65	65	65	65	65
Employment ADD without WUE	51	51	51	51	51	51	51	51	51	51	51	51	51	51	51
Average Day Demand (gpm)															
Demand without WUE	5,348	5,428	5,458	5,488	5,517	5,541	5,564	5,588	5,612	5,635	5,654	5,673	5,691	6,074	7,745
Demand with WUE		5,410	5,422	5,433	5,445	5,450	5,456	5,461	5,467	5,472	5,473	5,473	5,474	5,849	7,493
Maximum Day Demand (gpm)															
Demand without WUE	11,629	11,803	11,867	11,932	11,997	12,048	12,099	12,150	12,202	12,253	12,294	12,334	12,375	13,208	16,841
Demand with WUE		11,764	11,789	11,814	11,839	11,851	11,863	11,875	11,886	11,898	11,899	11,900	11,901	12,718	16,292
Peak Hour Demand (gpm)															
Demand without WUE	16,995	17,249	17,343	17,438	17,532	17,607	17,681	17,757	17,832	17,907	17,966	18,026	18,085	19,302	24,612
Demand with WUE		17,191	17,228	17,265	17,302	17,319	17,336	17,354	17,371	17,388	17,390	17,391	17,393	18,586	23,810

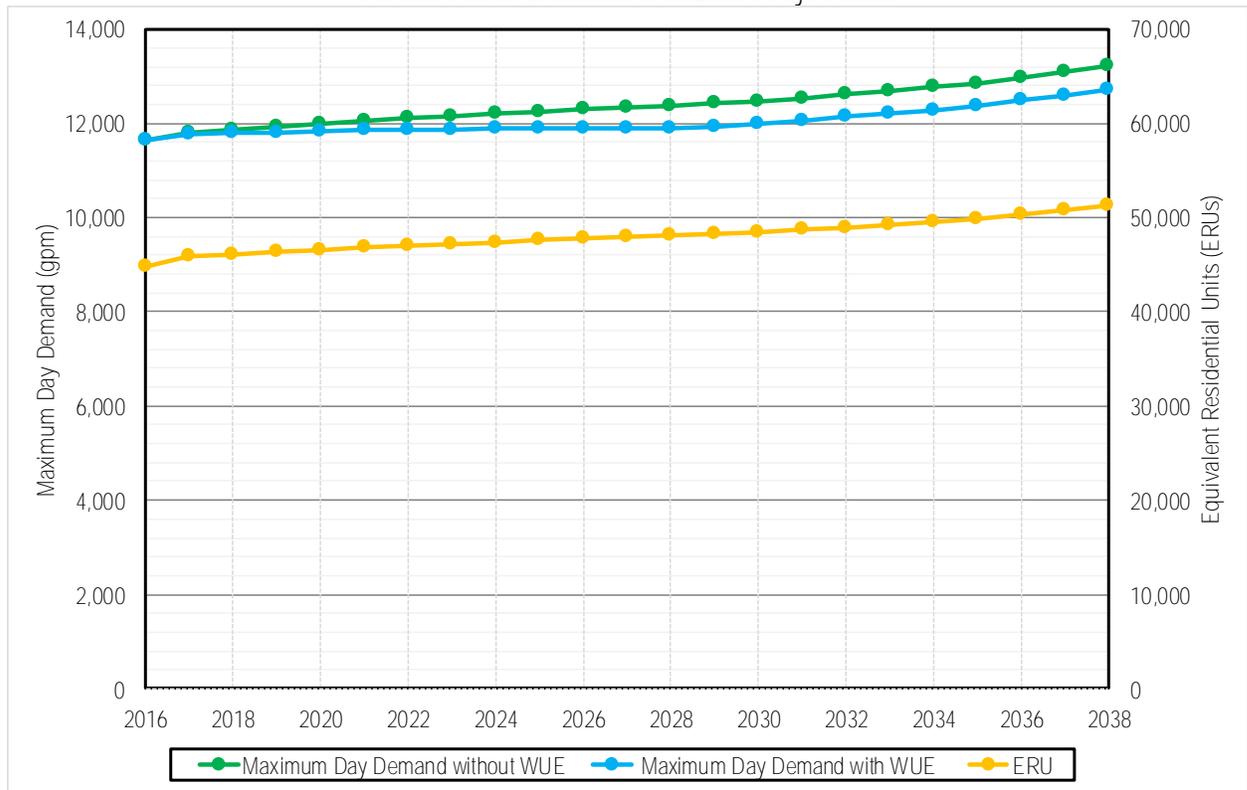
The analysis and evaluation of the existing water system with proposed improvements, as presented in **Chapters 7 and 9**, is based on the 2038 projected demand data without WUE reductions. This ensures that the future system will be sized properly to meet all requirements, whether or not additional water use reductions are achieved. However, the City will continue to pursue reductions in water use by implementing the WUE Program contained in **Appendix E**.

Table 4-13 presents the existing and projected ERUs of the system. The ERU forecasts are based on the projected water demands from **Table 4-12** and the 6-year rolling average demand per ERU that was computed from actual 2011 through 2016 data. The projected water demand and ERU data from **Tables 4-12 and 4-13** are also shown graphically in **Chart 4-7**. **Chart 4-7** will be used in **Chapter 7** to compare demand projections with source of supply availability.

Table 4-13
Future ERU Projections

Description	Actual			Projected												
	2016	2017	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2038	2068	
													(+10 yrs)	(+20 yrs)	(+50 yrs)	
Demand Data (gpm)																
ADD without WUE	5,348	5,428	5,458	5,488	5,517	5,541	5,564	5,588	5,612	5,635	5,654	5,673	5,691	6,074	7,745	
ADD with WUE		5,410	5,422	5,433	5,445	5,450	5,456	5,461	5,467	5,472	5,473	5,473	5,474	5,849	7,493	
ERU Basis Data (gal/day/ERU)																
Demand per ERU without WUE	172	171	171	171	171	171	171	171	171	171	171	171	171	171	171	
Demand per ERU with WUE		171	171	171	171	171	171	171	171	171	171	171	171	171	171	
Equivalent Residential Units (ERUs)																
Total System ERUs	44,854	45,828	46,079	46,330	46,580	46,779	46,978	47,177	47,377	47,577	47,735	47,892	48,049	51,283	65,392	

Chart 4-7
Future Water Demand and ERU Projections



CLIMATE CHANGE IMPACTS

The City understands that projections of precipitation patterns due to long-term trends in climate conditions indicate potential impacts to the availability and reliability of drinking water supplies the ability to meet future demands. RH2 has performed a literature review to document climate change projections and estimate their impact on the City’s source vulnerability and future demand projections.

CLIMATE CHANGE PROJECTIONS

In 2013, the University of Washington’s Climate Impact Group released a report titled *Climate Change Impacts and Adaptation in Washington State*. This report is cited by the Washington State Department of Health (DOH) as a source for their own projections of climate change impacts on drinking water in Washington State.

In summary, this report projects the following major quantitative climatic changes in Washington State pertinent to water system planning.

- The average annual surface air temperature is estimated to increase between 4.3°F and 5.8°F by the end of 2060. This increase depends on projected future greenhouse gas emissions and is relative to the temperatures measured between 1950 and 1999.

- The average number of days with more than 1 inch of precipitation is estimated to increase between 6 and 20 percent by the end of 2060. This increase depends on projected future greenhouse gas emissions and is relative to precipitation records between 1971 and 2000.
- The average April 1st snowpack volume is estimated to decrease between 38 and 46 percent by the end of 2050 for low and medium greenhouse gas emission scenarios. This decrease is relative to the snowpack records between 1916 and 2006.
- The average sea level is estimated to rise between 4 inches and 56 inches by the year 2100. This increase depends on projected future greenhouse gas emissions and is relative to sea level recorded in 2000.

The report also projects the following qualitative impacts specific to water resources management.

- Decreasing summer minimum stream flows and increased potential for more frequent summer water shortages, especially in fully allocated watersheds with little management flexibility.
- Increasing average and peak stream temperatures.
- Widespread changes in streamflow timing and flood risk compared to historical trends.
- Higher rates of water-borne diseases, primarily from increased flooding.

Perhaps the most significant impacts to water purveyors from projected climatic changes would be the projected declining snowpack volume and changes in streamflow timing and summer minimum flows. Effects to streamflow timing vary from basin to basin and depend on the proportion of precipitation that falls as snow versus rain as follows.

- **Rain-Dominant Basins:** In watersheds with warmer winter temperatures where less than 10 percent of winter precipitation falls as snow, streamflow peaks during the winter months and atmospheric warming is projected to have minimal effect on peak streamflow timing in unregulated basins. However, changes in intensity of precipitation could alter reservoir operations and storage availability to accommodate sudden stormwater events that would fill reservoirs. Streamflows in regulated basins may become more extreme despite the availability of reservoir regulation to mitigate these extremes.
- **Mixed Rain and Snow Basins:** Middle elevation watersheds near the current snowline where between 10 percent and 40 percent of winter precipitation falls as snow are the most sensitive to projected atmospheric warming. In these basins, peak streamflow is projected to shift significantly earlier in the season by weeks to months, as wet season precipitation falls as rain instead of snow.
- **Snow-Dominant Basins:** In watersheds with cold winter temperatures where more than 40 percent of winter precipitation currently falls as snow, peak streamflow will shift earlier in the season from early summer to spring as early and late wet season precipitation falls as rain instead of snow. Permanent reduction of glacial ice volume will also affect stream flow in high altitude watersheds.

In the Green River Watershed, which supplies the City of Tacoma and serves as an emergency source for the City of Kent through its Second Supply Pipeline, winters are cool and much of the precipitation falls in the form of snow during winter months¹. The watershed can most likely be generalized as a “mixed rain and snow basin” or “snow dominant basin.” The City of Tacoma would have some ability to mitigate projected shift in peak streamflow timing through operation of the Eagle Creek Reservoir and is preparing for earlier and later peak streamflows. However, the dam is operated to capture extreme winter precipitation volumes, release them safely to the Green River, then drain the reservoir for the next event. If the reservoir captures and releases a greater percentage of the annual volume of precipitation to mitigate flooding, less water would be available for capture and storage for potable supply.

SOURCE VULNERABILITY IMPACTS

The City’s water is supplied predominantly by groundwater sources recharged by annual precipitation, and the City’s supply appears more resilient against changes in streamflow timing, declining snowpack, and water quality than other water systems that rely on surface water sources. The inherent slow filling, persistent storage, and slow draining characteristics of aquifer replenishment offers some degree of protection against summer water availability if the volume and location of winter precipitation still results in sufficient aquifer recharge. The relationship between precipitation and aquifer recharge is complex and local. Impacts to the City’s groundwater sources depend on the precise characteristics of rainfall patterns, surface and subsurface permeability, pathways of infiltration into the aquifer, and locations and volumes of groundwater withdrawal. Urbanization and increased groundwater withdrawals from the source aquifers are significant factors partially or unrelated to changes in precipitation timing and temperature that could negatively impact the reliability of the City’s groundwater sources.

It is notable that the University of Washington Climate Impact Group indicated that nearby Tacoma Water’s average water supply reliability is expected to decrease (worsen) between 63 percent and 96 percent under projected low and medium greenhouse gas emission scenarios by 2080. This forecasted decrease in reliability is assumed to result from earlier snow melt and decreased summer flows. This forecast also assumes no new sources of supply and no changes to current operating procedures. A system reliability of 100 percent indicates that no water shortage exists; as reliability decreases, the probability of a water shortage occurring increases. The source study indicates Tacoma Water’s supply is robust through 2030², so the City has some time to further evaluate and mitigate its risk due to changes in surrounding watersheds. The City may consider performing a detailed hydrogeologic study to improve awareness and management of aquifer recharge and withdrawals to mitigate potential changes in rainfall patterns and recharge.

DEMAND IMPACTS

The University of Washington Climate Impact Group reports high confidence that air temperatures will increase over time, but low confidence in how precipitation amounts will

¹ Tacoma Public Utilities. August 13, 2008. *Green River Watershed Management Plan*, Second Volume.

²Vano, J.A., Voisin, N., Cuo, L., Hamlet, A.F., McGuire Elsner, M., Palmer, R.N., Polebitski, A., Lettenmaier, D.P. April 27, 2010. *Climate Change Impacts on Water Management in the Puget Sound Region, Washington State, USA*.

change in time and location. Natural year-to-year variations in precipitation are expected to overprint any incremental changes attributed to climate change processes. There is a clear correlation between temperature, precipitation, and water system demand, but increases in demand are assumed to be caused primarily by the lack of precipitation in the summer and corresponding need for irrigation. Temperature increases alone are expected to have a less significant effect on demand, as most commercial, industrial, and residential uses will not increase solely due to temperature (e.g., showering, laundry, cooking, etc.) As lack of sufficient precipitation is assumed to be the primary driver of summertime demand increases, but there is low confidence in how climate change will impact precipitation patterns and volumes, it is difficult to estimate how climate change could impact demand. As a comparison benchmark, the University of Washington Climate Impact Group noted that Seattle Public Utilities’ water system demand is projected to increase by 1 percent in 2025, 2 percent in 2050, and 5 percent in 2075 due to climate change and warming atmospheric temperatures. This increase is relative to demands in 2000.

To predict how demand could be impacted by changes in temperature and precipitation, historic correlations between demand, temperature, and precipitation are helpful. **Chart 4-8** presents the relationship between temperature at Sea-Tac International Airport and the City’s total water supplied each month from 2011 to 2016.

Chart 4-8
City of Kent Supply and Sea-Tac International Airport Temperature (2011 through 2016)

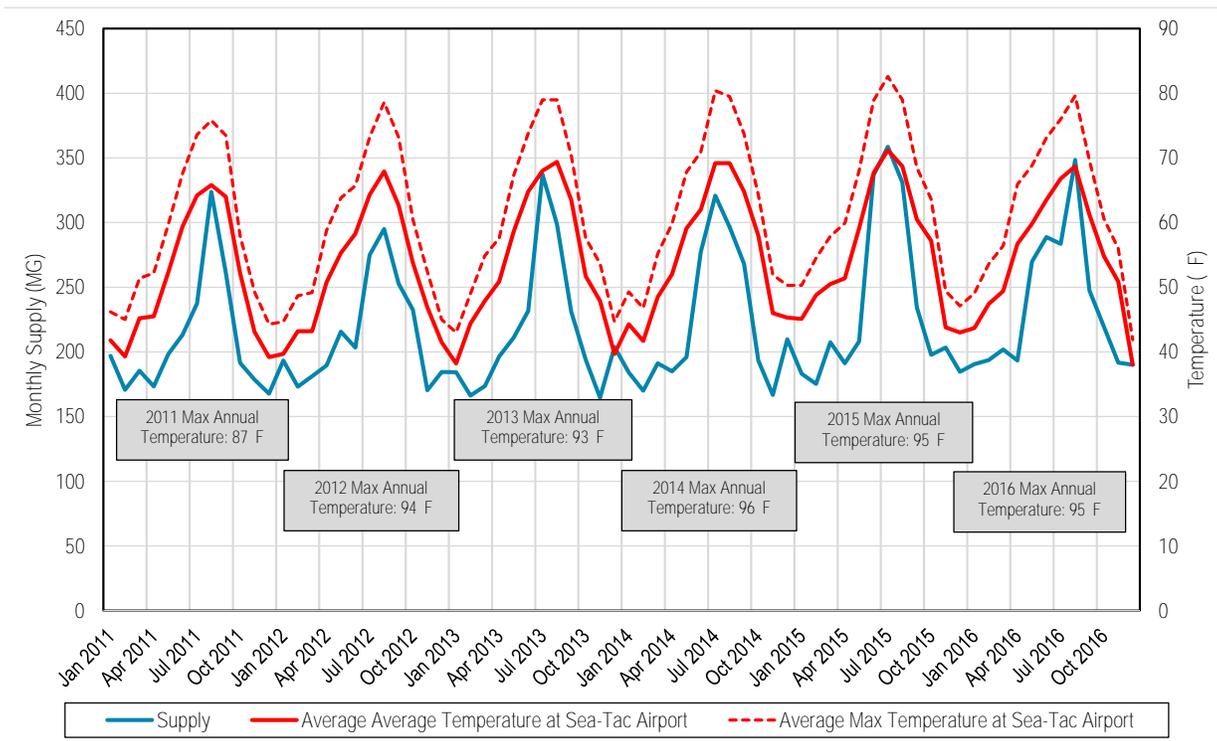


Chart 4-8 illustrates the pattern of summertime supply peaks that correlate with increased temperatures. It should be noted that even though temperature and demand tend to peak at the same time, years with higher maximum annual temperatures do not necessarily have higher water

demands than other years. This reinforces the assumption that, while temperature and demand correlate, increased temperatures alone do not necessarily cause increased demands.

Chart 4-9 presents the relationship between precipitation measured at Sea-Tac International Airport and the City's total water supplied between 2011 and 2016.

Chart 4-9

City of Kent Supply and Sea-Tac International Airport Precipitation 2011-2016

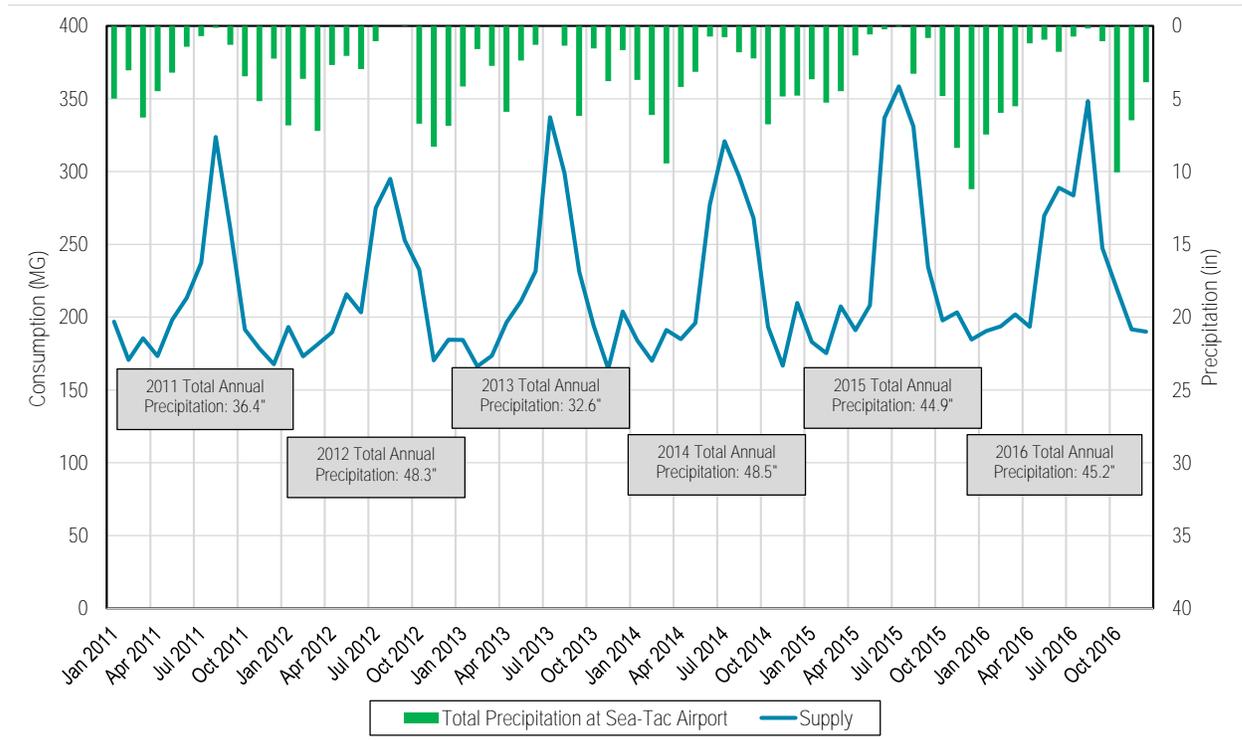


Chart 4-9 illustrates the pattern of summertime supply peaks that correlate with decreased precipitation. There is also some correlation evident year-to-year, as water demands tend to be lower in years with more precipitation and higher in years with less precipitation compared with the years immediately following and preceding (with 2016 as the only exception). Ultimately, the degree to which the City's future water demands will be impacted by climate change are a function of both expected warming and the expected change in precipitation patterns. As climate forecast models improve and changes to precipitation patterns can be forecast with more certainty, the City will further evaluate how demands are impacted by temperature and precipitation. Until that time, the City plans to use the same climate change-related increases that are projected for Seattle Public Utilities on an average day demand basis: a 1 percent increase in 2025; 2 percent in 2050; and 5 percent in 2075. The future demand projections based on these climate change-related increases are shown in **Table 4-14** with the demand projections without estimated reductions in water use from achieving WUE goals or changes in irrigation habits or practices, for reference. The analysis and evaluation of the existing water system with proposed improvements, as presented in **Chapters 7 and 9**, is based on the 2038 projected demand data without WUE reductions and without climate change increases. However, the City will continue to evaluate the projected warming and changes in precipitation patterns and will update the demand projections to include climate change increases in the future as necessary.

Table 4-14
 Future Water Demand Projections with Consideration for Climate Change

Description	Actual			
	2016	2028 (+10 yrs)	2038 (+20 yrs)	2068 (+50 yrs)
Water Service Area Population Data				
Residential Population	68,157	71,842	74,166	82,705
Employment Population	64,755	69,777	77,653	114,053
Average Day Demand (gpm)				
Demand with Climate Change Increase	5,348	5,717	6,121	7,933
Demand without WUE or Climate Change Increase		5,691	6,074	7,745
Maximum Day Demand (gpm)				
Demand with Climate Change Increase	11,629	12,430	13,309	17,249
Demand without WUE or Climate Change Increase		12,375	13,208	16,841
Peak Hour Demand (gpm)				
Demand with Climate Change Increase	16,995	18,166	19,450	25,208
Demand without WUE or Climate Change Increase		18,085	19,302	24,612

5 | REGULATORY REQUIREMENTS AND MINIMUM DESIGN CRITERIA

Establishing realistic design criteria is required to satisfy Washington State Department of Health (DOH) planning requirements, to evaluate the existing water system's adequacy, and to plan for future water system improvements. The minimum design criteria for the City of Kent (City) water system are in accordance with the standards and requirements set forth by the U.S. Environmental Protection Agency (EPA), DOH, and the Washington State Department of Ecology (Ecology), and for the water service area outside the City limits (in unincorporated King County) in accordance with the land use and planning guidelines of King County.

These standards are consistent with the DOH Group A Public Water Systems Waterworks Standards, the South King County Coordinated Water Supply Plan (SKC CWSP) Design and Construction Standards, and King County's Rules and Regulations relating to Fire Hydrants and Water Mains as authorized under King County Ordinance 5828. In some instances, the City Standards may be more stringent and/or restrictive than the requirements of other agencies, in which case the City Standards shall apply.

Water system facilities constructed within the water service area must also be designed and constructed according to City Standards. The minimum criteria put forth herein do not replace or supersede the City's Construction Standards, Developer Extension requirements or other codes and requirements associated with development proposals and permits. The City's most current Construction Standards are contained in **Appendix G** and have been utilized in this summary of design criteria. The Construction Standards can also be found on the City's website.

The City's standards and minimum design criteria accommodate anticipated maximum daily demands (MDD), as well as the demands on the system for peak hour, fire flow and other emergency situations. Minimum design criteria are established for water supply, storage volume, distribution and transmission main capacity and water quality standards. The criteria are used to determine existing deficiencies in the water system and projected water system requirements for the planning area described previously in this document. **Chapter 7** summarizes the analyses performed on the system and identified deficiencies in meeting the needs of the current and projected customers of the system.

This Chapter also discusses the City's project review procedures for both public works and developer extension projects and describes policies and requirements for outside parties. A discussion of the City's construction standards, construction certification, and construction follow-up procedure is also provided.

REGULATORY REQUIREMENTS

FEDERAL REQUIREMENTS

Public Law 93-523, the Safe Drinking Water Act (SDWA), directs the U.S. Environmental Protection Agency (EPA) to establish minimum national drinking water standards limiting the amount of potentially harmful substances which may be present in drinking water sources. These limits are regulated by the State of Washington Department of Health and adhered to by the City of

Kent. Complete details of current regulations are contained in **Chapter 6** and the City’s water quality monitoring program is provided in **Appendix I**.

Because of the listing of the Puget Sound Chinook Salmon and Bull Trout as a “threatened species,” rules and regulations under the authority of the Endangered Species Act (ESA) can affect water system operations. As part of its ESA compliance program, the City operates consistent with best management practices as appropriate to protect endangered species.

STATE OF WASHINGTON REQUIREMENTS

The rules and regulations regarding public water supplies are a part of the Washington Administrative Code (WAC) and are adopted pursuant to the provisions in the Revised Code of Washington (RCW) 43.20.050 for the protection of public health. The rules and regulations provide the minimum standards for design, construction, operations and maintenance of public water systems and conform with the Safe Drinking Water Act of 1974 and all subsequent amendments thereto.

The Growth Management Act (GMA) of 1990 (RCW 36.70A) has a direct impact on utility system planning by requiring a complete inventory of existing system facilities and a comprehensive effort toward determining the capability of utility systems to support anticipated growth and a plan to finance capital facilities. The GMA requires cities and counties to discuss and plan for seven key elements in their comprehensive plans: (1) Land Use, (2) Housing, (3) Capital Facilities, (4) Utilities, (5) Transportation, (6) Economic Development, and (7) Parks and Recreation. A primary outcome of the growth management planning in King County is the delineation of an Urban Growth Area (UGA) boundary within which an urban level of service is required. GMA rules and regulations will be crucial to projecting future water demands. Because much of the Retail Water Service Area for the City of Kent is within the UGA, as discussed in **Chapter 3**, the pressure for growth will remain substantial. In addition, the City is required to plan for the provisions of an “urban level of service” because it serves within the UGA.

Regulations related to accounting practices for municipalities such as the City of Kent are implemented and monitored by the State of Washington Auditor. Kent maintains a long-term system inventory program utilizing computerized mapping, equipment inventory and a Geographical Information System (GIS). These programs have assisted in compliance with Government Accounting Standards Bureau statement 34 requirements and have been a key element in development of this WSP.

DOH’s “Water System Design Manual” is the primary document governing the sizing and design of public water systems in the State of Washington. This publication sets forth the minimum system plan and reliability considerations. Criteria for distribution system design, water storage and daily supply requirements are summarized in this Chapter.

KING COUNTY REQUIREMENTS

Because a portion of the Retail Water Service Area is within unincorporated King County, the City must operate within the rules and regulations established by King County for these areas and utilize County planning data in developing growth projections for areas outside the City limits. Specifically, the King County Comprehensive Plan has a direct impact on the planning effort. King County Code Titles 13.24 (Sewer and Water Comprehensive Plans), 14, 21A, and 17.08, as well as Countywide Planning Policies and King County Comprehensive Plan Policies related to water utilities, have been utilized in the development of this document to ensure that water system operations and construction

standards are in conformance with King County requirements. The City must also operate within the terms of its current right-of-way franchise with King County.

CONDITIONS OF WATER SERVICE

The City of Kent currently provides water service to customers within its established service area boundary. Additionally, the City maintains metered interties with the City of Renton, the City of Tukwila, Highline Water District, the City of Auburn, Lake Meridian Water District, and Soos Creek Water and Sewer District.

Service area policies such as developer extension requirements, fee payment responsibilities, design standards and related issues are governed by the Kent City Code and the City of Kent Construction Standards.

FIRE FLOW REQUIREMENTS

The Washington Administrative Code (WAC) 246-290-230(6) states the following requirement for public water distribution systems:

“If fire flow is to be provided, the distribution system shall also provide maximum day demand (MDD) plus the required fire flow at a pressure of at least 20 psi (140 kPa) at all points throughout the distribution system, and under the condition where the designated volume of fire suppression and equalizing storage has been depleted.”

In accordance with DOH requirements, the Kent City Code defines “Fire Flow” as the measure of the sustained flow of available water for fighting fire at a specific building or within a specific area at 20 psi residual pressure. The City’s fire flow requirements are shown in **Table 4-11**.

SOURCE REQUIREMENTS

SOURCE QUANTITY

The City will plan for at least 20 years into the future so that future water resource limitations can be handled effectively.

The City will ensure that the capacity of the system, including wells, pump stations, storage, and transmission mains, is sufficient to meet the maximum day demands of the system.

The City will participate in regional supply management and planning activities as staff resources allow.

WATER QUALITY STANDARDS

The City will pursue steps to meet or exceed all water quality regulations and standards.

Security of the water supply is of primary importance. The City will take all reasonable measures to protect its system and customers. Security improvements identified in vulnerability assessment reviews shall be given the highest priority.

Chapter 6 identifies the existing water quality standards that the city’s water system must comply with.

PERMIT EXEMPT WELLS

Those applicants within Water Resource Inventory Areas (WRIAs) 8 and 9 without constructed wells, and submitting building permits reliant on use of a permit-exempt well (RCW 90.44.050) after January 19, 2018, are subject to its terms and limitations. Such applicants shall be limited to a maximum annual average withdrawal of 950 gallons per day (gpd) per connection. This amount may be reduced to 350 gpd for indoor use only during drought conditions. The quantitative and other limitations associated with Engrossed Substitute Senate Bill 6091 shall remain in effect until a watershed restoration and enhancement plan is approved by Ecology and implementing rules are adopted.

In order to secure building permits, applicants located within the City's corporate boundaries shall be required to pay the City a fee of \$500, \$350 of which is to be transmitted to Ecology. The City is required to record relevant water use restrictions with the property title.

Ecology is recommending that local jurisdictions located within Hirst-affected basins adopt the following recording language: "Domestic water use at this property is subject to a water use limitation of a maximum annual average withdrawal of 950 gallons per day, per connection, subject to the 5,000 gallon per day limit provided in RCW 90.44.050."

GENERAL WATER MAIN REQUIREMENTS

PIPELINE VELOCITIES

During normal demand conditions, the velocity of water in a water main should be less than 5 feet per second (fps).

During emergency conditions, such as a fire, and for design purposes, the velocity of water in a water main may exceed 5 fps, but may not exceed 8 fps except in existing 6- or 8-inch dead-end water main serving residential areas. New dead-end water main installed within residential areas may be approved for a maximum velocity of 10 fps on a case-by-case basis by the City.

WATER MAIN EXTENSIONS

- All water main extensions shall conform to the design requirements of the City and DOH.
- This WSP indicates the location and configuration of the major elements of the existing and proposed City supply mains, distribution system, interties and loops. The exact location or configuration of this system may be modified, provided the proposed system remains consistent with the overall intent of the WSP.
- Mainline extensions will be required when properties do not front on a water main or when the existing main is deemed inadequate for the proposed use. It is a City policy that the water main is extended to the far edge of the property to be serviced, regardless of where the service connection is to be made.

WATER SYSTEM DESIGN PARAMETERS

- Desirable system working pressure shall be approximately 60 to 70 psi, but not less than 35 psi under Peak Hourly Demand (PHD). The minimum pressure in the water system under fire flow conditions shall be 20 psi.
- Individual service Pressure Reducing Valves (PRVs) shall be installed and maintained on water service lines, by the property owner, when system pressures are in excess of 80 psi.

- All new mains providing fire flow will be sized to provide the required fire flow at a minimum residual pressure of 20 psi and maximum pipeline velocity of 8 fps during maximum day demand conditions. In general, new water mains that will carry fire flow in residential areas shall be a minimum of 8 inches in diameter and looped for multi-family residential developments. Exceptions in residential areas may be considered as discussed in the **Velocity** section of this chapter. New water mains in commercial, business park, industrial, and school areas shall be a minimum of 12 inches in diameter and looped.
- Connections to existing water mains shall be accomplished by “Extension,” “Wet Tap” or “Cut In” when mainline valves are required on the existing main. Connection to the existing main shall be per City Standard. No direct connection to the City’s existing water system will be allowed until purity and leakage tests of the new system have been performed and passed.
- Two cubes for “Pigging” shall be installed in the new water main at the initial connection and at each lateral from the new water main. The Water Division will provide the cubes, they must be picked up by the contractor at the Water Division Shop.
- Dead end mains shall be avoided whenever possible. Where dead end mains are unavoidable, a minimum two (2) inch blowoff assembly is required. Blowoff sizes for various pipe diameters are listed in the City of Kent Construction Standards.

WATER MAIN LOCATION

- Water mains shall be laid at least ten (10) feet horizontally from any existing or proposed sanitary sewer. The distance shall be measured edge-to-edge. Any deviation from this requirement shall meet Ecology and DOH requirements and be allowed only upon approval of the Director.
- Perpendicular water main crossings of sanitary sewers shall be laid to provide a minimum vertical distance of eighteen (18) inches above the sewer line, measured from the bottom of the water line to the top of the sewer line. Where separation between the water line and sewer line is less than eighteen (18) inches, the sewer line shall be ductile iron. All sanitary sewer lines which cross above a water main, regardless of the separation, shall be ductile iron as well, with no joints within a nominal ten (10) feet of the water main.
- Installation of water mains near other potential sources of contamination will require written approval by the Director on a case by case basis. They would include but not be limited to; storage ponds, land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms, solid waste disposal sites, or any other facility where failure of the facility would subject the water in the main to toxic chemical or pathogenic contamination.
- Water mains shall be located at least five (5) feet away from any other utility, including but not limited to storm drains, power, natural gas, CATV, private fire lines, etc.

VALVES

Water valves are required at the following locations:

- Four hundred (400) foot maximum intervals in commercial/industrial and multi-family residential areas. Locations involving hospitals, medical clinics, and other uses determined by the City of Kent to be critical applications may be required to have intervals reduced.
- Eight hundred (800) foot maximum intervals in residential areas.

- All sides of mainline tees and crosses.
- At all water service, fire line, and hydrant connections to the City main.
- At both sides of all bridge crossings, railroad crossings and casing/bores.

Existing gate valves may be subject to replacement with a new resilient wedge gate valve or a new resilient wedge gate valve installed at the property line per City of Kent Construction Standards at the discretion of the Director.

COMBINATION AIR/VACUUM RELEASE VALVES

Combination air/vacuum release valves shall be located at high points along the main. As a guide, valves are necessary where the difference between high and low points is two (2) feet on a gradual rise, or any abrupt rise. Actual locations should be in accordance with good engineering judgement and approved by the Director. The air inlet/discharge opening shall be thirty six (36) inches above finished grade and provided with a screened downward facing vent opening. It shall be located outside of traffic areas and installed to prevent damage to landscaping and pedestrians.

BLOWOFFS

Blowoffs shall be located at the dead end of all mains for flushing and “pigging” purposes. Blowoff assemblies must be sized and designed to achieve a minimum velocity of 2.5 fps in the water main. These velocities are to be used as a guideline and do not relieve the Contractor from assuring a clean line. Two (2) inch is the minimum blowoff size.

Where cubes for “pigging” are required in the main line installation, the blowoff size shall be four (4) inch for six (6) through eight (8) inch water mains and six (6) inch for ten (10) through twelve (12) inch water mains. Fire hydrants are preferred in lieu of blowoff devices where flows and pressures warrant a hydrant.

Using water from blowoffs requires a use permit, meter and check valve assembly issued by the Water Division. Persons using water illegally will be prosecuted.

FIRE HYDRANTS

HYDRANT LOCATION

Fire hydrant locations shall be reviewed and approved by the Fire Marshal prior to plan approval. In general, fire hydrants shall be installed at the following locations:

- Will generally be located at street intersections.
- Six hundred (600) foot maximum intervals in single family residential area.
- Three hundred (300) foot intervals in multi-family and commercial areas.
- Upstream of a fire line vault, if an existing public hydrant is not available at a location approved by the Fire Marshal.
- At other locations as directed by the Fire Marshal.

HYDRANT CONNECTIONS

Connections to the existing main shall be as follows:

- Hydrant leads shall be Class 52 ductile iron.

- Hydrant leads shall not exceed fifty (50) feet in length.
- Wet tap connection with heavy-duty tapping sleeve and resilient wedge tapping valve is required.
- No service connections are allowed to hydrant leads.
- Using water from hydrants requires a use permit, meter and check valve assembly issued by the Water Division. Persons using water illegally will be prosecuted.

HYDRANT ASSEMBLIES

Fire hydrant assemblies shall be as follows per City Standard:

- Assemblies shall be shackled on runs eighteen (18) feet or less, or restrained with an approved type of mechanical restrained joint on runs longer than eighteen (18) feet, to the mainline.
- Public fire hydrants shall be painted white.
- Private fire lines require an approved backflow protection assembly to be installed and to be located on private property.
- Private fire hydrants shall be painted yellow.

CROSS-CONNECTION CONTROL

There shall be no cross connection whatsoever between the City water distribution system and any unapproved pipes, wells, pumps, private hydrants, tanks, non-potable fluid or any other contaminating materials that may backflow into the water system. The City's Cross-Connection Control Program is contained in **Appendix F**.

BACKFLOW PREVENTION

The degree of public health protection required must be commensurate with the degree of hazard presented. In situations of known or potential physical or toxic health hazards, air gap separation and/or reduced pressure backflow assemblies shall be required. Double check valve assemblies are generally utilized where aesthetic or detrimental effects on water quality may occur. Each water system connection has unique problems arising from location, climatic conditions, service demands, and other factors. Consequently, each cross-connection shall be examined on an individual basis and the City shall make the final determination as to the degree of backflow protection required.

Backflow protection assemblies proposed for use can be found on the current list of approved assemblies by the Washington State Department of Health. All backflow assemblies are required to be tested annually by a Washington State certified backflow assembly tester. Copies of inspection reports shall be provided to the City.

The City of Kent has codified its cross connection control program requirements, which can be found in Kent City Code chapter 7.02.050 – 7.02.105. These requirements are further detailed in the City's cross connection control program.

PREMISE ISOLATION

Where the City determines protection of the public water distribution system is necessary, a Backflow Preventer shall be installed at the property line commensurate with the degree of hazard as defined in WAC 246-290-010. Installation of Air Gaps shall be approved by submitted drawings in

accordance with the latest edition of the Cross Connection Control Manual, Pacific Northwest Section AWWA and the latest edition of the Uniform Plumbing Code. Double Check Valve Assembly and Reduced Pressure Backflow Assembly installations shall be in accordance with Standard Details 3-14 through 3-18 in the City's Construction Standards.

IRRIGATION SYSTEM

Cross-connection protection is required for all irrigation systems. In general, the City requires Double Check Valve Assemblies to be used. If a chemical injection irrigation system were to be installed, a Reduced Pressure Backflow Assembly would be required. Both types of installations require freeze protection.

DEDICATED FIRE LINES

Cross-connection protection is required for all Dedicated Fire Lines. In general, the City requires Double Check Detector Assemblies be used. If chemical additive is used or there is an auxiliary water supply available to the system, a Reduced Pressure Detector Assembly is required.

STORAGE REQUIREMENTS

Storage requirements are based on four components: Operational Storage, required to maintain sufficient storage for pump operation; Equalizing Storage, required to supplement production from water sources during periods of high demand; Standby Storage, required as a backup supply in case the largest source is out of service; and, Fire Storage, required in order to deliver fire flow for the required duration.

The minimum amount of storage required shall be the total combined amount of the operational, equalizing, standby, and fire storage. **Chapter 7** provides a complete analysis of the City's water storage requirements and capacities.

OPERATIONAL STORAGE

Operational storage is the volume of water available to supply the system under normal operating conditions while the source is considered "off". This volume varies according to the sensitivity of the water level sensors controlling the pumps or other supply source and the configuration of the tanks designed to provide the required volume while preventing excessive cycling of the pump motor(s).

EQUALIZING STORAGE

The volume of equalizing storage must be sufficient to meet hourly water system demands in excess of the rate of supply and must be at an elevation sufficient to meet these demands at a minimum delivery pressure of 30 psi.

STANDBY STORAGE

Standby storage is required in order to augment the available supply of water during a period of restricted flow from the supply source. Restriction of flow may be caused by a pumping equipment failure, supply line failure, maintenance or repair, or other condition which causes interruption in the supply.

FIRE FLOW STORAGE

Fire flow storage must be equal to the amount of water required to accommodate the maximum fire demand under a specified duration of time. Fire flow requirements are determined by the City Fire Marshal and **Table 4-11** puts forth the minimum fire flow requirements used for analysis purposes in this water system planning effort. Fire flow storage must be located above an elevation that yields a 20 psi service pressure to all services in the zone under maximum day demand conditions.

DEAD STORAGE

Dead storage is the amount of water not available at the minimum design pressure to the highest elevation served by the storage facility.

TELEMETRY SYSTEMS

Telemetry systems must be compatible with the City's existing SCADA system. The system must provide discrete status, continuous analog reporting, and control capability which is both sending and receiving. It must also have an integral backup power supply able to sustain communication for a 24-hour period.

BACKUP POWER REQUIREMENTS

Backup power shall be provided at all sources or pumping stations which are required to be operational during power failures in order to meet system reliability requirements, or to continuously maintain a positive distribution system pressure.

PROJECT REVIEW PROCEDURES

Depending on the project type, the City employs two different procedures to review proposed improvement projects. Project types include public works projects and developer extension projects. The review procedure for each project type is discussed in the following sections.

PUBLIC WORKS PROJECTS

Projects that require public works contracts must be developed and reviewed as part of a water system planning effort. Public works projects must be identified based on either a water system or water quality analysis. For this planning effort, the water system analysis is described in **Chapter 7**, and the water quality requirements are discussed in **Chapter 6**. Projects that are identified based on these analyses have subsequently be assessed and prioritized relative to each as described in **Chapter 9**.

Several considerations are given to assess proposed public works projects. The following considerations are those recommended by DOH.

- **Health Standards.** The project must conform with and support all applicable regulations and standards.
- **Land Use.** The project must conform with and support applicable plans and policies.
- **Quantity.** The adequacy of a future water source resulting from the improvement project must be evaluated.

- **Reliability.** The amount of increase to system reliability based on the improvement project should be evaluated with respect to the system's desired level of reliability.
- **Costs.** The project's capital costs should be evaluated along with annual operation and maintenance costs.
- **Regional Benefit.** The project's ability to help meet regional goals (e.g., multi-purpose benefits such as flood control and recreation), in addition to meeting local water system needs, should be reviewed.
- **Environmental Effects.** If the project could create detrimental environmental impacts, these impacts need to be defined. In addition, an assessment should be made to determine whether the negative impacts can be mitigated.
- **Flexibility.** The project's responsiveness to changed land use, water demand, and other resource management decisions should be evaluated. The potential for phased implementation should also be considered.
- **Implementation.** The project's potential to be publicly accepted, easily designed, constructed, and financed should be reviewed.
- **Life Expectancy.** The project's expected duration of operation should be estimated.
- **Risk.** The risks of selecting and not selecting the project for implementation should be assessed, considering health risks, economic risks, and reliability of service.
- **Operation and Maintenance.** The ability to operate, maintain and make connections and repairs to the facility in a cost-effective manner.

DEVELOPER EXTENSION PROJECTS

Developer extension water projects are primarily limited to distribution main improvements. These developer-funded projects do not have to be explicitly reviewed by DOH and discussed within the context of a water system plan. They only have to be implicitly included in the water system plan by including the City design and construction standards required for these projects. These standards are included in **Appendix G**.

Any extension, addition or modification of the City water system are permitted via a Civil Construction Permit with the City. Civil Construction Permits are also required for the construction of plat improvements required by the subdivision code, construction of new streets or (excluding private service connections) within public rights-of-way or easements, or any utility installation that the City has determined must be owned and operated by the City.

Upon review of the proposed development, the Director of Public Works shall make the determination of when a mainline extension is required and the extent of improvements necessary.

The procedure to receive Development Extension Approval is as follows:

- The developer or his agent shall meet the Director of Public Works or his designated representative to verify the extent of improvements required. Compliance with the appropriate Comprehensive Plans and the procedure to complete a developer extension agreement with the City will be discussed at the meeting. Water or sewer extensions outside the City Limits, but within the City's franchise area, may require approval of the King County Boundary Review Board prior to extension. If Boundary Review Board approval is required, a meeting with the City of Kent Property Manager is necessary to discuss the procedures.

- The developer shall retain a civil engineer registered in the State of Washington to prepare the engineering plans, specifications and cost estimates for the mainline utility and/or street improvements. The engineering plans shall conform to the general criteria and standards as outlined in the Design and Construction Standards.
- Design plans are submitted to the Permit Center for review with a Civil Construction Permit Application and the appropriate review fees.
- Following review and approval of the design plans by the Director of Public Works, the developer shall secure all necessary outside agency approvals.

After all necessary permits and approvals have been secured and verified, and all documents (i.e. warranty, bonds, easements, insurance...) and fees as required by the City have been submitted, a preconstruction meeting with the appropriate Public Works staff is scheduled. Following construction completion, the following must be submitted:

- As built plans prepared by a Professional Land Surveyor registered in the State of Washington must be submitted.
- Bill of Sale.
- Addendums to the Bill of Sale.
- City Inspector's Preliminary Project Approval.
- Final walk-thru field inspection of the completed public improvements is scheduled with the City's Project Engineer, contractor, inspector and the Operations Division. A punch list is prepared and upon completion of this punch list, the contractor must notify the inspector for final acceptance of the constructed improvements.
- The Public Works Department will then schedule the project on the Council agenda for official City and Council acceptance of the public improvements. Upon acceptance by the City Council, performance bonds and other cash bonds are then released upon submittal of the required maintenance bonds as outlined in the Developer's Extension Packet.

LATECOMERS AGREEMENTS

Any person who constructs a water, sewer, storm drainage or street extension at the direction of the City, in excess of that which is required to meet minimum standards or which meets minimum standards and will benefit properties abutting the new improvements may, with the approval of the Director of Public Works, enter into a contract with the City which will allow the Developer to be reimbursed for that portion of the construction cost that benefits the adjoining properties and/or is in excess of the minimum standard. The format for a Latecomers Agreement must be submitted for review and approval by the City prior to plan approval to be considered. The City shall be reimbursed for all costs associated with the review and approval of the Latecomers Agreements.

The developer is responsible for preparing the Latecomers Agreement for City review and approval. The City will be responsible for recording the Latecomers Agreement. The Agreement shall include a list of those properties which will benefit from the improvements, a map outlining and designating these properties, legal descriptions as required by the City, and backup data supporting the costs submitted. The City will collect the Latecomers Fee from persons wanting to connect or use said public improvements and subsequently sees that the developer receives the payment.

UTILITY CONNECTION PERMITS

DUTY TO SERVE

The City has a duty to provide service to all new connections within the retail service area when the circumstances meet the following four threshold factors:

- The City has sufficient capacity to serve water in a safe and reliable manner.
- The service request is consistent with local plans and development regulations.
- The City has sufficient water rights to provide service.
- The City can provide service in a timely and reasonable manner.

The time-period starts for measuring timely and reasonable service when the water service application is first submitted to the City. The following section provides additional details regarding the City's duty to serve policies. A reasonable water service request meets the Duty to Serve requirements, is consistent with City Code Section 7, and meets the Permit Requirements outlined in the following section.

PERMIT REQUIREMENTS

The connection of private services to the City of Kent Utility System requires the issuance of the following permits:

- **Water Meter Permits** - Prior to the construction of a domestic water service, the owner or authorized agent, shall obtain a Water Meter Permit from the City. Permits will not be issued for connection to a new main until the system is ready for Council acceptance (except for projects where multiple buildings are approved for phased occupancy). For large, new developments, no permits will be issued until As-builts are in, walk-thru inspections are completed and the Bill of Sale is Council ready.
- **Fire Hydrant Permit** - Prior to the installation of a public fire hydrant, the owner/agent shall obtain a Fire Hydrant Permit from the City and approval of the location from the City Fire Marshal.
- **Fire Line Connection Permit** – Prior to the connection of a Fire line to the City water main, the owner/agent shall obtain a Fire Line Connection Permit from the City.
- **Private Fire Line Permit** – Prior to the installation of a private sprinkler system, private fire line and/or private fire hydrant(s), the owner/agent shall obtain a Private Fire Line Permit from the City Fire Marshal. In addition, a Backflow Assembly Permit shall be obtained if approved backflow prevention is not provided on the private fire line. Additional licenses are required by the Washington State Fire Marshal's Office for these installations.
- **Outside Agency Permits** - In addition to the permits listed above, the developer is responsible for securing and abiding by the conditions imposed by permits required by outside agencies. These permits include County and State DOT right-of-way permits, Hydraulic Permits, Shoreline Permits, Corps of Engineers, Department of Fisheries Permits, etc.
- **King County right-of-way permit** - For water extensions in King County right-of-way, the Owner shall obtain a King County right-of-way permit prior to the preconstruction meeting. Conditions and requirements set forth by the County shall comply with King County Road Standards. The City and the Contractor must schedule and attend a preconstruction meeting with King County right-of-way inspection staff prior to starting any work. Permit and

Inspection Fees charged to the City by the County will be billed to the Contractor or owner in full. All construction and restoration must be completed to the satisfaction of the County and City.

- Deduct, Water Use Only, and Backflow Assembly Permits - Prior to the installation of a water use only, deduct meter and Backflow assembly the owner/agent shall obtain a Water Service Permit from the City.
- Water system capacity will be evaluated at the time of water service application. The City will use the capacity analysis contained in **Chapter 7** of this WSP to evaluate source of supply, storage, and water rights capacity available to the applicant.
- Water system capacity, pressure, and fire flow will be considered when providing water availability to applicants.
- Water availability shall expire at the time that the associated permit expires (i.e., land use, site civil, or building permit).
- Time extensions in regard to water availability shall be granted in accordance with the associated permit requirements. When extensions are denied, the disputes are handled through the rules guiding the associated permit process. Disputes can be brought to the City Council for discussion.

TEMPORARY WATER SERVICE

In accordance to City Code Section 7.02.180, when water service is required for a specific short-term duration, upon approval by the director of public works, a temporary water meter may be obtained from the water utility.

Such meters shall only be used for a designated project and shall be promptly returned to the water utility upon completion of the project or at the end of sixty (60) days, whichever comes first. The meters are to be returned in the same condition as when rented, and the user shall be held responsible for any damage thereto including paying all repair or replacement costs. While in the user's possession, the user shall be solely responsible for the meter and as such, should it be lost or stolen, the user shall pay the water utility the cost of its replacement.

The Director of Public Works shall require that a cash bond be deposited with the City prior to receipt of a temporary meter. The amount of the bond shall equal the replacement cost of the respective meter. Upon return of the meter, and following the payment of all outstanding charges including any meter repair or replacement costs, the cash bond shall be released back to the user.

Temporary meters may be moved from one hydrant to another within the same project; provided, the water utility is notified in advance of the proposed relocation and that hydrant wrenches are used to make all connections and disconnections.

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6 | WATER SOURCE AND QUALITY

INTRODUCTION

The two basic objectives of a municipal water supply 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's 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 is served by multiple groundwater and surface water/spring sources located within and outside its water system service area. They include Clark Springs (including Rock Creek), Kent Springs, East Hill Well(s), Garrison Creek Well, Armstrong Springs Wells, Seven Oaks (Soos Creek) Well, Summit Well, O'Brien Well, 208th Street Well, and 212th Street Wells. The groundwater sources of supply are served by aquifers that underlie the Green and Cedar River basins and fall within and outside the City's water service area and City limits. In 1985, the City contracted with Tacoma Public Utilities (TPU) and became a partner in the Tacoma Regional Water Supply System (RWSS). This project delivers water from the Green River watershed to the City's Water Service Area. At this time, these sources are responsible for meeting all of the City's existing and projected water supply demand.

Kent Source Aquifers – Overview

The main aquifer within the Green River Valley is the recent alluvial aquifer (Qal) that occurs within the Pacific/Algona/Auburn areas, and in the Renton area. The Qal aquifers generally occur at depths of less than 100 feet, are unconfined, and are in hydraulic continuity with multiple surface water systems (White, Green, and Cedar Rivers). Aquifer recharge is from direct infiltration through the land surface, and lateral groundwater inflow from deeper aquifers in the adjacent uplands. Natural aquifer discharge is to the above-mentioned rivers. The Qal aquifer within the Renton area (6 miles north of the City) is very productive, with well yields that typically exceed 1,000 gallons per minute (gpm). The Qal aquifer within the Algona/Pacific/Auburn area (6 miles south of the City) is moderately productive, with well yields on the order of 500 gpm. Water resources in these aquifers are used by several jurisdictions, including the Cities of Pacific, Auburn, Renton, and Algona.

The Qvr aquifer occurs within the Auburn area at depths of 30 to 40 feet below ground surface to as much as 250 feet below ground surface. The aquifer is very productive given its high permeability and abundant recharge, both from the surface and the surrounding uplands. The aquifer discharges naturally to the Green River. The characteristics of the Qvr aquifer (extent, thickness, transmissivity, etc.) are well-defined from previous studies by the City of Auburn. No significant aquifers have been identified within the Green River Valley in the Kent area. The Qvr aquifer also occurs within the southeast portion of the Covington Uplands. The aquifer serves as a source of supply to the major spring sources that serve the City (Kent, Clark, and Armstrong

Springs). The aquifer is shallow and unconfined; recharge is relatively high due to the coarse-grained nature of the surficial soils and underlying geology, and the abundant precipitation that falls on the area. Natural aquifer discharge is to tributaries such as Jenkins Creek and Rock Creek, which discharge to Soos Creek and the Cedar River, respectively.

The Qva aquifer occurs primarily on the western portion of the Covington Uplands. Low-permeability glacial till overlies the aquifer and limits the amount of direct recharge from precipitation (Bauer and Mastin, 1997). Well yields are moderate to low, but the aquifer serves many domestic wells and is the source of supply for most of the wells serving Lake Meridian Water District. Natural discharge from the Qva aquifer occurs to the headwaters of Big Soos Creek.

The Qc₂ aquifer occurs throughout much of the Covington Uplands. In many areas it can be difficult to distinguish the Qc₂ aquifer stratigraphically from the overlying Qva aquifer. Glacial till overlies large portions of the aquifer, limiting the amount of natural recharge from direct precipitation. The Qc₂ aquifer serves as a major source of supply in the east Covington Uplands near Lake Sawyer, and appears to be in hydraulic communication with the north/northeastern end of the lake. Natural discharge from the aquifer occurs primarily to the lower reaches of Soos Creek.

The Qc₃ and Qc₄ aquifers occur within the Kent area near the valley wall and within other localized areas of the Covington Uplands (e.g., at the City's Seven Oaks Well). The aquifers are relatively productive near the City, with well yields that can exceed 1,000 gpm. These deep aquifers are confined beneath the Covington Uplands and receive their recharge as regional-scale downward leakage through the confining aquitard layers. Natural discharge from aquifers that outcrop in the major river valley walls is in the form of springs and seeps that feed the surface rivers. The deeper aquifers (at or below sea level) may discharge naturally to deep valley-filling sediments or through upward leakage across confining aquitard layers in the valley margins. Rates of leakage are usually low, giving rise to good degrees of confinement, as evidenced by artesian water levels in some of the wells located at lower elevations.

There is a general absence of deep well information within the Covington Uplands that might be expected to reveal lateral extensions of these aquifers to the east. Deeper exploratory wells (greater than 500 feet deep) that have been drilled at Kent Springs, and within the Lake Meridian Water District and Covington Water District areas, typically penetrate a thick sequence of fine-grained deposits (clays and silts) with a consistent absence of appreciable water-yielding horizons at depth. Bedrock occurs at shallower depths in the north and east parts of the Covington Uplands, limiting the potential lateral extent of any unidentified deep Qc₃ or Qc₄ aquifers.

Kent Source Aquifers – Reliability

As noted above, five aquifer systems exist in the Covington Uplands area, all of which are presumed to be part of a larger, hydrostratigraphic unit. The City's largest groundwater sources, including Kent, Clark, and Armstrong Springs, are located in the shallower aquifer system (i.e., Qvr aquifer) situated within the Covington Uplands, which flows or discharges to both the Green and Cedar Rivers. Upstream of Clark Springs, the groundwater flows east to west; however, at Clark Springs the flow pattern splits, with groundwater discharge going to both the Green and Cedar Rivers.

The groundwater split that feeds Clark Springs has been determined by King County, the City, and Ecology to discharge to Rock Creek, which is tributary to the Cedar River. The groundwater flowing towards the Green River flows past the City's Kent Springs and Armstrong Springs wells. This same water flows toward Lake Sawyer, which discharges into Covington Creek, which in turn discharges into Soos Creek, which is tributary to the Green River. Kent Springs also has been determined to flow at times into Jenkins Creek, which also flows into Covington Creek and the Green River.

With the exception of one seasonal water right (irrigation of River Bend Golf Course), all of the City's water rights authorize continuous, annual withdrawals of its authorized quantities.

Clark Springs

The Clark Springs Water Supply System is located off of Kent-Kangley Road in a protected, partially fenced, greater than 320-acre section of the Rock Creek watershed (RM 1.8). This property, which is geographically separate from the City of Kent proper, was annexed to the City in 1958 for municipal water supply purposes. The balance of the area falling outside of the City's annexed property is bounded and regulated by the City of Maple Valley on the west, and unincorporated King County to the north, south, and east. Substantial development activity with related increases in impervious surface area and installation of over 300 exempt wells have been allowed to occur within the Rock Creek watershed over the past 30 years. Nevertheless, that portion of the watershed falling within the City's property remains largely in pristine condition.

The Clark Springs Water System is used on a continuous basis throughout the year and is comprised of three separate, but conjunctively managed sources: Clark Springs Trench; Rock Creek Surface Water Diversion; and Clark Springs Wells. Each of these sources draw upon the same shallow aquifer source (Qvr) and are in hydraulic continuity with each other.

The City's Clark Springs Trench is located near Kent-Kangley Road, east of the Maple Valley-Black Diamond Road. Rock Creek flows through the property in a westerly-northwesterly direction and is tributary to the Cedar River. Water is collected in the infiltration gallery, which is constructed of approximately 500 feet of perforated steel pipe placed perpendicular to Rock Creek, across a narrow valley of glacial till, and extending under the streambed.

The collection system and the transmission line were constructed in 1957. Water collected by the gallery system has been determined by the City's hydrogeologic studies to come from the Qvr aquifer, which is the same aquifer source used by the City's Clark Springs Wells and the Kent Springs Water System, as well as the Armstrong Springs Wells at a lower hydraulic gradient.

The design of the Trench infiltration gallery allows the simultaneous withdrawal of water under the Trench water right and the Rock Creek surface water right. This design also allows the City, when appropriate, to limit diversions allowed under its Rock Creek surface water rights (although use of this right is not subject to minimum in-stream flow conditions). In such circumstances, the production of instantaneous and annual quantities authorized under the Rock Creek water right may be voluntarily reduced and shifted to the Trench. This conjunctive management approach assists the City in meeting system demands in a reliable and continuous manner, while protecting in-stream flow conditions in Rock Creek.

Given the close hydraulic connections among the Clark Springs sources, the City has found it most effective from a production and environmental protection standpoint to operate these sources in a conjunctive manner, whereby the instantaneous and annual withdrawals of the system are limited to the cumulative totals allowed under the combined Clark Springs System surface water, springs, and groundwater rights (i.e., 5,400 gpm – Qi, and 8,710 acre-feet per year (afy) – Qa). Current and future operation and management of the Clark Springs Wells, water rights, and overall water supply system facilities are required to occur consistent with the City's Habitat Conservation Plan, Incidental Take Permit, and related Habitat Conservation Plan Implementation Agreement.

Due to the close proximity of the Clark Springs sources to the Landsburg Mine Site (Site), the City has advised Ecology of the City's serious concerns regarding the adequacy of the agency's environmental oversight of the Site, and the risk of a contamination event originating from the Site that results in the temporary or permanent loss of the Clark Springs Water Supply System. To this end, the City has submitted to Ecology comments in opposition to its cleanup action plan for the Site, seeking further investigation/action at the Site and a cleanup action plan more protective of area groundwater, including the Clark Springs source aquifers. The City also has implemented various activities to increase monitoring and sampling at and near Clark Springs.

Kent Springs

The Kent Springs source is located near Black Diamond. The City owns approximately 75 acres at this site. This property has been annexed into the City for municipal purposes. The site is segregated by Cran-Mar Creek, which flows through the property in a westerly direction. Prior to the incorporation of Maple Valley in 1997, and recent annexations by the City of Black Diamond, the Kent Springs Water System property was surrounded by unincorporated King County. Today, Kent Springs is bounded by Maple Valley to the north and east, Black Diamond to the south, and unincorporated King County to the west. Because the City does not regulate land use outside of its Kent Springs Water System property, the City's ability to affect land uses potentially affecting the recharge area for these wells, has been and remains limited.

The Kent Springs Water System is comprised of three wells and a spring fed infiltration gallery. Both sources withdraw supply from the same shallow Qvr aquifer, identified by hydrogeologic studies as the aquifer that also serves the Clark Springs System at a higher hydraulic gradient. Due to their close hydraulic connection, the Kent Springs Wells/spring sources are operated in a conjunctive manner to maximize instantaneous and annual withdrawal capacity.

Armstrong Springs

The Armstrong Springs Wells are located at State Route 516 (Kent-Kangley Road), and east of Wax Road. Both wells withdraw water downstream from the same shallow Qvr aquifer system that serves the Clark and Kent Springs Systems. During its 1998 Phase 1 wellhead protection program study, the City determined that water not captured by the Clark and Kent Springs Systems flows to the Armstrong Springs sources; therefore, the three sources are considered hydraulically connected.

North Kent Wellfield

The water rights originally issued for the 208th Street, 212th Street, and Garrison Creek Wells were changed by the City several years ago to allow for that water to be pumped from any of

those wells (the wells are recognized as all tapping the same body of public groundwater). Consequently, from a practical operational and regulatory standpoint, the well sources operate as a wellfield.

These wells draw water from a confined aquifer that originates beneath the Covington Uplands to the east and extends beneath the Green River Valley to the west.

The 208th Street and 212th Street Wells are flowing artesian in nature. They have an artesian shut-in pressure of approximately 15 to 20 pounds per square inch during the off-season. The 208th Street, 212th Street, and Garrison Creek Wells are hydraulically connected, as pumping of one well will result in a drop in static artesian pressure of the others. Also, the water quality (i.e., manganese and iron) conditions are somewhat similar in all wells.

East Hill

The East Hill Wells, both the 104th and 108th Avenue SE sites, are located along the eastern rim of the Kent Valley. The aquifer shows seasonal water level fluctuations, with the lowest static water levels occurring in the summer and fall months. These fluctuations can reduce the production available from the current active well.

Remaining Sites

The remaining City well sites are all within the City limits on the Covington Uplands, east of the Green River Valley. The exception being the River Bend Golf Course irrigation wells, which are drilled in the Green River Valley near the western valley margin.

Additional information on each of the City's existing potable sources is presented in **Chapter 2**.

ROCK CREEK PROTECTION/CLARK SPRINGS WATER SUPPLY SYSTEM

Rock Creek is considered an important spawning ground for the Cedar River sockeye salmon, a stock that is recognized as depressed (Washington Department of Fish and Wildlife, et al., 1994). The extent of historic use of Rock Creek by Chinook salmon is uncertain, and recent use has been infrequent and unlikely to include any actual spawning. Rock Creek is used by Coho salmon for spawning.

Because of Rock Creek's outstanding natural habitat and its role in supporting the Clark Springs Water System, the City has a substantial and ongoing interest in preserving the health and vitality of the Rock Creek watershed. To that end, in 1997, the City installed a streamflow augmentation system that, depending on the aquifer levels, can supply up to 900 gpm (2.0 cubic feet per second (cfs)) of water to be discharged into Rock Creek (Figure 1-3) during low flow periods when listed salmonid species are spawning.

The flow augmentation system operates by pumping water from the clearwell in the Clark Springs System, from which it is then discharged to Rock Creek after aeration. The water available for flow discharge is subject to hydrologic conditions affecting the infiltration gallery. This system is operated periodically, especially when streamflows fall below 3 cfs during the October, November, and December salmonid spawning periods. Augmentation reduces the instantaneous amount of water available for the municipal water supply by the amount pumped to the stream.

The flow augmentation project described above was just one of the resource protection measures the Public Works Department implemented both prior and subsequent to the City's 2002 Water System Plan Update. Those measures include: 1) promoting responsible resource protection measures by governmental agencies and private parties within the Rock Creek basin; 2) sustained and effective monitoring of flow and aquatic habitat conditions; 3) improving flow and aquatic habitat conditions in Rock Creek; and 4) substantially minimizing/avoiding adverse operational effects upon listed species and aquatic habitat.

The listings of salmon and trout stocks in the Puget Sound Region (1998) under the Endangered Species Act (ESA) resulted in a decision by the Kent City Council on January 8, 2001, to notify the National Marine Fisheries Service (NMFS) and US Fish and Wildlife Service (USFWS) of the City's intent to voluntarily formalize its conservation activities under a Habitat Conservation Plan, and in so doing, obtain an Incidental Take Permit under Section 10(a)(1)(B) of the ESA for the operation of its Clark Springs Water Supply System (CSWSS) located adjacent to Rock Creek.

CLARK SPRINGS HABITAT CONSERVATION PLAN

In 2001, the City undertook efforts to prepare a Habitat Conservation Plan (HCP) in support of the City's application for an Incidental Take Permit (ITP) in conformance with Section 10(a)(2)(A) of the ESA.

The text of the HCP, which required over 6 years of studying and planning to prepare, was completed by the City in December 2010. The HCP was the product of a collaborative effort between the City and the federal fishery Services (Services), including the US Fish and Wildlife Service and the National Marine Fisheries Service, to meet the requirements of the ESA, domestic, industrial, and commercial water supply demands, fire flow requirements, and other related public safety needs of the City.

In more specific terms, the accomplishment of the HCP represents a long-term commitment by the City to protect important fish resources that may be impacted by future operations of the Clark Springs System and to mitigate those potential impacts to the maximum extent practicable.

With the HCP's completion, the City formalized its voluntary efforts to conserve and enhance important fish and wildlife habitat on the site and elsewhere in the Rock Creek basin. The final Environmental Impact Statement (EIS) for the HCP was prepared by the Services in spring of 2011.

On September 6, 2011, NMFS issued an ITP to the City, which shall be in effect until September 25, 2061. The ITP allows the City to operate its existing and proposed water supply operations in a lawful manner without threat of prosecution for incidental take that may occur to species covered by the ITP. An HCP Implementation Agreement was executed by USFWS, NMFS, and the City on September 26, 2011.

Implementing the HCP consistent with the ITP shall ensure that City activities to provide municipal water supply within its service area will include measures that benefit fish resources, in particular ESA-listed species such as bull trout and Chinook salmon, over both the short- and long-term. To this end, The City is currently in the process of designing, permitting, and constructing Habitat Conservation Measures (HCMs) outlined in the HCP.

WATER TREATMENT

All City water sources are chlorinated and fluoridated. In 2015, the Tacoma Green River filtration facility was completed, allowing for less-constrained use of the Tacoma supply. Aeration and sodium hydroxide pH adjustment are used at the Guiberson Reservoir site to treat blended Kent Springs and Tacoma RWSS water. The City also uses pH adjustment at the 212th Street Treatment Plant, Pump Station #5, and the East Hill (104th Avenue SE) Well.

WATER RIGHTS

EXISTING POTABLE WATER RIGHTS AND INTERTIES

The City currently holds 23 water rights that provide its potable and non-potable municipal water supply. In total, the City's water rights authorize a total instantaneous withdrawal rate (Q_i) of 23,458 gpm or 33.8 million gallons per day (MGD), and a total annual withdrawal volume (Q_a) of 19,885.6 afy (17.75 MGD). Within that total number of rights, the City holds one (1) water right claim and twenty-two (22) water right certificates.

In addition, the City has water available from the City of Tacoma RWSS. A summary of the water rights and water sources is presented in **Table 6-1**, and the principal water right documents are contained in **Appendix H**.

Table 6-1
Existing Water Rights and Interties

Water Right	Priority Date	Document	Use	Source Location	Instantaneous Rate (gpm)		Annual Volume (afy)	
					Additive	Non-additive	Additive	Non-additive
SWC 7232	10/14/1931	Cert	Municipal	Clark Springs	2,244	0	3,600	0
GWC 3107-A	2/18/1957	Cert	Municipal	Clark Springs	2,250	0	1,350	0
GWC 7660-A	2/4/1969	Cert	Municipal	Clark Springs	906	4,494	3,760	4,950
G1-123225CL	5/1/1909	L.F. Claim	Municipal	Kent Springs	4,488	0	965	0
G1-22956C	9/2/1977	Cert	Municipal	Kent Springs	3,690	0	5,904	0
G1-24189C	10/6/1982	Cert	Municipal	Armstrong Springs	1,300	0	0	500
G1-23614C	6/4/1980	Sup. Cert	Municipal	North Kent Wellfield	500	0	0	800
G1-24190C	10/6/1982	Sup. Cert	Municipal	North Kent Wellfield	2,700	0	0	1,400
G1-24404C	8/24/1983	Sup. Cert	Municipal	North Kent Wellfield	1,200	0	0	600
GWC 42-D	9/1/1923	Cert	Municipal	East Hill (104th)	60	0	90	0
GWC 44-A	9/12/1945	Cert	Municipal	East Hill (104th)	90	0	135	0
GWC 2890-A	9/12/1956	Cert	Municipal	East Hill (104th)	120	0	146	0
G1-23285C	1/4/1979	Cert	Municipal	East Hill (104th)	1,900	0	3,040	0
GWC 651-A	3/23/1948	Cert	Municipal	East Hill (108th)	60	0	42	0
GWC 2428-A	2/25/1953	Sup. Cert	Municipal	East Hill (108th)	120	0	78.4	0
GWC 767-A	1/18/1951	Sup. Cert	Municipal	O'Brien	243	0	45	0
G1-24073C	4/26/1982	Cert	Municipal	Soos Creek (Seven Oaks)	900	0	0	864
GWC 1116-A	6/17/1950	Cert	Municipal	Summit	200	0	320	0
GWC 494-A	7/29/1947	Cert	Municipal	Hamilton Road	38	0	30	0
GWC 4534-A	5/4/1962	Cert	Municipal	Hamilton Road	12	0	19.2	0
G1-23713C	10/15/1980	Cert	Municipal	High Meadows	7	0	11	0
GWC 1957-A	3/24/1952	Cert	Dom & Irr	Chappelear	140	0	60	0
G1-25204C	3/25/1988	Cert	Muni Irr	River Bend Golf Course	290	0	290	0
Total City Water Rights					23,458		19,885.6	
Total Tacoma RWSS					8,778		14,159	
Combined Total					32,236		34,044.6	

The City's water rights and water sources will be discussed based on location. All water rights divert or withdraw water from Water Resource Inventory Area (WRIA) 9 – Duwamish-Green, except for those water rights associated with the Clark Springs site, which is located in WRIA 8 – Cedar-Sammamish.

Ecology issued metering order DE 02WRNR-3754 dated April 1, 2002 to the City (**Appendix H**). This administrative order requires the City to install and maintain an approved measuring device on all points of diversion or withdrawal under almost all of its water rights. The two water rights that were not explicitly included were GWC 767-A (O'Brien) and GWC 1957-A (Chappelear). The meters need to be read weekly with the data submitted to Ecology on an annual basis (by January 31 of the following year).

Clark Springs

There are three water rights (Surface Water Certificate (SWC) 7232, Ground Water Certificate (GWC) 3107-A, and GWC 7660-A) authorizing one surface water diversion, one infiltration trench, and three wells associated with the Clark Springs site. Combined, these three water rights total 5,400 gpm and 8,710 afy, as limited by the most recently issued water right (GWC 7660-A). This site is the City's only site located in WRIA 8 with Clark Springs draining into Rock Creek, which then drains into the Cedar River.

Contrary to how these water rights have been depicted in the water right record and older water system plans, with the older two water rights being shown as being non-additive on both an instantaneous and annual basis, it is believed that the more accurate and proper way to display these water rights is shown in **Table 6-1**. This interpretation does not change the overall instantaneous rate or annual volume that can be withdrawn or diverted from any particular source at the Clark Springs site, but it more accurately represents the history of the water rights with the most junior water right placing an overall limit on both the instantaneous rate and annual volume that can be withdrawn.

GWC 7660-A contains minimum instream flow limitations for a control point located where Rock Creek crosses the Kent-Kangley Road at the downstream edge of the site. The flow in Rock Creek must be at or above the minimum levels as measured at that location, or else withdrawal of water under this water right must be stopped. The minimum instream flow levels for Rock Creek throughout the year are 15 cfs from January 1 through May 1, then decreasing arithmetically to 2 cfs by July 1, remaining at 2 cfs through October 31st, then 15 cfs from November 1st through December 31st. Diversion and withdrawal under the two older water rights (SWC 7232 and GWC 3107-A) are not subject to these minimum instream flow restrictions.

The City monitors stream conditions for the purposes of protecting fish and related aquatic habitat consistent with the HCP, in order to minimize/avoid potential adverse operational effects. During low flow events or seasonal conditions, the City may meet its current demand requirements by shifting its withdrawal of authorized, and required, quantities to its infiltration trench system.

Current and future operations and management of the Clark Springs site are required to occur consistent with the City's HCP, ITP, and related HCP Implementation Agreement.

Surface Water Certificate SWC 7232

SWC 7232, with a priority date of October 14, 1931, authorizes the diversion of a total of 5 cfs (4,488 gpm) for year round domestic supply from Rock Creek in the S ½ Section 26, Township 22 North, Range 6 East W.M., in WRIA 8. No annual volume limitation was specified, which was common practice at the time. The original certificate was issued to the City of Kent in July 1958. No changes have been made to this certificate since it was issued.

Pursuant to beneficial use of the water consistent with RCW 90.03.015, SWC 7232 qualifies as for municipal water supply purposes.

Ground Water Certificate GWC 3107-A

GWC 3107-A, with a priority date of February 18, 1957, authorizes the withdrawal of a total of 2,250 gpm and 1,350 afy for year round municipal supply from an infiltration trench located in

the S ½ Section 26, Township 22 North, Range 6 East W.M., in WRIA 8. The original certificate was issued to the City of Kent in July 1958. No changes have been made to this certificate since it was issued.

Ground Water Certificate GWC 7660-A

GWC 7660-A, with a priority date of February 4, 1969, authorizes the withdrawal of a total of 5,400 gpm and 8,710 afy under all of the City's Clark Springs site water rights, for year round municipal supply. This water right specifically authorizes withdrawal of water from three wells located in the S ½ Section 26, Township 22 North, Range 6 East W.M., in WRIA 8. This water right was granted subject to minimum instream flows for Rock Creek as measured at a point on the downstream side of the site. The original certificate was issued to the City of Kent in March 1972. No changes have been made to this certificate since it was issued.

Kent Springs

There are two water rights (Ground Water Claim G1-123225CL and certificate G1-22956C) authorizing diversion from the springs (infiltration gallery/trench) under the claim and three active wells under the certificate associated with the Kent Springs site. Combined, these water rights total 8,178 gpm and 6,869 afy. As will be discussed later, a Showing of Compliance with RCW 90.44.100(3) form was filed recently with Ecology to get Kent Springs Well #3 (completed in April 2001 with Unique Well ID AEC886) authorized under the water right certificate.

Ground Water Claim G1-123225CL

This ground water claim was filed on a long-form. G1-123225CL, with a claimed first date of use of May 1, 1909, claims a withdrawal of 10 cfs (4,448 gpm) and 965 afy for year round municipal supply from a spring located in the SE ¼ SW ¼ and SW ¼ SE ¼ Section 33, Township 22 North, Range 6 East W.M., in WRIA 9. The claim was filed by the City of Kent in June 1974. No changes have been made to this claim since it was filed.

Ground Water Certificate G1-22956C

G1-22956C, with a priority date of September 2, 1977, authorizes the withdrawal of a total of 3,690 gpm and 5,904 afy for year round municipal supply from two wells located in the SE ¼ SW ¼ Section 33, Township 22 North, Range 6 East W.M., in WRIA 9. The original certificate was issued to the City of Kent in February 1979. No changes have been made to this claim since it was filed.

Armstrong Springs

There is one ground water certificate (G1-24189C) and two active wells associated with the Armstrong Springs site. The water right is for 1,300 gpm and 500 afy with the annual volume being non-additive to other City water rights. The well names have changed over time and what was originally referred to as Wells #A-4 and #A-5, are now referred to as Armstrong Wells #1 and #2, respectively. These two wells at this site have been recognized as a wellfield by DOH.

Ground Water Certificate G1-24189C

G1-24189C, with a priority date of October 6, 1982, authorizes the withdrawal of 1,300 gpm and 500 afy (non-additive) for year round municipal supply from two wells located in the E ½ NE ¼ Section 36, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the City of Kent in January 1986. No changes have been made to this certificate since it was issued.

North Kent Wellfield (208th Street, 212th Street, and Garrison Creek)

There are three water right certificates (G1-23614C, G1-24190C, and G1-24404C) and six wells associated with this area that make beneficial use of these water rights. Originally, each well location in this area was covered by a single water right. In 2003, Ecology approved changes to each water right such that now each well location is included as an authorized point of withdrawal under each water right. During the 2003 changes, all three water rights were authorized to use the 208th Street Well, 212th Street Wells #1 and #2, and the Garrison Creek Well #1. These changes provide the City with flexibility when it comes to operating these wells. Combined, these water rights total 4,400 gpm and 2,800 afy with the annual volume being non-additive to other City water rights.

There is currently 1 well (active) at the 208th Street location, 3 wells (all active) at the 212th Street location, and 2 wells (1 active and 1 inactive) at the Garrison Creek location. As will be discussed later, Showing of Compliance with RCW 90.44.100(3) forms were filed recently with Ecology to get 212th Street Well #3 (completed in May 2001 with Unique Well ID AFR915) and Garrison Creek Well #2 (completed in February 2004 with Unique Well ID AFT320) authorized under all three water rights.

The Garrison Creek Well #1 was damaged in the 2001 Nisqually Earthquake, an attempt was made to redevelop the well in 2003, but that effort failed. The failure of Garrison Creek Well #1 is what drove construction of Garrison Creek Well #2.

Ground Water Certificate G1-23614C

G1-23614C, with a priority date of June 4, 1980, authorizes the withdrawal of 500 gpm and 800 afy (non-additive) for year round municipal supply from four wells located in the NE ¼ SE ¼ and SE ¼ NW ¼ Section 7 and the SE ¼ SW ¼ Section 6, Township 22 North, Range 5 East W.M., in WRIA 9. A superseding certificate was issued to the City of Kent in September 2013, subsequent to Ecology's approval of a water right change application. The original certificate had been issued to the City of Kent in May 1983 for municipal supply from Garrison Creek Well #1.

Ground Water Certificate G1-24190C

G1-24190C, with a priority date of October 6, 1982, authorizes the withdrawal of 2,700 gpm and 1,400 afy (non-additive) for year round municipal supply from four wells located in the NE ¼ SE ¼ and SE ¼ NW ¼ Section 7 and the SE ¼ SW ¼ Section 6, Township 22 North, Range 5 East W.M., in WRIA 9. A superseding certificate was issued to the City of Kent in September 2013, subsequent to Ecology's approval of a water right change application. The original certificate had been issued to the City of Kent in April 1993 for municipal supply from 212th Street Wells #1 and #2.

Ground Water Certificate G1-24404C

G1-24404C, with a priority date of August 24, 1983, authorizes the withdrawal of 1,200 gpm and 600 afy (non-additive) for year round municipal supply from four wells located in the NE ¼ SE ¼ and SE ¼ NW ¼ Section 7 and the SE ¼ SW ¼ Section 6, Township 22 North, Range 5 East W.M., in WRIA 9. A superseding certificate was issued to the City of Kent in September 2013, subsequent to Ecology's approval of a water right change application. The original certificate had been issued to the City of Kent in April 1993 for municipal supply from the 208th Street Well.

East Hill (104th Avenue SE)

The East Hill (104th Avenue SE) site consists of four ground water certificates (GWC 42-D, GWC 44-A, GWC 2890-A, and G1-23285C). The combined total authorized by these water rights is 2,170 gpm and 3,411 afy.

The City acquired the water system and East Hill (104th Avenue SE) wells water rights from the original owner in 1978 during annexation of the area into the City. When acquired, the East Hill (104th Avenue SE) water rights were used to supply a water system that was serving more than 15 residential connections. Subsequent to their acquisition, these water rights have been beneficially used for City water supply, consistently documented in the City's water system plans, and expressly denoted in the City's water rights portfolio and listing of the City's water rights. Based on the definitions in the municipal water law (RCW 90.03.015), these water rights qualify as being for municipal water supply purposes.

There are currently 5 wells (1 active, 1 unequipped, and 3 inactive) at the East Hill (104th Avenue SE) site. The active well is the East Hill Well #1 (originally authorized as a point of withdrawal under G1-23285C). The unequipped well is East Hill Well #2 (Unique Well ID AFT321) that was completed in June 2004, but has yet to be equipped and connected to the City's distribution system. The three inactive wells were the original points of withdrawal under GWC 42-D, GWC 44-A, and GWC 2890-A. As will be discussed later, Showing of Compliance with RCW 90.44.100(3) forms were filed recently to get the wells added to GWC 42-D, GWC 44-A, and G1-23285C.

The specifics of each water right will be discussed in this section.

Ground Water Certificate 42-D

GWC 42-D, with a priority date of September 1, 1923, authorizes the withdrawal of 60 gpm and 90 afy for year round domestic supply and watering livestock for community from a well located in Tract 20 of R.O. Smith Orchard Tracts, in Section 20, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the East Hill Community Well Company in March 1946. No changes have been made to this certificate since it was issued.

Ground Water Certificate 44-A

GWC 44-A, with a priority date of September 12, 1945, authorizes the withdrawal of 90 gpm and 135 afy for year round municipal supply from a well located in Tract 20 Smith's Orchard Tracts, Section 20, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the East Hill Community Well Company in April 1947. No changes have been made to this certificate since it was issued.

Ground Water Certificate 2890-A

GWC 2890-A, with a priority date of September 12, 1956, authorizes the withdrawal of 120 gpm and 146 afy for year round community domestic supply from a well located in Lot 1 of R.J. Bower's Addition to King County of Section 20, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the East Hill Community Well Company in August 1957. No changes have been made to this certificate since it was issued.

There is currently no active well at the location specified, and the City has been making beneficial use of this water right from the East Hill Well #1 located in Tract 20 of R.O. Smith Orchard Tracts, in Section 20, Township 22 North, Range 5 East W.M., through a *de facto* change.

Ground Water Certificate G1-23285C

G1-23285C, with a priority date of January 4, 1979, authorizes the withdrawal of 1,900 gpm and 3,040 afy for year round municipal supply from a well located in Block 20 R.O. Smith Orchard Tracts of Section 20, Township 22 North, Range 5 East W.M., in WRIA 9. This well is referred to as the East Hill Well #1. The original certificate was issued to the City of Kent in February 1982. No changes have been made to this certificate since it was issued.

East Hill (108th Avenue SE)

The East Hill (108th Avenue SE) site consists of two ground water certificates (GWC 651-A, and GWC 2428-A). The combined total authorized by these two water right certificates is 180 gpm and 120.4 afy.

There were historically 3 wells at the East Hills (108th Avenue SE) site (1 active and 2 inactive). As will be discussed later, a water right change will be filed on GWC 651-A to include the active well as an authorized point of withdrawal.

The City acquired the water system and East Hill (108th Avenue SE) site water rights from the original owner in 1964 during annexation of the area into the City. When acquired, the East Hill water rights were used to supply a water system that was serving more than 15 residential connections. Subsequent to their acquisition, these water rights have been beneficially used for City water supply, consistently documented in the City's water system plans, and expressly denoted the City's water rights portfolio and listing of the City's water rights. Based on the definitions in the municipal water law (RCW 90.03.015), these water rights qualify as being for municipal water supply purposes.

The well is currently operable, is run monthly to exercise the equipment, and serves as a back-up/standby water source that is not physically connected to the City's water distribution system. In the event of a large-scale natural disaster that compromises the City's water system, the well motor and pump can be operated with an on-site generator and can be used to pump water such that customers could travel to the site to receive potable water.

The specifics of each water right will be discussed in this section.

Ground Water Certificate 651-A

GWC 651-A, with a priority date of March 23, 1948, authorizes the withdrawal of 60 gpm and 42 afy for year round community water supply from a well located in the NE ¼ NW ¼ Section

29, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the East Hill Water Co., Inc. in June 1951. No changes have been made to this certificated right since it was issued.

There is currently no active well at the location specified and the City has been making beneficial use of this water right from the East Hill Well #1 located in Section 20, Township 22 North, Range 5 East W.M., and from the 108th Avenue Well located in Section 29, Township 22 North, Range 5 East W.M. through a *de facto* change.

Ground Water Certificate 2428-A

GWC 2428-A, with a priority date of February 25, 1953, authorizes the withdrawal of 120 gpm and 78.4 afy for year round municipal supply from the 108th Avenue Well located in the NW $\frac{1}{4}$ NW $\frac{1}{4}$ NE $\frac{1}{4}$ Section 29, Township 22 North, Range 5 East W.M., in WRIA 9. A superseding certificate was issued to the City of Kent in July 2015 after the City requested that Ecology conform the water right to recognize it as being for municipal water supply purposes. The original certificate had been issued to the East Hill Water Co., Inc. in December 1955 for domestic supply for community.

Ground Water Claim G1-123227CL

In addition to the ground water certificates, there is a ground water claim in the City's name for this site as well. That claim is G1-123227CL. The claimed rate is 150 gpm and the claimed annual volume is 241 afy. The date of first use is identified as October 1964. Since October 1964 is after Chapter 90.44 RCW was established, it is assumed that this claim does not represent a vested right. For this reason, it is not included in the City's water rights total.

O'Brien

There is one ground water certificate (GWC 767-A) for the O'Brien site, which has two (1 active and 1 inactive) wells. As will be discussed later, a Showing of Compliance with RCW 90.44.100(3) form was filed recently with Ecology to get the O'Brien Well #2 (Unique Well ID AEJ475) completed in September 1999, authorized under the water right.

Ground Water Certificate 767-A

GWC 767-A, with a priority date of January 18, 1951, authorizes the withdrawal of 243 gpm and 45 afy for year round municipal supply from one well located within Tract 27 of Shinn's Cloverdale Addition to Kent Section 7, Township 22 North, Range 5 East W.M., in WRIA 9. A superseding certificate was issued to the City in July 2015 after the City requested that Ecology conform the water right to recognize it as being for municipal water supply purposes. The original certificate had been issued to the O'Brien Water Users Association, Inc. in September 1951 for domestic supply of community.

Ground Water Claim G1-123226CL

In addition to the ground water certificate, there is a ground water claim in the City's name for this site. That claim is G1-123226CL. The claimed rate is 60 gpm and the claimed annual volume is 96.5 afy. The date of first use is identified as February 1959. Since February 1959 is after Chapter 90.44 RCW was established, it is assumed that this claim does not represent a vested right. For this reason, it is not included in the City's water rights total.

Soos Creek (Seven Oaks)

There is one ground water certificate (G1-24703C) and one active well associated with the Soos Creek (Seven Oaks) site.

Ground Water Certificate G1-24073C

G1-24073C, with a priority date of April 26, 1982, authorizes the withdrawal of 900 gpm and 864 afy (non-additive) for year round municipal supply from one well located within SW ¼ NW ¼ Section 28, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the City of Kent in November 1984. No changes have been made to this certificate since it was issued.

Summit

There is one ground water certificate (GWC 1116-A) and one active well associated with the Summit site. The active well has been redeveloped to correct a sanding issue. The well is currently operable, is run monthly to exercise the equipment, and serves as a back-up/standby water source that is not physically connected to the City's water distribution system. In the event of a large-scale natural disaster that compromises the City's water system, the well motor and pump can be operated with an on-site generator and can be used to pump water such that customers could come to the site to receive potable water.

Ground Water Certificate 1116-A

GWC 1116-A, with a priority date of June 17, 1950, authorizes the withdrawal of 200 gpm and 320 afy for year round municipal supply from one well located within Lot 11, Block 4 of City View Addition to Kent, Section 19, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the City of Kent in July 1952. No changes have been made to this certificate since it was issued.

Hamilton Road

There are two ground water certificates (GWC 494-A and GWC 4534-A) and two wells associated with the Hamilton Road site. Combined, these two water rights total 50 gpm and 49.2 afy. The City acquired the water system and water rights from the original owner in 1967 during annexation of the area into the City. When acquired, the water rights were used to supply a water system that was serving more than 15 residential connections. Subsequent to their acquisition, these water rights have been consistently documented in the City's water system plans, denoted within the City's water rights portfolio. Based on the definitions in the municipal water law (RCW 90.03.015), these water rights qualify as being for municipal water supply purposes.

These water rights are being retained and managed by the City to meet future municipal demand.

Ground Water Certificate GWC 494-A

GWC 494-A, with a priority date of July 29, 1947, authorizes the withdrawal of 38 gpm and 30 afy for year round domestic supply for community from one well located within the NW ¼ SE ¼ Section 18, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate

was issued to the Hamilton Road Community Water Company in November 1950. No changes have been made to this certificate since it was issued.

Ground Water Certificate GWC 4534-A

GWC 4534-A, with a priority date of May 4, 1962, authorizes the withdrawal of 12 gpm and 19.2 afy for year round community domestic supply from one well located within the N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ Section 18, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the Hamilton Road Community Water Company in June 1963. No changes have been made to this certificate since it was issued.

High Meadows

There is currently one ground water certificate (G1-23713C) and one well associated with the High Meadows site. This water right is being retained and managed by the City to meet future municipal demand.

Ground Water Certificate G1-23713C

G1-23713C, with a priority date of October 15, 1980, authorizes the withdrawal of 7 gpm and 11 afy for year round municipal supply from one well located within the NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$ Section 17, Township 22 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to the City of Kent in November 1984. No changes have been made to this certificate since it was issued.

Chappelear

There is one ground water certificate (GWC 1957-A) and one well at the Chappelear site. This water right is maintained as a standby water supply source for the City. This water right is being retained by the City to meet future municipal demand.

Ground Water Certificate GWC 1957-A

GWC 1957-A, with a priority date of March 24, 1952, authorizes the withdrawal of 140 gpm and 60 afy for year round domestic supply and irrigation of 30 acres from one well located in the NE $\frac{1}{4}$ SW $\frac{1}{4}$ Section 4, Township 21 North, Range 5 East W.M., in WRIA 9. The original certificate was issued to Harry M. Chappelear in August 1954. No changes have been made to this certificate since it was issued.

Tacoma Regional Water Supply System

The City is authorized to take up to 12.64 million gallons per day (MGD) (equal to 8,778 gpm and 14,159 afy) from Tacoma's RWSS as a partner. The water right utilized by the City of Tacoma for this water supply is surface water permit S1-00726P. S1-00726P is classified as an interruptible water right as it contains a provision requiring that diversion can only occur when minimum instream flows are met in the Green River at USGS gage 12106700. The minimum instream flows for normal and critical years are outlined in the permit as well as in WAC 173-509-030.

Over the past several years, the City has evaluated how Tacoma RWSS water could be used to provide source water for a proposed aquifer storage and recovery well at Lakehaven's

Optimization of Aquifer Storage for Increased Supply (OASIS) project. Water stored during the winter would be used to meet summer peaking and emergency standby/reliability standard requirements.

PENDING POTABLE WATER RIGHT APPLICATIONS

The City has two water right applications for additional municipal potable water supply pending before Ecology.

Potable Applications

Ground Water Application G1-27619A

G1-27619A, with a priority date of May 22, 1995, requests the withdrawal of 1,200 gpm and 500 afy for year round municipal supply from two wells located within the E ½ SW ¼ Section 4, Township 21 North, Range 5 East W.M., in WRIA 9. This application remains pending in Ecology's water right application processing queue.

Ground Water Application G1-27620A

G1-27620A, with a priority date of May 22, 1995, requests the withdrawal of 7,000 gpm and 6,496 afy for year round municipal supply from three wells located within the SE ¼ SE ¼ Section 7 and SW ¼ SW ¼ Section 8, Township 21 North, Range 5 East W.M., in WRIA 9. This application proposed to take water from wells in close proximity to the Green River during high flows for placement in storage and later use during high demand periods. This application remains pending in Ecology's water right application processing queue.

NON-POTABLE WATER RIGHTS HELD BY THE CITY

The City holds one ground water certificate (G1-25204C) that is for purposes other than potable water supply. This water right is mentioned here due to its ownership by the City but is not included in any of the calculations when comparing the City's water supply available to meet existing or future potable municipal demands.

River Bend Golf Course

The River Bend Golf Course is owned and operated by the City and the City has one water right and two wells (1 active and 1 inactive) at this location. Since this water right was issued to the City and is for a governmental or governmental proprietary purpose (irrigation of a golf course), under RCW 90.03.015(4)(b), the water right is considered to be for municipal water supply purposes. This water right is used exclusively for irrigation of the golf course and is not physically connected to the City's potable water distribution system.

As will be discussed later, a Showing of Compliance with RCW 90.44.100(3) form was filed recently with Ecology to get the River Bend Golf Course Well #2 (completed in August 2016 with Unique Well ID APP320) authorized under the water right.

Ground Water Certificate G1-25204C

G1-25204C, with a priority date of March 25, 1988, authorizes the withdrawal of 290 gpm and 290 afy for seasonal irrigation of 145 acres of the River Bend Golf Course from one well located

within the NE ¼ SE ¼ Section 22, Township 22 North, Range 4 East W.M., in WRIA 9. The original certificate was issued to the City of Kent Parks and Recreation Department in May 1990. No changes have been made to this certificate since it was issued.

NON-POTABLE AND NON-CONSUMPTIVE WATER RIGHT APPLICATIONS HELD BY THE CITY

The City has submitted three ground water applications (G1-27608A, G1-27778A, and G1-27914A) for non-consumptive streamflow augmentation of Mill Creek. These water right applications are included in this water system plan for completeness but are not included in any of the calculations when looking at the City's water supply available to meet existing or future potable municipal demands.

Mill Creek Streamflow Augmentation

The goal of the proposed Mill Creek Streamflow Augmentation Project is to increase critically low summer base flows in Mill Creek by pumping shallow ground water and then aerating it prior to discharge into the stream. Mill Creek is one of the City's major streams and experiences extremely low base flows (approximately 0.5 to 2.0 cfs) during the summer months. Primary benefits desired are to improved salmonid habitat by enhancing water quality and increasing available habitat by roughly doubling summertime streamflows.

Ground Water Application G1-27608A

G1-27608A, with a priority date of April 25, 1995, requests the withdrawal of 200 gpm and 100 afy for streamflow augmentation of Mill Creek during the low-flow season from one well located within the NW ¼ Section 19, Township 22 North, Range 5 East W.M., in WRIA 9. This application remains pending in Ecology's water right application processing queue.

Ground Water Application G1-27778A

G1-27778A, with a priority date of November 7, 1996, requests the withdrawal of 750 gpm and 400 afy for streamflow augmentation of Mill Creek during the low-flow season from four wells located within the S ½ Section 11, Township 22 North, Range 4 East W.M., in WRIA 9. This application remains pending in Ecology's water right application processing queue.

Ground Water Application G1-27914A

G1-27914A, with a priority date of May 1, 1998, requests the withdrawal of 100 gpm and 80 afy for streamflow augmentation of Mill Creek during the low-flow season from one well located within the SE ¼ SW ¼ Section 1, Township 22 North, Range 4 East W.M., in WRIA 9. This application remains pending in Ecology's water right application processing queue.

PERMIT EXEMPT WELLS

In 2016, the Washington State Supreme Court issued its decision in the case of Whatcom County v. Western Washington Growth Management Hearings Board, 186 Wn.2d 648 (2016) (often referred to as the "Hirst" decision). In the Hirst case, the court determined that counties and cities could not issue building permits reliant on permit exempt wells in 15 Puget Sound basins if beneficial use of the proposed well could impact senior minimum flows and/or closed surface

waters - irrespective of whether an adopted instream flow rule allows such use. The City is located within WRIA 8 (Cedar – Sammamish) and WRIA 9 (Duwamish-Green), both of which are affected basins.

As a consequence of the Hirst decision, local governments, including the City, were compelled to advise building permit applicants that the use of an exempt well to serve as a domestic water source may be subject to seasonal variations, curtailment, or other restrictions by Ecology, other agencies, or a court of law.

In 2018, the Washington State Legislature passed ESSB 6091, which allows permit exempt wells constructed in Hirst affected basins prior to the Act's effective date (January 19, 2018) to serve as proof of adequate domestic supply for a building permit. Such prior-Act wells constructed in these basins, including WRIA 15, in compliance with Chapter 18.04 RCW, are not subject to the new restrictions, limitations, and fees imposed by the Act. This is regardless of whether the well was put to beneficial use prior to January 19, 2018. Projects using permit exempt wells for non-domestic purposes are also not affected by the Act.

Under the new law, those applicants within WRIs 8 and 9 without constructed wells, and submitting building permits reliant on use of a permit exempt well (RCW 90.44.050) after January 19, 2018, are subject to its terms and limitations. Such applicants shall be limited to a maximum annual average withdrawal of 950 gallons per day (gpd) per connection. This amount may be reduced to 350 gpd for indoor use only during drought conditions. The quantitative and other limitations associated with ESSB 6091 shall remain in effect until a watershed restoration and enhancement plan is approved by Ecology and implementing rules are adopted.

In order to secure building permits, applicants located within the City's corporate boundaries shall be required to pay the City a fee of \$500, \$350 of which is to be transmitted to Ecology. The City is required to record relevant water use restrictions with the property title.

Ecology is recommending that local jurisdictions located within Hirst affected basins adopt the following recording language:

“Domestic water use at this property is subject to a water use limitation of a maximum annual average withdrawal of 950 gallons per day, per connection, subject to the 5,000 gallon per day limit provided in RCW 90.44.050.”

WATER SUPPLY EVALUATION

An evaluation of the City's combined existing potable water rights (excluding the Riverbend Golf Course Municipal Irrigation Water Right G1-25204C) and Tacoma RWSS contract was performed to determine the sufficiency of the water rights to meet both existing and future water demands. **Table 6-2** compares the combined maximum instantaneous water right/contract rates of the sources with the maximum day demand of the system, and the combined maximum annual water right/contract volume of the sources with the average day demand of the system. As shown in the table, the City has sufficient water rights (both instantaneous and annual amounts) to meet the demands of its existing customers.

Table 6-2
Existing Water Rights Evaluation

Description	Instantaneous Rights / Maximum Day Demand	Annual Rights / Average Day Demand	
	(gpm)	(afy)	(gpm)
Potable Water Rights	31,946	33,755	20,926
Existing (2016) Water Demand	11,629	8,627	5,348
Surplus (or Deficient) Rights	20,317	25,128	15,578

Table 6-3 summarizes the results of the future water rights evaluation, which compares the water rights and contracts of the existing sources with the system's future 10-year, 20-year, and 50-year demand projections. The analyses considered future demand projections with and without water use reductions from the City's planned water use efficiency efforts, as shown in the table. The results of the future water rights evaluation indicate the City has sufficient water rights to meet the demands through the year 2066.

Table 6-3
Future Water Rights Evaluation

Description	Instantaneous Rights / Maximum Day Demand	Annual Rights / Average Day Demand	
	(gpm)	(acre-feet)	(gpm)
Year 2026 (+10 years) Without Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	12,375	9,180	5,691
Surplus (or Deficient) Rights	19,571	24,574	15,235
Year 2036 (+20 years) Without Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	13,208	9,798	6,074
Surplus (or Deficient) Rights	18,738	23,957	14,852
Year 2066 (+50 years) Without Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	16,841	12,494	7,745
Surplus (or Deficient) Rights	15,105	21,261	13,181
Year 2026 (+10 years) With Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	11,899	8,827	5,473
Surplus (or Deficient) Rights	20,047	24,927	15,454
Year 2036 (+20 years) With Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	12,716	9,433	5,848
Surplus (or Deficient) Rights	19,230	24,322	15,078
Year 2066 (+50 years) With Conservation			
Potable Water Rights	31,946	33,755	20,926
Projected Water Demand	16,289	12,084	7,491
Surplus (or Deficient) Rights	15,657	21,671	13,435

RECENT WATER RIGHT ACTIONS

Through the water system planning process, it was discovered that newer wells drilled at existing sites had not been added to the appropriate water rights as points of withdrawal. To rectify this problem, the City has submitted Showing of Compliance with RCW 90.44.100(3) forms for the wells and water rights located at the sites identified in the following sections.

Kent Springs

Water right G1-22956C authorizes withdrawal from two wells (Kent Springs Wells #1 and #2). The public notice identified the wells as being located in the SE ¼ SW ¼ Section 33, Township

22 North, Range 6 East W.M. There has been one additional well drilled at this site that is not currently referenced in the water right record as an authorized point of withdrawal. This well is referred to as Kent Springs Well #3 (Well ID Tag AEC866) and was completed in April 2001. The following action was taken to get Kent Springs Well #3 authorized as a point of withdrawal under this water right:

- Submitted a Showing of Compliance with RCW 90.44.100(3) form to identify Kent Springs Well #3 (Well ID Tag AEC866) as an additional point of withdrawal under G1-22956C.

North Kent Wellfield (208th, 212th, and Garrison Creek)

Water rights G1-23614C, G1-24190C, and G1-24404C all went through a water right change application process in 2003 to have the authorized points of withdrawal include wells located at the 208th Street (208th Street Well), 212th Street (212th Street Wells #1 and #2), and Garrison Creek Well sites (Garrison Creek Well #1). The public notice identified the wells as being located in the SE ¼ SW ¼ Section 6 (208th), SE ¼ NW ¼ Section 7 (212th), and NE ¼ SE ¼ Section 7 (Garrison Creek), all in Township 22 North, Range 5 East W.M. There have been two additional wells drilled at these sites that are not currently referenced on the water rights as authorized points of withdrawal. These wells include the 212th Street Well #3 (Well ID Tag AFR915) completed in May 2001 and Garrison Creek Well #2 (Well ID Tag AFT320) completed in February 2004. The following actions were taken to get these two wells included as authorized points of withdrawal under these three water rights:

- Submitted Showing of Compliance with RCW 90.44.100(3) forms to identify the 212th Street Well #3 and Garrison Creek Well #2 as additional points of withdrawal under G1-23614C.
- Submitted Showing of Compliance with RCW 90.44.100(3) forms to identify the 212th Street Well #3 and Garrison Creek Well #2 as additional points of withdrawal under G1-24190C.
- Submitted Showing of Compliance with RCW 90.44.100(3) forms to identify the 212th Street Well #3 and Garrison Creek Well #2 as additional points of withdrawal under G1-24404C.

East Hill (104th Avenue SE)

Currently, there are five wells (3 inactive, 1 active, and 1 unequipped) at the East Hill (104th Avenue SE) site. Four water rights are associated with the site. The site is bisected by an administrative boundary, which complicates things slightly from a water right perspective. The public notice legal description for the wells under three of the water rights (GWC 42-D, GWC 44-A, and G1-23285C) is Block 20 R.O. Smith Orchard Tracts of Section 20, Township 22 North, Range 5 East W.M. The active well and unequipped well are both located within the published well legal description of GWC 42-D, GWC 44-A, and G1-23285C. The active well (East Hill Well #1) is only currently authorized under one water right (G1-23285C). The unequipped well is referred to as East Hill Well #2 (Well ID Tag AFT321) completed in June 2004, is not currently associated with any water right. The following actions were taken to get both wells included as authorized points of withdrawal under these four East Hill (104th Avenue SE) water rights:

- Submitted Showing of Compliance with RCW 90.44.100(3) forms to identify East Hill Well #1 as a replacement point of withdrawal under GWC 42-D and GWC 44-A.
- Submitted Showing of Compliance with RCW 90.44.100(3) forms to identify the East Hill Well #2 (Unique Well ID AFT321) as an additional point of withdrawal under GWC 42-D, GWC 44-A, and G1-23285C.

O'Brien

Water right GWC 767-A authorizes withdrawal from the original O'Brien Well (O'Brien Well #1). The public notice identified the well as being located in Tract 27 of Shinn's Cloverdale Addition to Kent, Washington, Section 7, Township 22 North, Range 5 East W.M. There has been one additional well drilled at this site that is not currently referenced on the water right as an authorized point of withdrawal. This well is referred to as O'Brien Well #2 (Well ID Tag AEJ475) and was completed in September 1999. The following action was taken to get O'Brien Well #2 authorized as a point of withdrawal under this water right:

- Submitted a Showing of Compliance with RCW 90.44.100(3) form to identify O'Brien Well #2 (Well ID Tag AEJ475) as an additional point of withdrawal under GWC 767-A.

River Bend Golf Course

Water right G1-25204C authorizes withdrawal from the original River Bend Golf Course Well. The original River Bend Golf Course Well experienced decreased production and could not be rehabilitated. The public notice identified the well as being located in the NE ¼ SE ¼ Section 22, Township 22 North, Range 4 East W.M. There has been one additional well drilled at this site that is not currently referenced on the water right as an authorized point of withdrawal. This well is referred to as River Bend Golf Course Well #2 (Well ID Tag APP320) and was completed in August 2016. The following action was taken to get the River Bend Golf Course Well #2 authorized as a point of withdrawal under this water right:

- Submitted a Showing of Compliance with RCW 90.44.100(3) form to identify River Bend Golf Course Well #2 (Well ID Tag APP320) as an additional point of withdrawal under G1-25204C.

LONG-TERM WATER SUPPLY PLANNING

Although the City has sufficient water rights to supply the water system through 2066 and beyond, some facility improvements are necessary to fully utilize the City's existing water rights.

The existing sources of supply for the City's water system are a mixture of City owned and operated spring and ground water sources in both WRIA 8 and WRIA 9 authorized under City-held water rights, combined with receipt of treated water from the City of Tacoma's regional water supply system. As the City moves forward, its intention is to rehabilitate and upgrade its facilities to allow for full utilization of its City-owned sources up to the water right limits, as opposed to pursuit of new water rights.

FEASIBILITY OF OBTAINING NEW WATER RIGHTS

When considering supply redundancy, one option to investigate is the ability to obtain new water rights for municipal purposes. The City's current water sources and municipal boundary fall within both WRIA 8 – Cedar-Sammamish (Clark Springs site) and WRIA 9 – Green-Duwamish (majority of the City). Both WRIsAs have administrative rules that establish the requirements that must be met before there can be an issuance of new water rights.

The Green River and Cedar Rivers are subject to minimum instream flow rules and/or agreements that effectively preclude all new surface water withdrawals beyond those occurring during high flow winter months. Since the City of Tacoma secured a flow-restricted, seasonal water right on the Green River for its Second Supply/P-5 project in the 1980's, no further surface water applications have been approved by Ecology due to ongoing concerns relating to flow levels, cumulative impacts, and tribal treaty rights. Moreover, because streams tributary to the Green and Cedar Rivers have been closed by administrative rule to further appropriation, Ecology has not seriously entertained the issuance of new primary rights for these surface waters for several years. Due to the foregoing factors, and the advent of the Endangered Species Act, development of new additive surface water rights is not considered a viable supply alternative.

Application for Emergency Source Water Right

As a result of the contamination risk posed by the Landsburg Mine Site to its Clark Springs Water Supply System (CSWSS) and Rock Creek, the City intends to undertake the studies and analysis necessary to submit an emergency source water right application to Ecology. The City's goal in this regard is to secure an emergency supply source in close proximity to the existing CSWSS with the capacity to replace as much of the CSWSS supply as possible. The emergency source application process, which will be undertaken consistent with the permit requirements cited in Ecology Water Resources Program Policy POL-1045, will include a request for a pre-application meeting with Ecology, a request for a preliminary permit approval to undertake appropriate source testing, and consultations with the Muckleshoot Indian Tribe.

FEASIBILITY OF TRANSFERRING EXISTING WATER RIGHTS

Changing attributes of existing City-owned water rights is dependent on passing the statutory tests outlined in Chapters 90.03 and 90.44 RCW and as clarified in case law.

North Kent Wellfield Expansion **to Include O'Brien Site**

Water right changes include a variety of options, including changes in place of use, purpose of use, and to the point of diversion or withdrawal of water, as well as the addition of points of diversion or withdrawals to allow groundwater production in a wellfield configuration. As noted earlier, the City has secured approval to operate its 208th Street, 212th Street, and Garrison Creek Wells in a wellfield configuration under its water rights to restore the production capacity affected by the Nisqually Earthquake. Due to the close physical proximity and hydrogeologic relationship of this wellfield to the O'Brien site (Cert. No. 767-A), the City intends to submit water right change applications to include the O'Brien site Well #2 as an additional point of withdrawal to the existing North Kent Wellfield water rights (G1-23614C, G1-24190C, and G1-24404C) and to include the North Kent Wellfield wells as additional points of withdrawal under GWC 767-A.

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, DOH is the agency responsible for implementing and enforcing the 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 EPA regulated approximately 20 contaminants between 1974 and 1986. The 1986 Amendments identified 83 contaminants that EPA was required to regulate by 1989. Implementation of the new regulations has been marginally successful due to the complexity of the regulations and the associated high costs. To rectify the slow implementation of the new regulations, the SDWA was amended again and re-authorized in August of 1996.

In response to the 1986 SDWA Amendments, 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). The 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, provided 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 are typically 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 updates and creates 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 this rule.

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

Surface water sources, such as rivers, lakes, and reservoirs (which are open to the atmosphere and subject to surface runoff), and GWI sources are governed by the Surface Water Treatment Rule. 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 must also 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’s water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Second Supply Pipeline Source.

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's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Second Supply Pipeline Source.

Long Term 1 Enhanced Surface Water Treatment Rule

The 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's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Second Supply Pipeline Source.

Revised Total Coliform Rule

The Revised Total Coliform Rule 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, it is a treatment technique trigger. The water system must conduct an assessment of their 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 will also 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 which 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 I**.

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 90th 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 is typically 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.

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.

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 can also lead to serious health problems in people with Wilson's disease. Long-term exposure to elevated levels of copper in drinking water could also 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 EPA established interim drinking water regulations for radionuclides in 1976 under the SDWA. MCLs were established 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 1986 Amendments to the SDWA finalized the regulations for radionuclides by eliminating the term "interim." The amendments also directed the EPA to promulgate health-based MCLGs, as well as MCLs. The EPA failed to meet the statutory schedules for promulgating the radionuclide regulations, which resulted in a lawsuit. In 1991, the EPA proposed revisions to the regulations, but a final regulation based on the proposal was never promulgated. The 1996 Amendments to the SDWA directed the EPA to revise a portion of the earlier proposed revisions, adopt a schedule, and review and revise the regulations every 6 years, as appropriate, to maintain or improve public health protection. Subsequent to the 1996 Amendments, a 1996 court order required the EPA to either finalize the 1991 proposal for radionuclides or to ratify the existing standards by November 2000.

The final rule was published in the Federal Register on December 7, 2000, and became effective on December 8, 2003. The rule established an MCLG of zero for the four regulated contaminants 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 micrograms per liter ($\mu\text{g/L}$) for uranium. The City currently complies with all contaminant monitoring requirements under this rule.

Wellhead Protection Program

Section 1428 of the 1986 SDWA Amendments mandates that each state develops a 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, which became effective in July of 1994. In Washington State, DOH is the lead agency for the development and administration of the State's wellhead protection program.

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. All federally defined 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 J**.

Consumer Confidence Report

The 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.

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 may also 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 K**.

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. Trihalomethanes (THM) are a category of DBPs that had been regulated previous to this rule. However, systems with groundwater sources that serve a population of less than 10,000 were not previously required to monitor for THM.

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 THM, which are a composite measure of four individual THM, from the previous interim level of 0.10 mg/L to 0.08 mg/L. The rule established 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 established 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 Regulation

The EPA established the Unregulated Contaminant Monitoring Regulation (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 will be consistent with the existing requirements for other inorganic contaminants. The City complies with this rule since its surface and groundwater sources have naturally low levels of arsenic that are below the MCL.

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 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 water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Second Supply Pipeline Source.

Stage 2 Disinfectants/Disinfection Byproducts Rule

The EPA implemented the Stage 2 Disinfectants/Disinfection Byproducts Rule 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, total THM (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 qualified for 40/30 Certification and does not require 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 are also 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's water supply is classified as groundwater at all sources except for the Tacoma Regional Water Supply. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements for the Tacoma Second Supply Pipeline Source.

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 risks through an approach that relies on the four following 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 on December 8, 2016, under the state's existing sanitary survey program.
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.
 - 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's last sanitary survey was completed in December 2016. The City is currently addressing minor deficiencies identified in this 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 above 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.

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 Regulation 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 I**.

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 Clark Springs and the North Kent Wellfield, a moderate susceptibility rating to Kent Springs and Armstrong Wells #1 and #2, and a low susceptibility rating to East Hill Well #1, Seven Oaks Well, O'Brien Well, and Garrison Creek Well #2.

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, with the exception of 4 discrete detections of coliform in November 2016, September 2016, October 2014, and June 2012. Repeat coliform samples were not positive; therefore, these samples can be disregarded as outliers. Kent Springs and Clark Springs were last monitored for IOCs and VOCs in July of 2016. These sources have waivers for IOCs, VOCS, pesticides, soil fumigants, and radionuclides which are valid through December of 2019, and a waiver for herbicides valid through December of 2022. Both spring sources are also sampled annually for nitrates.

Similar to the City's spring sources, the East Hill Well #1, Seven Oaks Well, N Kent Wellfield, O'Brien Well, Garrison Well #1, and Armstrong Wells #1 and #2 sources are tested annually for nitrates, have waivers for IOCs, VOCs, pesticides, soil fumigants, and radionuclides valid through December of 2019, and a waiver for herbicides through December 2022. Additionally, the Seven Oaks Well, N Kent Wellfield, O'Brien Well, and Garrison Creek Well #2 are required to sample for manganese once every 3 years, with the next round of samples being due during the summer of 2019.

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

Due to the close proximity of the Clark Springs site to the Landsburg Mine site, the City has advised Ecology of the City's concerns about a contamination event originating from the site that results in the temporary or permanent loss of the City's Clark Springs source. In recent years, the City has submitted to Ecology comments in opposition to Ecology's cleanup action plan for the site, seeking further investigative/action at the site and seeking a cleanup action plan more protective of area groundwater including the Clark Springs source aquifers. The City has implemented various activities to increase monitoring and sampling at and near Clark Springs.

GROUNDWATER PROTECTION/RELIABILITY STUDIES

The geology and hydrogeology of southwestern King County, encompassing the City's area, has been summarized in a series of reports, including Luzier (1969) and Woodward, et al. (1995), the *South King County Ground Water Management Plan* (1989), and local area Wellhead Protection Plans (Covington Water District, 1995; Lake Meridian Water District, 1996; and the City of

Kent, 1996). In November 1997, the City authorized Hart Crowser to conduct a Phase 1 wellfield evaluation of its Clark Springs and Kent Springs groundwater systems. This study, which was completed in June 1998, included evaluating the maximum well field yield using the MODFLOW groundwater flow model developed for the Kent Wellhead Protection Study.

In September of 2006, the City retained Robinson, Noble & Saltbush to conduct a reliability study of its in-town water sources, with a project goal of determining the 98-percent reliable firm yield for these sources. The end result of the study should provide the City with the firm yield for each of these wells and well sites, such that the City knows how much water is available to be developed through existing wells and potential future wells at each of its existing well sites.

In January 2008, the City retained Aspect Consulting to undertake a Phase 2 comprehensive wellhead protection study addressing all wells and source aquifers not addressed in the 2008 Phase 1 wellhead protection study. The first task of this study, which was completed in May 2008, involved compiling the delineated wellhead protection areas (WHPA) for each of the City's nine groundwater supply sources. Additional tasks included:

- Preparing an inventory of potential sources of groundwater contamination for the each of the nine groundwater supply sources;
- Ranking each of the contaminant sources identified within each WHPA with respect to its potential risk for contamination of the City's well source;
- Refining the management strategies identified in the existing WHPP, and development of new management strategies as appropriate; and
- Updating the existing Monitoring Plan, Contingency Plan, and Spill Response Plan to address all groundwater supply sources.

Although there are no new potential sources of contamination outlined in the Aspect Consulting study, there are many new confirmed and suspected sites that were not listed in the Hart Crowser study (1996). All of these locations were notified in 2009, and again in 2018, about the wellhead protection area.

As a general operational matter, the City monitors groundwater levels in its well sources to monitor the sources, and as required by Ecology and related water right authorizations.

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 I**.

The City has been in compliance with all monitoring requirements for the past several years, except for some coliform violations that are described in the following section. A summary of the results of the distribution system water quality monitoring within the City's system is also presented.

Coliform Monitoring

From 2012 to 2018, coliform monitoring met regulations since samples did not test positive in more than 5 percent of the routine samples taken each month. Positive samples were found in September and November of 2016, October of 2014, and June of 2012. All follow-up repeat samples were negative. The positive samples were likely due to error. Based on the City's current population, a minimum of 80 coliform samples per month from different locations throughout the system are required to be collected. A description of coliform monitoring protocol and sample locations is described in the City's Coliform Monitoring Program, which is included in **Appendix I**.

Disinfectant Residual Concentration Monitoring

Disinfection requirements applicable to the City are contained in WAC 246-290-310, which states that a disinfectant residual concentration of 0.2 mg/L 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. Handheld chlorine residuals are recorded each time a coliform sample is collected; therefore, the City collects a minimum of 80 samples each month in addition to its online chlorine analyzers. 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 the entry point to meet that target. The City typically doses within the range of 0.8 and 1.0 mg/L; however, water coming from Tacoma enters the distribution system with a 1.2 to 1.6 mg/L concentration. In 2018 and January through March 18, 2019, free chlorine readings ranged between 0.30 and 1.93 mg/L and averaged 0.84 mg/L throughout the distribution system. The results of residual disinfectant concentration tests indicate that the City is in compliance with the regulations.

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 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. In response to the Stage 1 and Stage 2 D/DBPR, the City expanded its distribution system monitoring to include THM and HAA5. The City is required to collect four THM and four HAA5 samples on a quarterly basis. All recent samples show concentrations below both substances MCLs. Therefore, the City is in compliance with this regulation. A copy of the City's Stage 2 D/DBP Monitoring Plan is provided in **Appendix I**. The City was granted 40/30 Certification based on historical water quality data, and was therefore not required to perform an IDSE.

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. The City is required to collect 30 samples every 3 years. The latest tests occurred in September of 2018, which yielded a range of 0.001 to 0.0012 mg/L for lead and a range of 0.02 to 0.29 mg/L for copper. These results have all been satisfactory, since the 90th percentile concentration of either lead or copper from each group of samples has not exceeded the action levels.

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 City has a 9-year waiver with DOH for asbestos monitoring that will expire in December 2019. The last time an asbestos sample was taken was in December 1998. This sample yielded a concentration of 0.196 million fibers per liter, whereas the current MCL for asbestos is 7 million fibers per liter and greater than 10 microns in length. Should the City ever recommence asbestos monitoring, it 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 that is served by an asbestos cement pipe under conditions where asbestos contamination is most likely to occur.

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7 | WATER SYSTEM ANALYSIS

INTRODUCTION

This chapter presents the analysis of the City of Kent'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 system capacity analysis that was performed to determine the maximum number of equivalent residential units (ERUs) that can be served by the City's existing 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 pressures between 40 and 80 psi, primarily due to the topography of the water service area.

Table 7-1 lists each of the City's 11 pressure zones (the north and south sections of the 240 Zone and 360 Zone are evaluated separately), 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 evaluations based on the adequacy of the water mains under dynamic conditions.

Table 7-1
Minimum and Maximum Distribution System Static Pressures

Pressure Zone	Highest Elevation Served		Lowest Elevation Served	
	Elevation (feet)	Static Pressure (psi)	Elevation (feet)	Static Pressure (psi)
Existing System				
240 Zone	135	46	20	95
271 Alvord Zone	183	38	79	83
308 Hilltop Zone ¹	133	86	119	92
339 Seattle Zone	268	31	74	115
354.5 Zone	272	36	94	113
366 Stetson Zone	234	57	174	83
368 Weiland Zone	219	65	106	114
416 Zone ²	312	45	83	144
485 Zone	397	38	154	143
529 Zone	434	41	277	109
575 Zone	445	56	408	73
587 Zone	454	58	327	112
590 Zone	504	37	286	132
Projected 20-year System with Improvements				
240 Zone	135	46	20	95
271 Alvord Zone	183	38	79	83
308 Hilltop Zone ¹	133	86	119	92
339 Seattle Zone	268	31	74	115
354.5 Zone	272	36	94	113
366 Stetson Zone	234	57	174	83
368 Weiland Zone	219	65	106	114
416 Zone ²	312	45	83	144
485 Zone	397	38	154	143
529 Zone	434	41	277	109
575 Zone	Converted to 587 Zone			
587 Zone	454	58	327	112
590 Zone	471	51	286	132
640 Zone	504	59	383	111

(1) Hydraulic grade line of the 308 Hilltop Zone measured as 332 feet in November 2017.

(2) No direct service connections exist in the 416 Zone, but the zone was included to identify pressures within the 416 Zone infrastructure.

The City is currently providing water at pressures of at least 40 psi to services in each zone except for the 271 Alvord, 339 Seattle, 354.5, 485, and 590 Zones, as shown in **Table 7-1**. The low pressures in the 339 Seattle Zone occur in the Carter Place cul-de-sac, just east of Van De Vanter Avenue. The low pressures in the 354.5 Zone occur near the intersection of Reith Road and S 253rd Street, and near the intersection of S 254th Street and 45th Avenue S. The low pressures in the 590 Zone occur within and adjacent to SE 248th Street, including portions of

121st Place SE and 120th Avenue SE near their intersections with SE 248th Street. The low pressure areas in the 590 Zone will be converted to the 640 Zone in the future, as described in **Chapter 9**.

Pressures over 120 psi occur in the 416, 485, and 590 Zones. The 416 Zone does not have any direct service connections, but the high pressures in the zone occur near the intersection of 93rd Avenue S and S 218th Street in the 16-inch-diameter transmission main between the 6 Million Gallon (MG) #1 Reservoir and the 6 MG #2 Reservoir. The high pressures in the 590 Zone occur within 100th Avenue SE, between SE 227th Street and SE 225th Place.

The proposed 20-year planning period static pressures are shown in the bottom section of **Table 7-1**. These static pressures assume that the pressure zone improvement projects described in **Chapter 9** are completed, and that services located on or near the boundary of two pressure zones are connected to the pressure zone that provides more suitable pressures.

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 individual zone, or zones, that they supply.

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 pumping capacities of the individual supply facilities, is presented in **Table 7-2**. The demands used in the evaluation for 2028 and 2038 are future demand projections without reductions from water use efficiency efforts, as shown in **Table 4-12** of **Chapter 4**. Therefore, if additional reductions in water use are achieved through water use efficiency efforts, the total source capacity required in the future will be less than that shown in **Table 7-2**.

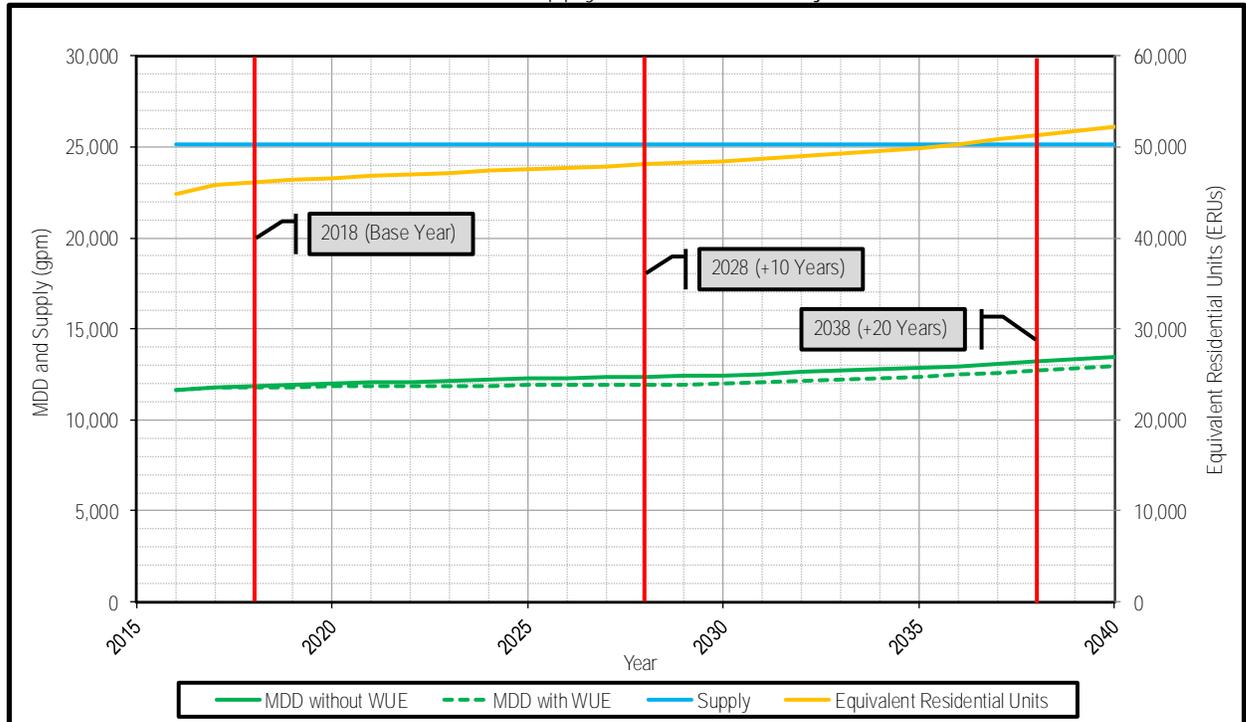
Table 7-2
Water Source Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
Maximum Day Demand	11,629	11,867	12,375	13,208
Available Source Capacity (gpm)				
208th Street/212th Street Wellfield	3,500	3,500	3,500	3,500
Armstrong Springs Wells	1,050	1,050	1,050	1,050
Clark Springs	5,400	5,400	5,400	5,400
East Hill Well	1,900	1,900	1,900	1,900
Garrison Creek Well	500	500	500	500
Kent Springs	3,680	3,680	3,680	3,680
O'Brien Well ¹	0	0	0	0
Seven Oaks Well	350	350	350	350
Regional Water Supply System	8,778	8,778	8,778	8,778
Total Source Capacity	25,158	25,158	25,158	25,158
Surplus or Deficient Source Capacity (gpm)				
Surplus or Deficiency	13,529	13,291	12,783	11,950

(1) Currently not utilized for water quality purposes, but is equipped with pumping equipment capable of providing up to 243 gpm to the system.

The results of the analysis indicate that the City has approximately 13,530 gallons per minute (gpm) of surplus source capacity to meet existing (year 2018) demands. **Chart 7-1** shows the relationship between future projected supply and demands.

Chart 7-1
Future Water Supply and Demand Projections



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 that 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) of the zone. The higher supply requirement of the latter criteria is compensating for the lack of equalizing storage that is typically utilized to provide short-term supply during times of peak system demands.

The available supply to each pressure zone is based on the maximum pumping capacity of each facility with all pumping units operating, per the requirements of WAC 246-290-230. The

Washington State Department of Health (DOH) *Water System Design Manual* recommends that additional capacity or redundancy be considered, and that new pumping facilities be designed to provide the average day demand (ADD) of the zone with the largest pumping unit out of service. Calculations were performed for each pressure zone based on each criterion, with a description of the results provided for each pressure zone in the following sections.

SUPPLY ANALYSIS RESULTS

Valley Operating Area

240 Zone

All the City's sources are capable of directly or indirectly supplying the 240 Zone, with indirect supply from Clark Springs and the East Hill Well capable of being transferred to the 240 Zone via interties with the Kent Springs Transmission Main that supplies the 240 Zone's Guiberson Reservoir. Additionally, multiple sources, including the Armstrong Springs Wells, Seven Oaks Well, and the City's Regional Water Supply System (RWSS) Point of Delivery (POD) #3 supply either the 240 Zone via the Kent Springs Transmission Main or the East Hill operating area. For the purposes of the supply analysis, supply from the Armstrong Springs Wells and the Seven Oaks Well were assumed to be entirely available to the 240 Zone as they are not needed to meet the East Hill operating area supply requirements during normal operations. The majority of the City's total RWSS supply has historically been to the 590 Zone, with approximately 67 percent supplied to the 590 Zone in 2016 compared to approximately 33 percent supplied to the 240 Zone in 2016. The 2016 RWSS supply percentages have been assumed to be applicable for the 2018, 2028, and 2038 planning periods.

Table 7-3 summarizes the current and future supply requirements of the 240 Zone based on existing and projected water demands for the operating area. **Table 7-3** also summarizes the amount of water supply available to the 240 Zone, assuming supply from Clark Springs and the East Hill Well is exclusively conveyed to other zones and is not available to the 240 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 240 Zone facilities are sufficient to meet both existing and future demands. In the event that the 240 Zone's largest source (Kent Springs) is out of service, the remaining facilities have sufficient capacity to meet projected MDD of the 240 Zone beyond the 10-year planning period. If the O'Brien Well is considered available to the system, the City's supply facilities have sufficient capacity to meet projected MDD of the 240 Zone through the 20-year planning period in the event that Kent Springs is out of service.

Table 7-3
240 Zone Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
240 Zone MDD	6,676	6,813	7,069	7,685
Other Zones MDD ¹	777	792	831	847
Total Required Supply	7,452	7,605	7,900	8,532
Available Supply Capacity (gpm)				
208th Street/212th Street Wellfield	3,500	3,500	3,500	3,500
Armstrong Springs Wells ²	1,050	1,050	1,050	1,050
Garrison Creek Well	500	500	500	500
Kent Springs	3,680	3,680	3,680	3,680
O'Brien Well ³	0	0	0	0
Seven Oaks Well ²	350	350	350	350
Regional Water Supply System ⁴	2,926	2,926	2,926	2,926
Total Supply Capacity	12,006	12,006	12,006	12,006
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	4,554	4,401	4,106	3,474

(1) The MDD of the West Hill zones is included in the 240 Zone supply evaluation. Demands in excess of these zone's MDD (i.e., PHD or fire flow) are supplied by the 240 Zone Reservoirs.

(2) Supply from these facilities also can be conveyed to the Clark Springs Transmission Main.

(3) Currently not utilized for water quality purposes but is equipped with pumping equipment capable of providing up to 243 gpm to the system.

(4) The City's portion of the available RWSS capacity is 12.64 MGD (8,778 gpm), with water being supplied to the 240 Zone (via the Kent Springs Transmission Main) or the 590 Zone. RWSS supply is provided at two delivery points; POD #1, which conveys supply directly to the 240 Zone; and POD #3, which can supply either the 240 Zone or the 590 Zone. The majority of the City's total RWSS supply historically has been to the 590 Zone. In 2016, approximately 67 percent of the City's RWSS supply was conveyed to the 590 Zone, with approximately 33 percent of the RWSS supply conveyed to the 240 Zone. For the purposes of these analyses, 67 percent of the City's RWSS capacity was assumed to be available in the 590 Zone, with the remaining 33 percent available in the 240 Zone.

West Hill Operating Area

All water supply to the West Hill operating area currently is provided by Pump Station #3. It is expected that a future booster pump station (BPS) adjacent to S 228th Street just east of the Green River will be constructed by 2028 and will provide additional redundancy and an additional 1,000 gpm of firm capacity to the West Hill operating area. This alone is more than sufficient

capacity to meet the projected 20-year MDD of the West Hill operating area. The future BPS is anticipated to pump 240 Zone water to the 587 Zone, and is expected to be the West Hill operating area's primary supply in the future. The proposed West Hill operating area supply improvements are described in additional detail in **Chapter 9**.

354.5 Zone

All water supply to the West Hill operating area is currently provided by Pump Station #3, which pumps 240 Zone water directly to the 354.5 Zone. Pump Station #3 is currently required to supply the MDD of the 354.5 Zone, as well as the MDD of the 529, 575, and 587 Zones, which are supplied via subsequent pump stations downstream of the 354.5 Zone. It is anticipated that additional supply will be available to the 354.5 Zone in future planning periods following completion of a future West Hill BPS via pressure reducing valves from other West Hill operating area zones. **Table 7-4** summarizes the current and future supply requirements of the 354.5 Zone based on existing and projected water demands for the operating area. **Table 7-4** also summarizes the amount of water supply available to the 354.5 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 354.5 Zone facilities are sufficient to meet both existing and future demands. In the event that one of the Pump Station #3 pumps is out of service, the remaining pump has sufficient capacity to meet the 2016 and 2018 MDD of the operating area. Following completion of the proposed West Hill BPS, the available supply capacity to the 354.5 Zone will be sufficient to meet the projected 20-year MDD of the operating area in the event that either Pump Station #3 or the proposed West Hill BPS are out of service.

Table 7-4
354.5 Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
354.5 Zone MDD	98	100	117	120
Other Zones MDD ^{1,2}	678	692	0	0
Total Required Supply	777	792	117	120
Available Supply Capacity (gpm)				
Pump Station #3 - Pump 1	900	900	900	900
Pump Station #3 - Pump 2	900	900	900	900
529 to 354.5 Zone PRVs ³	0	0	286	273
Total Supply Capacity	1,800	1,800	2,086	2,073
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	1,023	1,008	1,969	1,953

(1) The MDD of the 529, 575, and 587 Zones is included in the 2016 and 2018 supply evaluation for the 354.5 Zone. Demands in excess of these zone's MDD (i.e., PHD or fire flow) are supplied by the Reith Road Standpipe.

(2) The proposed West Hill BPS will supply the other West Hill pressure zones in 2028 and 2038; therefore, these zones will not require supply to be conveyed via the 354.5 Zone and Pump Station #3.

(3) The 2028 and 2038 supply capacity available via PRVs is the difference between the proposed 1,000 gpm West Hill BPS firm capacity and the MDD of the 529 and 587 Zones.

529 Zone

The 529 Zone currently is supplied exclusively by Pump Station #4, which pumps 354.5 Zone water to the 529 Zone. Pump Station #4 currently is required to supply the MDD of the 529 Zone, as well as the MDD of the 575 and 587 Zones, which are supplied via subsequent pump stations that pump out of the 529 Zone. It is anticipated that additional supply will be available to the 529 Zone in future planning periods following completion of a future West Hill BPS via PRVs from the 587 Zone. **Table 7-5** summarizes the current and future supply requirements of the 529 Zone based on existing and projected water demands for the operating area. **Table 7-5** also summarizes the amount of water supply available to the 529 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 529 Zone facilities are sufficient to meet both existing and future demands. However, sufficient fire flow is not available throughout the existing 529 Zone, as presented in the **Storage Analysis Results** section of this chapter. The proposed West Hill operating area supply improvements described in additional detail in **Chapter 9** will resolve the existing zone-wide fire flow supply deficiency in the 529 Zone.

Table 7-5
529 Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
529 Zone MDD	320	327	336	342
Other Zones MDD ^{1,2}	358	365	117	120
Total Required Supply	678	692	454	462
Available Supply Capacity (gpm)				
Pump Station #4 - Pump 1	900	900	900	900
Pump Station #4 - Pump 2	900	900	900	900
Pump Station #4 - Pump 3	2,000	2,000	2,000	2,000
587 to 529 Zone PRVs ³	0	0	622	615
Total Supply Capacity	3,800	3,800	4,422	4,415
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	3,122	3,108	3,969	3,953

(1) The MDD of the 575 and 587 Zones is included in the 529 Zone supply evaluation for 2016 and 2018. Demands in excess of the 575 and 587 Zone's MDD (i.e., PHD or fire flow) are supplied by the Cambridge Tank.

(2) The MDD of the 354.5 Zone is included in the 529 Zone supply evaluation for 2028 and 2038. Following construction of the proposed West Hill BPS, the primary supply to the 354.5 Zone will be from PRVs between the 529 and 354.5 Zones.

(3) The 2028 and 2038 supply capacity available via PRVs is the difference between the proposed 1,000 gpm West Hill BPS firm capacity and the MDD of the 587 Zone.

In the event that any of the Pump Station #4 pumps are out of service, the remaining pumps have sufficient capacity to meet the 2016 and 2018 MDD of the operating area. Following completion of the proposed West Hill BPS, the available supply capacity to the 529 Zone will be sufficient to meet the projected 20-year MDD of the operating area in the event that either Pump Station #4 or the proposed West Hill BPS are out of service.

575 Zone

The 575 Zone is a closed pressure zone currently provided normal supply by Pump Station #7, which pumps 529 Zone water to the 575 Zone. During fire or emergency events wherein Pump Station #7 pumps more than 450 gpm for 3 minutes, Pump Station #7 shuts down and the 575 Zone converts to the 529 Zone, with supply conveyed to the 575 Zone customers from the 529 Zone via a check valve in Pump Station #7. **Table 7-6** summarizes the current and future supply requirements of the 575 Zone based on existing and projected water demands for the operating area. **Table 7-6** also summarizes the amount of water supply available to the 575 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities

of the 575 Zone facilities are sufficient to meet both existing and future PHDs. However, sufficient fire flow is not available throughout the existing 575 Zone, as presented in the **Storage Analysis Results** section of this chapter. It is anticipated that the 575 Zone will be converted to the 587 Zone in future planning periods and will be supplied directly by a future West Hill Reservoir. The supply evaluation presented in **Table 7-6** is based on the 575 Zone remaining a closed zone (and not being converted to the 587 Zone), for conservatism, and in the event that the conversion to the 587 Zone is delayed. The proposed West Hill operating area supply improvements described in additional detail in **Chapter 9** will resolve the existing fire flow supply deficiency in the 575 Zone.

Table 7-6
575 Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
575 Zone PHD	88	89	94	97
575 Zone Maximum Fire Flow ¹	---	---	---	---
Total Required Supply	88	89	94	97
Available Supply Capacity (gpm)				
Pump Station #7 - Pump 1 ²	0	0	0	0
Pump Station #7 - Pump 2	250	250	250	250
Pump Station #7 - Pump 3	250	250	250	250
Largest Pump Out of Service ³	(250)	(250)	(250)	(250)
Total Supply Capacity	250	250	250	250
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	162	161	156	153

(1) Fire flow is currently provided by the 529 Zone; therefore, it is not included in the 575 Zone supply evaluation. Fire flow in future planning periods will be provided by a future West Hill BPS and reservoir in the 587 Zone; therefore, it is not included in the 575 Zone supply

(2) Pump 1 was removed from service in 2009.

(3) DOH *Water System Design Manual* 10.1.2 recommends that at least 30 psi be provided during PHDs in a closed zone with the largest capacity booster pump out of service.

587 Zone

The 587 Zone currently is a closed pressure zone provided normal supply by Pump Station #6, which pumps 529 Zone water to the 587 Zone. During fire or emergency events wherein Pump Station #6 pumps more than 1,220 gpm for 2 minutes, Pump Station #6 shuts down and the 587 Zone converts to the 529 Zone, with supply conveyed to 587 Zone customers via two check valves from the 529 Zone. It is anticipated that additional supply will be available to the 587 Zone in the 10- and 20-year planning periods following completion of a future West Hill

BPS. A future 587 Zone reservoir is also anticipated to be constructed, providing additional redundancy to the 587 Zone and the West Hill operating area. Following completion of a future 587 Zone reservoir, the 587 Zone will not be considered a closed zone, and the 587 Zone supply facilities will be required to supply the MDD of the 587 Zone with all pumps operational, instead of the current requirement of supplying the PHD of the zone with the largest capacity booster pump out of service. It is anticipated that the primary West Hill operating area supply in future planning periods will be the future West Hill BPS; therefore, the MDD of the other West Hill pressure zones is included in the supply requirements for the future planning periods.

Table 7-7 summarizes the current and future supply requirements of the 587 Zone based on existing and projected water demands for the operating area. **Table 7-7** also summarizes the amount of water supply available to the 587 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 587 Zone facilities are sufficient to meet both existing and future domestic demands. However, sufficient fire flow is not available throughout the existing 587 Zone, as presented in the **Storage Analysis Results** section of this chapter. The proposed West Hill operating area supply improvements described in additional detail in **Chapter 9** will resolve the existing fire flow supply deficiency in the 587 Zone.

Table 7-7
587 Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
587 Zone MDD	---	---	378	385
587 Zone PHD	435	444	---	---
587 Zone Maximum Fire Flow ¹	---	---	---	---
Other Zones MDD	---	---	454	462
Total Required Supply	435	444	831	847
Available Supply Capacity (gpm)				
Pump Station #6 - Pump 1	200	200	200	200
Pump Station #6 - Pump 2	450	450	450	450
Pump Station #6 - Pump 3	550	550	550	550
Pump Station #8 (HWD Intertie) ²	---	---	---	---
Largest Pump Out of Service ³	(550)	(550)	0	0
Future West Hill BPS Firm Capacity	---	---	1,000	1,000
Total Supply Capacity	650	650	2,200	2,200
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	215	206	1,369	1,353

(1) Fire flow is currently provided by the 529 Zone; therefore, it is not included in the 587 Zone supply evaluation. Fire flow in future planning periods will be provided by a future West Hill reservoir in the 587 Zone, and is not included in the 587 Zone supply evaluation.

(2) Pump Station #8 is used in emergency situations to pump water from Highline Water District to the 587 Zone and other West Hill Zones. Pump Station #8 consists of three identical 400 gpm pumps equipped with VFDs, but is not included in the 587 Zone supply evaluation because the facility is used only when Pump Station #6 is out of service.

(3) DOH *Water System Design Manual* 10.1.2 recommends that at least 30 psi be provided during PHDs in a closed zone with the largest capacity booster pump out of service. The largest pump was not assumed to be out of service in future planning periods wherein a future 587 Zone West Hill reservoir is constructed and the 587 Zone is no longer a closed pressure zone.

East Hill Operating Area

Water supply to the East Hill operating area currently is provided by multiple sources directly to the 416 and 590 Zones, with the supply to the other East Hill pressure zones conveyed by Pump Station #5 and multiple PRVs. The easterly portion of the existing 590 Zone is expected to be converted to a 640 Zone prior to 2028; therefore, a 640 Zone supply analysis is included within this section. The proposed 640 Zone creation improvements are described in additional detail in **Chapter 9**.

The Armstrong Springs Wells, Seven Oaks Well, and RWSS POD #3 can supply either the 240 Zone via the Kent Springs Transmission Main or the East Hill operating area. For the purposes of the supply analysis, supply from the Armstrong Springs Wells and the Seven Oaks Well were assumed to be entirely available to the 240 Zone because RWSS POD #3 and other supply facilities are capable of supplying the East Hill operating area and have sufficient capacity to meet the existing and projected supply requirements of the East Hill operating area without supply from the Armstrong Springs Wells and the Seven Oaks Well. The majority of the City's total RWSS supply historically has been to the 590 Zone, with approximately 67 percent supplied to the 590 Zone in 2016 compared to approximately 33 percent supplied to the 240 Zone in 2016. The 2016 RWSS supply percentages have been assumed to be applicable for the 2018, 2028, and 2038 planning periods.

416 Zone

The 416 Zone does not have any direct service connections but includes the 6 MG #1 Reservoir which serves as the termination point of the Clark Springs Transmission Main. Water stored in the 6 MG #1 Reservoir may be pumped to the 485 Zone or 590 Zone by Pump Station #5. Water pumped to the 485 Zone is stored in the 125K Tank, is consumed by customers within the 485 Zone, and is conveyed to five zones each supplied by a single PRV station (271 Alvord, 308 Hilltop, 339 Seattle, 366 Stetson, and 368 Weiland Zones). The 416 Zone supply analysis considers the combined MDD of these pressure zones.

Supply from the Armstrong Springs Wells, Clark Springs, the Seven Oaks Well, and the 590 Zone (via a normally closed valve at the 114th Street valve station) can be conveyed to the 416 Zone in the Clark Springs Transmission Main. Supply from the 590 Zone can also be conveyed to the 416 Zone through a bypass valve in the Pump Station #5 pump manifold. For the purposes of these analyses, supply from the Armstrong Springs Wells, the Seven Oaks Well, and the 590 Zone were assumed to be entirely available to the 240 Zone because the supply capacity of Clark Springs is sufficient to meet the combined MDD of the pressure zones supplied by the 416 Zone. In the event that the Clark Springs source is out of service or is otherwise unable to supply the 416 Zone, supply from the Armstrong Springs Wells and the Seven Oaks Well is capable of supplying the 416 Zone.

Table 7-8 summarizes the current and future supply requirements of the 416 Zone based on existing and projected water demands for the zone. **Table 7-8** also summarizes the current and future amount of water supply available to the 416 Zone. The results of the analyses indicate that the existing and proposed configurations are of sufficient capacity to meet both existing and future demands.

Table 7-8
416 Zone Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
416 Zone MDD ¹	0	0	0	0
Other Zones MDD ²	467	476	554	630
Total Required Supply	467	476	554	630
Available Supply Capacity (gpm)				
Armstrong Springs Wells ³	0	0	0	0
Clark Springs	5,400	5,400	5,400	5,400
Seven Oaks Well ³	0	0	0	0
590 Zone Intertie at 114th Street Valve Station	0	0	0	0
Total Supply Capacity	5,400	5,400	5,400	5,400
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	4,933	4,924	4,846	4,770

(1) No direct service connections exist within the 416 Zone. Water stored in, and supplied to, the 416 Zone is conveyed to other pressure zones via Pump Station #5 and the transmission main to the Garrison Creek (6 MG #2) Reservoir.

(2) The MDD of the 271 Alvord, 308 Hilltop, 339 Seattle, 366 Stetson, 368 Weiland, and 485 Zones are included in the 416 Zone supply evaluation. Demands in excess of these zone's MDD (i.e., PHD or fire flow) are supplied by the 125K Tank in the 485 Zone.

(3) Supply from the Armstrong Springs Wells and the Seven Oaks Well were assumed to be entirely available to the 240 Zone.

485 Zone

The 485 Zone is primarily supplied by Pump Station #5, with supplemental supply provided from the 590 Zone via multiple PRV stations. During normal operations, the Pump Station #5 small pumps (Pumps 1 and 2) supply the 485 Zone. Pump 2 is a dual speed pump that is also capable of supplying the 590 Zone. Pump Station #5 is required to supply the MDD of the 485 Zone, as well as the MDD of the 271 Alvord, 308 Hilltop, 339 Seattle, 366 Stetson, and 368 Weiland Zones, which are supplied via subsequent PRV stations. **Table 7-9** summarizes the current and future supply requirements of the 485 Zone based on existing and projected water demands for the zone. **Table 7-9** also summarizes the amount of water supply available to the 485 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 485 Zone facilities are sufficient to meet both existing and future MDDs, with and without the largest pumping unit in service.

Table 7-9
485 Zone (Open System) Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
485 Zone MDD	404	412	463	513
Other Zones MDD ¹	63	64	91	117
Total Required Supply	467	476	554	630
Available Supply Capacity (gpm)				
Pump Station #5 - Pump 1	1,225	1,225	1,225	1,225
Pump Station #5 - Pump 2	1,225	1,225	1,225	1,225
Pump Station #5 - Pump 3 ²	0	0	0	0
Pump Station #5 - Pump 4 ²	0	0	0	0
590 to 485 Zone PRVs ³	6,750	6,750	6,750	6,750
Total Supply Capacity	9,200	9,200	9,200	9,200
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	8,733	8,724	8,646	8,570

(1) The MDD of the 271 Alvord, 308 Hilltop, 339 Seattle, 366 Stetson, and 368 Weiland Zones are included in the 485 Zone supply evaluation. Demands in excess of these zone's MDD (i.e., PHD or fire flow) are supplied by the 125K Tank.

(2) Pump Station #5 large pumps supply the 590 Zone and are unavailable to provide direct supply to the 485 Zone.

(3) Surplus supply available in the 590 Zone presented as available to the 485 Zone, up to the maximum physical capacity of the PRVs, which is calculated to be 5,400 gpm based on the maximum suggested intermittent flow through three 6-inch-diameter Cla-Val 90-01 PRVs.

As presented in the **Storage Analysis Results** section of this chapter, the only direct storage facility in the 485 Zone is the 125K Tank, which does not have sufficient capacity to meet the storage needs of the 485 Zone and subsequent zones via PRVs. A closed system supply evaluation for the 485 Zone is shown in **Table 7-10**, which indicates that sufficient supply from the 590 Zone can be conveyed to the 485 Zone via PRVs in the event that the 125K Tank and the Pump Station #5 small pumps (Pumps 1 and 2) are offline to meet the existing and future demands of the 485 Zone.

Table 7-10
485 Zone (Closed System) Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
485 Zone PHD	590	602	677	749
Other Zones PHD ¹	92	94	133	171
Maximum Fire Flow Requirement ²	3,282	3,282	3,282	3,282
Total Required Supply	3,964	3,978	4,091	4,203
Available Supply Capacity (gpm)				
Pump Station #5 - Pump 1	0	0	0	0
Pump Station #5 - Pump 2	0	0	0	0
Pump Station #5 - Pump 3 ³	0	0	0	0
Pump Station #5 - Pump 4 ³	0	0	0	0
590 to 485 Zone PRVs ⁴	6,750	6,750	6,750	6,750
Total Supply Capacity	6,750	6,750	6,750	6,750
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	2,786	2,772	2,659	2,547

(1) The PHD of the 271 Alvord, 308 Hilltop, 339 Seattle, 366 Stetson, and 368 Weiland Zones are included in the 485 Zone supply evaluation.

(2) Kent Hillside Church.

(3) Pump Station #5 large pumps supply the 590 Zone and are unavailable to provide direct supply to the 485 Zone.

(4) Surplus supply available in the 590 Zone presented as available to the 485 Zone, up to the maximum physical capacity of the PRVs, which is calculated to be 5,400 gpm based on the maximum suggested intermittent flow through three 6-inch-diameter Cla-Val 90-01 PRVs.

590 Zone

The 590 Zone is supplied by RWSS POD #3, the East Hill Well, and Pump Station #5. During normal operations, the Pump Station #5 small pumps (Pumps 1 and 2) supply the 485 Zone. Pump 2 is a dual speed pump that is also capable of supplying the 590 Zone. For the purposes of the supply analyses presented in this section, the Pump 2 was assumed to be unavailable to the 590 Zone. The Pump Station #5 large pumps (Pumps 3 and 4) supply the 590 Zone during normal operations.

The majority of the City's total RWSS supply has historically been to the 590 Zone, with approximately 67 percent supplied to the 590 Zone in 2016 compared to approximately 33 percent supplied to the 240 Zone in 2016. The 2016 RWSS supply percentages have been assumed to be applicable for the 2018, 2028, and 2038 planning periods. The easterly portion of the existing 590 Zone is expected to be converted to a 640 Zone prior to 2028 that will be

supplied by a future 590 to 640 Zone BPS. The 590 Zone supply requirements include the 640 Zone MDD in the future 2028 and 2038 planning periods.

Table 7-11 summarizes the current and future supply requirements of the 590 Zone based on existing and projected water demands for the zone. **Table 7-11** also summarizes the amount of water supply available to the 590 Zone. The results of the analyses indicate that the existing and proposed configurations and capacities of the 590 Zone facilities are sufficient to meet both existing and future MDDs, with and without the largest 590 Zone supply facility in service.

Table 7-11
590 Zone Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
590 Zone MDD	3,710	3,786	2,822	2,912
Other Zones MDD ¹	0	0	1,098	1,132
Total Required Supply	3,710	3,786	3,920	4,045
Available Supply Capacity (gpm)				
Pump Station #5 - Pump 1	0	0	0	0
Pump Station #5 - Pump 2 ²	0	0	0	0
Pump Station #5 - Pump 3	1,950	1,950	1,950	1,950
Pump Station #5 - Pump 4	1,950	1,950	1,950	1,950
East Hill Well	1,900	1,900	1,900	1,900
King County WD 111 Intertie ³	---	---	---	---
Soos Creek WSD Intertie ⁴	---	---	---	---
RWSS POD #3 ⁵	5,852	5,852	5,852	5,852
Total Supply Capacity	11,652	11,652	11,652	11,652
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	7,942	7,866	7,732	7,607

(1) The MDD of the 640 Zone is included in the 590 Zone supply evaluation for 2028 and 2038.

(2) Pump Station #5 Pump 2 was assumed to be unavailable to the 590 Zone.

(3) The combined capacity of the three 6-inch meters that comprise the intertie with Water District 111 is 2.0 MGD. The intertie is a two-way intertie and is only used during emergency conditions; therefore it is not included in this supply capacity evaluation.

(4) The intertie has a capacity of 1.0 MGD, providing water from SCWSD's 627 Pressure Zone to the City's 590 Zone during emergency conditions; therefore it is not included in this supply capacity evaluation.

(5) The City's portion of the available RWSS capacity is 12.64 MGD (8,778 gpm), with water being supplied to the 240 Zone (via the Kent Springs Transmission Main) or the 590 Zone. RWSS supply is provided at two connection points; RWSS POD #1, which conveys supply directly to the 240 Zone; and RWSS POD #3, which can supply either the 240 Zone or the 590 Zone. The majority of the City's total RWSS supply has historically been to the 590 Zone. In 2016, approximately 67 percent of the City's RWSS supply was conveyed to the 590 Zone, with approximately 33 percent of the RWSS supply conveyed to the 240 Zone. For the purposes of these analyses, 67 percent of the City's RWSS capacity was assumed to be available in the 590 Zone, with the remaining 33 percent available in the 240 Zone.

640 Zone

The 640 Zone is expected to be created prior to the 2028 planning period and consists of the easterly portion of the existing 590 Zone. The 640 Zone will be supplied by two future 640 Zone BPSs, and the existing 640 Tank will provide water storage for the zone. One future 640 Zone BPS is planned to be constructed at the Blue Boy Standpipe site, and is anticipated to consist of three 1,750 gpm pumps, resulting in a firm capacity of 3,500 gpm with one pump out of service. The other future 640 Zone BPS is planned to be constructed at the RWSS POD #3 site, and is also anticipated to consist of three 1,750 gpm pumps, resulting in a firm capacity of 3,500 gpm with one pump out of service, and providing the future 640 Zone a redundant supply facility. **Table 7-12** summarizes the future supply requirements of the 640 Zone based on projected water demands for the zone. **Table 7-12** also summarizes the amount of water supply available to the 640 Zone. The results of the analyses indicate that the proposed configuration and capacity of one of the future 640 Zone BPSs is sufficient to meet future MDDs with the largest pumping unit out of service.

Table 7-12
640 Zone Supply Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Required Supply (gpm)				
640 Zone MDD	---	---	1,098	1,132
Other Zones MDD	---	---	0	0
Total Required Supply	---	---	1,098	1,132
Available Supply Capacity¹ (gpm)				
640 Zone BPS (Blue Boy Standpipe Site)	---	---	3,500	3,500
640 Zone BPS (RWSS POD #3 Site)	---	---	3,500	3,500
Total Supply Capacity	---	---	7,000	7,000
Surplus or Deficient Supply Capacity (gpm)				
Surplus or Deficiency	---	---	5,902	5,868

(1) Firm capacity for each BPS shown (i.e., largest pumping unit in each BPS out of service).

FACILITY DEFICIENCIES

The West Hill operating area lacks redundancy without the use of the Highline Water District Emergency Intertie, as Pump Station #3 is the only facility that supplies the West Hill operating area, and Pump Station #4 is the only facility that can supply the 529, 575, and 587 Zones. If Pump Station #4 was out of service, these zones would need to be supplied by the Highline Water District Emergency Intertie, which is limited in capacity to 1,200 gpm based on the capacity of Pump Station #8. If Pump Station #3 is out of service, the West Hill operating area could be temporarily supplied by the water stored in the Reith Road Standpipe, which has capacity to provide approximately 1.7 days of storage to the West Hill operating area during existing ADD conditions. Improvements to provide redundancy to the West Hill operating area by constructing additional facilities are described in **Chapter 9**.

The O'Brien Well is not normally operated because 480-volt power is not available at the facility and the City has to transport a generator to the site to operate the well pump, sand is present inside the well screen, and high levels of manganese are present in the groundwater. Manganese is a secondary contaminant that can stain fixtures and laundry and may lead to aesthetic customer complaints if not mitigated. **Chapter 9** identifies improvements to provide 480-volt power to the site, redevelop the well, and provide a manganese treatment facility.

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 below.

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 the average amount of drawdown in the reservoir during normal operating conditions, which represents a volume of storage that most likely will 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. 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 with Equation 9-1 from the DOH *Water System Design Manual* that considers the difference between the system PHD and the combined capacity of the supply sources.

Equation 9-1: $ES = (PHD - Q_s)(150 \text{ minutes})$, 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.

The capacities of the sources that supply each zone are sufficient to meet the peak hour demands of their zones. Therefore, the equalizing storage requirement for each 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, which has multiple supply sources, is based on Equation 9-3 from the DOH *Water System Design Manual*, which requires average day demand and supply source capacity data. The amount required is sufficient to supply the system for a 48-hour period when the primary supply facility is out of service and the system is experiencing average day demands.

Equation 9-3: $SB = (2 \text{ days})[(ADD)(N) - t_m (Q_s - Q_L)]$

Where:

SB = Standby Storage, in gallons

ADD = Average Day Demand per equivalent residential unit (ERU), in gallons per day (gpd) per ERU

N = Number of ERUs

Q_s = Sum of all installed and continuously available sources, except emergency supply, in gpm

Q_L = The capacity of the largest source available to the system, in gpm

t_m = Time the remaining sources are pumped on the day when the largest source is not available, in minutes. Unless otherwise restricted, this value is 1,440 minutes.

In addition to the standby storage requirements calculated from Equation 9-3, 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, the Puget Sound Regional 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.

The fire flow storage requirements shown in the analyses that follow are based on the maximum fire flow requirements in each pressure zone. The maximum fire flow requirement in the 240 Zone is 5,000 gpm for a 4-hour duration, which is equivalent to 1,200,000 gallons. The maximum fire flow requirement in the 354.5 Zone is 1,650 gpm for a 2-hour duration, which is equivalent to 198,000 gallons. The maximum fire flow requirement in the 529 Zone operating area and in the 587 Zone operating area is 4,600 gpm for a 4-hour duration, which is equivalent to 1,104,000 gallons. The maximum fire flow requirement in the 485 Zone is 3,282 gpm for a 4-hour duration, which is equivalent to 787,680 gallons. The maximum fire flow requirement in the 590 Zone operating area is 4,600 gpm for a 4-hour duration, which is equivalent to 1,104,000 gallons. The maximum fire flow requirement in the future 640 Zone operating area is 3,500 gpm for a 3-hour duration, which is equivalent to 630,000 gallons.

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 without pumping. 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

System-Wide Storage

The storage analyses are based on an evaluation of the existing storage facilities providing water to the City's distribution system. The maximum combined storage capacity of the City's reservoirs is 23.33 MG, as shown in **Table 7-13**. Operational storage is based on BPS setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the DOH *Water System Design Manual*. Standby storage is based on providing 200 gallons of storage per ERU, which is more conservative than the results of Equation 9-3 from the DOH *Water System Design Manual*. There is currently 3.76 MG of dead storage (i.e., non-usable storage) in the water system, of which 3.65 MG is within the 590 Zone. The results of the existing storage evaluation, as shown in **Table 7-13**, indicate that the existing (2018) system has a storage surplus of approximately 5.82 MG.

Table 7-13
System-Wide Storage Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	23.33	23.33	30.28	30.28
Dead (Non-usable) Storage	3.76	3.76	6.06	6.06
Total Available Storage	19.57	19.57	24.22	24.22
Required Storage (MG)				
Operational Storage	3.57	3.57	4.12	4.12
Equalizing Storage	0.00	0.00	0.00	0.00
Standby Storage	8.97	9.22	9.61	10.26
Fire Flow Storage	1.20	1.20	1.20	1.20
Total Required Storage	13.74	13.99	14.93	15.58
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	5.82	5.58	9.29	8.64

The system's future storage requirements, also shown in **Table 7-13**, were computed for the 10- and 20-year planning periods based on the corresponding demand projections shown in **Chapter 4**. The 10- and 20-year planning periods include additional usable storage within the existing 640 Tank that will become available to the system as part of the 640 Zone conversion project, and the construction of 3.00 MG of usable storage in the West Hill operating area. The City is projected to have a system-wide storage surplus through the 20-year planning period.

Valley Operating Area

240 Zone Storage

The City's 240 Zone, which is provided storage by the 6 MG #2 and Guiberson Reservoirs, has an existing combined storage capacity of 9.00 MG, as shown in **Table 7-14**. Operational storage is based on source setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the *DOH Water System Design Manual*. Standby storage is based on a rate of 200 gpd per ERU in the zone, which is more conservative than the results of Equation 9-3 from the *DOH Water System Design Manual*. There is currently no dead storage (i.e., non-usable storage) in the 240 Zone. The results of the storage evaluation, as shown in **Table 7-14**, indicate that the 240 Zone storage facilities have sufficient capacity to meet the existing and future storage requirements through the 20-year planning period.

Table 7-14
240 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	9.00	9.00	9.00	9.00
Dead (Non-usable) Storage	0.00	0.00	0.00	0.00
Total Available Storage	9.00	9.00	9.00	9.00
Required Storage (MG)				
Operational Storage	0.49	0.49	0.49	0.49
Equalizing Storage	0.00	0.00	0.00	0.00
Standby Storage	5.15	5.29	5.49	5.97
Fire Flow Storage	1.20	1.20	1.20	1.20
Total Required Storage	6.84	6.98	7.18	7.65
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	2.16	2.02	1.82	1.35

As presented in **Chapter 9**, the Guiberson Reservoir is proposed to be replaced within the 20-year planning period. The City is considering constructing the replacement reservoir with a larger capacity than the 3.00 MG capacity of the existing reservoir, with the proposed reservoir capacity to be identified during the predesign and design phases of the project. The storage capacity evaluation presented in **Table 7-14** assumes the Guiberson Reservoir storage volume to be 3.00 MG through the 20-year planning period, and any increase in storage volume that occurs when the Guiberson Reservoir is replaced will increase the surplus storage capacity available in the 240 Zone.

West Hill Operating Area

354.5 Zone Storage

The City's 354.5 Zone, which is provided storage by the Reith Road Standpipe, has an existing storage capacity of 1.01 MG, as shown in **Table 7-15**. Operational storage is based on BPS setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the *DOH Water System Design Manual*. Standby storage is based on the results of Equation 9-3 from the *DOH Water System Design Manual*, which is more conservative than a rate of 200 gpd per ERU in the zone. There is currently 0.12 MG of dead storage (i.e., non-usable storage) in the 354.5 Zone. The results of the storage evaluation, as shown in **Table 7-15**, indicate that the 354.5 Zone storage facility has sufficient capacity to meet the existing and future storage requirements through the 20-year planning period. For conservatism, the future system 354.5 Zone storage evaluation shown in **Table 7-15** does not include consideration for a future West Hill Reservoir that is proposed to be constructed in the 587 Zone to provide additional storage capacity in the West Hill operating area.

Table 7-15
354.5 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	1.01	1.01	1.01	1.01
Dead (Non-usable) Storage	0.12	0.12	0.12	0.12
Total Available Storage	0.90	0.90	0.90	0.90
Required Storage (MG)				
Operational Storage	0.24	0.24	0.24	0.24
Equalizing Storage	0.00	0.00	0.00	0.00
Standby Storage	0.13	0.13	0.16	0.16
Fire Flow Storage	0.20	0.20	0.20	0.20
Total Required Storage	0.57	0.57	0.59	0.60
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	0.33	0.33	0.30	0.30

529 Zone Storage

The City's 529 Zone, which is currently provided storage by the Cambridge Tank, has an existing storage capacity of 0.30 MG, as shown in **Table 7-16**. Operational storage is based on BPS setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the *DOH Water System Design Manual*. Standby storage is based the results of Equation 9-3 from the *DOH Water System Design Manual*, which is more conservative than a rate of 200 gpd per ERU in the zone. There is currently no dead storage (i.e., non-usable storage) in the 529 Zone. The Cambridge Tank currently provides fire flow storage for not only the 529 Zone, but also the 575 and 587 Zones. The results of the storage evaluation, as shown in **Table 7-16**, indicate that the Cambridge Tank does not have sufficient capacity to meet the existing and future storage requirements through the 20-year planning period. During a fire or emergency event, supply to the 529 Zone is initially provided by the Cambridge Tank, but as shown in **Table 7-16**, the Cambridge Tank capacity is significantly less than the volume required for fire flow. As the Cambridge Tank water level is reduced, Pump Station #4 is utilized to provide supply to the 529 Zone during fire or emergency events. Prior to 2028, it is expected that a new West Hill Reservoir will be constructed in the 587 Zone to provide adequate storage for the 529, 575, and 587 Zones, and improve redundancy in the West Hill operating area. The Cambridge Tank will remain operational following the completion of a future West Hill Reservoir and will be normally filled by water conveyed from the future West Hill Reservoir via a future PRV proposed to be installed at Pump Station #7.

Table 7-16
529 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected ¹	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	0.30	0.30	0.30	0.30
Dead (Non-usable) Storage	0.00	0.00	0.00	0.00
Total Available Storage	0.30	0.30	0.30	0.30
Required Storage (MG)				
Operational Storage	0.16	0.16	0.16	0.16
Equalizing Storage	0.00	0.00	0.00	0.00
Standby Storage	0.90	0.92	0.95	0.96
Fire Flow Storage	1.10	1.10	1.10	1.10
Total Required Storage	2.16	2.18	2.21	2.23
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	(1.86)	(1.88)	(1.91)	(1.93)

(1) A proposed 587 Zone West Hill reservoir will provide future system storage for the 529, 575, and 587 Zones.

587 Zone Storage

The City's 587 Zone currently does not have water storage, and adequate fire flow storage is not available in the three West Hill operating zones with the highest hydraulic grades (529, 575, and 587 Zones). A future 587 Zone reservoir is expected to be constructed prior to 2028 to improve fire flow protection and reliability in the West Hill operating area. **Table 7-17** presents the projected 2028 and 2038 storage capacity evaluation for the 587 Zone. The storage requirements of the 354.5, 529, and 575 Zones are included in the 587 Zone evaluation shown in **Table 7-17**, which indicate that the proposed 587 Zone reservoir will provide sufficient capacity to meet the existing and future storage requirements of the 587 Zone operating area, which includes the entire West Hill operating area (354.5, 529, 575, and 587 Zones), through the 20-year planning period.

Table 7-17
587 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	---	---	5.30	5.30
Dead (Non-usable) Storage	---	---	2.30	2.30
Total Available Storage	---	---	3.00	3.00
Required Storage (MG)				
Operational Storage	---	---	0.55	0.56
Equalizing Storage	---	---	0.00	0.00
Standby Storage	---	---	0.65	0.66
Fire Flow Storage ¹	---	---	1.50	1.50
Total Required Storage	---	---	2.70	2.72
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	---	---	0.31	0.28

(1) Existing maximum fire flow requirement in the 587 and 575 Zones is 4,600 gpm for 4 hours (Totem Middle School), resulting in a fire flow storage volume of 1.10 MG. The City anticipates redevelopment within the 587 Zone, and is planning for a future maximum fire flow requirement of 5,000 gpm for 5 hours in the 587 Zone, resulting in a fire flow storage volume of 1.50 MG.

East Hill Operating Area

590 Zone Storage

The City's 590 Zone, which is currently provided storage by the 3.5 MG Tank, the Blue Boy Standpipe, and the 640 Tank, has an existing combined storage capacity of 6.88 MG as shown in **Table 7-18**. Operational storage is based on BPS setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the *DOH Water System Design Manual*. Standby storage is based on a rate of 200 gpd per ERU in the zone, which is more conservative than the results of Equation 9-3 from the *DOH Water System Design Manual*. There is currently 3.65 MG of dead storage (i.e., non-usable storage) in the 590 Zone, the majority of which will be eliminated following the 640 Zone conversion project that is described in more detail in **Chapter 9**. The results of the 590 Zone storage evaluation, as shown in **Table 7-18**, indicate that the 590 Zone storage facilities do not have sufficient capacity to meet the existing storage requirements.

Table 7-18
590 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	6.88	6.88	4.50	4.50
Dead (Non-usable) Storage	3.65	3.65	1.32	1.32
Total Available Storage	3.23	3.23	3.17	3.17
Required Storage (MG)				
Operational Storage	0.90	0.90	0.21	0.21
Equalizing Storage	0.00	0.00	0.00	0.00
Standby Storage	2.86	2.94	2.19	2.26
Fire Flow Storage	1.10	1.10	1.10	1.10
Total Required Storage	4.87	4.95	3.50	3.57
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	(1.64)	(1.72)	(0.33)	(0.40)

Prior to 2028, the easterly portion of the 590 Zone is expected to be converted to a 640 Zone, which reduces the available and required storage in the 590 Zone. However, the City will be able to fill the 640 Tank to a maximum hydraulic grade of 645 feet following implementation of the 640 Zone conversion, resulting in approximately 1.65 MG of additional storage capacity. Additionally, the highest existing 590 Zone service connections will be transferred to the 640 Zone in the future, reducing the dead storage volume in the future 590 Zone storage facilities (Blue Boy Standpipe and the 3.5 MG Tank) by approximately 1.39 MG. Future surplus storage volume in the 640 Zone, presented in the **640 Zone Storage** section of this chapter, will be available to the 590 Zone via multiple PRVs to resolve the projected 10- and 20-year planning period storage deficiencies shown in **Table 7-18**.

640 Zone Storage

Storage in the 640 Zone will be provided by the existing 640 Tank, which is currently operated at a maximum hydraulic grade of 590 feet. In the future, the 640 Tank will provide 3.10 MG of usable storage to the 640 Zone and will be operated at a maximum hydraulic grade of 645 feet. **Table 7-19** presents the projected 2028 and 2038 storage evaluation for the 640 Zone, and indicates that the 640 Tank has sufficient capacity to meet the future 640 Zone storage requirements through the 20-year planning period. The projected 640 Zone storage surplus is also sufficient to resolve the projected 590 Zone storage deficiencies in the 10- and 20-year planning periods.

Table 7-19
640 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	---	---	4.03	4.03
Dead (Non-usable) Storage	---	---	0.93	0.93
Total Available Storage	---	---	3.10	3.10
Required Storage (MG)				
Operational Storage	---	---	0.81	0.81
Equalizing Storage	---	---	0.00	0.00
Standby Storage	---	---	0.85	0.88
Fire Flow Storage	---	---	0.63	0.63
Total Required Storage	---	---	2.29	2.32
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	---	---	0.81	0.78

The combined storage requirements of the 590 and 640 Zones following the 640 Zone conversion project is shown in **Table 7-20**. The combined 590 and 640 Zones storage requirements are based on the sum of the operational and standby storage volumes in the two zones. Equalizing storage is based on the results of Equation 9-1 from the *DOH Water System Design Manual*. Fire flow storage is based on the maximum planning-level fire flow requirement in the 590 and 640 Zones, which is 4,600 gpm for 4 hours based on the requirements of the Fred Meyer located on SE 240th Street, The Home Depot located on 104th Avenue SE, and Kent-Meridian High School located on SE 256th Street.

Table 7-20
Combined 590 and 640 Zone Future Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
Maximum Storage Capacity	---	---	8.53	8.53
Dead (Non-usable) Storage	---	---	2.26	2.26
Total Available Storage	---	---	6.27	6.27
Required Storage (MG)				
Operational Storage	---	---	1.02	1.02
Equalizing Storage	---	---	0.00	0.00
Standby Storage	---	---	3.04	3.14
Fire Flow Storage	---	---	1.10	1.10
Total Required Storage	---	---	5.16	5.26
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	---	---	1.11	1.01

485 Zone Storage

The City's 485 Zone, which is provided direct storage by the 125K Tank, has an existing storage capacity of 0.13 MG. The City's 6 MG #1 Reservoir provides indirect storage to the 485 Zone via Pump Station #5, which pumps from the 6 MG #1 Reservoir to the 125K Tank and the 485 Zone. As described in the **Supply Analysis Results** section of this chapter and shown in **Table 7-10**, the City can utilize Pump Station #5 to provide supply to the 485 Zone during peak demand and emergency demand conditions. Therefore, the combined storage capacity of the 125K Tank and the 6 MG #1 Reservoir, 6.14 MG, is considered in the 485 Zone storage capacity evaluation shown in **Table 7-21**. Operational storage is based on BPS setpoints provided by the City. Equalizing storage is based on the results of Equation 9-1 from the DOH *Water System Design Manual*, with demands in Equation 9-1 equivalent to the maximum pumping capacity of Pump Station #5 to represent the maximum conveyance out of the 6 MG #1 Reservoir, and a supply rate equivalent to the Clark Springs capacity. Standby storage is based on a rate of 200 gpd per ERU in the zone, which is more conservative than the results of Equation 9-3 from the DOH *Water System Design Manual*. There is currently no dead storage (i.e., non-usable storage) in either reservoir. The results of the 485 Zone storage evaluation, as shown in **Table 7-21**, indicate that the 125K Tank and the 6 MG #1 Reservoir have sufficient capacity to meet the existing and future storage requirements of the 485 Zone through the 20-year planning period.

Table 7-21
485 Zone Storage Capacity Evaluation

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Available/Usable Storage (MG)				
485 Zone Maximum Storage Capacity	6.14	6.14	6.14	6.14
485 Zone Dead (Non-usable) Storage	0.00	0.00	0.00	0.00
Total Available Storage	6.14	6.14	6.14	6.14
Required Storage (MG)				
Operational Storage	1.99	1.99	1.99	1.99
Equalizing Storage	0.23	0.23	0.23	0.23
Standby Storage	0.36	0.37	0.43	0.49
Fire Flow Storage	0.79	0.79	0.79	0.79
Total Required Storage	3.37	3.38	3.44	3.50
Surplus or Deficient Storage (MG)				
Surplus or Deficient Amount	2.77	2.76	2.70	2.64

FACILITY DEFICIENCIES

In order to resolve the storage deficiency in the West Hill operating area (as shown within the **529 Zone Storage** evaluation), a new 587 Zone reservoir will be constructed in the West Hill area. The City is considering a currently undeveloped property on the West Hill between 38th Avenue S and Military Road S, adjacent to S 248th Street. Construction of a new 587 Zone reservoir is described in **Chapter 9**.

In order to resolve the storage deficiency in the City's 590 Zone, the City is converting the easterly portion of the 590 Zone to a 640 Zone, which reduces the available and required storage in the 590 Zone. The City will be able to fill the 640 Tank to a maximum hydraulic grade of 645 feet following implementation of the 640 Zone conversion (currently, the maximum hydraulic grade of the 640 Tank is 590 feet), resulting in approximately 1.65 MG of additional storage capacity. Additionally, the highest existing 590 Zone service connections will be transferred to the 640 Zone in the future, reducing the dead storage volume in the future 590 Zone storage facilities by approximately 1.39 MG. The resulting storage evaluation for the combined 590 and 640 Zones indicates sufficient capacity will be available in the storage facilities to meet the requirements through the 20-year planning period.

The City's 2016 sanitary survey identified the need to retrofit or replace the air vents on the 6 MG #1 Reservoir, 125K Tank, Blue Boy Standpipe, Cambridge Tank, and the Reith Road Standpipe. The Cambridge Tank retrofit has been completed, and the 125K Tank retrofit is being designed in 2018 with construction planned for 2019. The retrofits for the remaining three tanks are scheduled to be completed by 2021, as identified in **Chapter 9**.

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 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 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.) with the City's most recent Geographic Information System (GIS) shapefile to reflect the best-known information on distribution system geometry and pipe characteristics, including diameter, material, and installation year.

Hydraulic model pipe roughness coefficients were initialized with computed estimates based on the water main material and age information from the City's water main GIS shapefile. Based on the premise that the internal surface of water mains become rougher as they get older, older water mains were assigned higher roughness coefficients than newer water mains. The junction node elevation data were updated using King County provided 5-foot contour data. A hydraulic model

node diagram, providing a graphical representation of the model of the water system, is contained in **Appendix L**.

Demand Data

The hydraulic model of the existing system contains demands based on 2016 individual customer meter water demand data provided by the City. Demand data for each parcel was distributed to the closest representative junction node of the model based on the recorded usage, which was then uniformly scaled to simulate the 2016 MDD and PHD. 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 2028, and 20-year demand levels that are projected for the year 2038.

The future demand distribution is based on planning area estimates identified in **Chapter 3**, which include population projections in Traffic Analysis Zones (TAZ) and employment projections in census tracts provided by the Puget Sound Regional Council (PSRC). The resulting ADD allocation for each pressure zone is shown in **Table 7-22**.

Table 7-22
Pressure Zone Demand Allocation

Pressure Zone	ADD (gpm)			
	2016 (Base)	2018 (Existing)	2028 (+10 years)	2038 (+20 years)
240	3,070	3,133	3,251	3,534
271 Alvord	12	12	16	20
308 Hilltop	0.4	0.4	1	1
339 Seattle	11	11	18	23
354.5	45	46	54	55
366 Stetson	2	2	3	3
368 Weiland	3	3	5	6
416	0.0	0.0	0.0	0.0
485	186	189	213	236
529	147	150	155	157
575	28	28	30	31
587	137	140	144	146
590	1,706	1,741	1,298	1,339
640	0.0	0.0	505	521
Total	5,348	5,458	5,691	6,074

Facilities

The hydraulic model of the existing system contains all active, existing system facilities. For the proposed system analyses in the year 2028 and 2038, 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 2028 and 2038 analyses, during a peak period were operating at their normal summertime 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 7-23**.

Table 7-23
Hydraulic Analyses Operational Conditions

Description	PHD Pressure Analyses			Fire Flow Analyses		
	2016	2028 (+10 years)	2038 (+20 years)	2016	2028 (+10 years)	2038 (+20 years)
Demand	2016 PHD	2028 PHD	2038 PHD	2016 MDD	2028 MDD	2038 MDD
Storage Facilities HGL (feet)						
Garrison Creek Reservoir	237.75	237.75	237.75	234.53	234.53	234.53
Guiberson Reservoir	236.50	236.50	236.50	233.28	233.28	233.28
Reith Road Standpipe	345.20	345.20	345.20	337.46	337.46	337.46
6 MG #1 Reservoir	404.00	404.00	404.00	404.00	404.00	404.00
125K Tank	456.31	456.31	456.31	463.51	463.51	463.51
Cambridge Tank	519.35	519.35	519.35	499.11	499.11	499.11
3.5 MG Tank	586.40	586.40	586.40	571.79	560.45	560.45
Blue Boy Standpipe	586.40	586.40	586.40	563.09	551.75	551.75
640 Tank	579.00	620.60	620.60	564.39	601.54	601.54
Future West Hill Reservoir	---	571.23	571.23	---	528.23	528.23
Supply Facilities Status						
208th Street/ 212th Street Wellfield	OFF	OFF	OFF	OFF	OFF	OFF
Armstrong Springs Wells	ON	ON	ON	ON	ON	ON
Clark Springs	ON	ON	ON	ON	ON	ON
East Hill Well	ON	ON	ON	ON	ON	ON
Garrison Creek Well	ON	ON	ON	ON	ON	ON
Kent Springs	ON	ON	ON	ON	ON	ON
O'Brien Well	OFF	OFF	OFF	OFF	OFF	OFF
Seven Oaks Well	ON	ON	ON	ON	ON	ON
RWSS POD #3	ON	ON	ON	ON	ON	ON
BPS Facilities Status						
Pump Station #3	ON	ON	ON	ON	ON	ON
Pump Station #4	ON	ON	ON	ON	ON	ON
Pump Station #5	ON	ON	ON	ON	ON	ON
Pump Station #6	ON	ON	ON	ON	ON	ON
Pump Station #7	ON	ON	ON	ON	ON	ON
Pump Station #8	ON	ON	ON	ON	ON	ON
Future West Hill BPS	---	ON	ON	---	ON	ON
Future 640 Zone BPS (Blue Boy)	---	ON	ON	---	ON	ON
Future 640 Zone BPS (POD #3)	---	---	ON	---	---	ON

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 operational, equalizing, and fire flow storage based on the maximum planning-level fire flow requirement. **Table 7-23** summarizes the operational conditions for the fire flow analyses for the existing and future planning periods.

Calibration

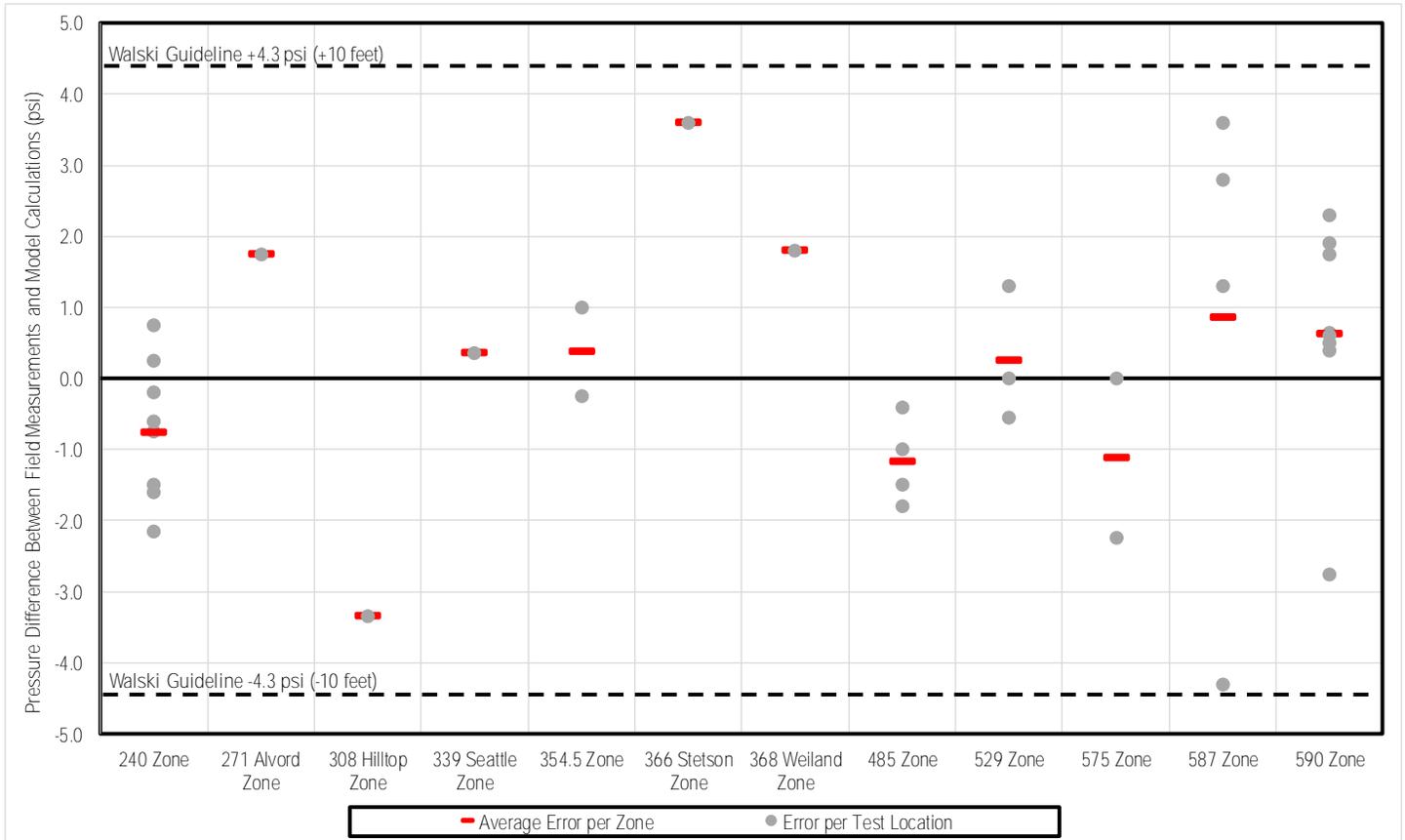
Hydraulic model calibration was completed during the preparation of this Water System Plan (WSP). Hydraulic model calibration is achieved by adjusting the roughness coefficients of the water mains in the model so the resulting pressures and flows closely match the pressures and flows from actual field tests under similar demand and operating conditions. Initial Darcy-Weisbach roughness coefficients were entered in the model based on computed estimates of the coefficients from available pipe age and material data. For example, older water mains were assigned higher roughness coefficients than newer water mains; thereby assuming that the internal surface of water pipe becomes rougher as it gets older. Additional calibration of the model was achieved using field flow and pressure data that were collected throughout the system during hydrant testing for this purpose.

Hydrant flow tests were performed at 51 locations in late 2017, with hydrant flows, static pressures, and residual pressures measured during each test for use in calibrating the hydraulic model. Telemetry data for each of the City's water system facilities were provided in 30-second intervals during the tests and 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). Hydraulic model calibration of the 51 locations was achieved by adjusting the roughness coefficients and connectivity of the water mains, adding check valves at appropriate locations, adding the "small" PRV within each PRV station in the hydraulic model, and updating BPS initial settings and controls. The identification of these differences was generally the result of sensitivity analyses, which consist of iterative model adjustments to assist in troubleshooting the cause of a discrepancy between field measurements and model calculations. Examples of sensitivity analyses performed for the City's hydraulic model include temporarily opening or closing a PRV to identify if the PRV opened in the field but not in the model (or vice versa); temporarily adjusting the pressure setpoints of pumps or valves to determine the impact on system pressures; or temporarily closing pipes or adding check valves to pipes to confirm the presence of a zone valve or check valve at pressure zone boundaries.

The hydraulic model's calculated head loss during the flow tests was within plus or minus 4.3 psi (10 feet) of the field-measured head loss at all 51 hydrants that were flow tested, and within 2.2 psi (5 feet) at 41 of the 51 hydrants. The accuracy of the calibrated hydraulic model is consistent with the guidelines published by Walski et al. (Walski) in the 2003 *Advanced Water Distribution Modeling and Management* book, which suggests that the hydraulic model is able to

predict the hydraulic grade line (HGL) to within 5 to 10 feet at model calibration points during peak demands. A summary of the difference between the hydraulic model’s calculated head loss during the flow tests and the field-measured head loss at each flow test location is shown in **Chart 7-2**.

Chart 7-2
Hydraulic Model Calibration Results Summary



HYDRAULIC ANALYSIS RESULTS

Several 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 pressures throughout the system under base year (i.e., 2016) PHD conditions. Subsequent analyses were performed to determine the pressures throughout the system under future 10- and 20-year PHD conditions. The results of the analyses 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 100 psi.

The City provides at least 30 psi to all existing service connections during PHD conditions, although there are multiple areas receiving less than 40 psi during PHD conditions, as shown in **Table 7-24**. Pressure zone improvements identified in **Chapter 9** increase the pressure above 40 psi at more than half of the low-pressure locations shown in **Table 7-24** within the 20-year planning period.

All water mains with pressures greater than 100 psi, as identified from the analyses, are generally located along pressure zone boundaries. Water services in these areas, as with any future services, are required to be equipped with individual PRVs to limit the maximum pressure to 80 psi. **Figure 7-1** presents a summary of the pressures provided throughout the water system during base year (i.e., 2016) PHD conditions.

Table 7-24
Pressure Analysis Summary

Land Use	Approximate Location	Existing Pressure Zone	Junction No.	2016	Pressure (psi)		
					+10 years w/ Proposed Improvements ¹	+20 years w/ Proposed Improvements ²	+20 years w/ All Improvements ³
Low Pressure Areas							
Single Family 6 Units/Acre	Neighborhood in cul-de-sac of Carter Pl, east of Van De Vanter Ave	339 Seattle Zone	J-2105	30	34	34	34
Single Family 6 Units/Acre	Near intersection of Reith Rd and S 253rd St	354.5 Zone	J-1674	32	32	32	32
Single Family 6 Units/Acre	Near intersection of SE 248th St and 120th Ave SE	590 Zone	J-26570	32	55	55	55
Parks and Open Space	Neighborhood just west of 124th Ave SE at SE 248th St	590 Zone	J-26236	33	55	55	55
Single Family 6 Units/Acre	Near intersection of SE 240th St and 116th Ave SE (First Christian Church)	590 Zone	J-2547	34	65	64	64
Single Family 6 Units/Acre	Neighborhood near SE 244th St and 119th Ave SE	590 Zone	J-2483	34	62	62	62
Single Family 6 Units/Acre	Neighborhood adjacent to and north of S 254th St and 45th Ave S	354.5 Zone	J-533	35	35	35	35
Single Family 6 Units/Acre	Neighborhood in cul-de-sac of SE 237th Pl, east of 112th Ave SE	590 Zone	J-2403	36	74	73	72
Single Family 6 Units/Acre	Near intersection of S 264th St and 34th Ave S	529 Zone	J-1732	36	36	36	36
Single Family 6 Units/Acre	Near intersection of E James St and N Lenora Ave	240 Zone	J-131	38	39	39	40
Medium Density Multifamily	Near intersection of S 248th St and 98th Ave S	485 Zone	J-1601	39	39	39	40
Single Family 4.5 Units/Acre	Neighborhood near 94th Pl S and S 216th Pl	240 Zone	J-25901	39	40	40	40
Single Family 8 Units/Acre	Adjacent to 98th Ave S, between S 248th St and S 243rd St	485 Zone	J-2091	40	40	40	42
Single Family 6 Units/Acre	Approximately the 9700 block between S 239th Pl and S 243rd St	485 Zone	J-26787	41	41	41	43
Single Family 6 Units/Acre	Near intersection of 94th Ave S (Hamilton Rd) and S 233rd Pl	485 Zone	J-2036	42	42	42	45
High Pressure Areas							
Single Family 6 Units/Acre	Neighborhood along 92nd Ave S, north of S 222nd St	485 Zone	J-25910	144	143	143	147
Medium Density Multifamily	Near intersection of Summit Ave N and E Smith St	485 Zone	J-472	129	129	128	131
Single Family 6 Units/Acre	Near intersection of Alexander Ave and E Cherry Hill St	485 Zone	J-1143	129	128	128	130
Single Family 6 Units/Acre	Neighborhoods along 100th Ave SE, north of S 228th Pl	590 Zone	J-26408	126	132	132	128
Single Family 6 Units/Acre	Near intersection of Reiten Rd and E Maclyn St	485 Zone	J-26929	124	124	124	125
Single Family 6 Units/Acre	Near intersection of Alvord Ave N and Spring Ave N	485 Zone	J-2367	120	120	120	123
Single Family 6 Units/Acre	Near intersection of S 222nd St and 93rd Ave S	485 Zone	J-26933	120	120	120	123
Single Family 6 Units/Acre	Near intersection of E Cherry Hill St and Olympic Way	485 Zone	J-1589	120	120	119	121
Single Family 6 Units/Acre	NW side of Scenic Way neighborhood, near Central Ave S and E Titus St	339 Seattle Zone	J-750	114	118	118	118
Single Family 6 Units/Acre	Near intersection of 96th Pl S and 97th Ave S	485 Zone	J-2737	113	113	113	117
Single Family 6 Units/Acre	East side of S 243rd St neighborhood	587 Zone	J-263	110	105	106	106
Single Family 6 Units/Acre	Near intersection of SE 228th St and 101st Pl SE	590 Zone	J-1799	107	113	113	110
Parks and Open Space	Along Canyon Drive near Kent Meridian HS field	590 Zone	J-26746	105	112	112	105
Single Family 6 Units/Acre	Near intersection of 104th Ave SE and SE 267th St	590 Zone	J-648	105	114	114	107
Single Family 6 Units/Acre	Neighborhood near intersection of S 262nd St and 46th Ave S	529 Zone	J-1653	103	103	103	104
Parks and Open Space	Near intersection of S 252nd St and 97th Pl S	590 Zone	J-641	102	108	109	101
Medium Density Multifamily	Near intersection of Lake Fenwick Rd and 46th Ave S	354.5 Zone	J-993	101	101	101	101
Single Family 8 Units/Acre	Neighborhood along Kensington Ave S, south of Reiten Rd	339 Seattle Zone	J-1576	97	101	101	101

(1) Includes 10-year CIP projects presented in Chapter 9, and assumed high priority water main replacement improvements.

(2) Includes 20-year CIP projects presented in Chapter 9, and does not include medium or low priority water main replacement improvements.

(3) Includes 20-year CIP projects presented in Chapter 9, and all medium and low priority water main replacement projects.

The second set of analyses was performed to determine the capability of the water system to provide fire flow throughout the water system under base year MDD conditions. A separate fire flow analysis was performed for each node in the model to determine the available fire flow at a minimum residual pressure of 20 psi in the main adjacent to the hydrant and a maximum allowable water main velocity of 8 feet per second (fps). More than 3,600 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 base year (2016) fire flow analyses is presented in **Figure 7-2**.

Table 4-11 in **Chapter 4** lists the general planning-level fire flow requirements for each land use classification. Since the fire flow requirement varies for buildings within each land use classification, the land use based fire flow requirements are only used as a general target for the primary purpose of the system-wide analyses that were performed for this WSP. Additional improvements may be needed in areas where actual fire flow requirements exceed the planning-level targets and shall be the responsibility of the developer. The results of the fire flow analyses were used to identify undersized water mains and proposed water main improvements based on the general planning-level fire flow requirements and current design criteria, which is not necessarily the same requirements and criteria that were in place when current developments and water main were constructed. The Puget Sound Regional Fire Authority provided the City the fire flow requirements for the largest structures in each pressure zone if the structures were to be new construction based on current regulations and guidelines. These fire flow requirements are shown in **Table 7-25**, along with the fire flow availability at these locations in the existing system, for future planning periods in the City's existing system, and for future planning periods with the improvements identified in **Chapter 9**.

Table 7-25
Large Structure Fire Flow Analysis Summary

Location Description	Address	Existing Pressure Zone	Junction No.	Available Fire Flow (gpm)			Target Fire Flow (gpm)	
				2016	+10 years w/ Proposed Improvements ¹	+20 years w/ Proposed Improvements ²		+20 years w/ All Improvements ³
Amazon Fulfillment Center	20403 68th Ave S	240 Zone	J-26014	4,666	3,749	4,647	6,000	4,600
Carpet Exchange	9021 S 180th St	240 Zone	J-26488	3,876	3,903	3,900	6,000	5,000
Farrington Court Retirement	516 Kenoshia Ave	240 Zone	J-27093	856	969	970	6,000	4,800
Kent North Corporate Park	7611 & 7691 S 180th St	240 Zone	J-27134	1,391	1,406	1,404	1,404	5,000
Regional Justice Center	401 4th Ave N	240 Zone	J-27091	1,910	1,878	2,801	6,000	5,000
Stafford Suites Retirement	112 Kennebeck Ave	240 Zone	J-779	740	900	1,248	4,684	3,450
Lake Fenwick Estate Apts.	24849 46th Ave S	354.5 Zone	J-27094	1,750	1,908	1,893	1,893	1,650
Kent Church of the Nazarene	930 E James St	485 Zone	J-2111	418	432	432	1,382	3,282
Fire Station 73	26512 Military Rd S	529 Zone	J-854	1,253	1,253	1,382	1,382	1,500
Star Lake Elementary ⁴	4014 S 270th St	529 Zone	J-798	---	---	---	777	3,163
Trinity Reformed Church	3807 Reith Road	529 Zone	J-27096	1,416	5,649	5,927	6,000	2,013
Totem Middle School	26630 40th Ave S	575 Zone	J-27095	1,235	850	879	1,594	4,600
Cornerstone Baptist Church	25030 Military Rd	587 Zone	J-1749	1,414	2,581	2,522	2,217	1,725
Sunny Crest Elementary	24629 42nd Ave S	587 Zone	J-26671	1,198	1,199	1,207	5,039	3,594
West Hill Plaza	24700 36th Ave S	587 Zone	J-27092	(N/A)	2,376	1,763	6,000	2,200
Home Depot	26120 104th Ave SE	590 Zone	J-1100	5,010	3,457	3,338	6,000	4,600
Kent-Meridian High School	10020 SE 256th St	590 Zone	J-26269	4,046	4,035	4,012	6,000	4,600

(1) Includes 10-year CIP projects presented in Chapter 9, and assumed high priority water main replacement improvements.

(2) Includes 20-year CIP projects presented in Chapter 9, and does not include medium or low priority water main replacement improvements.

(3) Includes 20-year CIP projects presented in Chapter 9, and all medium and low priority water main replacement projects.

(4) Fire protection provided by Highline Water District.

Once all deficiencies were identified based on the general planning-level fire flow requirements, proposed water main improvements were included in the model, and pressure and fire flow analyses were performed throughout the system to demonstrate that the improvements will eliminate the deficiencies and meet the current flow and pressure requirements. These analyses were modeled under projected year 2028 and 2038 MDD conditions to ensure that the improvements are sized sufficiently to meet the future systems' needs. A description of these improvements and a figure showing their locations are presented in **Chapter 9**, and the results of the 20-year fire flow analyses is presented in **Figures 7-3** and **7-4**, based on the improvements scheduled to be completed within the 20-year planning period as identified in **Chapter 9** (and not including medium or low priority water main replacement projects). A summary of the fire flow deficiencies and limitations in the 2038 planning period with the proposed 20-year improvements is as follows.

- 240 Zone: No widespread limitation, fire flows largely localized issues with 6-inch or 8-inch main being located adjacent to land uses with fire flow requirements in excess of 3,000 gpm.

- 271 Alvord: Limited by 8-inch main downstream of PRV, which was installed in 2012. Fire flow in zone limited to approximately 1,300 gpm due to this piping.
- 339 Seattle: Limited by 6-inch main downstream of PRV, which was installed in 2006. Fire flow in zone limited to approximately 750 gpm due to this piping.
- 366 Stetson: Limited by 6-inch main downstream of PRV, which was installed in 2012. Fire flow in zone limited to approximately 750 gpm due to this piping.
- 368 Weiland: Limited by 6-inch main upstream and downstream of PRV, which was installed in 1993. Fire flow in zone limited to approximately 680 gpm due to this piping.
- 485 Zone:
 - South of SR 516: 6-inch main throughout neighborhood limiting fire flow to approximately 1,100 gpm.
 - North of 234th Street: limited by 8-inch main on either side of the 234th and 96th PRV. Fire flow in vicinity limited to 1,000 to 1,400 gpm.
- 590 and 640 Zones: Fire flow limitations largely localized issues at dead-ends, or as a result of 6-inch main within neighborhoods.
- West Hill Zones: Fire flow limitations largely localized issues at dead-ends, or as a result of 6-inch main within neighborhoods.

DEFICIENCIES

Several areas throughout the system have sufficient fire flow; however, high water velocities are experienced in the system because the water mains are undersized to carry the demands and fire flows at acceptable water velocities. Operating the system with high water velocities can potentially damage the system due to the high pressure surges that commonly occur with high water velocities.

Some areas of the system have water mains that are more than 50 years old, which is approaching or beyond the average life expectancy of water mains of this vintage. Approximately 23 percent of the City's water main is cast iron pipe. Most of the cast iron pipe is located in the older areas of the City. The City is planning to replace the aging water main in the future, as shown in the schedule of planned improvements in **Chapter 9**. All new water main installations are required to use ductile iron water main in accordance with the City's Water System Standards, a copy of which is included in **Appendix G**.

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 water system has a Headquarters telemetry control panel at the Public Works Operations Building at 5821 South 240th Street. System facilities, including source, storage, and pumping, can be monitored with the telemetry system. The City performs regular calibration checks of the telemetry system components, including annual inspections of all telemetry recording instruments and mechanical flow meters. The City continually strives to improve the capabilities of the supervisory control and data acquisition (SCADA) system, and has plans to implement remote totalizer reading capabilities, which will allow for system-wide supply totals to be obtained instantaneously to allow for better recordkeeping of supply and consumption. There are no known deficiencies with the existing telemetry/SCADA system.

SYSTEM CAPACITY

This section evaluates the capacity of the City's existing water system components (e.g., supply, storage, and transmission) to determine the maximum number of ERUs it can serve. Once determined, system capacity becomes useful in calculating 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 4-7** 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, transmission, and storage facilities. The supply capacity analysis was based on the limiting capacity of the supply facilities and the system's MDD per ERU.

The transmission capacity analysis was based on the total capacity of the transmission system with a maximum pipeline velocity of 5 fps for the PHD analysis and 8 fps for the MDD plus fire flow analysis. The transmission capacity analysis considered the limiting supply requirement between the system's PHD and the MDD plus the maximum fire flow requirement for the system. The transmission system includes the following components.

- 31-inch-diameter Kent Springs Transmission Main (240 Zone).
- 12-inch-diameter Kent Springs Transmission Main (590 Zone).
- 21-inch-diameter Clark Springs Transmission Main.
- 16-inch-diameter transmission main downstream of the Garrison Creek Well and Reservoir site.
- 16-inch-diameter transmission main downstream of the 208th/212th Wellfield site.
- 12-inch-diameter transmission main downstream of the East Hill Well site.
- Two 16-inch-diameter transmission mains downstream of the Guiberson Reservoir site.

The storage capacity analysis was based on the storage capacity for equalizing and standby storage and the computed storage requirement per ERU. Operational and fire flow storage capacity were excluded from the storage analysis because these components are not directly determined by water demand or ERUs. For the analyses, a reserve amount equivalent to the existing operational and fire flow storage requirements were 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 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. The instantaneous water rights capacity evaluation was based on the existing instantaneous water rights, as summarized in **Chapter 6**, and the system's MDD per ERU.

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

CAPACITY ANALYSIS RESULTS

A summary of the results of the existing system capacity analysis is shown in **Table 7-26**. The results of the existing (2018) system capacity analysis indicate that the limiting capacity of the system is storage, which can support up to a maximum of approximately 73,972 ERUs. The existing water system has a surplus of approximately 27,893 ERUs based on this limiting component.

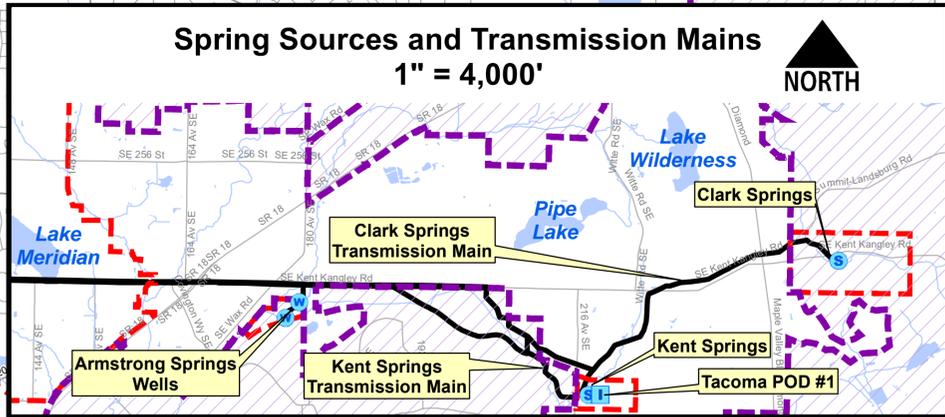
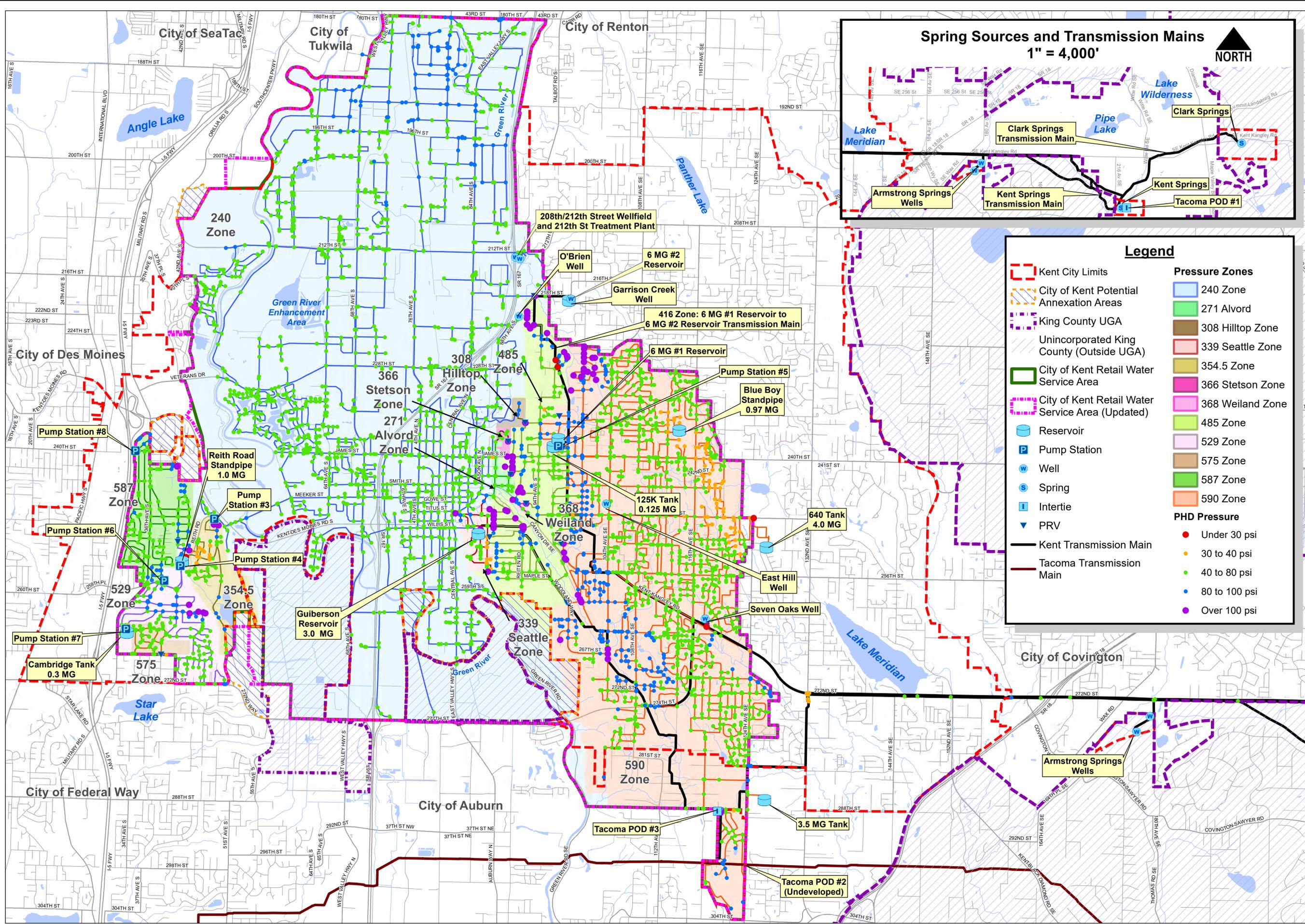
Table 7-26
System Capacity Analysis

Description	Base Year	Existing	Projected	
	2016	2018	2028 (+10 years)	2038 (+20 years)
Demands Per ERU Basis				
Average Day Demand per ERU (gal/day) ¹	172	171	171	171
Maximum Day Demand per ERU (gal/day) ¹	373	371	371	371
Peak Hour Demand per ERU (gal/day) ¹	546	542	542	542
Water Rights Capacity: Annual Average Based				
Water Rights Capacity - Annual Average Based (gal/day)	30,134,126	30,134,126	30,134,126	30,134,126
Average Day Demand per ERU (gal/day)	172	171	171	171
Water Rights Annual Average Based Source Capacity (ERUs)	175,500	176,674	176,674	176,674
Water Rights Capacity: Instantaneous Based				
Water Rights Capacity - Instantaneous Based (gal/day)	46,002,240	46,002,240	46,002,240	46,002,240
Maximum Day Demand per ERU (gal/day)	373	371	371	371
Maximum Day Based Source Capacity (ERUs)	123,216	124,040	124,040	124,040
Source Capacity: Maximum Day Based				
Source Treatment Capacity - Maximum Day Based (gal/day)	36,227,520	36,227,520	36,227,520	36,227,520
Maximum Day Demand per ERU (gal/day)	373	371	371	371
Maximum Day Based Source Treatment Capacity (ERUs)	97,035	97,684	97,684	97,684
Storage Capacity				
Maximum Equalizing & Standby Storage Capacity (gal)	14,794,367	14,794,367	18,898,504	18,898,504
Equalizing & Standby Storage Requirement per ERU (gal)	200	200	200	200
Maximum Storage Capacity (ERUs)	73,972	73,972	94,493	94,493
Transmission Capacity: PHD Based (5 fps)				
Transmission Capacity (gal/day)	36,273,200	36,273,200	36,273,200	36,273,200
Peak Hour Demand per ERU (gal/day)	546	542	542	542
Maximum Transmission Capacity (ERUs)	238,794	240,391	240,391	240,391
Transmission Capacity: MDD + Fire Flow Based (8 fps)				
Transmission Capacity (gal/day)	35,222,880	35,222,880	35,222,880	35,222,880
MDD + Maximum Fire Flow Requirement (gpm)	16,629	16,867	17,375	18,208
Maximum Day Demand per ERU (gal/day)	373	371	371	371
Maximum Transmission Capacity (ERUs)	151,741	151,831	149,860	146,627
Maximum System Capacity				
Maximum System Capacity (ERUs)	73,972	73,972	94,493	94,493
Limiting Facility	Storage	Storage	Storage	Storage
Unused Available System Capacity				
Maximum System Capacity (ERUs)	73,972	73,972	94,493	94,493
Projected ERUs	44,854	46,079	48,049	51,283
Unused Available System Capacity (ERUs)	29,118	27,893	46,443	43,210

(1) Includes distribution system leakage.

A summary of the results of the 10-year projected system capacity analysis also is shown in **Table 7-26**. The 10-year projected system capacity analysis includes improvements that are planned to be completed within the 10-year planning period, as described in **Chapter 9**. The primary improvements that impact the system capacity analysis are the proposed construction of a West Hill Reservoir and the 640 Zone conversion, which increases the available storage volume in the existing 640 Tank. The results of the 10-year projected system capacity analysis indicate that the storage capacity increases to 94,493 ERUs, and the limiting component remains storage. The system is projected to have a surplus of approximately 46,443 ERUs in 2028 if the improvements are completed as planned.

The water system's projected 2038 capacity is 94,493 ERUs, based on the same storage limitations as projected in 2028. In 2038, the system is projected to have a surplus of approximately 43,210 ERUs if the improvements are completed as planned.



Legend

Kent City Limits	240 Zone
City of Kent Potential Annexation Areas	271 Alvor
King County UGA	308 Hilltop Zone
City of Kent Retail Water Service Area	339 Seattle Zone
City of Kent Retail Water Service Area (Updated)	354.5 Zone
Reservoir	366 Stetson Zone
Pump Station	368 Weiland Zone
Well	485 Zone
Spring	529 Zone
Intertie	575 Zone
PRV	587 Zone
Kent Transmission Main	590 Zone
Tacoma Transmission Main	

PHD Pressure

	Under 30 psi
	30 to 40 psi
	40 to 80 psi
	80 to 100 psi
	Over 100 psi

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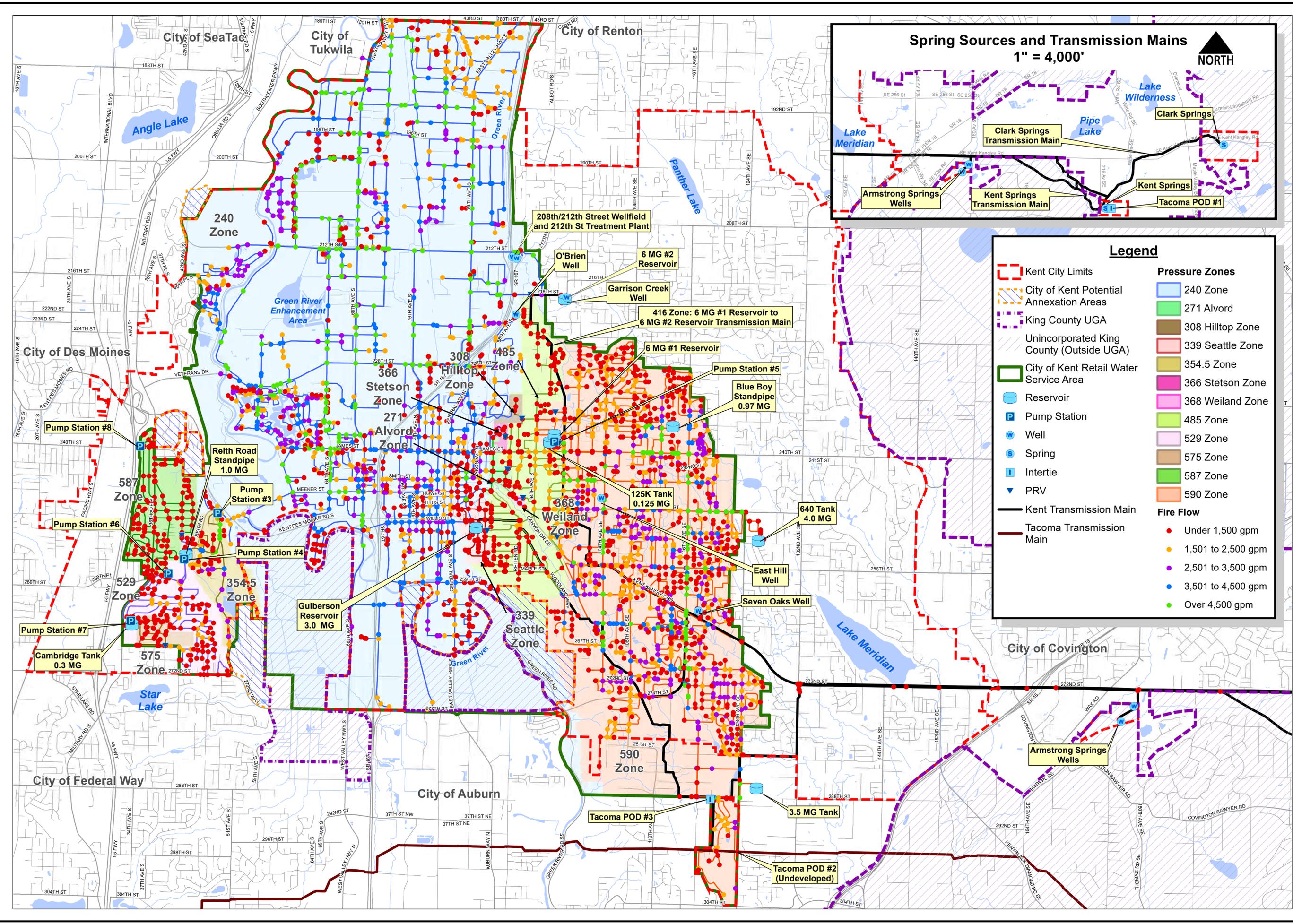


Figure 7-1
Base Year (2016) PHD Pressures
City of Kent
2019 Water System Plan

1 inch = 2,000 feet

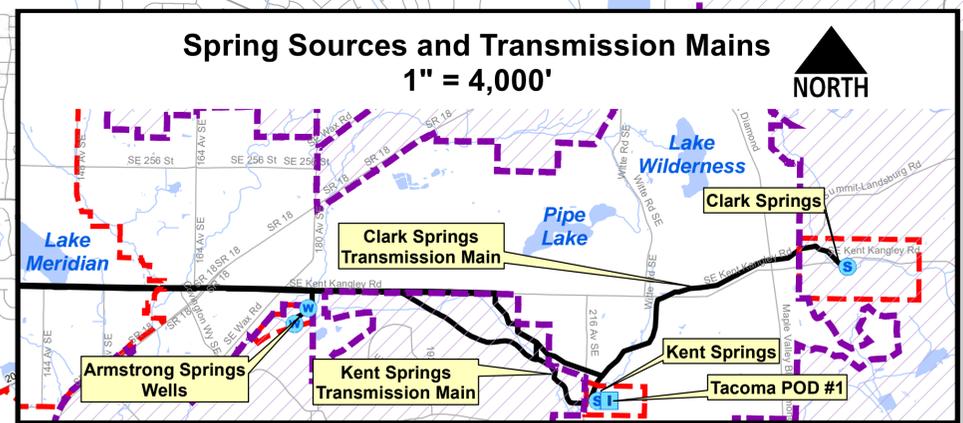
DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

J:\DATA\KENT\117-100\GIS\MAPS\FIGURE 7-1 EXISTING PHD PRESSURES.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET



Spring Sources and Transmission Mains

1" = 4,000'



Legend

- Kent City Limits
 - City of Kent Potential Annexation Areas
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service Area
 - Reservoir
 - P Pump Station
 - W Well
 - S Spring
 - I Intertie
 - ▼ PRV
 - Kent Transmission Main
 - Tacoma Transmission Main
- | Pressure Zones | |
|--|------------------|
| | 240 Zone |
| | 271 Alvorð |
| | 308 Hilltop Zone |
| | 339 Seattle Zone |
| | 354.5 Zone |
| | 366 Stetson Zone |
| | 368 Weiland Zone |
| | 485 Zone |
| | 529 Zone |
| | 575 Zone |
| | 587 Zone |
| | 590 Zone |
- | Fire Flow | |
|---------------------------------------|--------------------|
| ● | Under 1,500 gpm |
| ● | 1,501 to 2,500 gpm |
| ● | 2,501 to 3,500 gpm |
| ● | 3,501 to 4,500 gpm |
| ● | Over 4,500 gpm |

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Vicinity Map



Figure 7-2 Base Year (2016) Fire Flow Availability City of Kent 2019 Water System Plan

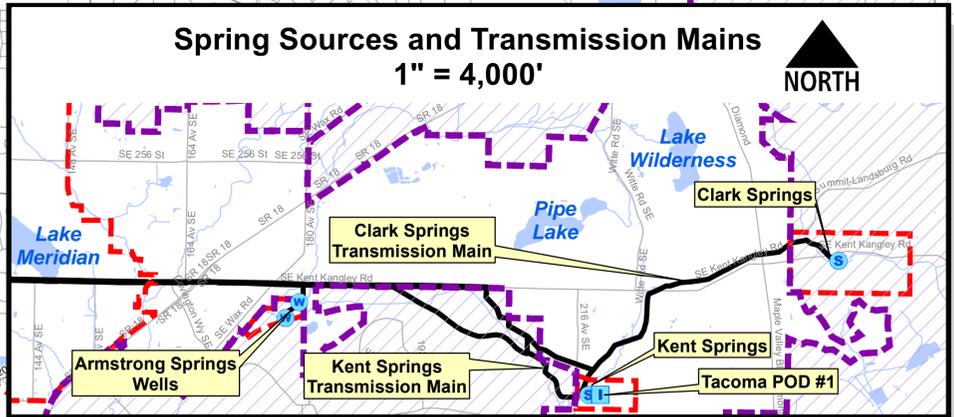
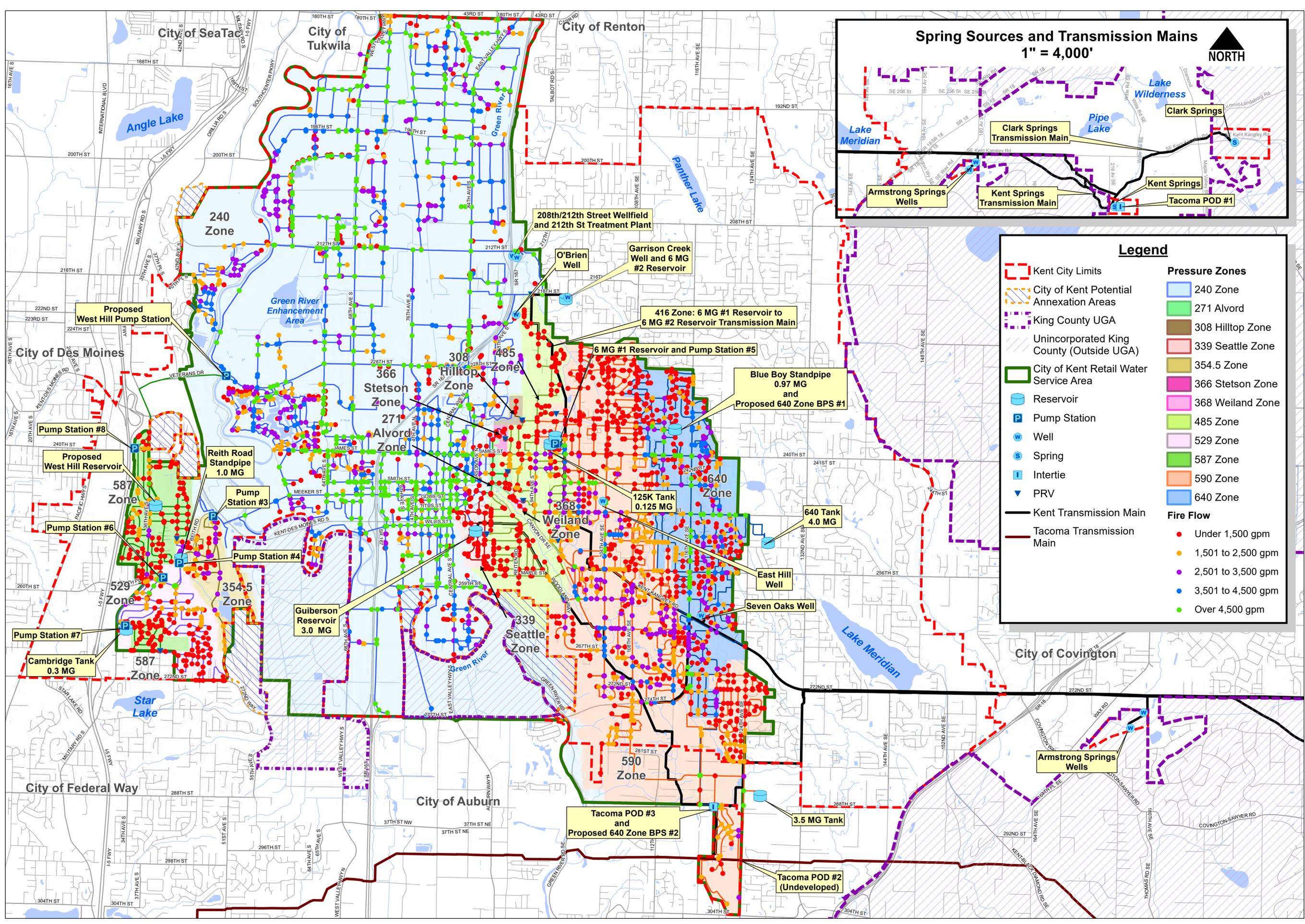
J:\DATA\KENT\11-100\GIS\MAPS\FIGURE 7-2 EXISTING FF AVAILABILITY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET



1 inch = 2,000 feet
 0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"





Legend

Kent City Limits	240 Zone
City of Kent Potential Annexation Areas	271 Alvor
King County UGA	308 Hilltop Zone
City of Kent Retail Water Service Area	339 Seattle Zone
Reservoir	354.5 Zone
Pump Station	366 Stetson Zone
Well	368 Weiland Zone
Spring	485 Zone
Intertie	529 Zone
PRV	587 Zone
Kent Transmission Main	590 Zone
Tacoma Transmission Main	640 Zone

Pressure Zones

- 240 Zone
- 271 Alvor
- 308 Hilltop Zone
- 339 Seattle Zone
- 354.5 Zone
- 366 Stetson Zone
- 368 Weiland Zone
- 485 Zone
- 529 Zone
- 587 Zone
- 590 Zone
- 640 Zone

Fire Flow

- Under 1,500 gpm
- 1,501 to 2,500 gpm
- 2,501 to 3,500 gpm
- 3,501 to 4,500 gpm
- Over 4,500 gpm

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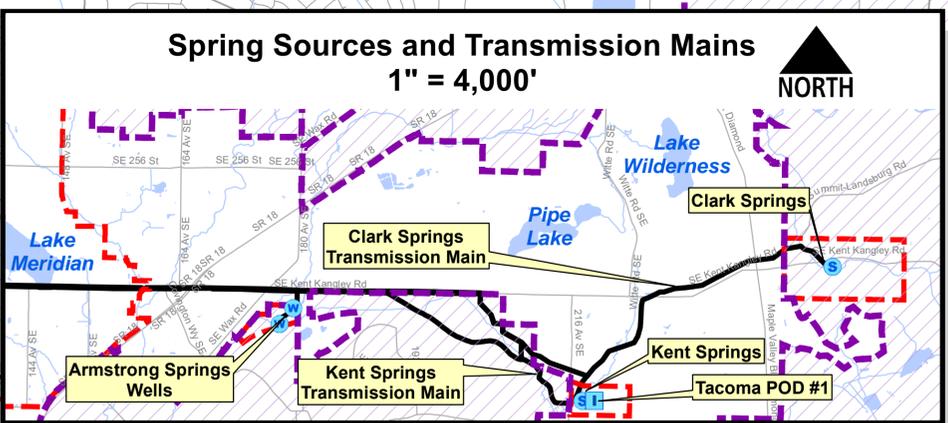
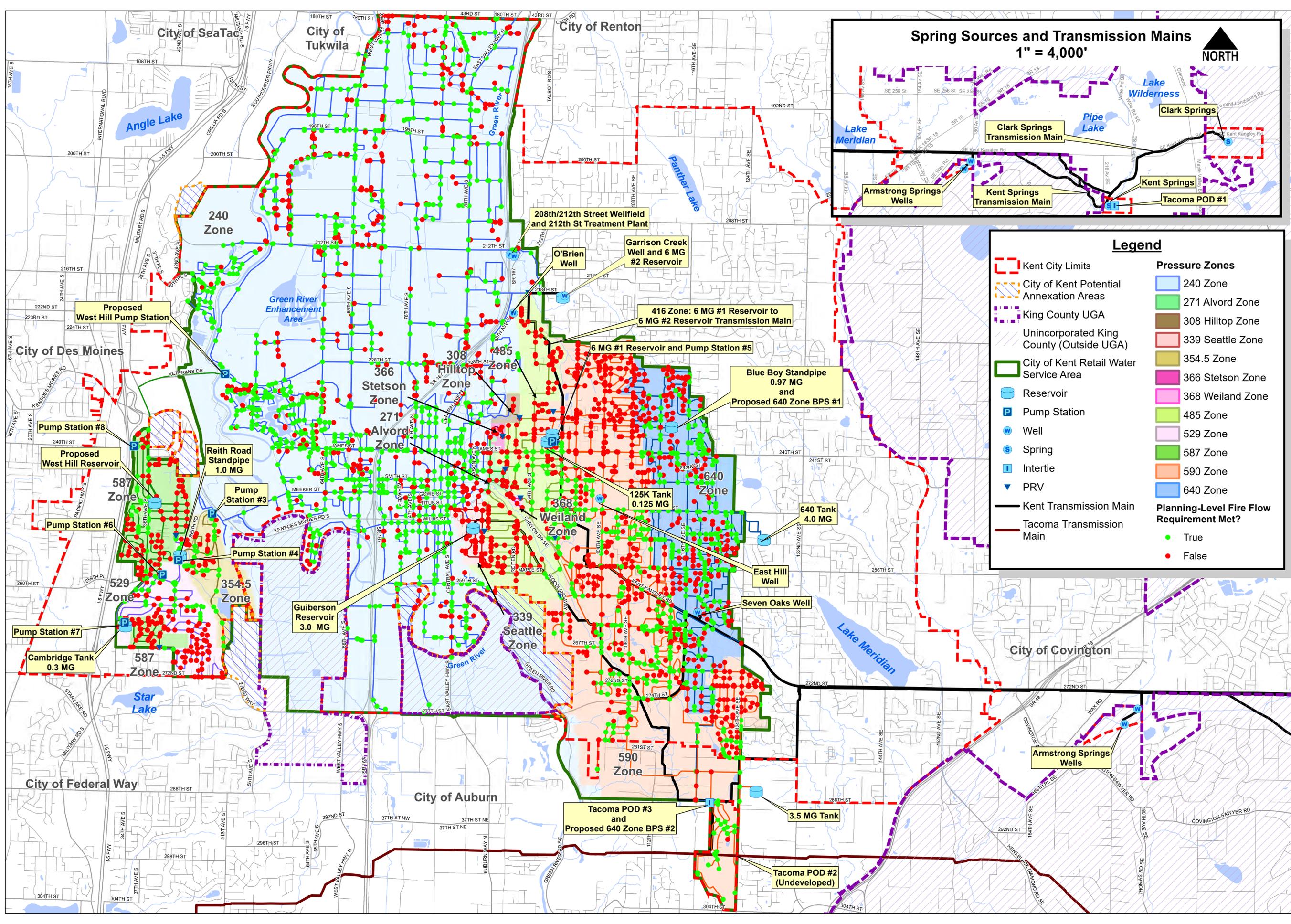


Figure 7-3
Projected 20-year Fire Flow Availability
w/ City-Funded & High Priority Improvements-
City of Kent
2019 Water System Plan

1 inch = 2,000 feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

J:\DATA\KENT\117-100\GIS\MAPS\FIGURE 7-3 20YR FF AVAILABILITY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET



Legend

Kent City Limits	240 Zone
City of Kent Potential Annexation Areas	271 Alvor Zone
King County UGA	308 Hilltop Zone
City of Kent Retail Water Service Area	339 Seattle Zone
Reservoir	354.5 Zone
Pump Station	366 Stetson Zone
Well	368 Weiland Zone
Spring	485 Zone
Intertie	529 Zone
PRV	587 Zone
Kent Transmission Main	590 Zone
Tacoma Transmission Main	640 Zone
Planning-Level Fire Flow Requirement Met?	
	True
	False

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Figure 7-4
Projected 20-yr Junctions Exceeding FF Req't w/ City-Funded & High Priority Imprvmts.
City of Kent
2019 Water System Plan



1 inch = 2,000 feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

J:\DATA\KENT\11-100\GIS\MAPS\FIGURE 7-4 20YR FF SATISFIED.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4801 FEET

8 | OPERATION AND MAINTENANCE PROGRAM

WATER DEPARTMENT GENERAL INFORMATION

The City of Kent Water Department's current mailing address and phone number is as follows.

City of Kent Water Department Mailing Address: 220 4th Avenue South
Kent, Washington 98032-5895
Phone: (253) 856-5600
Fax: (253) 856-6600

City of Kent Water Department's Site Address: City of Kent Water Department
5821 South 240th
Kent, Washington 98032-5895

State Department of Health Identification Number: 381501

State Department of Health Contact Person: Ms. Brietta Carter, P.E.
State Department of Health
20425 72nd Avenue South
Bldg. 2, Suite 310
Kent, Washington 98032-2358
(253) 395-6770

State Department of Health After Business Hours Hotline: 1 (877) 481-4901
(Weekends, Evenings, Holidays)

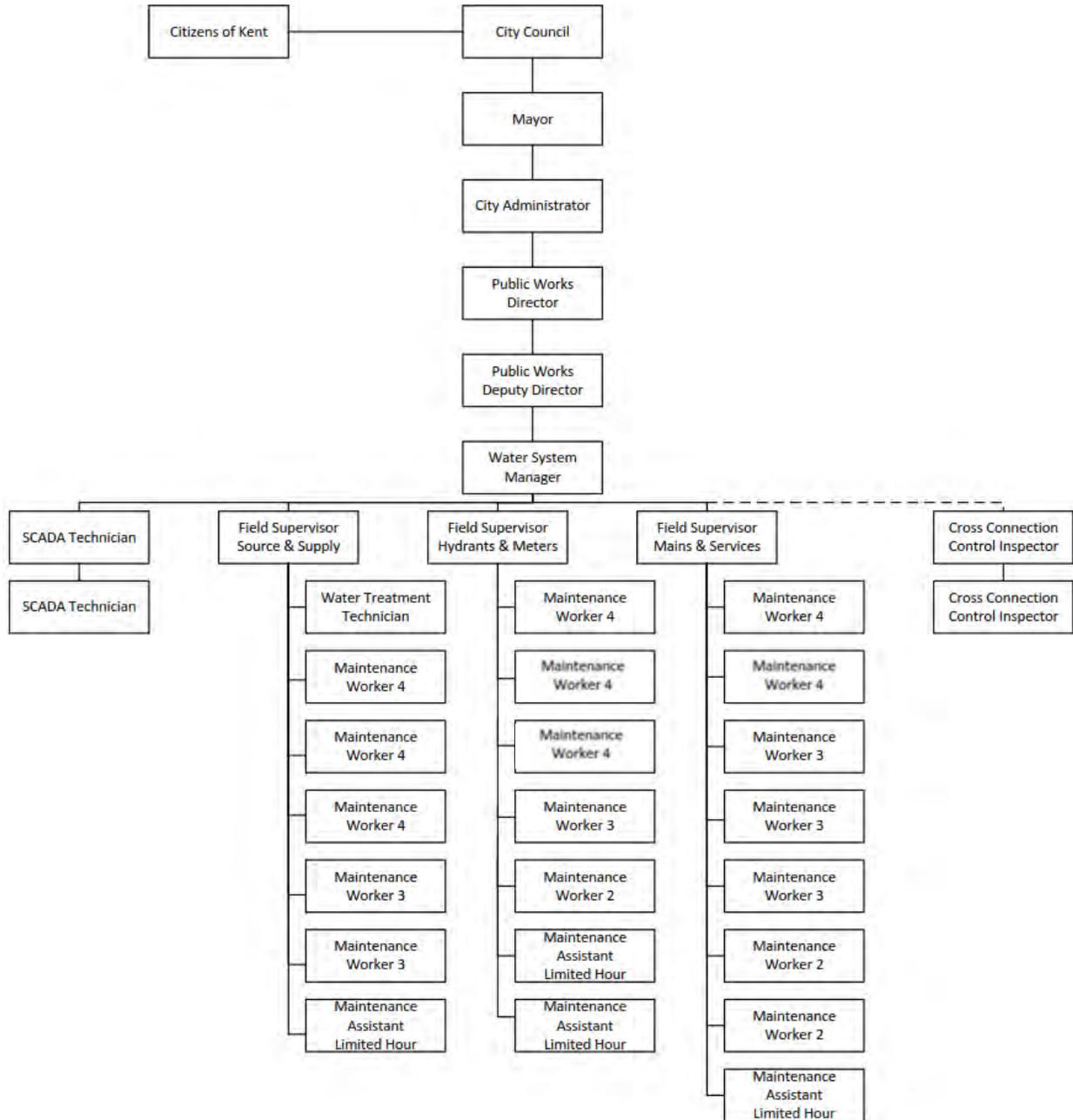
WATER SYSTEM ORGANIZATION, MANAGEMENT, AND PERSONNEL

The City of Kent (City) is a municipality organized with an elected mayor/council type of government. Overall City management, including Public Works, is provided by a City Operations Manager who acts under the direction of the Mayor and City Council. The Public Works Director manages the entire Public Works Department, including an Engineering Division that provides support to all of the Public Works divisions. A Public Works Operations Manager oversees the operation of the Public Works Maintenance Division, which includes the Water Department. The water system is operated and maintained under the direct supervision of a Water System Manager, who holds the Water Distribution Manager 4 certification required by the Washington State Department of Health (DOH).

The Water System Manager and Public Works Deputy Director/Operations Manager handle the routine management decisions for the Water Department. The Public Works Director is involved with all decisions of a significant nature, including the planning for future needs. All major policy decisions and capital requests are reviewed and approved by the Mayor/City Council/Operations Manager. The following sections identify functions in the City Water Department, and an asterisk (*) denotes specifically qualified and licensed/certified personnel

necessary for water system operation in accordance with the requirements of DOH. **Figure 8-1** presents an organizational chart of the internal organization of the Water Department.

Figure 8-1
City of Kent Water Department
Organization Chart



NORMAL DAY TO DAY OPERATIONS

Management, supervision, and direction is provided by the Water System Manager.* The Field Supervisors implement and follow through on the planned schedules for operation and maintenance of the water system, and implement emergency repairs under the direction of the Water System Manager. Routine repair needs are often requested or reported by customers or citizens of Kent, by meter reader personnel, or by other City staff; and are prioritized and merged with the work schedules by the Field Supervisors* for their specific areas of responsibility. The Water System Manager is required to hold a State of Washington Water Distribution Manager 4 (WDM 4) certification.

PREVENTATIVE MAINTENANCE

Weekly work schedules and personnel assignments are prepared by the Field Supervisors* and reviewed with the Water System Manager. Ongoing preventative maintenance programs are improved upon continuously by the field personnel, along with new programs, under the direction of the Field Supervisors and the Water System Manager. The implementation of an Infrastructure Management System (Cityworks) is in progress and will be used to track system component inventory, record maintenance history, produce preventative maintenance work schedules, and predict expected life for the water system infrastructure.

FIELD ENGINEERING

Three technical groups support the engineering needs of the water system. The general areas of responsibility are identified in the sections that follow and are shown with the group that normally handles the work in that area.

Consulting Engineers*

Consulting engineers are typically retained to perform specialized studies related to the water system, such as this Water System Plan (WSP). They also are retained for specialized design, planning, and construction needs such as water quality studies and system planning, water storage reservoirs, treatment systems, pump stations, hydraulic analyses, and structural improvements. Consulting engineers are considered Engineer of Record on many of the City's projects, and as such, are required to be registered as Professional Engineers in the State of Washington in the specific engineering application that is required for a given project.

Public Works Operations Engineers*

The City of Kent's Public Works Operations Engineers typically are registered Professional Engineers. These individuals typically are responsible for specialized projects and smaller design and construction needs that do not require assistance from outside consultants. These include completion of water treatment and distribution project management, water system construction standards, construction plan review, Geographic Information System (GIS) conversion and implementation, water system planning, and capital project coordination.

Public Works Engineering*

Employees of the Public Works Engineering group normally design and manage distribution water system projects, and manage developer improvements to the water system, water tank painting and structural improvements, water main replacements, and construction standards. A variety of certifications are applicable to this category of Public Works staff, primarily registered Professional Engineers.

WATER QUALITY MONITORING

Daily system monitoring of water quality and the required water system monitoring is performed by the Water Source and Supply Staff of the Water Department, under the direction of the Water System Manager, a WDM 4 in compliance with DOH requirements. Water treatment plant operation is performed by Water Treatment Plant Operator 2 (WTPO-2) certified personnel,* as required by DOH, under the direction of the Water System Manager. In-house staff performs most routine water analysis functions daily, and a State-certified contract laboratory is used for compliance monitoring requirements.

EMERGENCY RESPONSE

This section provides a brief overview of the key staff responsible for emergency response as it relates to the water system. The City maintains a comprehensive City-wide emergency response plan that is used in the event of an emergency. The emergency contact list is located in the Water Facilities Control Center at 5821 S. 240th Street, Kent, Washington 98032. Additional information of the basic elements of that plan is provided later in this chapter. The water system emergency response program itself is classified as a confidential document due to the critical nature of maintaining water system security as a matter of practicality, and in accordance with the Homeland Security Act.

After Hours Emergency Personnel

The Water System Manager is on-call at all times, available by telephone 24 hours a day. The City's Police Department maintains call-out lists of all Water Department personnel, as well as procedures for contacting them during emergencies or for customer complaints. Two Water Department personnel are normally on 24 hour standby duty, with cell phones and a City vehicle available for use after hours, on weekends during the higher demand months, and on holidays.

Normal Working Hours Emergency Personnel

Most emergencies during normal working hours are routed through Administration Staff for prioritization and dispatch to field crews. The Water Control Center monitors the Master Supervisory Control and Data Acquisition (SCADA) terminal and monitors the water system operation, under the direction of the Water System Manager. Major City emergencies are managed by the City Emergency Operations Committee (EOC) and the Kent Fire Department, and coordinated with the Water Department and other utilities through the Public Works DOC.

CROSS-CONNECTION CONTROL PERSONNEL

The City's Cross-Connection Control (CCC) program is managed by a designated Cross Connection Control Inspector* (CCS-1) under the supervision of the Water System Manager. All Water Department personnel classified as Maintenance Worker 3 and above are required to be CCS-1 certified to assist with water system protection and implementation of the program.

IMPLEMENTATION OF THE IMPROVEMENT PROGRAM

Improvements are jointly planned, budgeted, and prioritized by personnel of the Engineering and Operations divisions of the Public Works Department. Once developed, the annual budget is submitted to the Public Works Department for review and approval, and to the Mayor and City Council for adoption. Overall implementation is the responsibility of the Public Works Director or designee, who assigns specific elements thereof to the City Engineer or Operations Manager.

BUDGET FORMULATION

Field crews and Field Supervisors prepare and submit operating budget and capital budget requests to the Water System Manager, who prioritizes requests and adds capital improvements, reviews them with the Public Works Operations Manager, and submits them to the Public Works Director for review and approval. Final approval is given by the City Operations Manager, Mayor, and City Council. The Water Department rate structure and debt service is managed by the Public Works Director and staff, as well as the City Finance Department.

RESPONSE TO COMPLAINTS

Complaints are recorded by office staff and routed to the Water System Manager or Field Supervisors for follow up or crew dispatch in a timely manner. Follow-up results are reviewed by the Water System Manager and recorded by office staff. An Infrastructure Management System Customer Service module is used to provide better complaint tracking and more effective response.

PUBLIC PRESS CONTACT

All press-related releases related to the Water System are generally routed to the Water System Manager, and reviewed with the Public Works Operations Manager and the Public Works Director.

BILLING

Water customers' billing and meter reading is managed by the Utility Billing division of the Finance Department.

PERSONNEL CERTIFICATIONS

DOH requires State certifications for individuals responsible for certain aspects of water system management and operation. The City associates State certifications with specific job classifications as follows:

- Water System Management – Water Distribution Manager 4
- Water Treatment Plant Supervision – WTPO-2
- Water Treatment Plant Operation – WTPO-1
- Cross-Connection Control Program – CCS-1

The City has on staff the personnel to meet or exceed those requirements and requires DOH certification of all tenured water operations and maintenance personnel. This is achieved by sponsoring personnel attendance at appropriate safety and technical seminars to encourage advancements and compliance with the professional growth required. **Table 8-1** provides a listing of current certifications held by City staff members, and those required by DOH for this water system as indicated by an asterisk (*).

Table 8-1
Employee Certification

Certification	Number of Certified Personnel
BAT - Backflow Assembly Tester	1
*CCS 1 - Cross-Connection Specialist 1	24
WDMIT - Water Distribution Manager in Training	0
WDM1 - Water Distribution Manager 1	6
WDM2 - Water Distribution Manager 2	13
WDM3 - Water Distribution Manager 3	5
*WDM4 - Water Distribution Manager 4	1
WDS - Water Distribution Specialist	10
WTPOIT - Water Treatment Plant Operator in Training	4
*WTPO1 - Water Treatment Plant Operator 1	5
*WTPO2 - Water Treatment Plant Operator 2	2
WTPO3 - Water Treatment Plant Operator 3	2
WTPO4 - Water Treatment Plant Operator 4	1

SAFETY PROCEDURES

Employees of the City's Water Department adhere to all relevant Occupational Safety and Health Administration (OSHA)/Washington Industrial Safety and Health Act (WISHA) safety requirements, and follow procedures that meet or exceed those requirements (i.e., lock out/tag

out for pump station repairs and maintenance). Regular training of employees during safety meetings and tailgate meetings ensures that all employees are reminded of current safety policies and procedures.

Areas of potential work place hazards that have been identified by Water Department personnel are as follows:

- Confined space hazards – primarily atmospheric or oxygen deficiency
- Electrical, mechanical, and energy hazards
- Hazardous chemicals and materials
- Asbestos pipe hazards
- Fall hazards
- Excavation hazards
- Equipment operation hazards

The City has compiled programs to ensure the safety of its employees and citizens in each of the areas above. The employees are thoroughly trained in each of the safety programs as they apply to their job duties, and there are daily safety tailgate meetings with crews held by Field Supervisors to review specific safety procedures for the scheduled tasks and assignments. The department crews meet together monthly for mandatory safety training organized and coordinated by the Safety Committee, made up of representatives from each department. The committee also regularly inspects facilities and maintenance practices, as well as investigating incidents and accidents, to aggressively reduce workplace accidents and injuries of employees. First aid training is required for all employees, and first aid equipment (ten unit packs) are maintained in all vehicles and at major facilities. Emergency services (911) is called whenever needed for medical aid.

ROUTINE SYSTEM OPERATION

The following presents a schedule of inspection and maintenance for major water system components within the City's water system. Detailed information regarding specific facilities and equipment is not presented herein and is contained in Operation and Maintenance manuals.

WELLS AND SPRINGS

Well and spring source facilities are exercised regularly to maintain reliability when not in use. Disinfection and bacteriological analyses are performed after long periods of inactivity or following rehabilitation work on the source facilities. When online, local programmable logic controller (PLC) or remote (SCADA) controls start and stop the pumps as needed based on reservoir levels or system pressure.

PUMP STATIONS

Pumps alternate on and off regularly, usually every 24 hours, to provide exercise and maintain maximum reliability. Local controls (or remote SCADA control) start and stop the pumps as needed based on system pressures or reservoir levels.

RESERVOIRS

Reservoirs are monitored regularly for chlorine residuals, daily or weekly, to ensure frequent water turnover and avoid stagnation. Pump start and stop setpoints are set to ensure frequent water level cycling. Reservoirs that are drained for maintenance or repairs are cleaned, disinfected, and sampled for bacteriological or volatile organic compounds (VOCs) before being returned to service, following American Water Works Association (AWWA) Standards.

METER READING

Source, pump station, and reservoir meters are read each weekday on a regular schedule when online. The Water Department plans to implement remote totalizer reading with its new SCADA system in the near future, which will allow for system-wide totals to be obtained at a preset time, even on weekends and holidays. This will allow for better recordkeeping of production and demand, and enhance daily demand planning during peak periods.

SYSTEM PERFORMANCE

The overall performance of the water system is monitored by two critical parameters:

- Water Quality Reliability – Operations and maintenance programs and priorities are aligned to achieve optimum water quality that meets or exceeds DOH requirements throughout the water system. Water quality performance is measured by the history of Maximum Contaminant Level (MCL) violations, as well as the number, frequency, and type of complaints from customers regarding water quality. Performance also is measured by the daily source/system water quality parameters being above or below the average recorded. The City’s water system has an excellent record of water quality over the last 6 years; and
- Water Production and Storage – Operations and maintenance programs and priorities are aligned to achieve a reliable water supply measured in quantity stored to meet both demands and system pressures. The City’s system has a good history of maintaining reservoir levels at or above 80 percent at all times and water system pressures meeting the system design, even during peak summer demands and fire flow conditions/testing. Performance is measured by monitoring and recording reservoir levels and system pressures, as well as tracking customer complaints for low pressure. Customers are advised of the system pressure available and what is causing the volume restrictions.

Facility or system component performance is generally reflected in one of the two areas identified above. Individual equipment or appurtenance performance is monitored for reliability throughout its life cycle. Those which do not meet the criteria are scheduled/budgeted for replacement. The Hansen IMS system will assist in tracking performance and maintenance history in the future, as well as maintenance and repair costs.

PREVENTATIVE MAINTENANCE

The City maintains a strong preventative maintenance program to maximize the useful life of all water system facilities and avoid emergency conditions wherever possible by performing system maintenance on a regularly scheduled and timely manner. A key component of the City's preventative maintenance and asset management is the Hansen IMS (Infrastructure Management System). The City invested in this program to track maintenance work on its infrastructure and create a database that includes maintenance information on water system facilities such as valves, hydrants, water mains, water meters and services, pump stations, sources/wells, treatment facilities, and storage tanks/reservoirs.

Another key change to water system operation and maintenance in recent years is the advancement of the City's GIS. The City's in-house GIS staff and Water Department personnel have worked to create a comprehensive water system map in GIS linked to the Hansen technical maintenance data for a specific location or facility. When the Hansen system generates a work order, it also has the capability (as soon as it is linked to GIS) to print a map of where the asset identified on the work order is located. This allows for City-wide integration of data and assists with a variety of inter-department functions such as scheduling capital improvements projects, budgeting, and coordinating water, sewer, street, and storm water infrastructure repairs and projects through the common GIS database.

Another key benefit of the Hansen software in conjunction with the City-wide GIS system is that it provides a mechanism for developing an inventory of all water system assets. Using the inventory of assets and historical maintenance and repair data, a "self-thinking" database can be established to prompt staff when preventative maintenance work needs to be performed. Full implementation of the program will allow the City to:

- Inventory/track all assets by ID number and physical address;
- Track labor, material, and associated costs;
- Schedule work by individual asset or group assets;
- Generate work orders for scheduled and unscheduled preventative maintenance;
- Forecast repairs and replacement part needs; and
- Project budgetary information.

FIRE HYDRANTS

There are approximately 2,900 hydrants within the water system that are maintained by the Water Department. Information such as location, size, type, feeder information, manufacturer, and number of turns for the foot valve are examples of the information that is collected for the database.

Presently, City Water personnel have the responsibility for an ongoing program of inspecting and flushing hydrants. The Water Department hires one or more Maintenance Assistants who have a goal to inspect and operate approximately one-half of the fire hydrants annually and notify the Water Distribution Supervisor of any items requiring maintenance. With the addition of the

Hansen system, the Water Department does not anticipate changing the current inspection procedures; however, it will provide the database for labor, material, and historical data.

METERS 3 INCHES AND LARGER

Large meters, sized 3 inches and 4 inches, currently undergo bi-annual testing, and all meters sized 6 inches to 10 inches are tested annually. Some large meters require additional personnel to enter the confined space and provide support during the testing. The work order generated by the Hansen system will prompt crews in advance if the meter is located within a confined space, as well as the history of repairs and accuracy profile of each meter. The City has been upgrading many of the large meters and vaults for the past 10 years, and the accuracy, reliability, and safety has been significantly improved.

WATER MAINS/DEAD-END MAINS

There are approximately 595 dead-end mains within the distribution system. Dead-end mains are flushed on a yearly basis or more frequently as required. Each dead-end main has been assigned a unique identifier within the Hansen system for better tracking of historical data. Each time the main is flushed, it is recorded in the database. After a few years (or sooner for mains that require more frequent flushing), the database will generate work orders for main flushing. Other distribution mains are flushed or cleaned on an as-needed basis.

PUMP STATIONS

All water sources and pump stations are visited on a daily basis while in operation. Well and pump data is recorded and monitored to identify any irregularities in system operation. Pumps and pump station equipment receive regular service on an hours-in-operation or lapsed time basis.

STORAGE RESERVOIRS

Daily visits to the storage reservoirs are made to check security and overall site conditions. The reservoirs are taken out of service approximately every 3 to 5 years for cleaning and are painted every 10 to 15 years or on an as-needed basis.

PRESSURE REDUCING VALVES

City-owned distribution system pressure reducing valves are inspected monthly, receive complete maintenance on an annual basis, and are rebuilt every 5 years. Maintenance for privately owned pressure reducing valves is the responsibility of the customer.

TELEMETRY

The telemetry system employs primarily electronic components that require little maintenance, other than calibration checks and battery replacement. The telemetry system is inspected annually. This includes inspecting all telemetry recording instruments and mechanical flow meters.

In addition, more frequent checks are made to monitor facilities having temporary problems. Emergency response equipment and spare parts inventory also are checked periodically.

WATERSHED INSPECTION

To assist in maintaining the integrity of the City's water supply sources, the City has a watershed inspection and wellhead protection area (WHPA) program. Under this WHPA, the watershed areas are inspected on a regular basis for any activity that may affect the water quality at the City's facilities. Should a potential issue appear, the City would proceed with the necessary testing and studies to verify or discount the concerns. Should a concern be validated, the City would take whatever steps necessary to protect the integrity of its sources, which could include both physical improvements at its sources and legal action against the polluter. The City has obtained baseline sampling results from multiple sites within its most susceptible watershed and WHPA's 1 year time of travel, for high and low aquifer level periods, as phase one of its WHPA program.

The City also has advised King County of areas under County jurisdiction that fall within the watershed area and requested consideration and cooperation of protection of the watershed in County land use planning and actual developments.

Further protection of the sources of supply is achieved by regular, contracted daily security patrol services during evening and night time hours at these sources.

PREVENTATIVE MAINTENANCE SCHEDULE

A summary of the City's water system preventative maintenance schedule is described in **Table 8-2**.

Table 8-2
Preventative Maintenance Schedule

Sources of Supply	Interval						Comments
	Daily	Weekly	Monthly	Semi-Annual	Annual		
Inspect online buildings and sites, pumps, and chemical feed equipment, record flow and hour meter readings and electronic well levels, make adjustments, add chemicals, and sample and record water quality information.	X						
Exercise generators.		X					
Inspect all facilities, manually sound and record pumping and monitoring well levels. Clean buildings and piping.		X					
Inspect and exercise/test all equipment, perform scheduled PM, lubricate, and adjust equipment as necessary per manufacturers recommendations, record pump and motor voltage, amperage, and efficiency values.			X				
Inspect and test motor/pump bearings - ultrasound.						X	
Inspect and test electrical panels and motor connections - infrared.						X	
Inspect watersheds and surrounding areas - WHPA.			X				
Monitoring well levels recorded.			X				More thorough summer/winter
Grounds maintenance, mowing, and weeding.		X					Spring/Summer
Tree pruning and clearing fence lines.				X			Spring/Fall
Repaint buildings and piping.							1-5 years
Inspect/clean/test pump control valves.						X	
Rebuild pump control and flow control valves - replace all rubber parts.							Contractor (4 years)
Calibrate flow meters, level, and pressure transmitters, rebuild as necessary.						X	

Table 8-2
Preventative Maintenance Schedule (Continued)

Pump Stations	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Inspect online buildings and sites, pumps, and equipment. Record flow/hour meter and pressure readings, check Cl ₂ and pH readings.	X					
Exercise generator(s) and diesel pump(s).		X				
Inspect all facilities, clean buildings and piping.		X				
Inspect and exercise/test all equipment, perform scheduled PM, lubricate, and adjust equipment as necessary per manufacturers recommendations, record pump and motor voltage, amperage, and efficiency values.			X			
Inspect and test motor/pump bearings - ultrasound.					X	
Inspect and test electrical panels and motor connections - infrared.					X	
Inspect/clean/test pump control valves.					X	
Rebuild pump control valves - replace all rubber parts.						Contractor (4 years)
Calibrate flow meters and pressure transmitters - rebuild as necessary.					X	
Repaint buildings and piping.						1-5 years
Grounds maintenance, mowing, and weeding.		X				
Tree pruning and clearing fence lines.				X		Spring/Fall
Pressure Reducing Valves Stations and Vaults	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Inspect and clean valve stations and vaults. Record pressures and check operation.			X			
Inspect, clean, adjust, and test pressure reducing valves.					X	
Rebuild control valves - replace all rubber parts.						Contractor (4 years)

Table 8-2
Preventative Maintenance Schedule (Continued)

SCADA System	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Remote units (RTU) - Inspect and test batteries, calibration, and radio transmission.				X		
Base station and master SCADA - test auxiliary power.			X			
Clean and test/verify function of all discrete, analog, and control points from remote sites.					X	
Distribution System	Daily	Weekly	Monthly	Semi-Annual	Annual	Comments
Collect representative samples Cl ₂ , NaE, and pH.	X					
Reservoir/remote sites Cl ₂ , NaE, pH, and bacteriological.	X	X	X			DOH requirement - 70 per month for bacteriological
Flush all dead-end mains.					X	More frequently when needed
Air/vacuum release valves - inspect, clean, and test.						As needed
Transmission mains (inspect and clear easements).					X	As needed
Distribution mains - leak detect program.						When leakage is above standard
Fire hydrants/hydrant valves - inspect, test, operate, and record pressures.					X	As needed or every 2 years
Distribution valves - exercise and clean out valve box.						As needed
Test 3-inch and larger meters.					X	Annual (6" and up) Bi-annual (3" and 4")
Replace 2-inch and smaller meters.						15 to 20 years or as needed
Read commercial meters.			X			
Read residential meters.						Bi-monthly
Distribution main cleaning - ongoing.						10 to 20 years or as needed
Cross-connection/backflow devices tested by Certified BAT.					X	Documentation provided to City

EQUIPMENT INVENTORY

The City maintains a full array of heavy equipment, vehicles, and supplies to maintain regular system operations, construct small system extensions and replacements, and respond to emergency conditions. Identification of routine supplies and emergency response equipment and materials has been coordinated with the City's emergency response and hazard mitigation plans, a complete vulnerability assessment, and the needs of various departments within the City. An ongoing materials list and inventory is maintained by the Water Department for in-house needs and to assist with emergency response if requested by other purveyors in the area.

CHEMICAL INVENTORY

Operation and maintenance of a public water system requires use of various chemicals for water treatment and disinfection of facilities. **Table 8-3** identifies the typical types of chemicals stored and their purpose. Chemical specifications are identified in the City's Warehouse/Purchasing agents files, the material safety data sheet (MSDS) records, and posted onsite wherever chemical agents and compounds are used for water treatment.

Table 8-3
Chemical Inventory

Chemical	Purpose/Use
Chlorine (Liquid/Gas)	Disinfection of Water Supply
Sodium Fluoride	Fluoridation of Water Supply
Sodium Hypochlorite (12.5%)	Disinfection of Water Supply
Sodium Hydroxide (25%)	pH Adjustment (Corrosion Control)
Potassium Permanganate (Dry)	Iron and Manganese Removal
Potassium Permanganate (4% Solution)	Iron and Manganese Removal

WATER QUALITY MONITORING PROGRAM

Each of the City's water supply sources currently is classified as groundwater. The City is conducting an extensive WHPA program to serve as an early detection of possible aquifer contamination. The program involves monitoring from selected wells within the 1 year, 5 year, and 10 year zones of influence for the sources most susceptible to contamination: Clark Springs; Kent Springs; and Armstrong Springs.

The current quality of the City's water supply is excellent, with only minor secondary contaminant concerns. Secondary contaminants are classified by the U.S. Environmental Protection Agency (EPA) as aesthetic concerns and not a threat to human health. These contaminants are primarily iron and manganese, which are treated by aeration and dilution for the Seven Oaks (Soos Creek) and Garrison well sites, and oxidation followed by filtration for the 208th and 212th well sites. The City chlorinates its water supply for public health protection from bacteriological pathogens. The City also fluoridates the water supply for dental health benefits for consumers. The City's water supply also is moderately hard, with a relatively low pH;

consequently, it is slightly corrosive to plumbing fixtures. In June 2012, the City completed and put online a corrosion control facility at Guiberson Reservoir to adjust the pH of Kent Springs water and Kent Springs water when blending with Tacoma water to make it less corrosive. The 212th Treatment Plant adjusts the pH of its product water to a pH of 8.2 whenever it is operating. A summary of the City's water treatment is shown in **Table 8-4**.

As discussed in **Chapter 6**, the City maintains compliance with the regulations set forth by the EPA's Safe Drinking Water Act (SDWA); Title 40 Code of Federal Regulations (CFR) Part 141 National Primary Drinking Water Regulations; and DOH Drinking Water Regulations for Group A, Public Water Systems, Chapter 246-290 WAC.

Table 8-4
Water Treatment

Source	Type of Treatment	Comments
Clark Springs	Chlorination, fluoridation, and pH adjustment	None
Kent Springs	Chlorination, fluoridation, and pH adjustment	None
East Hill Well	Chlorination, fluoridation, and pH adjustment	None
Seven Oaks (Soos Creek Well)	Chlorination, fluoridation	Blended with Clark Springs or Kent Springs
Armstrong Springs Wells #1 and #2	Chlorination, fluoridation	Blended with Clark Springs or Kent Springs
Garrison Well	Chlorination, fluoridation	Blended with treated water at 6 MG #2 Reservoir
O'Brien Well	Chlorination, fluoridation	None
208th Well and 212th Wells #1, #2, and #3	Chlorination, fluoridation, filtration, and pH adjustment	208th and 212th Wells treated together at the 212th Street Treatment Plant

Table 8-5 includes a partial list of analytical laboratories used by the City for routine and specific analysis of drinking water samples. These laboratories are EPA and DOH certified for compliance with Department of Health regulations. The City's current water quality monitoring program is included in **Appendix I**.

Table 8-5
Water Quality Analytical Laboratories
(State of Washington Approved)

Laboratory	Phone Number	Address	Analysis Performed
Water Management Labs Inc.	(253) 531-3121	1515 80th Street E Tacoma, WA 98404	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis
Edge Analytical Laboratories	(800) 755-9295	1620 S Walnut Street Burlington, WA 98233	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis UCMR II
Washington DOH Public Health Laboratories	(206) 418-5400	1610 NE 150th Street Shoreline, WA 98155	Maximum total Trihalomethane potential (MTTPs), radionuclides, general organic chemistry
AmTest Laboratories	(425) 885-1664	13600 NE 126th Place, Suite C Kirkland, WA 98034	Bacteriological, IOC, VOC, SOC, THM, general chemistry, and other water quality analysis

PUBLIC NOTIFICATION

In accordance with the requirements of the EPA, the City prepares an annual water quality report sometimes referred to as a Consumer Confidence Report. A copy of this report is included in **Appendix K**.

In the event of an issue with the water supply, the City has established procedures for various levels of emergency, including suspected water quality issues, known contaminants identified in the water system, boil water notifications, and water supply interruption or shortage. The exact procedures and language identified for each potential water quality or quantity emergency is included in the City's Coliform Monitoring Plan, Cross-Connection Control Program, Water Shortage Response Plan, or Emergency Response Plan, as appropriate. In general, the City is fully prepared for the following public notification measures. Please note that these general methods of notification are intended only as a summary of complete procedures and language identified in the aforementioned plans and procedures.

- Newspaper Notices
- Direct Mail Notice or Hand Delivery to all Consumers or Customers in a Specific Area of the System
- Posted Notice
- Notice to Radio and Television Stations
- Notices to New Billing Units or New Hookups
- City of Kent social media sites

EMERGENCY RESPONSE

All water supply systems are subject to damage and interruption from unusual emergency events. The City's Water Department has participated in City-wide emergency response planning and has a detailed program for responding to a variety of emergency conditions. The details of that

emergency response program are classified confidential for the protection of the system, health and safety of system customers, and privacy of water system personnel. The following provides a general overview of key activities that have been evaluated and/or are in place.

WATER SYSTEM PERSONNEL EMERGENCY CALL-UP LIST

The City maintains information that identifies, in order (based on DOH certification level and experience), water system personnel responsible for making decisions in specific emergency situations. Job titles and phone numbers (work and home) are included. The Kent Police Department (phone 253-856-5800) has a current list of all phone numbers on file and available 24 hours a day, as well as procedures for emergency callout of the proper personnel.

NOTIFICATION PROCEDURES

A Boil Water Notice may be approved or distributed by the City. In all cases the Public Works Director, City Operations Manager, and/or the Mayor are to be notified of any action taken as soon as possible.

SEISMIC VULNERABILITY ANALYSIS

Kennedy Jenks completed a seismic vulnerability assessment of the City's water system in 2017. The objectives of the study were to determine the potential for damage, disruption of services, and injury or loss of life (life-safety) due to an earthquake; and to develop preliminary mitigation recommendations and estimated construction costs. The City has implemented the recommendations of the vulnerability analysis in its budgeting and Capital Improvement Program (CIP) (**Chapter 9**). Water system component vulnerability was assessed in the following areas: major fire; earthquake; chlorine gas; mechanical failure; bomb; power; employee accident/illness; sub-zero weather; flooding; and windstorm. The study did not identify any system components as "very vulnerable." However, the analysis did put forth recommendations for corrective action on some system components. While key recommendations for security improvements have been accomplished, this is considered an ongoing expense to the City, with improvements accomplished as technology allows and system components require.

Other system vulnerability upgrades have been identified in consultant reports and summarized in the CIP contained in **Chapter 9**. The identification and addition of all system improvements, however, will increase the reliability of the water system in the event of an emergency and extend the useful life of the system.

EMERGENCY PREPAREDNESS

Table 8-6
Preparation Common to All Emergencies

Personnel	Advise personnel to arrange for safety of families in advance.
	Prepare emergency schedule and brief personnel.
	Put all personnel on emergency status.
	Strategically locate and station crews.
Facilities	Check vehicles, auxiliary electrical power, and pumping units. A. Sufficient fuel. B. Operation of emergency power/battery operated lights. C. Operation of vehicles.
	Check emergency communication equipment for readiness.
	Maintain emergency rations, water, clothing, and bedding at the maintenance shops sufficient for 72 hours.
	Secure equipment and supplies in exposed areas; secure buildings; install storm shutters, if available and appropriate.
Materials	Review possible repair materials for local purchase of items on short notice in an emergency.
	Arrange with local suppliers and nearby utilities for access to stored chemicals, tools, repair parts, etc., which may be required immediately after the disaster.
	Determine the need to relocate certain materials to outlying sites.

CONDITIONS OF SERVICE

Throughout the year, three distinctive conditions of service (green, yellow, or red) can exist. The conditions are explained below. The Water System Manager is responsible for making all changes in the condition or service, with the approval of the Public Works Director.

1. Condition Green – Normal water use. Notification of Water Department Control Center is required for all unusual or excessive water/hydrant use.
2. Condition Yellow – Caution is necessary with all water/hydrant use. All inspections/water main flushing and/or hydrant flows must be cleared through the Water Department Control Center in advance.
3. Condition Red –
 - Level #1 – No hydrant use. No inspection water flows. Contact Water Department Control Center on all emergency hydrant use or water flows.

- Level #2 – Same as Level #1 except public irrigation is authorized on alternate days based on street address (odd/even), ONLY.
- Level #3 – Same as Level #1 except that public irrigation is prohibited.

PUBLIC NOTIFICATIONS

Many of the City's water quality monitoring and emergency response plans call for notification of the public of emergency conditions and of required demand curtailment measures. Sample announcements are presented here in increasing order of severity. The City should contact newspapers and several local radio and television stations, which broadcast in the service area, to make prior arrangements concerning emergency announcements.

Sample I

For Immediate Release:

The City of Kent is experiencing unusually high water demand and is having difficulty maintaining adequate reservoir reserves. Residents of the City are requested to reduce water consumption and to avoid wasting water wherever possible. It will be particularly helpful if homeowners will make every effort to reduce lawn irrigation. The problem is expected to be temporary in nature, and a public announcement will be made when normal water consumption can be resumed.

Sample II

For Immediate Release:

The City of Kent is experiencing a major loss of its water production capacity. The City's customers are directed to stop all irrigation and to make every effort to conserve potable water. Failure to do so may result in the application of fines of up to \$50/day, according to City ordinance #2227. The City is doing everything possible to correct the situation, and will make a public announcement as soon as the problem has been rectified.

Sample III

For Immediate Release:

This is a Community Emergency Announcement. The City of Kent has experienced a major loss of its water production capacity, and, therefore, is unable to maintain normal water deliveries. It is mandatory that all irrigation, industrial, and commercial use be discontinued. Water must be conserved for sanitary and potable use only. Your cooperation is urgently requested. Failure to eliminate unessential uses of water may result in the application of fines of up to \$50/day, according to City ordinance #2227. The City is doing everything possible to restore the water system to normal operations. You will be notified of any change in the situation. Note: repeat the above message.

Sample IV

For immediate Release:

The City of Kent has experienced a total loss of its water production capacity; as a result, the water mains have been shut off and normal water deliveries have been discontinued. The City

has made arrangements to deliver water by tanker truck or bottled water to residential areas for potable and sanitary uses only.

When picking up water at the tank truck locations, please bring your own clean containers. The City is doing everything possible to resume normal water service and will notify you as soon as water service has been restored.

State law, WAC 248-54-750, Reporting and Public Notification, clearly outlines the City's responsibilities for both oral and written communication with water users in situations that may be caused by emergencies. All staff with authority for public announcements should be familiar with these regulations.

In addition to public announcements, communication with emergency services is vital.

CUSTOMER COMPLAINT RESPONSE PROGRAM

The City has adopted the following policy and procedures for taking and responding to complaints/inquiries.

To contact the Water Department, citizens contact the Public Works Operations Department through the public number, which is (253) 856-5600. The phone is operated by City employees Monday through Friday (except holidays) between the hours of 7:30 a.m. and 4:00 p.m. During non-working hours, the phones are answered by a voice message system. In the case of emergencies during non-working hours, the calls are forwarded to the City Police Department who contacts Water Department employees on a callback list, the employees on standby, or the Water System Manager.

During standard working hours, the individual receiving the call shall record all of the pertinent information (i.e., name, address, location of the problem, date, phone number, and the nature of the call) on a complaint/inquiry form in the WebQA System for assignment and tracking. Each form has a unique identifying number to assist in tracking. Once all the pertinent information is recorded, a copy of the form is given to the corresponding supervisor or System Manager.

Field Supervisors/System Managers are responsible for contacting the citizen as soon as possible within a 24 hour period. After the citizen has been contacted and the situation assessed, the response given to the citizen is recorded in the WebQA database.

COMPLAINT RESPONSE

Following are the established procedures for responding to the most common complaints/inquiries.

High Chlorine – Contact customer by phone, explain chlorination practices and monitoring, follow up with visit to customer location (if necessary) and perform field analysis. Explain results to customer and give advice on procedures to lessen chlorine tastes and odors if normal levels have become objectionable to the customer.

Stains on Plumbing Fixtures – Contact customer by phone, determine type of stain (i.e., result of type of plumbing), explain water quality, and need to eliminate leakage that is leaving stain.

Request for Water Quality Results – Contact customer by phone to determine type of result they are looking for or reason for needing the information. Follow up with mail, email, or fax of results needed by customer.

Inquiry on Fluoride – Contact customer by phone. Generally, customer inquiry is “do we fluoridate the water?” Check customer address to verify City of Kent customer, and inform them of fluoride concentration.

Bad Tasting/Smelling Water – Contact customer by phone to determine type of smell or taste causing concern. Set up site visit to check water quality; and check chlorine residuals to determine quality of water. Meet with customer to review concerns, ways to eliminate or lessen concerns (i.e., flushing, refrigeration), and dispatch distribution crews for main flushing if necessary.

“Ill Because of Water” – Contact customer by phone and get information on the reason for this concern and schedule an appointment for meeting with the customer. Meet with customer and take chlorine residual to determine possibility of high chlorine demand; determine necessity of bacteriological sampling and sample if necessary with sample going to certified laboratory for analysis. Contact customer with results and inform them of physician responsibility to report suspected waterborne illness to local Health Department and the fact that the Health Department is not reporting a problem; advise customer to follow up with a doctor if necessary. If concern is related to other causes, such as minerals or chlorine, City staff inform the customer of water quality and methods for lessening exposure to these areas. If customer is still concerned, suggestion may be made to drink bottled water.

Inquiry of Lead Content – Inform customer of the absence of lead in the City water supply, but explain the potential for lead in plumbing piping and fixtures. Explain lead/copper monitoring program, City water quality characteristics, corrosion control facilities, and ways to eliminate exposure (i.e., flushing standing water, using cold water for cooking and drinking); provide customers with lead information packets.

Specks of Material in Water – Call customer and determine type of specks. Schedule an appointment with customer for determination of material. If it is related to the customers plumbing, suggest ways to clear. If related to distribution system, dispatch distribution crew for main flushing and determine cause.

Rusty Water – Call customer and determine if problem is internal to building or if it is from distribution system. If internal, suggest ways to clear problem. If external, dispatch distribution crew for main flushing and determine cause (i.e., dead-end main, contractor activity, or water system surges).

PROCEDURES FOR RECORD REPORTING TO DOH

For coliform monitoring and chemical analysis of water for compliance issues, the contracted certified laboratory sends a copy of the results to the City and a copy of the results directly to DOH. The City maintains water quality analysis results and provides these results to DOH upon request. For special programs such as lead/copper rule or synthetic organic susceptibility, the City mails results directly to DOH Drinking Water offices in Olympia.

Reporting to the Department of Health

For coliform monitoring, any instance of a positive coliform present analysis requires the City to follow the procedures outlined in the Coliform Monitoring Plan.

RECORDKEEPING AND REPORTING

DOH has enacted regulations for recordkeeping and reporting that may be found in WAC 246-290-480. The regulations identify recordkeeping and reporting procedures for operations and water quality testing. Records shall be kept for chlorine residual and other information as specified by DOH. DOH requires retention of critical records dealing with facilities and water quality issues as summarized below.

- Bacteriological analysis results: 5 years.
- Chemical analysis results: for as long as the system is in operation.
- Daily source meter readings: 10 years.
- Other records of operation and analyses as may be required by DOH: 3 years.
- Documentation of actions to correct violations of primary drinking water standards: 3 years after last corrective action.
- Records of sanitary surveys: 10 years.
- Project reports, construction documents and drawings, inspection reports, and approvals: life of the facility.
- Construction completion reports: life of the facility.

Table 8-7
Record Keeping and Reporting

Type of Record	Storage Location			Length of Retention
	Records Room	Supervisor Office	Electronic	
Customer Complaints	X	X	X	Permanent
DOH Water Facilities Inventory (WFI)		X	X	Permanent
Construction Completion Reports	X	X	X	Permanent
Ground Water Under Direct Surface Influence (GWUI)	X	X	X	Permanent
Wellhead Protection Plan Monitoring (WHPP)		X	X	Permanent
Source Production	X	X	X	Permanent
Water Quality Analysis	X	X	X	Permanent
Coliform Monitoring	X	X	X	Permanent
Fluoride/Chlorine	X	X	X	Permanent
Inorganics (IOCs)	X	X	X	Permanent
Volatile Organics (VOCs)	X	X	X	Permanent
Synthetic Organics (SOCs)		X	X	Permanent
Trihalomethanes (THMs)	X	X	X	Permanent
Radionuclides		X	X	Permanent
Lead/Copper Rule (LCR) Monitoring		X	X	Permanent
Water Department Time Books/Journals/Log Books	X	X		Permanent

The most recent sanitary survey of the City's water system by DOH was conducted in December 2016, and no major deficiencies were found. DOH found that the City's water system is in good sanitary condition, and that the water system is being operated and managed in a diligent manner. DOH also determined that the City has a functional operations and maintenance group with routine tasks documented and followed, has added additional security measures, is improving its telemetry system, offers reliability with the capability to move flow between zones and utilize different sources, and has auxiliary power available. The City continues to stay in compliance with its water quality sampling requirements.

It was very evident to DOH that City staff take their responsibilities seriously and are dedicated toward delivering safe and reliable drinking water to all customers.

9 | WATER SYSTEM IMPROVEMENTS

INTRODUCTION

This chapter presents proposed improvements to the City of Kent'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 improvement identified by the City. Numbers assigned to the improvements start at the west end of the system and generally increase incrementally to the east, as shown in **Figures 9-1** through **9-7**, which are plan views of the improvements. A brief description of the extents shown in these figures is as follows.

- Figure 9-1: System-Wide
- Figure 9-2: West Hill
- Figure 9-3: 240 Zone – West
- Figure 9-4: 240 Zone – Downtown
- Figure 9-5: 240 Zone – North
- Figure 9-6: East Hill – North
- Figure 9-7: East Hill – South

The improvements also are illustrated in the hydraulic profile of the future water system (**Figure 9-8**). The improvements are organized and presented in this chapter according to the following categories.

- Recent Water System Improvements
- Water Main Improvements
- Pressure Zone 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 2011, when the City last updated its Water System Plan (WSP). **Table 9-1** lists the major water system CIP projects that have been completed since 2011.

Table 9-1
Major Improvements Completed Since 2011 WSP

Project Description	Year Completed
640 Tank Construction	2011
Guiberson Corrosion Control Facility	2011
Pump Station #6 Emergency Generator Transfer Switch Installation	2011
Clark Springs Surge Tank Electrical Upgrade	2012
Pump Station #5 Control Valve Auma Replacements	2012
Pump Station #7 Mag Meter Replacement	2012
Pump Station #7 Generator Set Installation	2012
Cambridge Tank Overflow and Drain Improvements	2012
Blue Boy Standpipe Piping and Control Vault Improvements	2012
Armstrong Springs Chlorination Equipment Upgrade	2013
East Hill Well Generator Set Installation	2013
Clark Springs Well #1 MCC Replacement	2015
City of Tacoma Green River Filtration Facility	2015
Kent Springs Gallery Level Sensor and Chlorination Equipment Installation	2015
Pump Station #5 MCC Upgrade and Installation of Soft Starts for Pumps 3 and 4	2015
212th Street Treatment Plant Mag Meter Upgrade and Auma Valve Control Actuator Installation	2016
Armstrong Springs Wells Back-up Generator with MCC Installation	2016
Armstrong Springs Wells Property Purchase for Source Protection	2016
Pump Station #5 Control Vault Upgrades for 125K Tank	2016
6 MG #2 Reservoir Hatch Security Improvements	2016
Guiberson Reservoir Lining, Manifold, and Security Improvements	2016
3.5 MG Tank Drain and Control Vault Installation, and Flow Meter Installation	2016
East Hill Well Redevelopment and Pump and Motor Replacement	2017
3.5 MG Tank Cleaning, Inspection, and PAX Mixer Replacement	2017
Clark Springs Habitat Conservation Measure #6 – Rock Creek Woody Debris	2017
Clark Springs Watershed Property Purchase for Source Protection (Gribble Property)	2017
Guiberson Reservoir Exterior Coating	2017
Kent Springs Overflow Box Vault Lid Installation	2017
Kent and Lake Meridian Water District Intertie #3 Vault and Meter Upgrade	2017
Pump Station #8 Generator Hook-Up and Transfer Switch Installation	2017
Reith Road Tank Cleaning and Inspection	2017
485 Individual Customer PRVs Installed for Future 640 Zone Conversion	2018
6 MG #1 Reservoir Exterior Cleaning	2018
640 Tank Interior Cleaning and Inspection	2018
Clark Springs Augmentation Meter Upgraded	2018
Clark Springs Manual Generator Hook-Up Installed for Secondary Emergency Power	2018
Clark Springs Rock Creek Augmentation Pump Rebuilt and Replaced	2018
Clark Springs Wells 1, 2, and 3 Waste Discharge Line Flow Meter Installed	2018
Gribble Property Monitoring Well Drilled for Sampling South of the Landsburg Mine	2018
SCADA Security Study Performed with Department of Homeland Security	2018
640 Zone Conversion Improvements	2011-Ongoing

WATER MAIN IMPROVEMENTS

The following water main improvements were identified from the results of the distribution and transmission system analyses discussed in **Chapter 7** to meet the City’s 2019 design criteria. Some of the water main improvements will replace existing distribution water main and are grouped in the “Annual Water Main Replacement Program – High Priority” project (CIP WM1). The individual water main improvement projects within this group are numbered 1 through 55, as shown in **Figures 9-9** through **9-15**. Medium and low priority projects were not identified with a CIP number, but they are shown in **Figures 9-9** through **9-15**. Other water main improvements are mostly larger diameter water mains that function more like transmission mains than distribution mains and are identified by the City as individual projects (CIP WM2 through WM13).

CIP WM1: Annual Water Main Replacement Program – High Priority

Deficiency: Most of the water main improvements shown in **Figures 9-9** through **9-15** are required to resolve existing system fire flow deficiencies based on 2019 design criteria for new construction and are caused primarily by undersized water mains. Some of the water main improvements address aging water main materials, such as asbestos cement (AC) and cast iron (CI). Many areas also have known occurrences of water main leaks or breaks.

Improvement: Replace existing water main with new water main in accordance with the City’s construction standards. The individual water main improvements grouped under this project are numbered 1, 2, 3, etc., as shown in **Figures 9-9** through **9-15**. The selection of specific projects will be accomplished annually during the City’s budget development process and 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. An average allowance of approximately \$2,200,000 per year has been established for the annual replacement of water mains.

CIP WM2: Veterans Drive and Military Road Transmission Main

Deficiency: A single transmission main in Meeker Street crosses the Green River to connect the City’s supply facilities to the City’s West Hill operating area. A secondary transmission main is proposed to be installed to provide a redundant conveyance route to the West Hill operating area.

Improvement: The proposed main is recommended to be 16-inch-diameter to meet the future supply needs of the West Hill operating area and for compatibility with the proposed **CIP F1: West Hill BPS** capacity. The alignment of the proposed main is proposed to be within Veterans Drive, between a future West Hill BPS located immediately east of the Green River and Military Road, and primarily within Military Road, between Veterans Drive and a future West Hill Reservoir located at approximately S 248th Street. It is recommended that this project be designed and constructed in conjunction with CIP F1: West Hill BPS. This project location is shown on **Figure 9-2**.

CIP WM3: Reith Road Transmission Main Improvements

Deficiency: The existing 8-inch-diameter main in Reith Road between 42nd Avenue S and 38th Avenue S is undersized and does not provide sufficient fire flow to the 529 Zone.

Improvement: Replace the existing main in this location with 16-inch-diameter main. This project location is shown on **Figure 9-2**.

CIP WM4: 68th Avenue S Transmission Main Improvements

Deficiency: The existing main in 68th Avenue S between James Street and S 190th Street is predominantly constructed of concrete and is over 50 years old. The water main has likely reached or is approaching the end of its design life. Additionally, a *Seismic Vulnerability Assessment*, prepared in 2017 by Kennedy/Jenks Consultants, recommends that key transmission main in the City's 240 Zone be upgraded with the installation of seismically restrained main to prevent service interruptions following a seismic event.

Improvement: Replace the existing main in this location with 12- and 16-inch-diameter main. It is recommended that the replacement main be seismically restrained water main. This project location is shown on **Figures 9-3, 9-4, and 9-5**.

CIP WM5: S 212th Street Transmission Main Improvements

Deficiency: The existing main in S 212th Street between Russell Road and 84th Avenue S is over 50 years old and has likely reached or is approaching the end of its design life. Additionally, a *Seismic Vulnerability Assessment*, prepared in 2017 by Kennedy/Jenks Consultants, recommends that key transmission main in the City's 240 Zone be upgraded with the installation of seismically restrained main to prevent service interruptions following a seismic event.

Improvement: Replace the existing main in this location with 16-inch-diameter main. It is recommended that the replacement main be seismically restrained water main. This project location is shown on **Figures 9-3 and 9-5**.

CIP WM6: 84th Avenue S Transmission Main Improvements

Deficiency: The existing main in 84th Avenue S between S 228th Street and S 192nd Street is predominantly constructed of concrete and is over 60 years old. The water main has likely reached or is approaching the end of its design life. Additionally, a *Seismic Vulnerability Assessment*, prepared in 2017 by Kennedy/Jenks Consultants, recommends that key transmission main in the City's 240 Zone be upgraded with the installation of seismically restrained main to prevent service interruptions following a seismic event.

Improvement: Replace the existing main in this location with 16-inch-diameter main. It is recommended that the replacement main be seismically restrained water main. This project location is shown on **Figure 9-5**.

CIP WM7: Guiberson Reservoir Transmission Main Improvements

Deficiency: The Guiberson Reservoir has two primary transmission mains to convey water to the 240 Zone. The transmission main that conveys water west from the Guiberson Reservoir is

located primarily within easements, is difficult to access, and is located on a steep slope that has been the location of a historical landslide (Figure 2-2, *Seismic Vulnerability Assessment*, Kennedy/Jenks Consultants, 2017).

Improvement: Abandon the existing transmission main to the west of the Guiberson Reservoir, between approximately Kennebeck Avenue and Central Avenue S. Replace the existing transmission main to the north of the Guiberson Reservoir with 24-inch-diameter main in Kennebeck Avenue, between Guiberson Street and E Titus Street, and in E Titus Street between Kennebeck Avenue and Central Avenue S. It is recommended that the replacement main be seismically restrained water main. This project location is shown on **Figure 9-4**.

CIP WM8: 78th Avenue S Water Main Improvements

Deficiency: The existing 8-inch-diameter main in 78th Avenue S between approximately S 262nd Street and S 277th Street is undersized and does not provide sufficient fire flow to existing customers served by the looped main in this location.

Improvement: Replace the existing main in this location with 12-inch-diameter main. This project location is shown on **Figure 9-4**.

CIP WM9: 88th Avenue S Water Main Improvements

Deficiency: No water main currently exists in 88th Avenue S between S 218th Street and approximately S 222nd Street.

Improvement: Install 12-inch-diameter main in this location. This project location is shown on **Figure 9-5**.

CIP WM10: S 218th Street Transmission Main Improvements

Deficiency: The existing 12-inch-diameter main in S 218th Street between the 6 Million Gallon #2 (6 MG #2) Reservoir located at Garrison Creek Park and 88th Avenue S is undersized and does not provide sufficient fire flow to the 240 Zone.

Improvement: Replace the existing main in this location with 18-inch-diameter main. It is recommended that the replacement main be seismically restrained water main. In addition to the transmission main improvement, evaluate the reconfiguration of the S 218th Street pressure reducing valve (PRV) to allow the City to convey water directly to the 240 Zone from the 6 MG #2 Reservoir Transmission Main in the event that the 6 MG #2 Reservoir is out of service, or to wheel City of Tacoma water directly into the 240 Zone. This project location is shown on **Figure 9-5**.

CIP WM11: SE 284th Street Water Main Improvements

Deficiency: Additional conveyance capacity between the City of Tacoma (Tacoma) Point of Delivery (POD) #3 and the 590 Zone will be necessary following creation of the 640 Zone, which will truncate some existing distribution main in the east side of the existing 590 Zone.

Improvement: Install 12-inch-diameter main in SE 284th Street between 118th Avenue SE and 109th Avenue SE, and in 108th/109th Avenue SE between SE 284th Street and SE 279th Street. This project location is shown on **Figure 9-7**.

CIP WM12: 640 Zone BPS #2 Transmission Main Improvements

Deficiency: The City is converting the easterly portion of the existing 590 Zone to the 640 Zone, which will be supplied by two future BPSs. Transmission from the proposed 640 BPS #2 (CIP F5), proposed to be located at the Tacoma POD #3 site, will be required to connect the proposed BPS with the 640 Zone distribution system.

Improvement: Install 18-inch-diameter 640 Zone main in 118th Avenue SE between SE 284th Street and SE 277th Place, in SE 277th Place between 118th Avenue SE and 120th Avenue SE, and in 120th Avenue SE between SE 277th Place and SE 272nd Place. The proposed 18-inch-diameter main in 120th Avenue SE between SE 276th Street and SE 272nd Place is proposed to replace the existing 6- and 8-inch-diameter main in the same location.

Replace existing 8-inch-diameter main in SE 272nd Place between 116th Place SE and 102nd Avenue SE with 12-inch-diameter 640 Zone main.

Replace existing 4-inch-diameter main in 117th Avenue SE between SE 276th Street and SE 272nd Place with 8-inch-diameter 640 Zone main.

Convert approximately 800 linear feet of existing 18-inch-diameter 590 Zone main in SE 288th Street between the Tacoma POD #3 and 118th Avenue SE, and approximately 1,500 linear feet of existing 24-inch-diameter 590 Zone main in 118th Avenue SE between SE 288th Street and SE 284th Street SE to 640 Zone main.

Isolate the proposed 590 and 640 Zones near the vicinity of these proposed improvements with zone valves. This project location is shown on **Figure 9-7**.

CIP WM13: 590 Zone Transmission Main Downstream of Tacoma POD #3

Deficiency: The City is converting the easterly portion of the existing 590 Zone to the 640 Zone, and the existing 18-inch-diameter 590 Zone main in SE 288th Street is proposed to be converted to 640 Zone main as part of CIP WM16. Additional conveyance capacity from Tacoma POD #3 to the 590 Zone will be necessary following the conversion of the existing 590 Zone main.

Improvement: Install 12-inch-diameter 590 Zone main within an easement in approximately 120th Avenue SE between Tacoma POD #3 and SE 284th Street. Replace the existing 8-inch-diameter 590 Zone main in SE 284th Street between approximately 120th Avenue SE and 124th Avenue SE with 12-inch-diameter 590 Zone main. This project location is shown on **Figure 9-7**.

Future Water Main Extensions and Replacements

All new water main extensions and replacements shall be installed in accordance with the City's Water System Standard Plans, which are included in **Appendix G**. All new water mains shall be sized by hydraulic analysis to ensure that all pressure, flow, and velocity requirements stated in **Chapter 5** are met. In general, new and replacement water mains that will carry fire flow in

residential areas shall be a minimum of 8 inches in diameter and looped for multi-family and residential developments. New and replacement water mains in commercial, business park, industrial, and school areas shall be a minimum of 12 inches in diameter and looped.

PRESSURE ZONE IMPROVEMENTS

The following pressure zone improvements will improve the reliability and redundancy to vulnerable locations throughout the water system and will improve various low and high pressure problem areas throughout the water system. A brief description of the existing deficiency and the improvement itself is provided in the following sections.

CIP PZ1: Military Road Connection Between 587 and 575 Zones

Deficiency: The City's West Hill operating area includes independent 587 and 575 Zones, each of which are closed pressures zones that are supplied by separate BPSs. During a fire flow or emergency event, the hydraulic grade of these pressure zones is reduced, and the zones are supplied via the 529 Zone.

Improvement: A transmission main is proposed to be installed within Military Road to connect the 587 and 575 Zones to improve redundancy and reliability of these zones, and to convert both zones to open zones with the same hydraulic grade (587 feet) following the completion of a future West Hill Reservoir. The proposed main is recommended to be 12 inches in diameter, and to be installed primarily within Military Road, between approximately S 257th Street and S 264th Street, where the transmission main is proposed to extend to the Cambridge Tank and Pump Station #7 site and connect to the existing 575 Zone main on the discharge side of Pump Station #7. Following this improvement, supply to the converted 575 Zone will primarily be from 587 Zone facilities, with Pump Station #7 operating as backup supply. Operational controls for Pump Station #6 and Pump Station #7 should be adjusted accordingly. This project location is shown on **Figure 9-2**.

CIP PZ2: 640 Zone Conversion

Deficiency: The City is converting the easterly portion of the existing 590 Zone to the 640 Zone and will require multiple PRV stations to continue to provide a sufficient level of service to the 590 Zone following the pressure zone conversion, closed valves to separate the 590 and 640 Zones, and the installation of individual PRVs for customers that will experience an increase in service pressures for those that exceed 80 pounds per square inch (psi).

Improvement A (116th Avenue and SE 272nd Place): Install a PRV station at the westerly SE 272nd Place dead-end, between 116th Avenue SE and 116th Place SE. Install 12-inch-diameter water main between the proposed PRV and the existing 10-inch-diameter 590 Zone main at the intersection of 116th Avenue SE and 114th Avenue SE. A modified version of this improvement was originally identified in a *640 Zone Creation Report*, prepared by RH2 Engineering, Inc., (RH2) in July 2008, and was subsequently included in the analyses presented in a *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc. This project location is shown on **Figure 9-7**.

Improvement B (SE 270th Street): Install a PRV station in SE 270th Street, immediately east of the intersection with 120th Avenue SE. This improvement was originally identified in a *640 Zone Creation Report*, prepared by RH2 in July 2008, and was subsequently included in the analyses presented in a *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc. This project location is shown on **Figure 9-7**.

Improvement C (116th Avenue SE): Install a PRV station in 116th Avenue SE at approximately SE 270th Street. This improvement was originally identified in a *640 Zone Creation Report*, prepared by RH2 in July 2008, and was subsequently included in the analyses presented in a *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc. This project location is shown on **Figure 9-7**.

Improvement D (SE 265th Street): Install a PRV station in SE 265th Street, between 114th Place SE and 115th Place SE. This improvement was originally identified in a *640 Zone Creation Report*, prepared by RH2 in July 2008, and was subsequently included in the analyses presented in a *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc. This project location is shown on **Figure 9-6**.

Improvement E (SE 248th Street): Install a PRV station in SE 248th Street just east of the intersection with 110th Avenue SE. This improvement was originally identified in a *640 Zone Creation Report*, prepared by RH2 in July 2008, and was subsequently included in the analyses presented in a *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc. This project location is shown on **Figure 9-6**.

Improvement F (Valve Closures): Close existing in-line valves at the following locations, and install and close new in-line valves at the following locations if a valve is not currently installed at these locations. The list of zone valves starts in the south end of the existing 590 Zone and increase to the north.

- Between the two 116th Place SE cul-de-sacs.
- In SE 276th Street at the intersection with 116th Place SE.
- At the intersection of 120th Avenue SE and SE 276th Street.
- At the intersection of 120th Avenue SE and SE 272nd Street.
- In SE 266th Street, just west of the intersection with 116th Avenue SE.
- In the southwest corner of the Aspen Grove Condominium property, along the 8-inch-diameter main that connects 116th Avenue SE and 114th Avenue SE.
- In State Route (SR) 516 (Kent Kangley Road) on the east side of the intersection with 114th Avenue SE.
- In SE 256th Street between 113th Avenue SE and 114th Avenue SE.
- On the north side of SE 256th Street between 111th Avenue SE and 111th Place SE to convert the existing main installed within an easement at this location to a dead-end 640 Zone main.

- At the intersection of SE 252nd Street and 113th Avenue SE.
- At the intersection of SE 252nd Street and 111th Avenue SE (close two valves at this location).
- In SE 244th Street between 110th Place SE and 111th Avenue SE.
- In SE 240th Street at approximately 110th Avenue SE.
- At the intersection of 110th Avenue SE and SE 238th Street.
- In 108th Avenue SE between SE 236th Place and SE 236th Street.
- At the intersection of SE 236th Street and 108th Avenue SE.
- In SE 235th Street, just west of the intersection with 109th Avenue SE.
- At the intersection of SE 232nd Place and 108th Avenue SE (and activate the existing PRV at this same location).
- At the intersection of SE 232nd Street and 106th Place SE.
- At approximately 22900 106th Place SE.
- At the intersection of 108th Avenue SE and SE 228th Street/108th Avenue SE.

Improvement G (Individual PRVs): Install approximately 400 individual PRVs for customers in the proposed 640 Zone that will experience service pressures in excess of 80 psi.

FACILITY IMPROVEMENTS

The following water system facility improvements were identified from the results of the water system analyses that are discussed in **Chapter 7**. The improvements are primarily necessary to resolve existing system deficiencies, but also have been sized to accommodate projected growth.

CIP F1: West Hill BPS

Deficiency: Pump Station #3 is the only non-emergency supply facility for the City's West Hill operating area, and the suction main for Pump Station #3 is installed on the Meeker Street Bridge, which has been identified as a seismically vulnerable bridge. In the event that the main on the Meeker Street Bridge is out of service, or Pump Station #3 is out of service, the only supply available to the City's West Hill operating area is via an emergency intertie with the Highline Water District.

Improvement: Construct the West Hill BPS on Veterans Drive, east of the Green River. The proposed BPS will have a firm capacity capable of providing at least the projected 20-year maximum day demand (MDD) of the West Hill operating area, calculated to be 847 gallons per minute (gpm) in **Chapter 7**. This capacity assumes that **CIP F2: West Hill Reservoir** is completed before, or in conjunction with, the proposed West Hill BPS project. Therefore, the proposed West Hill BPS will normally pump to an open zone and will not be required to provide the fire flow requirement or peak hour demand (PHD) of the West Hill operating area. However, if the City would like to plan for temporary operations or maintenance conditions involving the

proposed West Hill Reservoir being offline, consideration for additional pumping capacity and equipping the proposed pumps with variable frequency drives (VFDs) is recommended to be evaluated during the preliminary design phase of the project. A stationary emergency generator with an automatic transfer switch is recommended to be installed at the West Hill BPS to maintain service in the event of a power outage. The number of pumps, their capacities, and configuration should be determined during the preliminary design phase of the project. For the purposes of this WSP, the West Hill BPS was assumed to consist of two pumps, each capable of providing at least 1,000 gpm to exceed the projected 20-year MDD of the West Hill operating area. It is recommended that this project be designed and constructed in conjunction with **CIP WM2: Veterans Drive and Military Road Transmission Main**, and that the sizing and configuration of the proposed BPS be determined during design of **CIP F2: West Hill Reservoir**. This project location is shown on **Figure 9-2**.

CIP F2: West Hill Reservoir

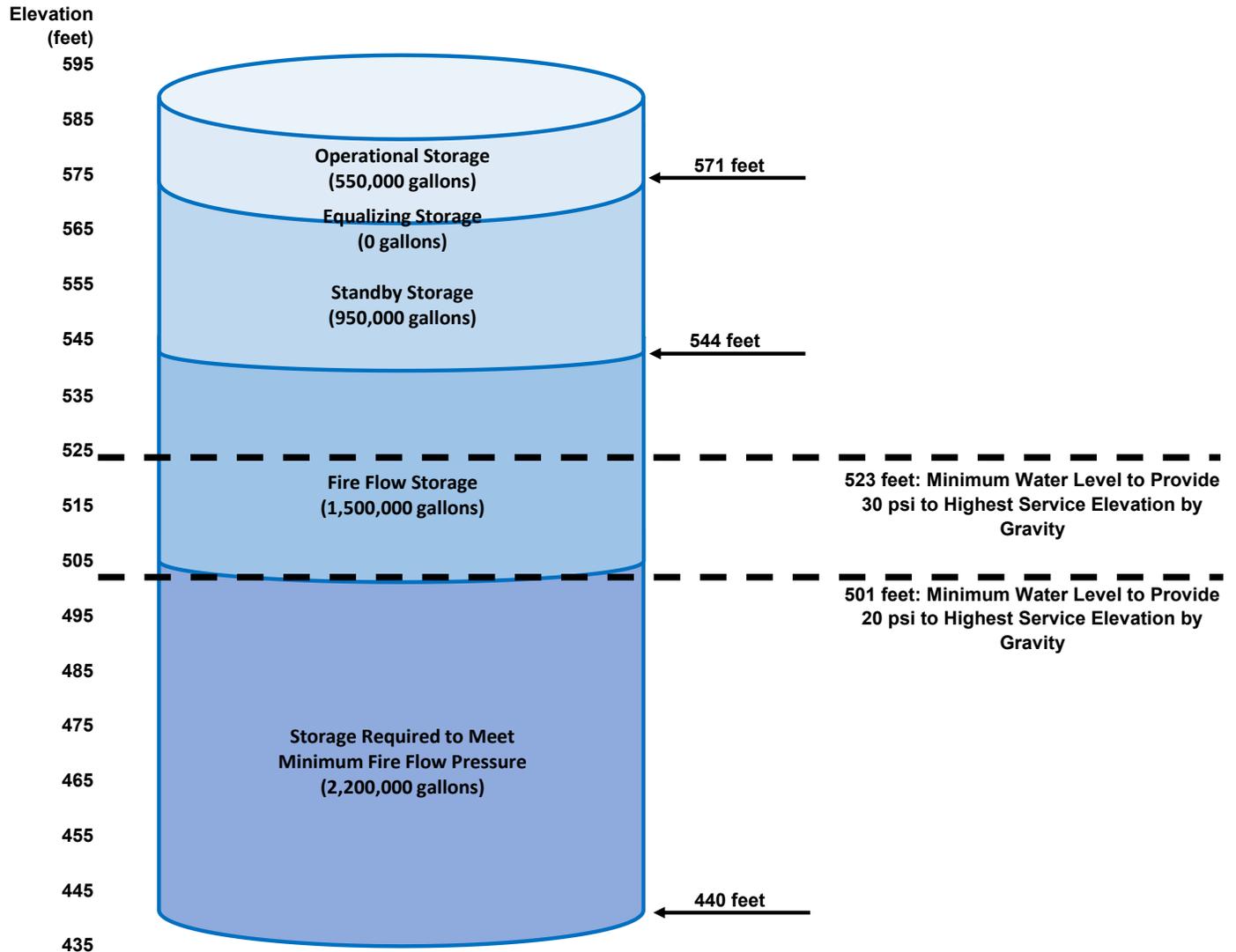
Deficiency: The West Hill operating area currently consists of four pressure zones, three of which are either closed pressure zones (575 and 587 Zones), or an open pressure zone without sufficient storage capacity to meet the regulatory requirements for the zone (529 Zone). In the event that the pump stations supplying these zones are out of service, or if a fire event occurs, the level of service provided to customers in these zones decreases significantly and can be reduced below regulatory and City's minimum standards.

Improvement: Construct a West Hill Reservoir to provide sufficient water storage for the West Hill operating area beyond the 20-year planning period, calculated to be 2.72 million gallons (MG) of usable storage in **Chapter 7**. To accommodate growth beyond the 20-year planning period presented in this WSP, the City is proposing to construct the West Hill Reservoir with approximately 10 percent additional usable storage volume, resulting in approximately 3.00 MG of usable storage proposed for the West Hill Reservoir.

During the preparation of this WSP, the City was evaluating multiple sites for the proposed West Hill Reservoir and considering standpipe and composite tank configurations for the proposed reservoir. For the purposes of this WSP, the future West Hill Reservoir was assumed to be a standpipe located at a currently undeveloped property on the West Hill between 38th Avenue S and Military Road S adjacent to S 248th Street.

The existing ground elevation at the future reservoir location is approximately 440 feet, and the minimum water level to provide 20 psi to the highest existing service elevation is approximately 501 feet, resulting in approximately 61 feet of dead storage at the bottom of the proposed reservoir. **Chart 9-1** presents a not-to-scale schematic identifying the approximate elevations and volumes of the proposed West Hill Reservoir storage components.

Chart 9-1: Approximate West Hill Reservoir Storage Component Elevations and Volumes



Based on a minimum usable storage volume of 3.00 MG, a minimum usable water level of 501 feet, and a maximum water level of 587 feet (to match the existing 587 Zone hydraulic grade), the resulting standpipe diameter is calculated to be approximately 78 feet. Constructing the proposed West Hill Reservoir with a maximum water level of 587 feet allows the existing 587 Zone customers to receive the same normal service pressures that are provided currently. However, the existing 587 Zone, and the existing 575 Zone that is proposed to be combined with the 587 Zone, provide pressures to existing customers that is approximately 10 to 20 psi higher than the minimum standards required by the Washington State Department of Health (DOH) and the City’s design criteria. Water quality evaluations are recommended to take place during the predesign phase of the project to estimate the time to achieve full water turnover in the reservoir (hydraulic residence time), to review potential mixing-related solutions to minimize stagnation within the proposed reservoir, and to evaluate the need for rechlorination at the proposed reservoir site. It is recommended that this project be designed in conjunction with **CIP F1: West**

Hill BPS and CIP F3: West Hill PRVs and Altitude Valves, and constructed at the same time or prior to the West Hill BPS. This project location is shown on **Figure 9-2**.

CIP F3: West Hill PRVs and Altitude Valves

Deficiency: Following construction of the proposed West Hill BPS and Reservoir, the City desires to provide the primary supply to the 529 and 345.5 Zones from the West Hill Reservoir. Installation of PRVs at four locations is recommended to facilitate this operational adjustment and improve fire flow availability downstream of each location.

Improvement: Install a PRV station at the following four locations.

- Within or adjacent to Pump Station #3 (354.5 Zone to 240 Zone).
- Within or adjacent to Pump Station #4 (529 Zone to 354.5 Zone).
- Within or adjacent to Pump Station #6 (587 Zone to 529 Zone).
- Within or adjacent to Pump Station #7 and on the existing Cambridge Tank site (587 Zone to 529 Zone).

The hydraulic grades in the preceding bullets reference the proposed hydraulic grades at these locations, following completion of the proposed West Hill BPS and Reservoir, and the proposed 587 and 575 Zone connection and conversion project (CIP PZ1). Proposed sizing for each PRV station includes a 3-inch PRV for low flows (between 2 and 460 gpm), and an 8-inch PRV for high flows (up to 3,900 gpm) to supplement supply to these zones during a fire flow event. The proposed PRV station within or adjacent to Pump Station #3 allows the Meeker Street transmission main to receive flow from two directions instead of functioning as a dead end, and negates the need for approximately 7,100 linear feet of existing Meeker Street transmission main between Washington Avenue and Pump Station #3 to be replaced with larger diameter main to meet the planning-level fire flow requirement along this alignment. It is recommended that these proposed PRV sizes and flow rates be reviewed during the predesign phase of the **CIP F2: West Hill Reservoir** project.

Altitude valves are recommended to be installed at the existing Reith Road Reservoir and the existing Cambridge Tank locations to prevent reservoir overflows from occurring following installation of the proposed PRV stations. This project location is shown on **Figure 9-2**.

CIP F4: 640 Zone BPS #1 (Blue Boy Standpipe Site)

Deficiency: The City is converting the easterly portion of the existing 590 Zone to the 640 Zone, which will be supplied by two future BPSs.

Improvement: Construct a 640 Zone BPS at the Blue Boy Standpipe site. The proposed BPS will have a firm capacity capable of providing at least the projected 20-year MDD of the 640 Zone, calculated to be 1,132 gpm in **Chapter 7**. A *640 Zone Phasing Analysis Technical Memorandum*, prepared in August 2016 by PACE Engineers, Inc., identified the proposed 640 Zone BPS to include three identical pumps, each equipped with a VFD, and rated for 1,750 gpm at 110 feet total dynamic head (TDH). This project location is shown on **Figure 9-6**.

CIP F5: 640 Zone BPS #2 (Tacoma POD #3 Site)

Deficiency: The City is converting the easterly portion of the existing 590 Zone to the 640 Zone, which will be supplied by two future BPSs.

Improvement: Construct a 640 Zone BPS at the City of Tacoma POD #3 site. The proposed BPS will provide redundant supply to the proposed 640 Zone and the 640 Zone BPS #1 that is proposed at the Blue Boy Standpipe site (CIP F5). To provide full redundancy to the 640 Zone, it is assumed that the 640 Zone BPS #2 will be constructed with the same configuration and capacity as the 640 Zone BPS #1, with three identical pumps, each equipped with a VFD, and rated for 1,750 gpm at 110 feet TDH. This project location is shown on **Figure 9-7**.

CIP F6: 125K Tank Exterior Recoating

Deficiency: The exterior of the 125K Tank needs to be recoated every 15 to 20 years, based on the typical life of coatings on steel tanks.

Improvement: Thoroughly inspect and sample the exterior coating of the 125K Tank to determine the properties of the existing coating and the extent of the required recoating. Recoat the exterior to prevent premature corrosion of the tank exterior. This project location is shown on **Figure 9-6**.

CIP F7: Guiberson Reservoir Replacement

Deficiency: The Guiberson Reservoir was constructed in the 1930s and is nearing the end of its useful life. Although multiple upgrades have taken place, the Guiberson Reservoir roof and floor are deficient, and it is recommended that a replacement reservoir be constructed.

Improvement: Construct a new reservoir to replace the existing Guiberson Reservoir, with a usable storage volume of approximately 8 to 10 MG, which exceeds the 240 Zone storage volume requirements for the 20-year planning period, as shown in **Chapter 7**. It is anticipated that the same treatment processes that occur at the existing Guiberson Reservoir will occur at the replacement reservoir, including pH adjustment of water from the Kent Springs Transmission Main by aeration and a sodium hydroxide pH adjustment process. This project location is shown on **Figure 9-4**.

CIP F8: **Garrison/O'Brien Treatment Plant**

Deficiency: Water pumped from the O'Brien Well has high concentrations of iron and manganese that results in discolored water immediately downstream of the well. The City elects to not normally operate the O'Brien Well due to the poor aesthetics of the source water.

Improvement: Construct a packaged treatment plant capable of treating the high concentrations of iron and manganese at the O'Brien Well. It is anticipated that the treatment plant will be sized to treat the combined capacity of the Garrison Creek Well and the O'Brien Well to allow raw water from the O'Brien Well to be blended prior to treatment. This project location is shown on **Figure 9-5**.

MISCELLANEOUS IMPROVEMENTS

The following improvements are planning efforts and program elements that are required to comply with various State of Washington water regulations or other miscellaneous improvements that have been identified as necessary for continued safe and reliable operation of the water system.

CIP M1: Generator Improvement Program

Deficiency: Not all of the City's water system facilities are equipped with temporary or permanent back-up power, and the City's existing generators require regular maintenance.

Improvement: Improve the back-up power capabilities throughout the water system on an ongoing basis.

CIP M2: Reservoir Maintenance and Improvement Program

Deficiency: The City's reservoirs require regular maintenance including, but not limited to, interior and exterior coatings, inspections, piping improvements, and seismic improvements.

Improvement: Maintain and improve the reservoirs as necessary.

CIP M3: Tacoma Regional Water Supply System (RWSS)

Deficiency: The City's interties with the City of Tacoma pipeline require ongoing improvements.

Improvement: Perform improvements related to the City of Tacoma interties and pipeline as necessary.

CIP M4: Transmission Main Easements/Land Acquisitions

Deficiency: Not all transmission mains have adequate easement width for maintenance and repair.

Improvement: The City will work to acquire necessary easements to allow for maintenance and repair.

CIP M5: Water System Plan Update

Deficiency: Washington Administrative Code (WAC) 246-290-100 requires that the City's WSP be updated every 10 years and submitted to DOH for review and approval.

Improvement: The City will update and submit its WSP every 10 years to comply with State requirements.

CIP M6: Watershed Control Plan, Habitat Conservation Plan, and Wellhead Protection Program

Deficiency: The Watershed Control Plan, Habitat Conservation Plan, and Wellhead Protection Program require ongoing management and updates.

Improvement: The City will update and implement the Watershed Control Plan, Habitat Conservation Plan, and Wellhead Protection Programs in accordance with State requirements.

CIP M7: Landsburg Mine Management

Deficiency: The Landsburg Mine is located upstream of Clark Springs and contains toxic contaminants.

Improvement: The City manages and coordinates Landsburg Mine clean-up plans, which are anticipated to be an ongoing effort.

CIP M8: Automatic Meter Reading System

Deficiency: The City desires to evaluate the feasibility of, and to implement, an automatic meter reading (AMR) system for the City's water system meters.

Improvement: The City will evaluate the feasibility of an AMR system, and if deemed viable, will implement and install an AMR system. Benefits of an AMR system are likely to include the following.

- Elimination of cyclical manual meter reading costs.
- Reduced billing expenses.
- Reduced fuel, fleet maintenance, and labor costs.
- Increased understanding of baseline and peak demands in smaller areas to assist with water system planning and identification of system losses.
- Identification of oversized meters that subsequently under-report consumption.
- Detection of reverse water flow and tampering.
- Information for customers regarding abnormal consumption potentially indicative of leaks, and the ability to provide customers access to their own data in hourly or daily intervals to allow customers to better understand their own usage.

CIP M9: PLC Upgrade Program

Deficiency: The City's programmable logic controllers (PLC) require ongoing upgrades and improvements.

Improvement: Maintain and improve the system's PLCs as necessary to facilitate continued connectivity and control of water system facilities.

CIP M10: SCADA System Upgrades

Deficiency: The City's supervisory control and data acquisition (SCADA) system software and hardware require upgrades to enhance its capabilities and reliability.

Improvement: Upgrade the SCADA system software and hardware as necessary to facilitate continued connectivity and control of water system facilities.

CIP M11: Well Rehabilitation Program

Deficiency: The City's wells require ongoing maintenance and rehabilitation to allow them to continually provide reliable supply to the City's system.

Improvement: Perform well maintenance and rehabilitation of approximately two wells on an annual basis. Typical tasks associated with this improvement include removing the well pump and motor from the well casing; inspecting the equipment condition and performing repairs or rebuilding equipment as necessary; performing a video inspection of the well casing; and reinstalling the equipment and returning the well(s) to service.

ESTIMATING COSTS OF IMPROVEMENTS

Project costs for the proposed improvements were estimated based on costs of similar, recently constructed water projects in the City and around the Puget Sound area and are presented in 2019 dollars. The project cost estimates include the estimated construction cost of the improvement, 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. The project cost estimates include a 20-percent contingency and sales tax of 10.0 percent.

Project 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 (2019 \$ per LF)
Standard Piping	
8	\$317
12	\$350
16	\$383
18	\$417
21	\$453
24	\$492
Seismically Restrained Piping	
8	\$633
12	\$700
16	\$766
18	\$833
21	\$906
24	\$984

The unit costs for each water main size are based on estimates of 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, 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 prioritized from established criteria to formulate a schedule that identifies projects with the most deficiencies and greatest need for improvement to be completed prior to projects with fewer deficiencies. A description of the criteria and method for prioritizing each category of improvements is provided in the following sections.

WATER MAIN IMPROVEMENTS

Table 9-3 lists criteria that were established for prioritizing the water main improvements. The criteria are based on the underlying deficiencies of the existing water main that will be replaced by the proposed water main improvements. The criteria are arranged in seven different categories with a weight factor assigned to each category. The criteria given the most weight are the Seismic Vulnerability, the Proximity to Critical Slopes, the Existing Water Main Maintenance/Breaks, and the Existing Water Main Fire Flow Capability categories.

The Seismic Vulnerability category ranks the water main improvements based on the vulnerability of the water main during a M9.0 seismic event, as identified in the *Seismic Vulnerability Assessment* prepared by Kennedy/Jenks Consultants in April 2017. The Proximity to Critical Slopes category ranks the water main improvements based on the slope of the ground surface adjacent to the water main, based on the 10-foot contour data provided by the City. The Existing Water Main Maintenance/Breaks category ranks the water main improvements based on the number of reported leaks or breaks that the City currently has on record. 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 Material category ranks the water main improvements based on the material of the existing water main. The Existing Water Main Year of Installation category ranks the water main improvements based on the age of the existing water mains. 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.

Table 9-3
Water Main Improvements Priority Ranking Criteria

Points	Category	Weight Factor	Weighted Points
Seismic Vulnerability¹			
5	High Vulnerability (Net Repair Rate > 0.27)	3	15
3	Medium Vulnerability (Net Repair Rate between 0.16 and 0.27)	3	9
0	Low Vulnerability (Net Repair Rate < 0.16)	3	0
Proximity to Critical Slopes			
5	Steep Slopes (Slope Exceeds 30%)	3	15
3	Medium Slopes (Slopes Between 15-30%)	3	9
0	Gentle or Flat Slopes (Slopes Less Than 15%)	3	0
Existing Water Main Maintenance/Breaks			
5	High Maintenance Requirements/High Frequency of Recent Breaks	3	15
3	Annual Maintenance/Recent History of Breaks	3	9
0	No Maintenance and No History of Problems	3	0
Existing Water Main Fire Flow Capability			
5	Derated Fire Flow is 59% or less of Required Fire Flow	3	15
4	Derated Fire Flow is 60-69% of Required Fire Flow	3	12
3	Derated Fire Flow is 70-79% of Required Fire Flow	3	9
2	Derated Fire Flow is 80-89% of Required Fire Flow	3	6
1	Derated Fire Flow is 90-99% of Required Fire Flow	3	3
0	Derated Fire Flow is 100% of Required Fire Flow	3	0
Existing Water Main Material			
5	Galvanized or Steel	2	10
4	Asbestos Cement	2	8
3	Cast Iron or Unknown	2	6
2	Copper	2	4
1	HDPE	2	2
0	Ductile Iron or PVC	2	0
Existing Water Main Year of Installation			
5	Before 1950	2	10
4	1950-1959	2	8
3	1960-1969	2	6
2	1970-1979	2	4
1	1980-1989	2	2
0	After 1989	2	0
Existing Water Main Benefit Area²			
5	Large Benefit Area (greater than 500 gpm)	1	5
4	Large Area Served (250 to 500 gpm)	1	4
3	Medium to Large Area Service (100 to 250 gpm)	1	3
2	Medium Area Served (50 to 100 gpm)	1	2
1	Small to Medium Area Served (25 to 50 gpm)	1	1
0	Small or Localized Area Served (less than 25 gpm)	1	0

(1) Based on the data presented in Figure 2-4A (Estimated Pipe Repair Rate for Three Pipe Categories for the M9.0 CSZ Earthquake Scenario) of the April 2017 *Seismic Vulnerability Assessment* prepared by Kennedy/Jenks Consultants.

(2) Flows based on existing maximum day demands.

The water main priority ranking criteria were applied to the annual water main replacement projects, with the weighted points associated with each project ranging between 1 and 53 points. These projects were categorized as high, medium, and low priority projects, with projects scoring more than 32 points identified as high priority projects, projects scoring between 17 and 32 points identified as medium priority projects, and projects scoring less than 17 points identified as low priority projects. The City will endeavor to complete most of the high priority projects within the 20-year planning period and has grouped these projects within CIP WM1, with the schedule to complete these projects CIP Nos. 1 through 55, as shown in **Figures 9-9 through 9-15**, reflect the projects within CIP WM1, and are generally numbered from west to east throughout the water system. These projects reflect the high priority water main replacement projects necessary to meet the City's 2019 design criteria, and are presented in **Table 9-4** with their weighted point totals.

Table 9-4
High Priority Distribution System Replacement Projects to Meet 2019 Design Criteria

CIP No.	Length (LF)	Prop. Diam. (inches)	Existing Material ¹	Location			Estimated Cost ²	Weighted Points
				In	From	To		
1	1,597	8	CI	S 262nd St, 46th Ave S	43rd Ave S	Kent Ct	\$508,000	35
2	632	16	AC	S Reith Rd	Military Rd S	38th Ave S	\$243,000	34
3	2,902	8	UNK	S 256th St, S 253rd St, 35th Pl S	32nd Pl S	S 252nd Pl	\$919,000	39
4	623	12	CI, UNK	42nd Pl S	S 253rd St	Cul-de-Sac near Reith Road Tank	\$218,000	34
5	2,980	8	AC, CI, DI, UNK	35th Ave S	S 240th St	Military Rd S	\$944,000	43
6	898	8	DI	Between Dead-Ends	W Valley Hwy	S 266th St	\$285,000	---3
7	3,247	12	CI, DI	72nd Ave S	Private Property	72nd Ave near Union Pacific Railroad	\$1,137,000	36
8	2,023	12	CI, DI	68th Ave S, W Valley Hwy, Private Property	S 188th St	72nd Ave S	\$708,000	37
9	6,499	12, 16	CI, DI	S 200th St, 81st Ave S, 78th Ave S, S 196th St	84th Ave S	84th Ave S	\$2,261,000	39
10	4,400	12	CI, UNK	Private Property	64th Ave S	Washington Ave S	\$1,540,000	36
11	2,406	12	CI, DI, UNK	W Smith St	64th Ave S	Thompson Ave N	\$842,000	44
12	1,577	12	CI, DI, UNK	68th Ave S, Private Property	S Sent Des Moines Rd	74th Ave S	\$552,000	47
13	1,126	12	DI	Naden Ave S	W Meeker St	SR 516	\$394,000	47
14	606	12	UNK	Madison Ave	W Smith St	W Meeker St	\$213,000	44
15	809	12	DI, UNK	W Harrison St, Thompson Ave N	W Meeker St	Washington Ave N	\$284,000	44
16	3,117	12	AC, CI, DI, UNK	James St	66th Avenue S	5th Avenue N	\$2,182,000	34
17	2,793	8, 12	CI, UNK	3rd Ave S	W Willis St	S 259th St	\$932,000	48
18	2,290	12	CI, DI	5th Ave S, Private Property	3rd Ave S	S 259th St	\$802,000	42
19	818	8	CI, DI	5th Ave S	Rachael Pl	Dead-end near W Overlock	\$259,000	38
20	1,652	12, 16	CI, UNK	E Willis St, W Willis St	4th Ave S	Central Ave S	\$595,000	35
21	1,821	8, 12	DI, UNK	2nd Ave S	W Meeker St	W Crow St	\$599,000	44
22	936	12	UNK	W Titus St	4th Ave S	1st Ave S	\$328,000	33
23	4,817	12, 16	AC, CI, DI	E Meeker St	Central Ave S	Kennebeck Ave S	\$3,412,000	50
24	2,550	12	DI, UNK	E Smith St	N Lincoln Ave	1st Ave N	\$893,000	47
25	1,955	12	CI, DI, UNK	N Lincoln Ave	W James St	W Meeker St	\$685,000	44
26	907	12	CI, DI	5th Ave N, Private Property	Private Property	W James St	\$228,000	40
27	4,103	12	CI, DI, UNK	1st Ave S, 80th Ave S	E Willis St	79th Ave S	\$1,436,000	35
28	293	10	CI	E Morton St	Railroad Ave S	Bridges Ave S	\$103,000	46
29	1,377	10	CI	Railroad Ave S	E Willis St	Dead-end near Private Property	\$482,000	47
30	1,383	12	CI	Bridges Ave S	E Willis St	Dead-end near Private Property	\$484,000	47
31	306	12	CI	E Saar St	Railroad Ave S	Central Ave S	\$108,000	44
32	748	16	DI	Central Ave S	E Titus St	E Willis St	\$287,000	47
33	1,179	12	UNK	1st Ave S	W Meeker St	W Titus St	\$413,000	38
34	1,827	8, 12	CI	State Ave N	E Smith St	Ward St	\$616,000	53
35	420	12	CI	Ward St	State Ave N	Kennebeck Ave S	\$147,000	45
36	1,632	12	AC, CI, DI, UNK	E Smith St	Railroad Ave N	Jason Ave N	\$572,000	46
37	3,239	12, 16	CI, DI	Railroad Ave N	E James St	E Willis St	\$1,155,000	48
38	3,930	12, 16	DI, UNK	4th Ave N	North of W Cloudy St	W Saar St	\$1,418,000	39
39	1,339	8, 12, 16	CI, DI	3rd Ave N	Cole St	W James St	\$449,000	46
40	1,327	8, 12	CI, DI	2nd Ave N	Cole St	W James St	\$443,000	42
41	2,018	12	CI, DI, UNK	1st Ave N	West of Cole St	W James St	\$707,000	46
42	6,685	12, 16	CI, CONC, DI	Central Ave N	S 228th St	E Titus St	\$4,764,000	47
43	717	12, 16	CI, DI	Kennebeck Ave N	E James St	E Temperance St	\$255,000	34
44	467	12	DI, UNK	N State Ave	E George St	E James St	\$164,000	33
45	1,158	12	AC, CI, DI	Clark Ave N	E James St	E Temperance St	\$406,000	37
46	8,464	8, 12, 16	CI, DI	Riverbend Industrial Area	Central Pl S	S 259th St	\$2,927,000	39
47	3,739	12, 16	CI	S 259th St	5th Ave S	88th Ave S	\$1,349,000	43
48	1,939	8	CI, UNK	E Chicago St, Wynwood Dr, Marion St	Van De Vanter Ave	Van De Vanter Ave	\$614,000	43
49	297	12	CI	W Titus St	Central Ave S	Railroad Ave S	\$104,000	46
50	1,995	8	CI, DI, UNK	E Chicago St	Van De Vanter Ave	Woodland Way	\$622,000	38
51	609	12	CI, UNK	Summit Ave N, Canyon Dr	E Smith St	Weiland St	\$214,000	40
52	284	12	CI	E Pioneer St	Railroad Ave N	Central Ave N	\$100,000	46
53	1,855	12	CI	Hazel Ave N, Stetson Ave	E James St	Dead-end	\$650,000	36
54	2,037	16, 21	CI, DI, UNK	104th Ave SE	SE 234th Pl	SE 240th St	\$788,000	35
55	2,914	16	CI, DI, UNK	108th Ave SE, SE 260th St	Kent Kangley Rd	SE 264th St	\$1,117,000	33

(1) UNK = unknown material

(2) Cost estimates for CIP Nos. 14, 53, and 55 include seismically restrained water main.

(3) Recommended to improve water quality and provide looping; no existing level-of-service deficiencies adjacent to proposed improvement alignment.

OTHER IMPROVEMENTS

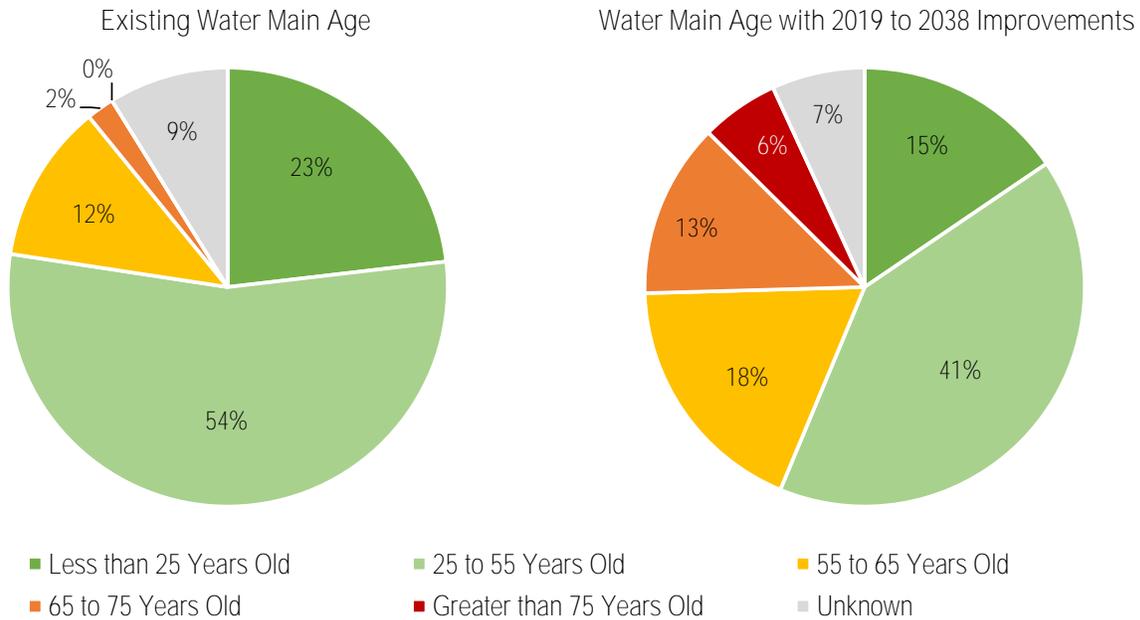
The additional water main, pressure zone, and facility improvements were prioritized based on existing deficiencies, safety concerns, and maintenance and capacity requirements. The miscellaneous improvements were prioritized based on regulatory requirements, funding availability, and an assessment of other water system needs. The priority order of these improvements is reflected in the schedule of improvements presented in the next section. **Figures 9-16 through 9-22** present all City-identified and distribution system replacement projects necessary to meet the City's 2019 design criteria. Water main replacement projects categorized as medium and low priority projects are not specifically funded within the 20-year planning period. These projects are anticipated to be completed within the 20-year planning period only if they are developer funded and determined to be necessary for redevelopment. High priority water main replacement projects necessary to meet the City's 2019 design criteria are endeavored to be replaced by the City within the 20-year planning period, but if specific schedules for the replacement of these water mains are necessary for redevelopment, these specific projects will be developer funded.

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 10-year CIP and annual water budget. The implementation schedule for the proposed improvements is shown in **Table 9-5**. An average allowance of approximately \$2,200,000 per year has been established for the annual replacement of high priority water mains. 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 in the same areas. Should the completion of a high priority water main replacement project be necessary for development or redevelopment at a schedule that differs from the schedule identified by the City during its annual budget process, the project shall be developer funded.

As the existing infrastructure continues to age, managing and funding the water system CIP is essential to maintaining a safe and reliable water supply for the City's customers. Based on the existing level of repair and replacement identified by the City for the water system CIP, the amount of water main in the system that is greater than 65 years old will increase from 2 percent to 19 percent by the end of the 20-year planning period, as shown in **Chart 9-2**. As funding becomes available, the City should consider a more aggressive water main repair and replacement program or continue to develop asset management strategies to address future infrastructure needs.

Chart 9-2
Existing and Future Water Main Age



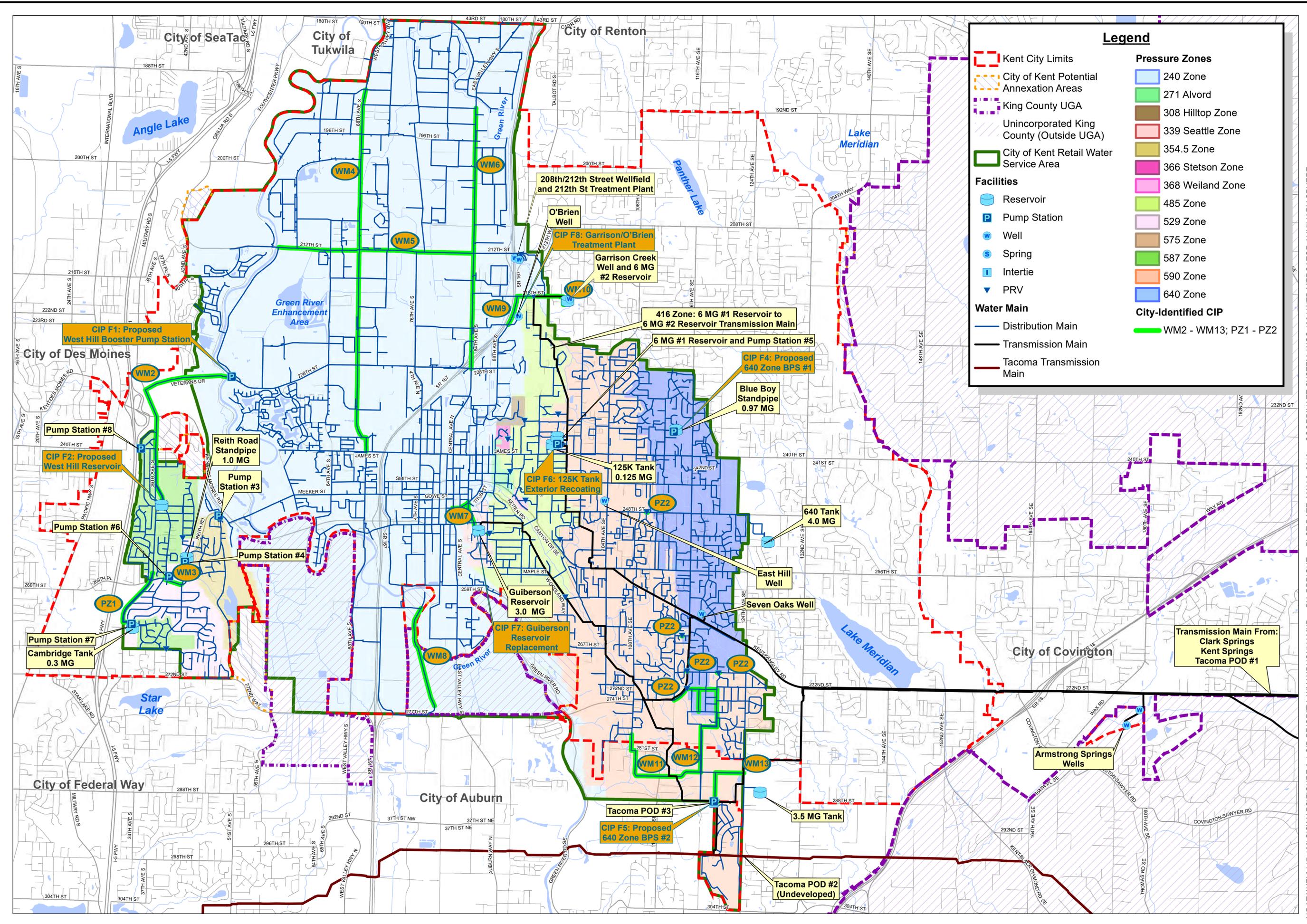
FUTURE PROJECT COST ADJUSTMENTS

All cost estimates shown in the tables are presented in year 2019 dollars. It is recommended that future costs be adjusted to account for the effects of inflation and changing construction market conditions at the actual time of project implementation. Future costs can be estimated using the Engineering News Record (ENR) 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 9-5
Proposed Improvements Implementation Schedule

No.	Description	Estimated Cost (2019 \$)	20-Year Schedule of Improvements												
			Planned Year of Project and Estimated Cost in 2019 \$												
			Prior to 2019	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028	2029-2038	Beyond 2038
Water Main Improvements															
WM1	Annual Water Main Replacement Program - High Priority	\$44,876,000		\$1,960K	\$1,500K	\$400K	\$400K	\$698K	\$535K	\$3,365K	\$3,465K	\$2,765K	\$2,855K	\$26,433K	\$500K
WM2	Veterans Drive and Military Road Transmission Main	\$6,000,000				\$1,100K	\$1,100K	\$2,150K	\$1,650K						
WM3	Reith Road Transmission Main Improvements	\$500,000							\$500K						
WM4	68th Avenue S Transmission Main Improvements	\$12,890,000													\$12,890K
WM5	S 212th Street Transmission Main Improvements	\$6,900,000													\$6,900K
WM6	84th Avenue S Transmission Main Improvements	\$9,180,000													\$9,180K
WM7	Guiberson Reservoir Transmission Main Improvements	\$5,000,000												\$5,000K	
WM8	78th Avenue S Water Main Improvements	\$2,000,000										\$2,000K			
WM9	88th Avenue S Water Main Improvements	\$490,000	\$490K												
WM10	S 218th Street Transmission Main Improvements	\$930,000	\$930K												
WM11	SE 284th Street Water Main Improvements	\$1,810,000											\$1,810K		
WM12	640 Zone BPS #2 Transmission Main Improvements	\$2,230,000					\$1,115K	\$1,115K							
WM13	590 Zone Transmission Main Downstream of Tacoma POD #3	\$980,000							\$980K						
Pressure Zone Improvements															
PZ1	Military Road Connection Between 587 and 575 Zones	\$1,220,000												\$1,220K	
PZ2	640 Zone Conversion	\$2,920,000	\$2,171K			\$749K									
Facility Improvements															
F1	West Hill BPS	\$2,800,000						\$1,000K	\$1,400K	\$400K					
F2	West Hill Reservoir	\$12,500,000	\$132K	\$8,200K		\$2,916K	\$1,050K	\$202K							
F3	West Hill PRVs and Altitude Valves	\$800,000								\$400K	\$400K				
F4	640 Zone BPS #1 (Blue Boy Standpipe Site)	\$3,250,000	\$3,250K												
F5	640 Zone BPS #2 (Tacoma POD #3 Site)	\$3,000,000			\$1,500K		\$1,500K								
F6	125K Tank Exterior Recoating	\$1,300,000	\$1,300K												
F7	Guiberson Reservoir Replacement	\$12,000,000												\$12,000K	
F8	Garrison/O'Brien Treatment Plant	\$1,300,000									\$1,300K				
Miscellaneous Improvements															
M1	Generator Improvement Program	\$2,000,000			\$1,000K					\$1,000K					
M2	Reservoir Maintenance and Improvement Program	\$10,000,000	\$546K	\$100K		\$500K	\$5,354K								
M3	Tacoma Regional Water Supply System (RWSS)	\$1,338,000	\$338K	\$50K	\$50K	\$50K	\$50K	\$50K	\$50K	\$50K	\$50K	\$50K	\$50K	\$500K	
M4	Transmission Main Easements/Land Acquisitions	\$1,000,000	\$108K	\$150K	\$50K	\$292K									
M5	Water System Plan Update	\$915,000	\$115K									\$400K	\$400K		
M6	Watershed Control Plan, Habitat Conservation Plan, and Wellhead Protection Program	\$8,000,000	\$2,964K	\$1,222K	\$413K									\$3,401K	
M7	Landsburg Mine Management	\$2,026,000	\$132K	\$790K	\$804K									\$300K	
M8	Automatic Meter Reading System	\$3,000,000												\$3,000K	
M9	PLC Upgrade Program	\$770,000	\$70K	\$35K	\$35K	\$35K	\$35K	\$35K	\$35K	\$35K	\$35K	\$35K	\$35K	\$350K	
M10	SCADA System Upgrades	\$500,000	\$150K						\$100K					\$100K	\$150K
M11	Well Rehabilitation Program	\$4,087,000		\$212K	\$275K	\$200K	\$2,000K								
Total Estimated Costs of City Funded Improvements		\$168,512,000	\$12,696K	\$12,719K	\$5,627K	\$6,000K	\$60,000K	\$29,470K							

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Legend

- Kent City Limits** (Red dashed line)
- City of Kent Potential Annexation Areas** (Orange dashed line)
- King County UGA** (Purple dashed line)
- Unincorporated King County (Outside UGA)** (Grey area)
- City of Kent Retail Water Service Area** (Green outline)

Facilities

- Reservoir (Blue circle)
- Pump Station (Blue square with 'P')
- Well (Blue circle with 'W')
- Spring (Blue circle with 'S')
- Intertie (Blue square with 'I')
- PRV (Blue triangle)

Water Main

- Distribution Main (Blue line)
- Transmission Main (Black line)
- Tacoma Transmission Main (Brown line)

Pressure Zones

- 240 Zone (Light blue)
- 271 Alford (Light green)
- 308 Hilltop Zone (Light brown)
- 339 Seattle Zone (Light red)
- 354.5 Zone (Light yellow)
- 366 Stetson Zone (Light pink)
- 368 Weiland Zone (Light purple)
- 485 Zone (Light green)
- 529 Zone (Light purple)
- 575 Zone (Light brown)
- 587 Zone (Light green)
- 590 Zone (Light orange)
- 640 Zone (Light blue)

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2 (Green line)

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Figure 9-1 Capital Improvement Projects 20-Year System-wide City of Kent 2019 Water System Plan

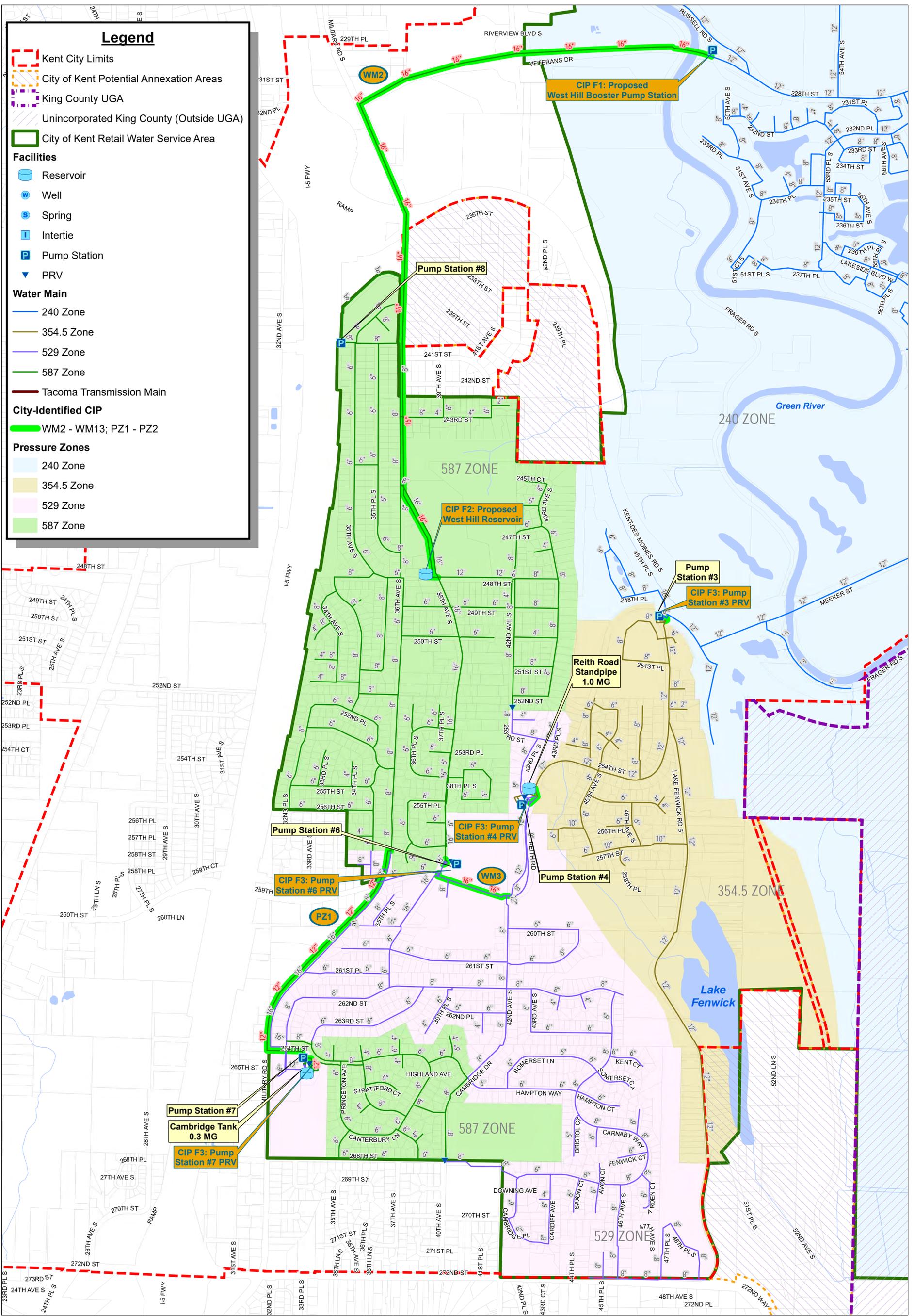


1 inch = 2,000 feet
0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



J:\DATA\KENT\17-100\GIS\MAPS\FIGURE 9-1 CIP-PRIORITY_WM\ANDONLY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: WGS 1984 WEB MERCATOR AUXILIARY SPHERE



J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-2 CIP-WEST_WM\ANDHONLY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-2 Capital Improvement Projects West Hill City of Kent 2019 Water System Plan

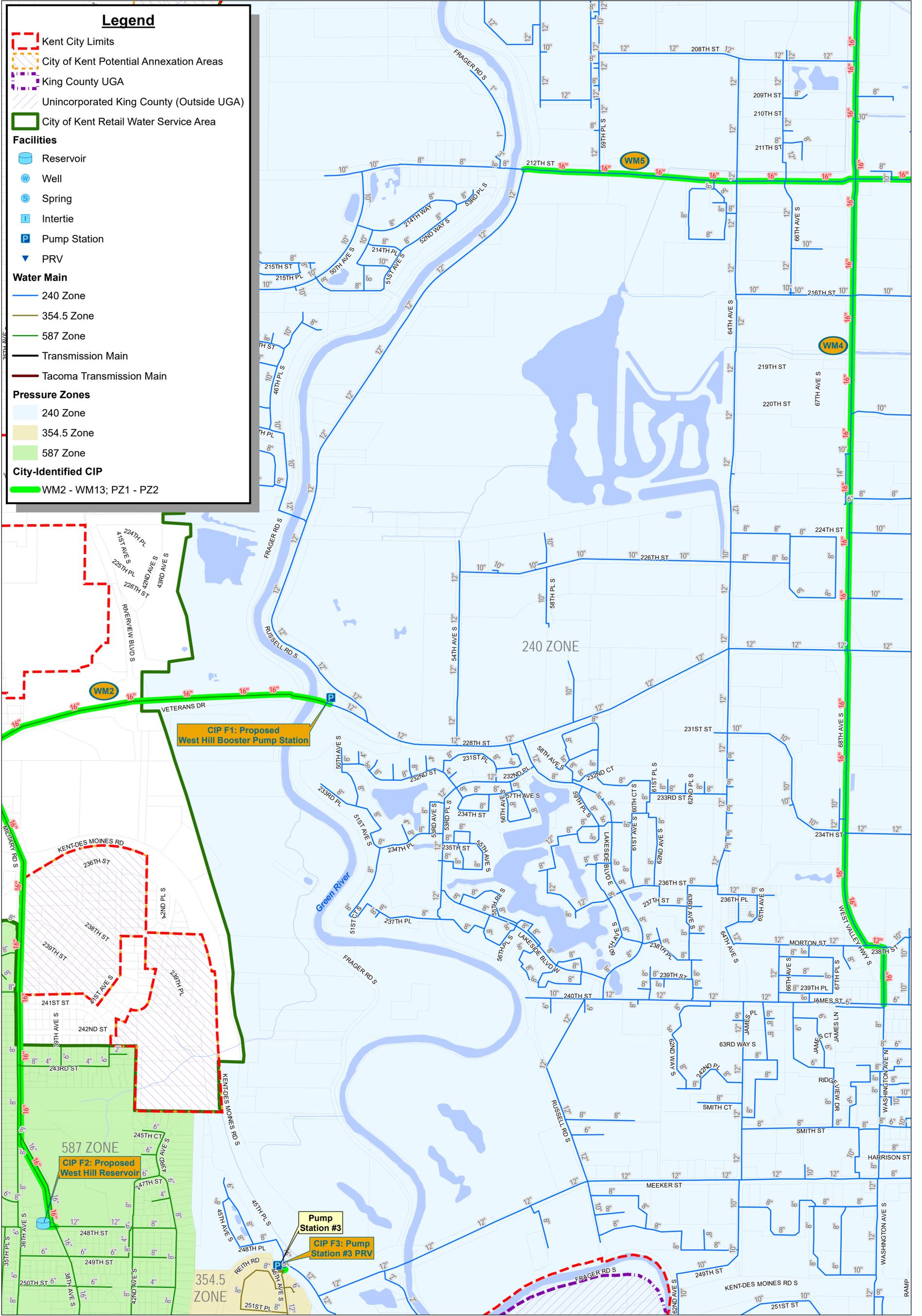
Vicinity Map



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Legend

- Kent City Limits
 - City of Kent Potential Annexation Areas
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service Area
- Facilities**
- Reservoir
 - Well
 - Spring
 - Intertie
 - Pump Station
 - PRV
- Water Main**
- 240 Zone
 - 354.5 Zone
 - 587 Zone
 - Transmission Main
 - Tacoma Transmission Main
- Pressure Zones**
- 240 Zone
 - 354.5 Zone
 - 587 Zone
- City-Identified CIP**
- WM2 - WM13; PZ1 - PZ2

Z:\BOTHELL\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-3 CIP-WEST 240_WM\DMANDONLY.MXD BY: RWITHERS PLOT DATE: MAY 13, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-3
Capital Improvement Projects
240 Zone - West
City of Kent
2019 Water System Plan

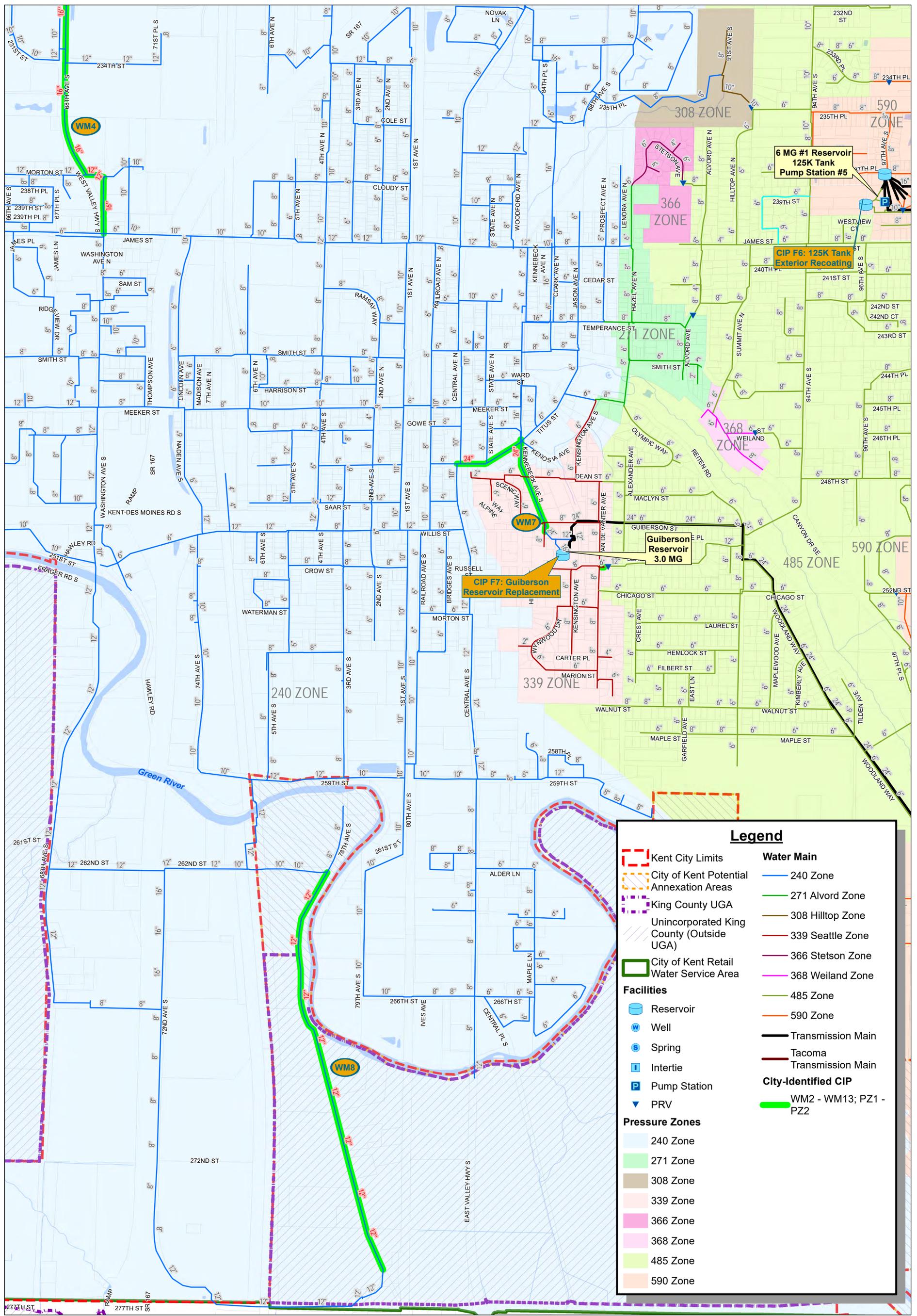
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Legend

Kent City Limits	Water Main
City of Kent Potential Annexation Areas	240 Zone
King County UGA	271 Alvor Zone
Unincorporated King County (Outside UGA)	308 Hilltop Zone
City of Kent Retail Water Service Area	339 Seattle Zone
Reservoir	366 Stetson Zone
Well	368 Weiland Zone
Spring	485 Zone
Intertie	590 Zone
Pump Station	Transmission Main
PRV	Tacoma Transmission Main
Pressure Zones	City-Identified CIP
240 Zone	WM2 - WM13; PZ1 - PZ2
271 Zone	
308 Zone	
339 Zone	
366 Zone	
368 Zone	
485 Zone	
590 Zone	

J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-4 CIP-DOWNTOWN_WM ANDHONLY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-4

Capital Improvement Projects

240 Zone - Downtown

City of Kent

2019 Water System Plan

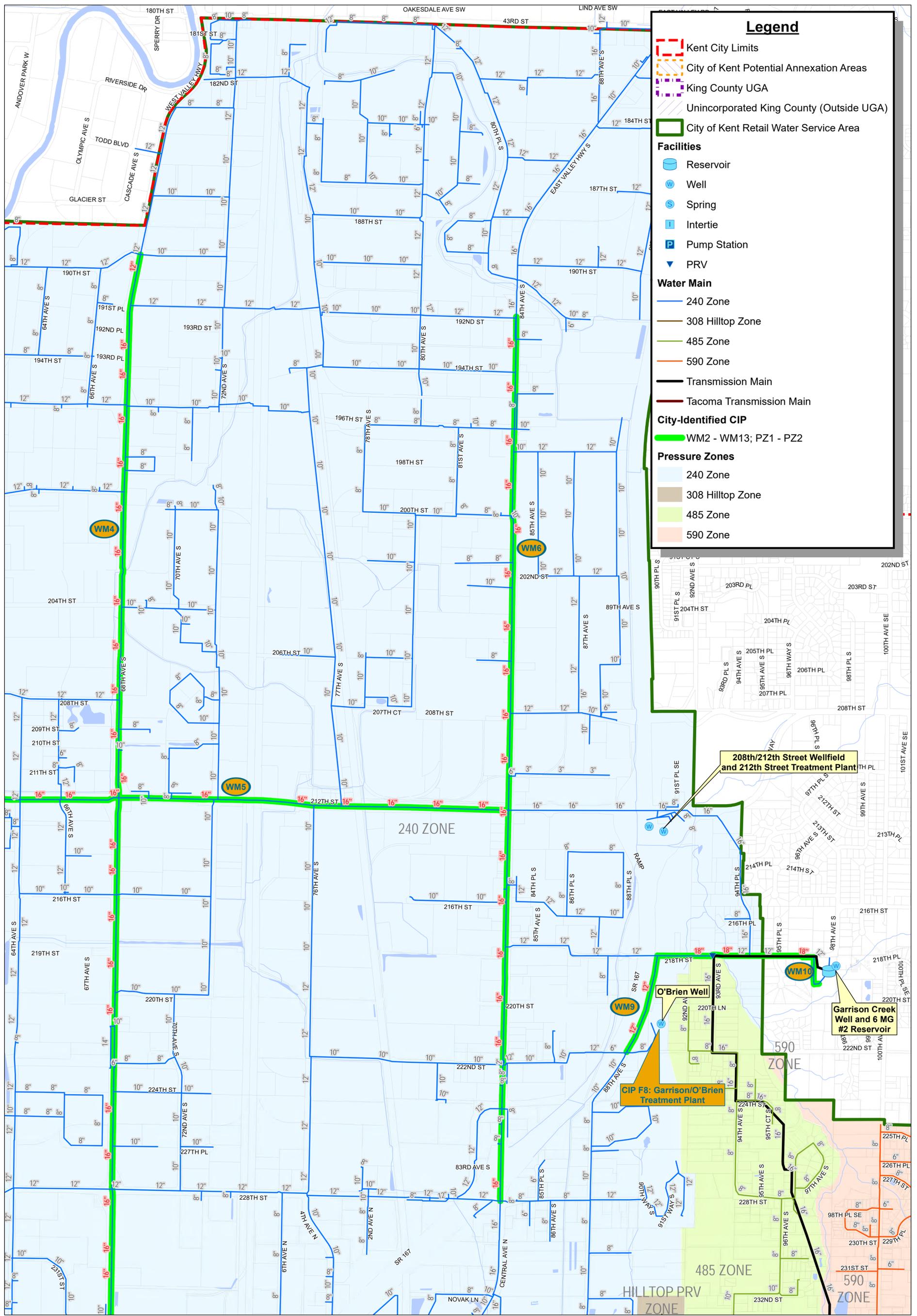
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Legend

- Kent City Limits
 - City of Kent Potential Annexation Areas
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service Area
- Facilities**
- Reservoir
 - Well
 - Spring
 - Intertie
 - Pump Station
 - PRV
- Water Main**
- 240 Zone
 - 308 Hilltop Zone
 - 485 Zone
 - 590 Zone
 - Transmission Main
 - Tacoma Transmission Main
- City-Identified CIP**
- WM2 - WM13; PZ1 - PZ2
- Pressure Zones**
- 240 Zone
 - 308 Hilltop Zone
 - 485 Zone
 - 590 Zone

Z:\BOTHELL\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-5 CIP-NORTH 240_WM\ANDHONLY.MXD BY: RWITHERS PLOT DATE: JUN 14, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 600 feet

0 300 600 1,200 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-5

Capital Improvement Projects

240 Zone - North

City of Kent

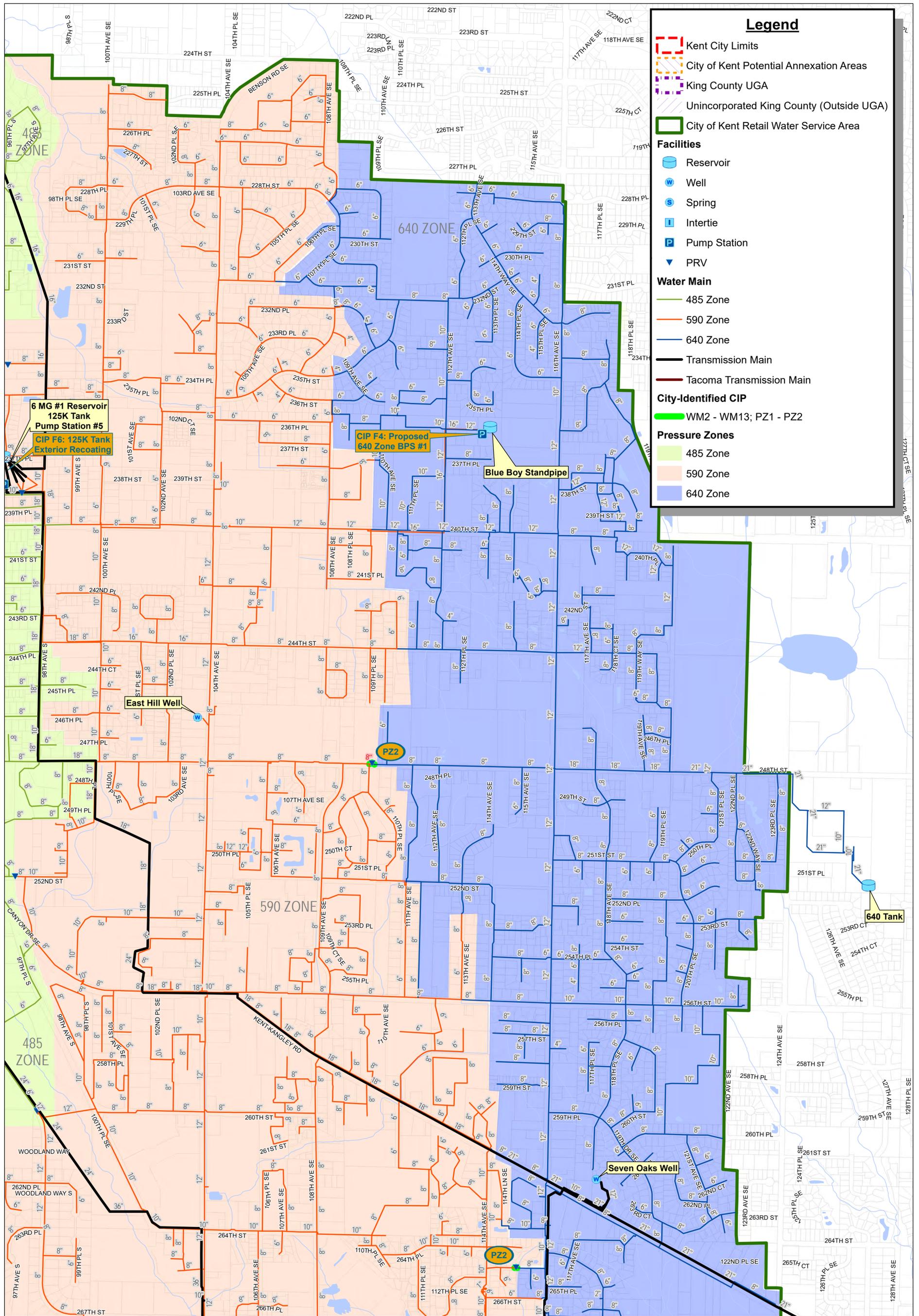
2019 Water System Plan



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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-6 CIP-EAST HILL-NORTH_WM\ANDHONLY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

RH2

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-6

Capital Improvement Projects

East Hill - North

City of Kent

2019 Water System Plan

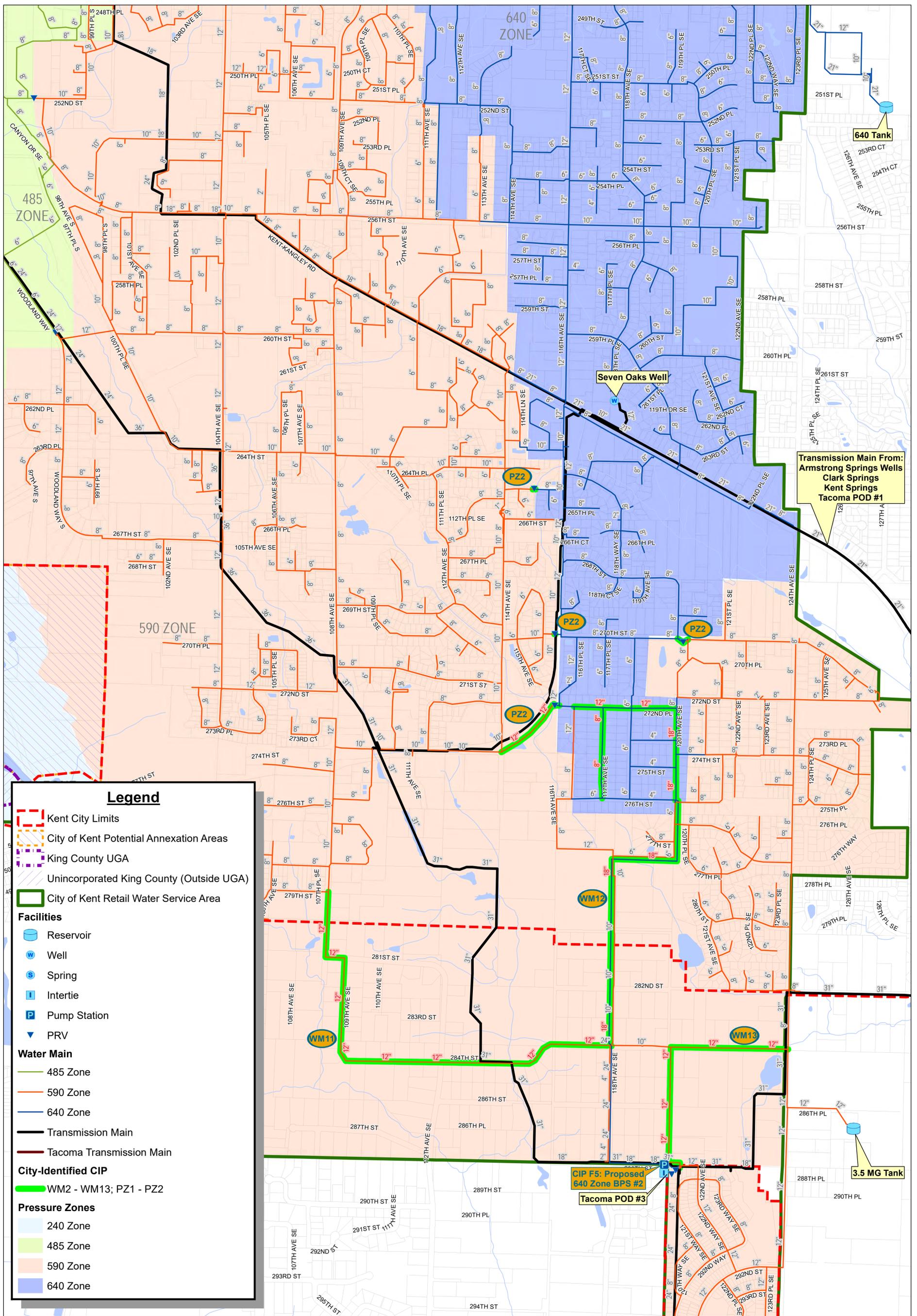
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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-7 CIP-EAST HILL-SOUTH_WM\ANDHONLY.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-7

Capital Improvement Projects

East Hill - South

City of Kent

2019 Water System Plan

Vicinity Map



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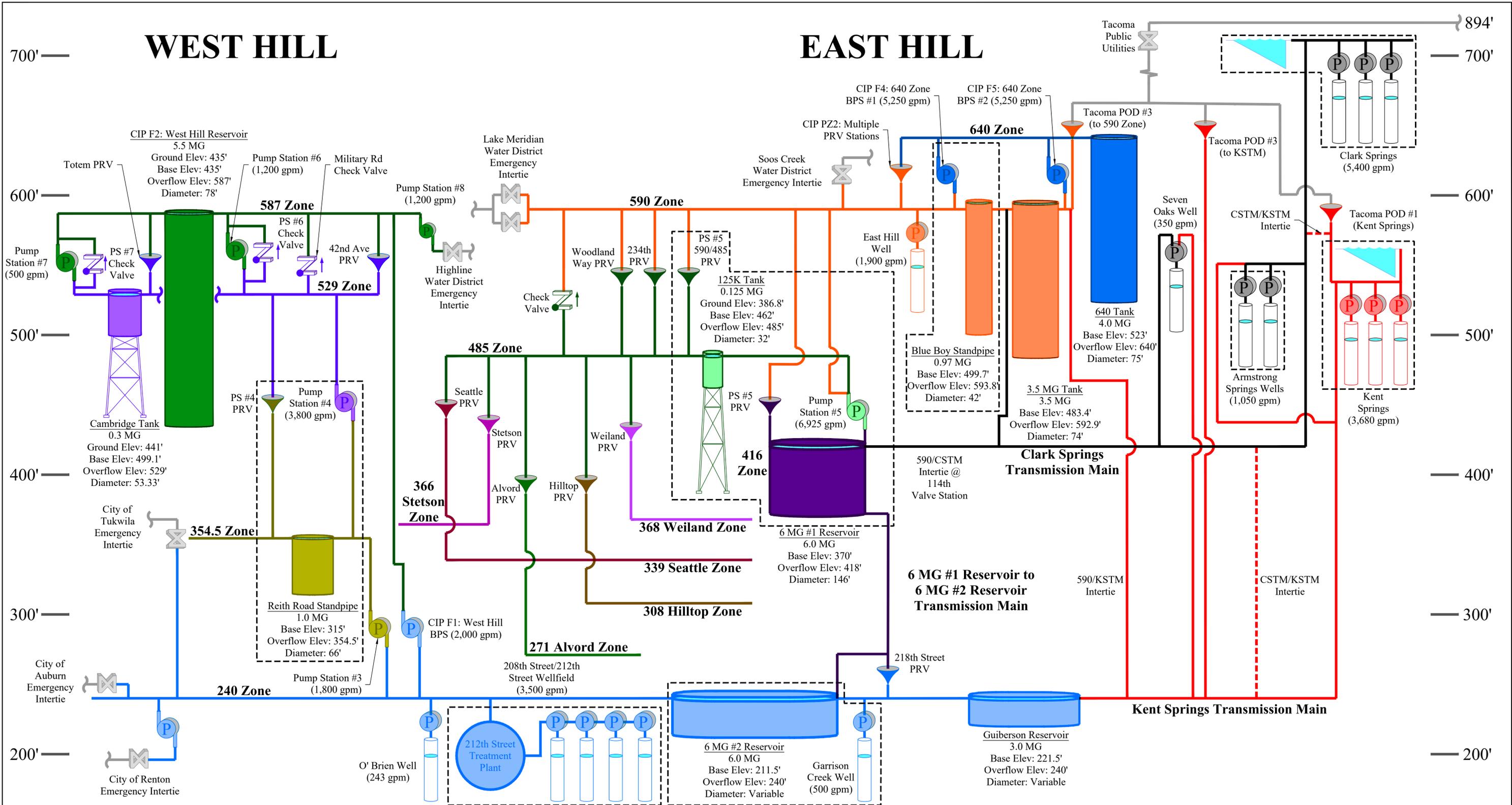


Figure 9-8: Proposed System with 20-Year Improvements Hydraulic Profile for the City of Kent Water System Plan

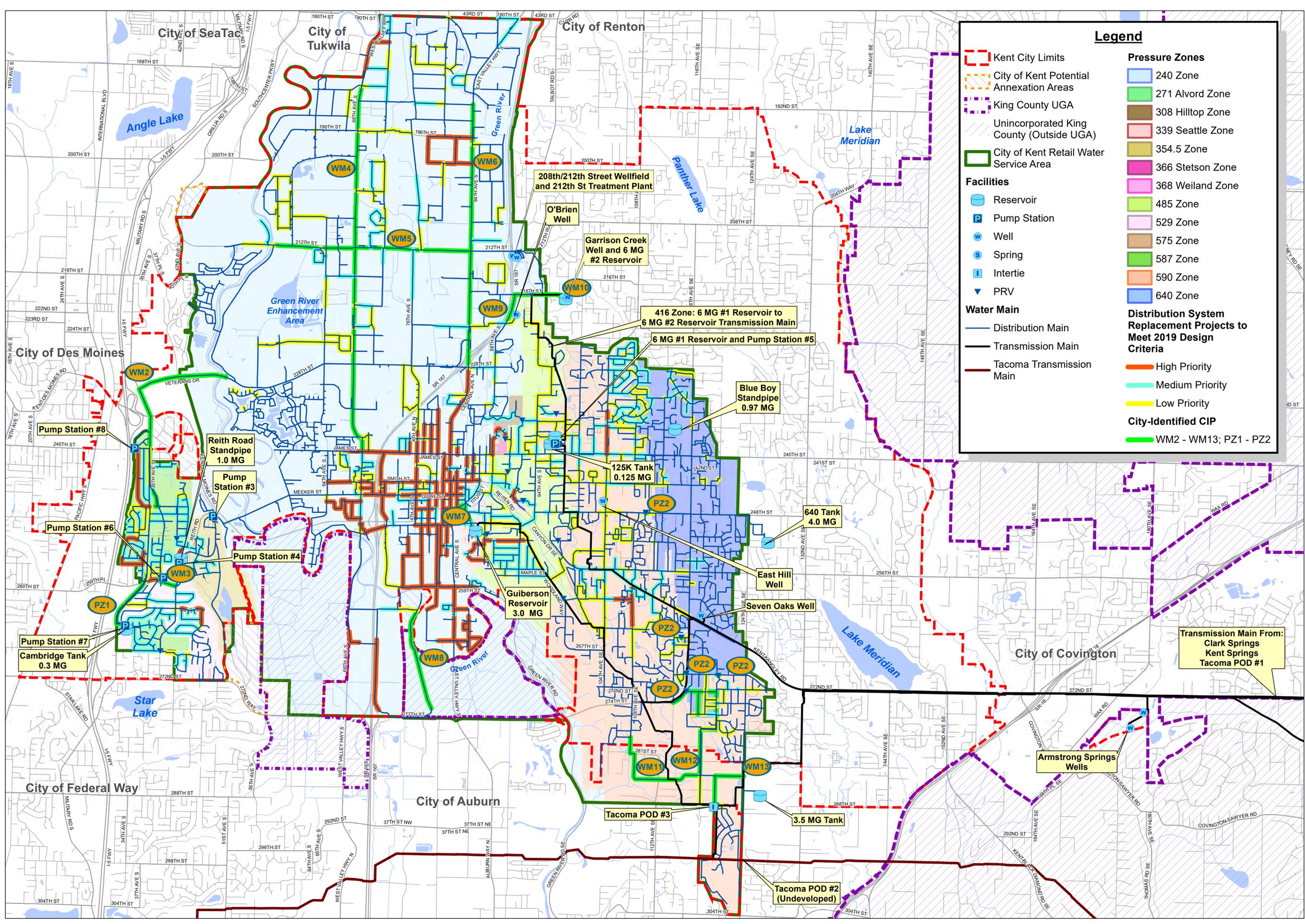
Date: March 11, 2019 Filename: KEN\117-100\CAD\KEN-HPP.DWG

Legend

— 240 Zone	— 368 Weiland Zone	— 640 Zone	Pressure Reducing Station
— 271 Alvord Zone	— 416 Zone	— Clark Springs Transmission Main	Intertie
— 308 Hilltop Zone	— 485 Zone	— Kent Springs Transmission Main	Check Valve
— 339 Seattle Zone	— 529 Zone	Booster Pump Station	Facilities at Same Site
— 354.5 Zone	— 587 Zone		
— 366 Stetson Zone	— 590 Zone		



— 100'



Legend

- Kent City Limits** (Red dashed line)
- City of Kent Potential Annexation Areas** (Yellow dashed line)
- King County UGA** (Purple dashed line)
- Unincorporated King County (Outside UGA)** (Grey hatched area)
- City of Kent Retail Water Service Area** (Green outline)

Facilities

- Reservoir (Blue circle)
- Pump Station (Blue square with 'P')
- Well (Blue circle with 'W')
- Spring (Blue circle with 'S')
- Intertie (Blue square with 'I')
- PRV (Blue triangle)

Water Main

- Distribution Main (Blue line)
- Transmission Main (Black line)
- Tacoma Transmission Main (Red line)

Pressure Zones

- 240 Zone (Light blue)
- 271 Alford Zone (Light green)
- 308 Hilltop Zone (Light brown)
- 339 Seattle Zone (Light pink)
- 354.5 Zone (Light yellow)
- 366 Stetson Zone (Light purple)
- 368 Weiland Zone (Light blue)
- 485 Zone (Light green)
- 529 Zone (Light pink)
- 575 Zone (Light brown)
- 587 Zone (Light green)
- 590 Zone (Light orange)
- 640 Zone (Light blue)

Distribution System Replacement Projects to Meet 2019 Design Criteria

- High Priority (Orange line)
- Medium Priority (Light green line)
- Low Priority (Yellow line)

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2 (Green line)

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Figure 9-9

Water Main Projects System-wide

City of Kent

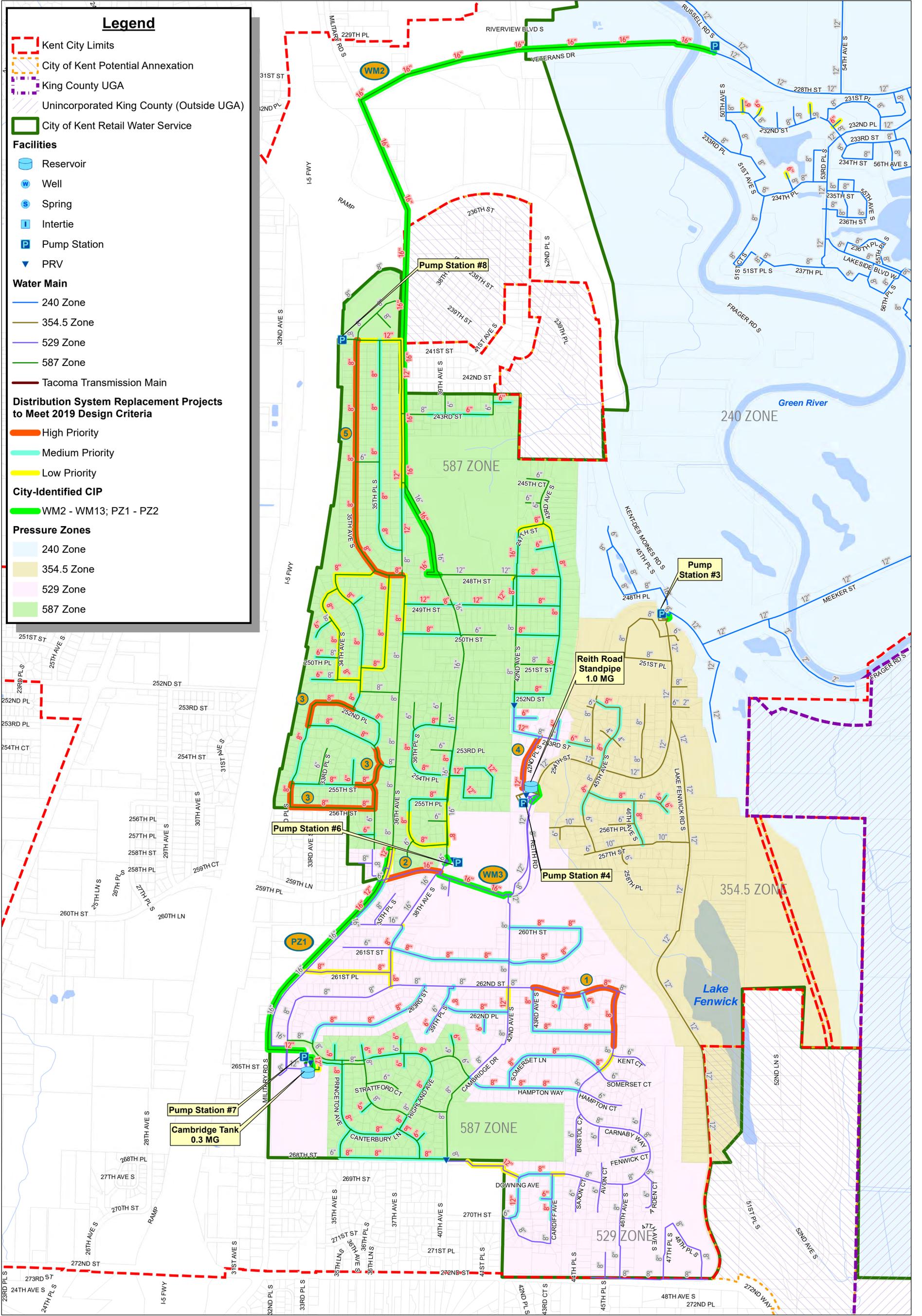
2019 Water System Plan

1 inch = 2,000 feet

0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

J:\DATA\KENT\17-100\GIS\MAPS\FIGURE 9-9 CIP-WATER MAIN-ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: WGS 1984 WEB MERCATOR AUXILIARY SPHERE



J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-10 CIP-WEST HILL_WM.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-10

Water Main Projects

West Hill

City of Kent

2019 Water System Plan

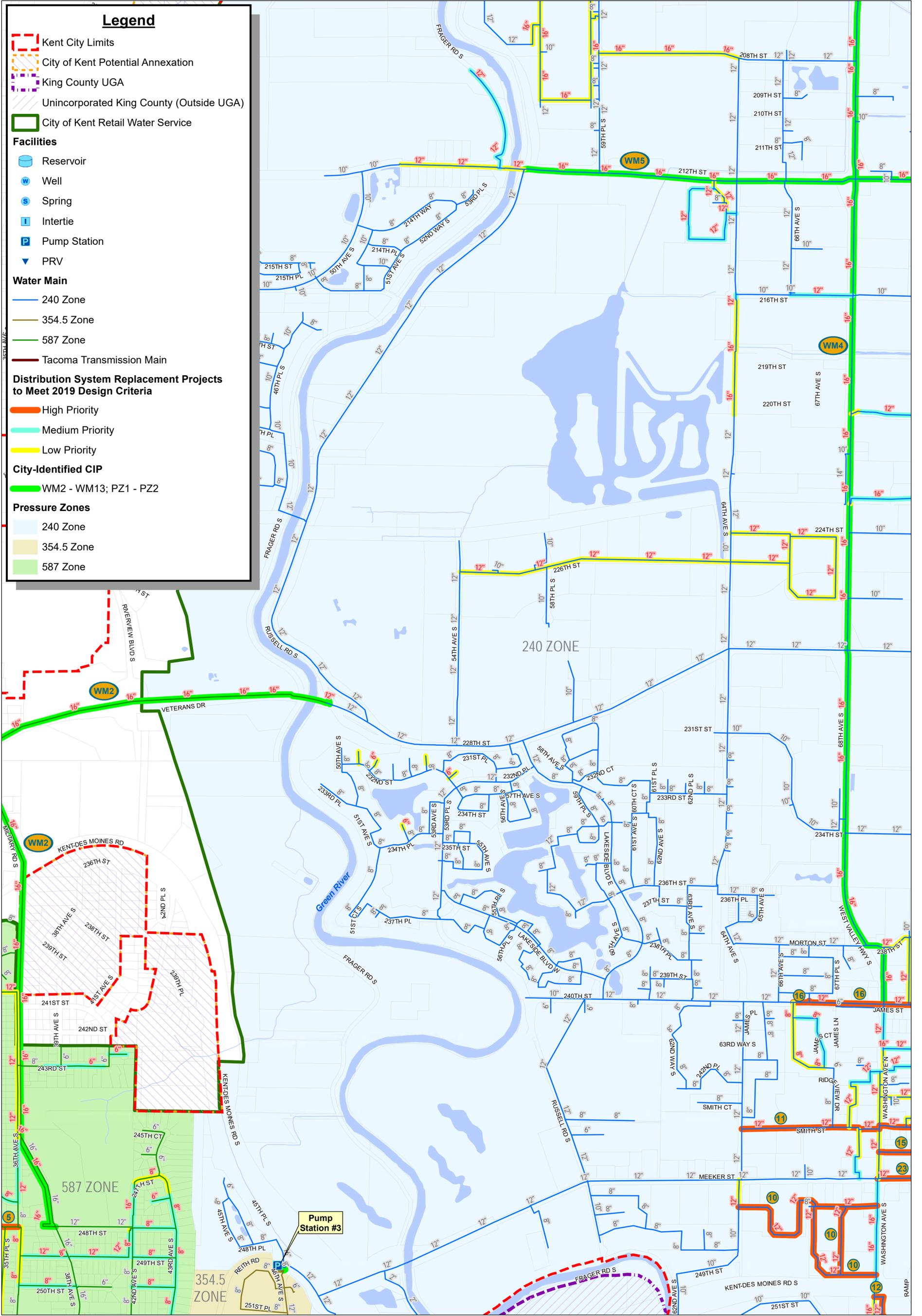
Vicinity Map



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Legend

- Kent City Limits
 - City of Kent Potential Annexation
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service
- Facilities**
- Reservoir
 - Well
 - Spring
 - Intertie
 - Pump Station
 - PRV
- Water Main**
- 240 Zone
 - 354.5 Zone
 - 587 Zone
 - Tacoma Transmission Main
- Distribution System Replacement Projects to Meet 2019 Design Criteria**
- High Priority
 - Medium Priority
 - Low Priority
- City-Identified CIP**
- WM2 - WM13; PZ1 - PZ2
- Pressure Zones**
- 240 Zone
 - 354.5 Zone
 - 587 Zone

J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-11 CIP-WEST 240_WM.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-11

Water Main Projects

240 Zone - West

City of Kent

2019 Water System Plan

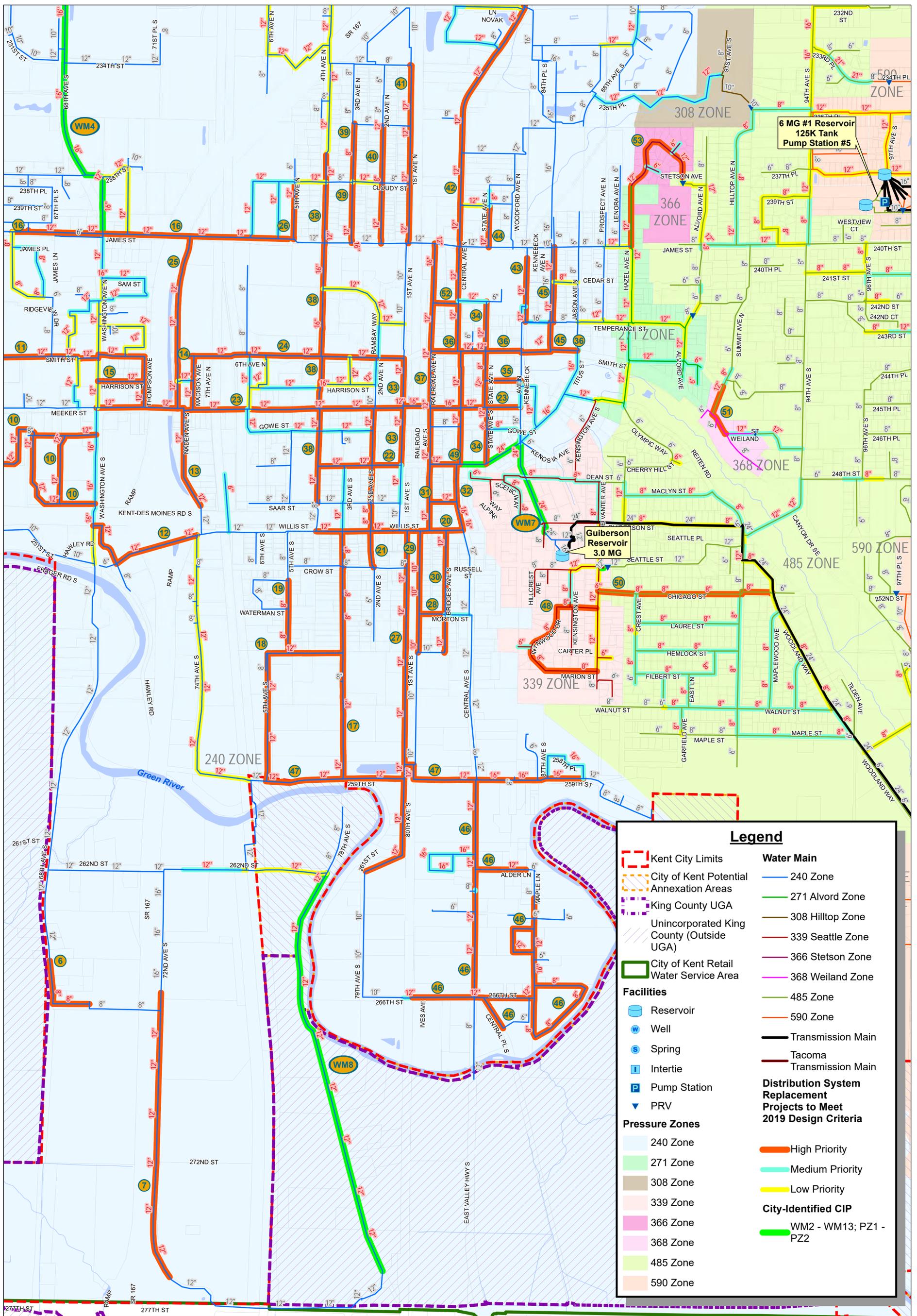
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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-12 CIP-DOWNTOWN_WATER MAIN.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-12

Water Main Projects

240 Zone - Downtown

City of Kent

2019 Water System Plan

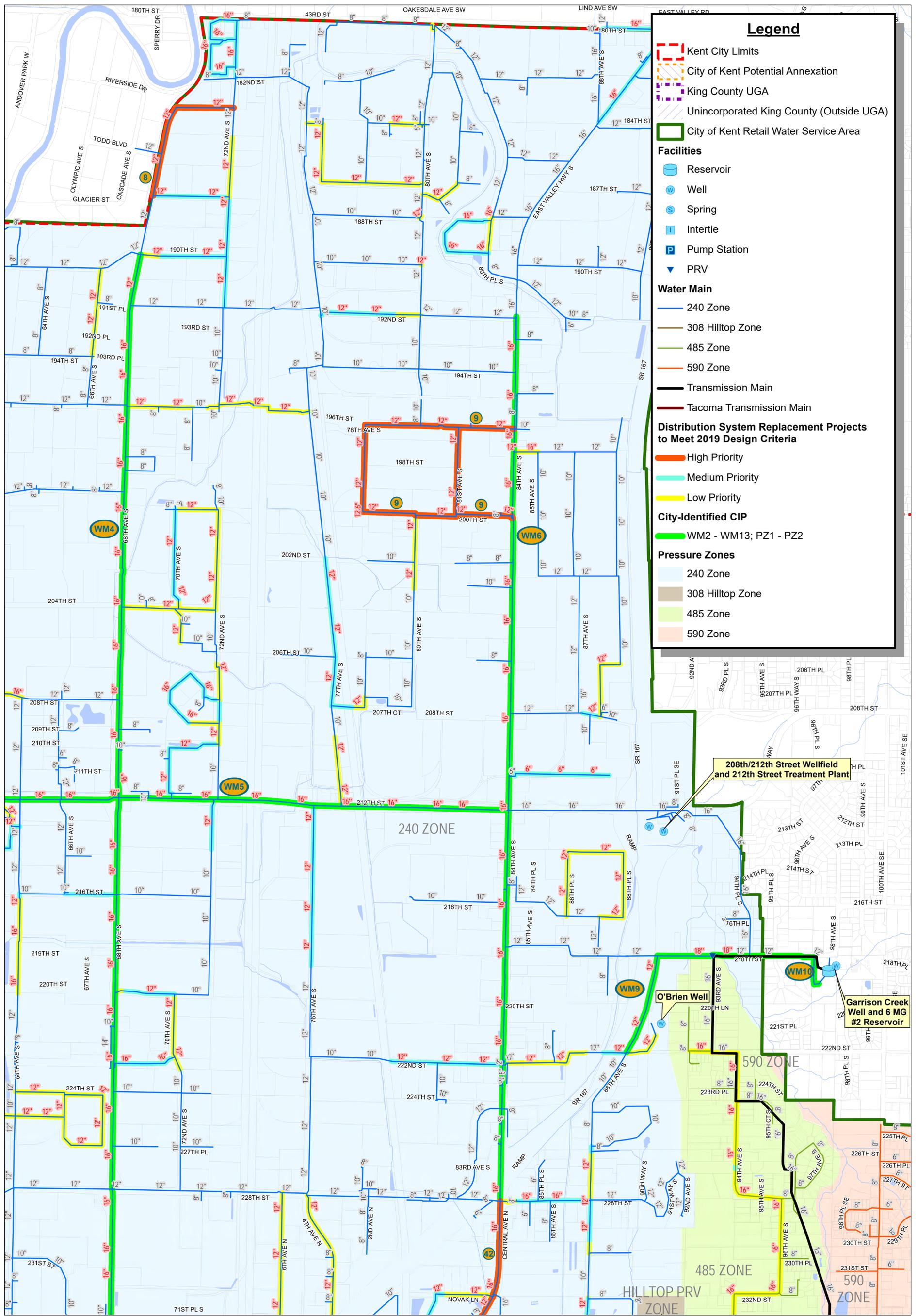
Vicinity Map



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Legend

- Kent City Limits
- City of Kent Potential Annexation
- King County UGA
- Unincorporated King County (Outside UGA)
- City of Kent Retail Water Service Area

Facilities

- Reservoir
- Well
- Spring
- Intertie
- Pump Station
- PRV

Water Main

- 240 Zone
- 308 Hilltop Zone
- 485 Zone
- 590 Zone
- Transmission Main
- Tacoma Transmission Main

Distribution System Replacement Projects to Meet 2019 Design Criteria

- High Priority
- Medium Priority
- Low Priority

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2

Pressure Zones

- 240 Zone
- 308 Hilltop Zone
- 485 Zone
- 590 Zone

Z:\BOTHELL\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-13 CIP-NORTH 240_WM.MXD BY: RWITHERS PLOT DATE: JUN 14, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 600 feet

0 300 600 1,200 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

KENT
WASHINGTON

Figure 9-13

Water Main Projects

240 Zone - North

City of Kent

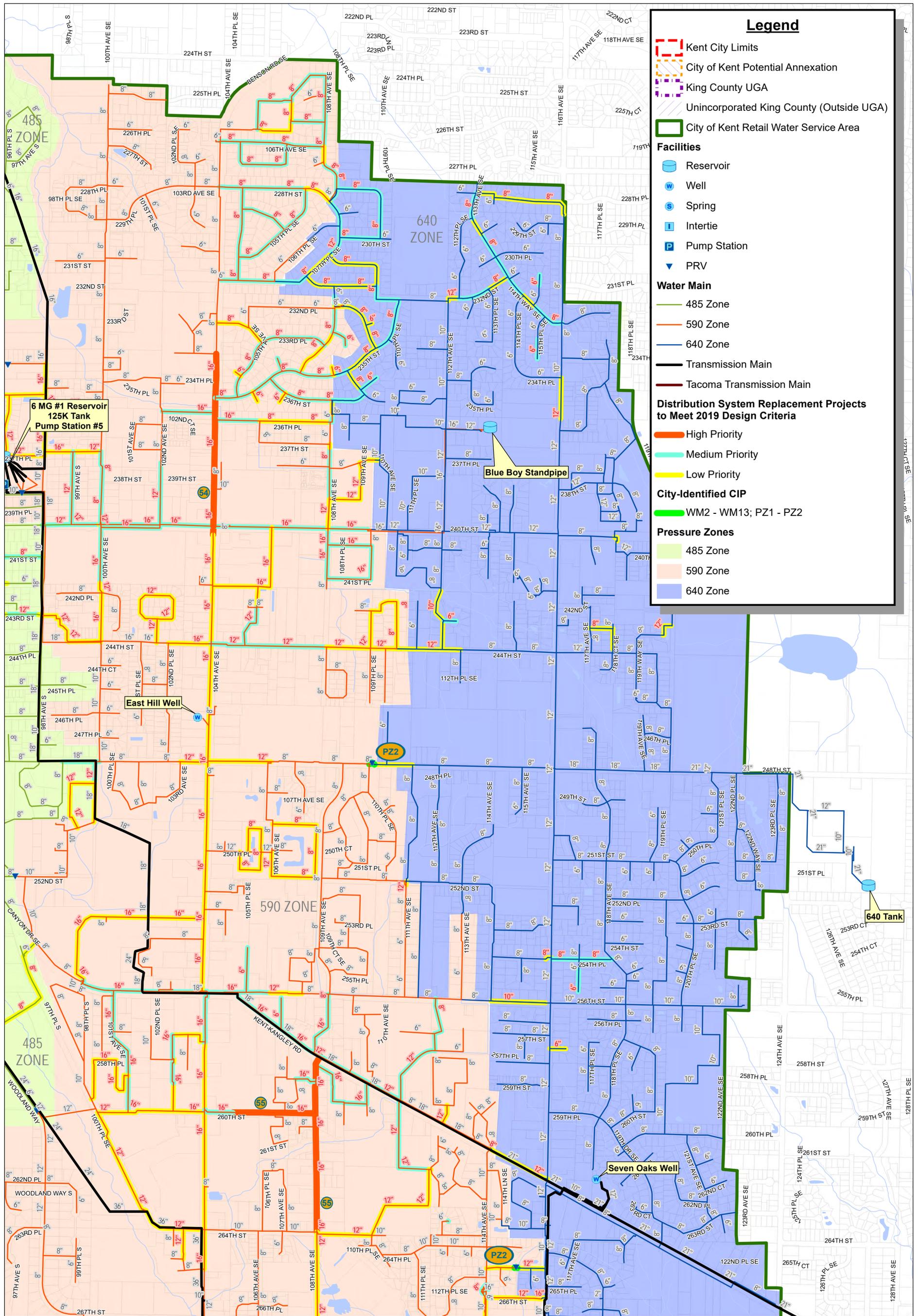
2019 Water System Plan

Vicinity Map

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Legend

- Kent City Limits
- City of Kent Potential Annexation
- King County UGA
- Unincorporated King County (Outside UGA)
- City of Kent Retail Water Service Area

Facilities

- Reservoir
- Well
- Spring
- Intertie
- Pump Station
- PRV

Water Main

- 485 Zone
- 590 Zone
- 640 Zone
- Transmission Main
- Tacoma Transmission Main

Distribution System Replacement Projects to Meet 2019 Design Criteria

- High Priority
- Medium Priority
- Low Priority

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2

Pressure Zones

- 485 Zone
- 590 Zone
- 640 Zone

J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-14 CIP-EAST HILL-WM.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-14

Water Main Projects

East Hill - North

City of Kent

2019 Water System Plan

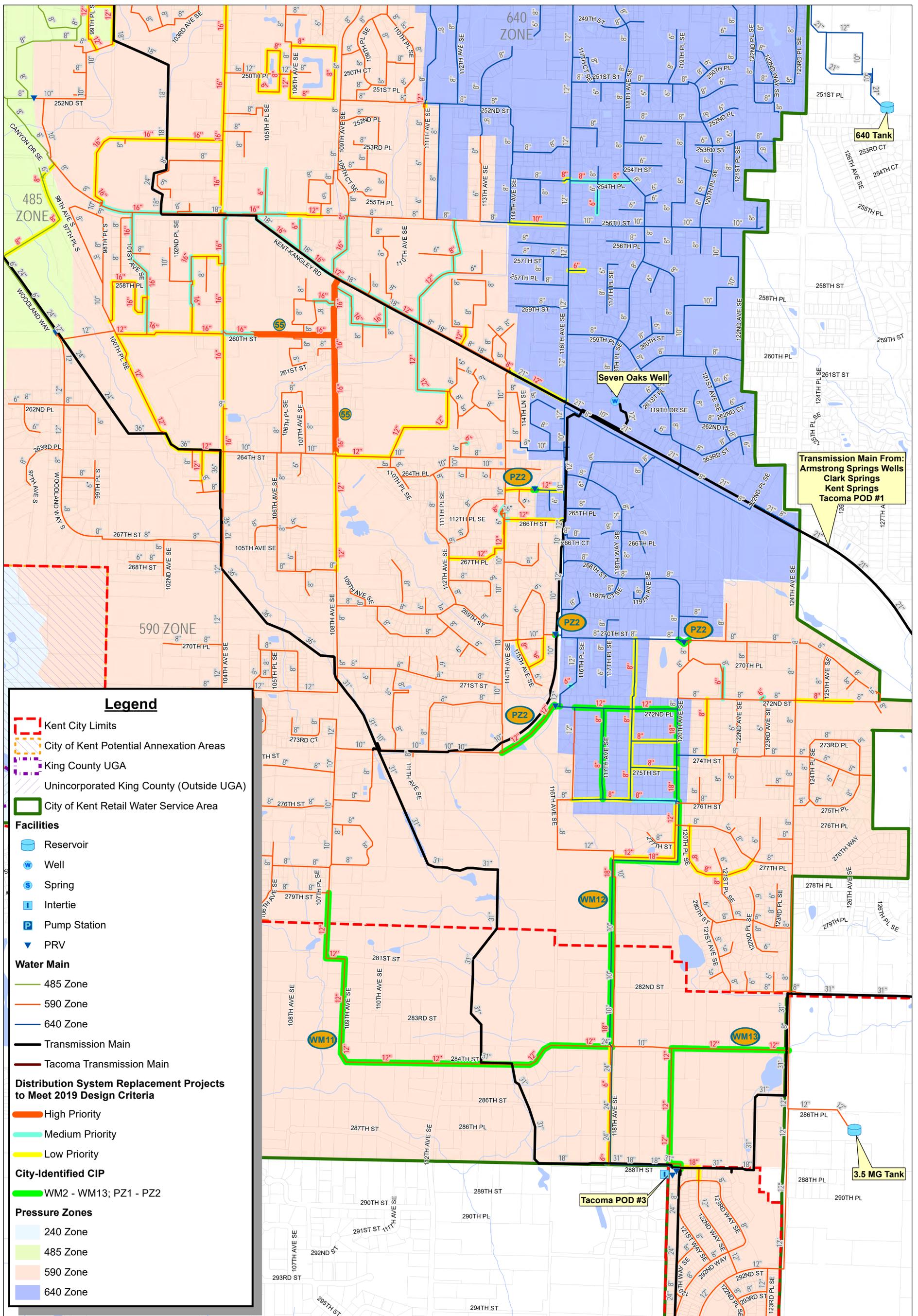
Vicinity Map



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Legend

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 - City of Kent Potential Annexation Areas
 - King County UGA
 - Unincorporated King County (Outside UGA)
 - City of Kent Retail Water Service Area
- Facilities**
- Reservoir
 - Well
 - Spring
 - Intertie
 - Pump Station
 - PRV
- Water Main**
- 485 Zone
 - 590 Zone
 - 640 Zone
 - Transmission Main
 - Tacoma Transmission Main
- Distribution System Replacement Projects to Meet 2019 Design Criteria**
- High Priority
 - Medium Priority
 - Low Priority
- City-Identified CIP**
- WM2 - WM13; PZ1 - PZ2
- Pressure Zones**
- 240 Zone
 - 485 Zone
 - 590 Zone
 - 640 Zone

J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-15 CIP-EAST HILL-SOUTH_WM.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-15

Water Main Projects

East Hill - South

City of Kent

2019 Water System Plan

Vicinity Map



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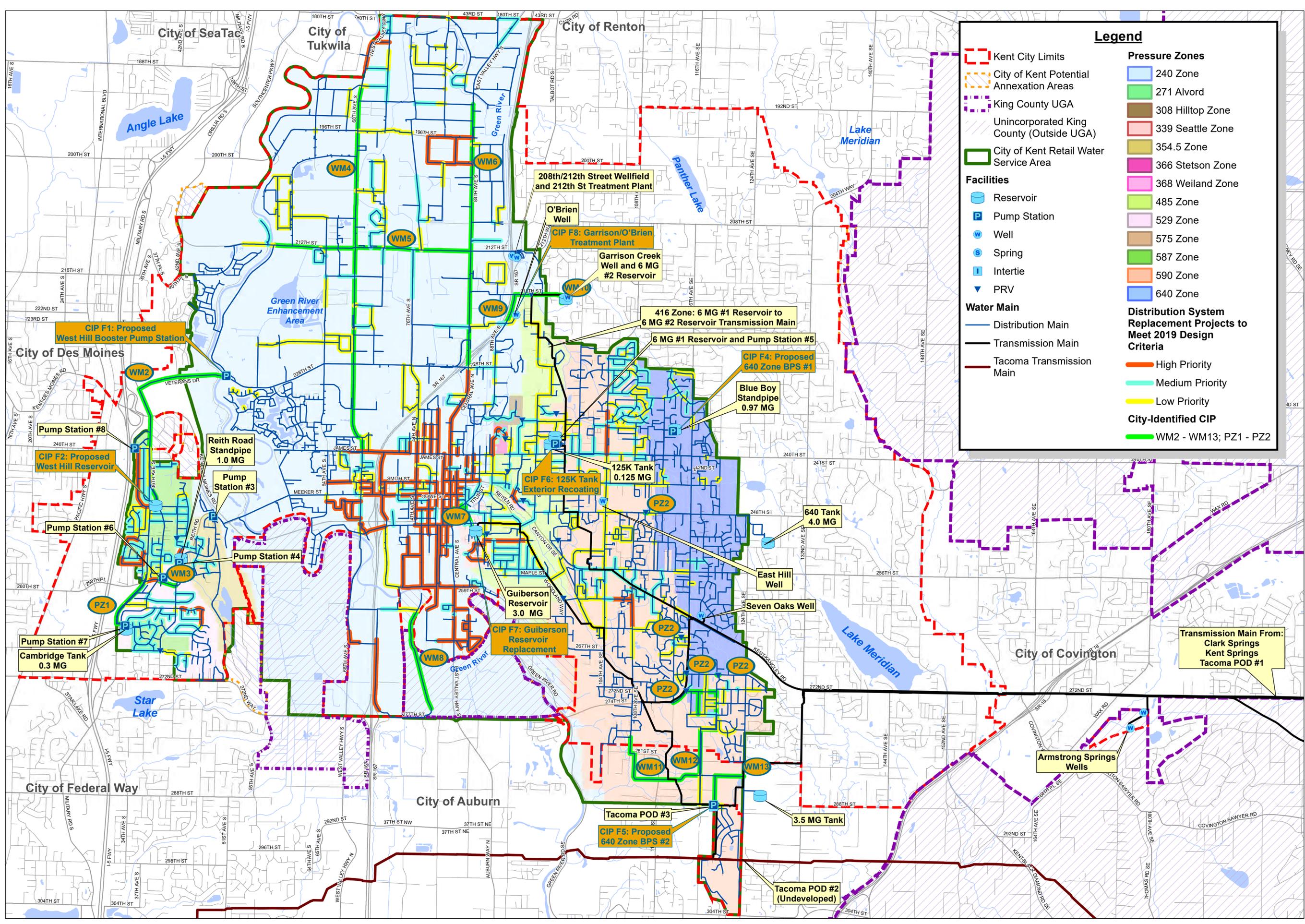
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Vicinity Map



Figure 9-16
Capital Improvement Projects
All Projects, System-wide
City of Kent
2019 Water System Plan



Legend

- Kent City Limits** (Red dashed line)
- City of Kent Potential Annexation Areas** (Yellow dashed line)
- King County UGA** (Purple dashed line)
- Unincorporated King County (Outside UGA)** (Grey area)
- City of Kent Retail Water Service Area** (Green outline)

Facilities

- Reservoir (Blue circle)
- Pump Station (Blue square with P)
- Well (Blue circle with W)
- Spring (Blue circle with S)
- Intertie (Blue square with I)
- PRV (Blue triangle)

Water Main

- Distribution Main (Blue line)
- Transmission Main (Black line)
- Tacoma Transmission Main (Brown line)

Pressure Zones

- 240 Zone (Light blue)
- 271 Alford (Light green)
- 308 Hilltop Zone (Light brown)
- 339 Seattle Zone (Light red)
- 354.5 Zone (Light yellow)
- 366 Stetson Zone (Light pink)
- 368 Weiland Zone (Light purple)
- 485 Zone (Light green)
- 529 Zone (Light blue)
- 575 Zone (Light brown)
- 587 Zone (Light green)
- 590 Zone (Light orange)
- 640 Zone (Light blue)

Distribution System Replacement Projects to Meet 2019 Design Criteria

- High Priority (Orange line)
- Medium Priority (Light green line)
- Low Priority (Yellow line)

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2 (Green line)

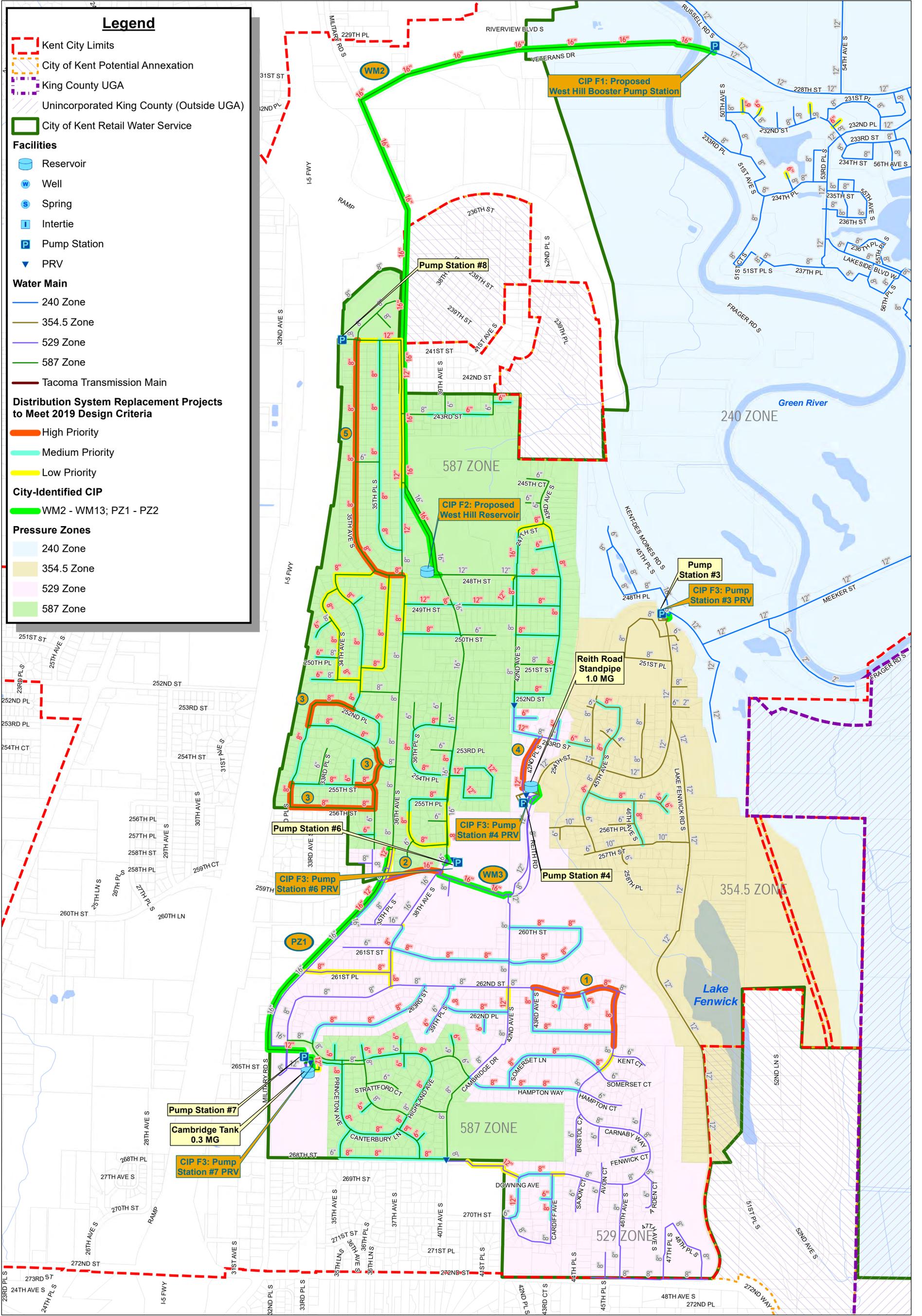
J:\DATA\KENT\117-100\GIS\MAPS\FIGURE 9-16 CIP-ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: WGS 1984 WEB MERCATOR AUXILIARY SPHERE



1 inch = 2,000 feet
 0 1,000 2,000 4,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"





Legend

- Kent City Limits
- City of Kent Potential Annexation
- King County UGA
- Unincorporated King County (Outside UGA)
- City of Kent Retail Water Service

Facilities

- Reservoir
- Well
- Spring
- Intertie
- Pump Station
- PRV

Water Main

- 240 Zone
- 354.5 Zone
- 529 Zone
- 587 Zone
- Tacoma Transmission Main

Distribution System Replacement Projects to Meet 2019 Design Criteria

- High Priority
- Medium Priority
- Low Priority

City-Identified CIP

- WM2 - WM13; PZ1 - PZ2

Pressure Zones

- 240 Zone
- 354.5 Zone
- 529 Zone
- 587 Zone

J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-17 CIP-WEST HILL_ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-17

Capital Improvement Projects

All Projects, West Hill

City of Kent

2019 Water System Plan

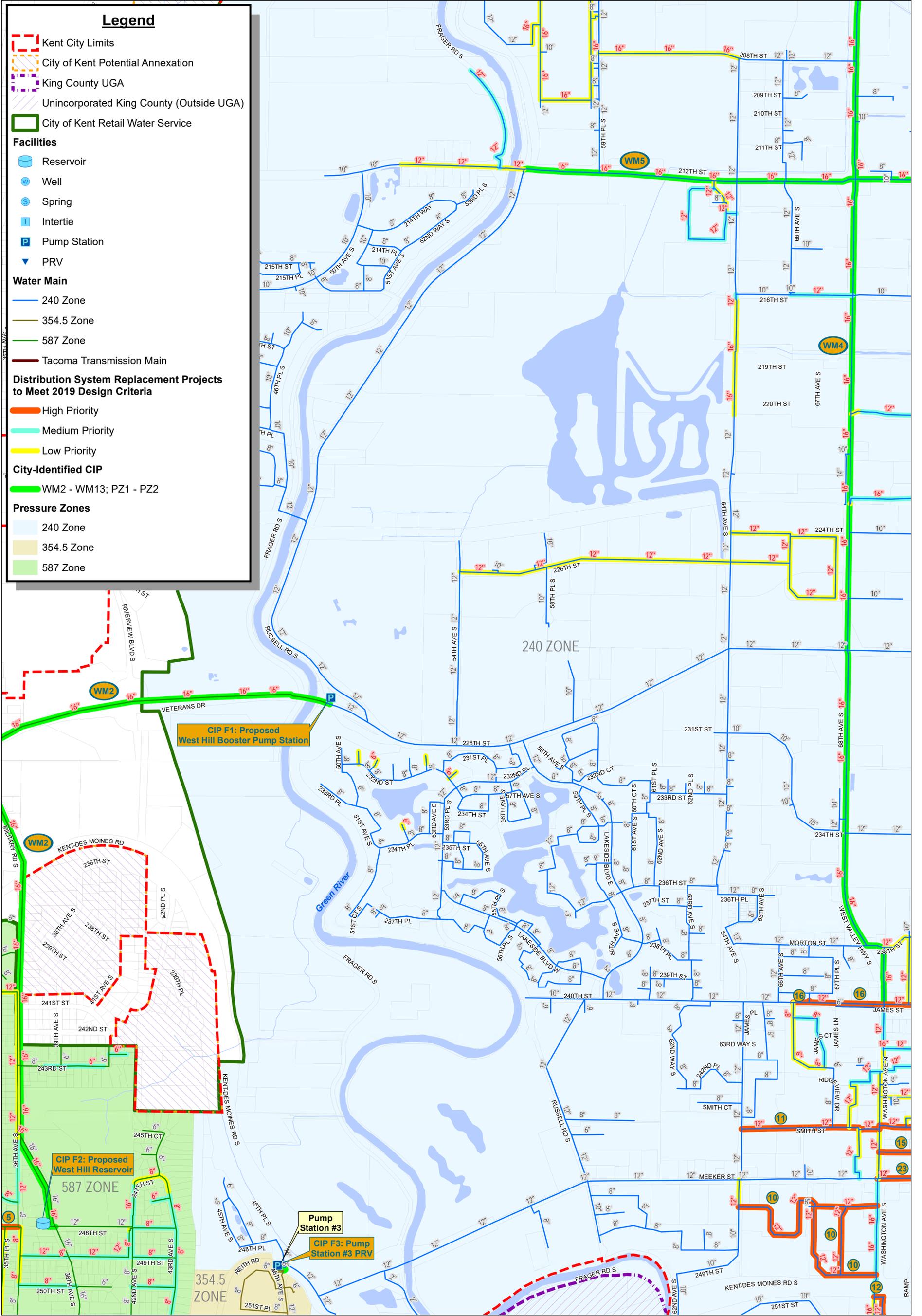
Vicinity Map



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Z:\BOTHELL\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-18 CIP-WEST 240_ALL.MXD BY: RWITHERS PLOT DATE: MAY 13, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-18

Capital Improvement Projects

All Projects, 240 Zone - West

City of Kent

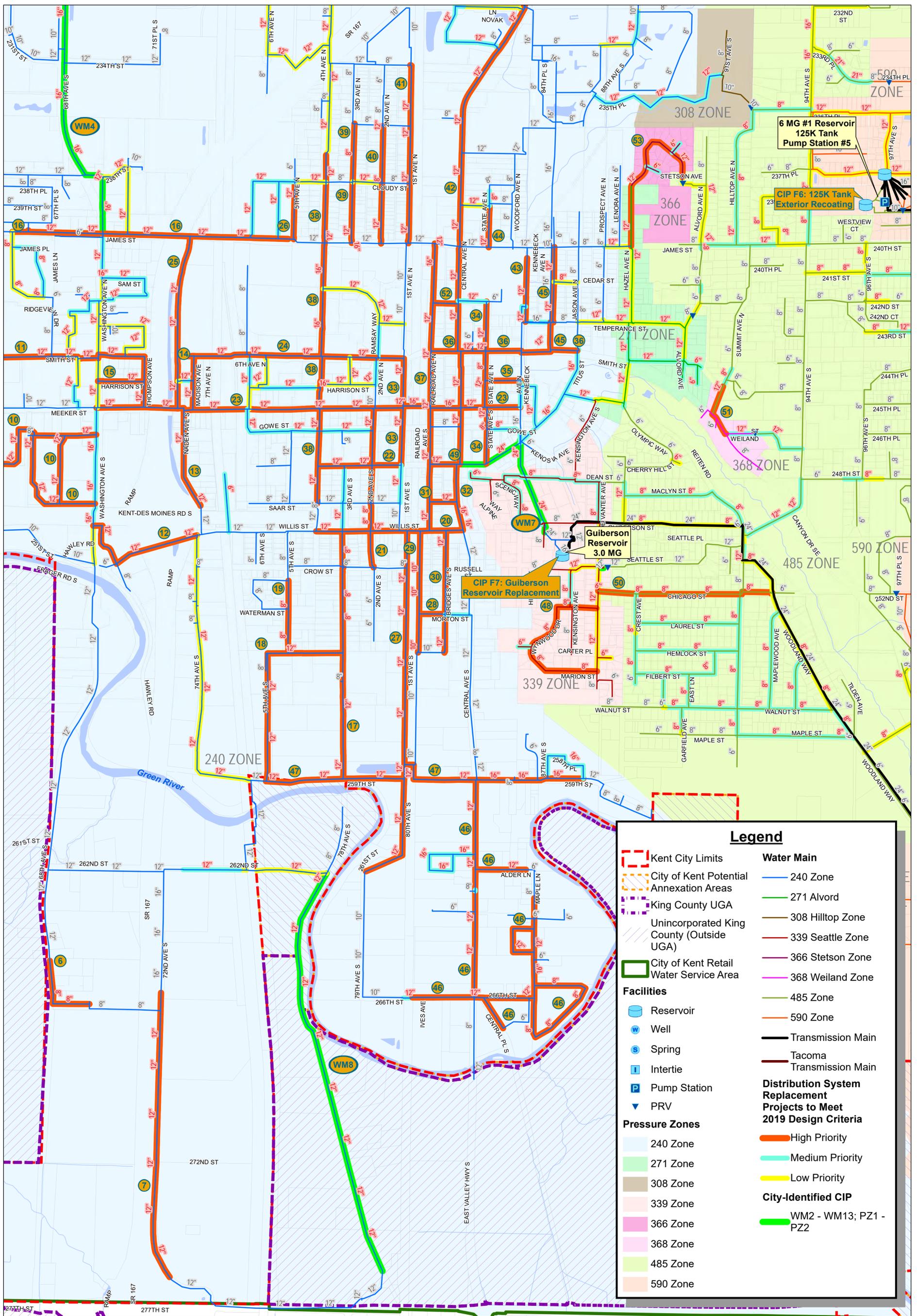
2019 Water System Plan



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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-19 CIP-DOWNTOWN_ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-19

Capital Improvement Projects

All Projects, 240 Zone - Downtown

City of Kent

2019 Water System Plan

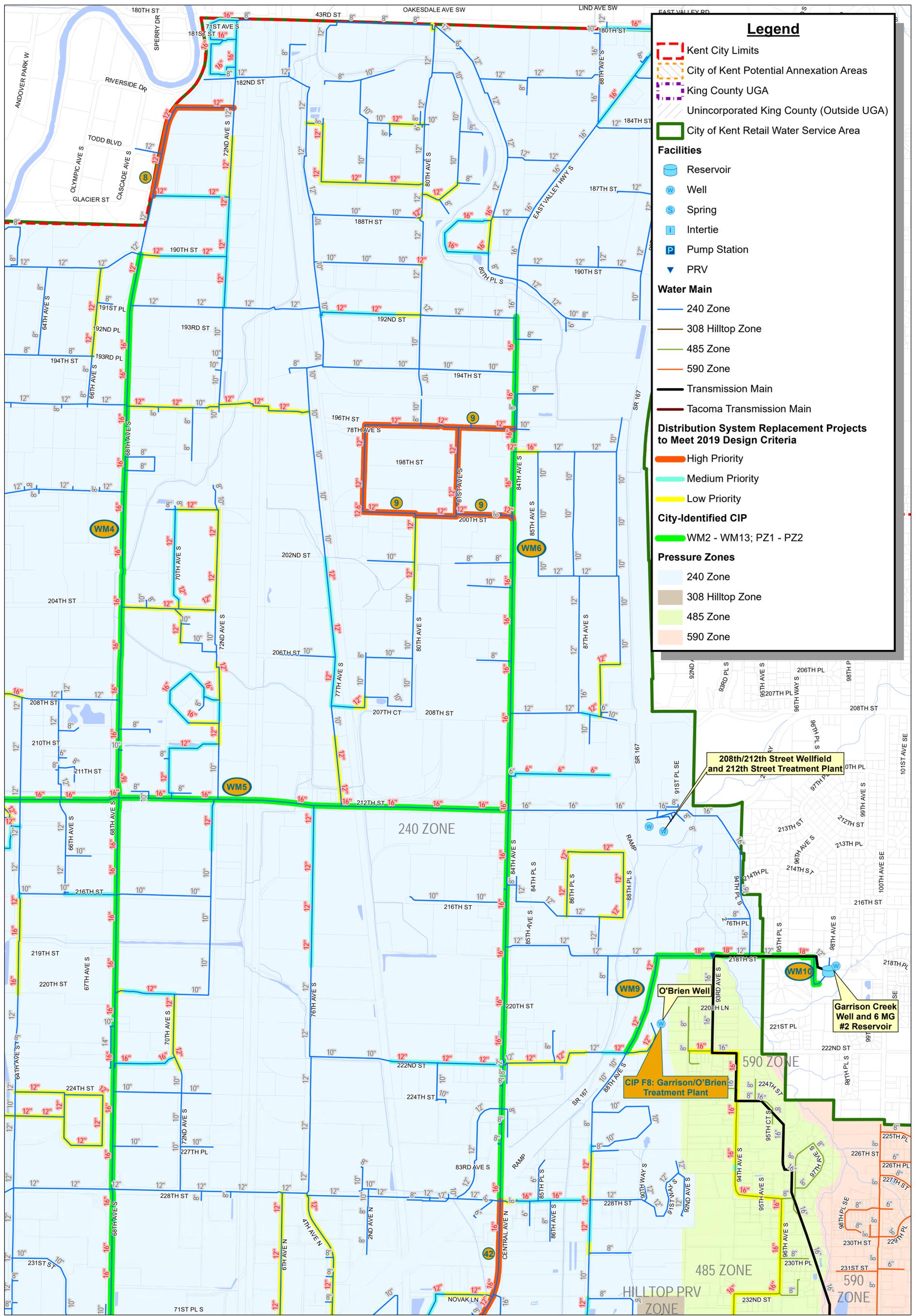
Vicinity Map



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Z:\BOTHELL\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-20 CIP-NORTH 240_ALL.MXD BY: RWITHERS PLOT DATE: JUN 14, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 600 feet

0 300 600 1,200 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-20

Capital Improvement Projects

All Projects, 240 Zone - North

City of Kent

2019 Water System Plan

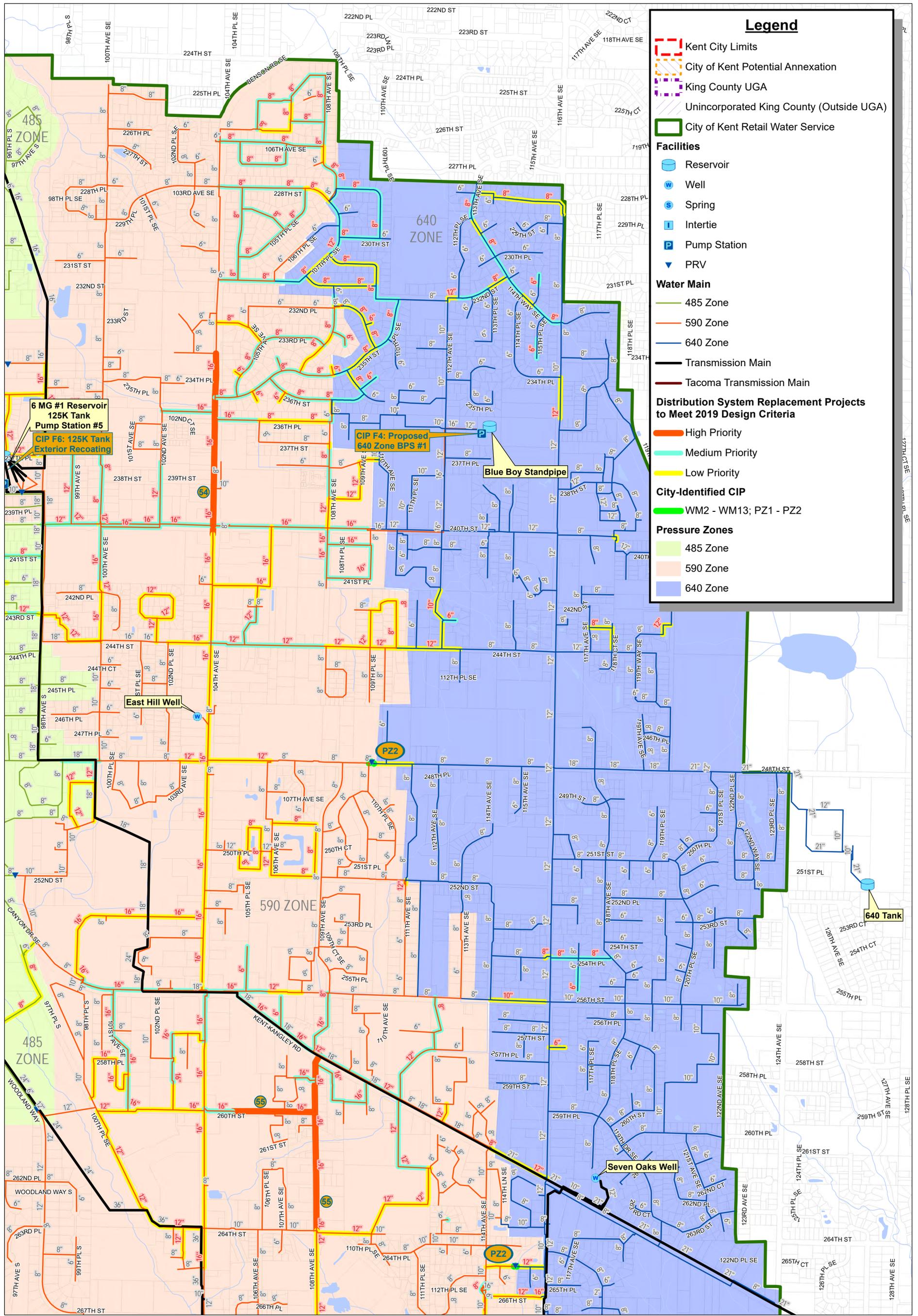
Vicinity Map



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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-21 CIP-EAST HILL-ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-21

Capital Improvement Projects

All Projects, East Hill - North

City of Kent

2019 Water System Plan

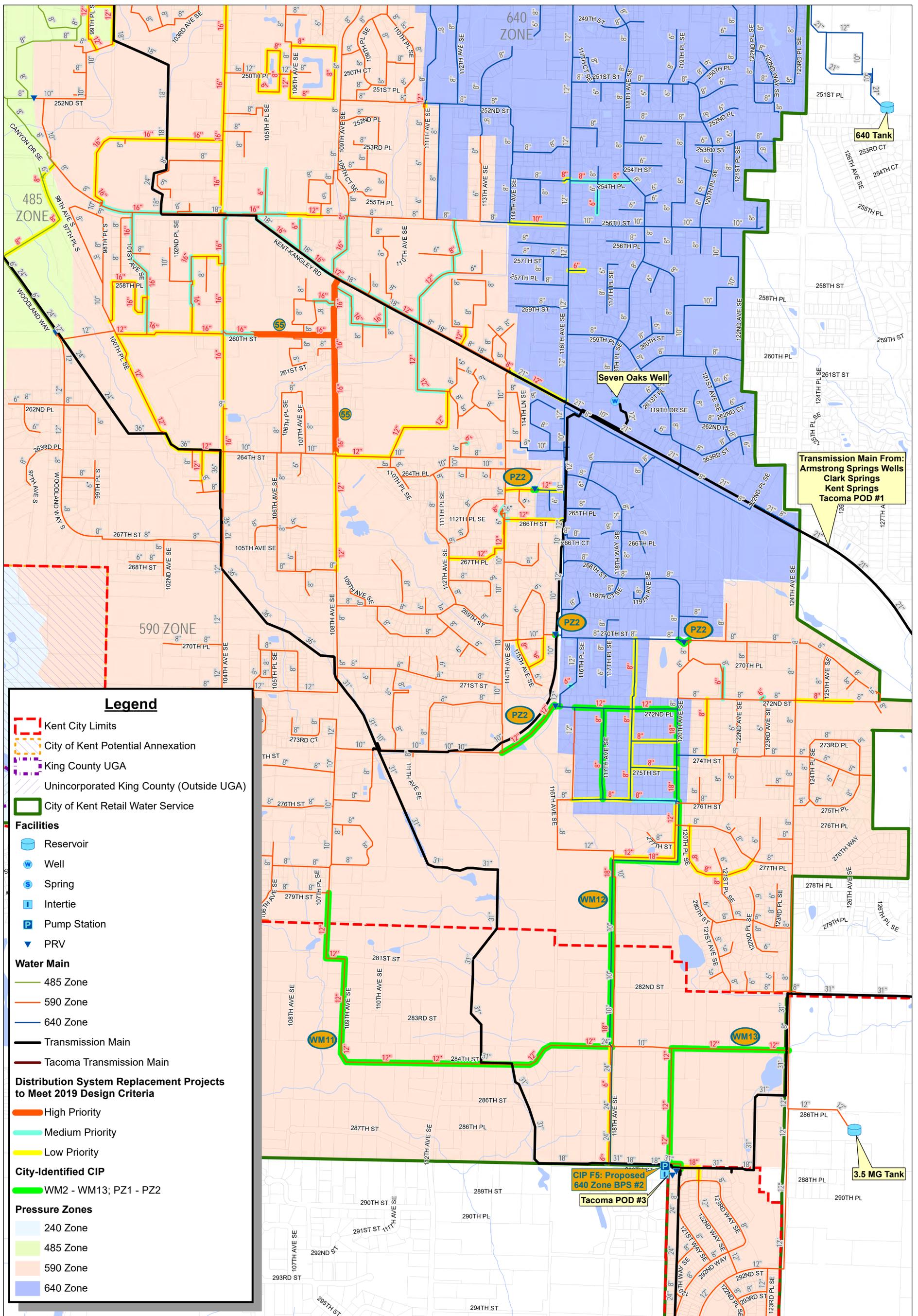
Vicinity Map



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J:\DATA\KEN\117-100\GIS\MAPS\FIGURE 9-22 CIP-EAST HILL-SOUTH_ALL.MXD BY: DBRIGHT PLOT DATE: MAY 8, 2019 COORDINATE SYSTEM: NAD 1983 HARN STATEPLANE WASHINGTON NORTH FIPS 4601 FEET

NORTH

1 inch = 500 feet

0 250 500 1,000 Feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



Figure 9-22

Capital Improvements Projects

All Projects, East Hill - South

City of Kent

2019 Water System Plan

Vicinity Map



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10 | FINANCIAL ANALYSIS

INTRODUCTION

This Chapter of the City of Kent's (City) 2019 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 Improvements Plan 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.

FISCAL RESPONSIBILITY

Provision of public water service is essential to the preservation of public health, 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 systems 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 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, 2019 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.kentwa.gov>.

Rates include a block rate structure and rebates for low-flow water fixtures as incentive to encourage water conservation and provide customers options for reducing their water bills with certain lifestyle changes. 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. Bi-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 water system plan 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
Water System 2019 Rates

Water Utility Meter Access Fees			Water Usage Fees per 100 cubic feet (748 gallons)		
Meter Size (inches)		Monthly Fee			
<u>Residential</u>			0-800 cf	\$	2.52
<1	\$	24.28	800+ cf	\$	4.96
1	\$	38.01			
<u>Commerical</u>			<u>Water Tap Fees (new connections)</u>		
<1	\$	30.52	Size		
1	\$	44.25	<3/4	\$	100.00
1.5	\$	78.59	3/4	\$	125.00
2	\$	119.80	1	\$	175.00
3	\$	188.48	1.5	\$	360.00
4	\$	284.63	2	\$	500.00
6	\$	422.00	>2		See KCC 7.02.160 [C]
8	\$	559.36			
10	\$	696.73			
<u>Dedicated Fireline</u>			<u>System Development Fees</u>		
<1	\$	2.89	<1	\$	7,694.19
1	\$	3.37	1	\$	19,234.84
1.25	\$	5.05	1.5	\$	38,468.40
1.5	\$	6.73	2	\$	61,549.70
2	\$	10.77	3	\$	123,100.70
3	\$	26.92	4	\$	192,344.60
4	\$	53.82	5	\$	288,331.30
6	\$	107.65	6	\$	384,689.20
8	\$	181.67	8	\$	615,502.19
10	\$	269.14	10	\$	846,315.22
Backflow Fee	\$	106.71			

To establish an affordable and sustainable rate structure, the City compiled a list of current rate structures at comparable neighboring water districts. Prior to the rate study, the City was on the low to mid-range of its comparable districts. The rate increase adopted in November 2016 allowed the City to remain in the mid-range for residential and commercial rates. At this point, the City does not anticipate the need to take on additional debt for funding the capital program over the term of this WSP, as it is a balanced plan. If, during this time, circumstances change that require financing through debt or other sources beyond cash financing, there are multiple options that could be considered depending on the need. These options include:

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

FINANCING PLAN AND PAST PERFORMANCE

In 2016, 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 adopting a fee for dedicated fire lines; adding an automatic annual cost of living increase for fees associated with use, meters, and fire lines; increasing the meter fee based on size and flow; and eliminating the winter and summer rates to have one year-round rate. Additionally, the adopted rate structure started to address the imbalance of fixed and variable revenue to fixed and variable expenses by increasing meter fees, implementing the fire line fee, and reducing the use fee on the first tier. This imbalance was partially a consequence of a highly successful water efficiency and conservation effort that discouraged high water use and, therefore, sales related to that use. The implemented changes have been in place since January 1, 2017, 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. In December 2017, City Council adopted a fund balance reserve policy that requires a 20 percent of operating expenses fund balance that would be available for use in case of an emergency.

The estimated costs of 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 this WSP will be financed from cash on hand. It is important to note that the anticipated revenue and expenses beyond the council adopted budget for 2019-2020 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 also 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 of Kent'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 2016, and the City anticipates beginning another rate study in 2020 to be completed in 2022.

Table 10-2
Water Operating Fund Projections

	2018	2019	2020	2021	2022	2023	2024	2025	2026	2027	2028
	Preliminary	Budget	Budget	Projection							
Revenues											
Charges for Services	22,519,154	23,363,100	23,923,790	24,497,961	25,085,912	25,687,974	26,304,485	26,935,793	27,582,252	28,244,226	28,922,087
System Dev/Connection Charges	1,852,189	1,451,100	1,480,120	1,515,643	1,552,018	1,589,267	1,627,409	1,666,467	1,706,462	1,747,417	1,789,355
Miscellaneous Revenue	1,178,818	661,350	674,580	690,770	707,348	724,325	741,709	759,510	777,738	796,403	815,517
Transfers In	-	-	-	-	-	-	-	-	-	-	-
Operating Revenues	25,550,161	25,475,550	26,078,490	26,704,374	27,345,279	28,001,565	28,673,603	29,361,769	30,066,452	30,788,047	31,526,960
Transfers In-Debt Service	3,760,718	4,113,510	3,579,390	4,604,978	4,061,511	3,515,473	4,146,464	4,130,653	4,109,197	4,093,757	4,076,208
Total Revenues	29,310,879	29,589,060	29,657,880	31,309,352	31,406,790	31,517,039	32,820,067	33,492,422	34,175,649	34,881,804	35,603,168
Expenditures											
Salaries & Benefits	3,152,687	3,500,220	3,614,120	3,722,544	3,834,220	3,949,247	4,067,724	4,189,756	4,315,448	4,444,912	4,578,259
Supplies	537,557	815,650	830,030	846,631	863,563	880,834	898,451	916,420	934,749	953,444	972,512
Services & Charges	9,281,302	10,874,800	11,224,460	11,448,949	11,677,928	11,911,487	12,149,716	12,392,711	12,640,565	12,893,376	13,151,244
Vehicles & Equipment	-	120,000	-	-	-	-	-	-	-	-	-
Cost Allocation	(371,148)	(480,000)	(480,000)	(494,400)	(509,232)	(524,509)	(540,244)	(556,452)	(573,145)	(590,339)	(608,050)
Transfers to Debt Service	46,983	-	-	-	-	-	-	-	-	-	-
Transfers to Capital Projects	7,760,420	13,119,000	5,627,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000	6,000,000
Debt Service - Principal	2,044,028	2,304,030	2,264,020	2,951,528	2,509,750	2,065,000	2,800,000	2,925,000	3,052,500	3,192,500	3,337,500
Debt Service - Interest	1,719,948	1,809,480	1,315,370	1,653,450	1,552,761	1,450,473	1,346,464	1,205,653	1,056,697	901,257	738,708
Operating Expenditures	24,171,777	32,063,180	24,395,000	26,128,701	25,928,990	25,732,532	26,722,111	27,073,088	27,426,814	27,795,150	28,170,174
Transfers Out - Debt Service	3,760,718	4,160,320	3,579,390	4,604,978	4,061,511	3,515,473	4,146,464	4,130,653	4,109,197	4,093,757	4,076,208
Total Expenditures	27,932,495	36,223,500	27,974,390	30,733,680	29,990,501	29,248,005	30,868,576	31,203,740	31,536,012	31,888,907	32,246,381
Change in Fund Balance	1,378,384	(6,634,440)	1,683,490	575,672	1,416,289	2,269,034	1,951,492	2,288,682	2,639,638	2,992,897	3,356,786
Ending Fund Balance	14,466,575	7,832,135	9,515,625	10,091,297	11,507,586	13,776,619	15,728,111	18,016,793	20,656,430	23,649,328	27,006,114

Table 10-3
Water Operating Fund History

	2012	2013	2014	2015	2016	2017
	Actuals	Actuals	Preliminary	Actuals	Actuals	Actuals
Revenues						
Charges for Services	16,249,512	17,007,080	18,411,975	18,901,932	18,751,378	21,810,968
System Dev/Connection Charges	1,266,547	1,370,342	1,338,469	890,927	1,495,241	1,986,572
Miscellaneous Revenue	713,106	1,101,250	1,339,026	498,209	846,052	976,012
Transfers In	-	5,854	10,026	-	4,838	500
Operating Revenues	18,229,165	19,484,526	21,099,496	20,291,068	21,097,509	24,774,052
Transfers In-Debt Service	3,480,575	4,397,692	3,668,805	3,676,293	3,428,491	3,435,184
Total Revenues	21,709,740	23,882,218	24,768,301	23,967,361	24,526,000	28,209,236
Expenditures						
Salaries & Benefits	3,105,497	2,839,228	2,780,926	2,863,591	3,016,383	2,956,384
Supplies	541,390	585,486	530,365	575,318	745,453	621,832
Services & Charges	7,035,164	8,026,927	7,822,797	8,051,658	8,345,677	8,919,899
Vehicles & Equipment	-	-	-	144,766	-	17,661
Cost Allocation	(737,533)	(879,343)	(456,770)	(505,647)	(480,711)	(506,142)
Transfers to Debt Service	46,969	48,936	47,064	47,100	46,894	47,360
Transfers to Capital Projects	3,151,301	2,704,254	3,025,900	2,800,000	3,009,738	7,450,000
Debt Service - Principal	1,667,974	2,782,326	2,016,528	2,071,528	1,971,528	2,024,028
Debt Service - Interest	1,812,601	1,615,366	1,652,277	1,612,939	1,571,379	1,611,727
Operating Expenditures	16,623,363	17,723,180	17,419,087	17,661,253	18,226,341	23,142,749
Transfers Out - Debt Service	3,480,575	4,397,692	3,668,805	3,676,293	3,428,491	3,435,184
Total Expenditures	20,103,938	22,120,872	21,087,892	21,337,546	21,654,832	26,577,933
Change in Fund Balance	1,605,802	1,761,346	3,680,409	2,629,815	2,871,168	1,631,303
Ending Fund Balance	1,363,111	3,344,832	7,020,229	8,817,521	11,029,672	13,088,191

Historical information was gathered from budget documents located on the City website

2014 are preliminary numbers actuals not printed in budget book.

APPENDIX A

Water Facilities Inventory (WFI) Form

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WATER FACILITIES INVENTORY (WFI) FORM

ONE FORM PER SYSTEM

Quarter: 1

Updated: 09/17/2019

Printed: 9/26/2019

WFI Printed For: On-Demand

Submission Reason: **Source Update**

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

Population update

1. SYSTEM ID NO. 38150 1	2. SYSTEM NAME KENT WATER DEPARTMENT	3. COUNTY KING	4. GROUP A	5. TYPE Comm
------------------------------------	--	--------------------------	----------------------	------------------------

6. PRIMARY CONTACT NAME & MAILING ADDRESS SEAN M. BAUER (MANAGER) 220 4TH AVE S KENT, WA 98032	7. OWNER NAME & MAILING ADDRESS KENT, CITY OF TIM LAPORTE 220 4TH AVE S KENT, WA 98032	8. OWNER NUMBER: 002950 PW DIRECTOR
STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	STREET ADDRESS IF DIFFERENT FROM ABOVE ATTN ADDRESS CITY STATE ZIP	

9. 24 HOUR PRIMARY CONTACT INFORMATION	10. OWNER CONTACT INFORMATION
Primary Contact Daytime Phone: (253) 856-5610	Owner Daytime Phone: (253) 856-5500
Primary Contact Mobile/Cell Phone: (253) 740-7089	Owner Mobile/Cell Phone:
Primary Contact Evening Phone: (xxx)-xxx-xxxx	Owner Evening Phone:
Fax: (253) 856-6600 E-mail: xxxxxxxxxxxxxxxxxxxxxx	Fax: E-mail: xxxxxxxxxxxxxxxxxxxxxx

11. SATELLITE MANAGEMENT AGENCY - SMA (check only one)	
<input checked="" type="checkbox"/> Not applicable (Skip to #12) <input type="checkbox"/> Owned and Managed <input type="checkbox"/> Managed Only <input type="checkbox"/> Owned Only	
SMA NAME: _____	SMA Number: _____

12. WATER SYSTEM CHARACTERISTICS (mark all that apply)		
<input checked="" type="checkbox"/> Agricultural <input checked="" type="checkbox"/> Commercial / Business <input checked="" type="checkbox"/> Day Care <input checked="" type="checkbox"/> Food Service/Food Permit <input checked="" type="checkbox"/> 1,000 or more person event for 2 or more days per year	<input checked="" type="checkbox"/> Hospital/Clinic <input checked="" type="checkbox"/> Industrial <input checked="" type="checkbox"/> Licensed Residential Facility <input checked="" type="checkbox"/> Lodging <input checked="" type="checkbox"/> Recreational / RV Park	<input checked="" type="checkbox"/> Residential <input checked="" type="checkbox"/> School <input type="checkbox"/> Temporary Farm Worker <input checked="" type="checkbox"/> Other (church, fire station, etc.): _____

13. WATER SYSTEM OWNERSHIP (mark only one)	14. STORAGE CAPACITY (gallons)
<input type="checkbox"/> Association <input checked="" type="checkbox"/> City / Town <input type="checkbox"/> County <input type="checkbox"/> Federal <input type="checkbox"/> Investor <input type="checkbox"/> Private <input type="checkbox"/> Special District <input type="checkbox"/> State	23,225,000

- SEE NEXT PAGE FOR A COMPLETE LIST OF SOURCES -

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO. 38150 1	2. SYSTEM NAME KENT WATER DEPARTMENT	3. COUNTY KING	4. GROUP A	5. TYPE Comm
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15	16 SOURCE NAME	17 INTERTIE	18 SOURCE CATEGORY										19 USE	20	21 TREATMENT					22 DEPTH	23	24 SOURCE LOCATION						
			Source Number	LIST UTILITY'S NAME FOR SOURCE AND WELL TAG ID NUMBER. Example: WELL #1 XYZ456 IF SOURCE IS PURCHASED OR INTERTIED, LIST SELLER'S NAME Example: SEATTLE	INTERTIE SYSTEM ID NUMBER	WELL	WELL IN A WELL FIELD	WELL IN A WELL FIELD	SPRING	SPRING IN SPRINGFIELD	SPRING IN SPRINGFIELD	SEA WATER			SURFACE WATER	RANNEY / INF. GALLERY	OTHER	PERMANENT	SEASONAL			EMERGENCY	SOURCE METERED	NONE	CHLORINATION	FILTRATION	FLUORIDATION	IRRADIATION (UV)
S01	Kent Springs 1,2,3										X	X	X			Y	X	X						6800	SE SW	33	22N	06E
S02	Clark Springs 1,2,3										X	X				Y	X	X						5400	NE SE	33	22N	06E
S03	InAct 06/01/1989 Clark Springs 2			X									X			Y	X							1800	NE SW	33	22N	06E
S04	InAct 06/01/1989 Clark Springs 3			X									X			Y	X							2700	SW NW	33	22N	06E
S05	East Hill Well 1			X									X			Y	X	X					225	1950	SW NW	20	22N	05E
S06	InAct 03/30/2018 Garrison Well 1			X											X	Y	X						422	500	NE SE	07	22N	05E
S07	Seven Oaks Well			X									X			Y	X	X					373	900	SW NW	28	22N	05E
S08	Armstrong Springs A1				X								X			Y	X	X					80	420	NE NE	36	22N	05E
S09	Armstrong Springs A2				X								X			Y	X	X					66	680	NE NE	36	22N	05E
S10	N Kent Wellfield (212th & 208th)				X								X			Y	X	X	X				180	5000	SE NW	07	22N	05E
S11	208th Street Well				X								X			Y	X	X	X				180	1200	SE NW	07	22N	05E
S12	OBrien Well			X									X			Y	X	X					192	243	SE SW	07	22N	05E
S13	Well 1 - 212 ST				X								X			Y	X	X	X				336	1200	SE NW	07	22N	05E
S14	Well 2 - 212 ST				X								X			Y	X	X	X				248	1200	SE NW	07	22N	05E
S15	Well 3 - 212 ST				X								X			Y	X	X	X				290	1300	SE NW	07	22N	05E
S16	Garrison Well 2			X									X			Y	X	X					422	600	NE SE	07	22N	05E
S17	Pre-Active 06/24/2002 East Hill Well			X									X			Y	X	X					216	600	SW NW	20	22N	05E
S18	Armstrong Wells 1 & 2				X								X			Y	X	X					66	1300	NE NE	36	22N	05
S19	Tacoma Water (2nd supply)	86800 N											X			Y	X						8778				00N	00E
S20	Highline Intertie (1)	40650 6													X	Y	X						1040				00N	00E
S21	Auburn Intertie (1)	03350 V													X	Y	X						200				00N	00E
S22	Renton Intertie (1)	71850 L													X	Y	X						1800				00N	00E
S23	Soos Creek Intertie (1)	40100 8													X	Y	X						700				00N	00E
S24	Lake Meridian Water Dist X (2)	41900 B													X	Y	X						1400				00N	00E
S25	Tukwila (1)	89500 F													X	Y	X						2360				00N	00E

WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID NO. 38150 1	2. SYSTEM NAME KENT WATER DEPARTMENT	3. COUNTY KING	4. GROUP A	5. TYPE Comm
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	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?)		30539	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	11335		
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	1602		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	19204		
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)	13	13	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	2306	2306	
28. TOTAL SERVICE CONNECTIONS		32858	

29. FULL-TIME RESIDENTIAL POPULATION
A. How many residents are served by this system 180 or more days per year? 69841

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?	0	0	0	0	0	0	0	0	0	0	0	0
B. How many days per month are they present?	0	0	0	0	0	0	0	0	0	0	0	0

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?	69,700	69,700	69,700	69,700	69,700	69,700	69,700	69,700	69,700	69,700	69,700	69,700
B. How many days per month is water accessible to the public?	31	28	31	30	31	30	31	31	30	31	30	31

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?	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200	6,200
B. How many days per month are they present?	31	28	31	30	31	30	31	31	30	31	30	31

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
* Requirement is exception from WAC 246-290	70	70	70	70	70	70	70	70	70	70	70	70

34. NITRATE SCHEDULE (One Sample per source by time period)	QUARTERLY	ANNUALLY	ONCE EVERY 3 YEARS
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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: 9/26/19
PRINT NAME: SEAN BAUER	TITLE: WATER SYSTEM MANAGER

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APPENDIX B

Retail Water Service Area and Other Agreements

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ORIGINAL

RESOLUTION NO. 2 5 6 8

1
2
3 A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF AUBURN,
4 WASHINGTON, AUTHORIZING THE MAYOR AND CITY CLERK TO EXECUTE
5 SOUTH KING COUNTY REGIONAL WATER ASSOCIATION JOINT OPERATING
6 AGREEMENT BETWEEN PARTICIPATING CITIES OF KENT, BLACK DIAMOND,
7 AUBURN, COVINGTON WATER DISTRICT AND KING COUNTY WATER
8 DISTRICT NO. 111.

9
10 WHEREAS, pursuant to RCW 39.34 entitled the "Interlocal
11 Cooperation Act", the City of Auburn is authorized to enter
12 into agreements with other public agencies to provide for the
13 most efficient services; and

14 WHEREAS, an adequate and safe water supply for South King
15 County Regional Water Association (SKRWA) is vital to both
16 existing citizens and the long-term comprehensive plans of
17 SKRWA; and

18 WHEREAS, the State and SKRWA have prepared a Coordinated
19 Water System Plan (CWSP) for South King County; and

20 WHEREAS, projects that provide for the joint use and
21 operation of supply, transmission, storage, treatment, and
22 pumping facilities to minimize cost, provide for improved
23 water quality, protect the environment, provide for emergency
24 needs and maximize the best use of the resource is in the best
25 interest of the citizens of the region.

26 NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF AUBURN,
WASHINGTON, IN A REGULAR MEETING, DULY ASSEMBLED, HERewith
RESOLVES AS FOLLOWS:

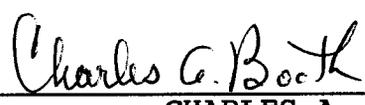
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Section 1. The Mayor and City Clerk of the City are hereby authorized to execute South King County Regional Water Association Joint Operating Agreement. A copy of said Agreement is attached hereto, denominated as Exhibit "A", and made a part hereof as though set forth in full herein.

Section 2. The Mayor is hereby authorized to implement such administrative procedures as may be necessary to carry out the directives of this legislation.

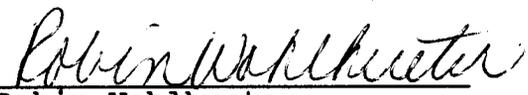
DATED and SIGNED this 5th day of June, 1995.

CITY OF AUBURN



CHARLES A. BOOTH
Mayor

ATTEST:



Robin Wohlhueter,
City Clerk

APPROVED AS TO FORM:



Michael J. Reynolds,
City Attorney

ORIGINAL

**SOUTH KING COUNTY REGIONAL WATER ASSOCIATION
JOINT OPERATING AGREEMENT**

January 1995

WHEREAS, an adequate and safe water supply for South King County Regional Water Association (SKCRWA) is vital to both existing citizens and implementing the long-term comprehensive plans of SKCRWA; and

WHEREAS, the State and SKCRWA prepared a Coordinated Water System Plan (CWSP) for South King County; and

WHEREAS, projects that provide for the joint use and operation of supply, transmission, storage, treatment, and pumping facilities to minimize cost, provide for improved water quality, protect the environment, provide for emergency needs, and maximize the best use of the resource is in the best interest of the citizens of the region;

WHEREAS, the current and near-term water needs of the local governments and SKCRWA require steps to establish a cooperative subregional water supply system; and

WHEREAS, the SKCRWA is committed to cooperate toward regional solutions for long range water supply needs.

NOW THEREFORE, the SKCRWA members as the initial developers of this Joint Operating Agreement (JOA), agree as follows:

1. **GENERAL**

- A. The Members acknowledge the requirement to incorporate land use planning as defined by the Growth Management Act with water supply planning; and
- B. The Members recognize the benefits of developing a subregional water supply system that will allow the optimum use of surface and groundwater to better manage and protect the area's water resources; and
- C. The Members will hold a joint meeting at least annually about September 30th to review the status of this JOA and any Amendments as well as other problems of mutual concern. The specific date, time, and location of the meeting will be set by mutual agreement.

2. **INTENT**

- A. The general intent of the Members is to cooperatively provide the additional facilities needed to develop a South King County Subregional Water Supply System (Subregional System). The Members may choose by Interlocal Agreement to produce additional water and distribute it within the Subregional System, with or without change to their retail service area.
- B. The JOA provides a framework for joint development of specific projects that may include two or more of the Participants. Each facility project and/or intertie shall be developed under a separate Interlocal Agreement (IA) consistent with this JOA subject to approval by appropriate affected city council and/or water district boards. The specific intent of this JOA is to make provisions for a standardized method to create or expand the Subregional System to meet the public water supply needs for both emergency and long-term use, and to establish a basis for agreement between the Participants for financing, ownership, construction, and operation of projects required for the Subregional System. These projects may include common facilities with other Agencies outside the SKCRWA.

It is further the specific intent of this JOA to preserve existing water rights and protect the established or planned interest and needs of each Participant with respect to sources of water.

Exhibit A is a suggested content of what should be included in each Interlocal Agreement.

- C. It is the desire of the Members that this JOA be incorporated into the South King County CWSP at the next update.
- D. The term "Participant" as used in this JOA shall mean all the signatories of an IA consistent with and implemented subsequent to this JOA.
- E. The term "members" as used in this JOA shall mean all the members of the SKCRWA whether they have signed this JOA or not.

3. **SUBREGIONAL SUPPLY SYSTEM AND SERVICE AREA**

- A. "Subregional System" shall mean:
- (a) that portion of the Participants' sources, interties, transmission, and storage systems required to supply water to the service area of the Participants or new facilities as defined by a separate IA.

- (b) those designated capacities within a Participant system as specifically defined in the appropriate IA.
- B. "Service Area of the Subregional System" shall mean the Participants' Designated Water Service Areas identified in the CWSP as shown on Exhibit B or as approved by amendments to the CWSP or the Participants' Comprehensive Water Plan.
- C. "Facility Ownership". Ownership of the physical facilities that exist on the date of this JOA shall remain with the individual Participants. Unless otherwise agreed to within a specific IA, ownership and operational responsibilities of new facilities shall be based generally on location in designated service areas, with capacity rights defined by appropriate IA.

4. WATER SUPPLY - CAPACITY RIGHTS

- A. Capacity Rights - Each Participant may purchase capacity in planned improvements to the Subregional System. Any changes in these capacity rights shall be recognized by an IA, approved by the appropriate affected city councils and/or water district boards.
- B. Additional JOA Participants - Other agencies may purchase capacity rights in the Subregional System with consent of the SKCRWA. Such consent shall not be unreasonably withheld. If other agencies become a JOA Participant in future projects, past costs recognized by the JOA including, but not limited to cost associated with development of this JOA, Water Rights, negotiations, and any Feasibility Studies will be assessed to the new agency..
- C. Wholesaling Water - The Participants may wholesale water through lease or otherwise, delivered through the Subregional System to areas outside of Participant's respective Service Area, so long as the other Participants' capacity rights are not negatively impacted. Members of the SKCRWA shall have right of first refusal for excess capacity which would be sold to non-members.
- D. Conservation and Curtailment. All Participants will develop and implement a conservation plan that is consistent with State guidelines and will incorporate guidance to ensure that their program is compatible with the Conservation Plan implemented by the source of supply agency. In addition, if a source of supply agency develops and implements a curtailment plan all purchasers shall develop and implement a compatible curtailment plan.
- E. Quality - An objective of the Members is to maintain the quality of the water in the Subregional System at or above the quality required by the State drinking water standards. The purchasing Participant will be responsible for ensuring water quality blending analyses and other water quality issues are resolved to their own

satisfaction. The Participants will meet periodically to ensure that water quality and operational issues are addressed, and that needed information is exchanged in a timely fashion. The written results of these meetings will be circulated in a timely manner to all members and participants and reviewed at the annual meeting.

- F. Additional Facilities - Projected needs will be identified by the Participants based on the Participant's designated service areas. As five or more years may be needed to bring major new source capacity capabilities on line, five-year and ten-year forecasts are required, and must be updated whenever a Participant becomes aware of any significant change in their forecast demand. These will be discussed jointly as they arise, and reviewed at the annual meeting.
- G. Financing - Each Project IA will include pertinent details of financing for that project. Financial participation in existing and additional facilities will be based on each Participant's projected need for each facility, as designated capacity rights.
- H. Cost of Service Charge - The Members and Participants will establish wholesale water sales charges for both emergency and long-term supply that include: (1) capital cost, (2) fixed operating cost, and (3) a variable operating cost based on quantity of water delivered based on actual costs of providing the service.

Fixed and variable operating and maintenance costs payments will be made monthly per meter and use rates. Projected annual rate adjustments and documentation shall be provided at the annual meeting. Any rate increase will be effective beginning January 1, of the following year.

- (1) The Rates and Charges for the capital, operation, and maintenance of the system shall be based on the following:
 - (a) Capital Cost - Those construction related costs incurred for Capacity Rights. Capital Costs for facilities contracted solely for a specific project (described in an IA) are allocated based on designated capacity to be purchased.

Capital costs shall include the debt service for each Participant. Such debt service shall be defined as the actual debt service on debt issued for the Participant's proportionate share of capacity rights, or if no debt is issued for the Participant's costs by the financing Participant, the amortized value at the interest rate of the most recent revenue bond issued by the financing Participant over 20 years. However, should all capital costs be paid in full by any Participant purchasing capacity rights prior to the time of the financing Participant incurring the costs, no interest charges shall be assigned to the Participant purchasing capacity rights.

Capital Costs associated with a supplying Participant's construction of their internal water system facilities may be included in the fixed and variable operating costs as appropriate, using cost of service principles, in the same manner as those costs are included in the supplying Participant's customer rate base.

- (b) Fixed Operating Cost - The cost of labor, supervision, supplies, utilities, services, taxes, insurance, and all other costs required to operate and maintain the system other than those items included under Variable Operating Cost. The operating cost will include an allocation for renewal and replacement.
- (c) Variable Operating Cost - Those costs directly proportionate to the volume of water produced, including chemicals, electric power, and other costs required to meet customer and system needs not included in (a) and (b) above.

(2) Accounting

Subregional System accounting shall be documented in accordance with generally accepted accounting practices acceptable to the Participants.

5. ADMINISTRATIVE, LEGAL AND OTHER PROVISIONS

- A. Each Participant shall designate in writing their representative responsible for coordination and implementation of the JOA and the subsequent IAs. The designated individuals will be the primary contact for all project approvals and communication and shall prepare and publish a schedule and plan to facilitate the planning, design and day-by-day operation of facilities associated with the JOA.

An Annual Meeting of the Members and Participants shall be held to review past activity and to propose efforts that may lead to further Amendments to this JOA.

- B. This JOA shall remain in full force unless terminated by mutual agreement. Any Member may request Amendment to this JOA at any time with approval subject to SKCRWA Bylaws.

IN WITNESS WHEREOF, the SKCRWA members hereto have caused this agreement to be executed by their proper Officers on the 26 day of July 1995.

By: Charles A. Booth
Title: Mayor Charles A. Booth
City of Auburn

Attest:

By: Robin Wohlhueter
Robin Wohlhueter, City Clerk

Approved As To Form:

By: Michael J. Reynolds
Michael J. Reynolds,
City Attorney

By: Sherrill A. [Signature]
Title: MAYOR
City of Black Diamond

Attest:

By: _____

Approved As To Form:

By: _____

By: Lep Hornsby
Title: Board President
Covington Water District

Attest:

By: _____

Approved As To Form:

By: _____

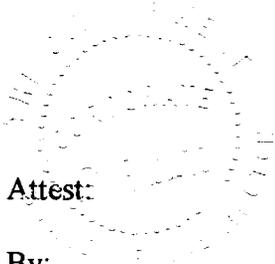
By: Jim White
Title: Mayor
City of Kent

Attest:

By: Brenda Jacober
City Clerk

Approved As To Form:

By: Heaven C. Bullock
ASS'T. CITY CLERK



By: Charles E. Linder
Title: President Board of Commissioners
King County Water District #111

Attest:

By: _____

Approved As To Form:

By: _____

By: _____
Title: _____
Date: _____

Attest:

By: _____

Approved As To Form:

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Title: _____
Date: _____

Attest:

By: _____

Approved As To Form:

By: _____

EXHIBIT A

SOUTH KING COUNTY REGIONAL WATER ASSOCIATION JOINT OPERATING AGREEMENT CHECKLIST FOR INTERLOCAL AGREEMENTS

1. Project Title

2. General

- List of Utilities to be Parties to the Interlocal Agreement (IA) and approval of appropriate city councils and/or water district boards.
- Consistency with Joint Operating Agreement (JOA).
- Description of need for project.
- Listing of potential Wholesale customers for water per Section 4.C of the JOA.
- Recognition of assessment of costs associated with development of JOA per Section 4.B of the JOA.
- Recognition South King County Regional Water Association (SKCRWA) members have right of first refusal on excess capacity per Section 4.C of the JOA.
- Recognition that capacity and water rights are available to meet the needs of the IA.

3. Description of the Project

Inclusion of a drawing (or description) which identifies all the facilities to be considered within the IA. Included within the description should be all jointly and solely owned facilities that are to be operated or paid for by a Party to the IA.

The information within the description should include the following:

- Long-term ownership of the facility
- Party responsible for long-term maintenance of the facility
- Party responsible for payment for design and construction for the facility

4. Project Costs, Financing, and Capacity Rights

- Description of all project costs and the allocation to each Party.
- Definition of Capacity rights for all facilities.

- Definition of cost sharing for long-term maintenance for each facility.
- Definition of methods of reimbursement for monies expended (if required).
- Description of any applicable latecomer fees or hook-up charges.
- Description of requirements for record keeping and monitoring of costs.
- Description of manner to finance project and to pay for purchased water including initial costs and method to adjust costs over time.

5. Project Design and Construction Management

- Definition of overall project management responsibilities.
- Definition of design and construction management responsibilities for individual facilities.
- Description of basic periodic meeting schedule for project review.

6. Conditions of Service

- Limitations to source sharing or delivery of water (if any).
- Design Criteria for full project.
- Minimum and maximum flow rates and pressures.
- Items specifically excluded from the project.

7. Term of Duration of the Agreement

Discussion of the length of time the agreement is in effect as well as the method to terminate the agreement and succeeding agencies' obligations.

8. Amendments

Methods by which the agreement could be amended.

9. Hold harmless, liability language, etc.

WATER SUPPLY AGREEMENTS

**CITY OF TACOMA
AND
SECOND SUPPLY PARTNER AGREEMENTS**

MEMORANDUM OF AGREEMENT
AMONG
THE SECOND SUPPLY PROJECT PARTICIPANTS,
THE WASHINGTON STATE DEPARTMENT OF ECOLOGY,
AND
THE WASHINGTON STATE DEPARTMENT OF HEALTH
CONCERNING
COORDINATED PLANNING AND MANAGEMENT OF WATER RESOURCES

RECITALS

WHEREAS, the Cities of Tacoma, Kent, and Seattle, the Covington Water District, and the Lakehaven Utility District (hereafter "Project Participants") have entered or intend to enter a series of agreements concerning the Second Supply Project Agreement; and

WHEREAS, said Agreement will involve diversion and use of water under Tacoma's Second Diversion Water Right, as well as additional water storage at Howard Hanson Dam, and inclusion of a branch pipeline to connect the Second Supply Pipeline to the Seattle water system; and

WHEREAS, the connection of the Project Participants' supply systems will make possible more efficient use of existing water supply sources, and provide opportunities for the development of regional water supply, water conservation, and fish enhancement programs; and

WHEREAS, the Washington State Departments of Ecology (DOE) and Health (DOH) have responsibilities for management of water resources to meet a variety of public needs, including environmental protection, and protection of public health and well-being by assurance of safe, adequate, and reliable supplies of drinking water; and

WHEREAS, all of the Parties to this agreement, which include the Project Participants and DOH and DOE, believe that coordinated planning and management of water resources will contribute to their responsibilities for meeting the future needs of both fish and people;

AGREEMENT

NOW, THEREFORE, the Parties agree as follows:

1. The Project Participants commit to coordinated management and planning of their water resources within an area that encompasses the authorized place of use of water under Tacoma's Second Diversion Water Right, as shown in the third permit extension.
2. The Project Participants agree to work with the Central Puget Sound Water Suppliers' Forum (hereafter "Forum"), or similar mechanism, to develop regional water supply and demand projections and to continue to work with the Forum's conservation work group, or similar mechanism, to develop and implement effective conservation methodologies and to establish data reporting and performance measurements.

3. The Project Participants agree to coordinate in developing their water system plans, and participate in other regional water supply planning activities in central Puget Sound.

4. The Project Participants agree to promote increased water use efficiency, including achieving a cumulative aggregate (total retail and wholesale) reduction in water use by 10% over a ten year period beginning January 1, 2000. This requires a 10% reduction in projected levels of consumption by January 1, 2011 using the year 2000 consumption rates as a basis for projections. The Project Participants' conservation program will:

- a) Be measured using accepted professional practices for conservation evaluation, including normalizing for weather, assessing large or atypical new demands, and accounting for economic and demographic changes.
- b) Be reviewed on a biennial basis by the parties to this agreement except that the utility conservation program may be reviewed more often by DOH if required under chapter 246-290 WAC.
- c) Provide verifiable evaluation results that include detailed documentation, full disclosure of data and methodology, and professional peer review.

The procedures and requirements for review and evaluation of the conservation program and the specific methodologies to be used to calculate the 10% reduction are included in Attachment A to this Agreement. Attachment A is incorporated into this Agreement by reference as if fully set forth herein.

The Project Participants will conduct a conservation potential assessment, if they have not already done so, within the boundaries of their respective planning areas, and will collaborate to identify and quantify the cost of water conservation opportunities in the aggregate area.

The Project Participants will, as necessary, amend their individual water system plans pursuant to WAC 246-290-100 to reflect these conservation activities, as supported by the conservation potential assessments, and submit the amendments to DOH. They will submit conservation plan amendments, conservation potential assessments, and consumption and use data to DOH for review as water system plan amendments. The initial amendments will be submitted to DOH prior to the first biennial review. They will also continue to report annually to DOH their source water production and use data, as required in WAC 246-290-480. The Parties agree that DOH will be the lead agency for monitoring performance pursuant to this Section 4.

As described in Section III.C of the attached Methodology, the Project Participants will submit the final report of evaluation results to DOH. After conferring with DOE, DOH will respond in writing to the Project Participants with its assessment of fulfillment of the terms of this Section 4.

During the period of this MOA and thereafter, the Project Participants remain committed to meet all water conservation obligations set forth by state statute and regulations, including any changes to those statutes and regulations.

5. The Parties to this agreement agree to work jointly to develop practical and effective local and regional alternatives to resolve identified streamflow problems resulting from water supply operations that adversely impact threatened or endangered fish. The Parties also agree to participate in a biennial review to assess and report progress in implementing specific projects and/or solutions to identified problems.

Further, the parties believe that within the place of use of the Second Supply project, potential solutions for these problems may include applying as appropriate the beneficial results of conservation and reuse programs, conjunctive use of surface and ground water, regional transmission and delivery systems, and water storage projects. The parties further agree to cooperate in identifying and addressing regulatory, financial, and other obstacles that may hinder or prevent implementation of appropriate solutions.

6. Nothing in this Agreement limits or supplants the regulatory authorities of the state agencies.

7. In the event of any dispute arising between or among Parties to this agreement concerning its implementation, the Parties agree to work together in good faith to resolve such disputes, using the dispute resolution procedures set forth in this section, or such other procedures upon which the parties may later agree

a) Any Party wishing to resolve a dispute under this Agreement shall notify the other Parties by setting forth its position in writing, including a specific description of the situation it wishes to address, the reasons why it believes certain actions or conditions constitute a violation of the Agreement (if that is the contention), and the actions it wishes a Party or Parties to take. The state agencies shall meet and confer with each other before either agency initiates dispute resolution.

b) The Party or Parties from whom action is requested will have 60 calendar days, or such other time as may be agreed, to respond. During this time the Party or Parties responding may seek clarification of the information provided in the initial notice. The initiating Party will use its best efforts to provide responsive information.

c) Within 60 calendar days after a response is provided or was due from the responding Party or Parties, whichever occurs first, representatives of the Parties having authority to resolve the dispute will meet and negotiate in good faith toward a solution satisfactory to all Parties, or will establish a specific process and timetable to seek such a solution.

d) If any issues cannot be resolved through such negotiations, the Parties will consider non-binding mediation or other alternative dispute resolution processes and, if a dispute resolution process is agreed upon, will make good faith efforts to resolve all remaining issues through that process. In the event that mediation is pursued, the mediator shall be selected by the Parties within 30 calendar days of the Parties' agreement to pursue mediation, and the process concluded within an additional 60 calendar days, unless the Parties otherwise agree. Costs shall be shared equally by all Parties to the dispute.

e) Any Party to this agreement may enforce its provisions by initiating an action for arbitration pursuant to chapter 7.04 RCW. No such action may be initiated until the party has exhausted the informal dispute resolution procedures of a) through d) above. The parties to the dispute agree to share equally the cost of the arbitrator(s). Regulatory compliance and enforcement matters that may arise between the Project Participants and the state agencies are not part of this Agreement and are not subject to and shall not be submitted to arbitration.

8. This MOA shall take effect on the effective date of the third permit extension to Tacoma's Second Diversion Water Right. Performance of the Parties relative to Sections 1 through 5 shall remain in effect until January 1, 2011 except that the Project Participants reporting requirement will remain in effect pursuant to Appendix A. Before or after the close of the reporting period described in Appendix A, III.C, DOH will evaluate performance regarding fulfillment of the terms of Section 4 of the MOA and provide a letter to the Project Participants indicating either satisfactory or unsatisfactory results. In the event DOH finds results to be unsatisfactory, dispute resolution procedures may be initiated by DOH or the Parties may agree upon appropriate measures to be taken by the Project Participants to address the deficiencies identified. The MOA may be amended or reviewed by written agreement of all of the Parties.

This Memorandum of Agreement executed by the following parties on October 24th, 2001:

City of Tacoma

By: Mark Jensen

Approved as to form:

By: Mark Blank

Covington Water District

By: Judith Nelson

Approved as to form.

By: John Coy

City of Kent

By: Jim Kato

Approved as to form:

By: [Signature]

Lakehaven Utility District

By: Donald P. Miller

Approved as to form:

By: Steve H. [Signature]

City of Seattle

By: Paul [Signature]

Approved as to form:

By: Kevin [Signature]

Washington State Department of Health

By: Dyc. Schief

Approved as to form:

By: [Signature]

Washington State Department of Ecology

By: [Signature]

Approved as to form:

By: _____

**ATTACHMENT A TO
MEMORANDUM OF AGREEMENT AMONG THE
SECOND SUPPLY PROJECT PARTICIPANTS,
THE WASHINGTON STATE DEPARTMENT OF ECOLOGY, AND
THE WASHINGTON STATE DEPARTMENT OF HEALTH
CONCERNING COORDINATED PLANNING AND MANAGEMENT
OF WATER RESOURCES**

**Procedures, Requirements, and Methodology for Demonstrating Compliance with
Water-Use Efficiency Provision**

As part of the discussions with respect to Tacoma's Second Supply Project (SSP), the Cities of Tacoma, Kent and Seattle, Covington Water District, Lakehaven Utility District ("Project Participants"), and the Washington State Departments of Ecology and Health entered into a Memorandum of Agreement ¹ (MOA) with regard to planning and management of water resources. Section 4 of the MOA addresses increased water use efficiency and achievement of "a cumulative aggregate (total retail and wholesale) reduction in water use by 10% over a ten year period beginning January 1, 2000."

This document sets forth the procedures and requirements for review and evaluation of the conservation program and the specific methodologies to be used to calculate the 10% reduction. It is an attachment to and an integral part of the MOA. This document was developed collaboratively through a series of discussions among the MOA parties during April – June 2001. Attachment 1 to this document lists the individuals who participated in these discussions.

I. General Assumptions

In the course of developing this document, the following general assumptions were identified. These assumptions shall be used to guide the analysis ultimately carried out to document the 10% reduction in water use.

- A. The 10% reduction is understood to apply to the five partners' "cumulative, aggregate" water use. Cumulative, aggregate water use is understood to mean total water use by all five Project Participants together, and is the sum of their total system uses, including all retail billed sales, wholesale billed sales, and non-revenue uses or losses. The combined water production of the five partners may provide a convenient measure of cumulative, aggregate water use.

¹ "Memorandum of Agreement Among the Second Supply Project Participants, the Washington State Department of Ecology, and the Washington State Department of Health Concerning Coordinated Planning and Management of Water Resources"

- B. The Project Participants may use the simplest, lowest-cost method necessary to demonstrate achievement of the 10% cumulative aggregate reduction in water use, so long as that method is consistent with accepted professional practices.
- C. Because conditions may change in unforeseen ways between the time this methodology was developed and the year 2010, it is reasonable and desirable to permit flexibility in the methodology ultimately used to demonstrate achievement of the 10% reduction. Therefore, this document identifies various options in the evaluation methodology. Any one of the options identified (see below) will be deemed acceptable in demonstrating achievement of the 10% reduction, so long as it conforms with accepted practices and incorporates the major influences on water use in the Project Participants' service areas. At the time the evaluation is performed, the Project Participants may select the desired option, based on service area conditions and changes, availability of data to perform the measurement, and cost-effectiveness of collecting and analyzing data under the various options listed. It is noted that Peer Review will be used to validate the methodology, unless this requirement is waived under Section III.B.
- D. The parties to the MOA recognize that in some cases changes in water use by individual customers that purchase large quantities of water may have a disproportionate effect on the measures of overall water-use efficiency (e.g. water use per capita, or water use per employee). These large changes in water use may be caused by events such as a service to a new customer with high water use; discontinuation of service to an existing customer; an increase or decrease in production by an existing customer, with a concomitant change in water use; or a change in production methods or equipment within a customer's facility. Changes in water use associated with individual, large customers may be relevant to water-use efficiency, or may be unrelated to water-use efficiency. Because of the potential impact associated with such changes, and because each large customer has unique attributes, water use data on large-water using accounts (e.g. those using 100,000 gallons per day or more) will be separated from the rest of the water use data used in this methodology (see further discussion below).
- E. It is recognized that statutes, rules, codes, ordinances and guidelines established by the federal government, Washington State, and/or local jurisdictions may contribute towards reductions in water use. For example, both the 1992 Washington State and the 1993 Federal Plumbing Codes contain efficiency standards for certain types of plumbing equipment. Any water savings attributable to such statutes, codes, etc. may be included in the cumulative, aggregate savings in water use discussed by this document.
- F. It is recognized that the 10% reduction refers to decreased water use resulting from improved water-use efficiency.

- G. The Project Participants will work together to produce a single analysis and a single report documenting the reduction in cumulative, aggregate water use. It is acknowledged that the data collected by each Project Participant may vary due to the nature of the water systems involved and the billing systems used. The analysis will document significant differences in the data collected for the five Project Participants, to the extent such differences may have an impact on the results of the evaluation.
- H. Nothing in this document or the remainder of the MOA establishes the methodology or decisions that DOH or Ecology must use or make in determining appropriate conservation activities for future review of water system plans or water right decisions.

II. Evaluation Methodology

A. Time Period for Measuring Results

The parties to the MOA concur that reductions in summer season water use are the most important aspect of regional water conservation programs, both in terms of managing water production and delivery systems and in terms of potential environmental benefits. Therefore, for the purposes of demonstrating the 10% reduction, "cumulative, aggregate water use" will be measured in terms of seasonal, average day water use, computed for the 4-5 month peak season from late spring through early fall. The parties to the MOA concur that achieving a 10% reduction in summer season water use will serve the overall purposes of the MOA. While 10% savings may also be achieved in year-round, average day water use, this is not required to satisfy the terms of the MOA. However, the year-round, average day water use in years 2000 and 2010 will be calculated and reported for informational purposes.

In accordance with Section 4 of the MOA, the only responsibility defined for the Project Participants after the term of this MOA is that they "remain committed to meet all obligations set forth by State statute and regulations."

B. Normalizing for Growth

It is anticipated that the service areas of the five Project Participants will experience considerable growth in population and related demographic variables from year 2000 to 2010. Therefore, the measure of water use to be used in calculating the 10% reduction will be normalized for growth. Normalization may be performed by measuring overall water use per capita; or water use in different customer categories per capita, per household, per employee, per dollar of economic production, etc. If these measures are calculated by the Project Participants in performing the evaluation, they will be included in the report.

C. Changes in Use by Large Water-using Customers

Significant changes in water use associated with individual large customers may occur during the 2000 – 2010 time period. For purposes of this evaluation, such customers are defined as those using 100,000 gallons per day or more at a single location or facility (whether served by one service connection or multiple service connections). Such changes in water use (increases or decreases) may occur due to initiation of new service to an individual customer; discontinuation of service to an individual customer; changes in the level of production by an individual industrial customer; changes in production methods and equipment; specific water-use efficiency initiatives; or other factors. Depending on the circumstances, such changes may count towards the 10% reduction in water use by the Project Participants, or may be considered a separate event that is unrelated to achievement of the 10% reduction. Therefore, water use data associated with large water-using customers will be provided separately from the remaining water use data provided for biennial and final reviews. Changes in water use by these customers during the 2000 – 2010 time period will be evaluated on a case-by-case basis to determine their impact on achieving the 10% reduction in water use.

D. Statistics to be Reported

In order to verify conservation savings, the Project Participants will employ and report certain statistics for year 2000 and for year 2010. Generally, each statistic will be reported as an aggregate value for all five systems together. However, in some cases, the nature and availability of the data may require reporting statistics separately by utility.

The statistics to be used and reported will depend to some extent on the final choice of method (see Computational Methods, below). However, regardless of which method is selected, the following statistics will be reported to document and facilitate understanding of the results:

- Total water use
- Total population
- Per-capita water use (total use divided by population)
- Total Residential water use
 - Single-family residential water use
 - Multi-family residential water use
- Total non-residential water use
 - Total Commercial water use
 - Total Industrial water use
 - Total Government water use
- Water use by individual large customers (defined herein as customers using at least 100,000 gallons per day at a single facility, on an average annual basis. In some cases, this may involve reporting total consumption measured by multiple meters serving a single facility)
- Total non-revenue water (water that is produced but not included in metered sales)

- A breakdown of non-revenue water into “accounted-for” and “unaccounted-for” categories (it is recognized that these categories will require estimation, since they are generally not directly measurable).

The additional statistics listed below will be reported, only if they are used in the calculation of the 10% savings:

- Total number of households served
- Number of single-family and multi-family households served
- Average residential water use per household
- Average water use per single-family household
- Average water use per multi-family household
- Total number of non-residential accounts
- In the non-residential category, average water use per employee or per capita (if per capita, the non-residential water use will be divided by the residential population)
- Changes in the nature of non-residential accounts that have significant effects on non-residential water use.
- Percent non-revenue water, expressed as a percentage of total system water use (i.e. [non-revenue] divided by [retail plus wholesale plus non-revenue]).

Where significant and necessary to understand the analysis performed, a narrative description will be provided of differences among the five Project Participants regarding the way these statistics are defined or calculated (e.g. differences in how single-family and multifamily customer categories are defined with respect to duplexes, mobile home parks, group housing, etc., if significant to understanding the analysis and results).

The demographic information will be derived from U.S. Census data, and/or an accepted source that processes Census Data for regional applications (e.g. the Puget Sound Regional Council). It is desirable that information derived from year 2010 Census data be included. However, in the event such information is not available in a timely fashion, other generally accepted sources may be used (e.g. data or projections produced by the State of Washington, or documented in approved water system plans of the Project Participants, etc.) so long as the information used reflects conditions in year 2010. Demographic data will be processed as needed to cover the respective retail and wholesale service areas of the five Project Participants, using an accepted professional methodology.

Following the effective date of the MOA, the Project Participants will work together to collect the applicable data and statistics for year 2000. The Project Participants will store this information in a format and location that ensures it will be readily available when the evaluation is performed (i.e. after year 2010).

E. Factors Affecting Water Use

Water use is affected by a number of factors. With regard to the retail and wholesale service areas of the five Project Participants, some of these are under the direct control of the Project Participants, while others are not. The following set of factors will be addressed explicitly in the analysis. For each factor, the Project Participants will determine whether they believe the factor has a significant impact on achievement of the 10% reduction, and whether analysis is feasible and relevant given available data and the evaluation method selected for the analysis. Each factor deemed both significant and feasible/relevant will be included in the analysis. Evaluation of the significance and appropriateness of each factor and a description of how they were used in adjusting water use values will be included in the report. If a factor is deemed significant but not feasible or relevant, then the Project Participants will explain why this is so, and will provide a narrative describing the effects of that factor in qualitative terms.

Factors Affecting Water Use:

- Weather conditions;
- Population and employment (or related demographic factors);
- Large new residential loads (such as Master Planned Developments)
- Changes in use by large customers (e.g. those with average daily consumption of 100,000 gallons or more);
- Large changes in the nature of non-residential water use, including large new customer loads
- Water rates (e.g. weighted average of rates paid by a "typical" household or business)
- System practices (e.g. main flushing, reservoir management, etc. for water quality or system operation requirements; significant repairs and replacement of mains or transmission lines, other infrastructure impacts, etc.)

The Project Participants may also address additional factors not on this list, if the Project Participants believe they have a significant impact on achievement of the 10% reduction. If additional factors are included, the Project Participants shall clearly define them and explain why they are appropriate for this evaluation.

If the results of the evaluation show that water use was not reduced by 10%, and if the Project Participants believe that factors outside their control precluded achievement of the 10% reduction, they shall provide a detailed explanation of these factors, and how they affected water use during the time period reviewed. If Ecology and Health concur with this explanation, an allowance may be made for these factors, taking into account the level of water savings actually achieved, and the good faith efforts of the Project Participants in implementing conservation efforts, including the scope and magnitude of conservation programs.

F. Computational Methods

It is generally understood that the Project Participants will use the simplest and most cost-effective methodology possible to verify the savings achieved and meet standards of accepted professional methods. The Project Participants may use any one of the following approaches. Regardless of the methodology used, the Project Participants will provide statistics adequate to illustrate the savings achieved, and will address the factors described above as necessary to compute savings. In addition, the results of Method 1 will be reported, regardless of which method is used to document achievement of the 10% reduction.

Method 1: Simple comparison of water use per capita. If this method is selected, the Project Participants will compare total, aggregate water use per capita in year 2000 with that in year 2010 and document the percent change. Supporting documentation will be provided with regard to the data used and factors employed in the methodology.

Method 2: Comparison of *actual* water use in year 2010, with projected water use in 2010 assuming no conservation efforts and other significant factors. The approach will estimate what consumption *would have been* in the absence of conservation efforts. If Method 2 is selected, the adjustment will be based on simple mathematical techniques, rather than detailed statistical methods. Supporting documentation will be provided with regard to the data used, factors employed in the methodology (see "Factors Affecting Water Use," above), and calculations.

Under Method 2, if *A* represents actual use, and *E* represents the estimate of what consumption would have been, the percent reduction in water use will be calculated as follows:

$$\text{Reduction} = (E-A)/E$$

Method 3: The same as Method 2 except that if Method 3 is selected, statistical techniques such as regression analysis may be used to estimate what consumption would have been.

III. Procedures Related to the Evaluation

- A. The evaluation will include detailed documentation, disclosure of data and methodology, and will utilize accepted professional practices prevailing at the time the evaluation is performed. The Project Participants will provide citations from the professional literature, State-approved Water System Plans, and/or similar sources to document that the methodology conforms with accepted practices.
- B. A peer review of the evaluation methodology will be performed, unless this requirement is waived by all of the parties to the MOA. Peer review may be

conducted by either a single reviewer or a panel of up to three reviewers. All of the parties to the MOA must agree on the peer reviewer or peer review panel selected for this activity. If conducted, the peer review will address the technical aspects of the evaluation, comprising the following points:

- Whether the technique applied conforms with accepted professional practices, given the nature of this evaluation and the premises set forth in this document;
- Whether the data used is appropriate to support the technique applied;
- Whether appropriate documentation of methods and data was provided;
- Whether the factors considered are appropriate and complete;
- Whether the computations were carried out correctly; and
- Whether the conclusions reached are valid and supported by the analysis and data presented.

The peer reviewer or review panel will submit a written report of their findings to all parties to the MOA.

- C. The evaluation will be performed retrospectively, when applicable data for year 2010 becomes available. The Project Participants will complete the evaluation expeditiously and deliver a single report documenting findings to DOH no later than December 31, 2012 (this amount of time may be necessary to allow for 2010 Census data to be used). Within 120 days of receipt of the evaluation report, DOH, after consultation with Ecology, will provide a letter either confirming that the evaluation is satisfactory and terms of Section 4 of the MOA have been met, or indicating otherwise and describing any deficiencies. However, in the event a peer review process is conducted, the 120-day time period will be extended to a time period agreed to by the Parties.
- D. The individual Project Participants will perform the analysis of their respective systems at their own cost and will cooperate to compile the information into a single report. If outside resources are needed to compile the report, the costs will be shared equitably among the Project Participants, proportional to their respective percentage of cumulative, aggregate water use. If a peer review process is utilized, 50% of the associated costs shall be borne by DOH and Ecology together, subject to availability of funding; and 50% of the associated costs shall be borne by the five Project Participants together.
- E. In the event of any dispute arising between or among the parties to the MOA regarding implementation or completion of Section 4, the dispute resolution provisions contained in Section 7 of the MOA shall apply.

Attachment 1
Participants in Development of Methodology for Demonstrating Compliance
with Water-use Efficiency Provision

Name	Organization
Robyn Bartelt	City of Kent
John Bowman	Lakehaven Utility District
David Brock	City of Kent
Lynn Coleman	Washington State Department of Ecology
Jane Evancho	Tacoma Water
Andrew Graham	EES, representing Covington Water District
John Kirner	Tacoma Water
Judy Nelson	Covington Water District
Don Perry	Lakehaven Utility District
Jim Rioux	Washington State Department of Health
Tim Skeel	Seattle Public Utilities
Anna Thurston	Tacoma Water
Don Wickstrom	City of Kent

KING COUNTY FRANCHISE No. 13083

**(To Operate, Maintain, Repair, and Construct Water Mains
within County Roads)**

April 20, 1998

13083

FRANCHISE NO. 13083

In the matter of the application for a franchise to operate, maintain, repair, and construct water mains and service lines, and appurtenances in, over, along, and under County roads and rights-of-way in King County, Washington.

The application of the City of Kent for a franchise to operate, maintain, repair and construct water mains and service lines, and appurtenances in, over, along, and under County roads and rights-of-way located within the area described in attached Exhibit "A" has been heard on this 20th day of APRIL, 1998. All of the property described in Exhibit "A" lies outside the limits of any incorporated Town or City.

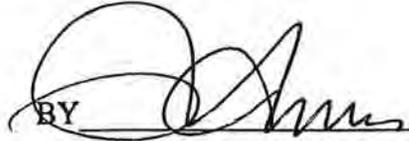
Legal notice of the franchise application and of the hearing has been given as is required by law.

The King County Council, having considered the interests proposed and advanced, and finding that the granting of this franchise is in the public interest, ORDERS that a franchise be granted to the City of Kent, the Grantee, subject to the conditions set forth in Exhibit "B" attached hereto, this franchise and Ordinance No. 13083. This franchise grants the right, privilege, authority and franchise to operate, maintain, repair and construct mains and service lines and appurtenances as a part of its distribution system in, over, along, and under County roads and rights-of-way located within the area described in Exhibit "A".

This franchise is granted subject to all of the terms and conditions contained herein, within Ordinance No. 13083 and Exhibit "B", and shall expire in twenty-five years on 4/20, 2023

Dated this 1 day of May, 1998

KING COUNTY, WASHINGTON

BY 

TITLE King County Executive

The undersigned accepts all the rights, privileges, and duties of this franchise subject to all terms, conditions, stipulations, and obligations contained herein, within Ordinance 13083 and Exhibit "B".

CITY OF KENT
GRANTEE

BY 

TITLE SENIOR DESIGN ENGINEER

Dated this 5TH day of JUNE, 1998.

Exhibit "A"AREA 1 (SEE MAP # 1)

Those portions of Sections 23, 26, 27, Township 22 North, Range 4 East, W.M., lying westerly, southerly, easterly and northerly of Kent city limits, AND that portion of the Northeast quarter of Section 35, Township 22 North, Range 4 East, W.M. lying north of the center line of South 277th Street, EXCEPT that portion lying within Kent city limits.

AREA 2 (SEE Map # 1)

That portion of Section 25, Township 22 North, Range 4 East, W.M. lying between the Green River and the Kent city limits.

AREA 3 (SEE MAP # 2)

Those portions of Sections 31, 32, 33, Township 22 North, Range 5 East, W.M., lying easterly of the center of the Green River, lying southerly, easterly, westerly and northerly of the existing Kent city limits and lying westerly and northerly of the following described line. Beginning at the intersection of the center of the Green River with the south line of said Section 32 being the beginning of line herein described; Thence east along the south line of said Section 32 and east along the south line of said Section 33 to the north/south center line of said Section 33; Thence north along said center line to a point 30 feet south of the south line of the north half of the north half of the south half of said Section 33, being the terminus of the line herein described.

AREA 4 (SEE MAP # 3)

Portion of Section 16, Township 22 North, Range 5 East, W.M., lying northerly and easterly of the Kent city limits and lying southerly, westerly and northerly of the following described line. Beginning at a point on the south right-of-way margin of S E 240th Street lying 180 feet west of the intersection of said south right-of-way margin and the north/south center line of Section 21, Township 22 North, Range 5 East, W.M. being the beginning of the line herein described; Thence north to the southwest corner of the east 180 feet of the southwest quarter of the southwest quarter of said Section 16; Thence north along the west line of the east 180 feet of the southwest quarter of the southwest quarter of said Section 16 to a point on the north line of said southwest quarter of southwest quarter; Thence west along the north line of the southwest quarter of the southwest quarter of said Section 16 to the southeast corner of the west half of the northwest quarter of the southwest quarter of said Section 16; Thence north along the east line thereof to a point on the south line of the northwest quarter of said Section 16; Thence west along the south line thereof to the east right-of-way margin of 116th Avenue S E; Thence north along the said east margin of the northwest corner of Lot 41 Terra Heights, Volume 125 page 7 through 9; Thence east along the north line thereof to northeast corner of Lot 31 in said Terra Heights; Thence east along the north line of said Terra Heights to a point 530.50 feet west of the east line of the southwest quarter of the northwest quarter in said Section 16; Thence north parallel with said east line to a point on the south line of the plat of Hunter Run Too in Volume 151, page 54 through 56; Thence west along the south line thereof to the southwest corner of Tract "A" in said Hunter Run Too; Thence north

along the east right-of-way margin of 116th Avenue S E to the intersection with the center of S E 228th Place; Thence west along said centerline to the west line of northwest quarter of said Section 16 being the terminus of the line herein described.

AREA 5 (SEE MAP # 3)

Portion of Section 17, Township 22 North, Range 5 East, W.M. lying northerly, westerly, easterly of the Kent city limits and lying southerly and westerly of the following described line. Beginning at the southwest corner of the northeast quarter of the northeast quarter of said Section 17; Thence north along the east line of the northwest quarter of the northeast quarter of said Section 17 to the northeast corner of the south one half of the northwest quarter of the northeast quarter of said Section 17; Thence west along the north line thereof a distance of approximately 1280.54' to the east line of the northwest quarter of said Section 17; Thence north along the east line of the northwest quarter of said Section 17 to the northeast corner thereof; Thence west along the north line of said Section 17 to the intersection of S E 224th Street and Benson Road (aka SSH Number 5-C); Thence in a southwesterly direction along the center line of said Benson Road to a point of intersection with the south line of the northeast quarter of the northwest quarter of the northwest quarter of said Section 17 produced east; Thence west along said easterly produced south line to the westerly right-of-way margin of said Benson Road being the terminus of the line described herein.

AREA 6 (SEE MAP # 3)

Portion of Section 17, Township 22 North, Range 5 East, W.M. lying northerly and easterly of the Kent city limits and lying southerly and westerly of the following described line beginning at the southeast corner of the northwest quarter of the northwest quarter of said Section 17; Thence north along the east line of the south one half of the northwest quarter of the northwest quarter of the northwest quarter of said Section 17 a distance of 330.77 feet to the northeast corner thereof; Thence west along the south line of the north one half of the northwest quarter of the northwest quarter of the northwest quarter of said Section 17 to the easterly right-of-way margin of 100th Avenue S E being the terminus of the line herein described.

AREA 7 (SEE MAP # 1)

Those portions of Sections 25, 36, Township 22 North, Range 4 East, Section 30, Township 22 North, Range 5 East, and Section 31, Township 23 North, Range 5 East, W.M. and including therein all Land Donation Claims and all recorded plats described as follows:

Beginning at a point on the left bank of the Green River and the north line of the George E. King Donation Claim Number 40 being the TRUE POINT OF BEGINNING of property herein described; Thence heading downstream along said left bank of said river to a point on the east right-of-way line of the Chicago-Milwaukee-St. Paul and Pacific Railroad right-of-way; Thence southerly along the east line thereof to a point on the south right-of-way margin of South 277th Street; Thence easterly along the south line thereof to a point on the east line of the Northern Pacific Railroad right-of-way and the Burlington Northern Railroad right-of-way; Thence north along the east line thereof to a point on the north margin of said street; Thence east along the north margin thereof to a point on the east line of the R. H. Beatty Donation Claim Numbers 37 and 44; Thence south along the east thereof to the southeast corner of said Beatty Donation Claim which point is also the northwest corner of the said King Donation Claim; Thence east along the north line thereof to the TRUE POINT OF BEGINNING.

EXHIBIT "B"
TERMS AND CONDITIONS APPLICABLE TO UTILITIES
FRANCHISES GRANTED BY KING COUNTY

THIS FRANCHISE is subject to the following terms and conditions:

1. DEFINITIONS

References to any County official or office also refers to any office that succeeds to any or all of the responsibilities of the named office or official. References to laws or "applicable laws" include federal, state, and local laws and regulations adopted pursuant to those laws; unless otherwise stated, references to laws include laws now in effect, as the same may be amended from time to time during the operation of this franchise. In addition, the following definitions shall apply:

Cable Services. The term "Cable Services" is used as defined in 47 United States Code 522 (5), as amended.

Cable System. The term "Cable System" is used as defined in 47 United States Code 522 (6), and King County Code 6.a.010 (J) as amended.

County Road Rights-of-Way. The term "County Road Rights-of-Way" includes any road, street, avenue, or alley located within the area described in the attached Exhibit "A", it does not include recreational or nature trails except where the trails intersect or are within roads, streets, avenues or alleys.

Director. The term "Director" refers to the chief executive of the King County Department of Transportation.

Grantee. The term "Grantee" refers to the CITY OF KENT its successors and those assignees approved pursuant to paragraph 16 herein.

Utility. The term "utility" refers either to the Grantee or, depending on the context, to any other person, firm, or corporation, public or private, which may hold a franchise to maintain and operate similar facilities in, under, over, across, and along any of the County property described in Exhibit "A".

Council. The term "Council" refers to the King County Council, acting in its official capacity.

Other Governing Body. The term "Other Governing Body" refers to any public official or other public board or body as may have the power and jurisdiction to permit or regulate the installation and maintenance of utilities and other facilities in, under, over, across, and along any of the county property described in Exhibit "A".

2. ACCEPTANCE BY GRANTEEES OF TERMS AND CONDITIONS

The full acceptance of this franchise and all of its terms and conditions shall be filed with the Clerk of the Council within thirty (30) days from _____, 19____, by the Grantee. Full acceptance of this franchise is a condition precedent to its taking effect, and unless this franchise is accepted within the time specified, this grant will be null and void and have no force or effect.

3. NON-EXCLUSIVE FRANCHISE

This franchise is not exclusive. It does not prohibit King County from granting franchises for other public or private utilities, in, under, over, across, and along any County property, including County road rights-of-way.

This franchise does not prevent or prohibit King County from constructing, altering, maintaining or using any County road rights-of-way covered by this franchise. King County retains full power to make all changes, relocations, repair, maintenance, etc. as it may deem fit.

4. JURISDICTION

This franchise is intended to convey limited rights and interest only as to those roads and rights-of-way in which King County has an actual interest. It is not a warranty of title or of interest in County road rights-of-way.

Whenever any of the County road rights-of-way as designated in this franchise, by reason of the subsequent incorporation of any Town or City or extension of the limits of any Town or City, shall later fall within the City or Town limits, this franchise shall continue in force and effect until such time as the incorporation and/or annexation is complete according to applicable State law, after which time the County will no longer have any responsibility for maintenance of any County roads, rights-of-way or other County property within the area of annexation/incorporation.

None of the rights granted to the Grantee shall affect the jurisdiction of King County over County road rights-of-way or the County's power to perform work upon its roadways, rights-of-way or appurtenant drainage facilities including by constructing, altering, renewing, paving, widening, grading, blasting or excavating.

All of the rights herein granted shall be subject to and governed by this franchise; provided, however, that nothing in this franchise may be construed in any way as limiting King County's rights to adopt ordinances which are necessary to protect the health, safety and welfare of the general public.

5. REGULATION OF USE AND CONTROL

This franchise does not deprive King County of any powers, rights, or privileges it now has or may later acquire in the future to regulate the use of and to control the County road rights-of-way covered by this franchise.

This franchise authorizes the use of County rights-of-way solely for the delivery by the Grantee of water to it customers. Additional uses of County rights-of-way by the Grantee, including for cable

communication services, shall first require a separate franchise from King County which conforms to the requirements of K.C.C. 6.27 as amended, or K.C.C. 6.27A as amended, and other applicable law.

Any use of the Grantee's equipment or facilities in County rights-of-way by others, including for telecommunication or cable communication services, is prohibited unless separately authorized and approved in writing by King County. The Grantee agrees that prior to authorizing any person to use the Grantee's equipment or facilities located in County rights-of-way, the Grantee will require the user to provide the Grantee with an affidavit that it has obtained the necessary franchise or other approval from the County to operate and provide the proposed service in County rights-of-way. At least thirty (30) day prior to executing any agreement with a potential user for the use of the Grantee's equipment or facilities, the Grantee shall fax the affidavit to the King County Office of Cable Communication at 206-296-0842.

6. EMINENT DOMAIN

This franchise and the limited rights and interests for the operation, maintenance, repair, and construction of Grantee's transmission and service lines and appurtenances are subject to the exercise of eminent domain. In the event of an exercise of eminent domain by King County, the value to be attributed to all the rights and interests granted under this franchise shall not exceed the actual amount the Grantee paid to King County in obtaining this franchise.

7. ENFORCEMENT

Failure of King County, on one or more occasions to exercise a right or to require compliance or performance under this franchise or any applicable law, shall not be deemed to constitute a waiver of such right or a waiver of compliance or performance, unless such right has been specifically waived in writing. Failure of King County to enforce or exercise its rights under any provision of this franchise or applicable law does not constitute a waiver of its rights to enforce or exercise a right in any other provision of this franchise or applicable law.

8. INDEMNITY AND HOLD HARMLESS

The Grantee agrees to indemnify and hold harmless King County as provided herein to the maximum extent possible under law. Accordingly, the Grantee agrees for itself, its successors, and assigns to defend, indemnify and hold harmless King County, its appointed and elected officials, and employees from and against liability for all claims, demands, suits, and judgments, including costs of defense thereof, for injury to persons, death, or property damage which is caused by, arises out of, or is incidental to Grantee's exercise of rights and privileges granted by this franchise. The Grantee's obligations under this section shall include:

- (a) Indemnification for such claims whether or not they arise from the sole negligence of the Grantee, the concurrent negligence of both parties, or the negligence of one or more third parties.
- (b) The duty to promptly accept tender of defense and provide defense to the County at the Grantee's own expense.
- (c) Indemnification of claims made by the Grantee's own employees or agents.

- (d) Waiver of the Grantee's immunity under the industrial insurance provisions of Title 51 RCW, which waiver has been mutually negotiated by the parties.

In the event it is necessary for the County to incur attorney's fees, legal expenses, or other costs to enforce the provisions of this section, all such fees, expenses and costs shall be recoverable from the Grantee.

In the event it is determined that RCW 4.24.115 applies to this franchise agreement, the Grantee agrees to defend, hold harmless and indemnify King County to the maximum extent permitted thereunder, and specifically for its negligence concurrent with that of King County to the full extent of Grantee's negligence. Grantee agrees to defend, indemnify and hold harmless the County for claims by Grantee's employees and agrees to waiver of its immunity under Title 51 RCW, which waiver has been mutually negotiated by the parties.

King County shall give the Grantee timely written notice of the making of any claim or of the commencement of any such action, suit, or other proceeding covered by the indemnity in this section. In the event any such claim arises, the County or any other indemnified party shall tender the defense thereof to the Grantee and the Grantee shall have the duty to defend, settle, or compromise any claims arising hereunder and the County shall cooperate fully therein.

Notwithstanding the above, the County shall have no obligation to tender a defense as a condition of the indemnity where there is a material conflict between the interests of the Grantee and King County.

9. VACATION

If at any time King County vacates any County road rights-of-way covered by this franchise, King County will not be held liable for any damages or loss to the Grantee by reason of such vacation. King County may, after giving thirty (30) days written notice to the Grantee, terminate this franchise with respect to any County road rights-of-way vacated.

10. REPAIR, REMOVAL OR RELOCATION

The Grantee hereby covenants, at its own expense, to repair, remove, or relocate existing facilities including all appurtenant facilities and service lines connecting its system to users, within King County road rights-of-way if such repair, removal, or relocation is required by King County for any County road purpose. Such repair, removal, or relocation shall not be unreasonably required.

The grantee shall, at no expense to the County, adjust, remove or relocate existing facilities within County road rights-of-way, including all appurtenant facilities and service lines connecting its system to users, if the County determines such adjustment, removal or relocation is reasonably necessary to allow for an improvement or alteration planned by the County in such road right-of-way. The County shall give the Grantee written notice of such requirement as soon as practicable, at the beginning of the pre-design stage for projects that are part of the County's capital improvement program, including such available information as is reasonably necessary for the Grantee to plan for such adjustment, removal or relocation.

For projects that are a part of the County's capital improvement program, in addition to any other

notice given to the Grantee, the County shall provide a vertical and horizontal profile of the roadway and drainage facilities within it, both existing and as proposed by the County, and the proposed construction schedule; notwithstanding any permit conditions that may later be applied to the County project, this initial design information shall be given at least 180 days before construction is scheduled to begin, except in cases of urgent construction or emergencies. The Grantee shall respond to this notice, and to any later notices of revised designs based on permit conditions, within no more than thirty (30) days by providing to the County the best available information as to the location of all of the Grantee's facilities, including all appurtenant facilities and service lines connecting its system to users and all facilities that it has abandoned, within the area proposed for the public works project.

The County shall offer the Grantee the opportunity to participate in the preparation of bid documents for the selection of a contractor to perform the public works project as well as all required adjustments, removals or relocations of the Grantee's facilities. Such bid documents shall provide for an appropriate cost allocation between the parties. The County shall have sole authority to choose the contractor to perform such work. The Grantee and the County may negotiate an agreement for the Grantee to pay the County for its allocation of costs, but neither party shall be bound to enter into such an agreement. Under such an agreement, in addition to the Grantee's allocation of contractor costs, the Grantee shall reimburse the County for cost, such as for inspections or soils testing, related to the Grantee's work and reasonably incurred by the County in the administration of such joint construction contracts. Such costs shall be calculated as the direct salary cost of the time of County professional and technical personnel spent productively engaged in such work, plus overhead costs at the standard rate charged by the County on other similar projects, including joint projects with other County agencies.

11. REQUIREMENT OF CONSTRUCTION PERMITS

The Grantee, its successors or assigns, has the right, privilege, and authority to enter the County road rights-of-way for the purpose of operating, maintaining, repairing or construction its transmission and service lines and appurtenances on the condition that it obtains permits approved by the Director and Property Services Division and, when applicable, by the Department of Development and Environmental Services. Applications for work permits shall be presented to the Property Services Division which may require copies of plans, blueprints, cross-sections, or further detailing of work to be done. In the event of an emergency, the Grantee may immediately commence the necessary work and shall apply the next business day for the work permit. Any work done, whether by Grantee, its contractors, or third parties will include necessary paving, patching, grading and any other reasonably necessary repair or restoration to the County road rights-of-way. All work shall be done to the satisfaction of the Director.

All equipment, lines and appurtenances which are used in the operation, maintenance, repair or construction of the Grantee's service and which are located within the County road rights-of-way shall be considered to be part of the Grantee's system and shall be the responsibility of the Grantee.

All permits for the operation, maintenance, repair or construction of said system shall be applied for and given in the name of the Grantee, who will be responsible for all work done under the permit. The Grantee remains responsible whether the work is done by the Grantee, its contractors, or by third parties.

The Grantee shall, at no expense to the County, assume the following obligations with respect to the facilities connected to its system that are within County road rights-of-way and which it does

not own, including appurtenant facilities and service lines connecting its system to users:

- (a) The Grantee shall apply for, upon request and on behalf of the owner of the facilities, a County right-of-way construction permit for any repairs required for such facilities; provided such owner agrees to reimburse the Grantee for all costs incurred by the Grantee and any other reasonable conditions the Grantee requires as a precondition to applying for the permit. All work to be performed in the County right-of-way shall comply with all conditions of the County permit and all applicable County requirements. The Grantee may at its option perform any part of the repair with its own forces or require the owner to employ a contractor for that purpose, provided such contractor is approved by the County;
- (b) In the event that the County determines emergency repair of such facilities is necessary to halt or prevent significant damage to County road rights-of-way or significant threats to the health, safety and welfare of parties other than the owner or the occupants of the building served by such facilities, the Grantee shall take prompt remedial action to correct the emergency to the County's approval, which the County shall not unreasonably withhold;
- (c) When the County or its contractor provides notice to the Grantee, pursuant to RCW 19.122, of its intent to excavate within County road rights-of-way, the Grantee shall provide to the County or its contractor the best information available from the Grantee's records or, where reasonable, from the use of locating equipment as to the location of such facilities, including surface markings where these would reasonably be of use in the excavation. If the Grantee fails to make good faith efforts to provide the above information within the deadlines provided by RCW 19.122, the Grantee shall hold the County harmless for all reasonable costs that result from damage to such facilities if such damage occurs as a result of the failure to provide such information. Nothing in this subsection is intended or shall be construed to create any rights in any third party or to form the basis for any obligation or liability on the part of the County or the Grantee toward any third party, nor is anything in this subsection intended to be construed to alter the rights and responsibilities of the parties under RCW 19.122, as amended.

12. RESTORATION OF COUNTY ROAD RIGHTS-OF-WAY

After work on, under or adjacent to County road rights-of-way, the Grantee is responsible for and will leave all County road rights-of-way in as good a condition as they were in before any work was done. In the event that the Grantee, its contractors, or third parties working under permit should fail to restore County road rights-of-way to the satisfaction of the Director, King County may make such repairs or restorations as are necessary to return the County road rights-of-way to its pre-work condition. Upon presentation of an itemized bill for repairs or restorations, including the costs of labor and equipment, the Grantee will pay the bill within thirty (30) days. If suit is brought upon the Grantee's failure to pay for repair and restoration, and if judgment in such a suit is entered in favor of King County, then the Grantee shall pay all of the actual costs, including interest from the date the bill was presented, disbursements, and attorney's fees and litigation related costs incurred.

13. PERFORMANCE OF WORK

The Grantee covenants that in consideration for the rights and privileges granted by this franchise, all work performed by the Grantee on County road rights-of-way shall conform to all County requirements including, but not limited to, the requirements of the current edition of the County Road Standards in force when the work is performed and all traffic control shall also conform to the current edition of the Manual of Uniform Traffic Control Devices in force when the work is performed.

14. BLASTING REQUIREMENTS

The right to operate, maintain, repair and construct Grantee's distribution and service lines and appurtenances granted by this franchise does not preclude King County, its agents or contractors from blasting, grading, or doing other road work to the Grantee's lines and appurtenances. Except in the case of an emergency, the Grantee will be given ten (10) business days written notice of any blasting so that the Grantee may protect its lines and appurtenances. If the Grantee notifies the County within ten (10) business days that the facilities will have to be relocated to protect them from blasting, the County will defer the blasting for up to ninety (90) days from the date of the original notice. In no event will the Grantee be given less than two (2) business days written notice of any blasting. Notification of any excavation shall be provided through the One-Call System as provided by RCW 19.122, as hereinafter amended.

15. SURVEY MARKERS AND MONUMENTS

It shall be the responsibility of the Grantee performing any construction work in the County road rights-of-way to restore any survey markers or monuments disturbed by such construction in accordance with RCW 58.09.130, and as hereinafter amended.

16. ASSIGNMENT

The Grantee shall not have the right to assign this franchise without the consent of the Metropolitan King County Council given by Ordinance. No assignment shall be effective unless an acceptance by the assignee of all rights, conditions, terms, provisions, and responsibilities contained within the franchise, as well as surety bonds which the Council deems necessary to be posted are received. Council approval of the assignment may be made subject to the assignee's acceptance of new or modified terms of the franchise.

17. EXPIRATION AND RENEWAL

To the extent described in Exhibit "A", all rights granted by this franchise to County road rights-of-way outside incorporated Towns and Cities apply to all existing County road rights-of-Way improved and unimproved and to all County road rights-of-way acquired by King County during the term of this franchise.

If the Grantee has initiated a renewal of this franchise before it expires, the County may, at its sole discretion, extend the term of the franchise on a month to month basis for up to one year. Should the County elect to extend the franchise, written notice shall be provided to the Grantee before the franchise expiration date.

If the Grantee has not applied for a renewal of this franchise before it expires, King County has the right to remove or relocate any lines and appurtenances of the Grantee as is reasonably necessary for the public's health, welfare, safety, or convenience including, but not limited to, the safe operation of County roads, franchise holders, or for the construction, renewing, altering, or improving of any County road right-of-way, or for the installation of lines and/or facilities of other franchise holders. Grantee shall be liable for the costs incurred in any removal or relocation of its lines and appurtenances under this section. Costs include the expense of labor and equipment.

Upon expiration of this franchise, the Grantee shall continue to be responsible for the operation and maintenance of existing facilities in the County road rights-of-way until removed, assigned to another franchised utility or abandoned; however, the Grantee shall not have the right to provide additional services or construct new facilities. King County will issue permits required for the repair and maintenance of the existing facilities in accordance with K.C.C. 14.44.055 as amended and Section 11 of this franchise. This section and sections 8, 10-13 and 15 of this franchise shall continue in force until such time as the lines are removed from County road rights-of-way, assigned to another franchised utility, or abandoned in place with the approval of the Manager of the Department of Transportation, Road Services Division.

18. RESERVATION OF RIGHTS

King County specifically reserves for itself the right to impose a utility tax on the Grantee if such taxing authority is granted by State of Washington and the local option is exercised by the King County Council.

King County also specifically reserves the right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of its property, pursuant to an ordinance. If King County elects to exercise such authority, the fair market compensation requirement for Grantee shall be imposed by ordinance not less than one hundred eighty (180) days after written notice ("Compensation Notice") is delivered to the Grantee, said Compensation Notice identifying with specificity the definition, terms and/or formula to be used in determining such fair market compensation. Acceptance of King County's definition terms and/or formula identified in the Compensation Notice will occur if the Grantee accepts in writing within thirty (30) days of receipt of the Compensation Notice; or, if Grantee takes no action in writing within thirty (30) days of receipt of the Compensation Notice; in which case the applicable ordinance that the King County Council passes will be determinative.

Nothing in this section shall be construed as an agreement by the Grantee of King County's right to exercise authority it has or may acquire in the future to secure and receive fair market compensation for the use of property. Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the legality of such right.

Grantee's rejection of the definition, terms, and/or formula identified in the Compensation Notice will only occur if such rejection is in written form, identifying with specificity the grounds for such rejection, and delivered to King County within thirty (30) days after receipt of the Compensation Notice, in which case the below identified arbitration terms will apply:

- (a) The Grantee and King County will select one arbitrator each, and the two selected

arbitrators will select a third arbitrator. If the two arbitrators have not selected a third arbitrator within thirty (30) days after the selection of the last selection of the two, either the Grantee or King County may apply to the presiding judge of the King County Superior Court for the appointment of a third arbitrator. The three arbitrators will determine the method for determining the fair market compensation for the County property used by the Grantee. The arbitration procedure employed shall be consistent with the rules and procedures of the American Arbitration Association. The decision of a majority of the arbitrators will bind both the Grantee and King County. At the conclusion of the arbitration, the arbitrators will submit written reports to the Grantee and King County which shall contain all pertinent evidence that led to their conclusion together with an explanation of their reasoning for such conclusion.

- (b) The fees of the arbitrators selected by each party shall be paid by that party, and the fees of the third arbitrator shall be paid one-half by the County and the Grantee. The other costs of the proceeding shall be shared equally by the County and the Grantee.
- (c) In event that the question of fair market compensation is not resolved prior to the effective date specified by the ordinance authorizing said compensation, the arbitration decision will be applied retroactively to the effective date in the ordinance. The Grantee will pay the retroactive sum plus interest in the amount of twelve percent (12%) per annum.

Nothing in this franchise may be construed to limit the exercise of authority now or later possessed by the County or any other governing body having competent jurisdiction to fix just, reasonable and compensatory rates or other requirements for services under this franchise. Nothing in this section shall be construed to prohibit the Grantee from challenging, in King County Superior Court or a court of competent jurisdiction, the authority of the County or any other governing body to fix rates or other requirements for services.

19. COMPLIANCE WITH LAWS

Grantee shall conform to all applicable federal, state and local laws and regulations including, but not limited to, the State Environmental Policy Act and King County environmental standards and ordinances.

20. NON-DISCRIMINATION CLAUSE

In all hiring or employment made possible or resulting from this franchise agreement, there shall be no discrimination against any employee or applicant for employment because of sex, sexual orientation, age, race, color, creed, national origin, marital status or the presence of any sensory, mental, or physical handicap, unless based upon a bona fide occupational qualification, and this requirement shall apply to but not be limited to the following: employment, advertising, lay-off or termination, rates of pay or other forms of compensation, and selection for training, including apprenticeship.

No person shall be denied, or subjected to discrimination in receipt of the benefit of any services or activities made possible by or resulting from this agreement on the grounds of sex, sexual

orientation, race, color, creed, national origin, age except minimum age and retirement provisions, marital status, or the presence of any sensory, mental or physical handicap.

Any violation of this provision shall be considered a violation of a material provision of this agreement and shall be grounds for cancellation, termination or suspension in whole or in part, of the agreement by the County and may result in ineligibility for further County agreements.

The Grantee shall make the best efforts to make opportunities for employment and/or contracting services available to women and minority persons. The Grantee recognizes that King County has a policy of promoting affirmative action, equal opportunity and has resources available to assist Grantee in these efforts.

21. PENALTY FOR VIOLATION OF CONDITIONS

If the Grantee shall violate or fail to comply with any of the material terms, conditions, or responsibilities of this franchise through neglect or failure to obey or comply with any notice given the Grantee under the provisions of this franchise or if the Grantee abandons its franchise, the Council may revoke this franchise. King County shall give written notice of its intent to revoke this franchise. A public hearing shall be scheduled within forty-five (45) days following the notification. The decision to revoke this franchise will become effective ninety (90) days following the public hearing if the County, by ordinance, finds:

- A. That the Grantee has not substantially cured the violation or failure to comply which was the basis of the notice; or
- B. that the violation or failure to comply which was the basis of the notice is incapable of cure; or
- C. that the Grantee has repeatedly violated or failed to comply with any of the material terms, conditions, or responsibilities of the franchise, even though the individual violations have been cured; and
- D. that the revocation of the franchise is in the public interest.

During the forty-five (45) days following the notification, the Grantee shall have the opportunity to remedy the failure to comply.

22. RIGHT OF APPEAL

Decisions, requirements, or approvals of the Director are binding on the parties to this document. Appeals from the Director's determinations will be made by filing a complaint with the King County Superior Court.

23. SEVERANCE

This franchise gives effect to purposes and uses which are consistent with economical and efficient services rendered in the public interest. If any provision of this franchise, or its application is determined to be invalid by a court of law, then the remaining provisions of this franchise shall continue and remain valid unless the dominant purpose of the franchise would be prevented or the

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public interest is no longer served.

Revised 07/25/96

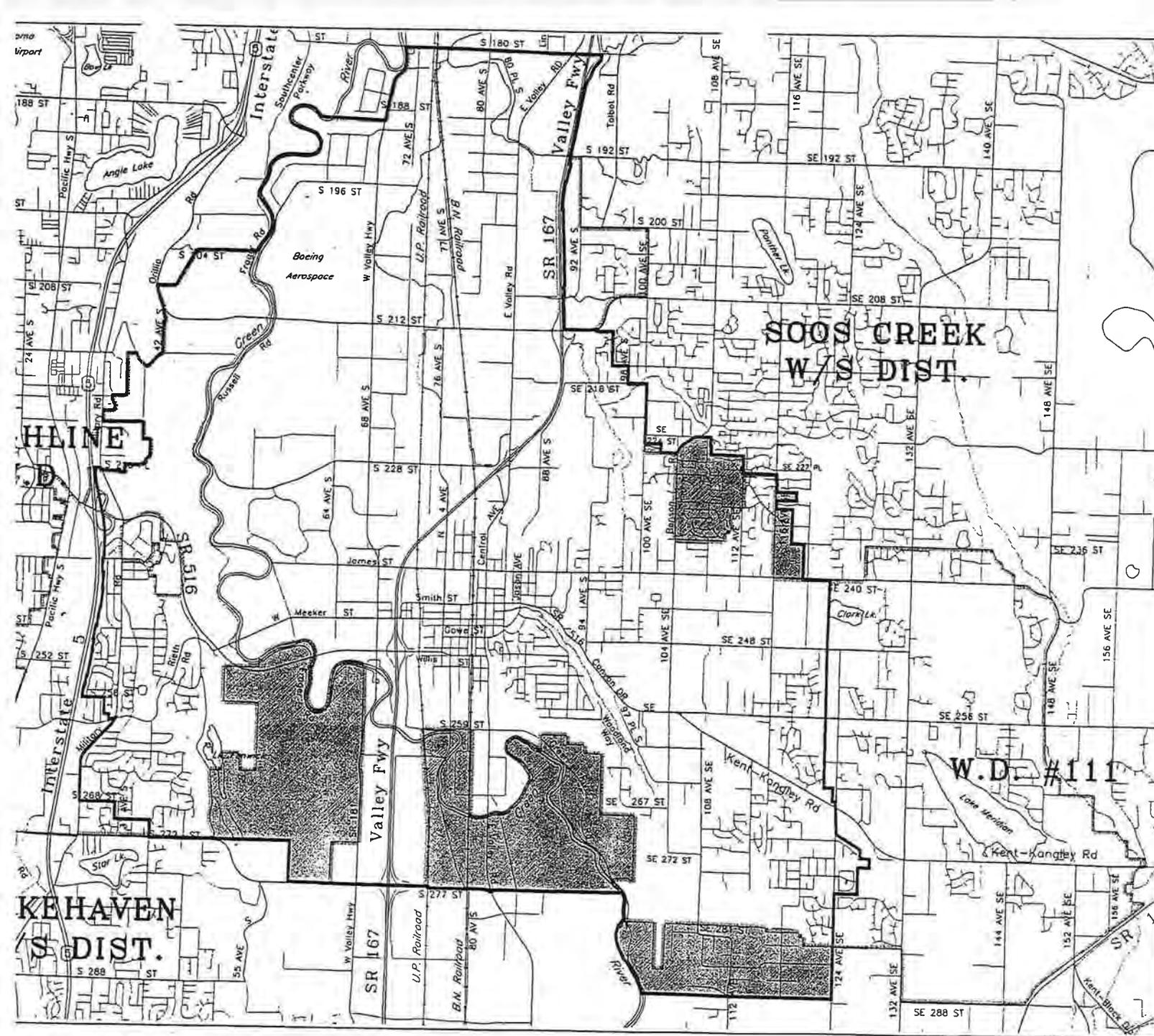
CITY OF KENT
WATER SERVICE AREA



-  KENT WATER SERVICE AREA BOUNDARY
-  KENT CITY LIMITS
-  CITY OF KENT WATER FRANCHISE

Printed 09-11-97

VICINITY
MAP



INTERLOCAL AGREEMENT
WITH KING COUNTY WATER DISTRICT #111,
CITY OF KENT, AND CITY OF AUBURN
(Water Service Area)
September 5, 2006

**CITY OF KENT, KING COUNTY WATER DISTRICT NO. 111
and CITY OF AUBURN
INTERLOCAL AGREEMENT ESTABLISHING
WATER SERVICE BOUNDARIES**

THIS AGREEMENT ("Agreement"), made and entered into this 5th day of September, 2006, by and between the City of Kent, a Washington municipal corporation ("Kent"), King County Water District No. 111, a Washington municipal corporation ("WD #111"), and the CITY OF AUBURN, a Washington municipal corporation, ("Auburn"), all being duly organized and existing under and by virtue of the laws of the State of Washington (individually a "Party" and collectively the "Parties).

WITNESSETH:

WHEREAS, pursuant to RCW 35.A.11.040, Auburn has the legal authority to exercise its powers and perform any of its functions as set forth in RCW 39.34, and

WHEREAS, pursuant to Chapter 39 34 RCW, the Interlocal Cooperation Act, Auburn has the legal authority to cooperate with other localities and utilities on the basis of mutual advantage and the efficient provision of municipal services, and

WHEREAS, pursuant to Chapter 39 34 RCW, the Interlocal Cooperation Act, Kent has the legal authority to cooperate with other localities and utilities on the basis of mutual advantage and the efficient provision of municipal services, and

WHEREAS, pursuant to Chapter 39 34 RCW, the Interlocal Cooperation Act, WD #111 has the legal authority to cooperate with other localities and utilities on the basis of mutual advantage and the efficient provision of municipal services, and

WHEREAS, the parties recognize the responsibility of public water utilities to provide efficient and reliable service to their customers at reasonable cost; and

WHEREAS, Kent owns, and desires to be the water service provider for a property currently within the corporate limits of Kent, and within the service areas of Auburn and WD #111, and

WHEREAS, pursuant to Chapter 70.116 RCW, Public Water System Coordination Act, the Parties determined and agreed upon the water service areas between the Parties as set forth in the South King County Coordinated Water System

Plan ("Plan") and the Parties now desire to modify their water service area boundaries as agreed in this Agreement.

NOW, THEREFORE, in consideration of the terms and conditions set forth herein, the Parties agree as follows:

1. Water Service Area. WD #111 and Auburn agree to relinquish to Kent the water service area depicted on the map attached hereto as Attachment 1 and legally described in Attachment 2, which are by this reference incorporated herein. The Parties agree that the South King County Coordinated Water System Plan and the water service area boundaries as set forth in the Plan shall be modified to be in accordance with the Parties' water service area boundaries as set forth in Attachment 1

2. Management, Regulation and Control of Water System. Kent, WD #111 and Auburn shall have the sole responsibility and authority to construct, maintain, manage, conduct and operate their water systems within their designated water service areas as depicted in Attachment 1, together with any additions, extensions and betterments thereto.

3. Future Annexations. The Parties agree that Kent shall provide water service to the area depicted in Attachment 1 without regard to the present corporate boundaries of the Parties and without regard to future corporate boundaries as they may be periodically altered through annexation

4. Kent Comprehensive Water Planning. The terms of this Agreement will be included as an amendment to Kent's Comprehensive Water System Plan. Kent will submit to Auburn and WD #111 its Comprehensive Water System Plans and amendments thereto.

5. WD #111 Comprehensive Water Planning. The terms of this Agreement will be included as an amendment to WD #111's Comprehensive Water Plan. WD #111 will submit to Kent and Auburn its Comprehensive Water System Plans and amendments thereto.

6. Auburn Comprehensive Water Planning. The terms of this Agreement will be included as an amendment to Auburn's Comprehensive Water Plan. Auburn will submit to Kent and WD #111 its Comprehensive Water System Plans and amendments thereto.

7. Reliance. Each Party hereto acknowledges that the terms hereof will be relied upon by the other in its comprehensive planning to meet the needs of the service area designated herein.

- 8. Liability.** Except as set forth in Section 12 regarding default, failure to perform or negligent conduct, the Parties agree that this Agreement shall not be a source of liability between the Parties for any failure or interruption of service in the service area of any Party as designated in this Agreement.
- 9. Government Notifications.** Auburn will give notice of the adoption of this Agreement to Metropolitan/King County, to the Washington State Department of Health, to the South King County Regional Water Association, to the Water Utility Coordinating Committee, and to any other agency with jurisdiction over, or interest in, the terms hereof, and the Parties shall cooperate and assist each other in all reasonable manner in procuring any necessary approvals hereof by those agencies.
- 10. Boundary Review Board.** In the event that implementation of the terms herein result in permanent water service to areas that will be outside the respective service boundaries of Kent, WD #111 or Auburn, the Parties will, at the time of such service, jointly file a notice of intention with the King County Boundary Review Board in accordance with Chapter 36 93.090 RCW and Chapter 57 08 047 RCW
- 11. Alteration, Amendment or Modification.** Kent, WD #111 and Auburn hereby reserve the right to alter, amend or modify the terms and conditions of this Agreement only upon written agreement of the Parties to such alteration, amendment or modification.
- 12. Indemnification and Hold Harmless.** Each Party hereto agrees to protect, defend, and indemnify the other Parties, their officers, officials, employees and agents from any and all cost, claims, judgments and/or awards of damages, arising out of or in any way resulting from the indemnifying Party's, its employees, subcontractors or agents default, failure of performance, or negligent conduct associated with this agreement. Each Party agrees that its obligations under this provision extend to any claim, demand, and/or cause of action brought by or on behalf of any of its employees, or agents. The foregoing indemnity is specifically and expressly intended to constitute a waiver of each Party's immunity under Washington's Industrial Insurance Act, RCW Title 51, as respects the other Parties only, and only to the extent necessary to provide each Party with a full and complete indemnity of claims made by the other Party's employees. The Parties acknowledge that these provisions were specifically negotiated and agreed upon by them.
- 13. Integration.** This Agreement constitutes the entire agreement of the Parties regarding the subject matter hereof, and there are no other representations or oral agreements other than those listed herein, which vary the terms of this Agreement. Future agreements may occur between the Parties to transfer additional or future service areas by mutual agreement.

14. Obligation Intact. Nothing herein shall be construed to alter the rights, responsibilities, liabilities, or obligations of Kent, WD #111 or Auburn regarding provision of water service, except as specifically set forth herein.

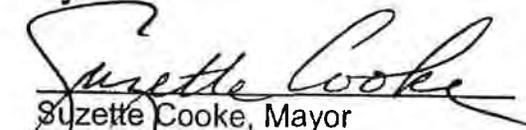
15. Duration. This Agreement shall take effect on the last day approved by all of the Parties and shall remain in effect until modified by written agreement of the Parties

16. Recording. Pursuant to RCW 39.34 040, following the approval and execution of this Agreement by the Parties, this Agreement shall be filed with the King County Auditor.

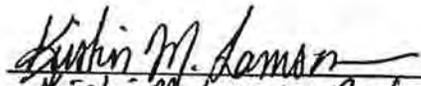
CITY OF KENT

Approved by Motion No. _____ of the City of Kent, Kent, Washington, at its regular meeting held on the 1st day of August, 2006.

By:


Suzette Cooke, Mayor
City of Kent

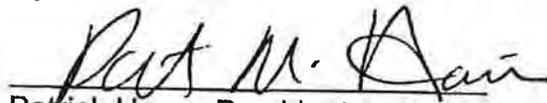
Approved as to form:


Krishin M. Lamson, Asst., City Attorney
City of Kent

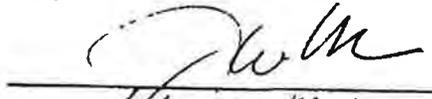
KING COUNTY WATER DISTRICT NO. 111

Approved by Resolution No. _____ of the King County Water District No. 111, Kent, Washington, at its regular meeting held on the 8th day of June, 2006

By:


Patrick Hanis, President
King County Water District No 111

Approved as to form:


John W. Milne, General Counsel
King County Water District No. 111

CITY OF AUBURN

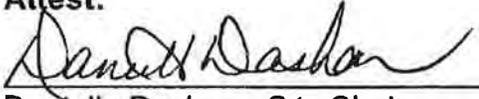
Approved by Resolution No. 3920 of the City of Auburn, Washington, at its regular meeting held on the 5th day of September, 2006.

By:



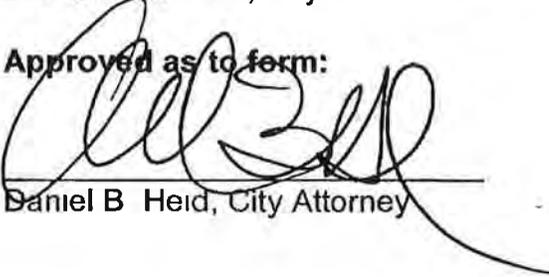
Peter B. Lewis, Mayor
City of Auburn

Attest:



Danielle Daskam, City Clerk

Approved as to form:



Daniel B. Heid, City Attorney

Attachment 2

Legal Description

THAT PORTION OF THE NORTHWEST QUARTER AND THE SOUTHWEST QUARTER OF SECTION 4, TOWNSHIP 21 NORTH, RANGE 5 EAST, W M IN KING COUNTY WASHINGTON, DESCRIBED AS FOLLOWS:

COMMENCING AT THE NORTHEAST CORNER OF GOVERNMENT LOT 3 IN SAID SECTION 4;

THENCE WEST ALONG THE NORTH LINE OF SAID GOVERNMENT LOT 3 A DISTANCE OF 30 FEET TO THE WEST MARGIN OF 124TH AVENUE SOUTHEAST AND THE TRUE POINT OF BEGINNING,

THENCE SOUTH ALONG SAID WEST MARGIN TO THE NORTHERLY MARGIN OF SOUTHEAST 304TH STREET;

THENCE WESTERLY ALONG SAID NORTHERLY MARGIN OF SE 304TH STREET TO THE SOUTHEAST CORNER OF THE PLAT OF CRYSTAL MEADOWS AS RECORDED IN VOLUME 194 OF PLATS AT PAGES 66 AND 67, RECORDS OF KING COUNTY,

THENCE NORTHWESTERLY ALONG THE NORTHEASTERLY EDGE OF SAID PLAT TO THE MOST NORTHERLY CORNER OF LOT 10 OF SAID PLAT,

THENCE WESTERLY ALONG THE NORTH EDGE OF SAID PLAT TO THE NORTHWEST CORNER OF LOT 15 OF SAID PLAT,

THENCE SOUTHERLY ALONG THE WEST LINE OF SAID LOT 15 TO A POINT 50 FEET NORTH OF THE SOUTHEAST CORNER OF TRACT 11 OF THE PLAT OF THE SOUND TRUSTEE COMPANY'S THIRD ADDITION, ACCORDING TO THE PLAT THEREOF RECORDED IN VOLUME 13 OF PLATS AT PAGE 100, RECORDS OF KING COUNTY, WASHINGTON,

THENCE NORTHWESTERLY TO A POINT ON THE NORTH LINE OF THE SOUTH HALF OF SAID TRACT 11, SAID POINT LYING 135 FEET WEST OF THE EAST LINE OF SAID TRACT 11,

THENCE CONTINUING NORTHWESTERLY TO A POINT ON THE NORTH LINE OF SAID TRACT 11, SAID POINT LYING 313.36 FEET WEST OF THE NORTHEAST CORNER OF SAID TRACT 11,

THENCE WESTERLY ALONG THE LINE COMMON TO TRACTS 10 AND 11 OF SAID PLAT OF THE SOUND TRUSTEE COMPANY'S THIRD ADDITION TO THE SOUTHWEST CORNER OF THE EAST HALF OF THE SOUTH 120 FEET OF SAID TRACT 10,

THENCE NORTHERLY ALONG THE WEST LINE OF THE EAST HALF OF THE SOUTH 120 FEET OF SAID TRACT 10 TO THE NORTHWEST CORNER OF THE EAST HALF OF THE SOUTH 120 FEET OF SAID TRACT 10,

THENCE WEST ALONG THE NORTH LINE OF THE SOUTH 120 FEET OF SAID TRACT 10 TO THE WEST LINE OF SAID TRACT 10,

THENCE NORTH ALONG SAID WEST LINE OF SAID TRACT 10 AND THE WEST LINE OF TRACT 9 OF SAID PLAT OF THE SOUND TRUSTEE COMPANY'S THIRD ADDITION TO THE NORTHWEST CORNER OF SAID TRACT 9,

THENCE EAST ALONG THE NORTH LINE OF SAID TRACT 9 TO THE NORTHEAST CORNER OF SAID TRACT 9 AND THE WEST LINE OF THE SOUTHEAST QUARTER OF THE NORTHWEST QUARTER OF SAID SECTION 4;

THENCE NORTH ALONG LAST SAID WEST LINE AND THE WEST LINE OF GOVERNMENT LOT 3 OF SAID SECTION 4 TO THE NORTHWEST CORNER OF SAID GOVERNMENT LOT 3;

THENCE EAST ALONG THE NORTH LINE OF SAID GOVERNMENT LOT 3 TO THE TRUE POINT OF BEGINNING

September 18, 2006

Brenda Jacober, City Clerk
City of Kent
220 4th Avenue South
Kent WA 98032

RE: INTERLOCAL AGREEMENT ESTABLISHING WATER SERVICE
BOUNDARIES

Dear Brenda:

Enclosed are two fully executed originals of the City of Kent, King County Water District No 111 and City of Auburn Interlocal Agreement establishing Water Service Boundaries. The City of Auburn City Council approved the Interlocal Agreement on September 5, 2006 pursuant to Resolution No 3920

If you have any questions regarding the agreement, please contact Water Utility Engineer Jeff Roscoe at (253) 931-4008

Sincerely,



Danielle Daskam
City Clerk

Enc

EMERGENCY WATER SYSTEM INTERTIE AGREEMENT

Kent/Auburn Intertie Agreement No. 1

EMERGENCY WATER SYSTEM INTERTIE AGREEMENT
Kent/Auburn Intertie Agreement No. 1

THIS AGREEMENT made and entered into by and between the City of Auburn, hereinafter referred to as Auburn, and, the City of Kent, hereinafter referred to as Kent, for the purposes of planning, designing, constructing, maintaining, and operating an emergency system intertie between the respective parties,

WITNESSETH:

WHEREAS, both Cities have water facilities in the vicinity, and

WHEREAS, both Cities can increase fire protection and emergency water supply reliability for their customers, and

WHEREAS, the Cities are willing to provide the necessary services to increase fire fighting and emergency supply reliability upon the terms and conditions set forth herein,

NOW, THEREFORE, IT IS MUTUALLY AGREED as follows:

- 1 The emergency water system intertie is intended to be operated manually as a two way emergency supply between the Auburn and Kent Systems. The intertie facility shall be located near South 277th Street at the Water Service Area Boundaries between the two cities. An existing intertie located at B Street NE and South 277th Street will be replaced with a temporary metering station and eventually a permanent metering station. Final location and configuration of the facilities shall be determined at the time of final design.
- 2 The emergency water system intertie shall be operated only in the event of an emergency. For purposes of this agreement, an emergency shall be defined as resulting from a water shortage, a major water line break, fire demand, contamination to the water supply system, mechanical equipment failure, electrical equipment failure or Puget Sound Energy facility failure, or any other agreed upon emergency within the water supply system.
- 3 Auburn has acquired the right of way for the metering station and Kent will design and administer the contract for the construction of the temporary facilities within the right of way acquired by the City of Auburn. The permanent facilities will be constructed as part of the South 277th Street Improvement Project. All of the facilities will be designed and constructed in accordance with reasonably accepted water utility standards for similar municipal water utilities. Auburn will own and maintain the piping, interior

equipment, emergency meter and interior appurtenances, and all piping up to the Kent side of the vault for both the temporary and permanent metering stations

- 4 Upon completion of construction, Auburn will transfer ownership of all exterior appurtenances, and all piping which is located on the Kent side of the vault, to Kent. Kent will own and maintain the exterior appurtenances and all piping on Kent's side of the vault.
- 5 Each City will each have unlimited access to the vault via a dual padlock or ownership of keys to the vault.
- 6 Each City will operate the respective normally locked valve inside of the vault. Auburn will solely unlock and operate the locked valve on Auburn's side of the meter and Kent will solely unlock and operate the locked valve on Kent's side of the meter.
- 7 The procedure for operating the intertie in the event of such emergency shall be as follows:
 - A Each City shall determine that an emergency of sufficient magnitude has occurred which warrants the need to request that the intertie be activated.
 - B The Public Works Director or appointed person or authorized personnel shall provide a verbal request to the other City's Public Works Director or appointed person. Upon agreement that an emergency exists which shall allow for the intertie to be opened, the intertie will be activated as soon as reasonably possible. Both Cities' personnel shall be present at the vault to open the valves to activate the facility.
 - C The City requesting the activation shall provide a written confirmation of the request not less than 24 hours after the verbal request, or on the first day of normal business after the verbal request.
 - D The intertie shall remain activated until the City requesting activation determines that the need for activation of the emergency intertie has ceased and shall request in writing to close the intertie.
 - E. In case of emergency or whenever the public health, safety, or the equitable distribution of water so demands, the City supplying the water may change, reduce or limit the time for or temporarily discontinue the supply of water without notice, water service may be temporarily interrupted, limited for purposes of making repairs,

extensions or doing other necessary work; and the City supplying the water shall not be responsible for any damage resulting from interruption, change or failure of the water supply, and the City receiving the water (City requesting activation) shall save and hold harmless the City supplying the water from any loss, damages or suites to or by customers of the City receiving the water resulting from interruption, change or failure of water supply provided by this Agreement, except damages arising out of the City supplying the water's negligence. Prior to a planned interruption or limiting of service, the City supplying the water will notify the City receiving the water of such not less than three days prior to the service disruption. The City supplying the water agrees to use best efforts and reasonable diligence to notify the City receiving the water as soon after it becomes aware of the need for service disruption and further will, to the extent practical, limit the service disruption to daylight hours

- 8 Auburn shall read the meter upon activation and upon deactivation of the intertie. The city supplying the water shall verify the information and shall then calculate and invoice the other City for the water used during the request. The invoice shall be calculated by the total water used during the event. The rate shall be at the current Auburn or Kent Wholesale Rate depending on which city is supplying the water. This shall be complete payment for the water, labor, and administration of activating the intertie.
- 9 The total project costs shall include costs for consulting design service, and construction. These costs shall be paid for by the City of Kent. The project costs shall be reviewed and agreed upon by Public Work Directors of both Cities at the beginning and end of each stage described above. Each City is responsible for associated staff, administration and legal costs associated with the implementation of the agreement.
- 10 To the extent allowed by law, the City of Kent shall defend, indemnify, and hold harmless the City of Auburn, its elected officials, employees and agents from and against any and all suits, claims, actions, losses, costs, expenses of litigation, attorney's fees, penalties and damages of whatsoever kind or nature arising out of or in connection with or incident to an act or omission of the City of Kent, its employees, agents, and contractors in the performance of the City of Kent's obligations under the Agreement and this Amendment. This indemnification provision shall include, but is not limited to, all claims against the City of Auburn by an employee or former employee of the City of Kent or its contractors and, as to such claims, the City of Kent expressly waives all immunity and limitation of liability under Title 51 RCW.

To the extent allowed by law, the City of Auburn shall defend, indemnify and hold harmless the City of Kent, its elected officials, employees and agents from and against any and all suits, claims, actions, losses, costs, expenses of litigation, attorney's fees, penalties, and damages or whatsoever kind or nature arising out of, in connection with or incident to an act or omission of the City of Auburn, its employees, agents, and contractors in the performance of the City of Auburn's obligations under this Agreement. This indemnification obligation shall include, but is not limited to, all claims against the City of Kent by an employee or former employee of the City of Auburn or its contractors and, as to such claims, the City of Auburn expressly waives all immunity and limitation of liability under Title 51 RCW.

11 This Agreement shall remain in force until terminated by either party hereto upon 60-days written notice to the other party. Any project costs, incurred up to the date of such notice, as described herein, shall be shared in accordance with the provisions of this Agreement.

IN WITNESS WHEREOF, we have hereunto set our hands and seals

CITY OF AUBURN
King County, Washington

By: Charles R. Booth 08-07-01
Mayor Date

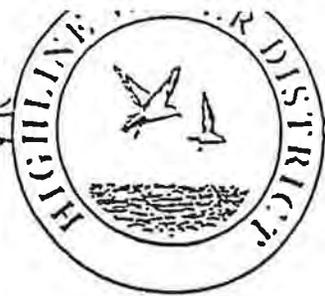
Approved as to form
By: [Signature] 2/17/01
City Attorney Date

CITY OF KENT
King County, Washington

By: [Signature]
Mayor Date 8-29-01
Jim White

Approved as to form
By: [Signature] 8-29-01
Asst. City Attorney Date
Steven Stouffer

**INTERLOCAL AGREEMENT BETWEEN
THE CITY OF KENT AND HIGHLINE WATER DISTRICT
(Emergency Intertie)**



Serving the Southwest Metropolitan Area since 1946

April 5, 1995

Mr. Don E. Wickstrom, P.E.
Director of Public Works
City of Kent
220 - 4th Avenue S.
Kent, WA 98032-5895

APR 7 1995
CITY OF KENT
P.W. OFFICE

Re: Changes to Intertie Agreement and
No Protest LID Covenant

Dear Don:

Enclosed are three originals of each of the above-referenced documents which have been signed by our General Manager. These originals include the changes you requested in your April 4, 1995 letters.

Thanks for bringing these omissions/changes to my attention. I look forward to working with you.

Sincerely,

Keith A. Harris x142
Manager
Plannin and Construction

w
Enclosures (3) originals

INTERTIE AGREEMENT

This Fire Protection and Intertie Agreement (the "Agreement" or "this Agreement") is made this 15th day of March 1995 (being the "anniversary date") between Highline Water District, King County (hereinafter sometimes referred to as "Highline") and the City of Kent, King County (hereinafter sometimes referred to as "Kent").

WHEREAS Highline and Kent are each municipal corporations organized and operating consistent with the laws of the State of Washington; and

WHEREAS the State of Washington, Department of Health encourages Water Service Agreements between adjacent water utilities; and

WHEREAS the connection operates via a pumping system to flow water to Kent and via gravity to flow water to Highline; and

WHEREAS Highline and Kent presently have an eight-inch (8") manually-operated connection between the District's connection between the districts located at S. 240th Street and 35th Avenue South, as governed by an Agreement to Provide Water Services dated October 6, 1982; and

WHEREAS the rate structure of Highline specifies the costs of providing water for certain classes of users; and

WHEREAS at least one boundary of Highline is parallel with and abuts at least one boundary of Kent; and

WHEREAS Highline and Kent wish to supersede the October 6, 1982 Agreement to Provide Water Service (the "Water Service Agreement"), and enter into a new Fire Protection and Emergency Intertie Agreement to serve the customers of Kent.

NOW THEREFORE, it is agreed as follows:

1. Location of Facilities: Highline and Kent agree to cooperate on the replacement and maintenance of an emergency fire protection intertie at the intersection of South 240th Street and 35th Avenue South. This intertie will be for two-way flow between Highline and Kent. The intertie shall be operational on a year-round basis.
2. Limitations on Use of Water From Intertie: Kent and Highline shall limit the use of the water obtained through the intertie for fire-fighting purposes, emergency use and special maintenance purposes.

Intertie Agreement

For purposes of this Agreement:

- a. Firefighting Purposes means in the event Kent storage tank and well pumping capacities are inadequate to combat a conflagration from mains with Kent, water from the intertie may be used to extinguish the fire.
- b. Emergency Use means in the event of a power outage, a pump system mechanical failure or a rupture in the distribution system which would impair the productivity of Kent wells to maintain the capacity of the storage tank for fire-fighting purposes and consumption by the public. This emergency use would terminate upon restoration of the electrical power and the repair to the pump(s) and damaged distribution system.
- c. Special maintenance purposes are limited to:
 - 1) Temporary removal from service of either the City's 300,000 gal. reservoir at 264th St. & 34th Ave. and/or 1 million gal. site at Reith Rd. & 256th St. for the purpose of maintenance, painting or decontamination.
 - 2) Scheduled preventive maintenance operation of the intertie pumping station whereupon the pumping station is operated once a month for no longer than a four hour duration.

4. Maintenance, Repair, Inspections and Costs for Same - Kent shall be responsible for inspecting and maintaining the intertie. Kent shall advise Highline of the qualifications of the firm which is proposed to do the inspection and maintenance. Highline shall reasonably approve the choice.

Kent or its representative shall inspect the intertie annually or more often as required, and shall advise Highline of the results of the inspections. Kent shall pay all costs to repair the intertie as necessary to insure its proper functioning and shall advise Highline of its maintenance and repair activities.

The parties agree that emergency repairs to the South 240th Street and 35th Avenue South Intertie may be performed by either party without notice, followed by notice to the other party as soon as reasonably possible. The costs of any emergency repairs undertaken by Kent shall be borne solely by Kent. The costs of any emergency repairs undertaken by Highline shall be promptly reimbursed by Kent.

Intertie Agreement

5. Notice - Kent shall notify Highline within a ten(10) day period after use of the intertie for fire-fighting purposes or other emergency use stating the nature of the emergency use, the date and time of use and the quantity of water used in the intertie.

6. Costs of Water Supplied by Highline - Kent shall pay Highline for use of water through the intertie system based on Highline's published wholesale rate in effect on the date the water is used by Kent. Any time Kent uses water, whether for one day or an entire month, Kent shall pay the monthly meter charge for the month or months in which it is drawing water, plus pay the commodity charge. Thus, using the rates in effect at the present time, for any use of water within a single month, Kent will pay \$2,305 plus \$1.41 (October through May) and \$1.87 (June through September) for each 100 cubic feet of water used. Kent understands that the wholesale rate may be revised by Highline from time to time. However, Kent will be allowed a scheduled maintenance period (up to four hours) each month to allow operation of the intertie pumping station for preventive maintenance purposes. This will not require payment of the monthly meter charge, only payment for water used.

7. City of Seattle Demand Charges - The parties reserve the right to negotiate with the City of Seattle to obtain an agreement with the City of Seattle to waive any City of Seattle demand charges incurred by Highline as a consequence of the South 240th Street and 35th Avenue South Intertie. Any agreement shall be in writing and shall become a part of this intertie Agreement. Highline will provide a signed copy of same to Kent.

If Highline is unable to obtain an agreement with the City of Seattle to reduce or waive demand charges to Highline caused by use of water in accordance with this Agreement, and shall any of the ten peak days used to calculate the demand charge be coincidental with a day in which water was taken through the South 240th Street and 35th Avenue South Intertie, then Kent shall calculate their portion, if any, of the demand charge.

8. Indemnification - The parties agree to indemnify and hold each other harmless from any claim arising under this Agreement. It is understood and agreed that Highline makes no warranties or assurances as to water availability, pressure or volume at any given time relating to the Intertie.

It is understood that if Highline's water service to the South 240th Street and 35th Avenue South Intertie is temporarily interrupted for repair for an emergency, or for any other reasons, it is not obligated to provide an alternative source of water supply. Highline does, however, warrant that it will not, except for reasons relating to emergencies or other necessary repairs, interrupt the water supply to the intertie.

8-A Costs of Water Supplied by Kent - Highline shall pay Kent for use of water through the intertie system based on Kent's published water rate in effect on the date the water is used by Highline.

Intertie Agreement

9. Term - This Intertie Agreement, except for the water rate, shall be reviewed annually, and shall continue indefinitely unless either party notifies the other of its intention not to continue or to renegotiate this Agreement by giving six months written notice prior to the end of each annual anniversary date.

10. Dispute Resolution - If a dispute arises out of or relates to this Agreement, or the breach of it, and if the dispute cannot be settled through negotiation, the parties agree first to try in good faith to settle the dispute by mediation under the rules and regulations of the Washington State Water/Wastewater Association, or Washington Arbitration and Mediation Services, Inc. before resorting to arbitration, litigation or some other dispute resolution procedure.

11. Termination - The October 6, 1982 Agreement to Provide Water Service is superseded by this Agreement, subject to any accrued monetary charges which may be owing from Kent to Highline.

DATED this 5 DAY OF April, 1995.

HIGHLINE WATER DISTRICT

CITY OF KENT

By Peggy S. Bosley
Peggy S. Bosley
Its GENERAL MANAGER

By _____
Its _____

STATE OF WASHINGTON)
COUNTY OF KING)

STATE OF WASHINGTON)
COUNTY OF KING)

I certify that I know or have satisfactory evidence that Peggy S. Bosley is the person who appeared before me and said person acknowledged that he/she signed this instrument on oath and stated that he/she was authorized to execute the instrument and acknowledged it as the Fire Protection & Emergency Intertie Agreement of Highline Water District, and she signed the document as the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

I certify that I know or have satisfactory evidence that _____ is the person who appeared before me and said person acknowledged that he/she signed this instrument on oath and stated that he/she was authorized to execute the instrument and acknowledged it as the Fire Protection & Emergency Intertie Agreement of Highline Water District, and that he/she signed the document as the free and voluntary act of such party for the uses and purposes mentioned in the instrument.

I, POLLY DAIGLE, am a Notary Public in King County, WA whose commission expires June 20, 1997 and resides in Kent, WA.

I _____ am a Notary Public in King County, WA, whose commission expires _____ and who resides in _____

Polly Daigle
POLLY DAIGLE

DATED: April 5 1995.
(seal or stamp)

DATED: _____ 1995.
(seal or stamp)

WATER SERVICE AREA BOUNDARY ADJUSTMENT AGREEMENT

This Water Service Area Boundary Adjustment Agreement ("Agreement") is made and entered into by and between the City of Kent, a Washington municipal corporation ("City"), and King County Water District 111, a Washington municipal corporation ("District") (each individually a "Party" and collectively the "Parties") for the purposes set forth below.

Recitals

A. The City is a non-charter code city formed and existing pursuant to Title 35A of the Revised Code of Washington (RCW). The City owns and operates water and sewer utility systems and provides retail water utility services to customers located within the City's corporate and approved utility service area boundaries.

B. The District is a water special purpose district formed and existing pursuant to Title 57 RCW. The District owns and operates a water utility system and provides retail water services to customers located within the District's corporate and approved water service area boundary.

C. Portions of the District's and the City's water service area boundaries are adjacent.

D. The City's and the District's exclusive water service area boundaries have been established and approved pursuant to Chapter 70.116 RCW, the Public Water System Coordination Act of 1977 ("Act"). In accordance with the South King County Coordinated Water System Plan prepared pursuant to the Act, the City and the District have been designated the exclusive water service purveyors within their respective authorized water service areas. The City's and District's retail water service area boundaries have also been established and approved pursuant to water system plans approved by the Washington State Department of Health (DOH), King County, and other public agencies with jurisdiction.

E. The City's and the District's exclusive water service area boundaries need to be revised to reflect existing infrastructure installed and maintained by either the City or the District, as the case may be, and to revise both boundaries to conform to the edges of existing lot lines, where possible, instead of bisecting existing lots. It is cumbersome for developers, City staff, and District staff, when a development proposal is submitted, and the water service area boundaries split the proposed development into separate water service areas.

Therefore, in consideration of the terms and conditions set forth herein, the Parties agree as follows:

Agreement

1. The Recitals set forth above are incorporated herein in full by this reference.
2. Water Service Area Boundary Adjustment. The water service area boundary between the City and the District is hereby adjusted as agreed upon by the Parties and shown in **Exhibit A** attached hereto and incorporated herein by this reference, as of the Effective Date of this Agreement.
3. Planning Documents, Other Approvals, and Governmental Notifications. The Parties agree to amend their respective water system plans and any other required planning or permitting documents to document, show, formalize and confirm the adjusted exclusive water service area boundary between the Parties as provided for in this Agreement, with each regular update of those plans, permits or other documents. Both Parties shall provide any required government notifications, including without limitation, notifications to DOH and the King County Boundary Review Board. However, failure to make those amendments, failure to obtain any required plan approvals involving the service area adjustment, or failure to provide required notifications will not affect the contractual obligations between the Parties as provided for in this Agreement.

4. Miscellaneous.

4.1 Duration. This Agreement will remain in effect as a permanent water service area boundary change between the Parties.

4.2 Indemnification. The City will defend, indemnify and hold the District, its officers, officials, employees, agents and volunteers harmless from any and all claims, injuries, damages, losses or suits, including all legal costs and attorney fees, arising out of or in connection with the City's negligent performance of this Agreement.

The District will defend, indemnify and hold the City, its officers, officials, employees, agents and volunteers harmless from any and all claims, injuries, damages, losses or suits, including all legal costs and attorney fees, arising out of or in connection with the District's negligent performance of this Agreement.

4.3 Non-Waiver of Breach. Either Party's failure to insist upon strict performance of any of the covenants and agreements contained in this Agreement or to exercise any option conferred by this Agreement in one or more instances will not be construed to be a waiver or relinquishment of those covenants, agreements or options.

4.4 Governing Law, Resolution of Disputes and Legal Costs. Washington law will govern this Agreement. If the Parties are unable to settle any dispute, difference or claim arising from this Agreement, the exclusive means of resolving that dispute, difference or claim, will only be by filing suit under the venue, rules and jurisdiction of the King County Superior Court, King County, Washington,

unless the Parties agree in writing to an alternative dispute resolution process. In any claim or lawsuit for damages arising from the Parties' performance of this Agreement, each Party will pay all its legal costs and attorney fees incurred in defending or bringing that claim or lawsuit, including all appeals, in addition to any other recovery or award provided by law; provided, however, nothing in this paragraph will be construed to limit either Party's right to indemnification under subsection 4.2.

4.5 Assignment or Modification. Assignment, waiver, alteration, or modification of all or part of this Agreement will not be binding on the Parties unless in writing and signed by a duly authorized representative of each Party.

4.6 Entire Agreement. The written provisions and terms of this Agreement supersede all prior verbal statements of any officers or other representatives, and those statements will not be construed as part of this agreement.

4.7 Counterparts. This Agreement may be executed in one or more counterparts, each of which shall constitute an original, and all of which together will constitute one agreement.

4.8 Authority. The Parties represent and warrant this Agreement has been duly approved and authorized by their respective legislative authorities, that each Party has full power and authority to enter into this Agreement and to carry out the actions required of them in this Agreement, and all persons signing this Agreement in a representative capacity represent and warrant they have the full power and authority to bind their respective municipal entities.

5. Effective Date. This Agreement will take effect on the last date entered below ("Effective Date").

The City of Kent

Dano Paper

By _____

Its _____

Date: _____

King County Water District 111

William C Hall

By WILLIAM C. HALL

Its GENERAL MANAGER

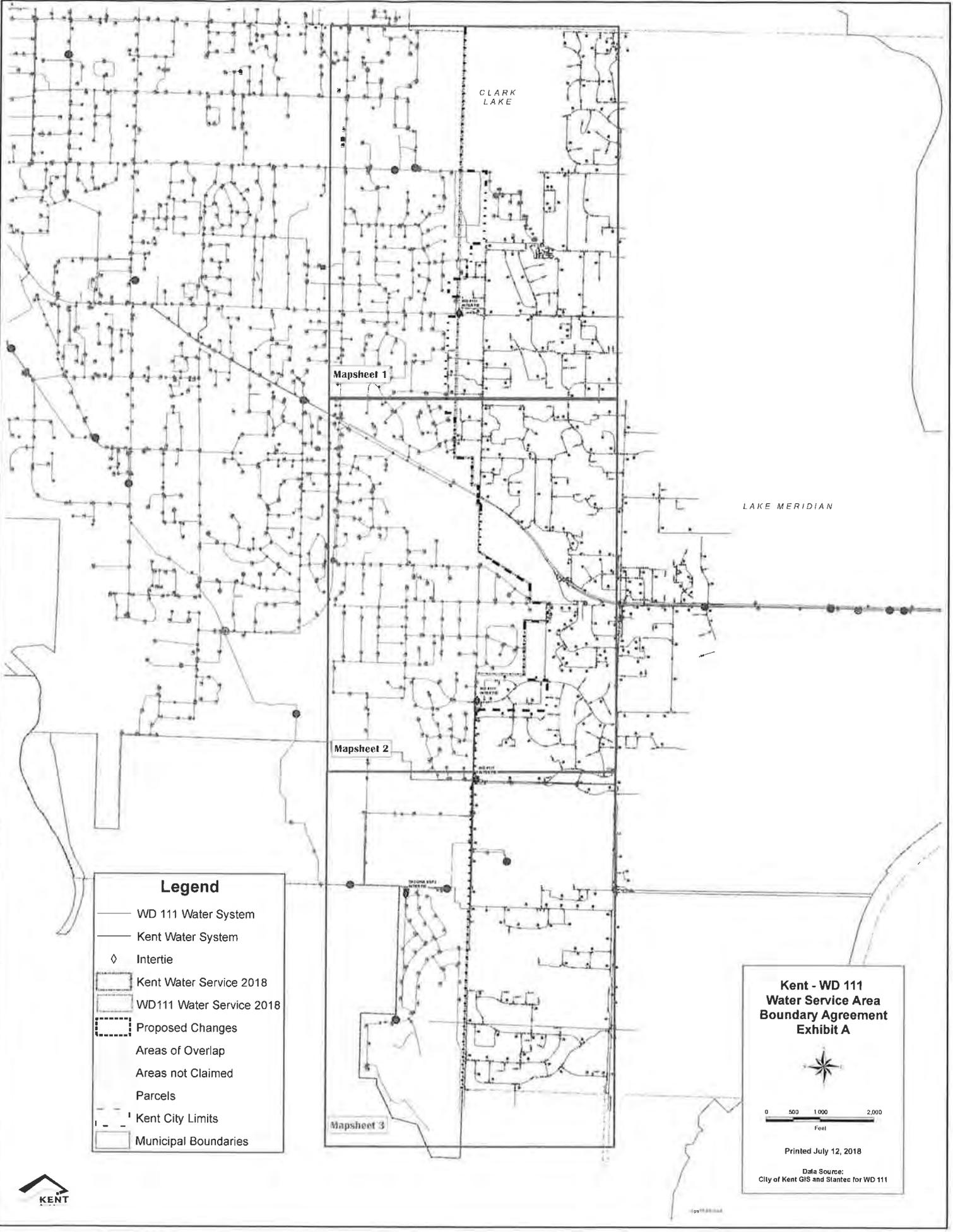
Date: 8/31/2018

APPROVED AS TO FORM:

Chisock

KENT LAW DEPARTMENT

EXHIBIT A
DEPICTION OF MODIFIED EXCLUSIVE RETAIL WATER SERVICE AREA BOUNDARIES



Legend

- WD 111 Water System
- Kent Water System
- ◇ Intertie
- ▭ Kent Water Service 2018
- ▭ WD111 Water Service 2018
- ▭ Proposed Changes
- ▭ Areas of Overlap
- ▭ Areas not Claimed
- ▭ Parcels
- - - Kent City Limits
- ▭ Municipal Boundaries

**Kent - WD 111
Water Service Area
Boundary Agreement
Exhibit A**

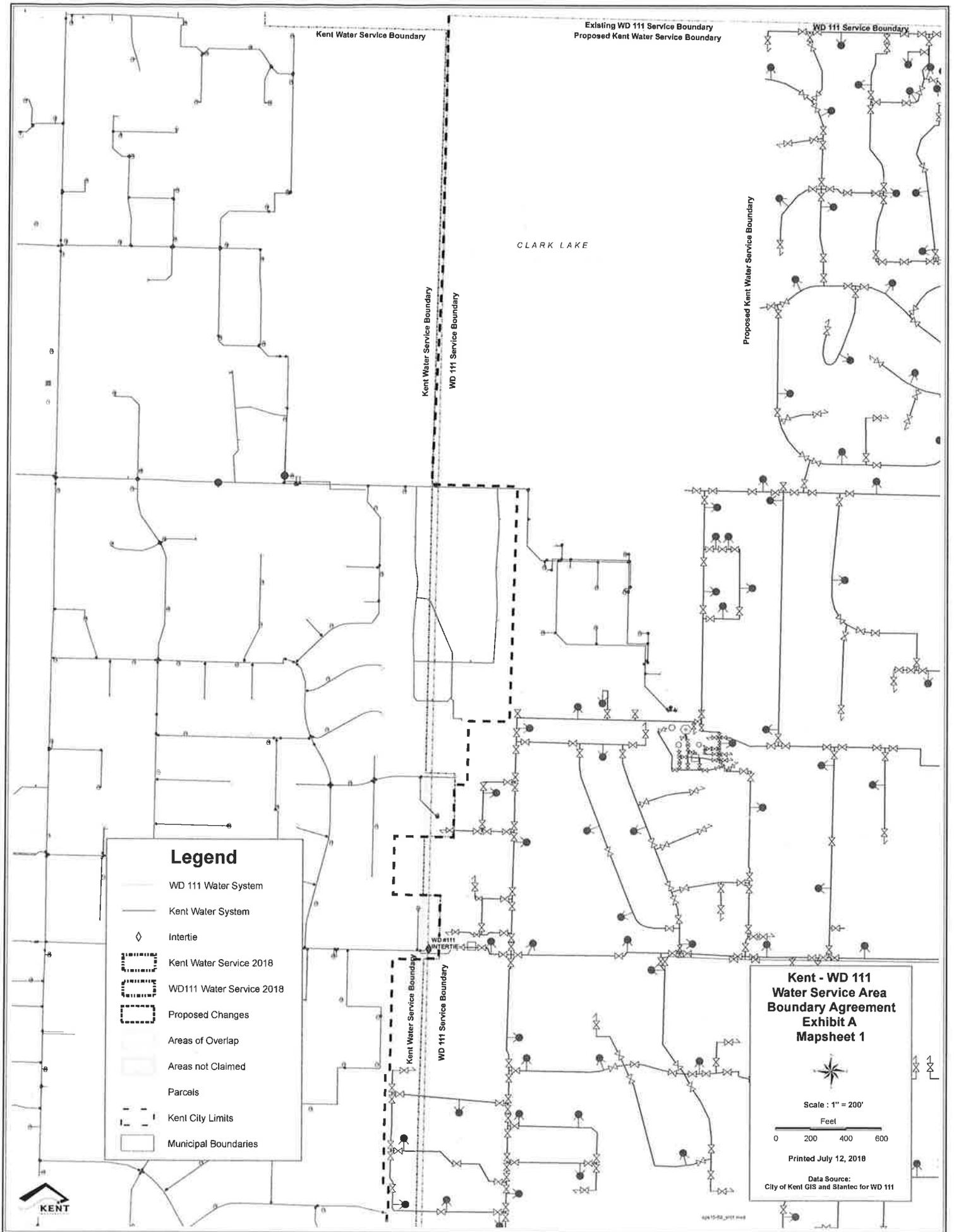


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Feet

Printed July 12, 2018

Data Source:
City of Kent GIS and Slantec for WD 111





Kent Water Service Boundary

Exlating WD 111 Service Boundary
Proposed Kent Water Service Boundary

WD 111 Service Boundary

CLARK LAKE

Proposed Kent Water Service Boundary

Kent Water Service Boundary
WD 111 Service Boundary

Kent Water Service Boundary
WD 111 Service Boundary

Legend

- WD 111 Water System
- Kent Water System
- ◇ Intertie
- ▭ Kent Water Service 2018
- ▭ WD111 Water Service 2018
- ▭ Proposed Changes
- ▭ Areas of Overlap
- ▭ Areas not Claimed
- ▭ Parcels
- - - Kent City Limits
- ▭ Municipal Boundaries

**Kent - WD 111
Water Service Area
Boundary Agreement
Exhibit A
Mapsheet 1**

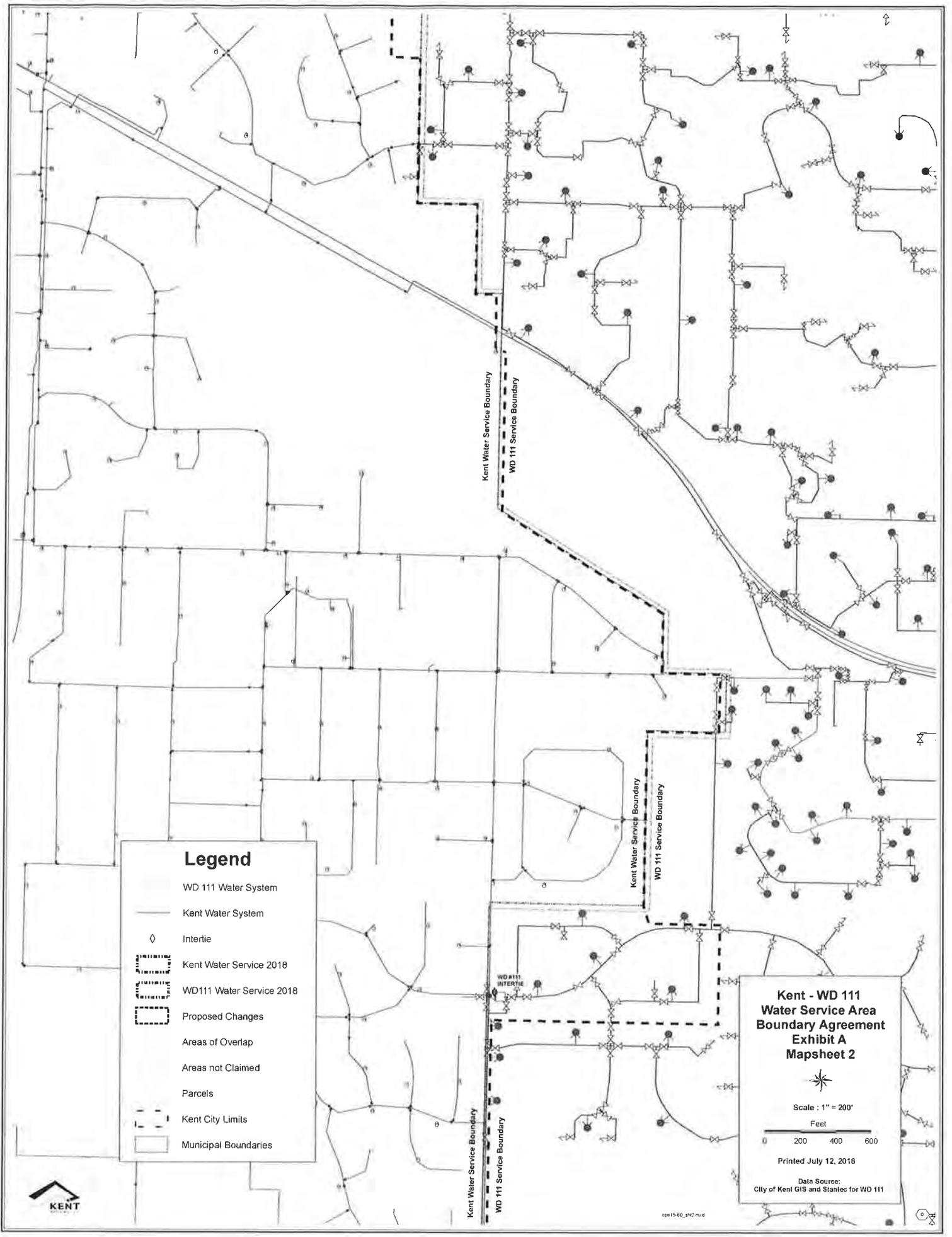
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Printed July 12, 2018

Data Source:
City of Kent GIS and Stantec for WD 111



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Legend

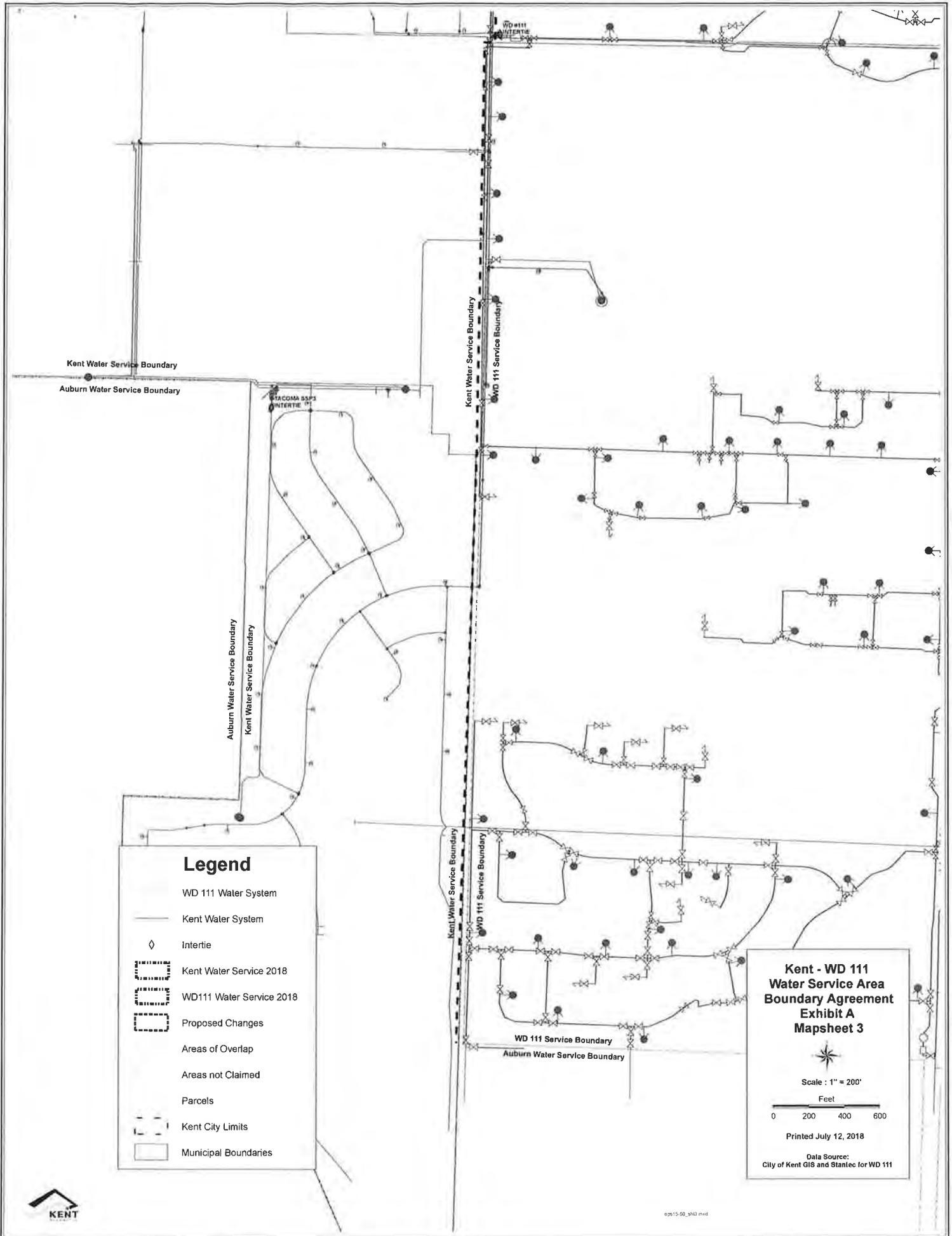
- WD 111 Water System
- Kent Water System
- ◇ Intertie
- Kent Water Service 2018
- WD 111 Water Service 2018
- Proposed Changes
- Areas of Overlap
- Areas not Claimed
- Parcels
- Kent City Limits
- Municipal Boundaries

**Kent - WD 111
Water Service Area
Boundary Agreement
Exhibit A
Mapsheet 2**


 Scale : 1" = 200'
 Feet
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 Printed July 12, 2018
 Data Source:
 City of Kent GIS and Stanlec for WD 111



cp15-60_212.mxd



Legend

- WD 111 Water System
- Kent Water System
- ◇ Intertie
- ▬ Kent Water Service 2018
- ▬ WD111 Water Service 2018
- ▬ Proposed Changes
- ▬ Areas of Overlap
- ▬ Areas not Claimed
- ▬ Parcels
- ▬ Kent City Limits
- ▬ Municipal Boundaries

**Kent - WD 111
Water Service Area
Boundary Agreement
Exhibit A
Mapsheet 3**

Scale : 1" = 200'

Feet

0 200 400 600

Printed July 12, 2018

Data Source:
City of Kent GIS and Stanlec for WD 111



AGREEMENT FOR THE EMERGENCY SALE OF WATER BETWEEN THE CITY OF RENTON AND THE CITY OF KENT

This AGREEMENT made and entered into this 17 day of May, 1995, by and between the CITY OF RENTON, a municipal corporation of the State of Washington, hereinafter called "RENTON" and the CITY OF KENT, a municipal corporation of the State of Washington, acting through its Water Department, hereinafter called "KENT".

WHEREAS, RENTON and KENT may experience periodic water supply shortfall;

WHEREAS, RENTON and KENT recognize the public benefits of cooperation and collaborative problem solving;

WHEREAS, RENTON and KENT are willing to sell water in an emergency at the existing system interties;

WHEREAS, the parties desire to enter into an AGREEMENT providing for the emergency sale of water.

NOW THEREFORE, IT IS AGREED AS FOLLOWS:

- 1) **Term of AGREEMENT.** The effective date of this AGREEMENT shall be _____, 1995. The AGREEMENT shall be for a minimum of one (1) year and shall continue in full force and effect in its present form or as amended until terminated by either party in accordance with Section 15 of this AGREEMENT. The rates and quantities of water sold are set forth in Sections (3), and (7).
- 2) **Sale.** Subject to the conditions set out in this agreement either party may sell water to the other in the event that the receiving City is experiencing an emergency. An emergency is defined, for the purposes of this agreement, as a situation of relative short duration during which the City can not meet water consumption needs of all or part of its distribution system.
- 3) **Rate.** For 1995 KENT shall pay to RENTON for all water delivered at the rate of \$1.73 per 100 cubic feet, which is Renton's retail rate for commercial customers for 1995. For 1995 RENTON shall pay to KENT for all water delivered at the rate of \$1.64 per 100 cubic feet during the period May 1st to September 30th, which is KENT's summer retail rate for commercial customers for 1995 and at the rate of \$1.24 per 100 cubic during the period October 1st to April 30th, which is KENT's winter retail rate for commercial customers for 1995. The rates charged by the SELLER shall be adjusted each year on January 1st and shall be the retail rates for the coming year for commercial customers of each respective City.
- 4) **Metering.** RENTON and KENT shall each provide, and own and maintain, an appropriate metering device to measure the water flowing through the intertie. An interlocal agreement may be prepared to allow one party to operate and maintain the intertie and distribute the costs equally between the both parties. Before allowing any water to flow through the intertie, the party requesting the water shall provide a description and documentation of the emergency condition to the other party.
- 5) **Priority and Continuity of Service.** The determination of whether water is available for emergency sale shall be at the sole discretion of the party delivering (selling) the water. In the event of a condition requiring restrictions on the delivery of water, the party delivering the water shall have the right to restrict or interrupt service. The party providing water may voluntarily interrupt or reduce deliveries of water if it determines that such interruption or

Agreement for the Emergency Sale of Water by the City of Renton to the City of Kent
Page 2

reduction is necessary or reasonable. Except in cases of emergency and in order that operations will not be unreasonably interfered with, the party providing water shall give the party buying water, reasonable notice of any such interruption or reduction, the reason therefor, and the probable duration thereof. The party buying water shall discontinue or reduce service from the intertie upon reasonable notice. Service shall be reactivated or increased again subject to the aforementioned conditions.

6) Water Quality. The quality of water delivered under this AGREEMENT shall be subject to applicable provisions of State and Federal law and rules and regulations of the appropriate State agency governing water quality, and subject also to applicable provisions of City ordinances relating thereto and not inconsistent herewith. Each party agrees to deliver water which shall be of no less quality than is delivered to its other retail customers throughout the service area.

7) Quantity of Water. Depending upon demand conditions, water availability (including conservation impacts), as well as aquifer behavior, in the RENTON system, RENTON may make available, for purchase by KENT, up to the approximate amount of three and a half million (3,500,000) gallons per day or more from the existing emergency intertie located at SW 43rd and Lind Avenue South. Depending upon demand conditions and water availability (including conservation impacts), KENT may make available, for purchase by RENTON, up to two million (2,000,000) gallons per day from the existing emergency intertie located at SW 43rd and Lind Avenue South.

8) Coordination and Project Management.

A) Operations:

For the purpose of operating the water system intertie between RENTON and KENT, coordination shall occur between representatives of the systems, who are:

Water Maintenance Manager, City of RENTON
and
Water Superintendent, City of KENT
(or their designated representatives).

The coordination shall consist of exchanging operational information such as when the intertie is used, the respective flow rates, pumping capacities, back-pressure sustaining valve setpoints, system pressure effects, water quality characteristics, and other operational information as necessary to accomplish the purposes of this AGREEMENT while maintaining safe operation of both systems.

B. Engineering:

For the purposes of coordinating engineering issues regarding the RENTON and KENT intertie, the following personnel shall be the designated representatives:

Water Utility Supervisor, City of RENTON
and
City Engineer, City of KENT
(or their designated representatives)

The engineering issues addressed shall include operational criteria as well as hydraulic

Agreement for the Emergency Sale of Water by the City of Renton to the City of Kent
Page 3

behavior, water quality considerations, and other appropriate engineering issues.

C. Administration:

For the purposes of AGREEMENT administration and AGREEMENT modifications or interpretations, the following personnel shall be the designated representatives:

Planning/Building/Public Works Administrator, City of RENTON
and
Public Works Director, City of KENT
(or their designated representatives)

- 9) Payment. The City providing the water shall read the meter once each month at approximately thirty (30) day intervals (when the intertie is being used). Payment shall be made by the City receiving water as soon as possible after receipt of statement and in any event, not later than the tenth (10) of the second month following the presentation of the bill.
- In the event a meter shall fail to register or obviously register incorrectly, the amount of water considered delivered through said meter shall be the amount delivered the previous day or the last day that the meter was previously known to be properly functioning and the total amount registered shall be pro-rated based on the number of days multiplied times the reading used.
- 10) Penalties For Late Payment. The City selling water may assess a late charge on the City buying water for failure to comply with the provisions in Section (9). This charge shall be at the rate of twelve percent (12%) per year. In the event that the City buying water should fail to make any payment for a period of sixty (60) days after the same becomes due, the City selling water shall have the right to terminate further water service without further notice, until such delinquency is cured.
- 11) Breach of Contract. Either party may cancel this Agreement for material breach of its terms by written notice served upon the other party at least twenty (20) days prior to the proposed termination date. If the breaching party removes the breach and performs under terms of this agreement before the termination date, the Agreement shall remain in full force and effect. However, if the breach is not removed and continues, then the Agreement shall be null and void in all respects except for obligation to make payments as defined for water use prior to the termination date.
- 12) Procedure for Amending the Contract. Either party can request the other to consider an amendment of the AGREEMENT. Any proposed amendments shall be made in writing. Amendments may be made if they are mutually acceptable to RENTON and KENT and signed by both parties. Minor or operational amendments may be made by the Administrators.
- 13) Access to Facilities and Records. Each party shall be entitled to inspect the intertie facilities of the other at any reasonable time. Both parties agree to make mutually available such information or records regarding the intertie as are at their disposal and as may be reasonably necessary to properly implement any section of this AGREEMENT.
- 14) Non-Assignability. Neither this AGREEMENT nor any interest therein shall be transferred

Agreement for the Emergency Sale of Water by the City of Renton to the City of Kent
Page 4

or assigned by either City without prior written consent of both Cities.

- 15) Termination. This AGREEMENT may be terminated in whole or in part by either party any time after one year from date of this AGREEMENT, upon ten (10) days written notice sent by certified mail to the other party. Send notices to the Water Utility Supervisor at the City of Renton and the City Engineer at the City of Kent.

IN WITNESS WHEREOF, the parties have hereunto set their hands this day and year above written.

CITY OF RENTON

By: Earl Clymer
Earl Clymer, Mayor

ATTEST/AUTHENTICATED:

Marilyn J. Petersen
Marilyn J. Petersen, City Clerk

APPROVED AS TO LEGAL FORM:

Larry Warren
Larry Warren, City Attorney

CITY OF KENT

By: Jim White
~~Jim White, Mayor~~ PRO TEM

ATTEST/AUTHENTICATED:

Brenda Jacober
Brenda Jacober, City Clerk

APPROVED AS TO LEGAL FORM:

Roger Lubovich
Roger Lubovich, City Attorney

**CITY OF KENT and SOOS CREEK WATER AND SEWER DISTRICT
EMERGENCY USE INTER-TIE AGREEMENT**

THIS AGREEMENT, made and entered into this 7th day of August, 2001, by and between the **CITY OF KENT**, a Washington municipal corporation (hereinafter referred to as "the City"), **SOOS CREEK WATER AND SEWER DISTRICT**, a Washington municipal corporation (hereinafter referred to as "the District"), and the **CITY OF SEATTLE** (hereinafter referred to as SPU), all entities being duly organized and existing under and by virtue of the laws of the State of Washington, is entered into for the purposes of planning, designing, constructing, maintaining and operating an emergency system inter-tie between the respective parties.

WITNESSETH:

WHEREAS, both the City and the District are public agencies authorized by law and qualified to provide domestic public water in accordance with federal, state and local laws and regulations; and

WHEREAS, emergency use inter-ties between public water agencies can assist them in performing their water supply duties during times of emergency and water shortage; and

WHEREAS, implementation of emergency intertie agreements between SPU purveyor and non-purveyor customers that involve SPU water supply are allowed subject to SPU approval; and

WHEREAS, it is in the public interest for the parties herein to establish an emergency use inter-tie to provide backup water supply in the event of an emergency, as defined herein.

NOW, THEREFORE:

IT IS HEREBY AGREED by and between the parties hereto as follows:

1. The inter-tie is intended to operate as a one way gravity flow from the District's system into the City's system, by an inter-tie facility to be located within a vault suitable for the purpose. The facilities for this purpose are schematically shown on Attachment 1 to this document. Final location and configuration of the facilities will be determined at the time of final design.
2. The District will act as the lead agency, and will be the design and contracting entity for the construction of the facilities contemplated hereby.
3. Upon completion of construction, the District and the City will own and operate the facilities respectively indicated on Attachment 1 to this agreement. The District will convey those facilities to be owned and operated by Kent by Bill of Sale.
4. The City shall reimburse the District for all actual costs associated with the planning, design, construction and permitting for this project. All reasonable

efforts have been made to develop cost projections for this project. The estimated total project cost is \$85,000.

5. The City and the District will each have access to the vault via dual padlocks or ownership of keys to the vault.
6. The City will be provided a key to the vault's lock. Only the District will unlock and operate the vault, except as otherwise provided herein.
7. The inter-tie will be operated only in the event of an emergency. For purposes of this agreement, an emergency is defined to be as a infrastructure failure, contamination of water supply fire flow demand failure, electrical supply failure, or drought condition as defined by the State Department of Ecology such that -the City's water supply is unable to provide sufficient water supply to its inhabitants.
8. It is anticipated that the inter-tie will be capable of transporting approximately 500-750 gpm. Both parties recognize that the District's water system's ability to sustain this flow rate is limited by District physical system characteristics. The District may reduce the rate of flow for any period necessary to ensure that the inter-tie does not adversely impact its system operation.
9. The procedures for operating the inter-tie in the event of an emergency shall be as follows:
 - a. The City will make the determination that an emergency exists which warrants a request that the inter-tie be activated.
 - b. The City's Water Superintendent or designee shall provide a verbal request to the District Manager or designee and Seattle Public Utilities (SPU). Upon the District's and SPU's concurrence that such an emergency exists, the inter-tie will be activated in one of the two following manners:
 - i. If the emergency is one that does not require immediate water by the City, the District will open the inter-tie at 9:00 a.m. on the first business day following the determination of the emergency. The City's personnel shall also be on site for operation of the City's facilities. At the time of activation, District and City personnel shall concurrently confirm and note the standing reading on the flow meter totalizer of the inter-tie.
 - ii. In the even of an emergency which requires immediate use of the inter-tie, the City shall verbally notify the District that the inter-tie's activation is required as soon as reasonably possible. If the District is unable to respond within thirty minutes of such verbal notification, the City's personnel will be permitted to unlock and activate the inter-tie valve, and to verify and to note the standing reading on the flow meter totalizer of the inter-tie.

- c. The City will provide the District with a written request confirmation not less than 24 hours after any verbal request, or during the first day of normal business after the verbal request, whichever is later. If the City requests that the inter-tie be activated prior to 9:00 a.m. on the first business day following the determination of an emergency, the City will provide backup data as necessary to allow the District to request a waiver of demand metering charges from SPU for the particular event, in accordance with the wholesale water contract between the District and SPU. If demand metering charges are not waived by SPU, the City shall pay such charges incurred by the District relative to the event.
 - d. The District shall notify SPU in writing within 10 days after the use of the emergency inter-tie. This notification will include a description of the nature of the emergency, and the date, time and quantity of water used during the activation of the inter-tie.
 - e. The inter-tie shall remain activated until the City has determined that the emergency causing need for the activation has ceased, but in no event for longer than two weeks unless mutually agreed to in writing by the District and SPU. The District shall close the inter-tie at the time of such determination, or at 9:00 a.m. on the following day. The City shall provide a written confirmation of its request that the inter-tie be closed.
 - f. The District shall read the meter, and calculate and invoice the City for the water used during each activation of the inter-tie as follows:
 - i. The District shall prepare an invoice by multiplying the number of ccf's (hundred cubic feet) of water used by either the new water wholesale rate or the demand metering charge the District is required to pay to SPU for the event, whichever is greater, plus the amount per ccf established the District's Board of Commissioners as the District's wheeling charge. For calendar year 2001, the wheeling charge shall be \$20 per ccf. Payment of invoices calculated in accordance herewith shall constitute complete payment for the water, labor, and activation of the inter-tie, and its administration while activated or while pending activation.
 - ii. The City shall pay each invoice in full within thirty days of its issue. After 60 days, a late charge of 10% of the amount due shall be added, and thereafter the entire balance due shall bear interest at 12% per annum, until paid in full.
10. The implementation of this agreement is contingent upon receipt of the written approval of SPU; and it shall be subject to any amendments made to the District's wholesale water contract with SPU during the term hereof.
12. The inter-tie project is subject to approval by the Washington State Department of Health. The District will submit plans and specifications to the Department for review and approval concurrently with the project's construction. The City will pay the review fees directly to the Department. Any changes to the project

required by the Department will be made by the District. Both parties recognize that these changes may result in additional costs to the City.

13. Each party hereto agrees to protect, defend and indemnify the other party, its officers, officials, employees and agents from any and all costs, claims, judgments and/or awards of damages, arising out of or in any way resulting from the party's default, failure of performance, or negligent conduct associated with this agreement, by the party, its employees, subcontractors or agents. Each party agrees that its obligations under this provision extend to any claim, demand, and/or cause of action brought by or on behalf of any of its employees, or agents. The foregoing indemnity is specifically and expressly intended to constitute a waiver of each party's immunity under Washington's industrial insurance act, RCW Title 51, as respects the other party only, and only to the extent necessary to provide each party with a full and complete indemnity of claims made by the other party's employees. The parties acknowledge that these provisions were specifically negotiated and agreed upon by them.
14. The City agrees to protect, defend and indemnify the District, its officers, officials, employees and agents from any and all costs, claims, judgments and/or awards of damages, arising out of or in any way related to pressure changes within the City's service area attributable to the activation and use of the inter-tie.
15. This agreement shall continue in effect until mutually cancelled by the parties.
16. Unless otherwise agreed to by the parties, this agreement is not intended to preclude, conflict with, or otherwise affect the terms of existing or future agreements executed between SPU and the City that may involve use of the inter-tie described herein.

THE CITY OF KENT

Jim White
Mayor, The City of Kent

Date: 7-26-01

SOOS CREEK WATER
AND SEWER DISTRICT

R. Jones
District Manager

Date: 8/1/01

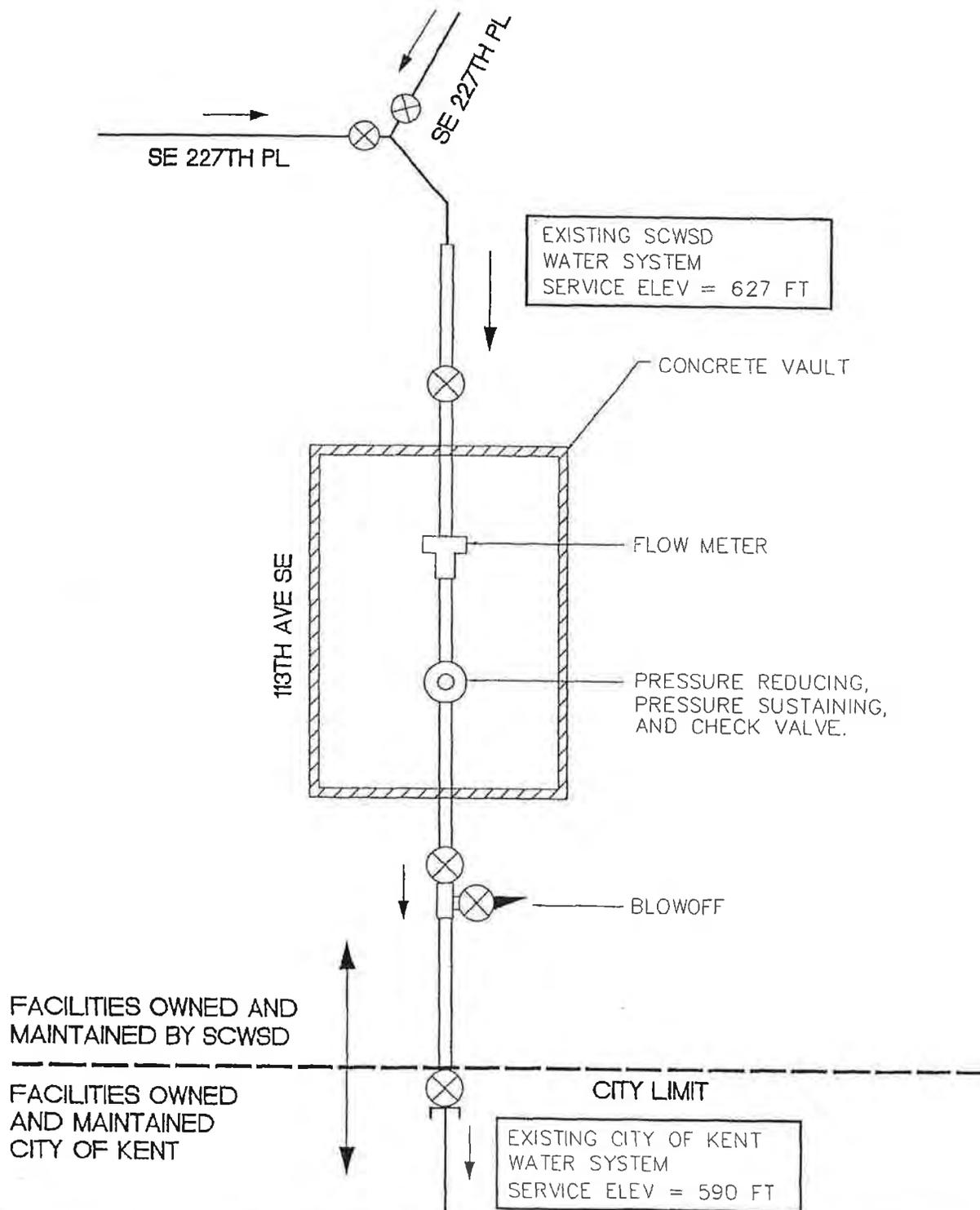
CITY OF SEATTLE

Diane H. Gule
SPU, Managing Director

Date: 8-7-01

ATTACHMENT NO. 1

CITY OF KENT - SOOS CREEK WATER AND SEWER DISTRICT
EMERGENCY USE INTERTIE AGREEMENT
SCHEMATIC DIAGRAM OF FACILITIES AND OPERATION



604 & O & A

A G R E E M E N T

THIS AGREEMENT entered into this 28 day of June 1979, by and between the CITY OF KENT, hereinafter referred to as "Kent" and the CITY OF TUKWILA, hereinafter referred to as "Tukwila".

WHEREAS Municipal Corporations are given the power to contract under RCW 39.34 for cooperative services, and

WHEREAS it is necessary for Tukwila and Kent to enter into this Agreement to provide a water intertie system, and

WHEREAS it is mutually beneficial to both parties to enter into this Agreement to provide emergency water flow and water supply to meet Kent's needs during periods of peak demand and for emergency flow and fire protection in both cities,

NOW, THEREFORE, IN CONSIDERATION of the mutual benefits conveyed hereby do agree as follows:

1. Both parties agree to cooperate in the construction of a water flow intertie system uniting the water supplies of the City of Kent and the City of Tukwila at a point on the West Valley Highway.

2. The intertie system will be constructed by the City of Kent at the City of Kent's expense and ownership of said facility shall remain with the City of Kent. The City of Kent hereby agrees to operate and maintain said facility.

3. Both parties agree that the intertie system will not be operated except during periods when either party desires to obtain

water from the other party. Whenever either party wishes to operate the intertie, ten days notice shall be given to the other party, except that in the case of an emergency, such notice shall not be required. Whenever operated, the operating party agrees to notify the other party's Fire Department and Water Department immediately.

4. Both parties agree that the rate to be charged for water used under this Agreement will be at the rate of \$0.33 per 100 cubic feet of water used. Billing for said charge shall be made in the normal course of business and paid by the other party promptly upon receipt of the invoice. Failure to pay for water utilized under this Agreement or for use for other than emergency purposes, unless otherwise agreed upon, shall be grounds for termination of this Agreement.

5. Either party may cancel this Agreement for material breach of its terms by written notice served upon the other party at least twenty (20) days prior to the proposed termination date. If the breaching party removes the breach and performs under terms of this Agreement before the termination date, the Agreement shall remain in full force and effect. However, if the breach is not removed and continues, then the Agreement shall be null and void in all respects except for the obligation to make payments as defined for water used prior to the termination date.

CITY OF TUKWILA

By Edgar N. Bauch
Mayor

CITY OF KENT

By Label Hogan
Mayor

Attest:

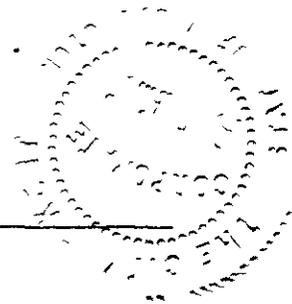
By Marian Anderson
City Clerk

Approved as to Form:

Lawrence E. Hank
City Attorney for
City of Tukwila

Attest:

By Marie Jones
City Clerk



Approved as to Form:

Ronald E. Hunt
City Attorney for
City of Kent

ORDINANCE NO. 4299

AN ORDINANCE of the City Council of the City of Kent, Washington, granting Highline Water District a non-exclusive 15-year franchise to construct, maintain, operate, replace and repair a water system within public rights-of-way of the City of Kent, imposing a franchise fee in the amount of six percent on the District's revenues and setting forth other provisions concerning the relocation of District facilities to accommodate projects caused by the City and other projects not caused by the City.

RECITALS

A. Highline Water District, a Washington special purpose municipal corporation ("District"), owns and operates water facilities ("Facilities") and provides retail utility water service to customers located within the District's corporate and approved retail water utility service area boundary; a portion of the District's Facilities are located in the City of Kent, a Washington non-charter municipal code city ("City"), within the City's right-of-way as hereinafter defined; and

B. The City also owns and operates a water utility system and provides retail water utility services to customers located with the City's corporate and approved retail water utility service area boundary.

C. Portions of the District's and the City's corporate and retail water utility service area boundaries are adjacent.

D. RCW 57.08.005 (3) authorizes the District to conduct water throughout the District and any city and town therein, and construct and

lay facilities along and upon public highways, roads and streets within and without the District; and

E. RCW 35A.47.040 authorizes the City to grant non-exclusive franchises for the use of the public streets above or below the surface of the ground by publicly owned and operated water facilities; and

F. The City and the District have prepared a Franchise Agreement ("Franchise" or "Agreement") to provide for the operation of District Facilities within the City right-of-way, to impose a franchise fee of six percent on District revenues and to govern the relocation of District facilities;

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF KENT, WASHINGTON, DOES HEREBY ORDAIN AS FOLLOWS:

ORDINANCE

SECTION 1. - *Definitions.* Where used in this Franchise these terms have the following meanings:

- A. "City" means the City of Kent, a Washington municipal corporation, and its respective successors and assigns.
- B. "District" means Highline Water District, a Washington municipal corporation, and its respective successors and assigns.
- C. "Facility" or "Facilities" means tanks, reservoirs, water treatment facilities, meters, pipes, mains, services, valves, blow offs, vaults, fire suppression water facilities, risers, generators, electrical control panels, power meters, telephone connections, pressure reducing valves ("PRVs"), pump stations, meter stations, interties, lines, and all other necessary or convenient facilities and appurtenances thereto for the purpose of operating a water utility system, whether the same be located over or under ground.

D. "Franchise Area" means every and all of the public roads, streets, avenues, alleys, highways and rights-of-way of the City as now or hereafter laid out, platted, dedicated or improved in District's service area within the present corporate boundaries of the City, and as such corporate boundaries may be extended within District's service area by annexation or otherwise.

E. "Ordinance" means this Ordinance No. 4299, which sets forth the terms and conditions of this Franchise.

F. "Party" or "Parties" means the City or the District individually, or collectively as addressed in this Franchise.

G. "Revenue" means income received by the District from the sale of metered water to direct retail customers whose connections to the District's water system are located within the City. Revenue shall not include: late fees; shut-off and reconnect fees; delinquent service charge collection costs and expenses; surcharges; impact or mitigation fees; permit fees and costs; any type of connection charges, general facilities charges, or local facilities charges; local improvement district and utility local improvement district assessments and payments; grants; contributed assets (contributions in aid of construction); loans; income from legal settlements not related to water sales to District customers; income from telecommunication leases or licenses; income from real property or from real property sales; income from the sale of surplus equipment, tools or vehicles; interest income; penalties; hydraulic modeling fees; water availability document fees and charges; water system extension agreement fees and charges; income from street lights; labor, equipment and materials charges and the Franchise Fee.

SECTION 2. - Franchise.

A. The City does hereby grant to District the right, privilege, authority and franchise to construct, install, lay, support, attach, maintain, repair,

renew, replace, remove, enlarge, operate and use Facilities in, upon, over, under, along, through and across open city right-of-ways within the Franchise Area for purposes of its water utility functions as defined in Title 57 RCW beginning on the Effective Date of this Franchise; provided the City's grant of the right to use the Franchise Area to the District as provided herein for its Facilities shall not be construed to require the District to provide such Facilities to the City.

B. Nothing contained in this Ordinance is to be construed as granting permission to District to go upon any other public place other than those types of public places specifically designated as the Franchise Area in this Ordinance. Permission to go upon any other property owned or controlled by the City must be sought on a case-by-case basis from the City.

C. In addition to the rights granted to the District to undertake and perform activities within the Franchise Area as provided herein, District shall have the right to discharge District water supply to and into the City's storm water system while performing water system flushing and other District activities, provided any District water to be discharged to the City's storm water system must comply with all applicable federal and state water quality standards and the City's NPDES permit relating to the City's storm water system.

D. At all times during the term of this Franchise, District shall fully comply with all applicable federal, state, and local laws and regulations.

SECTION 3. - Non-interference of Facilities.

A. Survey monuments shall not be removed or destroyed without the District first obtaining the required Department of Natural Resources (DNR) permit in accordance with RCW 58.09.130 and WAC 332-120-030, and as such statute and regulation may be modified and amended. All survey monuments which have been distributed or displaced by such work shall

be restored pursuant to all federal, state and local standards and specifications. District agrees to promptly complete all restoration work and to promptly repair any damage caused by such work at its sole expense.

B. If it is determined that the District has failed to restore the right-of-way in accordance with this Section, the City shall provide the District with written notice, which shall include a description of actions the City believes necessary to restore the right-of-way. If the right-of-way is not restored in accordance with the City's notice within fifteen (15) days of that notice, or such longer period as may be specified in the notice, the City, or its authorized agent, may restore the right-of-way and District shall be responsible for all reasonable costs and expenses incurred by the City in restoring the right-of-way in accordance with this Section. The rights granted to the City under this Section shall be in addition to those otherwise provided by this Franchise.

SECTION 4. - Relocation of Facilities.

A. Subject to each Party's prior and consistent compliance with the Section 6 Planning Coordination requirements below, whenever the City causes the grading or widening of the Franchise Area or undertakes construction of storm drainage lines, lighting, signalization, sidewalk improvement, pedestrian amenities, or other public street improvements (for purposes other than those described in Section 4(D) below) and such project requires the relocation of the District's then existing Facilities within the Franchise Area, the City shall:

1. Pursuant to RCW 35.21.905, or as amended, consult with the District in the predesign phase of any such project; and

2. After receipt of written notice from the City, the District shall design and relocate such Facilities within the Franchise Area within ninety (90) days for a smaller project and two hundred forty (240) days for a

larger project to accommodate the City project, unless the Parties agree on a different time; in any event, the City and the District will, in good faith, use their best efforts to coordinate their project schedules to avoid delay to the City's project. A smaller project includes but is not limited to adjusting at minimal time and cost, a water service line or a meter to a new grade or location, adjustment of a valve box, relocation or extension of a fire hydrant, or relocation of an air vac assembly or blow off. Notwithstanding the above, the District may, at any time within thirty (30) calendar days after receipt of written notice requesting the relocation of its Facilities, submit to the City written alternatives to such relocations. The City shall within a reasonable time evaluate such alternatives and advise the District in writing whether one or more of the alternatives is suitable to accommodate work that would otherwise necessitate relocation of the Facilities. If so requested by the City, District shall submit such additional information as is necessary to assist the City in making such evaluation. The City shall give each alternative full and fair consideration. In the event the City reasonably determines there is no other reasonable or feasible alternative, the City shall provide the District with further written notice to that effect. In that event, the City shall provide the District with conceptual plans and specifications for the City project and the District shall then relocate its Facilities by the date so established.

3. Coordinate and work with the District to minimize conflicts between existing Facilities and the public improvements where possible, and to avoid having the District relocate its Facilities whenever possible. The City and the District agree that coordination under this Section 4 shall include evaluating the costs of alternative plans that achieve the essential function of the public improvement most efficiently for both the District and the City, and to the greatest extent possible, avoid the relocation of District Facilities.

B. If relocation of District Facilities cannot be avoided through the coordination requirements in this Section 4 and a city project causes the

relocation of District Facilities, the cost of relocating such Facilities existing within the Franchise Area shall be paid as follows:

1. If the relocation occurs within fifteen (15) years after the District or a third party on the District's behalf initially constructed such Facility, then the City shall pay fifty percent (50%) of the cost of such relocation and the District shall pay the remaining fifty percent (50%);

2. If the relocation occurs more than fifteen (15) years after the District or a third party on the District's behalf initially constructed such Facility, then the relocation shall be at the District's sole cost.

3. For the purposes of this Section 4, the date of the Facility's acceptance by the District Board of Commissioners shall determine the age of the Facility.

C. Whenever any person or entity, other than the City, requires the relocation of District Facilities to accommodate the work of such person or entity within the Franchise Area, the City agrees not to require the District to relocate its Facilities. District shall have the right as a pre-condition of such relocation to require such person or entity to:

1. Make payment to District at a time and upon terms acceptable to the District for any and all costs and expense incurred by the District in the relocation of District Facilities; and

2. Protect, defend, indemnify and save the District harmless from any and all claims and demands made against it on account of injury or damage to the person or property of another arising out of or in conjunction with the relocation of District Facilities, to the extent such injury or damage is caused by the negligence or willful misconduct of the person or entity requesting the relocation of District Facilities or other negligence or willful misconduct of the agents, servants or employees of the person or entity requesting the relocation of District Facilities.

D. This Section 4 shall govern all relocations of District's Facilities required in accordance with this Franchise. Any cost or expense in connection with the location or relocation of any Facilities existing under benefit of easement or other right not in the Franchise Area shall be borne by the City, provided the City obtains the District's prior consent to such location or relocation.

E. For the purpose of this Section 4, a project or improvement is considered to be caused by the City (as described in Section 4(A) above) if it is permitted by the City and both of the following conditions exist:

1. The City is the lead agency for the project or improvement; and
2. Developer assessments, impact fees, contributions in aid of construction, and contributions in lieu of construction make up a minority of the overall costs of the improvement or project.

F. If a City project requires the relocation of then existing Facilities within the Franchise Area as provided in this Section 4, the District and the City may agree to include the relocation of any Facilities as part of the City's public works project under terms and conditions agreed between the City and the District.

SECTION 5. - Right-of-Way Management.

A. Excavation. Whenever the District excavates in any right-of-way for the purpose of installation, construction, operation, maintenance, repair or relocation of its Facilities, it shall apply to the City for a permit to do so in accordance with the ordinances and regulations of the City requiring permits to operate in City right-of-way. No District work shall commence within any City right-of-way without a permit, except as otherwise provided in this Franchise and applicable City Ordinance.

B. **Restoration after Construction.** The District shall, after any installation, construction, relocation, operation, maintenance or repair of Facilities within the Franchise Area, restore the right-of-way as nearly as reasonably possible to its condition prior to any such work. The District agrees to promptly complete all restoration work and to promptly repair any damage to the right-of-way caused by such work at its sole cost and expense. If it is determined the District has failed to restore the right-of-way in accordance with this Franchise and other applicable City regulations, the City shall provide the District with written notice including a description of the actions the City believes necessary to restore the right-of-way.

C. **Bonding Requirement.** The District, as a public agency, shall not be required to comply with the City's standard bonding requirement for working in the City's right-of-way.

D. **Emergency Work, Permit Waiver.** In the event of an emergency where any District Facilities located in the right-of-way are broken or damaged, or if the District's construction area for the District's Facilities is in a condition as to place health or safety of any person or property in imminent danger, the District shall immediately take any necessary emergency measures to repair, replace or remove its Facilities without first applying for and obtaining a permit as required by this Franchise; provided the District shall notify the City as soon as reasonably possible relative to such emergency activity and shall immediately obtain a permit for such activity if required by this Franchise or City Ordinance.

E. **City Work Zones.** The District shall not be required to obtain a City right-of-way permit to undertake utility work to accommodate a City-initiated project when the City and the District are jointly undertaking a project in the Franchise Area and the District work is located within the

City "work zone" for which the City has already approved a traffic control, pedestrian safety or other applicable plans.

F. **Complete Right-of-Way Permit Applications.** If the District is required to obtain any permit from the City to undertake utility work in the Right-of-Way in the Franchise Area, the City shall provide written review comments within twenty-one (21) calendar days of receiving a complete application for such permit. If the permit application requires resubmittal by the District, the City shall complete all subsequent reviews within fourteen (14) days of the receipt of such submittal. To be considered complete for purposes of this section, the application must show existing utilities, hard surfaces and proposed restoration.

G. **City Invoices.** The City shall invoice the District for all City fees and charges relating to the issuance of any City permits to the District, such as a City right-of-way permit or franchise street use permit, to undertake utility work in the Franchise Area, including inspection fees and charges, on a monthly basis, and the City's final fees and charges within sixty (60) calendar days of the completion of any District work in City right-of-way subject to a City permit, and the City's final acceptance of any such District work. The District shall pay all such City fees and charges within thirty (30) calendar days of receipt of the City's invoice for such fees and charges, except for any disputed fees and charges.

H. **Regular Maintenance.** The City will not require the District to obtain a right-of-way permit, or any other City-issued permit, to conduct regular maintenance of the District's Facilities, including, but not limited to, flushing mains, video inspecting mains, valve, blow-off or hydrant adjustments, or repairing surface areas around existing Facilities, unless such maintenance impacts a traffic lane or a high pedestrian area on SR 99; SR 516; Military Road; South 272nd Street; 30th Avenue South; or South 259th Place/ South 260th Street.

SECTION 6. - Planning Coordination.

A. The Parties agree to participate in the development of, and reasonable updates to, the other Party's planning documents to the extent they apply to the District's service area within the City limits as follows:

1. Each Party will participate in a cooperative effort to develop their respective Comprehensive Plan Utilities Elements that meet the requirements described in RCW 36.70A.070 (4).

2. Each Party will participate in a cooperative effort with the other Party to ensure that the Utilities Elements of their Comprehensive Plans are accurate as they relate to their operations and are updated to ensure continued relevance at reasonable intervals.

3. Each Party shall submit information related to the general location, proposed location, and capacity of all existing and proposed Facilities as requested by the other Party within a reasonable time, not exceeding sixty (60) days from receipt of a written request for such information, provided that such information is in the non-requesting Party's possession, or can be reasonably developed from the information in the non-requesting Party's possession.

4. Each Party will provide information relevant to their operations within a reasonable period of written request to assist the other Party in the development or update of their respective Comprehensive Plan(s), provided that such information is in the non-requesting Party's possession, or can be reasonably developed from the information in the non-requesting Party's possession.

B. District and City shall each assign a representative whose responsibility shall be to coordinate planning for capital improvement plan projects including those that involve undergrounding. At a minimum, such coordination shall include:

1. For the purpose of planning, the District and the City shall provide each other with a copy of their respective current adopted Capital Improvement Plan annually and upon request by the other Party.

2. By February 1st of each year, District shall provide the City with a schedule of the District's planned capital improvements which may affect the rights-of-way for that year.

3. By February 1st of each year, City shall provide the District with a schedule of City's planned capital improvements which may affect the rights-of-way for that year including but not limited to street overlays and repairs, storm drainage improvements and construction, and all other rights-of-way activities that could affect District capital improvements and infrastructure.

4. The District shall meet with the City, and other franchisees and users of the right-of-way, as necessary, to schedule and coordinate construction activities.

5. All construction locations, activities, and schedules should be coordinated to minimize public inconvenience, disruption or damages.

6. The City and the District agree to cooperate in the planning and implementation of emergency operations response procedures.

7. Without charge to either Party, both Parties agree to provide each other with as-built plans, maps and records in electronic format as available that show the location of its facilities within rights-of-way.

SECTION 7. - Indemnification.

A. District shall indemnify, defend and hold the City, its agents, officers, employees, volunteers and assigns harmless from and against any and all claims, demands, liability, loss, cost, damage or expense of any nature whatsoever, including all costs and attorney's fees, made against them on account of injury, sickness, death or damage to persons or property which is caused by or arises out of, in whole or in part, the willful, tortious or negligent acts, failures and/or omissions of District or its

agents, servants, employees, contractors, subcontractors or assigns in exercising the rights granted District in this Franchise; provided, however, such indemnification shall not extend to injury or damage to the extent caused by the negligence or willful misconduct of the City, its agents, officers, employees, volunteers or assigns.

B. City shall indemnify, defend and hold the District, its agents, officers, employees, volunteers and assigns harmless from and against any and all claims, demands, liability, loss, cost, damage or expense of any nature whatsoever, including all costs and attorney's fees, made against them on account of injury, sickness, death or damage to persons or property which is caused by or arises out of, in whole or in part, the willful, tortious or negligent acts, failures and/or omissions of City or its agents, servants, employees, contractors, subcontractors or assigns in exercising the rights granted City in this Franchise; provided, however, such indemnification shall not extend to injury or damage to the extent caused by the negligence or willful misconduct of the District, its agents, officers, employees, volunteers or assigns.

C. In the event any such claim or demand be presented to or filed with the District or the City arising out of or relating to the acts or omissions in whole or in part of the other Party, the Party shall promptly notify the other Party thereof, and the notified Party shall have the right, at its election and at its sole cost and expense, to settle and compromise such claim or demand.

D. Should a court of competent jurisdiction determine that this Franchise is subject to RCW 4.24.115, then, in the event of liability for damages arising out of bodily injury to persons or damages to property caused by or resulting from the concurrent negligence of City and District, their officers, employees and agents, District's liability hereunder shall be only to the extent of District's negligence. It is further specifically and

expressly understood that the indemnification provided herein constitutes the parties' waiver of immunity under Industrial Insurance, Title 51 RCW, solely for the purposes of this indemnification.

SECTION 8. - Default. If the District fails to comply with any of the provisions of this Franchise, unless otherwise provided for herein, the City may serve upon the District a written order to so comply within thirty (30) days from the date such order is received by the District. If the District is not in compliance with this Franchise after expiration of said thirty (30) day period, the City may act to remedy the violation and may charge the costs and expenses of such action to District. The City may act without the thirty (30) day notice in case of an emergency.

SECTION 9. - Non-exclusive Franchise. This Franchise is not and shall not be deemed to be an exclusive Franchise. This Franchise shall not in any manner prohibit the City from granting other and further franchises over, upon, and along the Franchise Area, which do not interfere with District's rights under this Franchise. This Franchise shall not prohibit or prevent the City from using the Franchise Area or affect the jurisdiction of the City over the same or any part thereof.

SECTION 10. - Franchise Term. This Franchise shall have a term of fifteen (15) years from its Effective Date as defined in Section 29 herein; provided, this Franchise shall be automatically extended for one additional five (5) year period unless either Party at least one hundred eighty (180) days prior to the termination date of the Franchise provides written notice to the other Party of its intent to terminate the Franchise at the end of the Franchise term; provided, at the end of the five (5) year term, this Franchise shall be automatically extended for successive one (1) year periods unless either Party at least one hundred twenty (120) prior to the termination date of any one (1) year extension provides written notice to

the other Party of its intent to terminate the Franchise at the end of the then current Franchise term.

SECTION 11. - *Non-assumption.* In consideration of the District's payment of the Franchise Fee to the City as provided in Section 12 herein, and the District's acceptance of the other terms and conditions of this Franchise, the City agrees not to exercise and to forbear its statutory authority pursuant to chapter 35.13A RCW or other statutes to attempt to assume jurisdiction over all or part of the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise. The City's agreement and forbearance includes not facilitating or cooperating with any other city or town to attempt pursuant to RCW 35.13A.060 or as such statute may be amended or superseded to assume jurisdiction over the District or any District responsibilities, property, facilities, equipment or utility customers located within or without the City's corporate limits during the term of this Franchise.

SECTION 12. - *Franchise Fee.*

A. In consideration of the rights granted the District under this Franchise, the District shall pay to the City a franchise fee ("Franchise Fee") in the amount of six percent (6.0%) of the District's Revenue beginning the first day of the first calendar quarter occurring at least sixty (60) days after the Effective Date of this Franchise, subject to the provisions of Section 12(B) herein.

B. Franchise Fees shall be paid to the City in bi-monthly installments due and payable within thirty (30) days following the end of the bi-monthly period.

C. Should the District be prevented by judicial or legislative action from paying any or all of the Franchise Fees, the District shall be excused from

paying that portion of the Franchise Fee and this Franchise agreement will immediately terminate, unless the Parties otherwise agree.

D. In consideration of the District's payment of a Franchise Fee to the City as provided in Section 12 herein, and the District's acceptance of the other terms and conditions of this Franchise, the City agrees not to exercise and to forbear any legal authority it may have to impose a utility, business and occupation tax, public utility tax, privilege tax, excise tax or any other tax (collectively, "Excise Tax") upon the District based on the District's revenues, gross receipts, or gross income during the term of this Franchise. However, if a court of competent jurisdiction determines the City may not agree to forbear its statutory authority to impose an Excise Tax upon the District based on the District's revenues, gross receipts, or gross income during the term of this Franchise, or to limit any such Excise Tax on the District's revenues, gross receipts, or gross income, the District shall have the right and option, at its sole election, to (1) terminate this Franchise and the payment of Franchise Fees to the City, and if the City determines to impose an Excise Tax on the District, the District shall have the right to bring an action to challenge the legal validity of any such Excise Tax, or (2) if the Parties mutually agree, elect not to terminate this Franchise and the District may agree to pay any such Excise Tax, provided the District's Franchise Fees herein to the City shall be credited against any such Excise Tax the City may impose.

E. In consideration of the District's payment of a Franchise Fee to the City as provided herein, and the District's acceptance of the other terms and conditions of this Franchise, the City agrees not to exercise and to forbear any legal authority it may have to impose compensation or a rental fee (collectively, "Rental Fee") upon the District for the District's use of the Franchise Area as provided for herein.

F. The District shall have the right to recover the Franchise Fee from the District's ratepayers residing within the City and may identify the Franchise Fee as a separate billing item on utility customer billings by using the following line item:

"Effect of City of Kent Franchise Fee: \$X.xx"

SECTION 13. - Compliance with Codes and Regulations; Annexations; Service Area Boundary.

A. The rights, privileges and authority herein granted are subject to and governed by this ordinance and all other applicable City ordinances and codes, as they now exist or may hereafter be amended, provided the City shall not unreasonably affect or modify any portion of this Franchise without District's written approval. Nothing in this ordinance limits the City's lawful power to exercise its police power to protect the safety and welfare of the general public. Any location, relocation, erection or excavation by District shall be performed by District in accordance with applicable federal, state and City rules and regulations, including the City public works policies and pre-approved plans, and any required permits, licenses or regulatory fees, and applicable safety standards then in effect.

B. If any territory served by District is annexed to the City after the Effective Date of this Franchise, this Franchise shall be deemed to be the new agreement required to be granted to a franchisee in annexed territory by RCW 35A.14.900 for whatever period of time is then remaining under this Franchise for the Franchise Area, unless a longer time period is required by that statute. Such territory shall then be governed by the terms and conditions contained herein upon the effective date of such annexation. The first Franchise Fee for any annexed area shall be calculated pro rata from the effective date of the annexation to the end of the next bi-monthly period and paid to the City at the same time as the fee for the Franchise Area is paid for that quarter.

C. The District's and the City's exclusive retail water service area boundaries have been established and approved pursuant to chapter 70.116 RCW, the Public Water System Coordination Act of 1977. In accordance with the South King County Coordinated Water System Plan prepared pursuant to the Act, the District and the City have been designated the exclusive water service purveyors within their respective authorized water service areas. The District's and the City's retail water service area boundaries have also been established and approved pursuant to water system plans approved by the Washington State Department of Health, King County and other public agencies with jurisdiction. The water system plans designate the District and the City as the exclusive water service purveyors within their respective authorized water service areas. The District and the City have reviewed certain service areas where their water service areas are adjacent to determine which Party is the most logical provider of water service to the property located within such areas based on the sizing and proximity of the Parties' respective water systems to such property. Based on such review, the Parties have determined to adjust and confirm the exclusive retail water service area boundary between the Parties. Therefore, the Parties agree that their respective exclusive retail water service area boundaries shall be modified, adjusted and confirmed as described and depicted on **Exhibit A** attached hereto and incorporated herein by this reference ("City of Kent-Highline Water District Retail Water Service Area Boundary" or "Retail Water Service Area Boundary"). The Parties agree to cooperatively participate in obtaining any required approvals by public agencies with jurisdiction to reflect and confirm the exclusive retail water service area boundary as depicted on **Exhibit A**. The respective exclusive retail water service area boundaries as provided herein shall survive any termination or expiration of this Franchise. Any modification of the exclusive retail water service area boundary provided herein shall be by written agreement between the Parties. This provision and the agreed exclusive

retail water service area boundary between the Parties shall supersede, rescind, and cancel all prior agreements between the Parties relative to the Parties' respective retail water service area boundaries.

SECTION 14. - Location of Facilities and Equipment. With the exception of components that are traditionally installed above ground such as fire hydrants, blow offs, vault lids, risers, pump stations, generators, electrical control panels, power meters, telephone connections, automated reading equipment and appurtenances, and utility markers, all Facilities and equipment to be installed within the Franchise Area shall be installed underground; provided, however, that such Facilities may be installed above ground if so authorized by the City, which authorization shall not be unreasonably withheld, conditioned or delayed, consistent with the provisions of the City's land use and zoning code and applicable development pre-approved plans.

SECTION 15. - Record of Installations and Service. With respect to excavations by District and the City within the Franchise Area, District and the City shall each comply with its respective obligations pursuant to chapter 19.122 RCW, and as such statute may be modified and amended, and any other applicable state law.

Upon written request of the City, District shall provide the City with the most recent update available of any plan of potential improvements to its Facilities within the Franchise Area; provided, however, any such plan so submitted shall only be for informational purposes within the Franchise Area, nor shall such plan be construed as a proposal to undertake any specific improvements within the Franchise Area.

Upon written request of District, the City shall provide District with the most recent update available of any plan of potential improvements to its improvements located within the Franchise Area; provided, however, any such plan so submitted shall only be for informational purposes within the

Franchise Area, nor shall such plan be construed as a proposal to undertake any specific improvements within the Franchise Area.

Available as-built drawings of the location of any Facilities located within the Franchise Area shall be made available to the requesting Party within a reasonable time, which should typically not exceed fourteen (14) calendar days of request.

SECTION 16. - Shared Use of Excavations.

A. District and the City shall exercise best efforts to coordinate construction work that either Party may undertake within the Franchise Area so as to promote the orderly and expeditious performance and completion of such work as a whole. Such efforts shall include, at a minimum, reasonable and diligent efforts to keep the other Party and other utilities within the Franchise Areas informed of its intent to undertake such construction work. District and the City shall further exercise best efforts to minimize any delay or hindrance to any construction work undertaken by themselves or other utilities within the Franchise Area.

B. If at any time, or from time to time, either District, the City, or another franchisee, shall cause excavations to be made within the Franchise Area, the Party causing such excavation to be made shall afford the others, upon receipt of a written request to do so, an opportunity to use such excavation, provided that:

1. No statutes, laws, regulations, ordinances or District policies prohibit or restrict the proximity of other utilities or facilities to District's Facilities installed or to be installed within the area to be excavated;

2. Such joint use shall not unreasonably delay the work of the Party causing the excavation to be made;

3. Such joint use shall be arranged and accomplished on terms and conditions satisfactory to both Parties. The Parties shall each

cooperate with other utilities in the Franchise Area to minimize hindrance or delay in construction.

SECTION 17. - Insurance. District shall maintain in full force and effect throughout the term of this Franchise, a minimum of Two Million Dollars (\$2,000,000.00) liability insurance for property damage and bodily injury. In satisfying the insurance requirement set forth in this Section, District may self-insure against such risks in such amounts as are consistent with good utility practice. Upon request, the District shall provide the City with sufficient written evidence, as determined by the City in its reasonable discretion, that such insurance (or self-insurance) is being so maintained by District. Such written evidence shall include, to the extent available from District's insurance carrier, a written certificate of insurance with respect to any insurance maintained by District in compliance with this Section.

SECTION 18. - Abandonment and/or Removal of District Facilities. The Parties agree that the standard practice will be to abandon underground District Facilities in-place whenever practical, subject to the following conditions:

1. The District shall continue to own and be responsible for any such facilities abandoned within the Franchise Area.

2. The City shall have the right to require the District to remove any Facilities abandoned within the Franchise Area if the City reasonably determines the removal of the abandoned Facility is required to facilitate the construction or installation of a City project within the Franchise Area and the City determines there is no other reasonable or feasible alternative to the removal of the Facility. The City will make reasonable efforts to avoid conflicts with abandoned Facilities whenever possible, however, whenever a conflict cannot be resolved except by removal from the right-of-way of previously abandoned District Facilities, then the District shall, at

the District's expense, remove such abandoned Facilities by their own forces or by participating in the City's public works project. When necessary, removal of abandoned Facilities shall be limited to the area of direct conflict. In removing such material, the District shall conform to all local, state, and federal regulations applicable to asbestos abatement, when applicable.

3. Within forty-five (45) calendar days of the District's permanent cessation of use of any of its Facilities as determined by the District, or any portion thereof, the District will, in good faith, use its best efforts to provide as-built drawings locating the abandoned Facilities or if unable to provide as-built drawings, will provide the most complete and accurate drawings the District can make available to provide adequate notice of the location of all abandoned Facilities.

4. District Facilities that are abandoned in-place shall be abandoned pursuant to City Standards, to the satisfaction of the Public Works Director.

5. The Parties expressly agree that this section shall survive the expiration, revocation or termination of this Franchise, unless modified by separate agreement.

SECTION 19. - Vacation of Franchise Area. If the City determines to vacate any right-of-way which is part of the Franchise Area where District Facilities are located or maintained, any ordinance vacating such right-of-way shall provide and condition such vacation on the District obtaining, at no cost to the District, a permanent easement at least fifteen (15) feet wide in such vacated right-of-way for the construction, operation, maintenance, repair and replacement of its Facilities located and to be located in such vacated right-of-way.

SECTION 20. - Assignment. All of the provisions, conditions, and requirements herein contained shall be binding upon the District, and no right, privilege, license or authorization granted to the District hereunder

may be assigned or otherwise transferred without the prior written authorization and approval of the City, which the City may not unreasonably withhold, condition or delay, provided that a merger or consolidation of District with or into another Title 57 water-sewer district shall not be considered an assignment for the purposes of this provision and shall not be subject to the City's approval.

SECTION 21. - Notice. Unless applicable law requires a different method of giving notice, any and all notices, demands or other communications required or desired to be given hereunder by any Party (collectively, "notices") shall be in writing and shall be validly given or made to another Party if delivered either personally or by Federal Express or other overnight delivery service of recognized standing, or if deposited in the United States Mail, certified, registered, or express mail with postage prepaid, or if sent by e-mail with electronic confirmation. If such notice is personally delivered, it shall be conclusively deemed given at the time of such delivery. If such notice is delivered by Federal Express or other overnight delivery service of recognized standing, it shall be deemed given one (1) business day after the deposit thereof with such delivery service. If such notice is mailed as provided herein, such shall be deemed given three (3) business days after the deposit thereof in the United States Mail. If such notice is sent by email, it shall be deemed given at the time of the sender's receipt of electronic confirmation. Each such notice shall be deemed given only if properly addressed to the Party to whom such notice is to be given as follows:

To City:

City Clerk
City of Kent
220 Fourth Avenue South
Kent, WA 98032
Phone: (253) 856-5725
Fax: (253) 856-6725

To District:

General Manager
Highline Water District
23828 – 30th Ave. S.
Kent, WA 98032
Phone: (206) 824-0375
Fax: (206) 824-0806

Any Party may change its address for the purpose of receiving notices as herein provided by a written notice given in the manner required by this Section to the other Party.

SECTION 22. - *Non-Waiver.* The failure of either Party to enforce any breach or violation by the other Party or any provision of this Franchise shall not be deemed to be a waiver or a continuing waiver by the non-breaching Party of any subsequent breach or violation of the same or any other provision of this Franchise.

SECTION 23. - *Alternate Dispute Resolution.* If the Parties are unable to resolve disputes arising from the terms of this Franchise, prior to resorting to a court of competent jurisdiction, the Parties shall submit the dispute to mediation or other non-binding alternate dispute resolution process agreed to by the Parties. Unless otherwise agreed upon between the Parties or determined herein, the cost of that process shall be shared equally by the Parties.

SECTION 24. - *Governing Law/Venue.* This Franchise shall be governed by the laws of the State of Washington. Any suit to enforce or relating to this Agreement shall only be filed in King County Superior Court, King County, Washington.

SECTION 25. - *Entire Agreement.* The Recitals set forth above are hereby incorporated herein in full by this reference. This Franchise constitutes the entire understanding and agreement between the Parties as to the subject matter herein and no other agreements or

understandings, written or otherwise, shall be binding upon the Parties upon execution and acceptance hereof. This Franchise shall supersede, rescind and cancel any prior franchise or agreement granted by the City to the District to locate and operate a public water system within the Franchise Area.

SECTION 26. - Amendment. This Franchise may be amended only by written instrument, signed by both Parties, which specifically states that it is an amendment to this Franchise, and is approved and executed in accordance with the laws of the State of Washington. Without limiting the generality of the foregoing, this Franchise (including, without limitation, Section 7 "Indemnification" above) shall govern and supersede and shall not be changed, modified, deleted, added to, supplemented or otherwise amended by any permit, approval, license, agreement or other document required by or obtained from the City in conjunction with the exercise (or failure to exercise) by District of any and all rights, benefits, privileges, obligations, or duties in and under this Franchise, unless such permit, approval, license, agreement or document specifically:

1. References this Franchise; and
2. States that it supersedes this Franchise to the extent it contains terms and conditions which change, modify, delete, add to, supplement or otherwise amend the terms and conditions of this Franchise.

In the event of any conflict or inconsistency between the provisions of this Franchise and the provisions of any such permit, approval, license, agreement or other document that does not comply with Subsections (1) and (2) referenced immediately above, the provisions of this Franchise shall control.

SECTION 27. - Directions to City Clerk. The City Clerk is hereby authorized and directed to forward certified copies of this ordinance to the

District as set forth in this ordinance. The District shall have thirty (30) days from the date of receipt of the certified copy of this ordinance to accept in writing the terms of the Franchise granted to the District by this ordinance and file with the City Clerk the executed statement of Acceptance of Franchise, attached hereto as **Exhibit B** and incorporated herein by this reference.

SECTION 28. - *District Acceptance of Franchise.* District shall have no rights under this Franchise nor shall District be bound by the terms and conditions of this Franchise unless District shall, within thirty (30) days after the receipt of the certified copy of this ordinance as addressed in Section 27 herein, file with the City its written acceptance of this Franchise.

SECTION 29. - *Effective Date of Franchise.* The terms and conditions of this ordinance shall not be binding on the City and the District unless the District Board of Commissioners within thirty (30) days of the receipt of the certified copy of this ordinance as addressed in Section 27 herein adopts a resolution accepting this Franchise, and the date of the adoption of such resolution by the District Board of Commissioners shall be the effective date ("Effective Date") of the Franchise.

SECTION 30. - *Severability.* If any one or more section, subsection, or sentence of this franchise is held to be unconstitutional or invalid, such decision shall not affect the validity of the remaining portion of this franchise and the same shall remain in full force and effect.

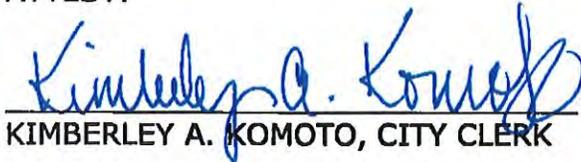
SECTION 31. - *Corrections by City Clerk or Code Reviser.* Upon approval of the city attorney, the city clerk and the code reviser are authorized to make necessary corrections to this ordinance, including the correction of clerical errors; ordinance, section, or subsection numbering; or references to other local, state, or federal laws, codes, rules, or regulations.

SECTION 32. - Effective Date of Ordinance. This ordinance, being an exercise of a power specifically delegated to the City legislative body, is not subject to referendum, and shall take effect 30 days after its passage and publication ("Effective Date").


DANA RALPH, MAYOR

December 11, 2018
Date Approved

ATTEST:

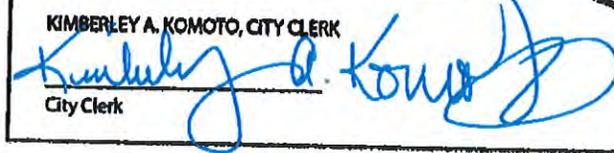

KIMBERLEY A. KOMOTO, CITY CLERK

December 11, 2018
Date Adopted

December 14, 2018
Date Published

APPROVED AS TO FORM:


ARTHUR "PAT" FITZPATRICK, CITY ATTORNEY

State of Washington County of King City of Kent	CERTIFICATION	
I KIMBERLEY A. KOMOTO, Clerk of the City of Kent, Washington, do hereby certify that the document on which this stamp is imprinted is a true and correct copy of said original as it appears on file and of record in my office and of the whole thereof IN TESTIMONY WHEREOF I have affixed this seal of the City of Kent at my office in Kent, Washington on this date <u>December 14, 2018</u>		
KIMBERLEY A. KOMOTO, CITY CLERK  City Clerk		

**EXHIBIT B
ACCEPTANCE OF FRANCHISE**

The undersigned authorized representative of Highline Water District (District) hereby declares on the District's behalf the District's acceptance of the nonexclusive franchise to Highline Water District approved by the City of Kent City Council on December 11, 2018, by the adoption of City of Kent Ordinance No. 4299.

DATED this 19th day of December, 2018.

Highline Water District

By: Matt Everett
Its: General Manager

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APPENDIX C

Consistency Statement Checklists

FORTHCOMING

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Local Government Consistency Determination Form

Water System Name: City of Kent PWS ID: 381501

Planning/Engineering Document Title: Water System Plan Plan Date: April 2019

Local Government with Jurisdiction Conducting Review: City of Kent

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Figs 2-3 & 3-1	yes
b) The <u>growth projection</u> 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.	Pages 3-6 to 3-10	yes
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Pages 5-3 to 5-5, App. M	yes
d) <u>Service area policies</u> 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 5-1 to 5-5, App. M	yes
e) <u>Other relevant elements</u> 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 to 3-5	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.



Signature

HAYLEY BONSTEEL, LONG RANGE PLANNING MANAGER, CITY OF KENT

5/9/19

Date

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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).

APPENDIX D
SEPA Checklist

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ECONOMIC & COMMUNITY DEVELOPMENT

Kurt Hanson
Director
220 4th Avenue South
Kent, WA 98032
Fax: 253-856-6454

PHONE: 253-856-5454

August 16, 2019

RE: Environmental Checklist
State Environmental Policy Act (SEPA)
ENV-2019-23 / KIVA #RPSA-2192101
K-PWE 2019 WATER COMPREHENSIVE PLAN

Dear Evan Swanson,

Enclosed, please find:

1. A copy of the signed environmental checklist for your project.
2. The Determination of Nonsignificance (DNS) without conditions.
3. The Decision Document

There is a 14-day appeal period for appeals to the DNS. All appeals are reviewed by the Kent Hearing Examiner.

If you have any questions concerning the SEPA review or the next step in the development plan review process, please call Kent Planning Services at 253-856-5454.

Sincerely,

A handwritten signature in black ink that reads "Erin George".

Erin George, AICP
Responsible Official

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Environmental Checklist Application Form

Public Notice Board and
Application Fee...See Fee Schedule

TO BE COMPLETED BY STAFF:

APPLICATION #: ENV-2019-23 KIVA #: RPSA 2192101

RECEIVED BY: _____ DATE: _____ PROCESSING FEE: _____

A. STAFF REVIEW DETERMINED THAT PROJECT:

- Meets the categorically exempt criteria.
- Has no probable significant adverse environmental impact(s) and application should be processed without further consideration of environmental effects.
- Has probable, significant impact(s) that can be mitigated through conditions. EIS not necessary.
- Has probable, significant adverse environmental impact(s). An Environmental Impact Statement will be prepared.
- An Environmental Impact Statement for this project has already been prepared.

[Signature] _____ Date 8/16/19

B. COMMENTS: _____

C TYPE OF PERMIT OR ACTION REQUESTED: Water System Plan update (non-project action)

D. ZONING DISTRICT: Various (city-wide)

TO BE COMPLETED BY APPLICANT:

A. BACKGROUND INFORMATION:

1. Name of Project: City of Kent 2019 Water Comprehensive Plan

2. Name of Applicant: Evan Swanson

Mailing Address: 220 4th Avenue S./Envir. Eng. PW, Kent, WA, 98032

Contact Person: Evan Swanson Telephone: 253.856.5527

(Note that all correspondence will be mailed to the applicant listed above.)

3. Applicant is (owner, agent, other): Employee of City of Kent

4. Name of Legal Owner: City of Kent Telephone: N/A

Mailing Address: 220 4th Avenue S./Envir. Eng. PW, Kent, WA, 98032

5. Location. Give general location of proposed project (street address, nearest intersection of streets and **section, township and range**).

Does not apply

6. Legal description and tax identification number

a. Legal description (if lengthy, attach as separate sheet):

Does not apply

b. Tax identification number:

Does not apply

7. Existing conditions: Give a general description of the property and existing improvements, size, topography, vegetation, soil, drainage, natural features, etc. (if necessary, attach a separate sheet).

Does not apply

8. Site Area: Does not apply Site Dimensions: Does not apply

9. Project description: Give a brief, complete description of the intended use of the property or project including all proposed uses, days and hours of operation and the size of the project and site. (Attach site plans as described in the instructions):

The Water System Plan (WSP) is required to be developed by all municipal water purveyors pursuant to guidelines and standards promulgated by the Washington State Department of Health (DOH). The WSP provides a detailed overview of the Kent Water System including current storage capacity, demand, and delivery capability. It describes future water system demand based on growth predictions and identifies deficiencies and capital projects that can remedy the deficiencies.

This WSP is a non-project action. A separate Washington State Environmental Policy Act (SEPA) review will be completed prior to actual implementation and construction of each individual project as identified in the Capital Improvement Plan (CIP) list. Certain categorical exemptions from the SEPA review process may apply to specific projects, in accordance with WAC 97-11-800.

10. Schedule: Describe the timing or schedule (include phasing and construction dates, if possible).

The CIP presented in the WSP consists mainly of physical improvements to the system that are intended to improve the City's ability to provide sufficient quantity and quality of water. The projects described in the CIP are grouped according to water main improvements, pressure zone improvements, facility improvement, and miscellaneous improvements. The projects are defined for each year with the projected estimated costs associated with each project. However, the CIP projects listed in the WSP should not be viewed as a commitment by the City to implement each project as planned and shown in the WSP. Actual project implementation will be based upon environmental review, permits and approvals, available funding and scheduling needs.

11. Future Plans: Do you have any plans for future additions, expansion or further activity related to or connected with this proposal? If yes, explain.

An update to the WSP is currently required by the DOH every 10 years. Any projects in the current WSP that fall beyond the 10-year planning horizon will be updated at the time of the next update. As noted above, a SEPA review will be conducted, as needed, for each project in the CIP scheduled to occur in the next 10 years.

12. Permits/Approvals: List all permits or approvals for this project from local, state, federal, or other agencies for which you have applied or will apply as required for your proposal.

The WSP, and all of its updates, must be approved by the Washington State Department of Health. No project specific approvals or permits are required as part of the WSP update.

13. Environmental Information: List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

Specific environmental information has not been prepared for the update of the WSP.

14. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

Development within the City's Water Retail Service Area will continue throughout the life of the WSP. This is consistent with the King County and City's planning policies, the Urban Growth Boundary and other environmental regulations.

B. ENVIRONMENTAL ELEMENTS

1. Earth

- a. General description of the site (circle one): Flat, rolling, hilly, steep slopes, mountainous, other: Does not apply.
- b. What is the steepest slope on the site (approximate percent slope)?

Does not apply

- 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 prime farmland.

Does not apply

- d. Are there surface indications or history of unstable soils in the immediate vicinity? If so, describe.

Does not apply

- e. Describe the purpose, type and approximate quantities of any filling or grading proposed. Indicate source of fill.

Does not apply

- f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

Does not apply

- g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Does not apply

- h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any.

Does not apply

2. Air

- a. What types of emissions to the air would result from the proposal (i.e., dust, automobile, odors, industrial wood smoke) during construction and when the project is completed? If any, generally describe and give approximate quantities if known.

Does not apply

- b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

Does not apply

- c. Proposed measures to reduce or control emissions or other impacts to air, if any.

Does not apply

3. **Water**

a. **Surface:**

- 1) Is there any surface water body on or in the immediate vicinity of the site (including year-round and seasonal streams, salt water, lakes, ponds, wetlands)? If yes, describe type. If appropriate, state stream or river it flows into.

Does not apply

- 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.

Does not apply

- 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.

Does not apply

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities, if known.

Does not apply

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

Does not apply

- 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.

Does not apply

b. Ground:

- 1) Will ground water be withdrawn, or will water be discharged to ground water? Give general description, purpose, and approximate quantities, if known.

The City will not be applying for additional water rights in conjunction with this WSP update.

- 2) Describe waste material that will be discharged into the ground from septic tanks or other sources, if any (for example: domestic sewage; industrial, containing the following chemicals...; agricultural; etc.). Describe the general size of the system, the number of such systems, the number of houses to be served (if applicable), or the number of animals or humans the system(s) are expected to serve.

Does not apply

c. Water Runoff (including storm water):

- 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.

Does not apply

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

Does not apply

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Does not apply

4. Plants

- a. Check or circle 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

_____ Wet soil plants: cattail, buttercup, bulrush, skunk cabbage

_____ Water plants: water lily, eelgrass, milfoil

_____ Other types of vegetation

- b. What kind and amount of vegetation will be removed or altered?

Does not apply

- c. List threatened or endangered species known to be on or near the site.

Does not apply

- d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Does not apply

5. **Animals**

- a. Circle any birds and animals which have been observed on or near the site or are known to be on or near the site:

Birds: hawk, heron, eagle, songbirds, other: _____

Mammals: deer, bear, elk, beaver, other: _____

Fish: bass, salmon, trout, herring, shellfish, other: _____

- b. List any threatened or endangered species known to be on or near the site.

Does not apply

- c. Is the site part of a migration route? If so, explain.

Does not apply

- d. Proposed measures to preserve or enhance wildlife, if any:

Does not apply

6. **Energy and Natural Resources**

- 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.

Does not apply

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.

Does not apply

- 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:

Does not apply

7. Environmental Health

- 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.

No

- 1) Describe special emergency services that might be required.

Does not apply

- 2) Proposed measures to reduce or control environmental health hazards, if any:

Does not apply

- b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment operation, other)?

Does not apply

- 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.

Does not apply

- 3) Proposed measures to reduce or control noise impacts, if any:

Does not apply

8. Land and Shoreline Use

- a. What is the current use of the site and adjacent properties?

Does not apply

- b. Has the site been used for agriculture? If so, describe.

Does not apply

- c. Describe any structures on the site.

Does not apply

- d. Will any structures be demolished? If so, what?

Does not apply

- e. What is the current zoning classification of the site?

Does not apply

- f. What is the current comprehensive plan designation of the site?

Does not apply

- g. If applicable, what is the current shoreline master program designation of the site?

Does not apply

- h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.

Does not apply

- i. Approximately how many people would reside or work in the completed project?

Does not apply

- j. Approximately how many people would the completed project displace?

None

- k. Proposed measures to avoid or reduce displacement impacts, if any:

None

- I. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any.

None

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low income housing.

None

- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low income housing.

None

- c. Proposed measures to reduce or control housing impacts, if any.

Does not apply

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas; what is the principal exterior building material(s) proposed?

Does not apply

- b. What views in the immediate vicinity would be altered or obstructed?

Does not apply

- c. Proposed measures to reduce or control aesthetic impacts, if any.

Does not apply

11. Light and Glare

- a. What type of light or glare will the proposals produce? What time of day would it mainly occur?

Does not apply

- b. Could light or glare from the finished project be a safety hazard or

interfere with views?

Does not apply

- c. What existing off-site sources of light or glare may affect your proposal?

None

- d. Proposed measures to reduce or control light and glare impacts, if any.

Does not apply

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?

Does not apply

- b. Would the proposed project displace any existing recreational uses? If so, describe.

Does not apply

- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any.

Does not apply

13. Historic and Cultural Preservation

- a. Are there any places or objects listed on, or proposed for, national, state or local preservation registers known to be on or next to the site? If so, generally describe.

No

- b. Generally describe any landmarks or evidence of historic, archaeological, scientific, or cultural importance known to be on or next to the site.

Does not apply

- c. Proposed measures to reduce or control impacts, if any.

Does not apply

14. Transportation

- a. Identify public streets and highways serving the site, and describe proposed access to the existing street system. Show on site plans, if any.

Does not apply

- b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?

No

- c. How many parking spaces would the completed project have? How many would the project eliminate?

None

- d. Will the proposal require any new roads or streets, or improvements to existing roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

No

- e. Will the project use (or occur in the immediate vicinity of) water, rail, or air transportation? If so, generally describe.

No

- f. How many vehicular trips per day would be generated by the completed project? If known, indicate when peak volumes would occur.

None

- g. Proposed measures to reduce or control transportation impacts, if any.

Does not apply

15. Public Services

- a. Would the project result in an increased need for public services (for example: fire protection, police protection, health care, schools, other)? If so, generally describe.

No

- b. Proposed measures to reduce or control direct impacts on public

services, if any.

Does not apply

16. Utilities

- a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

Does not apply

- b. Describe the utilities that are proposed for the project, the utilities providing the service and the general construction activities on the site or in the immediate vicinity, which might be needed.

Does not apply

C. SIGNATURE

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: 

Date: 8-7-2019

DO NOT USE THIS SHEET FOR PROJECT ACTIONS

D. SUPPLEMENTAL SHEET FOR NONPROJECT 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.

The proposed action is the adoption of the City of Kent 2019 WSP Update. The WSP refers to the development and utilization of transmission water supply projects that either are or may become part of Kent's future water system. Environmental impacts would be associated with construction activities as they relate to the construction, maintenance, and operations of the future project activities. These impacts will be evaluated during the environmental review of each specific project.

1. How would the proposal be likely to increase discharge to water; emission to air; production, storage, or release of toxic or hazardous substances; or production of noise?

The construction of some of the proposed components of Kent's water system may involve the creation and discharge or construction stormwater. Effects on surface waters may include increased runoff volumes and increased peak flows. The construction of some facilities may also result in the creation of impervious surfaces and their associated runoff.

Impacts to air quality due to construction of facilities could result in temporary increases in particulate emissions depending on the type of activity, weather and equipment used in construction. Increased carbon monoxide and oxides of nitrogen in the exhaust of construction equipment and power generation may occur during construction. Diesel, gasoline, propane and natural gas emergency electrical power generation equipment located at some facilities would produce emissions to the air during operation and maintenance activities.

The production and release of toxic or hazardous substances is not anticipated although there will likely be some storage and use of chemicals associated with the operation of water treatment facilities.

Proposed measures to avoid or reduce such increases are:

Minimization of impacts to surface waters would be achieved through implementation of applicable Best Management Practices (BMPs) and compliance with the regulatory requirements and permits (e.g. NPDES Construction Stormwater Permit, City of Kent Surface Water Design Manual, etc.).

Minimization of impacts to air quality during construction would be achieved by keeping exposed soil damp by spraying with water, covering truck loads, covering dirt and debris piles, properly maintaining equipment and scheduling construction work such as to minimize truck traffic and equipment operations.

All necessary chemical storage would be designed to meet required safety and environmental regulatory requirements including secondary containment, leak detection, alarms, prevention plans and equipment to clean up and contain any spills.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Transmission and water supply system components would not affect marine life.

Plants, animals and fish could be affected by water facilities, depending on location and function. For buried structures, such as pipelines, the impacts would be temporary and limited to the construction period. For pump stations and treatment facilities the effects would be above ground and extend beyond the construction period.

Proposed measures to protect or conserve plants, animals, fish, or marine life?

The site layout and design of such facilities would emphasize avoidance of impacts to plants, animals and fish. Where complete avoidance may not be possible the minimization of these impacts would be stressed. Impacts would be mitigated and enhancement measures implemented, as appropriate.

3. How would the proposal be likely to deplete energy or natural resources?

Water system components could consume, but not deplete, energy and natural resources.

Proposed measures to protect or conserve energy and natural resources are:

System components would be sited, designed, constructed, maintained and operated to be as efficient as possible.

4. How would the proposal be likely to use or affect environmentally sensitive areas or areas designated (or eligible or under study) for governmental protection; such as parks, wilderness, wild and scenic rivers, threatened or endangered species habitat, historic or cultural sites, wetlands, floodplains, or prime farmlands?

None of the proposed water system components are or would be located on prime farmlands, wild and scenic rivers or wilderness areas. It is possible that some components could be located on or near environmentally sensitive areas. Pipelines could be routed through wetlands or floodplains. Parks, endangered species habitat and historical or cultural sites would be avoided wherever possible.

Proposed measures to protect such resources or to avoid or reduce impacts are:

System components would be sited with the intent to avoid any environmentally sensitive areas. If use of any of these areas were necessary the impact of construction activities would be minimized. Possible minimizations include avoiding construction of above ground facilities in flood plains, using trenchless technologies for crossing fish bearing water courses and observing fish windows for work below the ordinary high water mark.

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?

Water system components would not affect land and shoreline use nor allow or encourage land or shoreline use that is incompatible with existing plans.

Proposed measures to avoid or reduce shoreline and land use impacts are:

System components would comply with existing land use and shoreline management plans. Construction of facilities in shoreline areas would be avoided whenever possible.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The construction, maintenance and operation of water system components identified in the WSP would, to a varying degree, increase the demands on transportation, public services and utilities. The increase should be insignificant with the possible exception of the need for electrical power associated with the operation of pumps and water treatment equipment.

Proposed measures to reduce or respond to such demand(s) are:

Modern “state of the art” equipment would maximize efficiency and minimize power consumption for components with higher demands. In addition, for pipelines, alignments would be chosen to maximize the use of gravity flow and minimize the need for pumps to move water through the system.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Water system projects identified in the WSP do not and will not conflict with local, state or federal laws or requirements for the protection of the environment.

P:\Planning\ADMIN\FORMS\SEPA\SEPA_CHECKLIST.doc (REVISED 12/08)



**CITY OF KENT
DETERMINATION OF NONSIGNIFICANCE**

Environmental Checklist No. ENV-2019-23
RPSA-2192101

Project: 2019 WATER COMPREHENSIVE
PLAN

Description: The City of Kent Public Works Department proposes to adopt a new Water System Plan, as required by the Washington State Department of Health and WAC 246-290. The Water System Plan provides a detailed overview of the Kent Water System including current and anticipated storage capacity, demand, and delivery capability, and contains a Capital Improvement Plan describing specific projects that are identified for future implementation. Kent’s current Water System Plan was last updated in 2011.

Location: Citywide

Applicant: City of Kent, Public Works Department

Lead Agency City of Kent

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 (EIS) 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.

_____ There is no comment period for this DNS pursuant to WAC 197-11-355, Optional DNS process.

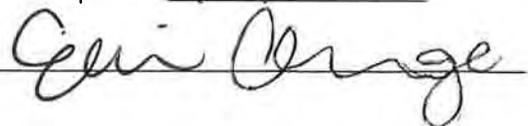
_____ There is no comment period for this DNS.

X This DNS is issued under 197-11-340(2). The lead agency will not act on this proposal for 14 days from the date of this decision; this constitutes a 14-day comment period. Comments must be submitted by **4:30 p.m., August 30, 2019**. This DNS is subject to appeal pursuant to Kent City Code section 11.03.520.

Responsible Official Erin George, AICP

Position/Title Current Planning Manager/SEPA Official

Address 220 S. Fourth Avenue, Kent, WA 98032 Telephone: (253) 856-5454

Dated August 16, 2019 Signature 

APPEAL PROCESS:

AN APPEAL OF A DETERMINATION OF NONSIGNIFICANCE (DNS) MUST BE MADE TO THE KENT HEARING EXAMINER WITHIN TWENTY-ONE (21) DAYS FOLLOWING THE DATE OF THIS DECISION PER KENT CITY CODE 11.03.520.

Conditions/Mitigating Measures: NONE



ECONOMIC & COMMUNITY DEVELOPMENT

Kurt Hanson, Director

PLANNING SERVICES

Erin George, AICP, Current Planning Manager

Phone: 253-856-5454

Fax: 253-856-6454

Address: 220 Fourth Avenue S.

Kent, WA 98032-5895

ENVIRONMENTAL REVIEW REPORT

Decision Document

K-PWE 2019 WATER COMPREHENSIVE PLAN

ENV-2019-23, KIVA # RSPA 2192101

Erin George, AICP Responsible Official

Staff Contact: Jason Garnham, AICP

I. PROPOSAL

The City of Kent Public Works department has initiated a non-project environmental review for a proposal to adopt a new Water System Plan, as required by the Washington State Department of Health and WAC 246-290. The Water System Plan provides a detailed overview of the Kent Water System including current and anticipated storage capacity, demand, and delivery capability, and contains a Capital Improvement Plan describing specific projects that are identified for future implementation. Kent's current Water System Plan was last updated in 2011.

II. BACKGROUND INFORMATION

Compliance with Kent's Comprehensive Plan (Ordinance 4163), the Washington State Growth Management Act (GMA), The Local Project Review Act (ESHB 1724 and ESB 6094), Kent's Construction Standards (Ordinance 3944) and Concurrency Management (Chapter 12.11, Kent City Code) will be required for current and future projects associated with the City's Water System Plan. Such projects may require additional concurrent improvements or the execution of binding agreements by the Applicant/Owner with Kent to mitigate identified environmental impacts. These improvements and/or agreements may include improvements to roadways, intersections and intersection traffic signals, stormwater detention, treatment and conveyance, utilities, sanitary sewerage and domestic water systems. Compliance with Kent's Construction Standards may require the deeding/dedication of right-of-way for identified improvements. Compliance with Title 11.03 and 11.06 of the Kent City Code may require the conveyance of Sensitive Area Tracts to the City of Kent in order to preserve trees, regulate the location and density of development based upon known physical constraints such as steep and/or unstable slopes or proximity to lakes, or to maintain or enhance water quality. Compliance with the provisions of Chapter 6.12 of the Kent City Code may require provisions for mass transit adjacent to the site.

In addition to the above, Kent follows revisions to the Washington State Environmental Policy Act, Chapter 197-11 WAC (effective November 10, 1997), which implements ESHB 1724 and ESB 6094, and rules which took effect on May 10, 2014 in response to 2ESSB 6406 passed by the State Legislature in 2012.

III. ENVIRONMENTAL ELEMENTS

A. Earth

The Water System Plan establishes the basis for selecting, financing, and implementing improvements to the City of Kent public water system. Some construction and maintenance activities will entail disturbance of earth and soils. Any impacts to soils will be evaluated during review of individual projects.

B. Air

The proposed amendments would impact the maintenance, design, construction, and operation of Kent's water system. No emissions or impacts to air are anticipated.

C. Water

As described in the Executive Summary of the draft Water System Plan, water supply in the City's system is supplied predominantly from Kent Springs, Clark Springs, and the Tacoma Regional Water Supply System. Water is also available from ten additional well sources that are not commonly used. No additional water sources are proposed to be acquired or developed as part of this Water System Plan, which demonstrates that the City's existing water sources have sufficient capacity to meet the existing and projected needs for at least 20 years.

While the proposed Water System Plan update would not directly impact surface or ground water resources, future maintenance and upgrades to the water system may impact ground and surface water or stormwater runoff. Impacts from these activities to ground and surface waters would be analyzed during review of individual projects and minimized through administration of City codes and regulations.

D. Plants and Animals

No impacts to plants or animals are anticipated by the proposed Water System Plan update. Potential impacts to plants or animals will be evaluated during review of individual projects.

E. Energy and Natural Resources

No impacts to energy or natural resources are anticipated from this proposal.

F. Environmental Health

One of the primary goals of the Water System Plan is to ensure a safe and adequate water supply to enhance the health and safety of Kent residents, visitors, and businesses. Water from all of the City's supply sources is treated via chlorination, fluoridation, and other means to ensure its safety for human consumption. The Department of Health requires monitoring of the water system for compliance with health and sanitation standards and has determined that the City complies with these requirements. No lead service lines or components were identified during an assessment that was performed in 2016. Measures to ensure the reliability of the water supply in the event of natural disasters or acts of terrorism were identified in related studies and are being implemented by the City's Public Works Department as part of the current and proposed Water System Plans. The maintenance and facility improvement projects identified in the Water System Plan will, when implemented, help to ensure continuous provision of a secure and ample water supply for the health and safety of Kent's residents and businesses.

G. Land and Shoreline Use

The updated Water System Plan establishes the basis for future water system maintenance and improvement projects. These projects are intended to ensure a safe and adequate water supply for current and future residents and businesses in Kent. Areas served by these current and future water facilities are subject to the Land Use Element of Kent's Comprehensive Plan and the provisions of Kent's Zoning Code, which designate different areas of the City for varying types and intensities of land uses and development. No new water service areas are proposed. The current and future water system is intended to support existing and future land uses in the applicable service areas. Specific maintenance and improvement projects will be analyzed for compliance with the City of Kent Comprehensive Plan, Kent Zoning Code, the 2009 City of Kent Design and Construction Standards, and other regulations as applicable during project design and construction. Any work proposed to take place within 200 feet of a waterbody designated as a Shoreline in the City of Kent Shoreline Master Program must be reviewed and approved by Kent Planning Services via submittal of a Shoreline permit application.

The existing water service area includes portions of the Cities of Auburn and Tukwila and unincorporated King County. According to the applicant, the proposed Water System Plan is also consistent with the City of Tukwila Comprehensive Plan, the City of Auburn Comprehensive Plan, the King County Comprehensive Plan, and other regional plans and studies including the South King County Coordinated Water System Plan.

H. Housing

The proposed Water System Plan includes current and projected population estimates for determining residential water service needs. While no new housing or direct impacts to existing housing are anticipated to result from the proposed plan, the Plan identifies several zones as having insufficient water pressure or fire flow supply, mostly in the West Hill area of the City. These deficiencies would limit the amount and type of new housing that could be constructed within the applicable water service areas. However, the Water System Plan includes strategies for correcting these deficiencies which, when implemented, will allow for new housing to be constructed in accordance with the applicable regulations. A new water reservoir facility is proposed to be constructed in this service area to address these insufficiencies. Environmental impacts from this facility were reviewed by Kent Planning Services via submittal of an environmental checklist (ENV-2019-15, RPSA-2191030), which resulted in issuance of a Mitigated Determination of Nonsignificance by the SEPA Responsible Official on May 17, 2019. This and any other new housing or water system projects will be reviewed for compliance with the applicable zoning, building, fire, and other codes at the time of permit application submittal for specific development projects.

I. Aesthetics, Noise, Light and Glare

No aesthetic impacts or noise, light, or glare are anticipated from the proposed Water System Plan. Aesthetic impacts or noise, light, or glare from future projects will be analyzed during design and review of specific proposals.

J. Recreation

No impacts to recreation facilities are anticipated to result from the proposed Water System Plan. Potential impacts to recreation facilities will be reviewed during design and review of specific project proposals.

K. Historic and Cultural Preservation

No impacts to historic or cultural resources are anticipated from this proposal. Potential impacts to historic or cultural resources will be reviewed during design and review of specific project proposals.

L. Transportation

No impacts to transportation systems are anticipated from the proposed Water System Plan update. Traffic Control Plan(s) will be prepared and implemented in accordance with the applicable standards to ensure safe and continuous access to Kent residences and businesses during construction of specific water system projects.

M. Utilities

The proposed Water System Plan includes a detailed overview of the existing water system of wells, springs, reservoirs, pressure zones and stations, pump stations, and mains. Kent's water service area encompasses approximately 23.7 square miles and contains 284 miles of water main. The Plan also includes a description of Kent's water system operation and maintenance program (Chapter 8). Chapter 9 of the proposed Water System Plan describes the key water system improvements that are identified for future implementation. Most of these improvements involve replacement and upgrading of aging or deficient existing systems, installing facilities to address existing water supply or fire flow insufficiencies, or constructing facilities to reinforce connections between City and regional water systems. Environmental impacts from each of the projects described in the Plan will be analyzed separately at the time of development plan review, as applicable. Impacts from these projects will be minimized through adherence with City standards during design and construction.

N. Public Services

The proposed Water System Plan update includes recommended projects that will, when implemented, maintain or enhance the available water supply or pressure needs for fire suppression of existing and future development within the Kent water service area. Impacts to other public services are not anticipated from this proposal.

IV. SUMMARY AND RECOMMENDATION

A. It is appropriate per WAC 197-11-660 and RCW 43.21C.060 that the City of Kent establish conditions to mitigate any identified impacts associated with this proposal. Supporting documents for the following conditions and mitigating measures include:

1. City of Kent Comprehensive Plan as prepared and adopted pursuant to the State Growth Management Act
2. The State Shoreline Master Program and the Kent Shoreline Master Program
3. Kent City Code Section 7.07 Surface Water and Drainage code.
4. City of Kent Transportation Master Plan, Green River Valley Transportation Action Plan and Six-year Transportation Plan
5. Kent City Code Section 7.09 Wastewater Facilities Master Plan
6. City of Kent Comprehensive Water Plan and Conservation Element
7. Kent City Code Section 6.02 Required Public Improvements
8. Kent City Code Section 6.07 Street Use Permit Requirements
9. Kent City Code Section 14.09 Flood Hazard Protection
10. Kent City Code Section 12.04 Subdivision Code
11. Kent City Code Section 12.05 Mobile Home Parks and 12.06 Recreation Vehicle Parks

12. Kent City Code Section 8.05 Noise Control
13. International Building and Fire Codes
14. Kent Zoning Code
15. Kent City Code Section 7.13 Water Shortage and Emergency Regulations and Water Conservation Ordinance 2227
16. Kent City Code Sections 6.03 Improvement Plan Approval and Inspection Fees
17. Kent City Code Section 7.05 Storm and Surface Water Drainage Utility
18. City of Kent Comprehensive Sewer Plan.
19. City of Kent Fire Master Plan
20. Kent City Code Chapter 11.06, Critical Areas
21. Department of Ecology Tacoma Smelter Plume Model Remedies Guidance (Publication Number 12-09-086-A)

It is recommended that a Determination of Nonsignificance (DNS) be issued for this project.

KENT PLANNING SERVICES

August 16, 2019

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APPENDIX E

Water Use Efficiency Program

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WATER USE EFFICIENCY PROGRAM

INTRODUCTION

The City of Kent (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 2007 via its City Council Public Works Committee and last updated its WUE Program as part of its 2011 WSP. The goals and objectives of the City's previous WUE Program, which extends to the approval of this WSP, are as follows.

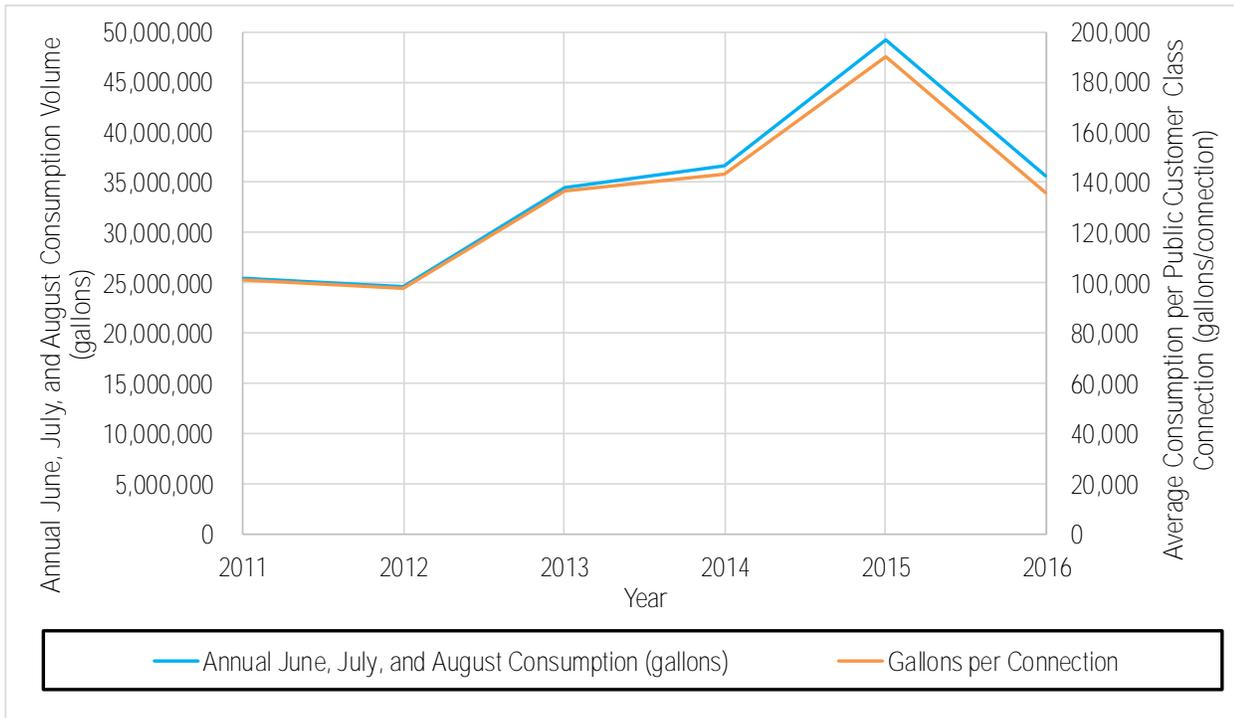
- Reduce water use by public agencies during the months of June, July, and August by 0.5 percent per year.
- Maintain system-wide DSL at less than 6 percent per year.

Results of the existing WUE program indicate that public consumption in June, July, and August (including the City, school, and government entities) decreased in 2012 and 2016, but increased in 2013, 2014, and 2015 as shown in **Table 1**. The average change over the last 6 years is an approximate 10 percent increase in public customer class consumption in June, July, and August. However, with consideration for additional public water service connections added each year, the average consumption per public customer class connection has increased 9 percent over the last 6 years. **Chart 1** shows the combined June, July, and August consumption totals for 2011 through 2016, and the average consumption per public customer class connection for the same period.

Table 1
Public Customer Class Historical June, July, and August Consumption

Period	Gallons	% Change from Year Prior
June 2011	4,848,536	--
July 2011	11,202,048	--
August 2011	9,421,808	--
Total 2011	25,472,392	--
June 2012	5,971,284	--
July 2012	8,613,968	--
August 2012	10,076,308	--
Total 2012	24,661,560	-3.2%
June 2013	6,966,124	--
July 2013	16,337,816	--
August 2013	11,232,716	--
Total 2013	34,536,656	40.0%
June 2014	6,250,288	--
July 2014	16,117,156	--
August 2014	14,242,668	--
Total 2014	36,610,112	6.0%
June 2015	11,339,680	--
July 2015	20,098,012	--
August 2015	17,753,032	--
Total 2015	49,190,724	34.4%
June 2016	8,928,876	--
July 2016	15,113,340	--
August 2016	11,636,636	--
Total 2016	35,678,852	-27.5%

Chart 1
Public Customer Class Historical June, July, and August Consumption Volume



System-wide DSL is discussed in **Chapter 4** and has been less than 6.0 percent each year since 2011, and the City’s 3-year rolling average between 2014 and 2016 is 5.0 percent. Based on the relative success the City has had in achieving its WUE goals and objectives, an additional goal has been established that includes the City’s multi-family residential customer class. The proposed WUE goals for the 2018 to 2028 water system planning cycle are as follows.

- Reduce water use by public agencies during the months of June, July, and August by 0.5 percent per year.
- Reduce multi-family residential water consumption by 1.0 percent per year.
- Maintain system-wide DSL at less than 6.0 percent 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 14,907 water service connections in 2016, which is the base year of the City's WSP. Based on the number of connections, at least nine 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 10.0 percent 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 implemented seasonal water rates every May through September to discourage excess water use during peak months, but eliminated that practice to stabilize revenue throughout the year and provide more certainty on rates to customers. The 2018 residential rate structure is shown in **Table 2**, and the 2018 rate structure for non-single-family residential customers is shown in **Table 3**.

Table 2
2018 Single-family Residential Rate Structure

Monthly Meter Access Fees	
Meter Size	Base Rate
3/4" or less	\$23.71
1"	\$37.12

Monthly Dedicated Fire Line Fees	
Size	Rate
3/4" or less	\$2.82
1"	\$3.29

Water Usage Fee per 100 Cubic Feet	
Consumption	Rate
0 to 800 cubic feet	\$2.46 per 100 cubic feet
800+ cubic feet	\$4.84 per 100 cubic feet

Table 3
2018 Non Single-family Residential Rate Structure

Monthly Meter Access Fees	
Meter Size	Base Rate
3/4" or less	\$29.80
1"	\$43.21
1.25"	\$43.21
1.5"	\$76.75
2"	\$116.99
3"	\$184.06
4"	\$277.96
6"	\$412.11
8"	\$546.25
10"	\$680.40

Monthly Dedicated Fire Line Fees	
Size	Rate
3/4" or less	\$2.82
1"	\$3.29
1.25"	\$4.93
1.5"	\$6.57
2"	\$10.52
3"	\$26.29
4"	\$52.56
6"	\$105.13
8"	\$177.41
10"	\$262.83

Water Usage Fee per 100 Cubic Feet	
Consumption	Rate
0 to 800 cubic feet	\$2.46 per 100 cubic feet
800+ cubic feet	\$4.84 per 100 cubic feet

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 King County's South Treatment Plant in Renton for treatment and disposal. King County operates a reclaimed water program at the South Treatment Plant that provides some reclaimed water for irrigating athletic fields and nurseries, and street sweeping. No reclaimed water is currently provided to the City, but that opportunity may exist in the future.

The City investigated other opportunities for reclaimed water use in 2007 and determined that there were no economically feasible options at that time.

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 11 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 46 WUE measures (**Table 4**), which is greater than the requirement of 9 WUE measures based on the number of service connections.

Water Bill Showing Consumption History

The City has presented consumption history charts and information on water bills for all customer classes since 1998 and plans to continue to do so in the future.

Washing Machine/Toilet/Sprinkler Rebates

The City offers a \$75 mail-in rebate for customers to replace old washing machines with more energy efficient horizontal axis washing machines. As of 2018, eligibility was limited to applicants who purchased a qualifying Energy Star washing machine and installed it in a residence in the City's water service area.

The City also offers a toilet rebate up to \$50 per toilet to incentivize customers to purchase U.S. Environmental Protection Agency (EPA) certified WaterSense toilets. As of 2018, eligibility was limited to customers who purchased a WaterSense toilet and used it to replace an existing 5 gallon-per-flush toilet installed prior to 1993 in the City's water service area.

In one instance, the City observed a 10- to 15-percent reduction in water consumption by replacing 247 toilets in a single apartment complex. The City has prepared a list of over 75 additional multi-family complexes constructed prior to 1993 that will be eligible for this rebate. This rebate is expected to be a key component of achieving the City's multi-family residential WUE goal of reducing multi-family residential water consumption by 1.0 percent per year.

The City also offers rebates for public customers to install high-efficiency sprinkler system products.

School Outreach

Since 2000, the City has co-sponsored the annual H₂O Festival, which presents WUE information to approximately 1,500 elementary school children from the City and adjacent communities every year. The program educates children about the importance of WUE and empowers youth to participate in water conservation.

Speakers Bureau

The City staff gives periodic presentations about water conservation practices to local groups and organizations on an as-requested basis. The City has prepared a variety of outreach materials for this purpose, and employs a full-time conservation specialist that is available for this purpose.

Advertising

The City distributes WUE information through its regular billing system and advertises its fixture rebate programs and education programs on its website. The City also advertises King County's Natural Yard Care program on its website, which is a program that strives to reduce water consumption for irrigation.

Displays at Fairs or Events

The City makes staff available to present water conservation materials and displays at local fairs and events, and even distributes brochures and water conservation kits.

Customer Leak Detection Education

The City's utility workers regularly inspect meters for abnormal usage and recheck meters when excessive consumption is evident. Staff are encouraged to contact homeowners who have potential leaks and distribute informational pamphlets on how to check for leaks and read their own meters. The City also provides the same information to customers who contact the City with questions.

Water Use Audits for Large Users

The City provides water conservation audits for large users and maintains a variety of financial incentives for commercial or industrial users to implement conservation measures.

Rain Sensors

Section 15.07.040(C) of the City Code requires irrigation systems constructed as parts of new developments to include rain sensors to promote water conservation.

Landscape Ordinances

Section 15.04.180(20) of the City Code prohibits activities that violate water conservation management practices in the development of agricultural and residential lands.

Table 4
Selected WUE Measures

Mandatory WUE Measures					
Measure	Implementation Status				
Source Meters Installed	✓				
Service Meters Installed	✓				
Meter Calibration Compliance	✓				
Water Loss Control Action Plan	Not Applicable				
Customer Education	✓				
WUE Measures that Must Be Evaluated					
Measure	Evaluation Status				
Rate Structure	✓				
Reclamation Opportunities	✓				
Selected WUE Measures					
Measure	Implementation Status				
	Single-family Residential	Multi-family Residential	Commercial	Industrial	Public
Rate Structure	✓	✓	✓	✓	✓
Water Bill Showing Consumption History	✓	✓	✓	✓	✓
Washing Machine/Toilet/Sprinkler Rebates	✓	✓			✓
School Outreach	✓	✓			
Speakers Bureau	✓	✓	✓	✓	✓
Advertising	✓	✓	✓	✓	✓
Displays at Fairs or Events	✓	✓	✓	✓	✓
Customer Leak Detection Education	✓	✓	✓	✓	✓
Water Use Audits for Large Users			✓	✓	✓
Rain Sensors	✓	✓	✓	✓	✓
Landscape Ordinances	✓	✓			✓

WATER USE EFFICIENCY PROGRAM SCHEDULE AND BUDGET

The WUE measures described above and selected for implementation by the City are summarized in **Table 5** with their corresponding schedule and budget. The successful implementation of this program is expected to:

- Reduce water use by public agencies during the months of June, July, and August by 0.5 percent per year;
- Reduce multi-family residential water consumption by 1.0 percent per year; and
- Maintain system-wide DSL at less than 6 percent per year.

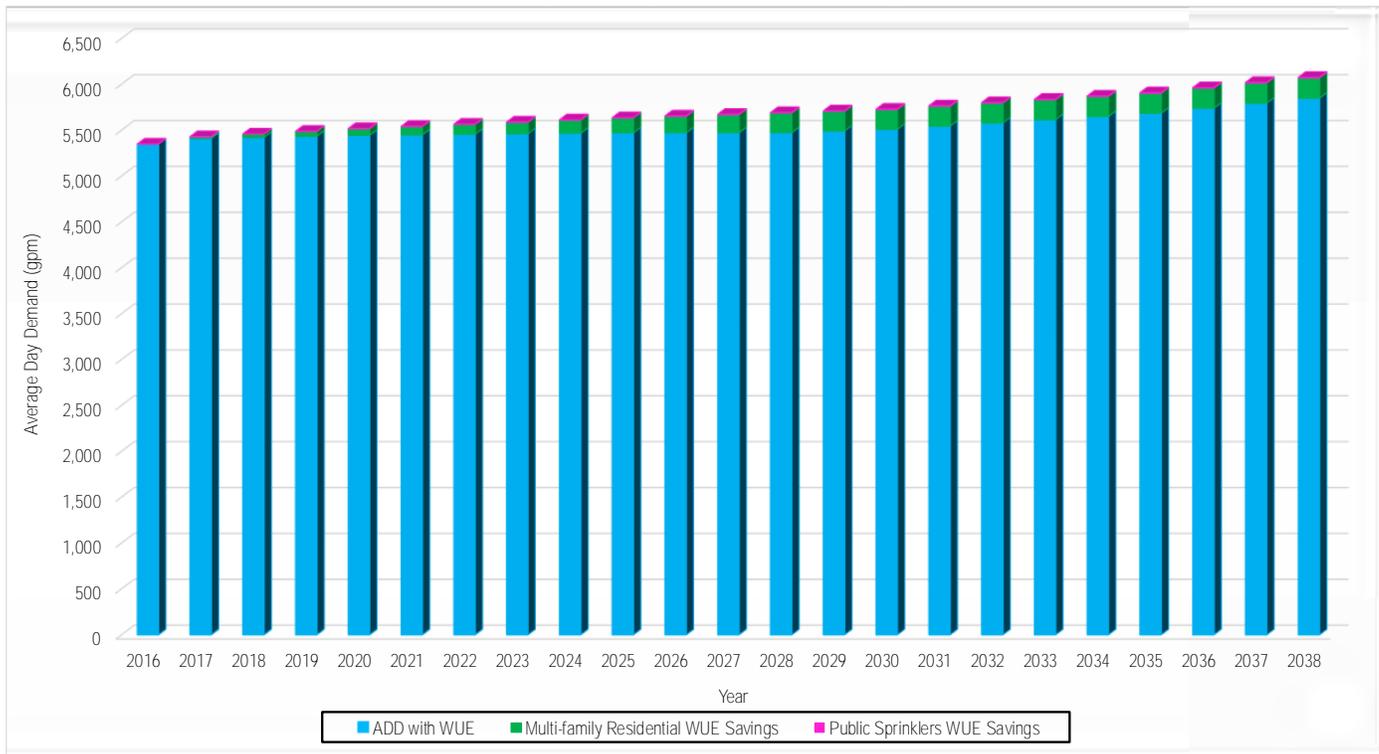
Accomplishing these goals is expected to reduce the system-wide average daily demand by approximately 3.8 percent by 2028, with the annual savings from each goal shown in **Chart 2**.

Table 5
WUE Schedule and Budget

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
Rate Structure	Ongoing	Not Applicable
Water Bill Showing Consumption History	Ongoing	Not Applicable
Washing Machine/Toilet/Sprinkler Rebates	Ongoing	\$100,000 per Year
School Outreach	Ongoing	\$35,000 per Year
Speakers Bureau	Ongoing	\$5,000 per Year
Advertising	Ongoing	\$35,000 per Year
Displays at Fairs or Events	Ongoing	\$5,000 per Year
Customer Leak Detection Education	Ongoing	O&M Funded
Water Use Audits for Large Users	Ongoing	\$35,000 per Year
Rain Sensors	Ongoing	Not Applicable
Landscape Ordinances	Ongoing	Not Applicable

O&M = Operations and Maintenance

Chart 2
WUE Program Projected Water Savings



APPENDIX F

Cross-Connection Control Program

Please find *Appendix F – Cross-Connection Control Program* on the flash drive that accompanies this Water System Plan.

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CITY OF KENT CROSS-CONNECTION CONTROL PROGRAM INTRODUCTION

Congress passed the “Safe Drinking Water Act” with the intent of protecting the public health and welfare of all public water supply users in the United States. The Environmental Protection Agency (EPA) interpreted this mandate to mean that certain contaminants should not be found in water “delivered to the free flowing outlet of the ultimate user.” Thus, these contaminants became the responsibility of the water purveyor (City of Kent). The EPA specifically exempted contaminants added to the water under circumstances controlled by the user (except for plumbing corrosion by-products). This was not, however, intended to absolve the purveyor of a responsibility to conduct an aggressive cross connection control program.

In cross connection control, the City of Kent responsibility is to protect the water distribution system from contamination. The greatest public health risk lies in the introduction of a contaminant into the public water supply system because the water distribution system can provide the conduit for the spread of the contaminant to a large population. Cross connections within the customer’s plumbing system and within the purveyor’s distribution system pose a potential source for the contamination of the public water supply.

Once water leaves the control of the water purveyor (i.e., leaves the distribution system), the water purveyor must consider the possibility that the water could become contaminated. Accordingly, the water purveyor must consider the plumbing systems of all customers to be a potential health hazard. The hazard, and thus the health risk, may vary from minor to severe. The purveyor’s cross connection control program should be based on the supposition that all customers should be isolated at the property line (meter) with an approved air gap, unless the purveyor is satisfied with the level of protection provided by the customer. Notwithstanding this basic supposition, the water purveyor should recognize the practical needs of the customer, and the responsibility of other regulatory agencies to protect the customer’s plumbing system from becoming contaminated.

The water purveyor’s degree of satisfaction in the customer’s reduction of their cross connection risk, is a factor in the determination by the purveyor that the purveyor’s requirement for premises isolation may be reduced from an approved air gap, to a reduced pressure backflow assembly, double check valve assembly, or no premises isolation.

To protect occupants of the customer's premises, it is necessary to isolate areas of the premises and/or each outlet rather than to install backflow protection at the meter. Generally, the prevention of contamination of a water distribution system or potable water system in a building is of concern to the following:

- The water purveyor (City of Kent Public Works Operations Water Section)
- The plumbing inspector (City of Kent Building Services)
- The local health inspector (King County Health Department)
- Worker safety regulations (Washington State Department of Labor & Industries)
- The agency with oversight of water systems (Wash. State Dept. of Health)

A Cross connection program may be administered by any or all of the above. To avoid confusion, it is desirable for the water purveyor to have a joint or cooperative program with the other agencies having jurisdiction. Unfortunately, although each has the same overall goal of preventing contamination, each has a different enforcement criteria, authority and responsibility that may prevent a subordination of its authority to another agency.

The need to eliminate cross connections as a source of potential contamination has been long recognized in plumbing design and plumbing code enforcement. However, plumbing codes handled cross connections only in very general terms. Few details are provided to specify methods of identifying and preventing cross connections. This is because it is impractical to cover in a plumbing code all of the information needed to control cross connections.

The plumbing code addresses the plumbing design and installation in new buildings. Generally, once a building occupancy permit is given, plumbing code jurisdiction effectively ceases until a permit is requested to modify the plumbing system. Changes to a plumbing system are often made without a permit. New equipment may be added. Piping, fixtures and appliances may wear out, malfunction, or be relocated. New cross connections may then be created. Backflow prevention assemblies and devices installed under the plumbing code to protect the public could be removed, bypassed or fail to operate due to the lack of maintenance. For these reasons, it is recommended that a water purveyor not place full reliance on the enforcement of the plumbing code to protect the water distribution system from contamination through cross connections.

The history of cross connection control has provided regulatory authorities with sufficient information to establish a list of those premises where high health hazard cross connections exist, or where the potential hazard is so great that these premises must be isolated from the water purveyor's system. Some states and provinces have established mandatory protection for these premises. However, it is important that each premise be surveyed individually to assess the degree of hazard and the corresponding backflow prevention assembly requirements. Never assume that all premises of the same kind will require the same type of backflow protection.

Experience has shown that the water purveyor is in a unique position to implement and administer a cross connection control program. The water purveyor has authority to supply water to a customer and to establish standards and remedies for a breach of those standards. The City of Kent cross connection control program is needed to effectively deal with all aspects of the public health risk posed by cross connections.

PUBLIC WORKS OPERATIONS

STANDARD OPERATING PROCEDURES

9.0 Water

9.16 Cross Connection Control Program

PURPOSE: The purpose of the City of Kent (the City) cross-connection control program (CCP) is to protect the public water system from contamination via cross-connection. Ordinance No. - 2394 gives the City the authority to operate the CCP, which meets the requirements of the State of Washington regulation WAC 246-290-490.

9.16.1 Policy

The City will ensure that cross-connections between the distribution system and a customer's premises are eliminated or controlled by the installation of a State of Washington approved backflow preventer that is equal to the degree of hazard. The City will operate a combination program whereby premises isolation requires backflow protection with an Air Gap (AG) or a Reduced Pressure Backflow Assembly (RPBA). In-premises isolation backflow protection (within the customer's property lines) will be permitted if there is no high health hazard and the CCS coordinates with the Local Administrative Authority (LAA).

The final building construction approval and occupancy shall not be granted by the Local Administrative Authority until final cross-connection compliance is determined by site inspection performed by a Cross-Connection Control Specialist.

The customer is responsible for the expense to protect the public water system from backflow contamination by installing, maintaining and testing backflow assemblies in accordance with the City Cross-Connection Program. Failure of the customer to cooperate in the installation, maintenance, repair, inspection or testing of backflow prevention assemblies required by the City may be grounds for termination of water service to the premises.

In the event the water purveyor must initiate action to enforce compliance with the Ordinance on this program, all costs incurred enforcing the action shall be borne by the property owner/business owner.

The City will refer to the Pacific Northwest Section AWWA Cross-Connection Control Manual Accepted Procedure and Practice (most current edition) and the current Manual of Cross-Connection Control (USC Manual) on issues concerning cross-connection control.

The City will ensure that at least one person certified as a Cross-Connection Specialist (CCS) is provided to develop and implement the cross-connection control program. Responsibilities include:

1. Administer the Cross-Connection Control Program (CCP).
2. Evaluate service connections for backflow hazards.
3. Assess customer's premises for cross connections and potential for cross connections and determine action to be taken.
4. Reporting on the annual progress of the CCP.
5. Public Education.
6. Investigate water quality concerns where backflow is suspected.
7. Keep current records of all backflow preventer testing, air gaps installed in-lieu of approved backflow preventers, test kit calibration, and tester certification.
8. Responsible to eliminate or control cross-connections between the distribution system and the customer's premises.
9. Ensure quality control for backflow testing.
10. Complete Backflow Incident Response Forms and inform DOH, and the LAA of incidents involving contamination to the public water system.
11. Training and continued education

A. Responsibilities

The City will not be responsible for any loss or damage caused by any negligence or wrongful act of a customer or his authorized representative in installing, maintaining, operating or using any and/or all appliances, facilities, or equipment for which water service is supplied. The customer will be held responsible for health and safety impacts on the water system as well as damage to the City facilities and other property resulting from the use and operation of appliances and facilities on the customer's premises, including damage caused by steam, hot water, chemical, etc.

9.16.2 Service Connections

Water service connections to the City public water system must meet the state of Washington Cross-connection Control requirements WAC-246-290-490. The City shall ensure that the customer installs a State of Washington approved backflow preventer that is equal with the degree of hazard. All high hazard service connections to the City public water system are required to have premises isolation backflow protection that shall be a CCS approved air gap (AG) or a State of Washington approved RPBA directly behind the City water meter installed by the customer at the customer's expense. The RPBA shall be installed to the City specifications and the customer is responsible to have the RPBA tested in accordance with the City cross-connection control test schedule annually or as required by City and State regulations. In-premises isolation will be permitted if the criteria for premises isolation is met and the CCS and LAA agree that the level of backflow protection is equal to the hazard.

There is no grandfathering that can exempt an existing cross-connection violation from meeting current cross-connection requirements of the adopted codes. Where public health protection for the public water system is required, no facility shall be exempt from compliance with current standards.

A cross-connection permit is required for the installation or alteration of a backflow prevention assembly. Backflow assembly permits may be acquired at the City Permit Center located at 400 W Gowe St.

The City shall ensure that the customer installs approved backflow preventers that equal the degree of hazard in accordance with the following time frame:

- For a cross-connection that poses an **immediate** or **direct** high hazard, the City will terminate water service immediately and will not restore service until the cross-connection is protected to the CCS's satisfaction.
- High health cross-connection hazards within 30 days of the City notifying the customer of the high health cross-connection hazard, or to the CCS's discretion.
- Low health cross-connection hazards within 90 days of the City notifying the customer of the cross-connection hazard or to the CCS's discretion.

9.16.3 Schedule for Evaluation and Continued Reevaluation

- a. Facilities that pose an immediate high health hazard cross-connection have priority.
- b. Facilities with severe or high health hazard cross-connections.
- c. Facilities with high hazard equipment will be evaluated before facilities with no high hazard equipment.
- d. Annually when backflow assembly testing is due.
- e. When there is a history of backflow incidents.
- f. When there is a history of failed backflow test reports.
- g. When there is a change in the use of the premises.
- h. When a plumbing permit is issued.
- i. When there is a backflow incident.
- j. Known sites with high or severe hazards will have a routine evaluation once a year as time and resources allow.

9.16.4 New Connections

The City representative will review all pre-application documents, new construction plans submitted to the City, all water service applications, City business license applications and any other documents which may indicate that a requirement for cross-connection control exists. Consultations prior to service installation will be conducted to assist the customer in meeting

State Regulations and the City Cross-Connection Control Ordinance to minimize retrofits and revisions.

For new connections made on or after the effective date of these regulations, the following conditions shall be met before water service is provided;

1. They shall be controlled by eliminating the cross-connection or by installation of approved backflow preventers equal with the degree of hazard.
2. A satisfactory completion of a test by a backflow assembly tester (BAT) must be submitted to the City in accordance with the description of backflow preventer inspection and testing.

Note: Water service will not be provided to new construction until the cross-connection control requirements are addressed satisfactorily.

9.16.5 Existing Connections

The City CCS will survey the premises to determine whether the requirement for cross-connection control exists.

For existing connections where the City identifies a high health cross-connection hazard, they shall be controlled by installation of approved backflow preventers equal with the degree of hazard. Photos or drawings indicating the installation point will be provided by the inspector.

Backflow Preventers shall be installed within thirty days of the City notifying the consumer of the high health cross-connection hazard; or in accordance with an alternate schedule acceptable to the City.

For existing connections where the City identifies a low health cross-connection hazard, they shall be controlled by installation of approved backflow preventers equal with the degree of hazard with a schedule acceptable to the City. Photos or drawings indicating the installation point will be provided by the inspector.

9.16.6 Existing Commercial Connections

Existing commercial connections that do not have a backflow assembly and any cross-connection hazard, do not need to have a backflow assembly installed. This will be determined by a field evaluation and requires continued reevaluations. At the time of remodel, reconstruction, ownership change etc., the connection may be required to have or convert to premises isolation backflow protection with an AG, RPBA, or RPDA. If the existing commercial connection is found to have a high health hazard cross-connection an AG, RPBA, or RPDA shall be required.

The City may allow a State of Washington approved DCVA or DCDA for premises isolation, if the DCVA is **already** installed correctly and there are **no** potential high health hazard cross-connections at the facility (determined by a field evaluation and requires continue reevaluations).

The primary enforcement action will be to work with the LAA or CCS to get the customer to comply. The secondary action shall be to start the process of discontinuing water service. Restricted access would require an Air Gap or RPBA (to be determined by the CCS) behind the City water meter. **No facility is exempt from complying with the most current standards.** The customer is responsible to have the assembly tested annually in accordance with the City cross-connection program.

9.16.7 All Service Connections

Facilities not found on the list below will be evaluated for appropriate premises or in-premises protection based upon potential or actual cross-connection(s) found. The City CCS will coordinate with the Local Administrative Authority (LAA) regarding in-premises protection.

A. Premises Isolation

The minimum criteria required for backflow prevention stated below shall be used during The above mentioned evaluations.

The City will have a CCS assess the degree or hazard posed by the customer’s water system upon the City’s distribution system. The CCS will determine the appropriate method of backflow protection by the following table.

Appropriate Methods of Backflow Protection for Premises Isolation

Degree of Hazard	Application Conditions	Appropriate Approved Backflow Preventer
High health cross-connection hazard	Back siphonage or back pressure backflow	AG, RPBA, or RPDA
Low health cross-connection hazard	Back siphonage or back pressure backflow	AG, RPBA, RPDA, DCVA, DCDA

The following facilities shall have an Air Gap (AG) or a RPBA unless there is no immediate potential for a cross-connection. In that case, a waiver form must be filled out and document why that facility does not need backflow prevention. Such a facility will be kept on record.

High health hazard cross-connections requiring premises isolation by AG or RPBA, including but not limited to the following WAC 246-290-490(4)(b)(iii)(Table 9):

- Agricultural (farms and dairies)
- Beverage bottling plants
- Car washes
- Chemical plants
- Commercial laundries and dry cleaners

Premises where both reclaimed water and potable water are provided.
Film process facilities
Food processing plants
Hospitals, medical centers, nursing homes, veterinary, medical and dental clinics,
and blood plasma centers.
Premises with separate irrigation systems using the City water supply and with
chemical addition such as parks, playgrounds, golf courses, cemeteries, estates,
Etc.
Laboratories
Metal plating industries
Mortuaries
Petroleum processing or storage plants
Piers and docks
Survey access denied or restricted
Wastewater lift stations and pumping stations.
Wastewater treatment plants, radioactive material processing plants or nuclear
reactors. May use RPBA's only when used in combination with an in-plant
approved air gap, otherwise an air gap behind the meter shall be used.
Premises with an unapproved auxiliary water supply interconnected with the
potable water supply.

The City may require backflow preventers equal with the degree of hazard determined by the City to be installed for premises isolation for connections serving premises that have characteristics such as, but not limited to, the following:

- Complex plumbing arrangements or plumbing potentially subject to frequent changes that make it impracticable to assess whether cross-connection hazards exist;
- A repeated history of cross-connections being established or reestablished; or
- Cross-connection hazards that are unavoidable or not correctable, such as, but not limited to tall buildings.
- Facilities not found on the above list and above special cases will be evaluated for appropriate premises or in-premises protection based upon potential or actual cross-connection(s) found. The CCS will coordinate with the LAA personnel regarding in-premises protection.

B. In-Premises Isolation

The City will have a CCS assess the level of protection equal with the degree of hazard.

If the hazard does not need premises isolation as described above and in WAC 246-290-490 then backflow protection provided at the point of hazard in accordance with WAC 51-46-0603 of the

UPC for hazards such as, but not limited to: irrigation systems, swimming pools or spas, ponds and boilers may be used.

For example, the City may accept an approved AVB on a residential irrigation system, if the AVB is properly installed in accordance with the UPC.

9.16.8 Fire Connections

A. Backflow Protection for Fire Systems

The City shall ensure that backflow protection consistent with WAC 51-46-0603 of the UPC is installed. The UPC requires minimum protection as follows: A RPBA or RPDA shall be used for fire protection systems with chemical addition or using unapproved auxiliary water supply. A DCVA or DCDA shall be used for all other fire protection systems.

B. New Fire Connections

For new connections made on or after the effective date of these regulations, the City shall ensure that backflow protection is installed before water service is provided.

C. Existing Fire Connections

With chemical addition or using unapproved auxiliary supplies, the City shall ensure that backflow protection is installed within thirty days of the City notifying the customer of the high health cross-connection hazard or in accordance with an alternate schedule acceptable to the City.

Without chemical addition, without on-site storage, and using only the City water (i.e., no unapproved auxiliary supplies on or available to the premises), the City shall ensure that backflow protection is installed within thirty days of the City notifying the customer of the cross-connection hazard or in accordance with a schedule acceptable to the CCS or at an earlier date if required by the LAA

When establishing backflow protection retrofitting schedules for fire protection systems that have the characteristics listed above, the City may consider factors such as, but not limited to, impacts of assembly installation on sprinkler performance, cost of retrofitting, and difficulty of assembly installation.

9.16.9 Procedures for Field Evaluation (Surveying)

The customer's water system shall be open for a "Field Evaluation" to the City within normal business hours or as otherwise arranged to determine whether cross-connections or other structural or sanitary hazard including violations of these regulations exist.

The initial inspection shall proceed according to the following steps:

1. Contact (form letter, or phone call) each customer explaining the need for a water system inspection, and requesting a convenient date and time for the inspection. Request that someone familiar with the plumbing system be on hand to answer questions, if possible.
2. On the appointed date, the CCS will meet with the customer/owner (and/or individual from the facility that is knowledgeable with the plumbing system). The CCS will inspect any blueprints or drawings of the "In-plant" system that are available, discuss any questions or other problems that arise, and conduct the inspection. The CCS will make a complete physical survey of all exposed piping, the underground system is to be checked as accurately as possible. All lines will be sketched on a field drawing except where intricate plumbing arrangements make it impractical. In this case, an "as-built" drawing will be requested. Each line shall be followed to its end and a survey made to determine whether there are any actual or potential cross-connections or conditions that have the potential to pollute or contaminate the potable water system.
3. Immediately upon completion of the survey, the inspector will orally brief the customer/owner (or representative) of the findings, if desired.
4. The Cross-Connection Specialist will prepare a written report that will include, but is not limited to, the following:
 - a. A list of all cross-connections found in their location, and any optional methods of control.
 - b. Any applicable drawings, sketches, blueprints, photographs etc.
 - c. A summary of the findings, and the recommendations or requirements for corrective actions, and a time (normally 30 days) in which the corrective action must be completed.
 - d. **Immediate** or **direct** Cross Connections will be isolated immediately at the source or by any other means of isolation and will not be returned to service until backflow prevention has been installed, inspected and tested determined by the CCS.
5. The Cross Connection specialist shall mail one copy of the completed report and a copy of the City installation specification requirements to the customer, water system manager and the LAA. The completed report shall include the recommendations and requirements for corrective actions and a corrective action completion date. One copy of the completed report shall reside in the CCS's permanent cross-connection file for the facility.
6. On the corrective action completion date, the CCS shall contact the customer and ask if the corrective actions have been completed. If the corrective actions have been completed, the

CCS shall make a re-inspection of the facility. If the corrective actions have not been completed, a new completion date will be set, or enforcement action begun, depending on the degree of hazard and other mitigating circumstances.

7. When all required actions have been completed, the file copy of the completed actions shall be placed in the cross-connection control file for the facility, and a copy will be sent to the LAA together with any completed backflow assembly test report forms.
8. Re-inspection of each premise found to be subject to this procedure shall be accomplished annually or more often if the degree of hazard so indicates.
9. If entry is refused the LAA shall secure entry and premise isolation shall be required (see Appendix F Enforcement Action).
10. If a cross-connection is a high hazard then the plumbing causing the cross-connection must be disconnected immediately. If the disconnection is disregarded water may be shut off and locked out until the cross-connection is disconnected.
11. If corrections have not been made by the completion date, the CCS will review the status with the Water Superintendent and Manager before filling out an "Order to Correct Violation Notice."
12. If corrections have not been made by the completion date, and the water superintendent and manager give permission, the CCS shall fill out an "Order to Correct Violation Notice" and notify the fire marshall of the proposed water shut-off.
13. Upon re-inspection, if the violation has been corrected, the CCS shall update the notice and a copy sent to the owner and/or occupant, LAA, Water System Manager and into the cross-connection control file.
14. The City purveyor reserves the right to suspend water service at any time during the enforcement case if it is determined that the public water system is in danger of contamination.
15. If water is turned off due to non-compliance, and the violation **is corrected**, the customer shall do the following to have water service restored:
 - A. Call the CCS for a violation correction re-inspection.
 - B. Upon re-inspection if the violation has been corrected, the notice shall be updated by the CCS and a copy given to the customer, LAA, Water System Manager and into the cross-connection control file.
 - C. Water service may be restored by the City.
16. If water is turned off, the BAT must make arrangements with the CCS to restore water for testing purposes only.

If water is turned off due to non-compliance, and the violation **is not corrected**, the CCS shall update the notice, give a copy to the customer, LAA, the cross-connection control file and leave the water turned off and locked out.

9.16.10 Backflow Preventers

The City will eliminate cross-connections whenever possible. When cross-connections cannot be eliminated, they will be controlled by installation of approved backflow preventers equal with the degree of hazard. The following table will be used to determine the appropriate method of backflow protection.

**Appropriate Methods of
Backflow Protection for Premises Isolation**

Degree of Hazard	Application Conditions	Appropriate Approved Backflow Preventer
High health cross-connection hazard	Back siphonage or back pressure backflow	AG, RPBA, or RPDA
Low health cross-connection hazard	Back siphonage or back pressure backflow	AG, RPBA, RPDA, DCVA, DCDA

Approved backflow preventers will be selected and installed in accordance with the following requirements:

WAC 246-290-490, the most current edition of the Accepted Procedure and Practice in Cross-Connection Control (prepared by the Cross-Connection Control Committee of the Pacific Northwest Section American Water Works Association) which shall be used as a guideline, as well as the University of Southern California manual, and the Uniform Plumbing Code.

The City will monitor all backflow assemblies. These assemblies are required to have a backflow assembly test performed at least annually and the City CCS may require backflow assembly testing more frequently in cases such as:

- a. Failed backflow assembly tests.
- b. Backflow contamination incident.
- c. High hazards.
- d. Required by CCS

A. Approval of Backflow Preventers

The City requires backflow preventers protecting the public water systems to be on the current State of Washington approved list unless the next paragraph applies.

The City may rely on testable backflow prevention assemblies that are not currently approved by the State of Washington, if the assemblies:

- a. Were included on the department and/or USC list of approved backflow prevention assemblies at the time of installation.
- b. Have been properly maintained.
- c. Are equal with the City assessed degree of hazard.
- d. Have been inspected and tested at least annually and have successfully passed the annual tests.

The City shall ensure that an unlisted backflow assembly is replaced by an approved assembly equal with the degree of hazard, when the unlisted assembly:

- a. Does not meet the conditions of (a) through (d) above of this section.
- b. Is moved.
- c. Cannot be repaired using spare parts from the original manufacturer.

B. Installation of Backflow Preventers

The City shall ensure that approved backflow preventers are installed in a manner that:

Facilitates their proper operation, maintenance, inspection, and in-line testing (as applicable) using standard installation procedures acceptable to the department such as those in the USC Manual or PNWS-AWWA Manual; ensures that the assembly will not become submerged due to weather-related conditions such as flooding; and ensures compliance with all applicable safety regulations.

The City shall ensure that approved backflow assemblies for premises isolation are installed at a location adjacent to the meter or property line or an alternate location acceptable to the City.

When premises isolation assemblies are installed at an alternate location acceptable to the City, the City shall ensure that there are no connections between the point of delivery from the public water system and the approved backflow assembly, unless the installation of such a connection meets the City cross-connection control requirements and is specifically approved by the City.

The City shall ensure that by-pass piping installed around any approved backflow preventer is equipped with an approved backflow preventer that affords at least the same level of protection as the approved backflow preventer that is being bypassed and complies with all applicable requirements of this section.

Backflow preventers shall be installed to the City specifications and in compliance with the LAA. The City requires that when a backflow assembly that protects the public water system is improperly installed, defective, an unapproved assembly, or does not equal the degree of hazard, it shall be properly reinstalled, repaired, overhauled, or replaced.

The City requires a Cross-Connection Specialist (CCS) to inspect new installations of Reduced Pressure Backflow Assemblies (RPBA's), Reduced Pressure Detector Assemblies (RPDA's), Double Check Valve Assemblies (DCVA's), Double Check

Detector Assemblies (DCDA's), Pressure Vacuum Breaker Assemblies (PVBA's), and Spill Resistant Vacuum Breaker Assemblies (SVBA's) that protect the public water system to ensure that protection is equal with the degree of hazard and that installation is in accordance with standards. These assemblies are required to be tested:

- a. At the time of installation.
- b. Annually after installation, or more frequently, if required by the City for facilities that pose a high health cross-connection hazard or for assemblies that repeatedly fail.
- c. After a backflow incident.
- d. After an assembly is repaired, reinstalled, or relocated.

C. Inspection and/or Testing of Backflow Preventers

A CCS inspects backflow preventer installations to ensure that protection is provided equal with the assessed degree of hazard.

A BAT tests approved backflow prevention assemblies for proper operation.

The Backflow Assembly Tester (BAT) or a Cross-Connection Specialist (CCS) inspects:

- a. Air gaps installed in-lieu of approved backflow prevention assemblies for compliance with the approved air gap definition.
 - b. Backflow prevention assemblies for correct installation and approval status.
1. The City shall ensure that inspections and/or tests of approved air gaps and approved backflow assemblies are conducted:
 - a. At the time of installation.
 - b. Annually after installation, or more frequently if required by the City for facilities that pose a high health cross-connection hazard, or for assemblies that repeatedly fail;
 - c. After a backflow incident, and after an assembly is repaired, reinstalled, or relocated or an air gap is replumbed. The City will notify customers annually before their due date informing them that their backflow preventer is due to be tested, However, this reminder process does not relieve the owner of the responsibility for testing their device(s) annually and providing the test reports to the City.

2. The City shall ensure that inspections of Atmospheric Vacuum Breakers (AVB's) that protect the public water system installed on irrigation systems are conducted:
 - a. At the time of installation;
 - b. After a backflow incident; and
 - c. After repair, reinstallation, or relocation

The City shall ensure that approved backflow prevention assemblies are tested using procedures acceptable to the department, such as those specified in the most recently published edition of the USC Manual. When circumstances, such as, but not limited to, configuration or location of the assembly, preclude the use of USC test procedures, the City may allow, on a case-by case basis, the use of alternate (non-USC) test procedures acceptable to the department. These procedures must be approved by the City prior to proceeding with any testing.

The City shall ensure that results of backflow prevention assembly inspections and tests are documented and reported on a form and in a manner acceptable to the City.

The City shall ensure that an approved backflow prevention assembly or AVB, whenever found to be improperly installed, defective, not equal with the degree of hazard, or failing a test (if applicable) is properly reinstalled, repaired, overhauled, or replaced.

The City shall ensure that an approved air gap, whenever found to be altered or improperly installed, is properly replumbed or, if equal with the degree of hazard, is replaced by an approved RPBA.

9.16.11 Backflow Assembly Testing and Quality Control

To meet the WAC regulation the City requires the following:

1. All backflow assemblies that protect the public water system require a backflow assembly test annually by a State of Washington certified tester in accordance with the City Cross-Connection Program.
2. The City will only accept backflow assembly test reports from current State of Washington certified Backflow Assembly Tester's (BAT's)..
3. Each tester is required to have current BAT certification and current test kit calibration on file with the City.
4. It is the customer's responsibility to ensure that the backflow test reports are submitted to the City in a timely manner. Test reports submitted more than 30 days after the test has been performed may not be accepted (unless approved by the City).

5. All test report forms (Appendix H) must be filled out with:
 - a. Customer's name or property owner.
 - b. Address.
 - c. Location of the assembly on the premise.
 - d. Phone number.
 - e. Assembly manufacturer.
 - f. Model.
 - g. Size.
 - h. Serial number.
 - i. Test kit calibration date.
 - j. Test kit model and serial number.
 - k. BAT certification number
 - l. Date of test.
 - m. Line pressure.
 - n. Pressure that the check valves held at.
 - o. RPBA's opening pressure of the relief valve and measurement of the *minimum air gap.
 - p. Results of the test, did the assembly pass or fail.
 - q. Type of assembly
 - r. BAT phone number
 - s. BAT printed name and signature.

* *Twice the diameter of the supply piping measured vertically from the overflow rim.*
6. The City will only accept tests that have been performed using the most recent State approved (U.S.C.) test procedures. When circumstances preclude the use of State approved test procedures, the City may allow on case by case basis, the use of alternate test procedures acceptable to the City.

9.16.12 Backflow Incident Response Procedures

When a water quality problem occurs where backflow is the suspected cause the City will ensure that:

1. The Cross-Connection Specialist will investigate the water quality problem as soon as possible and notify the Water System Manager of the findings.
2. Isolate the area of contamination and flush thoroughly, monitor water quality parameters until satisfactory.
3. The City shall notify the Local Administration Authority (LAA) and the Department of Health as soon as possible, but no later than the end of the next business day when a backflow incident is known by the City to have contaminated the public water system or occurred within the premises of a customer served by the City.
4. The City will document details of backflow incidents on a DOH approved form (such as the most recent edition of the PNWS-AWWA Manual).
5. Include all backflow incident report(s) in the annual cross-connection program summary report.
6. If entry is refused, the CCS shall notify the LAA who shall secure entry and premises isolation will be needed (See Appendix F Enforcement Action)
7. If entry cannot be made, the CCS can perform temporary water quality tests at the meter if needed.

9.16.13 Cross-Connection Public Education Program

The City shall implement an education program for the City's customer. The education program will consist of but not limited to:

1. Sharing knowledge and training with inspectors, engineers, architects, plumbing contractors, suppliers and, irrigation contractors and suppliers, fire protection contractors, wastewater personnel and the customer.
2. Educating the staff of the City. Utilize locators, meter readers, maintenance workers, Building Official, Inspectors and Engineering staff to assist in identifying cross-connections.
3. Public education using billing inserts, newspapers, newsletters, and brochures.
4. Have education information available for community events.

9.16.14 Cross-Connection Control Record Keeping

The CCS and the LAA will be responsible for entering their own data into the respective data bases.

The CCS shall develop and maintain cross-connection control records that include:

A. Service Connection Master List

A master list of service connections where the City relies upon approved backflow preventers to protect the public water system from contamination by premises isolation and/or in-premises protection and the assessed hazard level of each, as well as an inventory of all water system service connections and summary of the history of inspections at each location. The required backflow preventer(s) records shall be kept as long as the premises pose a cross-connection hazard to the City distribution system.

1. The Inspection Services Section of Public Works Operations shall establish a separate jacket file, for each individual customer that requires the installation of a backflow prevention assembly. Jacket files shall be filed by section in numerical order. The following information shall be maintained in each individual jacket file:
 - a. Copies of all correspondence with customer relative to cross-connection control.
 - b. Copies of inspection reports complete with field drawings.
 - c. Copy of application and completed installation order.
 - d. Copies of test reports on all assemblies.
2. All backflow assembly test report forms shall be entered into a computer program that tracks backflow testing and dates of tests and DOH requirements for the annual summary reports.

B. Inventory Information

Records regarding inventory information shall be kept for five years or the life of the approved backflow preventer whichever is longer in the City's respective database. Inventory information will be kept on:

1. Approved air gaps installed in-lieu of approved assemblies:
 - a. Exact air gap location, design and dimensions with photos
 - b. Assessed degree of hazard.
 - c. Installation date.
 - d. History of inspections.
 - e. Inspection results.
 - f. Person conducting inspection.

- g. What the assembly protects against

2. Approved backflow assemblies including:

- a. Exact assembly location, design and dimensions with photos
- b. Type of assembly.
- c. Manufacturer.
- d. Model.
- e. Size.
- f. Serial number.
- g. Assessed degree of hazard.
- h. Installation date.
- i. History of inspections, tests, and repairs.
- j. Test results.
- k. Person performing test.
- l. What the assembly protects against

3. Approved AVB's used for irrigation systems including:

- a. Location, design and dimensions with photos
- b. Manufacturer.
- c. Model.
- d. Size.
- e. Installation date.
- f. History of inspections(s).
- g. Person performing inspection.
- h. What the assembly protects against

C. Annual Summary Report

The CCS will complete and submit to the Department of Health an annual summary report. All records will be kept on file for at least ten years. Records will include:

- 1. Types of connections:
 - a. Residential.
 - b. Commercial.
- 2. High health hazard facilities that the water system serves:
 - a. Number of facilities served.
 - b. The number currently protected by an AG or RPBA installed for premise isolation.

- c. The number exempted from premise isolation. The City shall document reasons for not applying premises isolation for facilities that are considered high hazard facilities.
3. AG and AVB's used for irrigation systems that are:
 - a. Installed in the system (total).
 - b. New installations for reporting year.
 - c. Inspected.
 - d. Failing initial inspection, including incorrect installations.
 - e. Re-plumbed or reinstalled correctly.
 - f. Replaced by assembly.
 - g. Replaced by new AVB.
 - h. Re-inspected.
 4. All assemblies (RPBA, RPDA, DCVA, DCDA, PVBA, SVBA):
 - a. Installed in system by type and total.
 - b. New installations during year by type and total.
 - c. Inspected and tested.
 - d. Installed incorrectly.
 - e. Failing initial test.
 - f. Repaired.
 - g. Replaced.
 - h. Replaced with different assembly type.
 - i. Re-tested.
 5. The CCS will record test report information that includes:
 - a. Customer's name.
 - b. Address.
 - c. Location of the assembly.
 - d. Phone number.
 - e. Assembly manufacturer.
 - f. Model.
 - g. Size.
 - h. Serial number.
 - i. Test kit calibration date.
 - j. BAT certification number and signature.
 - k. Date of test.
 - l. Line pressure
 - m. Pressure that the check valve held at.
 - n. RPBA's opening relief valve pressure and measurement of the *minimum air gap
 - o. Results of the test, did the assembly pass or fail.

* *Twice the diameter of the supply piping measured vertically from the*

9.16.15 Reclaimed Water Additional Requirements

The City does not connect, distribute and/or have facilities that receive reclaimed water within their water service area. If in the future this does occur the City will meet any additional cross-connection control requirements imposed by the department under a permit issued in accordance with chapter 90.46 RCW.

Any facility that uses reclaimed water and which is also supplied by the City water supply shall have an A/G or RPBA protecting the City water distribution from that premises.

9.16.16 Notification Procedures for Backflow Assembly Testing

1. Customers with backflow assemblies that protect the public water system will be required to have these assemblies tested in accordance with the City Cross-Connection Program (section 9.16.10) at the owner's expense.
2. A first letter will be sent to the customer annually (usually giving 30 days compliance).
3. If there is no response from the first letter, a second letter (usually giving 15 days compliance) will be sent notifying the customer that the City shall shut their water off.
4. If there is no response to the second letter, a third letter, Mailed Certified, (usually giving 15 days compliance) will be sent notifying the customer that the City shall shut their water off.
5. If there is no response from the third letter, a door hanger will be hung at the property (and the property owner will be notified if rental property) notifying them that the water shall be shut off. The City may elect to use other methods of enforcement, such as requiring "premises isolation" at the customer's water meter.

9.16.17 Tanker Truck & Trailer Requirements

1. Tanker trucks and trailers require a cross-connection inspection in accordance with the City Cross-Connection Program (Section 9.16.10).
2. Tanker trucks and trailers will be assessed the same risk as an unapproved auxiliary supply, a high health hazard.
3. Air Gap or Reduced Pressure Backflow Assembly is the required protection for all tanker trucks and trailers (unless otherwise approved by the City in writing by the Water Superintendent).

9.16.18 Hydrant Use Requirements

Authorization must be obtained to use a City hydrant. Permits can be obtained at the City Public Works office located at 5820 SE 240th St Kent WA 98032 with paid receipt from utility billing located at 400 W Gowe St Kent WA 98032.

1. Any portable pressure spray or cleaning unit that is connected to a hydrant shall be fitted with a double check valve assembly if it does not contain an approved air gap. If chemicals are used, a RPBA must be used in place of the DCVA. Testing of all assemblies must be in accordance with the City Cross-Connection Program (Section 9.16.10)
2. Flushing storm drains and sanitary sewers from a hydrant is prohibited, unless approved by the CCS. In all cases an air gap must separate the potable water piping from the storm or sewer system, as above. The configuration must be approved by the CCS.
3. Filling tanker trucks and trailers from a hydrant is assessed the same risk as an unapproved auxiliary supply; a high health hazard.
4. When using a hydrant to flush newly constructed water mains prior to acceptance by the City and purity sample results, a double check valve assembly is required to separate the potable water system from the new water main. (See Appendix M SOP 9.3 New Water main Connection Procedures).

APPENDIX

- A. DEFINITIONS, ABBREVIATIONS AND ACRONYMS
- B. ORDINANCE# 2394 AND SECTION 7.02 KENT CITY CODE
- C. AGREEMENT BETWEEN CITY OF KENT PURVEYOR AND LAA
- D. WAC 246-290-490
- E. CHAPTER 6 OF THE UNIFORM PLUMBING CODE
- F. ENFORCEMENT ACTION AND BUSINESS PROCESS
- G. INCIDENT RESPONSE FORM
- H. BACKFLOW PREVENTION TEST REPORT
- I. WASHINGTON STATE TEST PROCEDURES
- J. WASHINGTON STATE APPROVED ASSEMBLIES
- K. AWWA RECOMMENDED PROTECTION AT FIXTURES AND EQUIPMENT
- L. CITY OF KENT SPECIFICATIONS
- M. SOP 9.3 NEW WATER MAIN CONNECTION PROCEDURES
- N. REFERENCE GUIDE

DEFINITIONS, ABBREVIATIONS AND ACRONYMS

Per cross-connections which have been extracted from WAC 246-290-010.

“Approved air gap” means a physical separation between the free-flowing end of a potable water supply pipeline and the overflow rim of an open or non-pressurized receiving vessel. To be an air gap approved by the department, the separation must be at least:

- Twice the diameter of the supply piping measured vertically from the overflow rim of the receiving vessel, and in no case be less than one-inch, when unaffected by vertical surfaces (sidewalls); and:
- Three times the diameter of the supply piping, if the horizontal distance between the supply pipe and a vertical surface (sidewall) is less than or equal to three times the diameter of the supply pipe, or if the horizontal distance between the supply pipe and intersecting vertical surfaces (sidewalls) is less than or equal to four times the diameter of the supply pipe and in no case less than one and one-half inches.

“Approved atmospheric vacuum breaker” means an AVB of make, model, and size that is approved by the department. AVB’s that appear on the current approved backflow prevention assemblies list developed by the University of Southern California foundation for Cross-Connection Control and Hydraulic Research or that are listed or approved by other nationally recognized testing agencies (such as IAPMO, ANSI, or UL) acceptable to the local administrative authority are considered approved by the department.

“Approved backflow preventer” means an approved air gap, an approved backflow prevention assembly, or an approved AVB. The terms “approved backflow prevention” “approved air gap,” or “approved backflow prevention assembly” refer only to those approved backflow preventers relied upon by the purveyor for the protection of the public water system. The requirements of WAC 246-290-490 do not apply to backflow preventers installed for other purposes.

“Approved backflow prevention assembly” means an RPBA, RPDA, DCVA, DCDA, PVBA, or SVBA of make, model, and size that is approved by the department. Assemblies that appear on the current approved backflow prevention assemblies list developed by the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research or other entity acceptable to the department are considered approved by the department.

“Backflow” means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer’s potable water system.

“Backflow assembly tester” means a person holding a valid BAT certificate issued in accordance with chapter 246-292 WAC.

“Backpressure” means a pressure (caused by a pump, elevated tank or piping, boiler, or other means) on the consumer’s side of the service connection that is greater than the pressure provided by the public water system and which may cause backflow.

“Backsiphonage” means backflow due to a reduction in system pressure in the purveyor’s distribution system and/or consumer’s water system.

“Combination fire protection system” means a fire sprinkler system that:

- Is supplied only by the purveyor’s water;
- Does not have a fire department pumper connection; and
- Is constructed of approved potable water piping and materials that serve both the fire sprinkler system and the consumer’s potable water system.

“Consumer” means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, “consumer” means the owner or operator of a water system connected to a public water system through a service connection.

“Consumer’s water system” as used in WAC 246-290-490, means any potable and/or industrial water system that begins at the point of delivery from the public water system and is located on the consumer’s premises. The consumer’s water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

“Cross-connection” means any actual or potential physical connection between a public water system or the consumer’s water system and any source of non-potable liquid, solid, or gas that could contaminate the potable water supply by backflow.

“Cross connection control program” means the administrative and technical procedures the purveyor implements to protect the public water system from contamination via cross-connections as required in WAC 246-290-490.

“Cross-connection control specialist” means a person holding a valid CCS certificate issued in accordance with chapter 246-292 WAC.

“Cross-connection control summary report” means the annual report that describes the status of the purveyor’s cross-connection control program.

“Customer” means any person receiving water from a public water system from either the meter, or the point where the service line connects with the distribution system if no meter is present. For purposes of cross-connection control, “customer” means the owner or operator of a water system connected to a public water system through a service connection.

“Department” refers to the Washington State Department of Health (DOH).

“Flow-through fire protection system” means a fire sprinkler system that:

- Is supplied only by the purveyor’s water;
- Does not have a fire department pumper connection;
- Is constructed of approved potable water piping and materials to which sprinkler heads are attached; and
- Terminates at a connection to a toilet or other plumbing fixture to prevent the water from becoming stagnant.

“High health cross-connection hazard” means a cross-connection which could impair the quality of potable water and create an actual public health hazard through poisoning or spread of disease by sewage, industrial liquids or waste.

“In-premises protection” means a method of protecting the health of consumers served by the consumer’s potable water system, located within the property lines of the consumer’s premises by the installation of an approved air gap or backflow prevention assembly at the point of hazard, which is generally a plumbing fixture.

“Local administrative authority” means the local official, board, department, or agency authorized to administer and enforce the provisions of the Uniform Plumbing Code as adopted under chapter 19.27 RCW.

“Low health cross-connection hazard” means cross-connection that could cause an impairment of the quality of potable water to a degree that does not create a hazard to the public health, but does adversely and unreasonably affect the aesthetic qualities of such potable waters for domestic use.

“Premises Isolation” means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer’s water system from the purveyor’s distribution system.

“Reclaimed water” means effluent derived in any part from sewage from a wastewater treatment system that has been adequately and reliably treated, so that as a result of that treatment, it is suitable for beneficial use or a controlled use that would not otherwise occur, and it is no longer considered wastewater.

“Unapproved auxiliary water supply” means a water supply (other than the purveyor’s water supply) on or available to the consumer’s premises that is either not approved for human consumption by the health agency having jurisdiction or is not otherwise acceptable to the purveyor.

“Uniform Plumbing Code” means the code adopted under RCW 19.27.031 (4) and amended under chapter 51-46 WAC. This code establishes statewide minimum plumbing standards applicable within the property lines of the consumer’s premises.

“Used water” means water which has left the control of the purveyor.

Abbreviations and Acronyms

AG	Air Gap
AVB	Atmospheric Vacuum Breaker
AWWA	American Water Works Association
BAT	Backflow Assembly Tester (for WAC 246-290-490)
DOH	State of Washington Department of Health
CCP	Cross-Connection Control Program
CCS	Cross-Connection Control Specialist
CITY	Refers to the City of Kent
DCDA	Double Check Detector Assembly
DCVA	Double Check Valve Assembly
IAPMO	International Association of Plumbing and Mechanical Officials
LAA	Local Administrative Authority
PVBA	Pressure Vacuum Breaker Assembly
RPBA	Reduced Pressure Backflow Assembly
RPDA	Reduced Pressure Detector Assembly
SVBA	Spill Resistant Vacuum Breaker Assembly
Table 9	Refers to WAC 246-290-490(4)(iii)(Table 9)
UBC	Uniform Building Code
UL	Underwriters Laboratories Inc.
UPC	Uniform Plumbing Code

D

ORDINANCE NO. 2394

AN ORDINANCE of the City of Kent, Washington, relating to water services; amending Chapter 7.06 Kent City Code by adding new sections 7.06.180 - 7.06.185 adopting Rules and Regulations of the State Board of Health relating to and regulating cross-connections in public water systems.

THE CITY COUNCIL OF THE CITY OF KENT, WASHINGTON, DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Chapter 7.06 Kent City Code is amended to add the following sections 7.06.180, 7.06.181, 7.06.182, 7.06.183, 7.06.184, and 7.06.185:

7.06.180. Purpose. It is the purpose of KCC 7.06.180 - KCC 7.06.185 to protect the health of consumers receiving water from the City of Kent by protecting the public water system of the City of Kent from actual or potential contamination.

7.06.181. Definitions. The following are established as definitions for purposes of KCC 7.06.180 - 7.06.185 :

- A. "Cross connection" shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewer, or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply system of this district as a result of backflow.
- B. "Backflow" shall mean the flow, other than the intended direction of flow, of any foreign liquids, gases or substances into the City public water supply or distribution system.
- C. "Backflow prevention device" shall mean a device to counteract back pressure or to prevent back siphonage.
- D. "Director" shall mean the Director of Public Works of the City of Kent Department of Public Works.

E. Upon the filing of one copy with the City Clerk, all definitions contained in the State of Washington Administrative Code (WAC) 248-54-830, as now or hereafter amended, shall by this reference be considered definitions within this section.

7.06.182. Service Connection.

- A. No water service connection from the City of Kent's water system to any premise(s) shall be installed or maintained unless the City of Kent's water supply is protected by backflow prevention devices as required by the Director or her/his Designee and the rules and regulations of the State Board of Health and this Code. The installation or maintenance of a cross-connection which will endanger the water quality of the City of Kent's water supply is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the City of Kent's systems shall be in accordance with WAC 248-54-820 to 248-54-850. as now or hereafter amended.
- B. Service to any property, landowner, or water user receiving its water supply from the City of Kent water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the State Board of Health and of this Code pertaining to cross-connections. Service shall be discontinued to any premise(s), water user or property owner for failure to comply with such regulations of the State Board of Health and of this Code pertaining to cross-connections, and any discontinued service will not be re-established until the Department of Public Works of the City of Kent has approved compliance with such requirement of the rules and regulations of the State Board of Health and of this Code pertaining to cross-connection.

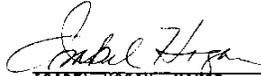
7.06.183. Public Works to Administer. The Department of Public Works of the City of Kent shall be responsible for administering this ordinance including the development of the necessary procedures and practices to accomplish same, consistent with the standards in this Code and Chapter 248-54 WAC.

7.06.184. Inspection - Right of Entry. The Director and other duly authorized employees of the Department of Public Works bearing proper credentials and identification shall be permitted to enter upon all properties receiving water service from the City of Kent water supply system for the purposes of inspection, observation and testing in accordance with the provisions of this Code.

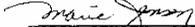
7.06.185. Administrative Code Adopted. The provisions of Sections 248-54-820 through 248-54-850, Washington Administrative Code, as now or hereafter amended relating to cross-connection control and elimination and the use of backflow prevention devices when such are considered to be advisable are upon the filing of one copy with the City Clerk, hereby adopted and made a part hereof, and all provisions of said Code may be executed and applied by the Department of Public Works in determining when cross-connection are prohibited and when backflow prevention devices shall be required.

Section 2. Severability. If any section, subsection, sentence, clause, phrase, part or portion of this Ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance.

Section 3. Effective Date. This ordinance shall take effect and be in force five (5) days from and after its passage, approval and publication as provided by law.


ISABEL HOGAN, MAYOR

ATTEST:


MARIE JENSEN, CITY CLERK

APPROVED AS TO FORM:


P. STEPHEN DIJULIO, CITY ATTORNEY

PASSED the 7 day of March, 1983.

APPROVED the 8 day of March, 1983.

PUBLISHED the 11th day of March, 1983.

I hereby certify that this is a true copy of Ordinance
No. 2394, passed by the City Council of the City of Kent,
Washington, and approved by the Mayor of the City of Kent as hereon
indicated.


MARIE JENSEN, CITY CLERK (SEAL)

Kent City Code

7.02.050 Cross-connection restrictions – Purpose.

It is the purpose of KCC 7.02.050 through 7.02.100 to protect the health of consumers receiving water from the city by protecting the public water system of the city from actual or potential contamination. (Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.180)

7.02.060 Same – Definitions.

The following are established as definitions for purposes of KCC 7.02.050 through 7.02.100:

Cross-connection shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewer, or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply system of this district as a result of backflow.

Backflow shall mean the flow, other than the intended direction of flow, of any foreign liquids, gases or substances into the city public water supply or distribution system.

Backflow prevention device shall mean a device to counteract back pressure or to prevent back siphonage.

Director shall mean the director of public works of the department of public works.

All definitions contained in WAC 248-54-830, as now or hereafter amended, shall by this reference be considered definitions within this section.

(Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.181)

Cross reference(s) – Definitions and rules of construction generally, § 1.01.030.

7.02.070 Same – Service connection.

A. No water service connection from the city water system to any premises shall be installed or maintained unless the city water supply is protected by backflow prevention devices as required by the director or his designee and the rules and regulations of the state board of health and this code. The installation or maintenance of a cross-connection which will endanger the water quality of the city water supply is prohibited. Any such cross-connection is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the city systems shall be in accordance with WAC 248-54-820 through 248-54-850, as amended.

B. Service to any property, landowner or water user receiving its water supply from the city water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the State Board of Health and of this code pertaining to cross-connections. Service shall be discontinued to any premises, water user or property owner for failure to comply with such regulations of the State Board of Health and of this code pertaining to cross-connections, and any discontinued service will not be re-established until the department of public works has approved compliance with such requirement of the rules and regulations of the State Board of Health and of this code pertaining to cross-connection.

(Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.182)

7.02.080 Same – Administration.

The department of public works shall be responsible for administering KCC 7.02.050 through 7.02.100 including the development of the necessary procedures and practices to accomplish same, consistent with the standards in this code and Chapter 248-54 WAC.

(Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.183)

7.02.090 Same – Inspection – Right of entry.

The director and other duly authorized employees of the department of public works bearing proper credentials and identification shall be permitted to enter upon all properties receiving water service from the city water supply system for the purposes of inspection, observation and testing in accordance with the provisions of this code.

(Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.184)

7.02.100 Same – Administrative code adopted.

The provisions of WAC 248-54-820 through 248-54-850, as now or hereafter amended relating to cross-connection control and elimination and the use of backflow prevention devices when such are considered to be advisable are upon the filing of are hereby adopted and made a part hereof. All provisions of the Washington Administrative Code may be executed and applied by the department of public works in determining when cross-connections are prohibited and when backflow prevention devices shall be required. A copy of such provisions is on file in the city clerk’s office.

(Ord. No. 2394, § 1. Formerly Code 1986, § 7.06.185)

7.02.110 Right of entry, shutting off water.

Employees of the water utility or finance department when in the course of their employment shall have the right to go upon private property to read, inspect, repair, install or remove a water meter or to inspect, repair or remove any connection between the water main to and including the water meter, or to shut off a water service. A water meter may be removed from the premises for purpose of inspection or repair, or when a bill for consumed water or sewer service is not paid.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.200)

7.02.120 Separate meters required – Exceptions.

Except as provided in this chapter, each separate building occupied as a dwelling or as a place of business must have a separate water service and water meter. Where the applicant desires to have two (2) or more service pipes on the same premises, he shall state in his application for a water connection, and separate service pipes shall be run with individual stop cocks to each water meter. Each mobile home park and each condominium may be served by one (1) water meter. The city council may enter into agreements with commercial and industrial users to allow more than one (1) building to be served by a single meter.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.240)

7.02.130 Existing service to more than one (1) building.

At the time of the adoption of this chapter where more than one (1) building is served through one (1) meter, the consumption of water for each billing period shall be divided by the number of buildings served and the charge will then be calculated as if each building were a separate account.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.280)

7.02.140 Connection with other water supply.

A. No service connection shall be allowed from the city mains to any premises supplied by water from any other source, unless special permission is given by the director of public works, which special

permission may be terminated at any time if in the judgment of the director of public works the public interest requires it.

B. No cross-connection shall be made or maintained between any city service connection and pipe supplying water from any other source unless the water supplied from the other source, by tests by the State Board of Health, is shown to conform with the United States bacteriological standard for drinking water. Such tests must be made by a professional tester and submitted to the city at least once each month.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.320)

7.02.150 Connections outside of city limits.

A. Whenever any person outside the limits of the city, not already furnished with water by the city, shall desire the system to be extended, such person shall apply to the city council to have such water service extended. Such application shall designate the premises to be supplied and the number of services desired. If a permit is granted by the city council, the applicants shall, at their own expense, install all necessary mains or pipes in accordance with the requirements of the city engineer and the comprehensive water plan of the city which is on file in the office of the director of public works. All regulations concerning the size of service and meter shall apply.

B. Whenever any water district desires to purchase water from the city, it shall make application to the city council and if accepted, install all mains and services in accordance with the rules and regulations of the city. An individual contract will be negotiated for the purchase of water. Whenever any portion of a water district is annexed to the city, the ownership of the mains, meters and services shall become the property of the city in accordance with RCW 35.13A.020.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.360)

7.02.160 Installation and connection charges inside city limits.

A. Any property owner within the city limits applying for water service shall pay in full a tap charge plus a system development charge prior to issuance of the water service permit. The tap charge will include the cost of connection and laying the pipe from the city water main to the property line of the property to which service is desired, or at a distance of sixty (60) feet from the main toward such property line, whichever is shorter. The minimum tap charge so established for service installed by the water utility is as follows:

1. Two hundred seventy-five dollars (\$275) for each five-eighth (5/8) inch by three-quarter (3/4) inch connection.
2. Three hundred twenty-five dollars (\$325) for each three-quarter (3/4) inch connection.
3. Three hundred fifty dollars (\$350) for each one (1) inch connection.
4. Six hundred dollars (\$600) for each one and one-half (1 1/2) inch connection.
5. Eight hundred dollars (\$800) for each two (2) inch connection.

On any connection over two (2) inches, the minimum tap charge shall be the actual cost of the meter and installation, plus twenty-five (25) percent.

B. If the workload of the water utility as determined by the director of public works is such that the installation of the water connection would interfere with the proper operation and maintenance of the water system, the director of public works may require that the property owner employ a licensed contractor to make the connection and install the necessary line and materials except the water meter. All such water services shall meet or exceed the standards and specifications approved by the director of public works. The minimum tap charge is as follows:

1. One hundred dollars (\$100) for each five-eighth (5/8) inch by three-quarter (3/4) inch connection.
2. One hundred twenty-five dollars (\$125) for each three-quarter (3/4) inch connection.

3. One hundred seventy-five dollars (\$175) for each one (1) inch connection.
4. Three hundred sixty dollars (\$360) for each one and one-half (1 1/2) inch connection.
5. Five hundred dollars (\$500) for each two (2) inch connection.

All such contractor-installed connections shall be guaranteed by the contractor for a period of one (1) year.

C. The system development charge is as follows:

1. One thousand one hundred dollars (\$1,100) for each meter less than one (1) inch in size.
2. One thousand nine hundred fifty-eight dollars (\$1,958) for each one (1) inch meter.
3. Four thousand four hundred dollars (\$4,400) for each one and one-half (1 1/2) inch meter.
4. Seven thousand eight hundred twenty-two dollars (\$7,822) for each two (2) inch meter.
5. Seventeen thousand six hundred dollars (\$17,600) for each three (3) inch meter.
6. Thirty-one thousand two hundred eighty-four dollars (\$31,284) for each four (4) inch meter.
7. Forty-eight thousand eight hundred eighty-four dollars (\$48,884) for each five (5) inch meter.
8. Seventy thousand four hundred dollars (\$70,400) for each six (6) inch meter.
9. One hundred twenty-five thousand one hundred fifty-eight dollars (\$125,158) for each eight (8) inch meter.
10. One hundred ninety-five thousand five hundred fifty-eight dollars (\$195,558) for each ten (10) inch meter.

D. If an undersized meter is installed, a deduction will be allowed from the above charges, including system development charges, which will reflect the difference in cost between the undersized meter and the regular size meter. All service material (including water meter) will remain the property of the city.

E. If the tap is changed to one of a larger size, the cost and expense of such charge must be paid before the larger size tap is installed.

F. If it becomes necessary during the installation of such connection on a time and material basis to break and replace either concrete or blacktop paving, then in each instance an additional charge shall be made to cover the cost of such repair.

(Ord. No. 2370, § 1; Ord. No. 3486, § 1, 11-16-99; Ord. No. 3534, § 1, 12-5-00. Formerly Code 1986, § 7.06.400)

7.02.170 Installation and connection charges outside city.

Any property owner outside the city limits applying for water service shall pay in full the tap charge plus a system development charge prior to the issuance of a water service permit. The minimum charge established shall be the cost as established for inside the city limits plus fifty (50) percent, except the system development charge. The system development charge shall be the same as for inside city limits.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.440)

7.02.180 Temporary water meters.

A. When water service is required for a specific short-term duration, upon approval of the director of public works, a temporary water meter may be obtained from the water utility.

B. Such meters shall only be used for a designated project and shall be promptly returned to the water utility upon completion of the project or at the end of sixty (60) days, whichever comes first. The meters are to be returned in the same condition as when rented, and the user shall be held responsible for any damage thereto including paying all repair or replacement costs. While in the user's possession, the user shall be solely responsible for the meter and as such, should it be lost or stolen, the user shall pay the water utility the cost of its replacement.

C. The director of public works shall require that a cash bond be deposited with the city prior to receipt of a temporary meter. The amount of the bond shall equal the replacement cost of the respective meter.

Upon return of the meter, the payment of all outstanding charges including any meter repair or replacement costs, the cash bond shall be released back to the user.

D. Temporary meters may be moved from one (1) hydrant to another within the same project; provided, the water utility is notified in advance of the proposed relocation and that hydrant wrenches are used to make all connections and disconnections.

E. The charge for water used through the temporary meter shall be at a rate of one dollar and thirty-three cents (\$1.33) per one hundred (100) cubic feet, plus a meter charge as established in subsections (E)(1) and (E)(2) of this section. Effective December 31, 1999, the charge for water used through the temporary meter shall be at a rate of two dollars and thirty cents (\$2.30) per one hundred (100) cubic feet, plus a meter charge as established in subsections (E)(1) and (E)(2) of this section.

1. Up to one and one-half (1 1/2) inch meter, fifty dollars (\$50);

2. Two (2) inch and larger meter, one hundred dollars (\$100).

Payment shall be made in full upon return of the meter. If a meter is lost or stolen, payment for water used shall be based on an estimate made by the director of public works.

(Ord. No. 2370, § 1; Ord. No. 3486, § 2, 11-16-99; Ord. No. 3534, § 1, 12-5-00. Formerly Code 1986, § 7.06.460)

7.02.190 Stop cocks.

All service pipes must come directly from the street main and shall be laid at such depth and at such point as the water utility shall designate. All stop cocks and connections thereto shall be maintained by and under the control of the water utility.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.480)

7.02.200 Turn on and off service by water utility employees.

No person except employees of the water utility or the finance department will be allowed to turn the water on or off at the city's stop cock after the plumbing has been completed and the water turned on by the water utility, except to repair the special stop and waste cock or the pipe between it and the city's stop cock.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.520)

7.02.210 Special stop and waste cock.

A special stop and waste cock with a key attached thereto shall be placed on the pipe leading from the city's stop cock outside of the building or inside if basement is available. No branch pipe, bibb or fixture of any kind shall be placed between this stop cock and the city's main. If this stop cock does not thoroughly drain all pipes throughout the premises, additional ones shall be placed in all sags, bends and traps that cannot otherwise be drained. If the service is to a business building adjacent to a city sidewalk, a valve type stop and waste cock in a cast iron valve box, with traffic type lid shall be installed near the outside wall of the building.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.560)

7.02.220 Replacement – Permit credit.

If a property owner, lessee or occupant requests a change in meter size and/or water line size, an application shall be made to the city engineer. The city engineer shall review the application for compliance with KCC 7.02.030. If the request results in an increase flow capability to the property, the charge for this service shall include the respective system development charge, otherwise, the charge shall be limited to a time and material basis. In all cases a credit on this charge will be made for the meter removed. This credit will be based on a depreciation schedule of twenty (20) percent per year for the

number of years the meter has been in service, with a minimum credit of two dollars and fifty cents (\$2.50). No credit will be allowed for the valves, meter box, or pipe originally installed. Where a system development charge is included, a credit will also be given for that previously paid system development charge.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.600)

7.02.230 Connections from stop cock at owner's expense and care.

All pipes and connections from the city's adapter or coupling located on or near the property line or near the meter box shall be put in at the expense of the property owner, who shall be responsible for all damages resulting from leaks and breaks.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.640)

7.02.240 Plumber's permit for turn on and off.

No plumber or other person will be allowed to make connection with the city mains or make alterations in conduit, pipe or other fixture connecting therewith, or to connect pipes when they have been disconnected, or to turn water off or on, upon any premises at the city's stop cock without a permit from the director of public works.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.680)

7.02.250 Water turned on by owner or tenant prohibited.

If the water is turned on to the premises by anyone other than an employee of the water utility or the finance department after it has been turned off at city stop cock, it will be turned off again at the city stop cock and locked, and will not be turned on again until the charges as prescribed in this chapter have been paid. Such charges will consist of the actual cost per hour, including overhead, of sending water utility employees to return service to the account, plus a turn on charge of fifteen dollars (\$15). In no case will the charge be less than fifteen dollars (\$15).

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.720)

7.02.260 Vacant premises – Water supply.

If it is decided to discontinue the use of water supply to vacant premises for a period of not less than thirty (30) days, notice in writing must be given to the finance department. The water will be turned off and will be turned on again upon written application at a charge of fifteen dollars (\$15) for such turn on. No remission of charges will be made for a lesser period than thirty (30) days or without receipt of notice by the finance department.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.760)

7.02.270 Size of water main.

No water main shall be installed unless it is at least six (6) inches in diameter and is the size indicated in the comprehensive water plan.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.800)

7.02.280 Turning off-turning on charges.

A. For the purpose of paying the expense to the water utility or finance department, a charge as set forth in this chapter is hereby fixed and made to turn off or turn on the water service to any building for the making within the building of any inspection, repair, maintenance, enlargement, replacement, addition, or change in or to the water line or lines, or plumbing, or plumbing fixtures, or for the purpose of connection any kind of machine, appliance, toilet or bath facilities, or any kind of plumbing in or to the

water system located within the building when the building does not have stop and waste cock as required in KCC 7.02.210.

B. The charge shall be twenty-five dollars (\$25) if the turn-off or turn-on is done within a period of forty-eight (48) hours, which charge shall be paid to the finance director before any water service is turned off or turned on for any of the purposes set forth in this section.

C. If the turn-off and turn-on is not done within a period of forty-eight (48) hours, the charge is fifteen dollars (\$15) to turn off the water service and fifteen dollars (\$15) to turn on the service. The charge shall be paid to the finance director before any water service is turned off or turned on for any of the purposes set forth in this section.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.820)

7.02.290 Prohibited uses.

No person shall:

1. Use water from the city water system for sprinkling or irrigating when requested by a police officer or firefighter of the city to cease such use during a fire which the fire department is seeking to control or when use of water for sprinkling or irrigation is forbidden by the city council;
2. Bathe in, fish in, or throw any substance into any reservoir or water tank or standpipe or into any pipe or connection to the city water system, or upon the premises where any reservoir, water tank or standpipe is located;
3. Obstruct the access to any fire hydrant or place lumber, dirt, rubbish or other material upon public right-of-way or city owned property within twenty (20) feet of a fire hydrant or to open or operate a fire hydrant except a member of a fire department or employee of the city in pursuance of his employment or duty;
4. Break or deface the seal of a water meter or tamper with, damage, obstruct or alter a water meter in service;
5. Make any connection with a water main, water pipe or fire hydrant for delivery of water from the city water system to a consumer without a permit from the water utility and a means of measuring the quantity of water taken prior to consumption;
6. Turn on or turn off a water service at the water box or any place between the water meter and the water main of the city water system other than by an employee of the water utility or finance department who is authorized to either turn on or turn off a water service;
7. Interfere with, obstruct or prevent free or safe access to any water meter or water service for purpose of reading, inspection, repair, removal or installation by any employee of the water utility or finance department in pursuit of his employment;
8. Tamper with, destroy, break or interfere with any part of the water system; or
9. Make, construct, buy, sell or in any way dispose of to any person any curb cock key or hydrant wrench that fits or may be used on any part of the city water system without permission of the director of public works of the city.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.840)

7.02.300 Water rates within the city.

A. The monthly rate from October 1 to April 30 is one dollar and twenty-four cents (\$1.24) per one hundred (100) cubic feet plus a monthly demand charge for service and meter, and from May 1 to September 30 the monthly rate is one dollar and sixty-four cents (\$1.64) per one hundred (100) cubic feet plus a monthly demand charge for service and meter. Effective December 31, 1999, the monthly rate from October 1 to April 30 is one dollar and twenty-four cents (\$1.24) per one hundred (100) cubic feet for all use less than or equal to seven hundred (700) cubic feet plus one dollar and sixty-nine cents

(\$1.69) per one hundred (100) cubic feet for all use greater than seven hundred (700) cubic feet, plus a monthly demand charge for service and meter. Effective December 31, 1999, the monthly rate from May 1 to September 30 is one dollar and sixty-four cents (\$1.64) per one hundred (100) cubic feet for all use less than or equal to seven hundred (700) cubic feet plus two dollars and nine cents (\$2.09) per one hundred (100) cubic feet for all use greater than seven hundred (700) cubic feet, plus a monthly demand charge for service and meter. The monthly demand charge for service and meter is as follows:

Meter size (inches)	Charge
5/8 x 3/4	\$2.20
1	2.45
1 1/2	3.30
2	4.00
3	13.95
4	16.80
6	28.10
8	37.59
10	48.46

B. For lifeline-qualified water service customers, the monthly rate is forty-five cents (\$0.45) per one hundred (100) cubic feet plus a monthly demand charge for service and meter as set forth in subsection (A) of this section.

C. Eligibility criteria for lifeline rate shall be as established by city council.

D. 1. Subject to the right of access and inspection by a representative of the city, water service customers of the city may apply for a one-time rate adjustment for any single billing period under the following circumstances:

- a. An accidental water leak has been discovered on the subject property; or
- b. A water line failure has occurred on the subject property; or
- c. An unexplained, abnormal water meter reading has occurred on the subject property even though subsequent city inspection of the water meter indicates that the meter is functioning properly.

This rate adjustment shall not exceed fifty (50) percent of the difference between the total amount of the billing period sought for adjustment minus the customer's average water usage. For the purposes of this subsection, the "average water usage" shall be computed by determining the total volume of water consumed, under normal use conditions, during the preceding twelve (12) months and dividing that total volume by the number of times the city would typically read the customer's water meter in a twelve (12) month period.

2. This rate adjustment is permitted on a one-time basis only and can only be applied to one (1) billing period. To be eligible for this rate adjustment, the affected water system must be owned by or subject to the exclusive control of the customer and be located between the city's water meter and owner's residence or structure. The bill sought for adjustment must exceed two (2) times the customer's highest usage in any single billing period during the twelve (12) months prior to the billing period sought for adjustment.

3. Following a request for rate adjustment provided under this subsection, the city's finance director, or his/her designee, shall review the request and determine whether or not to adjust the customer's monthly billing. In order to make a proper determination, city staff shall be entitled to access, inspect and approve the customer's water system repair prior to granting a rate adjustment.

4. If approved, the city shall make this rate adjustment by issuing a credit to the customer's account after verification of leakage or water system failure, inspection of water meter and water system, where

applicable, and verification of corrective repairs. All repairs shall occur within thirty (30) days of application to the city.

5. The owner may request reconsideration of the decision of the finance director, or his/her designee, by the city council through the city council's operation committee.

(Ord. No. 2732, § 3; Ord. No. 2495, § 1; Ord. No. 3043, § 1, 5-5-92; Ord. No. 3143, § 2, 11-16-93; Ord. No. 3486, § 3, 11-16-99. Formerly Code 1986, § 7.06.860)

7.02.310 Water rates outside city.

A. The monthly rate from October 1 to April 30 is one dollar and sixty-four cents (\$1.64) per one hundred (100) cubic feet plus a monthly demand charge for service and meter, and from May 1 to September 30 the monthly charge is two dollars (\$2) per one hundred (100) cubic feet plus a monthly demand charge for service and meter. Effective December 31, 1999, the monthly rate from October 1 to April 30 is one dollar and sixty-four cents (\$1.64) per one hundred (100) cubic feet for all use less than or equal to seven hundred (700) cubic feet plus two dollars and nine cents (\$2.09) per one hundred (100) cubic feet for all use greater than seven hundred (700) cubic feet, plus a monthly demand charge for service and meter. Effective December 31, 1999, the monthly rate from May 1 to September 30 is two dollars (\$2) per one hundred (100) cubic feet for all use less than or equal to seven hundred (700) cubic feet plus two dollars and forty-six cents (\$2.46) per one hundred (100) cubic feet for all use greater than seven hundred (700) cubic feet, plus a monthly demand charge for service and meter. The monthly demand charge for service and meter is as follows:

Meter size (inches)	Charge
5/8 x 3/4	\$ 2.20
1	2.45
1 1/2	3.30
2	4.00
3	13.95
4	16.80
6	28.10
8	37.59
10	48.46

B. For lifeline-qualified water service customers, the monthly rate is forty-eight cents (\$0.48) per one hundred (100) cubic feet plus a monthly demand charge for service and meter as set forth in subsection (A) of this section.

C. Eligibility criteria for lifeline rate shall be as established by city council.

D. 1. Subject to the right of access and inspection by a representative of the city, water service customers of the city may apply for a one-time rate adjustment for any single billing period under the following circumstances:

- a. An accidental water leak has been discovered on the subject property; or
- b. A water line failure has occurred on the subject property; or
- c. An unexplained, abnormal water meter reading has occurred on the subject property even though subsequent city inspection of the water meter indicates that the meter is functioning properly.

This rate adjustment shall not exceed fifty (50) percent of the difference between the total amount of the billing period sought for adjustment minus the customer's average water usage. For the purposes of this subsection, the "average water usage" shall be computed by determining the total volume of water consumed, under normal use conditions, during the preceding twelve (12) months and dividing that total

volume by the number of times the city would typically read the customer's water meter in a twelve (12) month period.

2. This rate adjustment is permitted on a one-time basis only and can only be applied to one (1) billing period. To be eligible for this rate adjustment, the affected water system must be owned by or subject to the exclusive control of the customer and be located between the city's water meter and owner's residence or structure. The bill sought for adjustment must exceed two (2) times the customer's highest usage in any single billing period during the twelve (12) months prior to the billing period sought for adjustment.

3. Following a request for rate adjustment provided under this subsection, the city's finance director, or his/her designee, shall review the request and determine whether or not to adjust the customer's monthly billing. In order to make a proper determination, city staff shall be entitled to access, inspect and approve the customer's water system repair prior to granting a rate adjustment.

4. If approved, the city shall make this rate adjustment by issuing a credit to the customer's account after verification of leakage or water system failure, inspection of water meter and water system, where applicable, and verification of corrective repairs. All repairs shall occur within thirty (30) days of application to the city.

5. The owner may request reconsideration of the decision of the finance director, or his/her designee, by the city council through the city council's operation committee.

(Ord. No. 2732, § 3; Ord. No. 2495, § 2; Ord. No. 3043, § 2, 5-5-92; Ord. No. 3143, § 3, 11-16-93; Ord. No. 3486, § 4, 11-16-99; Ord. No. 3534, § 1, 12-5-00. Formerly Code 1986, § 7.06.880)

7.02.320 Billing for service.

All billing for water shall be made to the nearest five cents (\$0.05).

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.900)

7.02.330 Charges when meter is out of order.

If a meter fails to register the amount of water used, the customer will be charged at the average rate of monthly consumption as shown by the meter when the meter was in working order.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.920)

7.02.340 Request for meter check.

A customer may request a meter check. If it is found that the meter is registering less than or more than the requirements of the state for meter accuracy, no charge will be made. If it is found that the meter is registering in accordance with state regulations, a charge which is on file in the city clerk's office will be made. This charge will be added to the next water billing.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.930)

7.02.350 Fire protection service.

A. Pipes for fire protection purposes must be fitted with such fixtures as are needed for fire protection and such fixtures shall be sealed by the water utility. In no case shall such seal be broken, except in case of fire or by the fire chief for the purpose of testing the pipes, fixtures or hose.

B. When seals are broken in case of fire, it shall be the duty of the owner or tenant of the premises to notify the water utility within twenty-four (24) hours after its occurrence, and the seal will be replaced by the water utility.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.940)

7.02.360 Emergency shutoff without notice.

A. The water may at any time be shut off from the mains without notice for repairs, extensions or other necessary purposes and persons having boilers supplied by direct pressure from the mains are cautioned against danger of explosion or collapse. Where meters are in use, a safety valve shall be placed between the boiler on such service and the meter at the owner's expense, and the owner shall be held responsible to the city for any and all damages to meters caused by hot water.

B. The city will not be responsible for the safety of boilers or other fixtures on the premises of any water consumer.

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.960)

7.02.370 Penalty for violation.

Any person found guilty of violating this chapter or any part thereof shall be guilty of a misdemeanor, and, upon conviction thereof, shall be subject to a fine not exceeding three hundred dollars (\$300).

(Ord. No. 2370, § 1. Formerly Code 1986, § 7.06.950)

**Cross Connection Control Agreement Between Water Purveyor and Local
Administrative Authority**

1.0 Purpose:

To establish a policy and procedure for a joint cross-connection program between the City of Kent Water Purveyor (Public Works Operations), the City of Kent Engineering Department, and the City of Kent Local Administrative Authority (Building Services).

2.0 Responsibilities:

The Water Purveyor will be responsible for the protection of the water distribution system at the property line from cross-connections through the enforcement of the city's cross connection control program. The Local Administrative Authority will be responsible for cross-connection control within the property lines as required by the city's adopted plumbing code.

3.0 Procedures:

3.1 New Construction (Public Works Engineering Responsibility)

Public Works Engineering Cross Connection Control Specialist (CCS) will be responsible for conducting the new construction plan review to determine whether or what type of backflow preventers are needed. This will include:

- A. Conduct new backflow device and site or facility inspections (premise and in-premise) for new construction
- B. Direct all Building owners, Land Owners and Contractors in the City to acquire permits for backflow prevention installation.
- C. Inspections to ensure that installation and testing are done properly.
- D. Forward a copy of each permit to Public Works Operations to add to the system database for future cross connection requirement surveys and annual backflow testing.

3.2 Existing Facilities (Public Works Operations Responsibility)

The Public Works Operations Cross Connection Control Specialist (CCS) will administer the Cross-Connection Control Program (CCP) and assure

that the program meets or exceeds Department of Health requirements. This will include:

- A. Evaluate service connections for backflow hazards
- B. Create a priority list for inspections of high hazard facilities
- C. Inspection of existing system facilities
- D. Report the annual progress of the CCP to the Department of Health.
- E. Plan and implement public education programs for cross connection control with government agencies as well as planning and implementation of the CCP.
- F. Investigate drinking water quality concerns or incidents where backflow is suspected
- G. Eliminate or control cross connections between the distribution system and the customer's premises
- H. Keep current records of all backflow preventer testing, air gaps installed in-lieu of approved backflow preventers, test kit calibration, and tester certification; and share information with Building Services.
- I. Ensure quality control for backflow testing.
- J. Inform the Department of Health and Building Services of incidents involving contamination to the public water system

3.3 New and Existing Facilities (Building Services Responsibility)

Building Services will work jointly with the Public Works Department to protect the public water supply of the City of Kent in compliance with the "Safe Drinking Water Act," WAC 246-290-490 and Chapter 51-56 WAC. Building Service's primary function in this endeavor will be to initially identify potential sources of cross-connections within the buildings and structures of this City. Once identified, these potential problem areas will be addressed by the Public Works Cross-Connection Control Specialist prior to any final plumbing inspection approval. Since cross-connection protection is also covered under Chapter 6 of the 2000 Uniform Plumbing Code, Building Services has a vested interest, mandated by state law, in protecting the potable water system.

AGREED TO THIS 20th DAY OF FEBRUARY, 2003:


Don E. Wickstrom, P.E. Director of Public Works


Fred Satterstrom, Community Development Director

WAC 246-290-490 Cross-connection control. (1) Applicability, purpose, and responsibility.

(a) All community water systems shall comply with the cross-connection control requirements specified in this section.

(b) All noncommunity water systems shall apply the principles and provisions of this section, including subsection (4)(b) of this section, as applicable to protect the public water system from contamination via cross-connections. Noncommunity systems that comply with subsection (4)(b) of this section and the provisions of WAC [51-56-0600](#) of the UPC (which addresses the installation of backflow preventers at points of water use within the potable water system) shall be considered in compliance with the requirements of this section.

(c) The purpose of the purveyor's cross-connection control program shall be to protect the public water system, as defined in WAC [246-290-010](#), from contamination via cross-connections.

(d) The purveyor's responsibility for cross-connection control shall begin at the water supply source, include all the public water treatment, storage, and distribution facilities, and end at the point of delivery to the consumer's water system, which begins at the downstream end of the service connection or water meter located on the public right of way or utility-held easement.

(e) Under the provisions of this section, purveyors are not responsible for eliminating or controlling cross-connections within the consumer's water system. Under chapter [19.27](#) RCW, the responsibility for cross-connection control within the consumer's water system, i.e., within the property lines of the consumer's premises, falls under the jurisdiction of the local administrative authority.

(2) General program requirements.

(a) The purveyor shall develop and implement a cross-connection control program that meets the requirements of this section, but may establish a more stringent program through local ordinances, resolutions, codes, bylaws, or operating rules.

(b) Purveyors shall ensure that good engineering and public health protection practices are used in the development and implementation of cross-connection control programs. Department publications and the most recently published editions of references, such as, but not limited to, those listed below, may be used as guidance for cross-connection program development and implementation:

(i) *Manual of Cross-Connection Control* published by the Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California (USC Manual); or

(ii) *Cross-Connection Control Manual, Accepted Procedure and Practice* published by the Pacific Northwest Section of the American Water Works Association (PNWS-AWWA Manual).

(c) The purveyor may implement the cross-connection control program, or any portion thereof, directly or by means of a contract with another agency or party acceptable to the department.

(d) The purveyor shall coordinate with the local administrative authority in all matters concerning cross-connection control. The purveyor shall document and describe such coordination, including delineation of responsibilities, in the written cross-connection control program required in (e) of this subsection.

(e) The purveyor shall include a written description of the cross-connection control program in the water system plan required under WAC [246-290-100](#) or the small water system management program required under WAC [246-290-105](#). The cross-connection control program shall include the minimum program elements described in subsection (3) of this section.

(f) The purveyor shall ensure that cross-connections between the distribution system and a consumer's water system are eliminated or controlled by the installation of an approved backflow preventer commensurate with the degree of hazard. This can be accomplished by implementation of a cross-connection program that relies on:

(i) Premises isolation as defined in WAC [246-290-010](#); or

(ii) Premises isolation and in-premises protection as defined in WAC [246-290-010](#).

(g) Purveyors with cross-connection control programs that rely both on premises isolation and in-premises protection:

(i) Shall comply with the premises isolation requirements specified in subsection (4)(b) of this section; and

(ii) May reduce premises isolation requirements and rely on in-premises protection for premises other than the type not addressed in subsection (4)(b) of this section, if the conditions in (h) of this subsection are met.

(h) Purveyors may rely on in-premises protection only when the following conditions are met:

(i) The in-premises backflow preventers provide a level of protection commensurate with the purveyor's assessed degree of hazard;

(ii) Backflow preventers which provide the in-premises backflow protection meet the definition of approved backflow preventers as described in WAC [246-290-010](#);

(iii) The approved backflow preventers are installed, inspected, tested (if applicable), maintained, and repaired in accordance with subsections (6) and (7) of this section;

(iv) Records of such backflow preventers are maintained in accordance with subsections (3)(j) and (8) of this section; and

(v) The purveyor has reasonable access to the consumer's premises to conduct an initial hazard evaluation and periodic reevaluations to determine whether the in-premises protection is adequate to protect the purveyor's distribution system.

(i) The purveyor shall take appropriate corrective action within its authority if:

(i) A cross-connection exists that is not controlled commensurate to the degree of hazard assessed by the purveyor; or

(ii) A consumer fails to comply with the purveyor's requirements regarding the installation, inspection, testing, maintenance or repair of approved backflow preventers required by this chapter.

(j) The purveyor's corrective action may include, but is not limited to:

(i) Denying or discontinuing water service to a consumer's premises until the cross-connection hazard is eliminated or controlled to the satisfaction of the purveyor;

(ii) Requiring the consumer to install an approved backflow preventer for premises isolation commensurate with the degree of hazard; or

(iii) The purveyor installing an approved backflow preventer for premises isolation commensurate with the degree of hazard.

(k) Purveyors denying or discontinuing water service to a consumer's premises for one or more of the reasons listed in (i) of this subsection shall notify the local administrative authority prior to taking such action except in the event of an emergency.

(l) The purveyor shall prohibit the intentional return of used water to the purveyor's distribution system. Such water would include, but is not limited to, water used for heating, cooling, or other purposes within the consumer's water system.

(3) Minimum elements of a cross-connection control program.

(a) To be acceptable to the department, the purveyor's cross-connection control program shall include the minimum elements identified in this subsection.

(b) Element 1: The purveyor shall adopt a local ordinance, resolution, code, bylaw, or other written legal instrument that:

(i) Establishes the purveyor's legal authority to implement a cross-connection control program;

(ii) Describes the operating policies and technical provisions of the purveyor's cross-connection control program; and

(iii) Describes the corrective actions used to ensure that consumers comply with the purveyor's cross-connection control requirements.

(c) Element 2: The purveyor shall develop and implement procedures and schedules for evaluating new and existing service connections to assess the degree of hazard posed by the consumer's premises to the purveyor's distribution system and notifying the consumer within a reasonable time frame of the hazard evaluation results. At a minimum, the program shall meet the following:

(i) For new connections made on or after the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted before service is provided;

(ii) For existing connections made prior to the effective date of these regulations, procedures shall ensure that an initial evaluation is conducted in accordance with a schedule acceptable to the department; and

(iii) For all service connections, once an initial evaluation has been conducted, procedures shall ensure that periodic reevaluations are conducted in accordance with a schedule acceptable to the department and whenever there is a change in the use of the premises.

(d) Element 3: The purveyor shall develop and implement procedures and schedules for ensuring that:

(i) Cross-connections are eliminated whenever possible;

(ii) When cross-connections cannot be eliminated, they are controlled by installation of approved backflow preventers commensurate with the degree of hazard; and

(iii) Approved backflow preventers are installed in accordance with the requirements of subsection (6) of this section.

(e) Element 4: The purveyor shall ensure that personnel, including at least one person certified as a CCS, are provided to develop and implement the cross-connection control program.

(f) Element 5: The purveyor shall develop and implement procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable) in accordance with subsection (7) of this section.

(g) Element 6: The purveyor shall develop and implement a backflow prevention assembly testing quality control assurance program, including, but not limited to, documentation of tester certification and test kit calibration, test report contents, and time frames for submitting completed test reports.

(h) Element 7: The purveyor shall develop and implement (when appropriate) procedures for responding to backflow incidents.

(i) Element 8: The purveyor shall include information on cross-connection control in the purveyor's existing program for educating consumers about water system operation. Such a program may include periodic bill inserts, public service announcements, pamphlet distribution, notification of new consumers and consumer confidence reports.

(j) Element 9: The purveyor shall develop and maintain cross-connection control records including, but not limited to, the following:

(i) A master list of service connections and/or consumer's premises where the purveyor relies upon approved backflow preventers to protect the public water system from contamination, the assessed hazard level of each, and the required backflow preventer(s);

(ii) Inventory information on:

(A) Approved air gaps installed in lieu of approved assemblies including exact air gap location, assessed degree of hazard, installation date, history of inspections, inspection results, and person conducting inspections;

(B) Approved backflow assemblies including exact assembly location, assembly description (type, manufacturer, model, size, and serial number), assessed degree of hazard, installation date, history of inspections, tests and repairs, test results, and person performing tests; and

(C) Approved AVBs used for irrigation system applications including location, description (manufacturer, model, and size), installation date, history of inspection(s), and person performing inspection(s).

(iii) Cross-connection program summary reports and backflow incident reports required under subsection (8) of this section.

(k) Element 10: Purveyors who distribute and/or have facilities that receive reclaimed water within their water service area shall meet any additional cross-connection control requirements imposed by the department under a permit issued in accordance with chapter [90.46 RCW](#).

(4) Approved backflow preventer selection.

(a) The purveyor shall ensure that a CCS:

(i) Assesses the degree of hazard posed by the consumer's water system upon the purveyor's distribution system; and

(ii) Determines the appropriate method of backflow protection for premises isolation in accordance with Table 8.

**TABLE 8
APPROPRIATE METHODS OF BACKFLOW PROTECTION FOR PREMISES ISOLATION**

Degree of Hazard	Application Condition	Appropriate Approved Backflow Preventer
High health cross-connection hazard	Backsiphonage or backpressure backflow	AG, RPBA, or RPDA
Low health cross-connection hazard	Backsiphonage or backpressure backflow	AG, RPBA, RPDA, DCVA, or DCDA

(b) Premises isolation requirements.

(i) For service connections with remises posing a high health cross-connection hazard including, but not limited to, those premises listed in Table 9, the purveyor shall ensure that an approved air gap or RPBA is installed for premises isolation.

(ii) If the purveyor's CCS determines that no hazard exists for a connection serving premises of the type listed in Table 9, the requirements of (b)(i) of this subsection do not apply.

(iii) The purveyor shall document, on a case-by-case basis, the reasons for not applying the requirements of (b)(i) of this subsection to a connection serving premises of the type listed in Table 9 and include such documentation in the cross-connection control program summary report required in subsection (8) of this section.

**TABLE 9
HIGH HEALTH CROSS-CONNECTION HAZARD PREMISES REQUIRING PREMISES ISOLATION BY AG OR RPBA**

- Agricultural (farms and dairies)
- Beverage bottling plants
- Car washes
- Chemical plants
- Commercial laundries and dry cleaners
- Premises where both reclaimed water and potable water are provided
- Film processing facilities

Food processing plants
Hospitals, medical centers, nursing homes, veterinary,
medical and dental clinics, and blood plasma centers
Premises with separate irrigation systems using the
purveyor's water supply and with chemical addition⁺
Laboratories
Metal plating industries
Mortuaries
Petroleum processing or storage plants
Piers and docks
Radioactive material processing plants or nuclear reactors*
Survey access denied or restricted
Wastewater lift stations and pumping stations
Wastewater treatment plants*
Premises with an unapproved auxiliary water supply
interconnected with the potable water supply

+ For example, parks, playgrounds, golf courses, cemeteries, estates, etc.

* RPBA's for connections serving these premises are acceptable only when used in combination with an in-plant approved air gap; otherwise, the purveyor shall require an approved air gap at the service connection.

(c) Backflow protection for single-family residences.

(i) For single-family residential service connections, the purveyor shall comply with the requirements of (b) of this subsection when applicable.

(ii) If the requirements of (b) of this subsection do not apply and the requirements specified in subsection (2)(h) of this section are met, the purveyor may rely on backflow protection provided at the point of hazard in accordance with WAC [51-56-0600](#) of the UPC for hazards such as, but not limited to:

- (A) Irrigation systems;
- (B) Swimming pools or spas;
- (C) Ponds; and
- (D) Boilers.

For example, the purveyor may accept an approved AVB on a residential irrigation system, if the AVB is properly installed in accordance with the UPC.

(d) Backflow protection for fire protection systems.

(i) Backflow protection is not required for residential flow-through or combination fire protection systems constructed of potable water piping and materials.

(ii) For service connections with fire protection systems other than flow-through or combination systems, the purveyor shall ensure that backflow protection consistent with WAC [51-56-0600](#) of the UPC is installed. The UPC requires minimum protection as follows:

(A) An RPBA or RPDA for fire protection systems with chemical addition or using unapproved auxiliary water supply; and

(B) A DCVA or DCDA for all other fire protection systems.

(iii) For new connections made on or after the effective date of these regulations, the purveyor shall ensure that backflow protection is installed before water service is provided.

(iv) For existing fire protection systems:

(A) With chemical addition or using unapproved auxiliary supplies, the purveyor shall ensure that backflow protection is installed within ninety days of the purveyor notifying the consumer of the high

health cross-connection hazard or in accordance with an alternate schedule acceptable to the purveyor.

(B) Without chemical addition, without on-site storage, and using only the purveyor's water (i.e., no unapproved auxiliary supplies on or available to the premises), the purveyor shall ensure that backflow protection is installed in accordance with a schedule acceptable to the purveyor or at an earlier date if required by the agency administering the Uniform Building Code as adopted under chapter [19.27](#) RCW.

(C) When establishing backflow protection retrofitting schedules for fire protection systems that have the characteristics listed in (d)(iv)(B) of this subsection, the purveyor may consider factors such as, but not limited to, impacts of assembly installation on sprinkler performance, costs of retrofitting, and difficulty of assembly installation.

(e) Purveyors may require backflow preventers commensurate with the degree of hazard determined by the purveyor to be installed for premises isolation for connections serving premises that have characteristics such as, but not limited to, the following:

(i) Complex plumbing arrangements or plumbing potentially subject to frequent changes that make it impracticable to assess whether cross-connection hazards exist;

(ii) A repeated history of cross-connections being established or reestablished; or

(iii) Cross-connection hazards are unavoidable or not correctable, such as, but not limited to, tall buildings.

(5) Approved backflow preventers.

(a) The purveyor shall ensure that all backflow prevention assemblies relied upon by the purveyor are models included on the current list of backflow prevention assemblies approved for use in Washington state. The current approved assemblies list is available from the department upon request.

(b) The purveyor may rely on testable backflow prevention assemblies that are not currently approved by the department, if the assemblies:

(i) Were included on the department and/or USC list of approved backflow prevention assemblies at the time of installation;

(ii) Have been properly maintained;

(iii) Are commensurate with the purveyor's assessed degree of hazard; and

(iv) Have been inspected and tested at least annually and have successfully passed the annual tests.

(c) The purveyor shall ensure that an unlisted backflow prevention assembly is replaced by an approved assembly commensurate with the degree of hazard, when the unlisted assembly:

(i) Does not meet the conditions specified in (b)(i) through (iv) of this subsection;

(ii) Is moved; or

(iii) Cannot be repaired using spare parts from the original manufacturer.

(d) The purveyor shall ensure that AVBs meet the definition of approved atmospheric vacuum breakers as described in WAC [246-290-010](#).

(6) Approved backflow preventer installation.

(a) The purveyor shall ensure that approved backflow preventers are installed in the orientation for which they are approved (if applicable).

(b) The purveyor shall ensure that approved backflow preventers are installed in a manner that:

(i) Facilitates their proper operation, maintenance, inspection, and/or in-line testing (as applicable) using standard installation procedures acceptable to the department such as those in the USC Manual or PNWS-AWWA Manual;

(ii) Ensures that the assembly will not become submerged due to weather-related conditions such as flooding; and

(iii) Ensures compliance with all applicable safety regulations.

(c) The purveyor shall ensure that approved backflow assemblies for premises isolation are installed at a location adjacent to the meter or property line or an alternate location acceptable to the purveyor.

(d) When premises isolation assemblies are installed at an alternate location acceptable to the purveyor, the purveyor shall ensure that there are no connections between the point of delivery from the public water system and the approved backflow assembly, unless the installation of such a connection meets the purveyor's cross-connection control requirements and is specifically approved by the purveyor.

(e) The purveyor shall ensure that approved backflow preventers are installed in accordance with the following time frames:

(i) For new connections made on or after the effective date of these regulations, the following conditions shall be met before service is provided:

(A) The provisions of subsection (3)(d)(ii) of this section; and

(B) Satisfactory completion of a test by a BAT in accordance with subsection (7) of this section.

(ii) For existing connections where the purveyor identifies a high health cross-connection hazard, the provisions of (3)(d)(ii) of this section shall be met:

(A) Within ninety days of the purveyor notifying the consumer of the high health cross-connection hazard; or

(B) In accordance with an alternate schedule acceptable to the purveyor.

(iii) For existing connections where the purveyor identifies a low health cross-connection hazard, the provisions of subsection (3)(d)(ii) of this section shall be met in accordance with a schedule acceptable to the purveyor.

(f) The purveyor shall ensure that bypass piping installed around any approved backflow preventer is equipped with an approved backflow preventer that:

(i) Affords at least the same level of protection as the approved backflow preventer that is being bypassed; and

(ii) Complies with all applicable requirements of this section.

(7) Approved backflow preventer inspection and testing.

(a) The purveyor shall ensure that:

(i) A CCS inspects backflow preventer installations to ensure that protection is provided commensurate with the assessed degree of hazard;

(ii) Either a BAT or CCS inspects:

(A) Air gaps installed in lieu of approved backflow prevention assemblies for compliance with the approved air gap definition; and

(B) Backflow prevention assemblies for correct installation and approval status.

(iii) A BAT tests approved backflow prevention assemblies for proper operation.

(b) The purveyor shall ensure that inspections and/or tests of approved air gaps and approved backflow assemblies are conducted:

(i) At the time of installation;

(ii) Annually after installation, or more frequently, if required by the purveyor for connections serving premises or systems that pose a high health cross-connection hazard or for assemblies that repeatedly fail;

(iii) After a backflow incident; and

(iv) After an assembly is repaired, reinstalled, or relocated or an air gap is replumbed.

(c) The purveyor shall ensure that inspections of AVBs installed on irrigation systems are conducted:

(i) At the time of installation;

(ii) After a backflow incident; and

(iii) After repair, reinstallation, or relocation.

(d) The purveyor shall ensure that approved backflow prevention assemblies are tested using procedures acceptable to the department, such as those specified in the most recently published edition of the USC Manual. When circumstances, such as, but not limited to, configuration or location of the

assembly, preclude the use of USC test procedures, the purveyor may allow, on a case-by-case basis, the use of alternate (non-USC) test procedures acceptable to the department.

(e) The purveyor shall ensure that results of backflow prevention assembly inspections and tests are documented and reported in a manner acceptable to the purveyor.

(f) The purveyor shall ensure that an approved backflow prevention assembly or AVB, whenever found to be improperly installed, defective, not commensurate with the degree of hazard, or failing a test (if applicable) is properly reinstalled, repaired, overhauled, or replaced.

(g) The purveyor shall ensure that an approved air gap, whenever found to be altered or improperly installed, is properly replumbed or, if commensurate with the degree of hazard, is replaced by an approved RPBA.

(8) Recordkeeping and reporting.

(a) Purveyors shall keep cross-connection control records for the following time frames:

(i) Records pertaining to the master list of service connections and/or consumer's premises required in subsection (3)(j)(i) of this section shall be kept as long as the premises pose a cross-connection hazard to the purveyor's distribution system;

(ii) Records regarding inventory information required in subsection (3)(j)(ii) of this section shall be kept for five years or for the life of the approved backflow preventer whichever is shorter; and

(iii) Records regarding backflow incidents and annual summary reports required in subsection (3)(j)(iii) of this section shall be kept for five years.

(b) Purveyors may maintain cross-connection control records in original form or transfer data to tabular summaries.

(c) Purveyors may maintain records or data in any media, such as paper, film, or electronic format.

(d) The purveyor shall complete the cross-connection control program summary report annually. Report forms and guidance on completing the report are available from the department.

(e) The purveyor shall make all records and reports required in subsection (3)(j) of this section available to the department or its representative upon request.

(f) The purveyor shall notify the department, local administrative authority, and local health jurisdiction as soon as possible, but no later than the end of the next business day, when a backflow incident is known by the purveyor to have:

(i) Contaminated the public water system; or

(ii) Occurred within the premises of a consumer served by the purveyor.

(g) The purveyor shall:

(i) Document details of backflow incidents on a form acceptable to the department such as the backflow incident report form included in the most recent edition of the PNWS-AWWA Manual; and

(ii) Include all backflow incident report(s) in the annual cross-connection program summary report referenced in (d) of this subsection, unless otherwise requested by the department.

[Statutory Authority: RCW [43.20.050](#) (2) and (3) and [70.119A.080](#). 03-08-037, § 246-290-490, filed 3/27/03, effective 4/27/03. Statutory Authority: RCW [43.02.050](#) [[43.20.050](#)], [99-07-021](#), § 246-290-490, filed 3/9/99, effective 4/9/99. Statutory Authority: RCW [43.20.050](#). 91-02-051 (Order 124B), recodified as § 246-290-490, filed 12/27/90, effective 1/31/91. Statutory Authority: P.L. 99-339. 89-21-020 (Order 336), § 248-54-285, filed 10/10/89, effective 11/10/89. Statutory Authority: RCW [34.04.045](#). 88-05-057 (Order 307), § 248-54-285, filed 2/17/88. Statutory Authority: RCW [43.20.050](#). 83-19-002 (Order 266), § 248-54-285, filed 9/8/83.]

WAC 51-56-0600 Chapter 6 -- Water supply and distribution.

603.0 Cross-Connection Control. Cross-connection control shall be provided in accordance with the provisions of this chapter. Devices or assemblies for protection of the public water system must be models approved by the department of health under WAC [246-290-490](#). The administrative authority shall coordinate with the local water purveyor where applicable in all matters concerning cross-connection control within the property lines of the premises.

No person shall install any water operated equipment or mechanism, or use any water treating chemical or substance, if it is found that such equipment, mechanism, chemical or substance may cause pollution or contamination of the domestic water supply. Such equipment or mechanism may be permitted only when equipped with an approved backflow prevention device or assembly.

603.3.3 For devices and assemblies other than those regulated by the Washington department of health in conjunction with the local water purveyor for the protection of public water systems, the administrative authority shall ensure that the premise owner or responsible person shall have the backflow prevention assembly tested by a Washington state department of health certified backflow assembly tester:

- (1) At the time of installation, repair or relocation; and
- (2) At least on an annual schedule thereafter, unless more frequent testing is required by the administrative authority.

603.4.6.1 Potable water supplies to systems having no pumps or connections for pumping equipment, and no chemical injection or provisions for chemical injection, shall be protected from backflow by one of the following devices:

- (1) Atmospheric vacuum breaker.
- (2) Pressure vacuum breaker.
- (3) Reduced pressure backflow preventer.
- (4) A double check valve may be allowed when approved by the water purveyor and the administrative authority.
- (5) A spill proof pressure vacuum breaker may be allowed when approved by the water purveyor and the administrative authority.

603.4.13 Potable Water Supply to Carbonators shall be protected by a listed reduced pressure principle backflow preventer as approved by the administrative authority for the specific use.

603.4.18.1 Except as provided under Sections 603.4.18.2 and 603.4.18.3, potable water supplies to fire protection systems that are normally under pressure, including but not limited to standpipes and automatic sprinkler systems, except in one or two family residential flow-through or combination sprinkler systems piped in materials approved for potable water distribution systems, shall be protected from back-pressure and back-siphonage by one of the following testable devices:

1. Double check valve assembly.
2. Double check detector assembly.
3. Reduced pressure backflow preventer.
4. Reduced pressure detector assembly.

Potable water supplies to fire protection systems that are not normally under pressure shall be protected from backflow and shall meet the requirements of the appropriate standard(s) referenced in Table 14-1.

604.1 Water distribution pipe, building supply water pipe and fittings shall be of brass, copper, cast iron, galvanized malleable iron, galvanized wrought iron, galvanized steel or other approved materials. Except as provided in Section 604.13, asbestos-cement, CPVC, PE, PVC, or PEX water pipe materials manufactured to recognized standards may be used for cold water distribution systems outside a building. CPVC, PEX water pipe, tubing, and fittings, manufactured to recognized standards may be used for hot and cold water distribution systems within a building. Other products not listed in this section are acceptable for their intended use, provided that such materials or distribution systems are listed and approved in accordance with nationally recognized standards. All materials used in the water supply system, except valves and similar devices shall be of like material, except where otherwise approved by the administrative authority.

604.13 Plastic water service piping may terminate within a building, provided the connection to the potable water distribution system shall be made as near as is practical to the point of entry and shall be accessible. Barbed insert fittings with hose clamps are prohibited as a transition fitting within the building.

608.5 Relief valves located inside a building shall be provided with a drain, not smaller than the relief valve outlet, of galvanized steel, hard drawn copper piping and fittings, CPVC, or listed relief valve drain tube with fittings which will not reduce the internal bore of the pipe or tubing (straight lengths as opposed to coils) and shall extend from the valve to the outside of the building with the end of the pipe not more than two (2) feet (610 mm) nor less than six (6) inches (152 mm) above the ground or the flood level of the area receiving the discharge and pointing downward. Such drains may terminate at other approved locations. No part of such drain pipe shall be trapped or subject to freezing. The terminal end of the drain pipe shall not be threaded.

EXCEPTION: Replacement water heating equipment shall only be required to provide a drain pointing downward from the relief valve to extend between two feet (610 mm) and six inches (152 mm) from the floor. No additional floor drain need be provided.

610.4 Systems within the range of Table 6-5 may be sized from that table or by the method set forth in Section 610.5.

Listed parallel water distribution systems shall be installed in accordance with their listing.

[Statutory Authority: RCW [19.27.031](#), [19.27.074](#). 02-01-114, § 51-56-0600, filed 12/18/01, effective 7/1/02.]



Cross Connection Enforcement Action

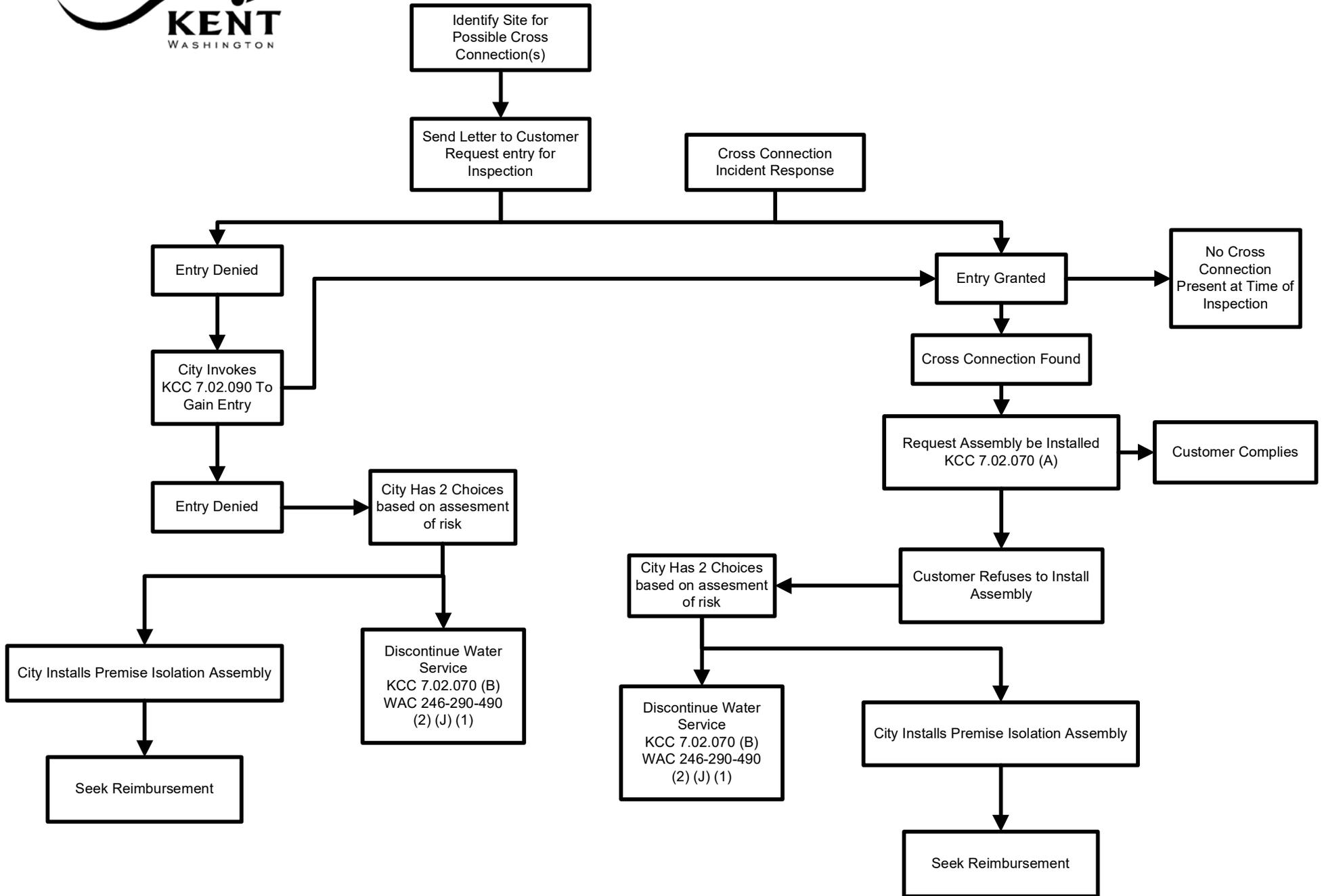


Figure 2

Backflow Incident Report Form

There are many backflow incidents which occur that are not reported. This is usually because they are of short duration and are not detected, the customer is not aware they should be reported, or it may not be known to whom they should be reported.

The PNWS-AWWA Cross Connection Control Committee is making an effort to bring these incidents to the attention of water purveyors and the public. If you have any knowledge regarding incidents, please fill out a copy of this form and return it to the committee, c/o the individual named on the reverse side. In addition, the state or provincial health agency should be notified.

Reporting Agency: _____ Report Date: _____

Reported By: _____ Title: _____

Mail Address: _____ City: _____

State: _____ Zip Code: _____ Telephone: _____

Date of Incident: _____ Time of Occurrence: _____

General Location (Street, etc.): _____

Backflow Originated From:

Name of Premise: _____

Street Address: _____ City: _____

Contact Person: _____ Telephone: _____

Type of Business: _____

Description of Contaminants:
(Attach Chemical Analysis or MSDS if available)

Distribution of Contaminants:

Contained within customer's premise: Yes: _____ No: _____

Number of persons affected: _____

Effect of Contamination:

Illness Reported: _____

Physical irritation reported: _____

Backflow Incident Report Form

Page 2

Cross Connection Source of Contaminant
(boiler, chemical pump, irrigation system, etc.)

Cause of Backflow:
(main break, fire flow, etc.)

Corrective Action Taken to Restore Water Quality:
(main flushing, disinfection, etc.)

Corrective Action Ordered to Eliminate or Protect from Cross Connection:
(type of backflow preventer, location, etc.)

Previous Cross Connection Survey of Premise:

Date: _____ By: _____

Types of Backflow Preventer Isolating Premise:

RPBA: _____ RPDA: _____ DCVA: _____ DCDA: _____ PVBA: _____ SVBA: _____

AVB: _____ Air Gap: _____ None: _____ Other Type: _____

Date of Latest Test of Assembly: _____

Notification of State [Provincial] Health Authority:

Date: _____ Time: _____ Person Notified: _____

Attach sheets with additional information, sketches, and/or media information, and mail to:

*PNWS-AWWA
c/o George Bratton
1252 S. Farragut Drive
Coupeville WA 98239*



Public Works

Location: 400 W. Gowe
 Mail to: 220 4th Avenue South • Kent, WA 98032-5895
 (253) 856-5300 FAX: (253) 856-6454

TEST DATE

Backflow Prevention Device Test and Maintenance Report

FOR OFFICE USE ONLY

FILE NO. _____

THIS FORM TO ACCOMPANY PERMIT NO. _____

METRO FORM DATE _____

PROJECT NAME _____

ADDRESS _____ ZIP _____ PHONE NO. _____

CONTRACTOR _____

- REDUCE BACKFLOW DEVICE
- DOUBLE CHECK VALVE ASSEMBLY
- PRESSURE VACUUM BRAKE

TO BE FILLED OUT BY INSPECTOR

MAKE OF DEVICE _____ MODEL _____ SERIAL NO. _____ SIZE _____

DATE INSTALLED _____ METER SER. NO. _____ METER READING _____

LOCATION OF DEVICE _____

TO BE FILLED OUT BY CERTIFIED TESTER

LINE PRESSURE _____ PSI PRESSURE DROP ACROSS FIRST CHECK VALVE _____ PSI

TEST BEFORE REPAIRS	CHECK VALVE NO. 1			CHECK VALVE NO. 2			DIFFERENTIAL PRESSURE RELIEF VALVE*		
	LEAKED <input type="checkbox"/>			LEAKED <input type="checkbox"/>			OPENED AT _____ PSI		
	CLOSED TIGHT <input type="checkbox"/>			CLOSED TIGHT <input type="checkbox"/>			REDUCED PRESSURE		
NEW PARTS AND REPAIRS	PART	CLEAN	REPLACE	PART	CLEAN	REPLACE	PART	CLEAN	REPLACE
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>		<input type="checkbox"/>	<input type="checkbox"/>
REMARKS									

TEST EQUIPMENT: MAKE _____ MODEL _____ SERIAL # _____

ASSY TESTED: SATISFACTORILY _____ FAILED _____ ACCURACY VERIFICATION DATE _____

***REQUIRED ONLY ON REDUCED PRESSURE BACKFLOW DEVICE**

Tested by _____ Date _____ Tester's Washington State Certification No. _____

Signature

Print Name _____ Repaired by _____ Date _____

Print Name

Phone # _____ Final test by _____ Date _____

DISTRIBUTION: WHITE - ENGINEERING YELLOW - APPLICANT PINK - CERTIFIED TESTER



PWD2004

Chapter 8 ASSEMBLY TEST PROCEDURES

INTRODUCTION

Several methods may be used to test backflow prevention assemblies. To ensure that test results obtained from certified testers are reliable, standardized testing procedures should be used. The acceptable procedures should be specified by the state or provincial health departments and the water purveyor (see Chapter 9).

The following are some of the publications or sources that provide test procedures for the reduced pressure backflow assembly, double check valve assembly and pressure vacuum breaker assemblies (PVBA and/or SVBA):

- Manufacturer's literature - differential pressure gauges.
- Manufacturer's literature - backflow prevention assemblies.
- *Cross Connection Control Manual*, 6th Edition, Appendix F, PNWS-AWWA
- *Cross-Connection Control Manual*, June 1989, US EPA Publication 570/9-89-007
- *Backflow Prevention Assemblies - Series 5000*, 1991, American Society of Sanitary Engineers
- *Manual of Cross-Connection Control*, Ninth Edition, Foundation for Cross-Connection Control and Hydraulic Research, University of Southern California

The test procedures listed above may vary in the test equipment used, the type of test performed to determine the operating performance of the assembly, and the criteria used to determine compliance with the operating requirements. Some tests may vary only in the sequence of the steps, or in the method of troubleshooting or diagnosing problems.

Recommended are those test procedures based on evaluating the operating requirements specified in the design standard for assembly using a differential pressure gauge. Testing of all components of a backflow prevention assembly to their performance criteria provides an addition safety factor, and thus, increases the reliability of an "approved assembly". The important operating requirements for assemblies, such as those established in American Water Works Association standards, are summarized in Appendix B.

In this Chapter, detailed step by step procedures are not provided for the testing of backflow prevention assemblies. It is assumed that the backflow assembly tester using this Manual has received step-by-step training through a backflow assembly tester certification course. And, that the tester is familiar with the procedures for purging test cocks, isolating the assembly, connecting test equipment, bleeding air from the test equipment, etc.

In the place of step-by-step procedures, this Manual provides an outline of the recommended test objective, a summary of the recommended test method, and the minimum reporting requirements for each type of assembly. The purposes of this information is to establish a recommended minimum performance requirements of the tester in testing the various types of assemblies.

Included in Appendix F are alternate test procedures that may be approved by some jurisdictions to test assemblies. The backflow assembly tester must verify with the local authority the acceptability of any alternate test procedure. These alternate test procedures were included in previous editions of this Manual. Their application may be desirable when physical constraints may prohibit the proper use of a differential pressure gauge, or completion of the recommended minimum performance requirements outlined in this Chapter (e.g., a leaking Shutoff Valve # 2).

PRELIMINARY STEPS TO TESTING ASSEMBLIES

Prior to initiating a test of any backflow prevention assembly, the following procedures should be followed⁽¹⁾

1. Obtain permission from the owner, or their representative, to shut down the water supply. This is necessary to insure that since all testing is accomplished under no-flow conditions, the owner is aware that the water supply will be temporarily shut off while the testing is being performed. Some commercial and industrial operations require constant and uninterrupted water supplies for cooling, boiler feed, seal pump water, etc., and water service interruptions cannot be tolerated. The water supply to hospitals and continuous process industries cannot be shut off without planned and coordinated shut downs.

For premise isolation assemblies, although notice can be given by the purveyor for an interruption of service, whenever possible, it is preferable to cooperate with the owner to arrange a mutually agreeable time for a shutdown.

The request to shut down the water supply is a necessary prerequisite to protect the customer as well as limit the liability of the tester (see also Chapter 2).

Concurrent with the request for permission to shut off the water, it is advisable to point out to the owner that while the water is shut off during the test period, any inadvertent use of water within the building will reduce the water pressure to zero. Backsiphonage could result in the building's plumbing system being contaminated through cross connections. To address this situation, it is recommended that the owner caution the inhabitants of the building not to use water until the backflow assembly test is completed and the water pressure restored. Additional options available to the owner would be the installation of two backflow assemblies in parallel that would enable a protected by-pass flow around the assembly to be tested (see Chapter 7). Also if all water outlets are properly equipped with backflow assemblies and devices within the building, backsiphonage would not occur while assemblies are being tested, or for other reasons.

2. Determine the type of assembly to be tested, i.e. RPBA, DCVA, PVBA or SVBA.
3. Determine the flow direction (reference directional flow arrows or wording provided by the manufacturer on the assembly).

(1) Portions copied with permission from work by Howard D. Hendrickson, P.E., Water Service Consultants. Mr. Hendrickson's work is also printed in the *Cross-Connection Control Manual*, 1989. US EPA

4. Number the test cocks (mentally), flush them of potential debris, and assemble appropriate test cock adapters and bushings that may be required.
5. Shut off the downstream isolating valve (Shutoff Valve # 2).
6. Hook up the test equipment in the manner appropriate to the assembly being tested and the specific test being performed.

**TEST PROCEDURES FOR REDUCED PRESSURE BACKFLOW AND
REDUCED PRESSURE DETECTOR ASSEMBLIES
USING DIFFERENTIAL PRESSURE GAUGE**

RELIEF VALVE:

Performance Criteria:

During normal operating conditions, whether or not there is flow through the assembly, the pressure in the zone between the check valves (zone of reduced pressure) shall be at least 2 psi less than the pressure on the inlet (supply) side of the assembly. When there is no flow from the inlet (supply) side of the assembly and the inlet pressure drops to 2 psi, the pressure within the zone of reduced pressure shall be atmospheric. If the inlet pressure drops below 2 psi, the Relief Valve shall continue to open. [AWWA C511 Sec. 4.2.1, 4.2.2]

Test Objective, Method and Reporting Requirements:

The first test objective is to determine the opening point and operation of differential pressure Relief Valve. To do so, the pressure between the check valves (zone of reduced pressure) must be increased by slowly bypassing water from upstream of Check Valve # 1 until the differential pressure begins to decrease. This is done through the differential pressure gauge test kit by bypassing higher supply pressure from Test Cock # 2 into the lower pressure of the zone of reduced pressure through Test Cock # 3. Closely observe the differential pressure as it slowly drops. When the first drop of water is observed, note the differential pressure. This value is the opening point of the Relief Valve and must be 2.0 psid or greater ['psid' refers to differential pressure].

Record on the Test Report Form the differential pressure gauge reading of the point of initial opening of the Relief Valve.

The second test is to verify that the Relief Valve will continue to open with a decrease in the differential pressure below the point which the Relief Valve begins to drip. This is considered an import factor in the issue of verification of the continued performance of an RPBA or RPDA. Although it is preferable to also verify that the Relief Valve will open fully when the supply pressure drops to atmospheric, space restriction around the assembly often make it impractical to do so in the field test on all assemblies.

To determine that the Relief Valve will continue to open with a decrease in the differential pressure, the flow of water must be increased between Test Cock # 2 and Test Cock # 3. This may be done by fully opening the low side control valve on the differential pressure gauge. On 2.5" and larger assemblies, it may be necessary to install a by-pass hose separate

from test equipment between Test Cock # 2 and Test Cock # 3 to provide a significant flow to check that the Relief Valve will continue to open.

If flow from the Relief Valve increases, as an increased supply of water is bypassed into the zone of reduced pressure, the Relief Valve shall be considered to continue to open.

Record on the Test Report Form that the Relief Valve “Continued to Open”.

CHECK VALVE # 1:

Performance Criteria:

Check Valve # 1 shall seal tight in the direction of flow at an adequate pressure to prevent the Relief Valve from opening, and, to prevent excessive discharge due to pressure fluctuation, the minimum pressure drop (differential) across the Check Valve # 1 under normal flow conditions shall be at least 3.0 psi greater than the pressure differential necessary to cause the Relief Valve to open [AWWA C511 Sec. 4.2.1, 4.2.6].

Test Objective, Method and Reporting Requirements:

To test Check Valve # 1 for tightness in the direction of flow, determine the static pressure drop across the check valve using a differential pressure gauge test kit.

The pressure differential gauge reading shows the “apparent” pressure drop (differential) across Check Valve # 1. If the gauge reading remains steady, Check Valve # 1 shall be considered to hold tight in the direction of flow. This test assumes that the Relief Valve operates. This test is valid only after the test of the Relief Valve is completed, and the Relief Valve is confirmed to be operable. However, the test may be performed before the test of the Relief Valve.

Record this differential pressure gauge reading on the Test Report Form as the Check Valve # 1 pressure drop and state that check valve held tight in direction of flow.

This test does not confirm that the check valve will hold tight against backpressure. It is assumed that if the check valve hold at least 1.0 psi differential in the normal direction of flow, it will hold tight in the reverse direction of flow.

To check for the minimum 3.0 psi “buffer”, subtract the pressure differential gauge reading for the Relief Valve to drip from the pressure drop across Check Valve # 1. The actual test is under static conditions, since the pressure drop “under normal flow conditions” varies with flow rate. This value shall be 3.0 psi or greater.

Record this value on the Test Report Form.

CHECK VALVE # 2:

Performance Criterion:

Check Valve # 2 shall be internally loaded so that when the pressure on the inlet (supply) side of the valve is at least 1 psi and the outlet (downstream) pressure is atmospheric, the check valve will be drip tight in the normal direction of flow [AWWA C511 Sec. 4.2.5].

Test Objective, Method and Reporting Requirements:

To test Check Valve # 2 for tightness in the direction of flow, determine the static pressure drop across the check valve using a differential pressure gauge test kit. The test differs from the test of Check Valve # 1, in that the downstream pressure is atmospheric.

This test may be made with the differential pressure gauge high side hose is connected only to Test Cock # 3, and Test Cock # 4 open. The test kit must be held at the centerline of the assembly or at the elevation of Test Cock # 4 if the test cock is located on the top of the check valve. After water stops flowing from Test Cock # 4 and the gauge stabilizes, the differential pressure indicated by the gauge is the static pressure drop across Check Valve # 2. The pressure drop must be 1.0 psid or greater.

Record this differential pressure gauge reading as the Check Valve # 2 pressure drop and state that check valve held tight in direction of flow.

It is recommended that Check Valve #2 be tested for tightness in the reverse direction of flow (backpressure condition) if the above noted direction of flow test is prevented by leaking isolating valves. See Alternate Test Procedures in Appendix G.

BYPASS METER ON RPDA:

Performance Criterion:

The bypass meter must register any flow (e.g., 3 to 5 gallons) that occurs through the assembly (mainline or bypass). However, it is not necessary that the meter accurately register the flow.

Test Objective, Method and Reporting Requirements:

Partially open the mainline assembly's Test Cock # 4. Observe bypass meter; meter dial should move to register flow.

In addition, if Test Cock # 4 of the mainline assembly is located on the bypass piping (rather than on the body of the main line assembly), close Shutoff Valve # 2 on the by-pass

assembly, partially open Test Cock # 4. If flow continues from test cock, this indicates that bypass connection to the body of the mainline assembly is not restricted.

Record on Test Report Form that 'detector' meter registered flow.

AIR GAP:

Performance Criterion:

The distance of the air gap below the Relief Valve discharge vent (port) shall be in compliance with the requirements for an Approved Air Gap (see Table 6-1).

Test Objective, Method and Reporting Requirements:

Measure the distance between the Relief Valve vent and the overflow rim of the receiving drain fixture.

Record on the Test Report Form that the air gap is in compliance.

RPBA/RPDA

Relief Valve [≥ 2.0 psid]	Dripped at: or failed to open? ____ (check) Continued to open? yes ____, no ____	____ . ____ psi
Check Valve # 1 [≥ 1.0 psid]	Pressure drop: Valve Tight?	____ . ____ psi Yes ____, no ____
Check Valve # 1 Buffer [≥ 3.0 psi]	C V #1 pressure drop minus relief valve psid	____ . ____ psi
Check Valve # 2 [≥ 1.0 psid] _____	Pressure drop: Valve Tight, Flow direction? Backpressure?	____ . ____ psi yes ____, no ____ yes ____, no ____
Air Gap distance adequate?		yes ____, no ____
Test Cock # 4 opened, meter moved? Detector Meter Reading: _____		yes ____, no ____

**TEST PROCEDURE FOR DOUBLE CHECK VALVE
AND DOUBLE CHECK DETECTOR ASSEMBLIES
USING DIFFERENTIAL PRESSURE GAUGE**

CHECK VALVE # 1 AND CHECK VALVE # 2:

Performance Criteria:

Check valves shall be loaded so that when the supply pressure is at least 1.0 psi and the outlet pressure is atmospheric, each check valve shall be drip tight in the normal direction of flow. There shall be no leakage past any check valve when the pressure conditions that causes backflow are present. [AWWA C510, Sec. 4.2].

Test Objective, Method and Reporting Requirements:

To test either Check Valve # 1 or # 2 for tightness in the direction of flow, determine the static pressure drop across the check valve using a differential pressure gauge test kit.

Both Shutoff Valve # 1 and # 2 must be closed. For Check Valve # 1, this test may be made with the differential pressure gauge high side hose connected only to Test Cock # 2, and Test Cock # 3 open (to atmosphere). For Check Valve # 2, this test may be made with the differential pressure gauge high side hose connected only to Test Cock # 3, and Test Cock # 4 open. For a valid pressure gauge reading, the test kit must be held at the centerline of the assembly or at the elevation of Test Cock # 4 (or Test Cock #3, for testing Check Valve #1) if the test cock is located on the top of the check valve. After water stops flowing from Test Cock # 4 and the gauge stabilizes, the differential pressure indicated by the gauge is the static pressure drop across the check valve. The pressure drop must be 1.0 psid or greater.

Record this differential pressure gauge reading on the Test Report Form as the Check Valve # 1 or Check Valve # 2 pressure drop and state that check valve held tight in direction of flow.

It is recommended that Check Valve # 2 be tested first to prevent entrapped air from giving an inaccurate test of Check Valve # 1.

The second operating requirement is that there shall be no leakage past any check valve when the pressure conditions that cause backflow are present. It is assumed that if the check valve hold at least 1.0 psi differential in the normal direction of flow, it will hold tight in the reverse direction of flow.

BYPASS METER ON DCDA:

Performance Criterion:

The bypass meter shall register any flow that occurs through the assembly (mainline or bypass). However, it is not necessary that the meter accurately register the flow.

Test Objective, Method and Reporting Requirements:

Partially open the mainline assembly's Test Cock # 4. Observe bypass meter; meter dial should move to register flow.

In addition, if Test Cock # 4 of the mainline assembly is located on the bypass piping (rather than on the body of the main line assembly), close Shutoff Valve # 2 on the by-pass assembly, partially open Test Cock # 4. If flow continues from test cock, this indicates that bypass connection to the body of the mainline assembly is not restricted.

Record on Test Report Form that 'detector' meter registered flow.

DCVA/DCDA

Check Valve # 2 [≥ 1.0 psid]	Pressure drop: Valve Tight Flow direction?	___ . ___ psi yes ____, no ____
Check Valve # 1 [≥ 1.0 psid]	Pressure drop: Valve Tight Flow direction?	___ . ___ psi yes ____, no ____
Test Cock # 4 opened, metered moved? Detector Meter Reading: _____		yes ____, no ____

**TEST PROCEDURE FOR PRESSURE VACUUM BREAKER
AND SPILL-RESISTANT VACUUM BREAKER ASSEMBLIES
USING DIFFERENTIAL PRESSURE GAUGE**

AIR INLET:

Performance Criteria:

The Air Inlet Valve shall be open when the differential pressure in the body is no less than 1.0 psi above atmospheric pressure. The Air Inlet Valve shall also be fully open when the water has drained from the body.

Test Objective, Method and Reporting Requirements:

To determine the opening point of the Air Inlet of the PVBA, using a differential pressure gauge test kit. Both Shutoff Valve # 1 and # 2 must be closed. The differential pressure gauge high side hose should be connected only to Test Cock # 2. For a valid pressure gauge reading, the test kit must be held at the centerline of Test Cock # 2. Slightly open the high side bleed valve while observing the Air Inlet. Observe the differential pressure at which the Air Inlet Valve opens. This value must be 1.0 psid or greater.

Record this pressure reading on the Test Report Form.

To determine the opening point of the Air Inlet of the SVBA, using a differential pressure gauge test kit, follow the above method, but slightly open the Air Bleed Screw rather than the high side bleed valve of the differential pressure gauge.

CHECK VALVE:

Performance Criteria:

The static pressure drop across the Check Valve shall be at least 1.0 psi.

Test Objective, Method and Reporting Requirements:

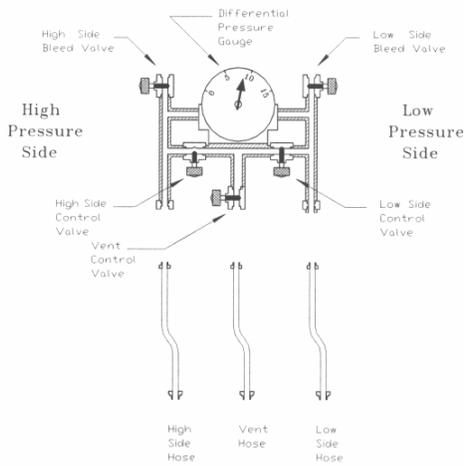
To test the Check Valve for tightness in the direction of flow, determine the static pressure drop across the check valve using a differential pressure gauge test kit. This test may be made with the differential pressure gauge high side hose is connected to Test Cock # 1. For a valid gauge reading, the centerline of the test kit must be maintained at the center of the SVBA during the test. Slightly open Test Cock # 2. The Air Inlet Valve will open as water flows out of Test Cock # 2. After water stops flowing from Test Cock # 2 and the gauge stabilizes, the differential pressure indicated by the gauge is the static pressure drop across Check Valve. The pressure drop must be 1.0 psid or greater.

Record this pressure reading on the Test Report Form.

To determine the opening point of the Air Inlet of the SVBA, using a differential pressure gauge test kit, follow the above method, but slightly open the Air Bleed Screw rather Test Cock # 2.

PVBA/SVBA

Check Valve # 1 [≥ 1.0 psid]	Pressure drop: Valve Tight?	___ . ___ psi Yes ____, no ____
Air Inlet [≥ 1.0 psid]	Opened at: Air Inlet opened	___ . ___ psi yes ____, no ____



**Figure 8-1
Major Component Parts Of A Five Valve
Differential Pressure Gauge**

Equipment Description:

- Differential Pressure Gauge - 0 - 15 PSID (0.1 or 0.2 psid graduations)
- Three - 6 ft. lengths - minimum 1/4" I.D. high pressure hose with screw type couplings
- 1/4" needle valves, for fine control of flows
- Appropriate adapter fittings for connection to various size test cocks.



Figure 8-2

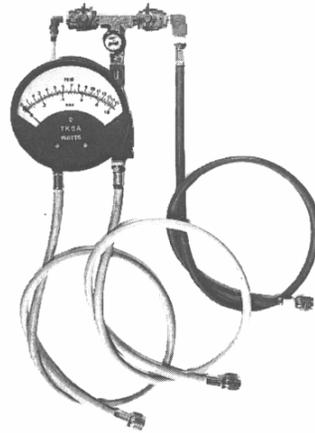


Figure 8-3

Differential Pressure Gauge Test Kits
Photos courtesy of WATTS

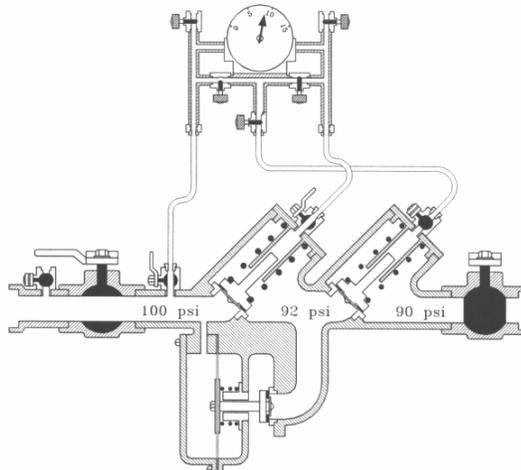


Figure 8-4
Illustration Of A RPBA Test
With A Differential Pressure Gauge

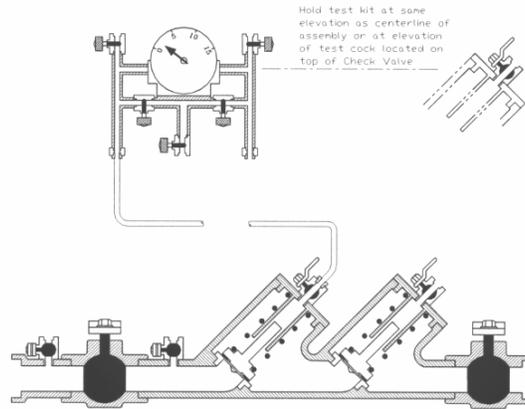


Figure 8-5
Illustration Of A DCVA Test
With A Differential Pressure Gauge

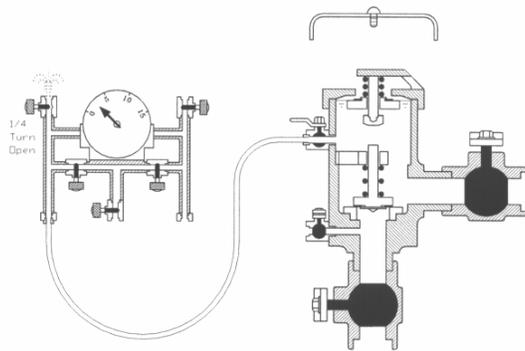


Figure 8-6
Illustration Of A PVBA Test
With A Differential Pressure Gauge

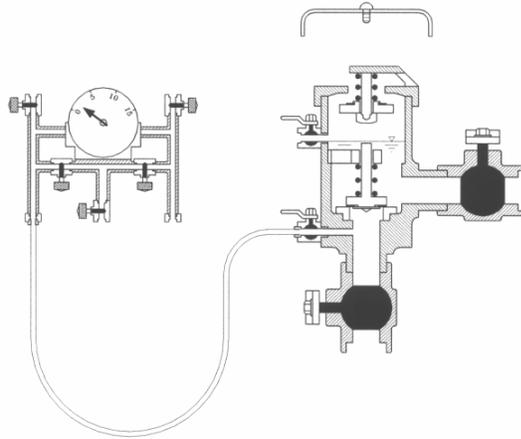


Figure 8-7
Illustration Of A PVBA Test
With A Differential Pressure Gauge

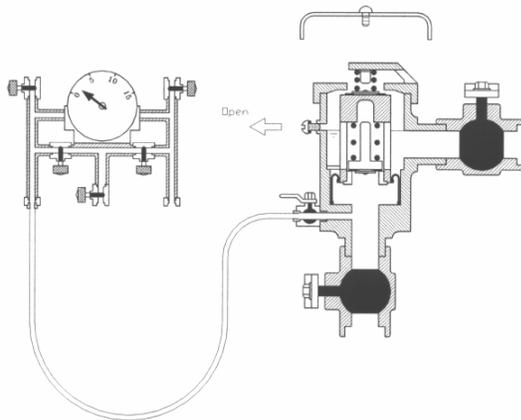


Figure 8-8
Illustration Of A SVBA Test
With A Differential Pressure Gauge

List of Approved Backflow Prevention Assemblies

To look something up select one of the following, or use the search tool in Adobe Acrobat™. You may also browse through the list.

New Additions (Since Last Published List)

Shut off valve designations

Double Check Valve Assemblies

Double Check Detector Assemblies

Reduced Pressure Principle Detector Assemblies

Reduced Pressure Principle Backflow Prevention Assemblies

Atmospheric Vacuum Breaker Assemblies

Pressure Vacuum Breaker Assemblies

Spill Resistant Vacuum Breaker Assemblies

Manufacturer's Addresses and Phone Numbers

Index of Special Notices

4 June 2003

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List of Approved Backflow Prevention Assemblies

4 June 2003

Supersedes All Prior Lists

The *List of Approved Backflow Prevention Assemblies*, includes the following modifications:

ORIENTATION

The List has been modified so that the orientation of each assembly is clearly shown with the listing of each assembly. Page 4 contains the legend for the various orientations.

ADDITIONS

Double Check Valve Assemblies

Ames

Colt 200Na - 2 1/2", 3", 4" (VUVD)

Maxim 200Na - 2 1/2", 3" (VUVD)

Watts

757Na - 2 1/2", 3", 4" (VUVD)

767Na - 2 1/2", 3" (VUVD)

Wilkins

350 - 10" (VU)

450 - 8" (VUVD)

450G - 8" (VUVD)

Double Check Detector Assemblies

Wilkins

350DA - 10" (VU)

Reduced Pressure Principle Assemblies

Ames

Colt 400N - 2 1/2", 3", 4" (VUVD)

Colt 400Z - 2 1/2", 3", 4" (VUVU)

Maxim 400N - 2 1/2", 3" (VUVD)

Maxim 400Z - 2 1/2", 3" (VUVU)

Watts

957N - 2 1/2", 3", 4" (VUVD)

957Z - 2 1/2", 3", 4" (VUVU)

967N - 2 1/2", 3" (VUVD)

967Z - 2 1/2", 3" (VUVU)

DELETIONS (these assemblies are all being removed from the List at the request of the manufacturer)

Double Check Valve Assemblies

Cla-Val

DC6LB - 3/4"

DC6LW - 3/4", 1", 1 1/2" 2"

DC7LW - 2 1/2", 3", 4", 6", 8", 10"

DC7LY - 2 1/2", 3", 4", 6", 8", 10"

DC8LW - 4", 6", 8" 10"

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Foundation for

Cross-Connection

Control and

Hydraulic Research

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DELETIONS (continued)

Double Check Valve Assemblies

Cla-Val

DC8LY - 4", 6", 8", 10"

DC8VW - 2 1/2", 3", 4", 6", 8", 10"

DC8VY - 2 1/2", 3", 4", 6", 8", 10"

DC8NW - 2 1/2", 3", 4", 6", 8", 10"

DC8NY - 2 1/2", 3", 4", 6", 8", 10"

Double Check Detector Assemblies

Cla-Val

DD7LY - 3", 4", 6", 8", 10"

DD8LY - 4", 6", 8"

DD8VY - 2 1/2", 3", 4", 6", 8", 10"

DD8NY - 2 1/2", 3", 4", 6", 8", 10"

Reduced Pressure Principle Detector Assemblies

Cla-Val

RD7LY - 2 1/2", 3", 4", 6", 8", 10"

Reduced Pressure Principle Assemblies

Cla-Val

RP6LW - 3/4", 1", 1 1/4", 1 1/2", 2"
RP6VW - 3/4", 1", 1 1/2", 2"
RP7LW - 2 1/2", 3", 4", 6", 8", 10"
RP7LY - 2 1/2", 3", 4", 6", 8", 10"
RP8LW - 2 1/2", 3", 4", 6", 8"
RP8LY - 2 1/2", 3", 4", 6", 8"
RP8VW - 2 1/2", 3", 4", 6", 8", 10"
RP8VY - 2 1/2", 3", 4", 6", 8", 10"
RP8NW - 2 1/2", 3", 4", 6", 8", 10"
RP8NY - 2 1/2", 3", 4", 6", 8", 10"

MODIFICATIONS (These assemblies are now listed as "Spare Parts Only," notated by —)

Double Check Valve Assemblies

Cla-Val

D2 - 3/4", 1", 1 1/4", 1 1/2"

D4 - 2"

Reduced Pressure Principle Detector Assemblies

Cla-Val

18-4 - 10"

Reduced Pressure Principle Assemblies

Cla-Val

RP-2 - 3/4", 1", 1 1/4", 1 1/2"

RP-4 - 2"

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Notice:

The original Certificate of Approval - identified by the Edition of the Manual and the Approved date shown below - is valid only if the original or renewal date shown hereon is within three (3) years of the current date.

The responsibility to request a renewal of an Approval is that of each manufacturer. The Foundation retains the right of determining the extent of re-evaluation required before renewal is granted. Certificates of Approval are not recalled for the purpose of updating the effective date. This revision of date is only published via the current *List of Approved Backflow Prevention Assemblies*.

Unless otherwise specified by the manufacturer all assemblies are to be installed on cold potable water applications

- below 110°F. Also all of the assemblies listed are Approved for **INDICATED ORIENTATION ONLY** (Please see the legend on page 3). Use of spare parts other than those of the original manufacturer invalidates the Approval.

Shutoff Valves

The backflow prevention assemblies shown on this list have been evaluated with a specific set of shutoff valves as an integral part of the assembly. The specific shutoff valves are coded by a parenthetic code shown below the assemblies' model designations. This coding of shutoff valves is defined below. Other shutoff valves having similar performance characteristics which permit the assembly to meet the Specifications are also shown immediately

after the original shutoff valves. The use of any shutoff valve on a specific assembly, other than those listed for that specific assembly invalidates the Approval. Assemblies listed as "only spare parts available," designated by the greek letter psi (—) may not include the shutoff valve designation.

List of Approved Backflow Prevention Assemblies

Identification of shutoff valves:

(aa) American Figure 1 - QT

(bb) American Figure 17 - NRS RW

(cc) American Figure 37 - OSY RW

(dd) Apollo Series 7B - QT

(ee) AVK Series 25 - NRS

(ff) AVK Series 23 - OSY

(Nibco F607RW OSY)
 (gg) Clow R/W F6102 - NRS
 (hh) Clow R/W F6136 - OSY
 (ii) Fortune Figure 620 - QT
 Formerly Figure 601
 private labeled as:
 Ames
 Buckner
 Febco
 Flomatic
 Hersey
 Wilkins
 (jj) Kennedy Ken Seal I - NRS
 (kk) Kennedy Ken Seal I - OSY
 (ll) Kennedy Ken Seal II - NRS
 (mm) Kennedy Ken Seal II - OSY
 (nn) Lee Brass - QT
 (oo) Watts 405-RW
 (pp) Watts 408-OSY
 (qq) Mueller R/W HP NRS
 (rr) Mueller R/W HP OSY
 (ss) Toro/Orion Integral Ball Valve - QT
 (tt) American Flow Control
 (Waterous) Series 500 - NRS
 (uu) American Flow Control
 (Waterous) Series 500 - OSY
 (vv) Watts Figure FBV (& FBV-E) - QT
 (ww) Watts G4000FDA - QT
 (xx) Watts Series 6080 (& 6080-E) - QT
 (yy) Matco-Norca 10RW (NRS)
 (zz) Matco-Norca 105U (OSY)
 (aaa) American Flow Control Series 2500-NRS
 (bbb) American Flow Control Series 2500-OSY
 (ccc) M&H Model 4067-02 (NRS)
 (ddd) M&H Model 4068-02 (OSY)
 (eee) Stockham Model G-610 (OSY)
 (fff) Febco Series 620 - QT
 (ggg) Fortune Figure 620U - QT
 (hhh) Watts Figure S-FBV (& S-FBV-E) - QT
 (iii) Mueller Model A2360 - NRS
 (int) Shutoff valve is integral part of assembly
 (jjj) Febco Series 621 - QT
 (kkk) Febco Series 620U - QT
 (lll) Mueller Model R2360 - OSY
 (mmm) Conbraco Series IBVE-125 - QT
 (nnn) Kennedy Ken Seal II Post Indicator/Tapping Valve
 (ooo) Febco Series 622 - QT
 (ppp) Clow Series F6105 - NRS
 (qqq) Clow Series F6138 - OSY
 (rrr) Apollo Series 7B-308-01 (& 7B-308-31)
 (sss) Clow Series F6104 - NRS
 (ttt) Clow Series F6137 - OSY
 (uuu) Apollo Series 7H - QT
 (vvv) Clow R/W F6136-OSY Post Indicator/Tapping
 Valve
 (www) Clow R/W F6138-OSY Post Indicator/Tapping
 Valve

(xxx) Febco Series 622U QT
(yyy) Victaulic Series 702 (Butterfly valves)

DC, DCDA, RP, RPDA

Horizontal

(H)
(VU)
(VD)
(VUVD)
(VUVU)
(VDVU)
(VDVD)
(HVD)
(VUH)
(H)
(VD)
(VUVD)
(VUH)

PVB/SVB

(H)
(VUH)

AVB

Key

Vertical Up

Down (H) (D)

(U) (V)

Shutoff Valve

Air inlet Valve

Direction of Flow

Sample

(VDVU)

Inlet- Vertical flowing down

Outlet- Vertical flowing up

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Ames — DC - 4", 6" (H) Approved 6th Ed. of Manual (14 June 1985)

Renewed 14 June 2000

— DC - 8" (H) Approved 7th Ed. of Manual (4 August 1987)

Renewed 4 August 2002

2000B - ½" (H) Approved 9th Ed. Of Manual (16 June 1997)

(vv), xx Previously Approved 8th Ed. (6 December 1993)

Renewed 16 June 2000

2000B - ½" (VU) Approved 9th Ed. of Manual (16 June 1997)

(vv), xx Previously Approved 8th Ed. (19 April 1996)

Renewed 16 June 2000
 2000B - 3/4" (H) Approved 8th Ed. of Manual (5 April 1993)
 (vv),xx Renewed 5 April 2002
 2000B - 3/4" (VU) Approved 8th Ed. of Manual (27 August 1996)
 (vv),xx Renewed 27 August 2002
 2000B - 1" (H) Approved 9th Ed. of Manual (18 May 1998)
 Renewed 18 May 2001
 (vv),xx Previously Approved 8th Ed. (26 February 1991)
 2000B - 1" (VU) Approved 9th Ed. of Manual (18 May 1998)
 (vv),xx Renewed 18 May 2001
 2000B - 1 1/4" (H,VU) Approved 8th Ed. of Manual (1 October 1996)
 (vv),xx Renewed 1 October 2002
 2000B - 1 1/2" (H) Approved 8th Ed. of Manual (24 May 1994)
 (vv),xx Renewed 24 May 2000
 2000B - 1 1/2" (VU) Approved 8th Ed. of Manual (11 March 1996)
 (vv), xx Renewed 11 March 2002
 2000B - 2" (H) Approved 8th Ed. of Manual (30 June 1992)
 (vv),xx Renewed 30 June 2001
 2000B - 2" (VU) Approved 8th Ed. of Manual (8 March 1996)
 (vv),xx Renewed 8 March 2002
 2000BM3 - 3/4"(H,VU) Approved 9th Ed. of Manual (27 March 2000)
 (vv),xx
 2000 CIV - 4" (H) Approved 6th Ed. of Manual (15 January 1982)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 15 January 2003
 2000 CIV - 4" (VU) Approved 8th Ed. of Manual (11 March 1996)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 11 March 2002
 2000 CIV - 6" (H) Approved 6th Ed. of Manual (18 May 1982)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 18 May 2000
 2000 CIV - 8" (H) Approved 6th Ed. of Manual (6 July 1981)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 6 July 2002
 2000 CIV - 10" (H) Approved 6th Ed. of Manual (16 March 1983)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 16 March 2001
 2000 CIV - 6", 8", 10" (VU) Approved 8th Ed. of Manual (5 December 1996)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 5 December 2002
 2000-DC - 10" (H) Approved 7th Ed. of Manual (4 August 1987)
 (Formerly Model DC) Renewed 4 August 2002
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu
 2000-G-DC - 10" (H) Approved 7th Ed. of Manual (4 August 1987)
 (Formerly Model DC) Renewed 4 August 2002
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu
 2000-DCA - 4", 6", 8" (H) Approved 7th Ed. of Manual (11 January 1988)
 (Formerly Model DCA) Renewed 11 January 2003
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu

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Ames 2000-G-DCA - 4", 6", 8" (H) Approved 7th Ed. of Manual (11 January 1988)

(Formerly Model DCA) Renewed 11 January 2003

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu

2000 SE - 2 1/2" (H) Approved 8th Ed. of Manual (10 September 1996)

(mm),ee,ff,gg,hh,ccc,ddd,ll,tt,uu Renewed 10 September 2002

2000 SE - 6" (H) Approved 8th Ed. of Manual (22 November 1993)

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 22 November 2002

2000 SE - 8" (H) Approved 8th Ed. of Manual (9 September 1992)

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 9 September 2001
 → 2000 SS - 3/4", 1" (H) Approved 8th Ed. of Manual (5 May 1995)
 (ii) Renewed 5 May 2001
 → 2000 SS - 1 1/4" (H) Approved 8th Ed. of Manual (14 July 1995)
 (ii) Renewed 14 July 2001
 → 2000 SS - 1 1/2", 2" (H) Approved 8th Ed. of Manual (13 October 1995)
 (ii) Renewed 13 October 2001
 2000 SS - 2 1/2", 3" (H) Approved 8th Ed. of Manual (11 July 1991)
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 11 July 2000
 2000 SS - 4" (H) Approved 8th Ed. of Manual (11 July 1991)
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 11 July 2000
 2000 SS - 6" (H) Approved 8th Ed. of Manual (9 September 1992)
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 9 September 2001
 2000 SS - 8" (H) Approved 8th Ed. of Manual (16 September 1996)
 (mm),ee,ff,gg,hh,ccc,ddd,ll,tt,uu Renewed 16 September 2002
 2000 SS - 10" (H) Approved 8th Ed. of Manual (16 February 2001)
 (ll), mm
 2000 SS-M - 4", 6" (H) Approved 8th Ed. of Manual (5 May 1995)
 (tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 5 May 2001
 Colt 200a - 2 1/2", 3", 4" (H,VU) Approved 9th Ed. of Manual (7 October 2002)
 (ppp),qqq,yyy
 Colt 200Na - 2 1/2", 3", 4" (VUVD) Approved 9th Ed. of Manual (20 March 2003)
 (ppp),qqq,yyy
 Maxim 200a - 2 1/2", 3" (H,VU) Approved 9th Ed. of Manual (7 October 2002)
 (ppp),qqq,yyy
 Maxim 200Na - 2 1/2", 3" (VUVD) Approved 9th Ed. of Manual (20 March 2003)
 (ppp),qqq,yyy
 Beeco - See Hersey/Grinnell
 Buckner → 24100 - 3/4" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24101 - 1" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24102 - 1 1/4" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24103 - 1 1/2" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24104 - 2" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24100/25 - 3/4" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24101/25 - 1" (H) Approved 8th Ed. of Manual (1 April 1991)
 (ii) Renewed 1 April 2003
 → 24102/25 - 1 1/4" (H) Approved 8th Ed. of Manual (31 October 1989)
 (ii) Renewed 31 October 2001

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Buckner → 24103/25 - 1 1/2" (H) Approved 8th Ed. of Manual (31 October 1989)
 (ii) Renewed 31 October 2001
 → 24104/25 - 2" (H) Approved 8th Ed. of Manual (31 October 1989)
 (ii) Renewed 31 October 2001
 Cla-Val → D2 - 1 1/4", 1 1/2" (H) Approved 5th Ed. of Manual (6 November 1976)
 (nn), dd Renewed 6 November 2000

→ D2 - 3/4", 1" (H) Approved 5th Ed. of Manual (19 April 1977)
 (nn), dd Renewed 19 April 2001
 → D4 - 2" (H) Approved 8th Ed. of Manual (22 June 1989)
 (nn), dd Renewed 22 June 2001
 D4 - 2 1/2", 3", 4", 6", 8", 10" (H) Approved 8th Ed. of Manual (22 June 1989)
 (gg),hh,qq,rr Renewed 22 June 2001
 Conbraco 1/2DC - 1/2" (H,VU) Approved 9th Ed. of Manual (18 September 2000)
 (dd)
 2 1/2DC - 2 1/2" (H,VU) Approved 9th Ed. of Manual (16 October 2000)
 (ll) mm
 2 1/2DC-7 - 2 1/2" (H,VU) Approved 9th Ed. of Manual (23 October 2001)
 (mm) [#1 SOV],
 (qqq) [#2 SOV]
 2 1/2DCU - 2 1/2"(VUVD) Approved 9th Ed. of Manual (10 April 2001)
 (ll),mm
 3DC - 3" (H,VU) Approved 9th Ed. of Manual (16 October 2000)
 (ll) mm
 3DC-7 - 3" (H,VU) Approved 9th Ed. of Manual (23 October 2001)
 (mm) [#1 SOV],
 (qqq) [#2 SOV]
 3DCU - 3" (VUVD) Approved 9th Ed. of Manual (10 April 2001)
 (ll),mm
 4DC - 4" (H,VU) Approved 9th Ed. of Manual (16 October 2000)
 (ll) mm
 4DC-7 - 4" (H,VU) Approved 9th Ed. of Manual (23 October 2001)
 (mm) [#1 SOV],
 (qqq) [#2 SOV]
 4DCU - 4" (VUVD) Approved 9th Ed. of Manual (10 April 2001)
 (ll),mm
 6DC - 6" (H,VU) Approved 9th Ed. of Manual (16 October 2000)
 (ll) mm
 6DC-7 - 6" (H,VU) Approved 9th Ed. of Manual (23 October 2001)
 (mm) [#1 SOV],
 (qqq) [#2 SOV]
 6DCU - 6" (VUVD) Approved 9th Ed. of Manual (10 April 2001)
 (ll),mm
 8DC - 8" (H,VU) Approved 9th Ed. of Manual (16 January 2003)
 (mm),ll
 10DC - 10" (H,VU) Approved 9th Ed. of Manual (16 January 2003)
 (mm),ll
 40-100-02 - 3" (H) Approved 8th Ed. of Manual (8 April 1991)
 (tt),bb,ee,ll Renewed 8 April 2003
 40-100-03 - 3" (H) Approved 8th Ed. of Manual (8 April 1991)
 (uu),cc,mm Renewed 8 April 2003
 40-100-05 - 3" (H) Approved 8th Ed. of Manual (8 December 1998)
 (mmm) Renewed 8 December 2001

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Conbraco 40-103-02 - 1/2" (H) Approved 8th Ed. of Manual (1 May 1995)
 (dd) Renewed 1 May 2001

40-104-02 - 3/4" (H) Approved 8th Ed. of Manual (17 March 1989)
 (dd) Renewed 17 March 2001

40-104-T2- 3/4" (H) Approved 8th Ed. of Manual (27 June 1996)

(dd) [formerly 40-104-99T] Renewed 27 June 2002
40-104-A2 - 3/4" (H) Approved 8th Ed. of Manual (21 June 1993)
(dd) Renewed 21 June 2002
40-104-A2T - 3/4" (H) Approved 8th Ed. of Manual (25 March 1992)
(dd) Renewed 25 March 2001
40-104-TC2 - 3/4" (H) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-105-02 - 1" (H) Approved 8th Ed. of Manual (17 March 1989)
(dd) Renewed 17 March 2001
40-105-T2- 1" (H) Approved 8th Ed. of Manual (27 June 1996)
(dd) [formerly 40-105-99T] Renewed 27 June 2002
40-105-A2 - 1" (H) Approved 8th Ed. of Manual (21 June 1993)
(dd) Renewed 21 June 2002
40-105-A2T - 1" (H) Approved 8th Ed. of Manual (25 March 1992)
(dd) Renewed 25 March 2001
40-105-TC2 - 1" (H) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-106-02 - 1 1/4" (H) Approved 8th Ed. of Manual (6 April 1992)
(dd) Renewed 6 April 2001
40-106-A2 - 1 1/4" (H) Approved 8th Ed. of Manual (21 June 1993)
(dd) Renewed 21 June 2002
40-106-A2T - 1 1/4" (H) Approved 8th Ed. of Manual (22 May 1993)
(dd) Renewed 22 May 2002
40-106-T2- 1 1/4" (H) Approved 8th Ed. of Manual (9 October 1996)
(dd) [formerly 10-106-99T] Renewed 9 October 2002
40-107-02 - 1 1/2" (H) Approved 8th Ed. of Manual (17 March 1989)
(dd) Renewed 17 March 2001
40-107-A2 - 1 1/2" (H) Approved 8th Ed. of Manual (22 May 1993)
(dd) Renewed 22 May 2002
40-107-A2T - 1 1/2" (H) Approved 8th Ed. of Manual (22 May 1993)
(dd) Renewed 22 May 2002
40-107-T2 - 1 1/2" (H) Approved 8th Ed. of Manual (9 October 1996)
(dd) [formerly 40-107-99T] Renewed 9 October 2002
40-108-02 - 2" (H) Approved 8th Ed. of Manual (17 March 1989)
(dd) Renewed 17 March 2001
40-108-A2 - 2" (H) Approved 8th Ed. of Manual (22 May 1993)
(dd) Renewed 22 May 2002
40-108-A2T - 2" (H) Approved 8th Ed. of Manual (22 May 1993)
(dd) Renewed 22 May 2002
40-108-T2 - 2" (H) Approved 8th Ed. of Manual (9 October 1996)
(dd) [formerly 40-108-99T] Renewed 9 October 2002
40-109-02 - 2 1/2" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003
40-109-03 - 2 1/2" (H) Approved 8th Ed. of Manual (8 April 1991)
(uu),cc,mm Renewed 8 April 2003
40-109-05 - 2 1/2" (H) Approved 8th Ed. of Manual (8 December 1998)
(mmm) Renewed 8 December 2001
40-10A-02 - 4" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003

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Conbraco 40-10A-03 - 4" (H) Approved 8th Ed. of Manual (8 April 1991)

(uu),cc,mm Renewed 8 April 2003

40-10A-05 - 4" (H) Approved 8th Ed. of Manual (8 December 1998)
 (mmm) Renewed 8 December 2001
 40-10A-06 - 4" (H) Approved 8th Ed. of Manual (1 February 2000)
 (mm)[#1SOV] (nnn)[#2SOV] Renewed 1 February 2003
 40-10C-02 - 6" (H) Approved 8th Ed. of Manual (8 April 1991)
 (tt),bb,ee,ll Renewed 8 April 2003
 40-10C-03 - 6" (H) Approved 8th Ed. of Manual (8 April 1991)
 (uu),cc,mm Renewed 8 April 2003
 40-10C-05 - 6" (H) Approved 8th Ed. of Manual (8 December 1998)
 (mmm) Renewed 8 December 2001
 40-10C-06 - 6" (H) Approved 8th Ed. of Manual (1 February 2000)
 (mm)[#1SOV] (nnn)[#2SOV] Renewed 1 February 2003
 40-10E-02 - 8" (H) Approved 8th Ed. of Manual (22 October 1991)
 (tt),bb,ee,ll Renewed 22 October 2000
 40-10E-03 - 8" (H) Approved 8th Ed. of Manual (22 October 1991)
 (uu),cc,mm Renewed 22 October 2000
 40-10E-06 - 8" (H) Approved 8th Ed. of Manual (1 February 2000)
 (mm)[#1SOV] (nnn)[#2SOV] Renewed 1 February 2003
 40-10G-02 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)
 (tt),bb,ee,ll Renewed 13 April 2002
 40-10G-03 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)
 (uu),cc,mm Renewed 13 April 2002
 40-10G-06 - 10" (H) Approved 8th Ed. of Manual (1 February 2000)
 (mm)[#1SOV] (nnn)[#2SOV] Renewed 1 February 2003
 Febco – 805 - 3/4", 1", 1 1/2", 2" (H) Approved 4th Ed. of Manual (29 April 1974)
 Renewed 29 April 2001
 – 805 - 3", 4" (H) Approved 4th Ed. of Manual (26 October 1973)
 Renewed 7 January 2001
 805Y - 3/4", 1" (H) Approved 6th Ed. of Manual (13 May 1982)
 (ii),fff,jjj,ooo Renewed 13 May 2003
 805YR - 3/4", 1" (H) Approved 8th Ed. of Manual (22 January 1993)
 (ii),fff,jjj,ooo Renewed 22 January 2002
 805YB - 3/4" (H) Approved 8th Ed. of Manual (4 May 1994)
 (ii),fff,jjj,ooo Renewed 4 May 2003
 805YB - 3/4" (VU) Approved 8th Ed. of Manual (16 April 1996)
 (ii) ,fff,jjj,ooo Renewed 16 April 2002
 805Y - 1 1/2" (H) Approved 6th Ed. of Manual (5 January 1983)
 (ii) ,fff,jjj,ooo Renewed 5 January 2001
 805Y - 2" (H) Approved 6th Ed. of Manual (5 January 1983)
 (ii) ,fff,ooo Renewed 5 January 2001
 – 805Y - 2 1/2" (H) Approved 6th Ed. of Manual (7 March 1983)
 Renewed 7 March 2001
 – 805Y - 3", 4" (H) Approved 6th Ed. of Manual (4 August 1982)
 Renewed 4 August 2000
 – 805Y - 6", 8" (H) Approved 5th Ed. of Manual (26 August 1977)
 (Formerly 805) Renewed 26 August 2001
 – 805Y - 10" (H) Approved 5th Ed. of Manual (31 May 1978)
 (Formerly 805) Renewed 31 May 2002
 805YD - 2 1/2",3",4",6",8",10" (H) Approved 7th Ed. of Manual (19 June 1987)
 (ee),ff,ll,mm,tt,uu (Formerly 805 Type YD) Renewed 19 June 2002

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Febco 850 - 1/2" (H) Approved 9th Ed. of Manual (21 November 1997)

(fff),ooo Renewed 21 November 2000
 850 - 1/2" (VU) Approved 9th Ed. of Manual (17 December 1999)
 (fff),ooo Renewed 17 December 2002
 850 - 1/2" (VD) Approved 9th Ed. of Manual (13 April 2000)
 (fff),ooo Renewed 13 April 2003
 850 - 3/4" (VD) Approved 9th Ed. of Manual (10 April 2000)
 (fff),jjj Renewed 10 April 2003
 850 - 3/4" (VU) Approved 9th Ed. of Manual (17 December 1999)
 (fff),jjj,ooo Renewed 17 December 2002
 850 - 3/4", 1", 1 1/4" (H) Approved 9th Ed. of Manual (21 November 1997)
 (fff),jjj,ooo Renewed 21 November 2000
 850 - 1" (VD) Approved 9th Ed. of Manual (14 January 2000)
 (fff),jjj,ooo Renewed 14 January 2003
 850 - 1" (VU) Approved 9th Ed. of Manual (7 September 2000)
 (fff),jjj,ooo
 850 - 1 1/4" (VU) Approved 9th Ed. of Manual (17 July 1999)
 (fff),jjj,ooo Renewed 17 July 2002
 850 - 1 1/4" (VD) Approved 9th Ed. of Manual (13 April 2000)
 (fff),jjj,ooo Renewed 13 April 2003
 850 - 1 1/2" (H) Approved 9th Ed. of Manual (19 February 1998)
 (fff),jjj,ooo Renewed 19 February 2001
 850 - 1 1/2" (VU) Approved 9th Ed. of Manual (17 July 1999)
 (fff),jjj,ooo Renewed 17 July 2002
 850 - 1 1/2" (VD) Approved 9th Ed. of Manual (13 April 2000)
 (fff),jjj,ooo Renewed 13 April 2003
 850 - 2" (H) Approved 9th Ed. of Manual (19 February 1998)
 (fff),ooo Renewed 19 February 2001
 850 - 2" (VD) Approved 9th Ed. of Manual (10 April 2000)
 (fff),ooo Renewed 10 April 2003
 850 - 2" (VU) Approved 9th Ed. of Manual (17 July 1999)
 (fff),ooo Renewed 17 July 2002
 850 - 2 1/2", 3" (H) Approved 8th Ed. of Manual (14 March 1997)
 (ee),ff,ll,mm,tt,uu Renewed 14 March 2003
 850 - 2 1/2", 3" (VU) Approved 8th Ed. of Manual (19 March 1997)
 (ee),ff,ll,mm,tt,uu Renewed 19 March 2003
 850 - 4", 6" (H) Approved 8th Ed. of Manual (4 May 1994)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 4 May 2003
 850 - 8" (H) Approved 8th Ed. of Manual (4 October 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 4 October 2001
 850 - 4" (VU) Approved 8th Ed. of Manual (7 February 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 7 February 2001
 850 - 6" (VU) Approved 8th Ed. of Manual (31 May 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 31 May 2001
 850 - 8" (VU) Approved 8th Ed. of Manual (14 October 1996)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 14 October 2002
 850F - 3/4" (H,VU,VD) Approved 9th Ed. of Manual (28 September 2001)
 (fff),jjj
 850U - 1/2" (H) Approved 9th Ed. of Manual (12 October 1998)
 (kkk) Renewed 12 October 2001
 850U - 1/2" (VU) Approved 9th Ed. of Manual (17 December 1999)
 (kkk) Renewed 17 July 2002
 850U - 1/2" (VD) Approved 9th Ed. of Manual (16 October 2000)
 (kkk)

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Febco 850U - 3/4" (H) Approved 9th Ed. of Manual (8 March 1999)

(kkk) Renewed 8 March 2002

850U - 3/4" (VD) Approved 9th Ed. of Manual (16 October 2000)

(kkk)

850U - 3/4" (VU) Approved 9th Ed. of Manual (17 December 1999)

(kkk) Renewed 17 December 2002

850U - 1" (H) Approved 9th Ed. of Manual (4 August 1999)

(kkk) Renewed 4 August 2002

850U - 1" (VD) Approved 9th Ed. of Manual (14 January 2000)

(kkk) Renewed 14 January 2003

850U - 1" (VU) Approved 9th Ed. of Manual (16 October 2000)

(kkk)

850U - 1 1/4", 1 1/2", 2" (H) Approved 9th Ed. of Manual (12 October 1998)

(kkk) Renewed 12 October 2001

850U - 1 1/4", 1 1/2", 2" (VU) Approved 9th Ed. of Manual (4 August 1999)

(kkk) Renewed 4 August 2002

850U - 1 1/4" (VD) Approved 9th Ed. of Manual (16 October 2000)

(kkk)

850U - 1 1/2" (VD) Approved 9th Ed. of Manual (16 October 2000)

(kkk)

850U - 2" (VD) Approved 9th Ed. of Manual (16 October 2000)

(kkk)

870 - 2 1/2", 3" (VUVD) Approved 8th Ed. of Manual (10 March 1995)

(ee),ll,tt,ff,mm,uu Renewed 10 March 2001

870 - 4", 6" (VUVD) Approved 8th Ed. of Manual (4 May 1994)

(ee),ll,tt,ff,mm,uu Renewed 4 May 2003

870 - 8" (VUVD) Approved 8th Ed. of Manual (24 May 1994)

(ee),ll,tt,ff,mm,uu Renewed 24 May 2003

870 - 10" (VUVD) Approved 8th Ed. of Manual (4 October 1996)

(ee),ll,tt,ff,mm,uu Renewed 4 October 2002

870V - 2 1/2", 3", 4", 6" (VUVD, VUVU) Approved 8th Ed. of Manual (8 March 1996)

(ee),ll,tt,ff,mm,uu Renewed 8 March 2002

870V - 8" (VUVD, VUVU) Approved 8th Ed. of Manual (6 January 1997)

(ee),ll,tt,ff,mm,uu Renewed 6 January 2003

870V - 10" (VUVD, VUVU) Approved 8th Ed. of Manual (11 July 1997)

(ee),ll,tt,ff,mm,uu Renewed 11 July 2000

Flomatic DCV - 3/4", 1" (H) Approved 8th Ed. of Manual (4 May 1994)

(ii) Renewed 4 May 2003

DCV - 1 1/2", 2" (H) Approved 8th Ed. of Manual (10 May 1995)

(ii) Renewed 10 May 2001

DCV - 2 1/2", 3" (H) Approved 8th Ed. of Manual (14 February 1997)

(gg), hh Renewed 14 February 2003

Flomatic DCV - 4" (H) Approved 9th Ed. of Manual (1 July 1999)

(gg), hh Renewed 1 July 2002

DCV - 6" (H) Approved 9th Ed. of Manual (31 January 2002)

(gg), hh

DCVE - 3/4", 1", 1 1/2", 2" (H) Approved 8th Ed. of Manual (7 June 2001)

(ii)

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Hersey/Grinnell

2 - 3", 4" (H) Approved 5th Ed. of Manual (27 December 1978)
 (tt),bb,qq,iii,III Renewed 27 December 2002
 2 - 6" (H) Approved 5th Ed. of Manual (22 December 1978)
 (tt),bb,qq,iii,III Renewed 22 December 2002
 2 - 8" (H) Approved 6th Ed. of Manual (6 July 1981)
 (tt),bb,qq,iii,III Renewed 6 July 2002
 2 - 10" (H) Approved 6th Ed. of Manual (19 February 1982)
 (tt),bb,qq,iii,III Renewed 19 February 2003
 FDC - 3/4" (H) Approved 5th Ed. of Manual (11 October 1976)
 (ii) Renewed 5 October 2000
 FDC - 1" (H) Approved 8th Ed. of Manual (15 February 1994)
 (ii) Renewed 15 February 2003
 FDC - 1 1/2" (H) Approved 5th Ed. of Manual (1 August 1979)
 (ii) Renewed 1 August 2000
 FDC - 2" (H) Approved 5th Ed. of Manual (20 December 1978)
 (ii) Renewed 20 December 2002
 Neptune - see Wilkins
 Richwell - see Wilkins
 SMR - see Wilkins
 Watts 007 - 2 1/2" (H) Approved 8th Ed. of Manual (30 September 1990)
 (oo),gg,hh,ll,mm,pp,tt,uu Renewed 30 September 2002
 007 - 3" (H) Approved 8th Ed. of Manual (30 September 1990)
 (oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 30 September 2002
 007 - 2 1/2" (VU) Approved 8th Ed. of Manual (27 August 1996)
 (oo),gg,hh,ll,mm,pp,tt,uu Renewed 27 August 2002
 007 - 3" (VU) Approved 8th Ed. of Manual (27 August 1996)
 (oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 27 August 2002
 007QT - 1/2" (H) Approved 9th Ed. of Manual (16 June 1997)
 (vv), xx Previously Approved 8th Ed. (6 December 1993)
 Renewed 16 June 2000
 007QT - 1/2" (VU) Approved 9th Ed. of Manual (16 June 1997)
 (vv), xx Previously Approved 8th Ed. (19 April 1996)
 Renewed 16 June 2000
 – 007QT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 Renewed 11 January 2003
 – 007QT - 1 1/2", 2" (H) Approved 7th Ed. of Manual (21 July 1988)
 (vv),xx Renewed 21 July 2000
 007PCQT - 1/2" (H) Approved 8th Ed. of Manual (17 February 1995)
 (vv),xx Renewed 17 February 2001
 – 007PCQT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 – 007M1QT - 3/4" (H) Approved 8th Ed. of Manual (26 February 1991)
 (vv),xx Renewed 26 February 2003
 007M1QT - 1" (H) Approved 9th Ed. of Manual (18 May 1998)
 (vv),xx Previously Approved 8th Ed. (26 February 1991)
 Renewed 18 May 2001
 007M1QT - 1" (VU) Approved 9th Ed. of Manual (18 May 1998)
 (vv),xx Renewed 18 May 2001
 – 007M1QT - 1 1/2" (H) Approved 8th Ed. of Manual (30 June 1992)
 (vv),xx Renewed 30 June 2001

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Watts 007M1QT - 2" (H) Approved 8th Ed. of Manual (30 June 1992)

(vv),xx Renewed 30 June 2001
 007M1QT - 2" (VU) Approved 8th Ed. of Manual (8 March 1996)
 (vv),xx Renewed 8 March 2002
 007M1PCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2000
 – 007M1PCQT - 1 1/2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 007M1PCQT - 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 007M2QT - 3/4" (H) Approved 8th Ed. of Manual (5 April 1993)
 (vv),xx Renewed 5 April 2002
 007M2QT - 3/4" (VU) Approved 8th Ed. of Manual (27 August 1996)
 (vv),xx Renewed 27 August 2002
 007M2QT - 1 1/4" (H,VU) Approved 8th Ed. of Manual (1 October 1996)
 (vv),xx Renewed 1 October 2002
 007M2PCQT - 1 1/4" (H,VU) Approved 8th Ed. of Manual (9 December 1996)
 (vv),xx Renewed 9 December 2002
 007M2QT - 1 1/2" (H) Approved 8th Ed. of Manual (24 May 1994)
 (vv),xx Renewed 24 May 2003
 007M2QT - 1 1/2" (VU) Approved 8th Ed. of Manual (11 March 1996)
 (vv),xx Renewed 11 March 2002
 007M2PCQT - 1 1/2" (H) Approved 8th Ed. of Manual (12 September 1994)
 (vv),xx Renewed 12 September 2000
 007M3QT - 3/4" (H,VU) Approved 9th Ed. of Manual (18 October 1999)
 (vv),xx Renewed 18 October 2002
 – 007SSQT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 Renewed 11 January 2003
 – 007SSQT - 1 1/2", 2" (H) Approved 7th Ed. of Manual (21 July 1988)
 (vv),xx Renewed 21 July 2000
 – 007SSPCQT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 – 007SSM1QT - 3/4", 1" (H) Approved 8th Ed. of Manual (26 February 1991)
 (vv),xx Renewed 26 February 2003
 – 007SSM1PCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 – 700 - 2 1/2", 3" (H) Approved 5th Ed. of Manual (10 January 1981)
 Renewed 10 January 2002
 – 709 QT - 3/4", 1" (H) Approved 6th Ed. of Manual (4 August 1982)
 (vv),xx Renewed 4 August 2000
 – 709 QT - 1 1/2", 2" (H) Approved 6th Ed. of Manual (27 April 1982)
 (vv),xx Renewed 27 April 2003
 709 BB - 2 1/2", 3" (H) Approved 6th Ed. of Manual (20 July 1982)
 (oo),gg,tt,pp,hh,ll,mm,uu Renewed 20 July 2000
 709 - 2 1/2" (H) Approved 7th Ed. of Manual (12 June 1986)
 (oo),gg,tt,pp,hh,ll,mm,uu Renewed 12 June 2001
 709 - 3" (H) Approved 7th Ed. of Manual (12 June 1986)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 12 June 2001
 709 - 4" (H) Approved 6th Ed. of Manual (15 January 1982)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 15 January 2003
 709 - 4" (VU) Approved 8th Ed. of Manual (11 March 1996)
 (oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 11 March 2002

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Watts 709 - 6" (H) Approved 6th Ed. of Manual (18 May 1982)
(oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 18 May 2003
709 - 8" (H) Approved 6th Ed. of Manual (6 July 1981)
(oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 6 July 2002
709 - 10" (H) Approved 6th Ed. of Manual (16 March 1983)
(oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 16 March 2001
709 - 6", 8", 10" (VU) Approved 8th Ed. of Manual (5 December 1996)
(oo),gg,tt,pp,hh,ll,mm,uu,eee Renewed 5 December 2002
709QT-FDA- 2 1/2", 3",4",6",8",10" Approved 8th Ed. of Manual (30 September 1990)
(ww) (H) Renewed 30 September 2002
757a - 2 1/2", 3", 4" (H,VU) Approved 9th Ed. of Manual (7 October 2002)
(ppp),qqq,yyy
757Na - 2 1/2", 3", 4" (VUVD) Approved 9th Ed. of Manual (20 March 2003)
(ppp),qqq,yyy
767a - 2 1/2", 3" (H,VU) Approved 9th Ed. of Manual (7 October 2002)
(ppp),qqq,yyy
767Na - 2 1/2", 3" (VUVD) Approved 9th Ed. of Manual (20 March 2003)
(ppp),qqq,yyy
→ 770 - 4" (H) Approved 8th Ed. of Manual (20 May 1992)
(oo),gg,tt,pp,hh,ll,mm,uu Renewed 20 May 2001
→ 770 - 8" (H) Approved 8th Ed. of Manual (13 January 1993)
(oo),gg,tt,pp,hh,ll,mm,uu Renewed 13 January 2002
→ 770 QT-FDA - 4" (H) Approved 8th Ed. of Manual (13 January 1993)
(ww) Renewed 13 January 2002
→ 770 QT-FDA - 8" (H) Approved 8th Ed. of Manual (13 January 1993)
(ww) Renewed 13 January 2002
→ 772 - 4" (H) Approved 8th Ed. of Manual (1 July 1992)
(oo) Renewed 1 July 2001
→ 772 - 10" (H) Approved 8th Ed. of Manual (13 January 1993)
(oo) Renewed 13 January 2002
→ 774 - 3/4",1" (H) Approved 8th Ed. of Manual (5 May 1995)
(ii) Renewed 5 May 2001
→ 774 - 1 1/4" (H) Approved 8th Ed. of Manual (14 July 1995)
(ii) Renewed 14 July 2001
→ 774 - 1 1/2", 2" (H) Approved 8th Ed. of Manual (13 October 1995)
(ii) Renewed 13 October 2001
774 - 2 1/2", 3" (H) Approved 8th Ed. of Manual (11 July 1991)
(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,oo,pp,uu Renewed 11 July 2000
774 - 4" (H) Approved 8th Ed. of Manual (11 July 1991)
(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,oo,pp,uu Renewed 11 July 2000
774 - 6" (H) Approved 8th Ed. of Manual (9 September 1992)
(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,oo,pp,uu Renewed 9 September 2001
774 - 8" (H) Approved 8th Ed. of Manual (16 September 1996)
(mm),ee,ff,gg,hh,ccc,ddd,ll,tt,oo,pp,uu Renewed 16 September 2002
774 - 10" (H) Approved 8th Ed. of Manual (16 February 2001)
(ll),mm
774X - 2 1/2" (H) Approved 8th Ed. of Manual (10 September 1996)
(mm),ee,ff,gg,hh,ccc,ddd,ll,tt,oo,pp,uu Renewed 10 September 2002
774X - 6" (H) Approved 8th Ed. of Manual (22 November 1993)
(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,oo,pp,uu Renewed 22 November 2002
774X - 8" (H) Approved 8th Ed. of Manual (9 September 1992)
(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,oo,pp,uu Renewed 9 September 2001
775QT - 1" (H,VU) Approved 9th Ed. of Manual (12 August 1999)

(int) Renewed 12 August 2002

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Watts 775QT - 1/2" (H,VU) Approved 9th Ed. of Manual (1 February 2000)

(int) Renewed 1 February 2003

775QT - 3/4" (H,VU) Approved 9th Ed. of Manual(1 February 2000)

(int) Renewed 1 February 2003

775QT - 1 1/4" (H,VU) Approved 9th Ed. of Manual (7 September 2000)

(int)

775QT - 1 1/2" (H,VU) Approved 9th Ed. of Manual (7 September 2000)

(int)

775QT - 2" (H,VU) Approved 9th Ed. of Manual (28 March 2002)

(int)

SS007M1QT - 1" (H,VU) Approved 9th Ed. of Manual (18 May 1998)

(hhh), Renewed 18 May 2001

SS007M3QT - 1/2" (H,VU) Approved 9th Ed. of Manual (11 September 2000)

(hhh)

SS007M3QT - 3/4" (H,VU) Approved 9th Ed. of Manual (7 September 2000)

(hhh)

U007QT - 1/2" (H,VU) Approved 9th Ed. of Manual (8 March 1999)

(vv),xx Renewed 8 March 2002

– U007QT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)

(vv),xx Renewed 11 January 2003

– U007QT - 1 1/2", 2" (H) Approved 7th Ed. of Manual (21 July 1988)

(vv),xx Renewed 21 July 2000

– U007PCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)

(vv),xx Renewed 10 December 2002

– U007PCQT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)

(vv),xx Renewed 27 September 2000

U007M1AQT - 3/4", 2" Approved 8th Ed. of Manual (24 February 1994)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 24 February 2003

U007M1APCQT - 3/4" Approved 8th Ed. of Manual (10 December 1994)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 27 September 2000

U007M1APCQT - 2" Approved 8th Ed. of Manual (27 September 1994)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 27 September 2000

U007M1PCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)

(vv),xx Renewed 10 December 2002

U007M1PCQT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)

(vv),xx Renewed 27 September 2000

U007M1QT - 3/4", 1" (H) Approved 8th Ed. of Manual (30 August 1993)

(vv),xx Renewed 30 August 2002

– U007M1QT - 1 1/2" (H) Approved 8th Ed. of Manual (20 October 1993)

(vv),xx Renewed 20 October 2002

U007M1QT - 2" (H) Approved 8th Ed. of Manual (20 October 1993)

(vv),xx Renewed 20 October 2002

U007M2AQT - 1 1/2" Approved 8th Ed. of Manual (6 September 1994)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 6 September 2000

U007M2QT - 1 1/4" (H) Approved 8th Ed. of Manual (1 October 1996)

(vv),xx Renewed 1 October 2002

U007M2QT - 1 1/2" (H) Approved 8th Ed. of Manual (6 September 1994)

(vv),xx Renewed 6 September 2000

– U007SSQT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)

(vv),xx Renewed 11 January 2003

– U007SSQT - 1 1/2", 2" (H) Approved 7th Ed. of Manual (21 July 1988)
 (vv),xx Renewed 21 July 2000
 – U007SSPCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
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 Watts – U007SSPCQT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 Wilkins 350 - 2 1/2", 3" (H) Approved 9th Ed. of Manual (5 September 2001)
 (gg),ee,tt,yy,hh,ff,uu,zz
 350 - 2 1/2", 3" (VU) Approved 9th Ed. of Manual (3 April 2002)
 (gg),ee,tt,yy,hh,ff,uu,zz
 350 - 4" (H) Approved 9th Ed. of Manual (15 September 1999)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 15 September 2002
 350 - 4" (VU) Approved 9th Ed. of Manual (7 September 2000)
 (gg),ee,tt,yy,hh,ff,uu,zz
 350 - 6" (H) Approved 9th Ed. of Manual (18 October 1999)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 18 October 2002
 350 - 6" (VU) Approved 9th Ed. of Manual (17 December 1999)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 17 December 2002
 350 - 8" (H) Approved 9th Ed. of Manual (8 March 2002)
 (gg),ee,tt,yy,hh,ff,uu,zz
 350 - 8" (VU) Approved 9th Ed. of Manual (16 January 2003)
 (gg),ee,tt,yy,hh,ff,uu,zz
 350 - 10" (H) Approved 9th Ed. of Manual (28 August 2002)
 (hh),gg,ee,tt,yy,ff,uu,zz
 350 - 10"(VU) Approved 9th Ed. of Manual (14 March 2003)
 (hh),gg,ee,tt,yy,ff,uu,zz
 350G - 2 1/2", 3" (H,VU) Approved 9th Ed. of Manual (3 April 2002)
 (ppp),qqq
 350G - 4" (H) Approved 9th Ed. of Manual (10 April 2000)
 (ppp),qqq Renewed 10 April 2003
 350G - 4" (VU) Approved 9th Ed. of Manual (13 December 2000)
 (ppp),qqq
 350G - 6" (H,VU) Approved 9th Ed. of Manual (10 April 2000)
 (ppp),qqq Renewed 10 April 2003
 350G - 8" (H) Approved 9th Ed. of Manual (8 March 2002)
 (ppp),qqq
 350GPI - 4",6" (H,VU) Approved 9th Ed. of Manual (31 July 2001)
 (qqq)-#1 SOV, (www)-#2 SOV
 350PI - 4",6" (H,VU) Approved 9th Ed. of Manual (31 July 2001)
 (hh)-#1 SOV, (vvv)-#2 SOV
 450 - 2 1/2" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
 (gg), hh
 450 - 3" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
 (gg), hh
 450 - 4" (VUVD) Approved 9th Ed. of Manual (12 April 2000)
 (ppp),qqq Renewed 12 April 2003
 450 - 6" (VUVD) Approved 9th Ed. of Manual (24 May 2000)
 (ppp),qqq Renewed 24 May 2003
 450 - 8" (VUVD) Approved 9th Ed. of Manual (14 April 2003)
 (ttt)
 450G - 2 1/2" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
 (ppp), qqq
 450G - 3" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
 (ppp), qqq

450G - 4" (VUVD) Approved 9th Ed. of Manual (25 August 2000)
(sss)

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Wilkins 450G - 6" (VUVD) Approved 9th Ed. of Manual (25 August 2000)

(sss)

450G - 8" (VUVD) Approved 9th Ed. of Manual (14 April 2003)

(qqq)

— 550 - 3/4", 1" (H) Approved 5th Ed. of Manual (11 October 1976)

Renewed 5 October 2000

— 550A - 3/4", 1" (H) Approved 7th Ed. of Manual (17 April 1987)

(ii) Renewed 17 April 2002

— 550 - 1 1/4", 1 1/2", 2" (H) Approved 5th Ed. of Manual (11 October 1976)

(ii) Renewed 5 October 2000

— 550 - 2 1/2" (H) Approved 7th Ed. of Manual (25 September 1986)

(gg),ee,tt, yy Renewed 25 September 2001

— 550 - 3" (H) Approved 5th Ed. of Manual (20 August 1979)

(gg), ee,tt,yy Renewed 20 August 2000

— 550 - 4" (H) Approved 5th Ed. of Manual (20 June 1980)

(gg),ee,tt,yy Renewed 20 June 2001

— 550 - 6" (H) Approved 6th Ed. of Manual (6 July 1981)

(gg),ee,tt,yy Renewed 6 July 2002

— 550 - M8" (4"x4"x8" Manifold) (H) Approved 8th Ed. of Manual (15 March 1989)

(gg),ee,tt,yy Renewed 15 March 2001

— 550 - M10" (6"x6"x10" Manifold) (H) Approved 6th Ed. of Manual (11 April 1983)

(formerly MBD) Renewed 11 April 2001

(gg),ee,tt,yy

950 - 3/4",1" (H) Approved 8th Ed. of Manual (18 July 1991)

(ii) Renewed 18 July 2000

950 - 1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (5 April 1991)

(ii) Renewed 5 April 2003

950G - 4",6" (H,VU) Approved 8th Ed. of Manual (27 March 2000)

(ppp) Renewed 27 March 2003

950XL - 3/4",1",1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (2 November 1992)

(ii) Renewed 2 November 2001

950XL - 3/4" (VU) Approved 8th Ed. of Manual (12 December 1996)

(ii) Renewed 12 December 2002

950XLD - 3/4" (H) Approved 9th Ed. of Manual (15 September 1999)

(ii) Renewed 15 September 2002

950XLD - 3/4" (VU) Approved 9th Ed. of Manual (5 January 2000)

(ii) Renewed 5 January 2003

950XLT - 3/4", 1" (H) Approved 9th Ed. of Manual (9 May 1997)

(ii) Renewed 9 May 2003

950XLT - 1 1/4" (H) Approved 9th Ed. of Manual (19 June 1998)

(ii) Renewed 19 June 2001

950XLT - 1 1/2", 2" (H) Approved 9th Ed. of Manual (9 April 1998)

(ii) Renewed 9 April 2001

950XLU - 3/4", 1", 1 1/2", 2" (H) Approved 8th Ed. of Manual (15 February 1994)

(ggg) Renewed 15 February 2003

950 - 2 1/2" (H) Approved 8th Ed. of Manual (26 November 1991)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 26 November 2000
950 - 3",4" (H) Approved 8th Ed. of Manual (8 November 1991)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 8 November 2000
950 - 6" (H) Approved 8th Ed. of Manual (18 March 1992)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 18 March 2001
950 - 8" (H) Approved 8th Ed. of Manual (18 March 1989)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 18 March 2001

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Wilkins 950 - 10" (H) Approved 8th Ed. of Manual (12 April 1994)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 12 April 2003

950 - 4", 6", 8" (VU) Approved 8th Ed. of Manual (29 August 1995)

(gg),ee,tt,yy,hh,ff,uu,zz Renewed 29 August 2001

950A - 3/4", 1", 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (18 July 1991)

(ii) Renewed 18 July 2000

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Ames — DCDC - 4", 6" (H) Approved 6th Ed. of Manual (14 June 1985)

(K),A,B,C,D,E,F,G,H,I,J,L,M,N,O,P,Q Renewed 14 June 2000

ee,ff,gg,hh,ccc,ddd

Watts 709QT - 3/4" (H)

— DCDC - 8" (H) Approved 7th Ed. of Manual (4 August 1987)

(K),A,B,C,D,E,F,G,H,I,J,L,M,N,O,P,Q Renewed 4 August 2002

ee,ff,gg,hh,ccc,ddd

Watts 709QT - 3/4" (H)

Detector Backflow Prevention Assemblies

WARNING

The Double Check Detector Assemblies (DCDA) and Reduced Pressure Principle Detector Assemblies (RPDA) shown below have been evaluated with a specific meter as the detector element of the assembly. That specific meter is coded by a parenthetic letter shown immediately after the size designation. This coding of meters is shown in this Section. Other meters having similar performance characteristics to permit the assembly to meet the Specifications are shown immediately after the original evaluation meter. The use of any other meter or modified bypass piping invalidates the Approval.

Most of the Approved Assemblies below utilize a line-size assembly which is not a standard or stock Approved Assembly. Increased loads are required in these linesize units to allow the assembly to accurately record low flow rates in the bypass meter. Therefore, various 'off the shelf' components can not be assembled and expected to perform satisfactorily. The bypass backflow preventer Approved with the detector assembly is listed after the meter designations in *italics*. This is only for verification purposes. Should replacement parts or a complete by-pass be needed the model number of the complete detector assembly should be used in ordering these components.

Identification of meters:

(A) Hersey Model F-F 5/8"x3/4" (K) Precision 5/8"

(B) Carlon 5/8" x 3/4" (L) Neptune Trident 8 5/8"

(C) Dande' Model D-3 5/8"x3/4" (M) Neptune T-10 5/8"

(D) Gamon-Calmet 5/8" (N) Badger Model 25 3/4"

(E) Hays Acumeter 5/8"x3/4" (O) Badger 5/8" x 3/4" Model M25
(F) Arad 5/8"x3/4" (Master Meter) (P) Hersey Model 430 Series II 5/8"
(G) Schlumberger 5/8" x 3/4" Model MBRF (Q) Hersey Model MVR-30 3/4"
(H) Rockwell (Sensus) SR-II 5/8" x 3/4" (R) Neptune T-10 1"
(I) Hersey Model 430 - 5/8" (S) Neptune T-10 1 1/2"
(J) ABB Model C700 5/8"x3/4"
formerly Kent

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Ames 3000 B- 2" (H,VU) Approved 9th Ed. of Manual (16 June 1997)

(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 16 June 2000
(bbb)

Ames 1/2 2000B (H,VU), Watts 007QT - 1/2" (H,VU)

3000 CIV - 4", 6" (H) Approved 6th Ed. of Manual (27 July 1987)

(N),A,B,C, D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 27 July 2002
(pp),hh,uu,eee

Ames 2000B 1/2" (H), Watts 007QT - 1/2" (H)

3000 CIV - 4" (VU) Approved 8th Ed. of Manual (27 August 1996)

(N),A,B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 27 August 2002
(pp),hh,uu,eee

Ames 2000B 1/2" (VU), Watts 007QT - 1/2" (VU)

3000 CIV - 8" (H) Approved 6th Ed. of Manual (19 April 1987)

(N),A,B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 19 April 2002
(pp),hh,mm,uu,eee

Ames 2000B 1/2" (H), Watts 007QT - 1/2" (H)

3000 CIV - 10" (H) Approved 6th Ed. of Manual (27 July 1987)

(N),E,F,G, H,I,J,K,L,M,O,P,Q Renewed 27 July 2002
(pp),hh,mm,uu,eee

Ames 2000B 1/2" (H), Watts 007QT - 1/2" (H)

3000 CIV - 6", 8", 10" (VU) Approved 8th Ed. of Manual (5 December 1996)

(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 5 December 2002
(pp),hh,mm,uu,eee

Ames 2000B 1/2" (VU), Watts 007QT- 1/2" (VU)

3000-DCDC - 10" (H) Approved 7th Ed. of Manual (4 August 1987)

(M),B,C,D,E,G,F,H,I,J,K,L,N,O,P,Q (Formerly DCDC) Renewed 4 August 2002
(uu),ee,ff,gg,hh,ccc,ddd

Watts 007M2QT - 3/4" (H) (— Watts 709QT - 3/4" (H)), Ames 2000B - 3/4" (H)

— 3000-G-DCDC - 10" (H) Approved 7th Ed. of Manual (4 August 1987)

(M),B,C,D,E,FG,H,I,J,K,L,N,O,P,Q (Formerly DCDC) Renewed 4 August 2002
(uu),ee,ff,gg,hh,ccc,ddd

Watts 709QT - 3/4" (H)

— 3000 DCDA - 4" (H) Approved 7th Ed. of Manual (11 January 1988)

(M),B,C,D,E,FG,H,I,J,K,L,N,O,P,Q (Formerly DCDA) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 007QT - 3/4" (H)

— 3000-G-DCDA - 4" (H) Approved 7th Ed. of Manual (11 January 1988)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q (Formerly DCDA) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 007QT - 3/4" (H)

— 3000 DCDA - 6" (H) Approved 7th Ed. of Manual (11 January 1988)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q (Formerly DCDA-I) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 709QT - 3/4" (H)

→ 3000-G-DCDA - 6" (H) Approved 7th Ed. of Manual (11 January 1988)
(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q (Formerly DCDA-I) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 709QT - 3/4" (H)

→ 3000 DCDA - 8" (H) Approved 7th Ed. of Manual (11 January 1988)
(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q (Formerly DCDA) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 007QT - 3/4" (H)

Double Check Detector Assemblies

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Ames → 3000-G-DCDA - 8" (H) Approved 7th Ed. of Manual (11 January 1988)
(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q (Formerly DCDA) Renewed 11 January 2003
(uu),mm,ee,ff,gg,hh,ccc,ddd

Watts 007QT - 3/4" (H)

3000SE - 2 1/2" (H) Approved 8th Ed. of Manual (10 September 1996)
(M),N,O,P,Q Renewed 10 September 2002

(mm),ee,ff,gg,hh,ccc,ddd,uu,ll,tt

Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)

3000SE - 6" (H) Approved 8th Ed. of Manual (24 May 1995)
(M),A,B,C, D,E,F, G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)

3000SE - 8" (H) Approved 8th Ed. of Manual (9 September 1992)
(M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 9 September 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Watts 007M1QT - 3/4" (H)

→ 3000SE-A - 8" (H) Approved 8th Ed. of Manual (5 May 1995)
(M),A,B,C, D,E,F, G,H,I,J,K,L,N,O,P,Q Renewed 5 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Ames 2000SS - 3/4" (H)

3000SS - 2 1/2", 3", 4" (H) Approved 8th Ed. of Manual (24 May 1995)
(M),A,B,C, D,E,F, G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)

3000SS - 6" (H) Approved 8th Ed. of Manual (9 September 1992)
(M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 9 September 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Watts 007M1QT - 3/4" (H)

3000SS - 8" (H) Approved 8th Ed. of Manual (16 September 1996)
(M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 16 September 2002

(mm),ee,ff,gg,hh,ccc,ddd,ll,tt,uu

Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)

3000SS - 10" (H) Approved 8th Ed. of Manual (16 February 2001)
(J),C,D,E,F,G,H,I,K,L,M,N,O,P,Q

(ll),mm

Ames 2000B - 3/4" (H)

→ 3000SS-A - 6" (H) Approved 8th Ed. of Manual (5 May 1995)
(M),A,B,C, D,E,F, G,H,I,J,K,L,N,O,P,Q Renewed 5 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Ames 2000SS - 3/4" (H)

→ 3000SS-M - 4" (H) Approved 8th Ed. of Manual (5 May 1995)
(R) Renewed 5 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Ames 2000SS - 1" (H)

3000SS-M - 6" (H) Approved 8th Ed. of Manual (5 May 1995)

(S) Renewed 5 May 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt

Watts 007M2QT - 1 1/2" (H)

3000SS-WM1 - 2 1/2",3" (H) Approved 8th Ed. of Manual (11 July 1991)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 11 July 2000

(uu),ee,ff,gg,hh,ccc,ddd,

ll,mm,tt (*Formerly 3000SS-prior to Serial Number 2EK0320*)

Watts 007M1QT - 3/4" (H)

Double Check Detector Assemblies

COMPANY MODEL-SIZE STATUS OF APPROVAL

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Ames 3000SS-WM1 - 4" (H) Approved 8th Ed. of Manual (11 July 1991)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 11 July 2000

(uu),ee,ff,gg,hh,ccc,ddd,

ll,mm,tt (*Formerly 3000SS-prior to Serial Number 2EK0320*)

Watts 007M1QT - 3/4" (H)

3000SE-WM1 - 6" (H) Approved 8th Ed. of Manual (22 November 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 22 November 2002

(uu),ee,ff,gg,hh,ccc,ddd,

ll,mm,tt (*Formerly 3000SS-prior to Serial Number 2EK0320*)

Watts 007M1QT - 3/4" (H)

Conbraco 2 1/2DCDA - 2 1/2" (H,VU) Approved 9th Ed. of Manual (16 October 2000)

(M),E,F,G,H, I,J,K,LN,O,P,Q

(ll) mm

Conbraco Model 1/2DC 1/2" (H,VU)

2 1/2DCDA-6 - 2 1/2" (H,VU) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H, I,J,K,L,N,O,P,Q

(mm)[#1SOV],[ooo][#2SOV]

Conbraco Model 1/2DC 1/2" (H,VU)

2 1/2DCDAU - 2 1/2" (VUVD) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H I,J,K,L,M,N,O,P,Q

(ll),mm

Conbraco Model 1/2 DC 1/2" (H)

3DCDA - 3" (H,VU) Approved 9th Ed. of Manual (16 October 2000)

(M),E,F,G,H, I,J,K,LN,O,P,Q

(ll) mm

Conbraco Model 1/2DC 1/2" (H,VU)

3DCDA-6 - 3" (H,VU) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H,I,J,K,L,N,O,P,Q

(mm)[#1SOV],[ooo][#2SOV]

Conbraco Model 1/2DC 1/2" (H,VU)

3DCDAU - 3" (VUVD) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,HI,J,K,L,M,N,O,P,Q

(ll),mm

Conbraco Model 1/2DC 1/2" (H)

4DCDA - 4" (H,VU) Approved 9th Ed. of Manual (16 October 2000)

(M),E,F,G,H,I,J,K,LN,O,P,Q

(ll) mm

Conbraco Model 1/2DC 1/2" (H,VU)

4DCDA-6 - 4" (H,VU) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H,I,J,K,L,N,O,P,Q

(mm)[#1SOV],(ooo)[#2SOV]
Conbraco Model 1/2DC 1/2" (H, VU)
 4DCDAU - 4" (VUVD) Approved 9th Ed. of Manual (10 April 2001)
 (M),E,F,G,HI,J,K,L,M,N,O,P,Q
 (ll),mm
Conbraco Model 1/2 DC 1/2" (H)
 6DCDA - 6" (H,VU) Approved 9th Ed. of Manual (16 October 2000)
 (M),E,F,G,H,I,J,K,LN,O,P,Q
 (ll) mm
Conbraco Model 1/2DC 1/2" (H, VU)

Double Check Detector Assemblies

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Conbraco 6DCDA-6 - 6" (H,VU) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H,I,J,K,L,N,O,P,Q

(mm)[#1SOV],(ooo)[#2SOV]

Conbraco Model 1/2DC 1/2" (H, VU)

6DCDAU - 6" (VUVD) Approved 9th Ed. of Manual (10 April 2001)

(M),E,F,G,H,I,J,K,L,M,N,O,P,Q

(ll),mm

Conbraco Model 1/2 DC 1/2" (H)

8DCDA - 8" (H,VU) Approved 9th Ed. of Manual (16 January 2003)

(M),F,G,H,I,J,K,L,N,O,P,Q

(mm),ll

Conbraco Model 1/2DC 1/2" (H, VU)

10DCDA - 10" (H,VU) Approved 9th Ed. of Manual (16 January 2003)

(M)F,G,H,I,J,K,L,N,O,P,Q

(mm),ll

Conbraco Model 1/2DC 1/2" (H, VU)

40-600-C3 - 3" (H) Approved 8th Ed. of Manual (20 August 1996)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 20 August 2002

(uu),cc,mm (Formerly 40-600-03)

Conbraco 40-104-02 - 3/4" (H)

40-600-E3 - 3" (H) Approved 8th Ed. of Manual (20 August 1996)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 20 August 2002

(uu),cc,mm (Formerly 40-600-03)

Conbraco 40-104-02 - 3/4" (H)

40-60A-C3 - 4" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60A-03)

Conbraco 40-104-02 - 3/4" (H)

40-60A-C6 - 4" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],(ooo)[#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60A-E3 - 4" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60A-03)

Conbraco 40-104-02 - 3/4" (H)

40-60A-E6 - 4" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],(ooo)[#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60C-C3 - 6" (H) Approved 8th Ed. of Manual (2 June 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 2 June 2002
(uu),cc,mm (Formerly 40-60C-03)
Conbraco 40-104-02 - 3/4" (H)
40-60C-C6 - 6" (H) Approved 8th Ed. of Manual (1 February 2000)
(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003
(mm)[#1SOV],[ooo][#2SOV]
Conbraco 40-104-02 - 3/4" (H)
40-60C-E3 - 6" (H) Approved 8th Ed. of Manual (2 June 1993)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 2 June 2002
(uu),cc,mm (Formerly 40-60C-03)
Conbraco 40-104-02 - 3/4" (H)

Double Check Detector Assemblies

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Conbraco 40-60C-E6 - 6" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],[ooo][#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60E-C3 - 8" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60E-03)

Conbraco 40-104-02 - 3/4" (H)

40-60E-C6 - 8" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],[ooo][#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60E-E3 - 8" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60E-03)

Conbraco 40-104-02 - 3/4" (H)

40-60E-E6 - 8" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],[ooo][#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60G-C3 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60G-03)

Conbraco 40-104-02 - 3/4" (H)

40-60G-C6 - 10" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],[ooo][#2SOV]

Conbraco 40-104-02 - 3/4" (H)

40-60G-E3 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002

(uu),cc,mm (Formerly 40-60G-03)

Conbraco 40-104-02 - 3/4" (H)

40-60G-E6 - 10" (H) Approved 8th Ed. of Manual (1 February 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003

(mm)[#1SOV],[ooo][#2SOV]

Conbraco 40-104-02 - 3/4" (H)

Febco — 806 - 4" (H) Approved 6th Ed. of Manual (4 August 1983)

(F),A,B,C,D,E,G,H,I,J,K,L,M,N,O,P,Q Renewed 4 August 2001

Febco 805Y - 3/4" (H)

— 806 - 6",8",10" (H) Approved 6th Ed. of Manual (13 May 1982)

(F),A,B,C,D,E,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 May 2003

Febco 805Y - 3/4" (H)

806YD - 3" (H) Approved 8th Ed. of Manual (26 September 1988)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 26 September 2000

(ff),mm,uu (Formerly 806 Type YD)

Febco 805Y - 3/4" (H)

806YD - 4",6",8",10" (H) Approved 7th Ed. of Manual (10 July 1987)

(F),A,B,C,D,E,G,H,I,J,K,L,M,N,O,P,Q Renewed 10 July 2002

(ff),mm,uu (Formerly 806 Type YD)

Febco 805Y - 3/4" (H)

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Febco 856 - 2 1/2",3" (H) Approved 8th Ed. of Manual (19 March 1997)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 19 March 2003

(ff),mm,uu

Febco 805YB - 3/4" (H)

856 - 2 1/2",3" (VU) Approved 8th Ed. of Manual (5 January 2000)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 5 January 2003

(ff),mm,uu

Febco 805YB - 3/4" (VU)

856 - 4",6" (H) Approved 8th Ed. of Manual (4 May 1994)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 4 May 2003

(ff),mm,uu,nnn

Febco 805YB - 3/4" (H)

856 - 4",6" (VU) Approved 8th Ed. of Manual (16 April 1996)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 16 April 2002

(ff),mm,uu,nnn

Febco 805YB - 3/4" (VU)

856 - 8" (H) Approved 8th Ed. of Manual (4 October 1995)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 4 October 2001

(ff),mm,uu,nnn

Febco 805YB - 3/4" (H)

856 - 8" (VU) Approved 8th Ed. of Manual (5 January 2000)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 5 January 2003

(ff),mm,uu,nnn

Febco 805YB - 3/4" (VU)

876 - 2 1/2", 3" (VUVD) Approved 8th Ed. of Manual (10 March 1995)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 10 March 2001

(ff),mm,uu

Febco 805YB - 3/4" (H)

876 - 4",6" (VUVD) Approved 8th Ed. of Manual (4 May 1994)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 4 May 2003

(ff),mm,uu

Febco 805YB - 3/4" (H)

876 - 8" (VUVD) Approved 8th Ed. of Manual (24 May 1995)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2001

(ff),mm,uu

Febco 805YB - 3/4" (H)

876 - 10" (VUVD) Approved 8th Ed. of Manual (4 October 1996)

(M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 4 October 2002

(ff),mm,uu

Febco 805YB - 3/4" (H)

876V - 2 1/2",3",4",6" (VUVD,VUVU) Approved 8th Ed. of Manual (8 March 1996)

(M),B,C,D, E,F,G,H,I,J,K,L,N,O,P,Q Renewed 8 March 2002
(ff),ee,ll,mm,tt,uu
Febco 805YB - 3/4" (H)
876V - 8" (VUVD,VUVU) Approved 8th Ed. of Manual (6 January 1997)
(M),B,C,D, E,F,G,H,I,J,K,L,N,O,P,Q Renewed 6 January 2003
(ff),mm,uu
Febco 805YB - 3/4" (H)
876V - 10" (VUVD,VUVU) Approved 8th Ed. of Manual (11 July 1997)
(M),B,C,D, E,F,G,H,I,J,K,L,N,O,P,Q Renewed 11 July 2000
(ee), ll,tt,ff,mm,uu
Febco 805YB - 3/4" (H)

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Double Check Detector Assemblies

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Hersey/Grinnell

DDC-II - 3" (H) Approved 6th Ed. of Manual (31 January 1985)
(Q),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P Renewed 31 January 2003
(uu),cc,rr,iii,lll

Hersey FDC - 3/4" (H)

DDC-II - 4",6" (H) Approved 6th Ed. of Manual (10 April 1980)
(I),J,K,L,M,N,O,P,Q Renewed 18 March 2001
(uu),cc,rr,iii,lll

Hersey FDC - 3/4" (H)

DDC-II - 8" (H) Approved 6th Ed. of Manual (6 July 1981)
(I),J,K,L,M,N,O,P,Q Renewed 6 July 2002
(uu),cc,rr,iii,lll

Hersey FDC - 3/4" (H)

DDC-II - 10" (H) Approved 7th Ed. of Manual (14 March 1986)
(Q),B,C,D,E,F,G,H,I,J,K,L,M,N,O,P Renewed 14 March 2001
(uu),cc,rr,iii,lll

Hersey FDC - 3/4" (H)

Watts 007 DCDA - 2" (H) Approved 9th Ed. of Manual (16 June 1997)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 16 June 2000
(bbb) Previously Approved 8th Ed. (19 April 1996)

Watts 007QT - 1/2" (H)

007 DCDA - 2" (VU) Approved 9th Ed. of Manual (16 June 1997)
(H),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 16 June 2000
(bbb) Previously Approved 8th Ed. (10 September 1996)

Watts 007QT - 1/2" (VU)

007 DCDA - 2 1/2" (H) Approved 8th Ed. of Manual (11 October 1993)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 11 October 2002
(pp),gg,hh,ll,mm,oo,tt,uu

Watts 007M2QT - 3/4" (H) (Watts 007M1QT - 3/4" [H])

007 DCDA - 2 1/2" (VU) Approved 8th Ed. of Manual (27 August 1996)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 27 August 2002
(pp),gg,hh,ll,mm,oo,tt,uu

Watts 007M2QT - 3/4" (VU)

007 DCDA - 3" (H) Approved 8th Ed. of Manual (19 September 1992)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 19 September 2001
(pp),hh,mm,uu

Watts 007M2QT - 3/4" (H) (Watts 007M1QT - 3/4" [H])

→ 007 DCDA - 4",6" (H) Approved 8th Ed. of Manual (1 February 1995)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 1 February 2001
(oo),gg,tt,pp,hh,uu
Watts 007M1QT - 3/4" (H)
709 DCDA - 3" (H) Approved 6th Ed. of Manual (19 April 1987)
(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 19 April 2002
(pp),hh,uu,eee (Formerly 709DDC)
Watts 007QT - 1/2" (H) (Watts 007M1QT - 3/4" [H]; → Watts 709QT - 3/4" [H])
709 DCDA - 4", 6" (H) Approved 6th Ed. of Manual (27 July 1987)
(N),A,B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 27 July 2002
(pp),hh,uu,eee (Formerly 709DDC)
Watts 007QT - 1/2" (H) (Watts 007M1QT - 3/4" [H]; → Watts 709QT - 3/4"[H])
709 DCDA - 4" (VU) Approved 8th Ed. of Manual (27 August 1996)
(N),A,B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 27 August 2002
(pp),hh,uu,eee
Watts 007QT - 1/2" (VU) {Watts 007M2QT [VU] - 3/4"}
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Double Check Detector Assemblies

COMPANY MODEL-SIZE STATUS OF APPROVAL
Watts 709 DCDA - 8" (H) Approved 6th Ed. of Manual (19 April 1987)
(N),A,B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 19 April 2002
(pp),hh,mm,uu,eee (Formerly 709DDC)
Watts 007QT - 1/2" (H) (Watts 007M1QT - 3/4"[H]; → Watts 709QT - 3/4"[H])
709 DCDA - 10" (H) Approved 6th Ed. of Manual (27 July 1987)
(N),E,F,G,H,I,J,K,L,M,O,P,Q Renewed 27 July 2002
(pp),hh,mm,uu,eee (Formerly 709DDC)
Watts 007QT - 1/2" (H) (Watts 007M1QT - 3/4" [H]; → Watts 709QT - 3/4" [H])
709 DCDA - 6", 8", 10" (VU) Approved 8th Ed. of Manual (5 December 1996)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 5 December 2002
(pp),hh,mm,uu,eee
Watts 007QT - 1/2" (VU)
→ 770 DCDA - 4" (H) Approved 8th Ed. of Manual (20 May 1992)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 20 May 2001
(pp),hh,mm,uu
Watts 007M1QT - 3/4" (H)
→ 770 DCDA - 8" (H) Approved 8th Ed. of Manual (13 January 1993)
(N),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 13 January 2002
(oo),gg,hh,ll,mm,pp,tt,hh,uu
Watts 007M1QT - 3/4" (H)
→ 772 DCDA - 4" (H) Approved 8th Ed. of Manual (1 August 1992)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 1 August 2001
(oo)
Watts 007M1QT 3/4" (H)
→ 772 DCDA - 10" (H) Approved 8th Ed. of Manual (13 January 1993)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 13 January 2002
(oo)
Watts 007M1QT 3/4" (H)
774DCDA - 2 1/2",3",4" (H) Approved 8th Ed. of Manual (24 May 1995)
(M),A,B,C, D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2001
(uu),ee,ff,gg,hh,ll,mm,oo,pp,tt,ccc,ddd
Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)
774DCDA- 6" (H) Approved 8th Ed. of Manual (9 September 1992)
(M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 9 September 2001
(uu),ee,ff,gg,hh,ll,mm,oo,pp,tt,ccc,ddd

Watts 007M1QT - 3/4" (H)
 774DCDA - 8" (H) Approved 8th Ed. of Manual (16 September 1996)
 (M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 16 September 2002
 (mm),ee,ff,gg,hh,ll,mm,oo,pp,tt,uu,ccc,ddd
Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)
 774DCDA - 10" (H) Approved 8th Ed. of Manual (16 February 2001)
 (J),C,D,E,F,G,H,I,K,L,M,N,O,P,Q
 (ll),mm
Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)
 774XDCDA - 2 1/2" (H) Approved 8th Ed. of Manual (10 September 1996)
 (M)N,O,P,Q Renewed 10 September 2002
 (mm),ee,ff,gg,hh,ll,mm,oo,pp,tt,uu,ccc,ddd
Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)
 774XDCDA - 6"(H) Approved 8th Ed. of Manual (24 May 1995)
 (M),A,B,C, D,E,F, G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2001
 (uu),ee,ff,gg,hh,ll,mm,oo,pp,tt,ccc,ddd
Watts 007M2QT - 3/4" (H), Ames 2000B - 3/4" (H)
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Watts 774XDCDA - 8"(H) Approved 8th Ed. of Manual (9 September 1992)
 (M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q Renewed 9 September 2001
 (uu),ee,ff,gg,hh,ll,mm,oo,pp,tt,ccc,ddd
Watts 007M1QT - 3/4" (H)
 Wilkins 350DA - 2 1/2", 3" (H) Approved 9th Ed. of Manual (3 April 2002)
 (M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (H)
 350DA - 2 1/2", 3" (VU) Approved 9th Ed. of Manual (8 October 2002)
 (M),A,B,C,D,E,F G,H,I,J,K,L,N,O,P,Q
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (VU)
 350DA - 4" (H) Approved 9th Ed. of Manual (15 September 1999)
 (M),A,B,C,D,EF,G,H,I,J,K,L,N,O,P,Q Renewed 15 September 2002
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (H)
 350DA - 4" (VU) Approved 9th Ed. of Manual (9 September 2000)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (VU)
 350DA - 6" (H) Approved 9th Ed. of Manual (18 October 1999)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 18 October 2002
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (H)
 350DA - 6" (VU) Approved 9th Ed. of Manual (5 January 2000)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 5 January 2003
 (hh),ff,mm,uu,zz
Wilkins 950XLD - 3/4" (VU)
 350DA - 8" (H) Approved 9th Ed. of Manual (3 July 2002)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (hh),ff,gg,uu,zz
Wilkins 950XLD - 3/4" (H)
 350DA - 8" (VU) Approved 9th Ed. of Manual (16 January 2003)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (hh),ff,gg,uu,zz
Wilkins 950XLD - 3/4" (VU)
 350DA - 10" (H) Approved 9th Ed. of Manual (28 August 2002)

(N),F,G,H,I,J,K,L,M,O,P,Q
(hh),ff,gg,uu,zz
Wilkins 950XLD - 3/4" (H)
350DA - 10" (VU) Approved 9th Ed. of Manual (14 March 2003)
(N),F,G,H,I,J,K,L,M,O,P,Q
(hh),ff,gg,uu,zz
Wilkins 950XLD - 3/4" (VU)
350 DAG - 4" (H) Approved 9th Ed. of Manual (10 April 2000)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 10 April 2003
(qqq)
Wilkins 950XLD - 3/4" (H)
350 DAG - 4" (VU) Approved 9th Ed. of Manual (13 December 2000)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q
(qqq)
Wilkins 950XLD - 3/4" (VU)

Double Check Detector Assemblies

COMPANY MODEL-SIZE STATUS OF APPROVAL

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Double Check Detector Assemblies

COMPANY MODEL-SIZE STATUS OF APPROVAL

Wilkins 350 DAG - 6" (H,VU) Approved 9th Ed. of Manual (10 April 2000)

(M),A, B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 10 April 2003

(qqq)

Wilkins 950XLD - 3/4" (H, VU)

350 DAGPI - 4",6" (H, VU) Approved 9th Ed. of Manual (31 July 2001)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q

(qqq)- #1SOV, (www)-# 2SOV

Wilkins 950XLD - 3/4" (H, VU)

350 DAPI - 4",6" (H,VU), Approved 9th Ed. of Manual (31 July 2001)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q

(hh)- #1SOV, (vvv)-# 2SOV

Wilkins 950XLD - 3/4" (H, VU)

450DA - 4" (VUVD) Approved 9th Ed. of Manual (12 April 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 12 April 2003

(qqq)

Wilkins 950XLD - 3/4" (H)

450DA - 6" (VUVD) Approved 9th Ed. of Manual (24 May 2000)

(M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 24 May 2003

(qqq)

Wilkins 950XLD - 3/4" (H)

450DAG - 4" (VUVD) Approved 9th Ed. of Manual (25 August 2000)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q

(ttt)

Wilkins 950XLD - 3/4" (H)

450DAG - 6" (VUVD) Approved 9th Ed. of Manual (25 August 2000)

(M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q

(ttt)

Wilkins 950XLD - 3/4" (H)

950DA -2 1/2", 3" (H) Approved 8th Ed. of Manual (2 January 1994)

(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 2 January 2003

(hh),ff,mm,uu,zz

Wilkins 950XL - 3/4" (H) (Wilkins 950 - 3/4" [H])

950DA - 4", 8" (H) Approved 8th Ed. of Manual (9 June 1993)

(M),E,F,G,H,I,J,K,L,N,O,P,Q Renewed 9 June 2002
(hh),ff,mm,uu,zz
Wilkins 950XL - 3/4" (H) (Wilkins 950 - 3/4" [H])
950DA - 4", 8" (VU) Approved 8th Ed. of Manual (12 December 1996)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 12 December 2002
(hh),ff,mm,uu,zz
Wilkins 950XL - 3/4" (VU)
950DA - 6" (H) Approved 8th Ed. of Manual (9 June 1993)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 9 June 2002
(hh),ff,mm,uu,zz
Wilkins 950XL - 3/4" (H) (Wilkins 950 - 3/4" [H])
950DA - 2 1/2", 3", 6" (VU) Approved 8th Ed. of Manual (12 December 1996)
(M),D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 12 December 2002
(hh),ff,mm,uu,zz
Wilkins 950XL - 3/4" (VU)
950DA - 10" (H) Approved 8th Ed. of Manual (23 June 1994)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 23 June 2000
(hh),ff,mm,uu,zz
Wilkins 950XL - 3/4" (H) (Wilkins 950 - 3/4"[H])
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Double Check Detector Assemblies

COMPANY MODEL-SIZE STATUS OF APPROVAL
Wilkins 950DAG -4" (H), Approved 8th Ed. of Manual (27 March 2000)
(M),E,F,G,H,I,J,K,L,N,O,P,Q Renewed 27 March 2003
(qqq)
Wilkins 950 XL 3/4" (H)
950DAG - 4" (VU) Approved 8th Ed. of Manual (27 March 2000)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 27 March 2003
(qqq)
Wilkins 950 XL 3/4" (VU)
950DAG -6" (H) Approved 8th Ed. of Manual (27 March 2000)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 27 March 2003
(qqq)
Wilkins 950 XL 3/4" (H)
950DAG -6" (VU) Approved 8th Ed. of Manual (27 March 2000)
(M),D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 27 March 2003
(qqq)
Wilkins 950 XL 3/4" (VU)
— DCDA - 2 1/2", 3" (H) Approved 7th Ed. of Manual (5 March 1987)
(M) B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 5 March 2002
(hh),ff,mm,uu,zz
Wilkins 550A - 3/4" (H)
— DCDA - 4" (H) Approved 7th Ed. of Manual (18 May 1988)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 18 May 2003
(hh),ff,mm,uu,zz
Wilkins 550A - 3/4" (H)
— DCDA - 6" (H) Approved 7th Ed. of Manual (2 June 1988)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 2 June 2003
(hh),ff,mm,uu,zz
Wilkins 550A - 3/4" (H)

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2003 © University of Southern California
Ames 5000 - 4", (H) Approved 8th Ed. of Manual (28 December 1989)
(M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 28 December 2001

(uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt
Conbraco 40-204-02 - 3/4" (H)
 5000 - 6", (H) Approved 8th Ed. of Manual (28 December 1989)
 (K),A,B,C,D,E,F,G,H,I,J,L,M,N,O,P,Q Renewed 28 December 2001
 (uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt
Conbraco 40-204-02 - 3/4" (H)
 5000 - 8", (H) Approved 8th Ed. of Manual (1 July 1989)
 (K),A,B,C,D,E,F,G,H,I,J,L,M,N,O,P,Q Renewed 1 July 2001
 (uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt
Conbraco 40-204-02 - 3/4" (H)
 5000 - 10", (H) Approved 8th Ed. of Manual (19 March 1990)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 19 March 2002
 (uu),ee,ff,gg,hh,ccc,ddd,ll,mm,tt
Conbraco 40-204-02 - 3/4" (H)
 5000CIV - 2 1/2" (H) Approved 8th Ed. of Manual (7 July 2000)
 (H),C,D,E,F,G,I,J,K,L,M,N,O,P,Q
 (pp),hh,mm,uu
Watts Model 909QT 3/4" (H)
 5000CIV - 3",4",6",8",10" (H) Approved 8th Ed. of Manual (7 July 2000)
 (N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q
 (pp),hh,mm,uu,eee
Watts Model 909QT 3/4" (H)
 Cla-Val — 18-4 - 10" (H) Approved 8th Ed. of Manual (23 August 1990)
 (H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 23 August 2002
 (hh),gg,qq,rr
Cla-Val RP2 - 3/4" (H)
 Conbraco 40-700-C3 - 3" (H) Approved 8th Ed. of Manual (27 July 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 27 July 2002
 (uu),cc,mm (Formerly 40-700-03)
Conbraco 40-204-02 - 3/4" (H)
 40-700-E3 - 3" (H) Approved 8th Ed. of Manual (27 July 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 27 July 2002
 (uu),cc,mm (Formerly 40-700-03)
Conbraco 40-204-02 - 3/4" (H)
 40-70A-C3 - 4" (H) Approved 8th Ed. of Manual (27 July 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 27 July 2002
 (uu),cc,mm (Formerly 40-70A-03)
Conbraco 40-204-02 - 3/4" (H)
 40-70A-E3 - 4" (H) Approved 8th Ed. of Manual (27 July 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 27 July 2002
 (uu),cc,mm (Formerly 40-70A-03)
Conbraco 40-204-02 - 3/4" (H)
 40-70C-C3 - 6" (H) Approved 8th Ed. of Manual (20 October 1993)
 (M),D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 20 October 2002
 (uu),cc,mm (Formerly 40-70C-03)
Conbraco 40-204-02 - 3/4" (H)

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Conbraco 40-70C-E3 - 6" (H) Approved 8th Ed. of Manual (20 October 1993)

(M),D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 20 October 2002

(uu),cc,mm (Formerly 40-70C-03)

Conbraco 40-204-02 - 3/4" (H)

40-70E-C3 - 8" (H) Approved 8th Ed. of Manual (24 May 1993)

(M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 24 May 2002
 (uu),cc,mm (Formerly 40-70E-03)
Conbraco 40-204-02 - 3/4" (H)
 40-70E-E3 - 8" (H) Approved 8th Ed. of Manual (24 May 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 24 May 2002
 (uu),cc,mm (Formerly 40-70E-03)
Conbraco 40-204-02 - 3/4"(H)
 40-70G-C3 - 10"(H) Approved 8th Ed. of Manual (13 April 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002
 (uu),cc,mm (Formerly 40-70G-03)
Conbraco 40-204-02 - 3/4" (H)
 40-70G-E3 - 10"(H) Approved 8th Ed. of Manual (13 April 1993)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 13 April 2002
 (uu),cc,mm (Formerly 40-70G-03)
Conbraco 40-204-02 - 3/4" (H)
 Febco 826YD - 2 1/2", 3" (H) Approved 8th Ed. of Manual (11 November 1988)
 (M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 11 November 2000
 (ff),mm,uu (Formerly 826 Type YD)
Febco 825Y - 3/4" (H)
 826YD - 4" (H) Approved 8th Ed. of Manual (14 October 1988)
 (M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 14 October 2000
 (ff),mm,uu (Formerly 826 Type YD)
Febco 825Y - 3/4" (H)
 826YD - 6" (H) Approved 8th Ed. of Manual (1 March 1990)
 (M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 1 March 2002
 (ff),mm,uu (Formerly 826 Type YD)
Febco 825Y - 3/4" (H)
 826YD - 8", 10" (H) Approved 8th Ed. of Manual (22 June 1990)
 (M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 22 June 2002
 (ff),mm,uu (Formerly 826 Type YD)
Febco 825Y - 3/4" (H)
 Hersey/Grinnell
 6CMDA - 4",6",8",10" (H) Approved 8th Ed. of Manual (28 December 1989)
 (M),B,C,D,E,F,G,H,I,J,K,L,N,O,P,Q Renewed 28 December 2001
 (uu),cc,rr,iii,iii
Hersey FRP-II - 1 1/2" (H)
 Watts – 009NRS RPDA - 4",6" (H) Approved 8th Ed. of Manual (1 February 1995)
 (H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 1 February 2001
 (oo),gg,ll,tt
Watts 009M2QT - 3/4" (H)
 – 009OSY RPDA - 4",6" (H) Approved 8th Ed. of Manual (1 February 1995)
 (H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 1 February 2001
 (pp),hh,mm,uu
Watts 009M2QT - 3/4" (H)

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Watts 909 RPDA - 2 1/2" (H) Approved 8th Ed. of Manual (16 June 1999)

(H),C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 16 June 2002

(pp),hh,mm,uu

Watts 909QT - 3/4" (H)

909 RPDA - 3" (H) Approved 8th Ed. of Manual (5 October 1988)

(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 5 October 2000

(pp),hh,mm,uu,eee (Formerly Model 909 DDC-M2)

Watts 909QT - 3/4" (H)

909 RPDA - 4" (H) Approved 8th Ed. of Manual (9 February 1988)
(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 9 February 2003
(pp),hh,mm,uu,eee

Watts 909QT - 3/4" (H)

909 RPDA - 6" (H) Approved 8th Ed. of Manual (5 October 1988)
(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 5 October 2000
(pp),hh,mm,uu,eee (Formerly Model 909 DDC)

Watts 909QT - 3/4" (H)

909 RPDA - 8" (H) Approved 8th Ed. of Manual (14 February 1988)
(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 14 February 2003
(pp),hh,mm,uu,eee

Watts 909QT - 3/4" (H)

909 RPDA - 10" (H) Approved 8th Ed. of Manual (15 February 1988)
(N),B,C,D,E,F,G,H,I,J,K,L,M,O,P,Q Renewed 15 February 2003
(pp),hh,mm,uu,eee

Watts 909QT - 3/4" (H)

– 990 RPDA - 4" (H) Approved 8th Ed. of Manual (1 November 1992)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 11 November 2001
(pp),hh,mm,uu

Watts 009QT 3/4" (H)

– 990 RPDA - 8" (H) Approved 8th Ed. of Manual (13 January 1993)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 13 January 2002
(oo),gg,hh,ll,mm,pp,tt,uu

Watts 009QT 3/4" (H)

– 992 RPDA - 4" (H) Approved 8th Ed. of Manual (1 November 1992)
(H),A,B,C,D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 1 November 2001
(oo)

Watts 009QT 3/4" (H)

– 992 RPDA - 10" (H) Approved 8th Ed. of Manual (13 January 1993)
(H),D,E,F,G,I,J,K,L,M,N,O,P,Q Renewed 13 January 2002
(oo)

Watts 009QT 3/4" (H)

Wilkins 375DA - 2 1/2", 3" (H) Approved 9th Ed. of Manual (8 October 2002)
(M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q
(hh),ff,mm,uu,zz

Wilkins 975XLD 3/4" (H)

375DA - 4" (H) Approved 9th Ed. of Manual (13 December 2000)
(M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q
(hh),ff,mm,uu,zz

Wilkins 975XLD 3/4" (H)

375 DA - 6" (H) Approved 9th Ed. of Manual (31 May 2001)
(N),C,D,E,F,G,H,I,J,K,L,M,O,P,Q
(hh),ff,mm,uu,zz

Wilkins 975XLD - 3/4" (H)

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Wilkins 375DAG - 4" (H) Approved 9th Ed. of Manual (31 July 2001)

(M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q

(qqq)

Wilkins 975XLD 3/4" (H)
 375DAG - 6" (H) Approved 9th Ed. of Manual (6 August 2001)
 (N),C,D,E,F,G,H,I,J,K,L,M,O,P,Q
 (qqq)
Wilkins 975XLD 3/4" (H)
 375DAGPI - 4" (H) Approved 9th Ed. of Manual (31 July 2001)
 (M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q
 (qqq)- #1 SOV, (www)- #2 SOV
Wilkins 975XLD 3/4" (H)
 375DAGPI - 6" (H) Approved 9th Ed. of Manual (28 March 2002)
 (N),C,D,E,F,G,H,I,J,K,L,M,O,P,Q
 (qqq)- #1 SOV, (www)- #2 SOV
Wilkins 975XLD 3/4" (H)
 375DAPI - 4" (H) Approved 9th Ed. of Manual (31 July 2001)
 (M),C,D,E,F,G,H,I,J,K,L,N,O,P,Q
 (hh)- #1 SOV, (vvv)- #2 SOV
Wilkins 975XLD 3/4" (H)
 375DAPI - 6" (H) Approved 9th Ed. of Manual (28 March 2002)
 (N),C,D,E,F,G,H,I,J,K,L,M,O,P,Q
 (hh)- #1 SOV, (vvv)- #2 SOV
Wilkins 975XLD 3/4" (H)
 475 DA - 4" (VUVD) Approved 9th Ed. of Manual (20 March 2001)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (ppp),qqq
Wilkins 975XLD - 3/4" (H)
 475 DA - 6" (VUVD) Approved 9th Ed. of Manual (31 May 2001)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (ppp),qqq
Wilkins 975XLD - 3/4" (H)
 475 DAG -4", 6"(VUVD) Approved 9th Ed. of Manual (6 August 2001)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (qqq),ttt
Wilkins 975XLD - 3/4" (H)
 475 DAV - 4" (VUVD) Approved 9th Ed. of Manual (20 March 2001)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (ppp),qqq
Wilkins 975XLD - 3/4" (H)
 475 DAVG - 4" (VUVD) Approved 9th Ed. of Manual (6 August 2001)
 (N),F,G,H,I,J,K,L,M,O,P,Q
 (qqq),ttt
Wilkins 975XLD - 3/4" (H)
 975 DA - 2 1/2", 3" (H) Approved 8th Ed. of Manual (1 February 1994)
 (M),A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 1 February 2003
 (hh),ff,uu,zz
Wilkins 975 3/4" (H)
 975 DA - 4" (H) Approved 8th Ed. of Manual (1 November 1993)
 (M), A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,Q Renewed 1 November 2002
 (hh),ff,uu,zz
Wilkins 975 3/4" (H)

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Wilkins 975 DA - 6" (H) Approved 8th Ed. of Manual (14 March 1994)
 (M), A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 14 March 2003

(hh),ff,uu,zz

Wilkins 975 3/4" (H)

975 DA - 8", 10" (H) Approved 8th Ed. of Manual (5 December 1996)

(M), A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 5 December 2002

(hh),ff,uu,zz

Wilkins 975 3/4" (H)

975 DAG - 4", 6" Approved 8th Ed. of Manual (27 March 2000)

(M), A,B,C,D,E,F,G,H,I,J,K,L,M,N,O,P,Q Renewed 27 March 2003

(qqq)

Wilkins 975 3/4" (H)

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Ames 4000B - 1/2" (H) Approved 9th Ed. of Manual (10 September 1996)

(vv),xx Previously Approved 8th Ed. (26 May 1993)

Renewed 10 September 2002

4000B - 3/4" (H) Approved 8th Ed. of Manual (31 October 1992)

(vv),xx Renewed 31 October 2001

4000B - 1" (H) Approved 7th Ed. of Manual (11 January 1988)

(vv),xx Renewed 11 January 2003

4000B - 1 1/4", 1 1/2" (H) Approved 8th Ed. of Manual (24 August 1993)

(vv),xx Renewed 24 August 2002

4000B - 2" (H) Approved 9th Ed. of Manual (10 September 1996)

(vv),xx Renewed 10 September 2002

4000BM2 - 1" (H) Approved 9th Ed. of Manual (18 May 1998)

(vv),xx Renewed 18 May 2001

4000BM3 - 3/4"(H) Approved 9th Ed. of Manual (27 March 2000)

(vv),xx Renewed 27 March 2003

4000CIV - 2 1/2", 3" (H) Approved 7th Ed. of Manual (7 July 2000)

(oo),gg,hh,ll,mm,pp,tt,uu

4000CIV - 4", 6"(H) Approved 6th Ed. of Manual (19 June 2000)

(oo),gg,hh,ll,mm,pp,tt,uu,eee

4000CIV - 8", 10" (H) Approved 8th Ed. of Manual (19 June 2000)

(oo),gg,hh,ll,mm,pp,tt,uu

4000SS - 2 1/2", 3", 4" (H) Approved 8th Ed. of Manual (15 April 1994)

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 15 April 2003

4000SS - 6" (H) Approved 8th Ed. of Manual (22 September 1997)

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu Renewed 22 September 2000

4000-RP - 4", 6", 8" (H) Approved 7th Ed. of Manual (13 October 1987)

(formerly Model RP) Renewed 13 October 2002

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu

4000-RP - 10" (H) Approved 7th Ed. of Manual (13 October 1987)

(formerly Model RP) Renewed 13 October 2002

(tt),ee,ff,gg,hh,ccc,ddd,ll,mm,uu

Colt 400 - 2 1/2", 3", 4" (H) Approved 9th Ed. of Manual (7 October 2002)

(ppp), qqq

Colt 400N - 2 1/2", 3", 4" (VUVD) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

Colt 400Z - 2 1/2", 3", 4" (VUVU) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

Maxim 400 - 2 1/2", 3" (H) Approved 9th Ed. of Manual (7 October 2002)

(ppp),qqq

Maxim 400N - 2 1/2", 3" (VUVD) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

Maxim 400Z - 2 1/2", 3" (VUVU) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

Beeco - See Hersey/Grinnell

Buckner → 24000 - 3/4" (H) Approved 8th Ed. of Manual (14 March 1994)
(ii) Renewed 14 March 2003
→ 24001 - 1" (H) Approved 8th Ed. of Manual (14 March 1994)
(ii) Renewed 14 March 2003
→ 24002 - 1 1/4" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000
→ 24003 - 1 1/2" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000

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Buckner → 24004 - 2" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000 → 24000/25 - 3/4" (H) Approved 8th Ed. of Manual (14 March 1994)
(ii) Renewed 14 March 2003
→ 24001/25 - 1" (H) Approved 8th Ed. of Manual (14 March 1994)
(ii) Renewed 14 March 2003
→ 24002/25 - 1 1/4" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000
→ 24003/25 - 1 1/2" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000
→ 24004/25 - 2" (H) Approved 8th Ed. of Manual (18 July 1991)
(ii) Renewed 18 July 2000
Cla-Val → RP-2 - 3/4", 1" (H) Approved 4th Ed. of Manual (6 February 1974)
(nn),dd Renewed 18 March 2001
→ RP-2 - 1 1/4", 1 1/2" (H) Approved 5th Ed. of Manual (13 August 1976)
(nn),dd Renewed 5 October 2000
RP-4 - 6" (H) Approved 7th Ed. of Manual (7 August 1987)
(gg),hh,qq,rr Renewed 7 August 2002
→ RP-4 - 2" (H) Approved 8th Ed. of Manual (22 June 1989)
(nn) Renewed 22 June 2001
RP-4 - 2 1/2", 3", 4", 8", 10" (H) Approved 8th Ed. of Manual (22 June 1989)
(gg),hh,qq,rr Renewed 22 June 2001
RP4V - 4" (VUVU) Approved 8th Ed. of Manual (15 March 1990)
(gg),hh,qq,rr Renewed 15 March 2002
Conbraco 40-200-02 - 3" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003
40-200-03 - 3" (H) Approved 8th Ed. of Manual (8 April 1991)
(uu),cc,mm Renewed 8 April 2003
40-200-05 - 3" (H) Approved 8th Ed. of Manual (8 December 1998)
(mmm) Renewed 8 December 2001
40-201-02 - 1/4" (H) Approved 8th Ed. of Manual (3 May 1991)
(dd) Renewed 3 May 2003
40-201-A2 - 1/4" (H) Approved 8th Ed. of Manual (19 April 1996)
(dd) Renewed 19 April 2002
40-201-A2S - 1/4" (H) Approved 8th Ed. of Manual (19 April 1996)
(uuu) Renewed 19 April 2002
40-201-T2 - 1/4" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-201-99T] Renewed 16 September 2001
40-202-02 - 3/8" (H) Approved 8th Ed. of Manual (3 May 1991)
(dd) Renewed 3 May 2003
40-202-A2 - 3/8" (H) Approved 8th Ed. of Manual (19 April 1996)
(dd) Renewed 19 April 2002
40-202-A2S - 3/8" (H) Approved 8th Ed. of Manual (19 April 1996)

(uuu) Renewed 19 April 2002
40-202-T2 - 3/8" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-202-99T] Renewed 16 September 2001
40-203-02 - 1/2" (H) Approved 8th Ed. of Manual (3 May 1991)
(dd) Renewed 3 May 2003
40-203-A2 - 1/2" (H) Approved 8th Ed. of Manual (19 April 1996)
(dd) Renewed 19 April 2002
40-203-A2S - 1/2" (H) Approved 8th Ed. of Manual (19 April 1996)
(uuu) Renewed 19 April 2002

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Conbraco 40-203-T2 - 1/2" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-203-99T] Renewed 16 September 2001
40-204-02 - 3/4" (H) Approved 8th Ed. of Manual (8 May 1989)
(dd) Renewed 8 May 2001
40-204-T2 - 3/4" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-204-99T] Renewed 16 September 2001
40-204-A2 - 3/4" (H) Approved 8th Ed. of Manual (27 November 1991)
(dd) Renewed 27 November 2000
40-204-A2S - 3/4" (H) Approved 8th Ed. of Manual (16 August 1994)
(uuu) Renewed 16 August 2000
40-204-A2U - 3/4" (VUVD) Approved 8th Ed. of Manual (6 November 1992)
(dd) Renewed 6 November 2001
40-204-A2Z - 3/4" (VUVU) Approved 8th Ed. of Manual (6 November 1992)
(dd) Renewed 6 November 2001
40-204-TC2 - 3/4" (H) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-204-TCU - 3/4" (VUVD) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-205-02 - 1" (H) Approved 8th Ed. of Manual (8 May 1989)
(dd) Renewed 8 May 2001
40-205-T2 - 1" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-205-99T] Renewed 16 September 2001
40-205-A2 - 1" (H) Approved 8th Ed. of Manual (27 November 1991)
(dd) Renewed 27 November 2000
40-205-A2S - 1" (H) Approved 8th Ed. of Manual (16 August 1994)
(uuu) Renewed 16 August 2000
40-205-A2U - 1" (VUVD) Approved 8th Ed. of Manual (15 September 1993)
(dd) Renewed 15 September 2002
40-205-A2Z - 1" (VUVU) Approved 8th Ed. of Manual (15 September 1993)
(dd) Renewed 15 September 2002
40-205-TC2 - 1" (H) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-205-TCU - 1" (VUVD) Approved 8th Ed. of Manual (30 November 1998)
(dd) Renewed 30 November 2001
40-206-02 - 1 1/4" (H) Approved 8th Ed. of Manual (6 April 1992)
(dd) Renewed 6 April 2001
40-206-A2 - 1 1/4" (H) Approved 8th Ed. of Manual (21 June 1993)
(dd) Renewed 21 June 2002
40-206-A2U - 1 1/4" (VUVD) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001
40-206-A2Z - 1 1/4" (VUVU) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001

40-206-T2 - 1 1/4" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-206-99T] Renewed 16 September 2001
40-207-02 - 1 1/2" (H) Approved 8th Ed. of Manual (17 March 1989)
(dd) Renewed 17 March 2001
40-207-A2 - 1 1/2" (H) Approved 8th Ed. of Manual (16 September 1992)
(dd) Renewed 16 September 2001
40-207-A2U - 1 1/2" (VUVD) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001
40-207-A2Z - 1 1/2" (VUVU) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001
40-207-T2 - 1 1/2" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-207-99T] Renewed 16 September 2001

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Conbraco 40-208-02 - 2" (H) Approved 8th Ed. of Manual (17 March 1989)
(dd) Renewed 17 March 2001
40-208-A2 - 2" (H) Approved 8th Ed. of Manual (16 September 1992)
(dd) Renewed 16 September 2001
40-208-A4 - 2" (H) Approved 8th Ed. of Manual (24 May 2000)
(rrr) Renewed 24 May 2003
40-208-A2U - 2" (VUVD) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001
40-208-A2Z - 2" (VUVU) Approved 8th Ed. of Manual (2 February 1995)
(dd) Renewed 2 February 2001
40-208-T2 - 2" (H) Approved 8th Ed. of Manual (16 September 1998)
(dd) [formerly 40-208-99T] Renewed 16 September 2001
40-209-02 - 2 1/2" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003
40-209-03 - 2 1/2" (H) Approved 8th Ed. of Manual (8 April 1991)
(uu),cc,mm Renewed 8 April 2003
40-209-05 - 2 1/2" (H) Approved 8th Ed. of Manual (8 December 1998)
(mmm) Renewed 8 December 2001
40-20A-02 - 4" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003
40-20A-03 - 4" (H) Approved 8th Ed. of Manual (8 April 1991)
(uu),cc,mm Renewed 8 April 2003
40-20A-05 - 4" (H) Approved 8th Ed. of Manual (8 December 1998)
(mmm) Renewed 8 December 2001
40-20C-02 - 6" (H) Approved 8th Ed. of Manual (8 April 1991)
(tt),bb,ee,ll Renewed 8 April 2003
40-20C-03 - 6" (H) Approved 8th Ed. of Manual (8 April 1991)
(uu),cc,mm Renewed 8 April 2003
40-20C-05 - 6" (H) Approved 8th Ed. of Manual (8 December 1998)
(mmm) Renewed 8 December 2001
40-20E-02 - 8" (H) Approved 8th Ed. of Manual (22 October 1991)
(tt),bb,ee,ll Renewed 22 October 2000
40-20E-03 - 8" (H) Approved 8th Ed. of Manual (22 October 1992)
(uu),cc,mm Renewed 22 October 2001
40-20G-02 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)
(tt),bb,ee,ll Renewed 13 April 2002
40-20G-03 - 10" (H) Approved 8th Ed. of Manual (13 April 1993)
(uu),cc,mm Renewed 13 April 2002
Febco — 825 - 2 1/2" (H) Approved 5th Ed. of Manual (17 March 1975)

Renewed 17 March 2002

– 825 - 3" (H) Approved 5th Ed. of Manual (16 June 1975)

Renewed 16 June 2002

– 825 - 4" (H) Approved 5th Ed. of Manual (12 June 1975)

Renewed 12 June 2002

– 825 - 6" (H) Approved 5th Ed. of Manual (6 June 1975)

Renewed 6 June 2002

– 825 - 8" (H) Approved 5th Ed. of Manual (11 November 1975)

Renewed 11 November 2002

– 825 - 10" (H) Approved 5th Ed. of Manual (23 March 1979)

Renewed 23 March 2003

– 835B- 3/4", 1", 1 1/2", 2" (H) Approved 5th Ed. of Manual (6 March 1979)

Renewed 6 March 2003

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Febco – 825D - 2 1/2", 3", 4", 6", 8", 10" (H) Approved 7th Ed. of Manual (13 September 1987)

(Formerly 825 Type D) Renewed 13 September 2002

825Y - 3/4", 1" (H) Approved 6th Ed. of Manual (19 March 1982)

(ii),fff,jjj,ooo Renewed 19 March 2003

825Y - 1 1/4" (H) Approved 6th Ed. of Manual (3 June 1982)

(ii),fff,jjj,ooo Renewed 3 June 2003

825Y - 1 1/2" (H) Approved 6th Ed. of Manual (6 August 1982)

(ii),fff,jj,ooo Renewed 6 August 2000

825Y - 2" (H) Approved 6th Ed. of Manual (6 August 1982)

(ii),fff,ooo Renewed 6 August 2000

825YA - 3/4", 1" (H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (5 March 1990)

(ii),fff,jjj,ooo Renewed 5 March 2002

825YA - 1 1/2" (H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (8 May 1989)

(ii),fff,jjj,ooo Renewed 8 May 2001

825YA - 2" (H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (8 May 1989)

(ii),fff,ooo Renewed 8 May 2001

825 YAR - 3/4"(H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (22 January 1993)

(ii),fff,jjj,ooo Renewed 22 January 2002

825 YAR - 1"(H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (21 January 1993)

(ii),fff,jjj,ooo Renewed 21 January 2002

825 YAR - 1 1/2"(H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (19 August 1993)

(ii),fff,jjj,ooo Renewed 19 August 2002

825 YAR - 2" (H,VUVD,VUH,HVD) Approved 8th Ed. of Manual (19 August 1993)

(ii),fff,ooo Renewed 19 August 2002

825YD - 2 1/2", 3", 4", 6", 8", 10" (H) Approved 7th Ed. of Manual (24 February 1989)

(ee),ff,ll,mm,tt,uu (Formerly 825 Type YD) Renewed 24 February 2001

825YR - 3/4", 1"(H) Approved 8th Ed. of Manual (22 January 1993)

(ii),fff,jjj Renewed 22 January 2002

825YR - 1 1/2" (H) Approved 8th Ed. of Manual (23 July 1993)

(ii),fff,jjj Renewed 23 July 2002

825YR - 2"(H) Approved 8th Ed. of Manual (23 July 1993)

(ii),fff Renewed 23 July 2002

860 - 1/2" (H) Approved 9th Ed. of Manual (9 April 1998)

(fff),ooo Renewed 9 April 2001

860 - 3/4", 1" (H) Approved 9th Ed. of Manual (21 November 1997)

(fff),jjj,ooo Renewed 21 November 2000

860 - 1 1/4" (H) Approved 9th Ed. of Manual (4 June 1998)

(fff),jjj,ooo Renewed 4 June 2001

860 - 1 1/2" (H) Approved 9th Ed. of Manual (9 April 1998)
 (fff),jjj,ooo Renewed 9 April 2001
 860 - 2" (H) Approved 9th Ed. of Manual (9 April 1998)
 (fff),ooo Renewed 9 April 2001
 860 - 2 1/2", 3" (H) Approved 8th Ed. of Manual (19 April 1996)
 (ee),ll,tt,ff,mm,uu Renewed 19 April 2002
 860 - 4" (H) Approved 8th Ed. of Manual (31 May 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 31 May 2001
 860 - 6" (H) Approved 8th Ed. of Manual (7 August 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 7 August 2001
 860 - 8" (H) Approved 8th Ed. of Manual (4 October 1995)
 (ee),ll,tt,ff,mm,uu,nnn Renewed 4 October 2001
 860U - 1/2",3/4",1",1 1/4",1 1/2",2" (H)Approved 9th Ed. of Manual (12 October 1998)
 (kkk) Renewed 12 October 2001
 880 - 2 1/2",3" (VUVD) Approved 8th Ed. of Manual (24 May 1995)
 (ee),ll,tt,ff,mm,uu Renewed 24 May 2001

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Febco 880 - 4" (VUVD) Approved 8th Ed. of Manual (10 March 1995)
 (ee),ll,tt,ff,mm,uu Renewed 10 March 2001
 880 - 6",8" (VUVD) Approved 8th Ed. of Manual (19 May 1995)
 (ee),ll,tt,ff,mm,uu Renewed 19 May 2001
 880 - 10" (VUVD) Approved 8th Ed. of Manual (4 October 1996)
 (ee),ll,tt,ff,mm,uu Renewed 4 October 2002
 880V - 2 1/2", 3" (VUVD,VUVU) Approved 8th Ed. of Manual (30 June 1995)
 (ee),ll,tt,ff,mm,uu Renewed 30 June 2001
 880V - 4" (VUVD,VUVU) Approved 8th Ed. of Manual (8 August 1995)
 (ee),ll,tt,ff,mm,uu Renewed 8 August 2001
 880V - 6" (VUVD,VUVU) Approved 8th Ed. of Manual (5 July 1995)
 (ee),ll,tt,ff,mm,uu Renewed 5 July 2001
 880V - 8" (VUVD,VUVU) Approved 8th Ed. of Manual (18 December 1996)
 (ee),ll,tt,ff,mm,uu Renewed 18 December 2002
 880V - 10" (VUVD,VUVU) Approved 8th Ed. of Manual (17 June 1997)
 (ee),ll,tt,ff,mm,uu Renewed 17 June 2000
 Flomatic RPZ - 3/4", 1" (H) Approved 8th Ed. of Manual (7 June 1994)
 (ii) Renewed 7 June 2000
 RPZ - 1 1/2", 2" (H) Approved 8th Ed. of Manual (10 May 1995)
 (ii) Renewed 10 May 2001
 RPZ - 2 1/2", 3" (H) Approved 8th Ed. of Manual (14 February 1997)
 (gg), hh Renewed 14 February 2003
 RPZ - 4" (H) Approved 9th Ed. of Manual (28 January 1999)
 (gg), hh Renewed 28 January 2001
 RPZ - 6" (H) Approved 9th Ed. of Manual (31 January 2002)
 (gg),hh
 RPZE - 3/4",1",1 1/2",2" (H) Approved 8th Ed. of Manual (7 June 2001)
 (ii)
 RPZ-II - 1/2", 3/4" (H) Approved 8th Ed. of Manual (15 August 1997)
 (ii) Renewed 15 August 2000
 RPZ-IIIE - 1/2",3/4" (H) Approved 8th Ed. of Manual (7 June 2001)
 (ii)
 Hersey/Grinnell
 6CM - 2 1/2" (H) Approved 6th Ed. of Manual (12 August 1983)
 (tt),bb,qq,iii,III Renewed 12 August 2001

6CM - 3" (H) Approved 5th Ed. of Manual (1 December 1978)
(tt),bb,qq,iii,III Renewed 1 December 2002
6CM - 4" (H) Approved 5th Ed. of Manual (21 December 1978)
(tt),bb,qq,iii,III Renewed 21 December 2002
6CM - 6" (H) Approved 5th Ed. of Manual (27 December 1978)
(tt),bb,qq,iii,III Renewed 27 December 2002
6CM - 8" (H) Approved 5th Ed. of Manual (10 February 1981)
(tt),bb,qq,iii,III Renewed 10 February 2002
6CM - 10" (H) Approved 6th Ed. of Manual (19 February 1982)
(tt),bb,qq,iii,III Renewed 19 February 2003
FRP-II - 3/4", 1" (H) Approved 5th Ed. of Manual (15 December 1978)
(ii) Renewed 15 December 2002
FRP-II - 1 1/2" (H) Approved 5th Ed. of Manual (10 April 1980)
(ii) Renewed 18 March 2001
FRP-II - 2" (H) Approved 5th Ed. of Manual (5 May 1980)
(ii) Renewed 5 May 2001
FRP-II - 1 1/4" (H) Approved 6th Ed. of Manual (21 January 1981)
(ii) Renewed 21 January 2002

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Hersey/Grinnell

6CM-Bronze - 2 1/2" (H) Approved 5th Ed. of Manual (30 November 1978)
(tt),bb,qq Renewed 30 November 2002

6CM-Bronze - 3", 4" (H) Approved 6th Ed. of Manual (6 August 1980)
(tt),bb,qq Renewed 6 August 2001

6CM-Bronze - 6" (H) Approved 6th Ed. of Manual (23 December 1980)
(tt),bb,qq Renewed 23 December 2001

Neptune - See Wilkins

Richwell - see Wilkins

Watts 009 - 2 1/2" (H) Approved 8th Ed. of Manual (31 August 1990)
(oo),gg,hh,ll,mm,pp,tt,uu Renewed 31 August 2002

009 - 3" (H) Approved 8th Ed. of Manual (31 August 1990)
(oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 31 August 2002

→ 009 - 4",6" (H) Approved 8th Ed. of Manual (17 February 1995)
(oo),gg,hh,ll,mm,pp,tt,uu Renewed 17 February 2001

→ 009M1QT - 1 1/4", 1 1/2" (H) Approved 8th Ed. of Manual (30 June 1992)
(vv),xx Renewed 30 June 2001

→ 009M1QT - 2" (H) Approved 8th Ed. of Manual (19 December 1991)
(vv),xx Renewed 19 December 2000

→ 009M1PCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
(vv),xx Renewed 27 September 2000

009M2QT - 3/4" (H) Approved 8th Ed. of Manual (31 October 1992)
(vv),xx Renewed 31 October 2001

009M2QT - 1" (H) Approved 9th Ed. of Manual (18 May 1998)
(vv),xx Renewed 18 May 2001

009M2QT - 1 1/4", 1 1/2" (H) Approved 8th Ed. of Manual (24 August 1993)
(vv),xx Renewed 24 August 2002

009M2QT - 2" (H) Approved 9th Ed. of Manual (10 September 1996)
(vv),xx Renewed 10 September 2002

009M2PCQT - 3/4" (H) Approved 8th Ed. of Manual (7 October 2002)
(vv),xx

009M2PCQT - 1" (H) Approved 9th Ed. of Manual (15 January 1999)
(vv), xx Renewed 15 January 2002

009M2PCQT - 1 1/4", 1 1/2" (H) Approved 8th Ed. of Manual (12 September 1994)
 (vv),xx Renewed 12 September 2000
 009M2PCQT - 2" (H) Approved 9th Ed. of Manual (26 August 1997)
 (vv), xx Renewed 26 August 2000
 009M3QT - 3/4" (H) Approved 9th Ed. of Manual (18 October 1999)
 (vv),xx Renewed 18 October 2002
 009PCQT - 3/4" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 – 009PCQT - 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 009PCQT - 1/2" (H) Approved 8th Ed. of Manual (17 February 1995)
 (vv),xx Renewed 17 February 2001
 – 009PCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 009QT - 1/4", 3/8" (H) Approved 8th Ed. of Manual (7 August 1995)
 (vv),xx Renewed 7 August 2001
 009QT - 1/2" (H) Approved 9th Ed. of Manual (10 September 1996)
 (vv),xx Previously Approved 8th Ed. (26 May 1993)
 Renewed 10 September 2002

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Watts 009QT - 3/4" (H) Approved 7th Ed. of Manual (11 January 1988)
 (vv),xx Renewed 11 January 2003
 – 009QT - 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 (vv),xx Renewed 11 January 2003
 – 009QT - 1 1/4", 1 1/2", 2" (H) Approved 7th Ed. of Manual (9 August 1988)
 (vv),xx Renewed 9 August 2000
 – 009SSM1QT - 2" (H) Approved 8th Ed. of Manual (19 December 1991)
 (vv),xx Renewed 19 December 2000
 – 009SSM1PCQT - 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 – 009SSPCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (xx),vv Renewed 10 December 2002
 – 009SSPCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 – 009SSQT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 (vv),xx Renewed 11 January 2003
 – 009SSQT - 1 1/4", 1 1/2", 2" (H) Approved 7th Ed. of Manual (9 August 1988)
 (vv),xx Renewed 9 August 2000
 909 - 2 1/2" (H) Approved 7th Ed. of Manual (12 June 1986)
 (oo),gg,hh,ll,mm,pp,tt,uu Renewed 12 June 2001
 909 - 3" (H) Approved 7th Ed. of Manual (12 June 1986)
 (oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 12 June 2001
 909 - 4" (H) Approved 6th Ed. of Manual (15 January 1982)
 (oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 15 January 2003
 909 - 6" (H) Approved 6th Ed. of Manual (6 July 1981)
 (oo),gg,hh,ll,mm,pp,tt,uu,eee Renewed 6 July 2002
 – 909 - 8", 10" (H) Approved 6th Ed. of Manual (6 July 1981)
 Renewed 6 July 2002
 909BB - 2 1/2", 3" (H) Approved 6th Ed. of Manual (4 February 1983)
 (oo),gg,hh,ll,mm,pp,tt,uu Renewed 4 February 2001
 909HWQT - 3/4", 1" (H) Approved 5th Ed. of Manual (29 September 1979)
 (vv),xx Renewed 29 September 2000

909HWM1QT- 1 1/4", 1 1/2", 2" (H) Approved 5th Ed. of Manual (7 February 1980)
(vv),xx (Formerly 909HWQT) Renewed 7 February 2001
909M1 - 8", 10" (H) Approved 8th Ed. of Manual (1 May 1989)
(oo),gg,hh,ll,mm,pp,tt,uu Renewed 1 May 2001
909M1QT- 1 1/4", 1 1/2", 2" (H) Approved 6th Ed. of Manual (15 January 1982)
(vv),xx (Formerly 909QT) Renewed 15 January 2003
909M1QTFDA - 8",10" (H) Approved 8th Ed. of Manual (15 October 1990)
(ww) Renewed 15 October 2002
909PCHWM1QT - 1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (2 February 1995)
(vv),xx Renewed 2 February 2001
909PCHWQT - 3/4",1" (H) Approved 8th Ed. of Manual (2 February 1995)
(vv),xx Renewed 2 February 2001
909PCM1QT - 1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (2 February 1995)
(vv),xx Renewed 2 February 2001
909PCQT - 3/4",1" (H) Approved 9th Ed. of Manual (9 October 1998)
(vv),xx Previously Approved 8th Ed (2 February 1995)
(Ninth Ed. Approval for Serial numbers 464100
and higher) Renewed 9 October 2001
909PCQT - 3/4",1" (VU) Approved 9th Ed. of Manual (9 October 1998)
(vv),xx (Serial Numbers 464100 and higher)
Renewed 9 October 2001

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Watts 909QT- 3/4", 1" (H) Approved 9th Ed. of Manual (18 June 1998)

(vv), xx Renewed 18 June 2001

Previously Approved 6th Ed. (15 January 1982)

(Ninth Ed. Approval for Serial Numbers 461650

and higher) Renewed 18 June 2001

909QT- 3/4", 1" (VU) Approved 9th Ed. of Manual (18 June 1998)

(vv), xx Renewed 18 June 2001

(Serial Numbers 461650 and higher)

909QTFDA - 2 1/2",3",4",6" (H) Approved 8th Ed. of Manual (15 October 1990)

(ww) Renewed 15 October 2002

957 - 2 1/2", 3", 4" (H) Approved 9th Ed. of Manual (7 October 2002)

(ppp),qqq

957N - 2 1/2",3",4" (VUVD) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

957Z - 2 1/2",3",4" (VUVU) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

967 - 2 1/2", 3" (H) Approved 9th Ed. of Manual (7 October 2002)

(ppp),qqq

967N - 2 1/2",3" (VUVD) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

967Z - 2 1/2",3" (VUVU) Approved 9th Ed. of Manual (14 April 2003)

(ppp),qqq,yyy

— 990 - 4" (H) Approved 8th Ed. of Manual (1 November 1992)

(oo),gg,hh,pp,tt,uu Renewed 1 November 2001

— 990 - 8" (H) Approved 8th Ed. of Manual (13 January 1993)

(oo),gg,hh,pp,tt,uu Renewed 13 January 2002

— 990QT-FDA - 4" (H) Approved 8th Ed. of Manual (13 January 1993)

(ww) Renewed 13 January 2002

— 990QT-FDA - 8" (H) Approved 8th Ed. of Manual (13 January 1993)

(ww) Renewed 13 January 2002

– 992 - 4" (H) Approved 8th Ed. of Manual (1 November 1992)
 (oo) Renewed 1 November 2001
 – 992 - 10" (H) Approved 8th Ed. of Manual (13 January 1993)
 (oo) Renewed 13 January 2002
 994 - 2 1/2", 3", 4" (H) Approved 8th Ed. of Manual (15 April 1994)
 (tt),ee,ff,gg,hh,ll,mm,oo,pp,uu,ccc,ddd Renewed 15 April 2003
 994 - 6" (H) Approved 8th Ed. of Manual (22 September 1997)
 (tt),ee,ff,gg,hh,ll,mm,oo,pp,uu,ccc,ddd Renewed 22 September 2000
 995QT - 1/2" (H) Approved 9th Ed. of Manual (13 April 2000)
 (int) Renewed 13 April 2003
 995QT - 3/4" (H) Approved 9th Ed. of Manual (13 April 2000)
 (int) Renewed 13 April 2003
 995QT - 1" (H) Approved 9th Ed. of Manual (14 January 1999)
 (int) Renewed 14 January 2002
 995QT - 1 1/4" (H) Approved 9th Ed. of Manual (28 March 2002)
 (int)
 995QT - 1 1/2" (H) Approved 9th Ed. of Manual (28 March 2002)
 (int)
 FAE909QT - 1 1/4", 1 1/2", 2" (H) Approved 6th Ed. of Manual (15 January 1982)
 (vv),xx Renewed 15 January 2003
 FAE909HWQT 1 1/4", 1 1/2", 2" (H) Approved 5th Ed. of Manual (7 February 1980)
 (vv),xx Renewed 7 February 2001

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Watts SS009M3QT - 1/4" (H) Approved 9th Ed. of Manual (19 December 2001)

(hhh)

SS009M3QT - 3/8" (H) Approved 9th Ed. of Manual (19 December 2001)

(hhh)

SS009M3QT - 1/2" (H) Approved 9th Ed. of Manual (19 December 2001)

(hhh)

SS009M3QT - 3/4" (H) Approved 9th Ed. of Manual (31 July 2001)

(hhh)

SS009QT - 1" (H) Approved 9th Ed. of Manual (18 May 1998)

(hhh) Renewed 18 May 2001

U009APCQT - 3/4" Approved 8th Ed. of Manual (10 December 1993)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 10 December 2002

– U009APCQT - 1" Approved 8th Ed. of Manual (10 December 1993)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 10 December 2002

U009AQT - 3/4" Approved 8th Ed. of Manual (12 June 1992)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 12 June 2001

– U009AQT - 1" Approved 8th Ed. of Manual (12 June 1992)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 12 June 2001

– U009M1APCQT - 1 1/2", 2" Approved 8th Ed. of Manual (27 September 1994)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 27 September 2000

– U009M1AQT - 1 1/2" (H) Approved 8th Ed. of Manual (16 December 1992)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 16 December 2001

– U009M1AQT - 2" (H) Approved 8th Ed. of Manual (9 November 1992)

(vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 9 November 2001

U009M1PCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)

(vv),xx Renewed 27 September 2000

U009M1QT - 1 1/4" (H) Approved 8th Ed. of Manual (30 June 1992)

(vv),xx Renewed 30 June 2001

– U009M1QT - 1 1/2", 2" (H) Approved 8th Ed. of Manual (30 June 1992)

(vv),xx Renewed 30 June 2001
 U009M2APCQT - 1" (H) Approved 9th Ed. of Manual (15 January 1999)
 (vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 15 January 2002
 U009M2APCQT - 1 1/2" (H) Approved 8th Ed. of Manual (12 September 1994)
 (vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 12 September 2000
 U009M2APCQT - 2" (H) Approved 9th Ed. of Manual (26 August 1997)
 (vv), xx (VUVD,VDVU,VUVU,VDVD) Renewed 26 August 2000
 U009M2AQT - 1" (H) Approved 9th Ed. of Manual (15 January 1999)
 (vv),xx (VUVD,VDVU,VUVU,VDVD) Renewed 15 January 2002
 U009M2AQT - 1 1/2" (H) Approved 8th Ed. of Manual (24 August 1993)
 (vv), xx (VUVD,VDVU,VUVU,VDVD) Renewed 24 August 2002
 U009M2AQT - 2" (H) Approved 9th Ed. of Manual (26 August 1997)
 (vv), xx (VUVD,VDVU,VUVU,VDVD) Renewed 26 August 2000
 U009M2PCQT - 1" (H) Approved 9th Ed. of Manual (15 January 1999)
 (vv),xx Renewed 15 January 2002
 U009M2PCQT - 1 1/2" (H) Approved 8th Ed. of Manual (12 September 1994)
 (vv),xx Renewed 27 September 2000
 U009M2PCQT - 2" (H) Approved 9th Ed. of Manual (26 August 1997)
 (vv), xx Renewed 26 August 2000
 U009M2QT - 3/4" (H) Approved 8th Ed. of Manual (16 November 1992)
 (vv),xx Renewed 16 November 2001
 U009M2QT - 1" (H) Approved 9th Ed. of Manual (15 January 1999)
 (vv),xx Renewed 15 January 2002
 U009M2QT - 1 1/2" (H) Approved 8th Ed. of Manual (24 August 1993)
 (vv),xx Renewed 24 August 2002

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Watts U009M2QT - 2" (H) Approved 9th Ed. of Manual (26 August 1997)
 (vv), xx Renewed 26 August 2000
 U009PCQT - 1/2" (H) Approved 8th Ed. of Manual (2 February 1995)
 (vv),xx Renewed 2 February 2001
 U009PCQT - 3/4" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 — U009PCQT - 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 — U009PCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 U009QT - 1/2" (H) Approved 8th Ed. of Manual (2 February 1995)
 (vv),xx Renewed 2 February 2001
 — U009QT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 (vv),xx Renewed 11 January 2003
 — U009QT - 1 1/4", 1 1/2", 2" (H) Approved 7th Ed. of Manual (9 August 1988)
 (vv),xx Renewed 9 August 2000
 — U009SSPCQT - 3/4", 1" (H) Approved 8th Ed. of Manual (10 December 1993)
 (vv),xx Renewed 10 December 2002
 — U009SSPCQT - 1 1/4", 1 1/2", 2" (H) Approved 8th Ed. of Manual (27 September 1994)
 (vv),xx Renewed 27 September 2000
 — U009SSQT - 3/4", 1" (H) Approved 7th Ed. of Manual (11 January 1988)
 (vv),xx Renewed 11 January 2003
 — U009SSQT - 1 1/4", 1 1/2", 2" (H) Approved 7th Ed. of Manual (9 August 1988)
 (vv),xx Renewed 9 August 2000
 U909QT - 3/4", 1" (H) Approved 9th Ed. of Manual (9 October 1998)
 (vv),xx Previously Approved under 6th Ed. (15 Jan. 1982)

Ninth Ed. Approval for Serial Numbers 464100
and higher) Renewed 9 October 2001
U909QT - 3/4", 1" (VU) Approved 9th Ed. of Manual (9 October 1998)
(vv),xx (Serial Numbers 464100 and higher)
Renewed 9 October 2001
U909HWQT - 3/4", 1" (H) Approved 5th Ed. of Manual (29 September 1979)
(vv),xx Renewed 29 September 2000
Wilkins 375 - 2 1/2", 3" (H) Approved 9th Ed. of Manual (28 September 2001)
(gg),ee,tt,yy,hh,ff,uu,zz
375 - 4" (H) Approved 9th Ed. of Manual (27 March 2000)
(gg),ee,tt,yy,hh,ff,uu,zz Renewed 27 March 2003
375G - 2 1/2", 3" (H) Approved 9th Ed. of Manual (3 April 2002)
(ppp),qqq
375G - 4" (H) Approved 9th Ed. of Manual (10 April 2000)
(ppp),qqq Renewed 10 April 2003
375 - 6" (H) Approved 9th Ed. of Manual (27 July 2000)
(gg),ee,tt,yy,hh,ff,uu,zz
375 - 8" (H) Approved 9th Ed. of Manual (11 November 2002)
(gg),ee,tt,yy,hh,ff,uu,zz
375G - 6" (H) Approved 9th Ed. of Manual (27 July 2000)
(ppp),qqq
375GPI - 4",6" (H) Approved 9th Ed. of Manual (31 July 2001)
(qqq)- #1 SOV, (www)- #2 SOV
375PI - 4", 6" (H) Approved 9th Ed. of Manual (31 July 2001)
(hh)- #1 SOV, (vvv)- #2 SOV

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Wilkins 475 - 2 1/2" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
(gg), hh,ee,tt,yy,ff,uu,zz
475 - 3" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
(gg), hh,ee,tt,yy,ff,uu,zz
475 - 4",6" (VUVD) Approved 9th Ed. of Manual (27 July 2000)
(ppp),qqq
475G - 2 1/2" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
(ppp), qqg
475G - 3" (VUVD) Approved 9th Ed. of Manual (24 January 2002)
(ppp), qqg
475G - 4",6" (VUVD) Approved 9th Ed. of Manual (25 August 2000)
(sss),ttt
475V - 2 1/2" (VUVU) Approved 9th Ed. of Manual (24 January 2002)
(gg),hh,ee,tt,yy,ff,uu,zz
475V - 3" (VUVU) Approved 9th Ed. of Manual (24 January 2002)
(gg),hh,ee,tt,yy,ff,uu,zz
475V - 4" (VUVU) Approved 9th Ed. of Manual (9 September 2000)
(ppp),qqq
475V - 6" (VUVU) Approved 9th Ed. of Manual (31 May 2001)
(ppp),qqq
475VG - 2 1/2" (VUVU) Approved 9th Ed. of Manual (24 January 2002)
(ppp), qqg
475VG - 3" (VUVU) Approved 9th Ed. of Manual (24 January 2002)
(ppp), qqg
475VG - 4"(VUVU) Approved 9th Ed. of Manual (13 December 2000)
(sss),ttt

475VG - 6" (VUVU) Approved 9th Ed. of Manual (6 August 2001)
 (ppp),sss,ttt
 – 575 - 3/4", 1" (H) Approved 5th Ed. of Manual (28 April 1976)
 Renewed 30 April 2003
 – 575A - 3/4", 1" (H) Approved 7th Ed. of Manual (17 April 1987)
 (ii) Renewed 17 April 2002
 – 575 - 1 1/4", 1 1/2", 2" (MOD-III) (H) Approved 5th Ed. of Manual (11 October 1976)
 (ii) Renewed 5 October 2000
 – 575 - 2 1/2" (H) Approved 7th Ed. of Manual (25 September 1986)
 (gg),ee,tt,yy Renewed 25 September 2001
 – 575 - 3" (H) Approved 5th Ed. of Manual (20 August 1979)
 (gg),ee,tt,yy Renewed 20 August 2000
 – 575 - 4" (H) Approved 5th Ed. of Manual (8 June 1980)
 (gg),ee,tt,yy Renewed 8 June 2001
 – 575 - 6" (H) Approved 6th Ed. of Manual (6 July 1981)
 (gg),ee,tt,yy Renewed 6 July 2002
 – 575 -M8" (4"x4"x8" Manifold) (H) Approved 6th Ed.of Manual (11 April 1983)
 (formerly MBC - 8") Renewed 11 April 2001
 (gg),ee,tt,yy
 – 575 - M10" (6"x6"x10" Manifold) (H) Approved 6th Ed. of Manual (1 June 1983)
 (formerly MBC -10") Renewed 1 June 2001
 (gg),ee,tt,yy
 975 - 3/4",1",1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (18 July 1991)
 (ii) Renewed 18 July 2000
 975 - 2 1/2" (H) Approved 8th Ed. of Manual (26 November 1991)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 26 November 2000

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Wilkins 975 - 3",4",6" (H) Approved 8th Ed. of Manual (8 November 1991)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 8 November 2000
 975 - 8",10" (H) Approved 8th Ed. of Manual (6 February 1995)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 6 February 2001
 975A - 3/4",1",1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (18 July 1991)
 (ii) Renewed 18 July 2000
 975 BMS - 2 1/2", 3", 4", 6", 8", 10" (H)Approved 8th Ed. of Manual (17 June 1997)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 17 June 2000
 975G - 4",6" (H) Approved 8th Ed. of Manual (27 March 2000)
 (ppp) Renewed 27 March 2003
 975MS - 2 1/2",3",4"6" (H) Approved 8th Ed. of Manual (5 May 1995)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 5 May 2001
 975MS - 8",10" (H) Approved 8th Ed. of Manual (5 December 1996)
 (gg),ee,tt,yy,hh,ff,uu,zz Renewed 5 December 2002
 975XL - 1/4", 3/8", 1/2" (H) Approved 8th Ed. of Manual (12 July 1994)
 (ii) Renewed 12 July 2000
 975XL - 3/4",1",1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (2 November 1992)
 (ii) Renewed 2 November 2001
 975XLBMS - 3/4", 1", 1 1/4", 1 1/2", 2"Approved 8th Ed. of Manual (9 May 1997)
 (ii) (H) Renewed 9 May 2003
 975XLD - 3/4" (H) Approved 9th Ed. of Manual (8 October 2002)
 (ii)
 975XLMS - 3/4",1",1 1/4",1 1/2",2" (H) Approved 8th Ed. of Manual (30 August 1994)
 (ii) Renewed 30 August 2000
 975XLSE - 3/4", 1" (VUVD,VUVU) Approved 9th Ed. of Manual (16 October 2000)

(ii)
975XLSE - 1 1/4", 1 1/2", 2" Approved 9th Ed. of Manual (4 November 1999)
(ii) (VUVD, VUVU) Renewed 4 November 2002
975XLST - 3/8", 1/2" (H) Approved 9th Ed. of Manual (19 November 2002)
(ii)
975XLSEU - 3/4", 1" (VUVD, VUVU) Approved 9th Ed. of Manual (16 October 2000)
(ggg)
975XLSEU - 1 1/4", 1 1/2", 2" Approved 9th Ed. of Manual (27 March 2000)
(ggg) (VUVD, VUVU) Renewed 27 March 2003
975XLU - 3/4", 1", 1 1/2", 2" (H) Approved 8th Ed. of Manual (2 September 1993)
(ggg) Renewed 2 September 2002
975XLV - 3/4", 1" (VUVD, VUVU) Approved 9th Ed. of Manual (7 January 2001)
(ii)

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Atmospheric Vacuum Breakers

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Arrowhead 58 - 1/2" Approved 6th Ed. of Manual (18 March 1983)

Brass Renewed 18 March 2001

Ames A100 - 3/4", 1" (VUH) Approved 8th Ed. of Manual (1 November 1991)

Renewed 1 November 2000

A100 - 1 1/2" (VUH) Approved 8th Ed. of Manual (27 September 1991)

Renewed 27 September 2000

A100 - 2" (VUH) Approved 8th Ed. of Manual (21 August 1991)

Renewed 21 August 2000

Champion 162 3/4", 1", 1 1/4", 1 1/2", 2" (H) Approved 7th Ed. of Manual (13 January 1986)

Brass Renewed 13 January 2001

262 (angle) - 3/4", 1", 1 1/4", 1 1/2", 2" Approved 7th Ed. of Manual (13 January 1986)

(VUH) Renewed 13 January 2001

— 362 3/4". 1" (VUH) Approved 7th Ed. of Manual (13 January 1986)

Renewed 13 January 2001

466P 3/4", 1" (VUVD) Approved 7th Ed. of Manual (13 January 1986)

Renewed 13 January 2001

Rain Bird APAS - 075 - 3/4" (VUVD) Approved 6th Ed. of Manual (22 April 1982)

Renewed 22 April 2003

DAS - 075 - 3/4" (VUVD) Approved 6th Ed. of Manual (22 April 1982)

Renewed 22 April 2003

Strahman HS - Vertical - 3/4" (VD) Approved 6th Ed. of Manual (5 June 1981)

Renewed 5 June 2002

HS - Horizontal - 3/4" (H) Approved 6th Ed. of Manual (15 September 1981)

Renewed 5 September 2002

Watts 288A-M3 - 1 1/4" (VUH) Approved 8th Ed. of Manual (12 August 1991)

Renewed 12 August 2000

288A-M3 - 1 1/2" (VUH) Approved 8th Ed. of Manual (27 September 1991)

Renewed 27 September 2000

288A-M3 - 2" (VUH) Approved 8th Ed. of Manual (21 August 1991)

Renewed 21 August 2000

288A-M3 - 2 1/2" (VUH) Approved 8th Ed. of Manual (10 September 1991)

Renewed 10 September 2000

288A-M3 - 3" (VUH) Approved 8th Ed. of Manual (16 September 1991)

Renewed 16 September 2000

288A-M5 - 3/4", 1" (VUH) Approved 8th Ed. of Manual (1 November 1991)

Renewed 1 November 2000

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Ames A200 - 3/4" (VUH) Approved 8th Ed. of Manual (6 April 1993)

(vv),xx Renewed 6 April 2002

A200 - 1" (VUH) Approved 8th Ed. of Manual (25 May 1993)

(vv),xx Renewed 25 May 2002

A200 - 1 1/2", 2" (VUH) Approved 8th Ed. of Manual (21 June 1993)

(vv),xx Renewed 21 June 2002

Buckner → 24199 - 1/2" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24200 - 3/4" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24201 - 1" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24202 - 1 1/4" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

→ 24203 - 1 1/2" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

→ 24204 - 2" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

→ 24199/25 - 1/2" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24200/25 - 3/4" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24201/25 - 1" (VUH) Approved 8th Ed. of Manual (10 December 1991)

(ii) Renewed 10 December 2000

→ 24202/25 - 1 1/4" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

→ 24203/25 - 1 1/2" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

→ 24204/25 - 2" (VUH) Approved 8th Ed. of Manual (9 September 1992)

(ii) Renewed 9 September 2001

Conbraco 40-503-02 - 1/2" (VUH) Approved 8th Ed. of Manual (6 September 1991)

(dd) Renewed 6 September 2000

40-504-02 - 3/4" (VUH) Approved 8th Ed. of Manual (6 September 1991)

(dd) Renewed 6 September 2000

40-505-02 - 1" (VUH) Approved 8th Ed. of Manual (6 September 1991)

(dd) Renewed 6 September 2000

40-506-02 - 1 1/4" (VUH) Approved 8th Ed. of Manual (1 December 1993)

(dd) Renewed 1 December 2002

40-507-02 - 1 1/2" (VUH) Approved 8th Ed. of Manual (1 December 1993)

(dd) Renewed 1 December 2002

40-508-02 - 2" (VUH) Approved 8th Ed. of Manual (1 December 1993)

(dd) Renewed 1 December 2002

PVB -1/2", 3/4", 1" (VUH) Approved 9th Ed. of Manual (23 September 1999)

(dd)

PVB - 1 1/4", 1 1/2" (VUH) Approved 9th Ed. of Manual (7 October 2002)

(dd)

Febco 745 - 3/4", 1" (VUH) Approved 6th Ed. of Manual (10 May 1983)

(ii),fff,jjj,ooo Renewed 10 May 2001

765 - 1/2" (VUH) Approved 5th Ed. of Manual (26 March 1974)

(ii),fff,ooo,xxx Renewed 1 July 2001

Pressure Vacuum Breakers

COMPANY MODEL-SIZE STATUS OF APPROVAL

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Pressure Vacuum Breakers

COMPANY MODEL-SIZE STATUS OF APPROVAL

Febco 765 - 3/4", 1" (VUH) Approved 5th Ed. of Manual (26 March 1974)

(ii),fff,jjj,ooo,xxx Renewed 1 July 2001

765 - 1 1/4" (VUH) Approved 5th Ed. of Manual (26 March 1974)

(ii),fff,jjj,ooo Renewed 1 July 2001

765 - 1 1/2" (VUH) Approved 5th Ed. of Manual (26 March 1974)

(ii),fff,jjj,ooo,xxx Renewed 1 July 2001

765 - 2" (VUH) Approved 5th Ed. of Manual (26 March 1974)

(ii),fff,ooo,xxx Renewed 1 July 2001

766 - 1" (VUH) Approved 9th Ed. of Manual (31 August 1999)

(fff),ii,jjj,ooo Renewed 31 August 2002

Flomatic PVB - 3/4", 1" (VUH) Approved 9th Ed. of Manual (21 November 1997)

(ii) Renewed 21 November 2000

Neptune, SMR - See Wilkins

Watts → 800 QT- 3/4", 1" (VUH) Approved 5th Ed. of Manual (14 February 1978)

(vv),xx Renewed 14 February 2002

→ 800 QT- 1 1/4", 1 1/2", 2" (VUH) Approved 5th Ed. of Manual (14 August 1978)

(vv),xx Renewed 14 August 2002

800M QT - 1/2", 3/4" (VUH) Approved 8th Ed. of Manual (18 July 1989)

(vv),xx Renewed 18 July 2001

800CM QT - 1/2", 3/4" (VUH) Approved 8th Ed. of Manual (18 July 1989)

(vv),xx Renewed 18 July 2001

→ 800M2QT - 1/2", 3/4", 1" (VUH) Approved 8th Ed. of Manual (9 July 1991)

(vv),xx Renewed 9 July 2000

→ 800M2QT - 1 1/4", 1 1/2", 2" (VUH) Approved 8th Ed. of Manual (25 March 1993)

(vv),xx Renewed 25 March 2002

→ 800 M3QT - 1/2", 3/4" (VUH) Approved 8th Ed. of Manual (24 February 1992)

(vv),xx Renewed 24 February 2001

800 M4FR - 1/2", 3/4" (VUH) Approved 9th Ed. of Manual (12 May 1998)

(vv),xx Renewed 12 May 2001

800 M4FR - 1" (VUH) Approved 9th Ed. of Manual (1 September 1995)

(vv),xx Renewed 1 September 2001

800 M4FR - 1 1/4", 1 1/2", 2" (VUH) Approved 9th Ed. of Manual (13 May 1997)

(vv),xx Renewed 13 May 2003

800M4QT - 1/2" (VUH) Approved 8th Ed. of Manual (6 September 1993)

(vv),xx Renewed 6 September 2002

800M4QT - 3/4" (VUH) Approved 8th Ed. of Manual (6 April 1993)

(vv),xx Renewed 6 April 2002

800M4QT - 1" (VUH) Approved 8th Ed. of Manual (25 May 1993)

(vv),xx Renewed 25 May 2002

800M4QT - 1 1/4" (VUH) Approved 8th Ed. of Manual (24 May 1994)

(vv),xx Renewed 24 May 2003

800M4QT - 1 1/2", 2" (VUH) Approved 8th Ed. of Manual (21 June 1993)

(vv),xx Renewed 21 June 2002

Wilkins 420 - 1/2", 3/4" (VUH) Approved 9th Ed. of Manual (17 July 1999)

(ii) Renewed 17 July 2002

420 - 1" (VUH) Approved 9th Ed. of Manual (29 September 2000)

(ii)

720A - 1/2", 3/4", 1" (VUH) Approved 5th Ed. of Manual (28 August 1978)

(ii) Renewed 28 August 2002

720A - 1 1/4", 1 1/2", 2" (VUH) Approved 5th Ed. of Manual (28 August 1978)

(ii) Renewed 28 August 2002

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Fifty-two (52) Pages

Paul H. Schwartz, P.E., Chief Engineer

NOTE: All assemblies are listed in alphabetical order;
there is no implication of preference of assemblies.

Spill Resistant Pressure Vacuum Breakers

COMPANY MODEL-SIZE STATUS OF APPROVAL

Conbraco SVB - 1/4", 3/8", 1/2" (H) Approved 9th Ed. of Manual (30 November 2000)
(int)

Watts 008PCQT - 3/8" (VUH) Approved 9th Ed. of Manual (18 November 1998)

(vv),xx Renewed 18 November 2001

008PCQT - 1/2" (VUH) Approved 9th Ed. of Manual (18 November 1998)

(vv),xx Renewed 18 November 2001

008PCQT - 3/4" (VUH) Approved 9th Ed. of Manual (19 June 2000)

(vv),xx

008PCQT - 1" (VUH) Approved 9th Ed. of Manual (19 June 2000)

(vv),xx

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Hersey/Grinnell

<http://www.grinnell.com/>

Grinnell Corporation

Research and Development Center

1467 Elmwood Ave.

Cranston, RI 02910

(401) 781-8220

Rain Bird

<http://www.rainbird.com>

19233 E. Foothill Blvd.

Glendora, CA 91340

(626) 963-9311

Strahman Valves, Inc.

<http://www.strahmanvalves.com/>

3 Vreeland Road

Florham Park, NJ 07932

(973) 377-4900

Watts Regulator Company

<http://www.wattsreg.com/>

815 Chestnut Street

North Andover, MA 01845

(978) 688-1811

Wilkins Regulator Company

<http://www.zurn.com/wilkins/wilkins.htm>

1747 Commerce Way

Paso Robles, CA 93446

(800) 817-8177

Ames Company

<http://www.ames-co.com/>

1485 Tanforan Ave.

Woodland, CA 95695

(530) 666-2493

Arrowhead Brass

<http://www.arrowheadbrass.com/>

5147 Alhambra Ave.
Los Angeles, CA 90032
(323) 343-9790

Buckner, Inc.

<http://www.bucknerirrigation.com>

4381 N. Brawley Ave.
Fresno, CA 93722
(559) 275-0500

Champion Brass Manufacturing Co.

<http://www.championirrigation.com/>

1460 N. Nuad Street
Los Angeles, CA 90012
(213) 221-2108

Cla-Val Company

<http://www.cla-val.com/>

P. O. Box 1325
Newport Beach, CA 92659-0325
(949) 722-4800

Conbraco Industries

<http://www.conbraco.com/>

P. O. Box 247
Matthews, NC 28105
(704) 847-9191

Febco - SPX Valves & Controls

<http://www.cmb-ind.com/>

P. O. Box 8070
Fresno, CA 93747
(559) 252-0791

Flomatic

<http://www.flomatic.com/>

15 Pruyn's Island Dr.
Glen Falls, NY 12801-4424
(800) 833-2040

Manufacturers of Approved Assemblies

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Special Notices

From time to time the Foundation issues Special Notices when specific information needs to be brought before the Members of the Foundation. A copy of the notices are sent to Foundation Members as they are published. Notices may also be found on the Internet at the World Wide Web address of <http://www.usc.edu/fccchr/notice.html>

Notices are summarized as follows.

Notice 96-001

This notice lists Ames assemblies which have been reported with low check valve readings. Corrections to the problem are discussed.

Notice 97-001

This Notice discusses changes in the Wilkins 975 8" and 10" reduced pressure principle assemblies. A change in the retaining cup in the relief valve stem.

Notice 97-002

Ames 2000SS, 3000SS, and 4000SS series assemblies were discovered to have unapproved components.

Notice 97-003

This notice lists assemblies which were NOT Approved by the Foundation, although advertisements may have implied otherwise.

Notice 98-001

This notice advises members of certain action in the Federal Register regarding cross-connection control programs.

Notice 98-002

This notice advises members of Wilkins 950 series and 975 series modifications.

Notice 99-001

This notice lists assemblies which were NOT Approved by the Foundation, although advertisements may have implied otherwise.

Notice 99-002

This notice lists assemblies which were NOT Approved by the Foundation, although advertisements may have implied otherwise.

Notice 99-003

This notice lists assemblies which were NOT Approved by the Foundation, although advertisements may have implied otherwise.

Notice 01-001

Discuss silicon parts in certain Febco relief valves

Notice 01-002/Revised Notice 01-002-R1

This notice discusses some check valves not approved in certain Ames and Watts assemblies

Notice 01-003

This notice lists assemblies which were NOT Approved by the Foundation, although advertisements may have implied otherwise.

Notice 02-001

This notice explains there are some specific Febco assemblies with unapproved check valve retainers.

Notice 03-001

This notice explains there are some improper markings of model designations on some Wilkins assemblies

Notice 03-002

This notice explains there is the possibility of the interference of the check valves on some Ames and Watts assemblies.

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*Foundation for Cross-Connection Control
and Hydraulic Research*

University of Southern California

Kaprielian Hall 200

Los Angeles, California 90089-2531

(213) 740-2032

FAX: (213) 740-8399

E-Mail: fccchr@usc.edu

World Wide Web Homepage:

<http://www.usc.edu/fccchr/>

Recommended Protection At Fixtures and Equipment

Description of fixture, equipment or use of water	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premises or Internal Isolation*
• Air Compressor	low	DCVA	
• Air conditioning systems	high	RPBA	
• Air washers	high	RPBA	
• Aquarium make-up water	high	AG/RPBA	
• Aspirators, medical/lab	high	AVB	RPBA
• Aspirators, medical/lab	high	RPBA	
• Aspirator, weedicide, herbicide, and pesticide	high	RPBA	
• Aspirator, vault drain	high	RPBA	
• Autoclave	high	RPBA	
• Autopsy tables	high	RPBA	
• Baptismal fountain	high/low	RPBA/AG/AVB	
• Bathtub, below rim filler	high	RPBA	
• Bedpan washer	high	RPBA	
• Post-mix beverage dispenser using CO ₂	high	RPBA	
• Bidets	low	AVB	
• Boiler feed lines	high	RPBA	
• Bottle washing equipment	high	RPBA	
• Bottle washing equipment	high	PVBA/AVB	RPBA
• Box hydrant (irrigation)	high	PVBA/DCVA	
• Brine tank	low	AG/DCVA	
• Can washing equipment	high	RPBA	
• Can washing equipment	high	PVBA/AVB	RPBA
• Chemical feed tank or industrial process	high	AG/RPBA	RPBA
• Chemical feeder for commercial cleaners	high	AG/PVBA	
• Chemical feeder for commercial cleaners	high	AVB/PVBA	RPBA/DCVA
• Chlorinators	high	RPBA	
• Commercial coffee urns	low	AG/AVB	
• Computer cooling lines	high	RPBA	
• Condensate tanks	high	RPBA	
• Commercial cooking kettles	low	AG/AVB	

(*) Where a high health hazard is assessed, the use of an atmospheric vacuum breaker or other backflow device for protection at a fixture should only be allowed when area or premise isolation is provided by an approved assembly.

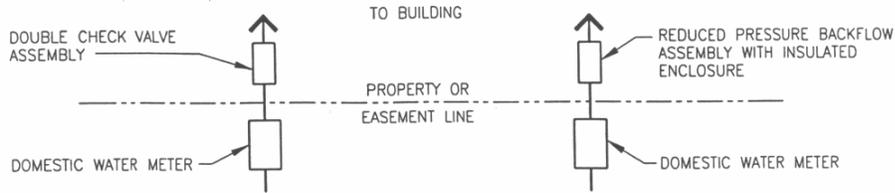
Recommended Protection At Fixtures and Equipment

Description of fixture, equipment or use of water	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premises or Internal Isolation*
• Cooling towers	high	AG/RPBA	
• Decorative ponds	high	AG/RPBA	
• Degreasing equipment	high	RPBA	
• Dental equipment/cuspidors	high	RPBA	RPBA
• Dialysis equipment	high	RPBA	
• Dishwashers	low	AVB	
• Drinking fountains	low	AG	
• Dye vats and tanks	high	AG/RPBA	
• Etching tanks	high	AG/RPBA	RPBA
• Fermenting tanks	high	AG/RPBA	RPBA
• Fertilizer injection	high	RPBA	
• Film processors	high	RPBA	
• Fire department connection	low	DCVA	
• Fire sprinkler system w/o chemical addition	low	DCVA/DCDA	
• Fire sprinkler system with chemical addition	high	RPBA/RPDA	
• Floor drains	high	AG	
• Flushing floor drains	high	AVB	DCVA
• Fume hoods (lab)	high	AVB	RPBA
• Garbage can washers	high	RPBA	
• Heat exchangers other than double wall with leak path	high	RPBA	
• Heat pumps	high	RPBA	
• High pressure washers w/o chemical injection	low	DCVA	
• Hose bibbs (residential)	low	AVB/HBVB	
• Hose bibbs (industrial)	varies	AVB/HBVB	RPBA/DCVA
• Hoses, kitchen rinse	low	AVB	
• Hot tubs	high	AG/RPBA	
• Commercial hot water heating boilers	high	RPBA	
• Hydrotherapy baths	high	RPBA	
• Ice makers	high	AG/RPBA	
• Industrial fluid systems	high	RPBA	

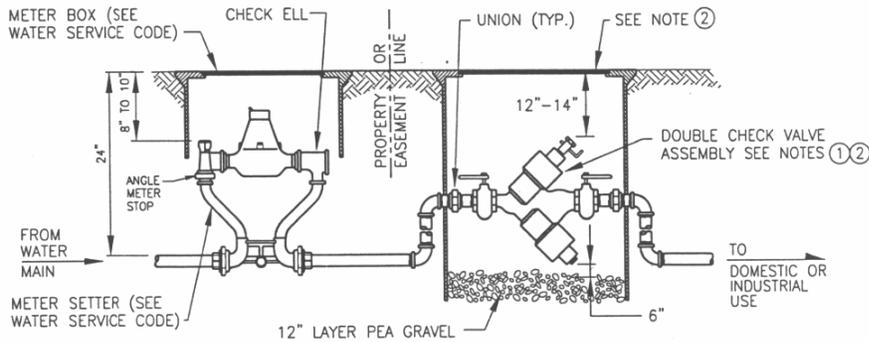
Recommended Protection At Fixtures and Equipment

Description of fixture, equipment or use of water	Assessed Health Hazard	Minimum Protection at Fixture	Additional Premises or Internal Isolation*
• Intertied (looped) service	low	DCVA	
• Irrigation system (lawn) with chemical addition	high	RPBA	
• Irrigation system (lawn) w/o chemical addition	low	PVBA/DCVA	
• Janitor sinks	low	AVB/HBVB	
• Kitchen equipment	low	AVB	
• Laboratory equipment	high	AVB/LFVB	RPBA
• Laundry machines, commercial	high	RPBA	
• Livestock drinking tanks	high	AG/AVB	DCVA
• Make-up tanks	high	AG/RPBA	
• Mobile carpet cleaners	high	RPBA	
• Pesticide applicator trucks	high	AG/RPBA	
• Photo developing sinks/tanks	high	RPBA	
• Private fire hydrants	low	DCVA	
• Pump prime lines	high	RPBA	
• Radiator flushing equipment	high	RPBA	
• Recreational vehicle dump station	severe	AG	RPBA
• Sewer connected equipment	severe	AG	
• Sewer flushing	severe	AG	
• Spas	high	AG/RPBA	
• Steam generating equipment	high	RPBA	
• Sterilizes	high	RPBA	
• Stills	high	RPBA	
• Sumps	high	AG	
• Swimming pools	high	AG/RPBA	
• Trap primers	high	AG	
• Used or gray water systems	high	RPBA	
• X-ray equipment	high	RPBA	

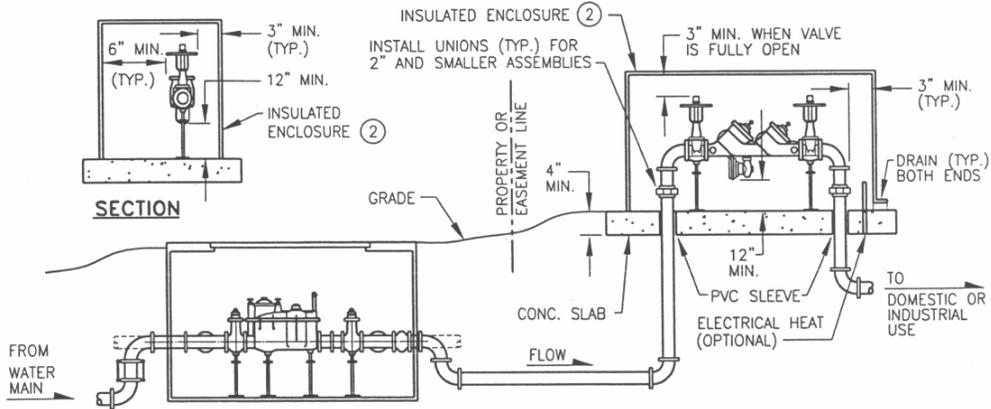
The information in this table may differ from the backflow prevention requirements for individual plumbing fixtures found in plumbing codes. For public health protection within a customer's premise, the plumbing code having jurisdiction governs. This table is provided to illustrate only some of the health hazards found in plumbing systems. This table should be used by water purveyors in assessing the degree of hazard a customer's plumbing system places upon the purveyor's water distribution system. Deficiencies in backflow prevention within the customer's premise, should be compensated for through the selection of an appropriate assembly for premise isolation.



PLAN VIEW - TYPICAL INSTALLATION



**PROFILE VIEW - WATER SERVICE AND DOUBLE CHECK VALVE ASSEMBLY (LOW HAZARD)
(SMALLER SERVICE SHOWN)**

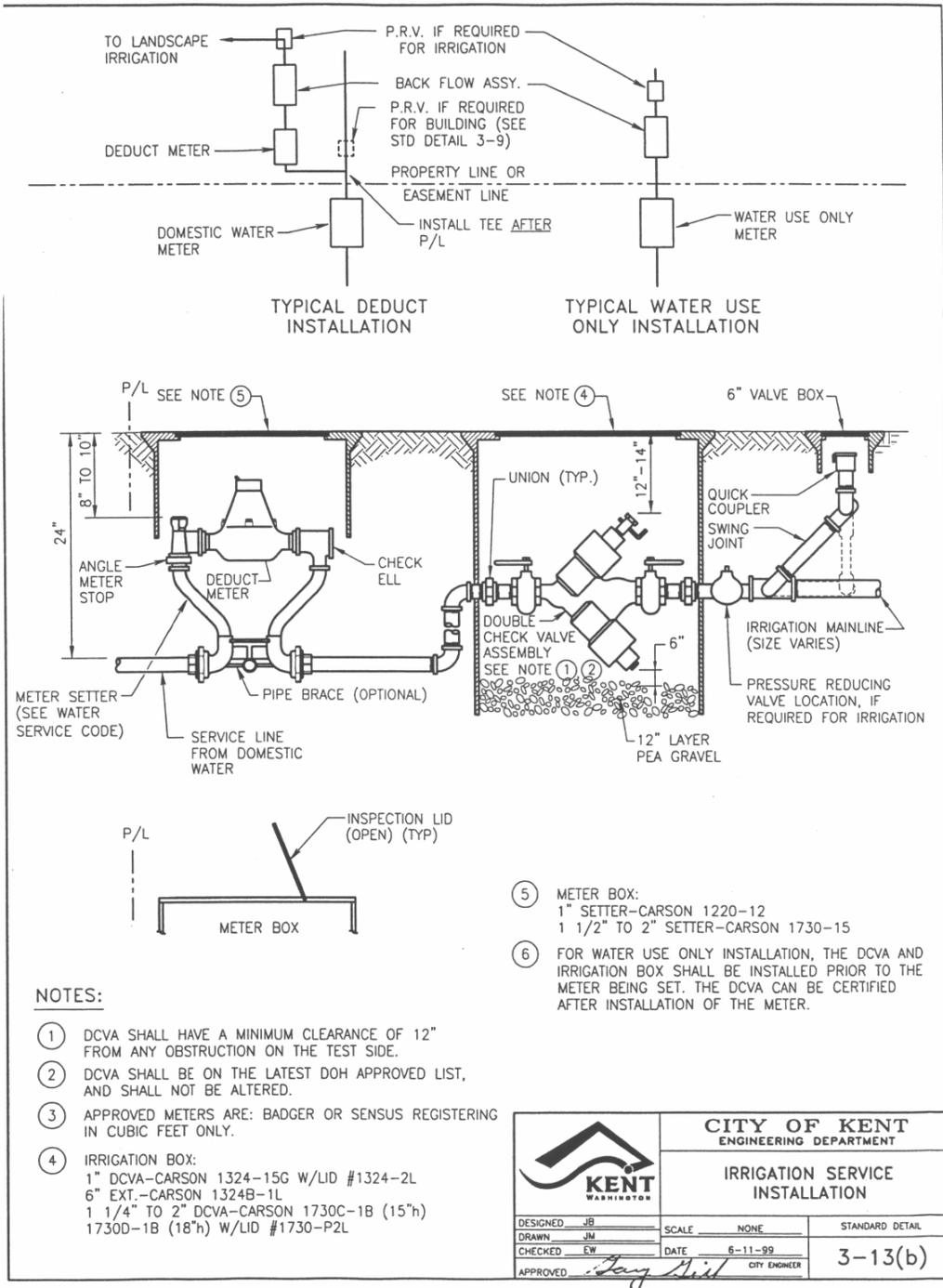


**PROFILE VIEW - WATER SERVICE AND REDUCED PRESSURE BACKFLOW ASSEMBLY (HIGH HAZARD)
(LARGER SERVICE SHOWN)**

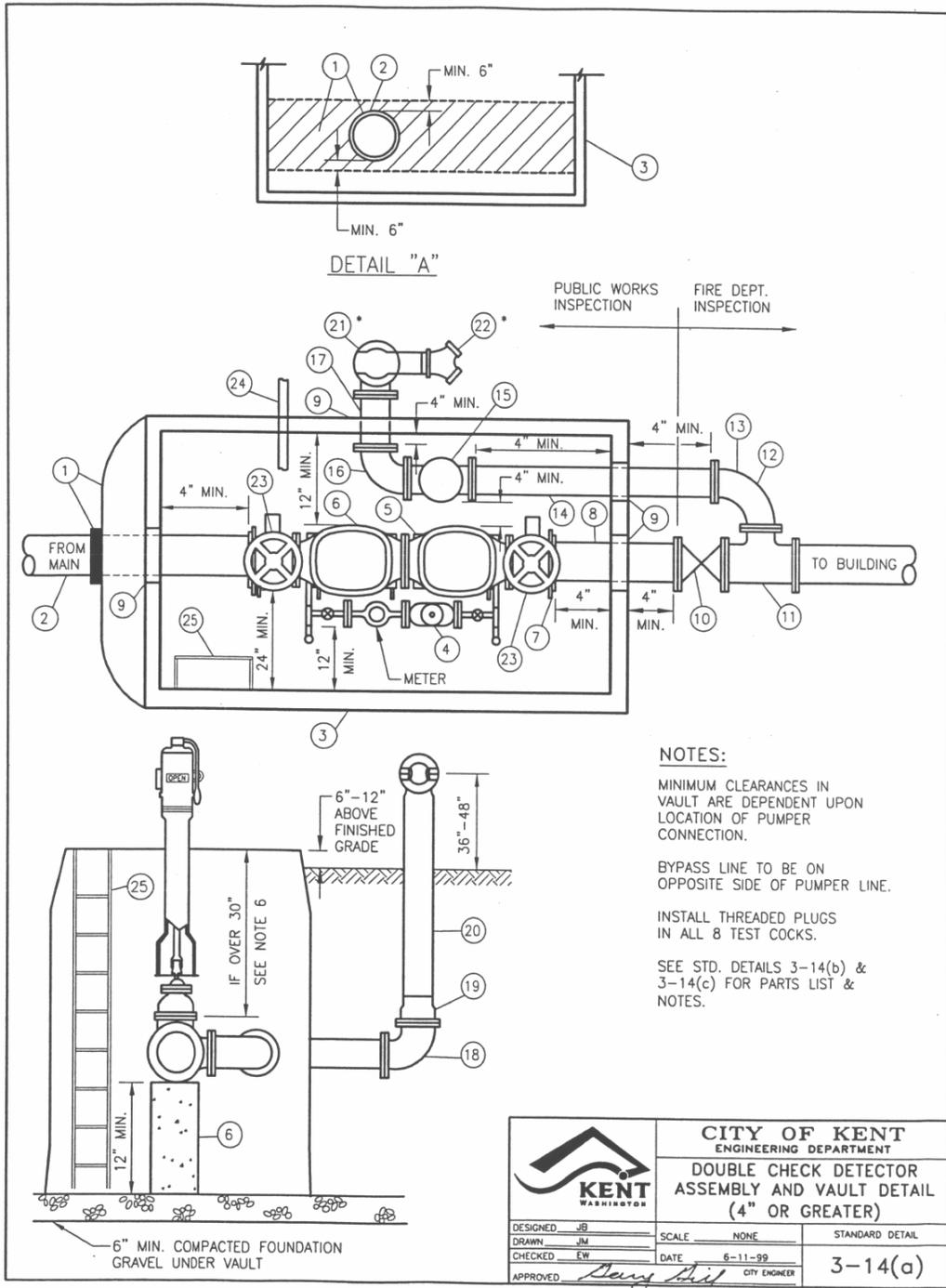
NOTES:

- ① DRAWINGS ARE ILLUSTRATIONS ONLY. SIZE OF METER AND BACKFLOW PREVENTER SHALL BE PER THE APPROVED PLANS AND PERMIT.
- ② DCVA BOXES OR VAULTS SHALL PER SECTION 3.5.1(E) OF THE CITY OF KENT CONSTRUCTION STANDARDS.
- ③ INSULATED ENCLOSURES SHALL ALLOW MINIMUM CLEARANCES OF ASSEMBLY.
- ④ BACKFLOW PREVENTER SHALL BE PER SECTION 3.6 OF THE CITY OF KENT CONSTRUCTION STANDARDS.

			CITY OF KENT	
			ENGINEERING DEPARTMENT	
			SERVICE CONNECTION	
			PREMISE ISOLATION	
DESIGNED	JB	SCALE	NONE	STANDARD DETAIL
DRAWN	JM			
CHECKED	EW	DATE	6-11-99	
APPROVED	<i>[Signature]</i>		CITY ENGINEER	3-13(a)



		CITY OF KENT ENGINEERING DEPARTMENT	
		IRRIGATION SERVICE INSTALLATION	
DESIGNED JB	SCALE NONE	STANDARD DETAIL	
DRAWN JM	DATE 6-11-99	3-13(b)	
CHECKED EW	CITY ENGINEER		
APPROVED <i>Jay Hill</i>			



SEE CITY FIRELINE CODE AND
STD. DETAIL 3-14(c) FOR NOTES.

SEE STD. DETAIL 3-14(o) FOR PLAN, ELEVATION & SECTION.

- ① CONC. BLOCKING AS REQ'D W/ LOCKING FOLLOWER RING AS SHOWN. SEE DETAIL "A".
- ② 4" MIN. D.I. CLASS 52.
- ③ PRECAST CONC. VAULT. SEE CITY OF KENT FIRELINE CODE.
- ④ APPROVED DCVA IN BYPASS LINE (LATEST HEALTH DEPARTMENT APPROVED LIST) SHALL BE ON OPPOSITE SIDE OF PUMPER LINE. (PART OF DCDA)
- ⑤ DCDA IN MAIN LINE (LATEST DSHS APPROVED LIST).
- ⑥ CONC. SUPPORT PADS UNDER CHECK VALVE.
- ⑦ 10", 8", 6" OR 4" FL COUPLING ADAPTER
- ⑧ 10", 8", 6" OR 4" PEXFL PIPE.
- ⑨ GROUT INTERIOR & EXTERIOR ALL AROUND PIPE.
- ⑩ 10", 8", 6" OR 4" RESILIENT WEDGE GATE VALVE, FL W/ POST INDICATOR W/ TAMPER SWITCH.
- ⑪ 10", 8", 6" OR 4" TEE, FL.
- ⑫ 10", 8", 6" OR 4" REDUCING 90° BEND, FL, AS REQ'D.
- ⑬ 6" OR 4" LONG RADIUS 90° BEND, FL
- ⑭ 6" OR 4" SPOOL, FL.
- ⑮ 6" SWING TYPE GRAVITY OPERATED CHECK VALVE, FL W/ BALL DRIP.
- ⑯ 4" OR 6" 90° BEND, FL
- ⑰ 4" OR 6" SPOOL, FLxFL.
- ⑱ 6" OR 4" BEND, FLxFL.
- ⑲ FLxIP ADAPTER.
- ⑳ 6" OR 4" GALV. PIPE, THREADED, LENGTH AS REQ'D (SEE STD. DET. 3-14C).
- ㉑* 4"x4"x6" BULL HEAD THREADED TEE.
- ㉒* UL LISTED FD CONNECTION & UL LISTED BREAK AWAY CAPS, LOCATE WITHIN 50' MAX. OF A PUBLIC FIRE HYDRANT.
- ㉓ O.S & Y VALVES TO BE RESILIENT SEATED W/ TAMPER SWITCHES. ADD WIRING IN ACCORDANCE W/ L & I (SEE NOTE 11 ON STD. DETAIL 3-14C).
- ㉔ GALV. CONDUIT SLEEVE, SEALED BOTH ENDS, FOR ELECTRONIC MONITORING WIRES.
- ㉕ LADDER AS REQ'D PER OSHA.

* ㉑ & ㉒ ARE GENERALLY 6" WITH THE BULL, ELBOW AS INDICATED. IN CASES WHERE A 4" DCVA IS APPROVED THE BULL, ELBOW IS ELIMINATED AND THE FD CONNECTION IS ATTACHED DIRECTLY TO THE GALV. PIPE.

		CITY OF KENT ENGINEERING DEPARTMENT	
		DOUBLE CHECK DETECTOR ASSEMBLY AND VAULT PARTS LIST (4" OR GREATER)	
DESIGNED <u>JB</u>	SCALE <u>NONE</u>	STANDARD DETAIL	
DRAWN <u>JM</u>	DATE <u>6-11-99</u>		
CHECKED <u>EW</u>	DATE		
APPROVED <u>Henry Hill</u>	CITY ENGINEER	3-14(b)	

4 INCH OR GREATER DOUBLE CHECK DETECTOR

ASSEMBLY AND VAULT NOTES:

- 1) VAULT DIMENSIONS BASED ON SIZE OF APPARATUS AND MEETING MINIMUM CLEARANCES.
- 2) ALL VAULT LIDS SHALL HAVE DOUBLE DOORS WITH LID DRAINS TO EXTERIOR OF VAULT.
- 3) MINIMUM APPARATUS SIZE SHALL BE 4 INCHES.
- 4) VAULT SHALL BE SEALED TO PREVENT WATER LEAKAGE.
- 5) LADDERS SHALL BE REQUIRED WHEN DEPTH FROM TOP OF LID TO TOP OF APPARATUS EXCEEDS 30", AND/OR THE APPARATUS IS MORE THAN 12" ABOVE THE FLOOR. INSTALLATION OF ALL LADDERS SHALL BE IN COMPLIANCE TO OSHA.
- 6) ALL BACK FLOW PREVENTORS SHALL BE ON THE LATEST APPROVED LIST APPROVED BY THE CITY OF KENT.
- 7) MAKE ALL ATTEMPTS TO LOCATE VAULT IN PLANTING AREA NOT IN PAVING AREA.
- 8) ALL BENDS AND ELBOWS TO BE CAST IRON, CLASS 250, CEMENT LINED. (SEE APWA AND AWWA).
- 9) TEMPORARY SUPPORT SHALL BE PROVIDED UNDER VALVES AT THE TIME OF INSTALLATION. AFTER COMPLETE INSTALLATION REMOVE THE TEMPORARY SUPPORT AND INSTALL CONCRETE SUPPORT PAD WITH 6" BRICK SHIMS AS REQUIRED.
- 10) GROUT INTERIOR AND EXTERIOR ALL AROUND PIPE.
- 11) ALL PIPE TO BE DUCTILE IRON CEMENT LINED CLASS 52 PIPE EXCEPT WHERE INDICATED. INSTALLATION MUST ALLOW CLEARANCE FOR PROPER OPERATION OF ALL O.S AND Y's.
- 12) GALVANIZED STEEL PIPE SHALL BE WRAPPED WITH POLYETHYLENE WRAPPING 10mm THICKNESS.

SEE STD. DETAIL 3-14(a) FOR PLAN, ELEVATION & SECTION.
SEE STD. DETAIL 3-14(b) FOR PARTS LIST.

	CITY OF KENT ENGINEERING DEPARTMENT	
	DOUBLE CHECK DETECTOR ASSEMBLY AND VAULT NOTES (4" OR GREATER)	
DESIGNED <u>JB</u>	SCALE <u>NONE</u>	STANDARD DETAIL
DRAWN <u>JM</u>	DATE <u>6-11-99</u>	
CHECKED <u>EW</u>		
APPROVED <i>[Signature]</i>	CITY ENGINEER	3-14(c)

INSIDE BUILDING ASSEMBLY LIST (4" OR GREATER):

- 1) PERIMETERS OF MINIMUM CLEARANCES TO BE PAINTED ON FLOOR IN WHITE ENAMEL PAINT WITH 2" STENCILED BLACK LETTERS "DO NOT BLOCK ACCESS".
- 2) 4" MINIMUM D.I. CLASS 52.
- 3) FLOOR DRAIN IN BUILDING TO STORM SYSTEM.
- 4) DCVA IN BYPASS LINE (LATEST HEALTH DEPT. APPROVED LIST) SHALL BE ON OPPOSITE SIDE OF PUMPER LINE.
- 5) DCDA IN MAIN LINE (LATEST HEALTH DEPT. APPROVED LIST).
- 6) CONCRETE SUPPORT PADS UNDER CHECK VALVE.
- 7) 10", 8", 6" OR 4" FL COUPLING ADAPTER.
- 8) 10", 8", 6" OR 4" PE x FL PIPE.
- 9) 2" CLEARANCE INTERIOR AND EXTERIOR ALL AROUND PIPE.
- 10) 10", 8", 6" OR 4" RESILIENT WEDGE GATE VALVE, FL WITH WALL MOUNTED POST INDICATOR WITH TAMPER SWITCH.
- 11) 10", 8", 6" OR 4" DIP, CL 50.
- 12) 10", 8", 6" OR 4" 90 DEGREE BEND, FL WITH BALL DRIP IN VAULT.
- 13) 6" OR 4" DIP, CL 50.
- 14) 6" OR 4" SPOOL, FL.
- 15) 6" SWING TYPE GRAVITY OPERATED CHECK VALVE, FL WITH BALL DRIP IN VAULT.
- 16) 4" OR 6" SPOOL, 90 DEGREE BEND.
- 17) 4" OR 6" SPOOL, FL x FL.
- 18) DRAIN ROCK, 1/2 C.Y.
- 19) FL x IP ADAPTER
- 20) 6" OR 4" GALV. PIPE, THREADED, LENGTH AS REQUIRED (SEE STD. DETAIL 3-14c).
- 21) 4"x4"x6" BULL, ELBOW, THREADED.
- 22) UL LISTED FD CONNECTION AND UL LISTED BREAK AWAY CAPS, LOCATE WITHIN 50' MAX. OF A PUBLIC FIRE HYDRANT.
- 23) O.S. AND Y VALVES TO BE RESILIENT WEDGE WITH TAMPER SWITCHES. ADD WIRING IN ACCORDANCE WITH L & I (SEE NOTE 11 ON STD. DETAIL 3-14c)
- 24) 10", 8", 6", OR 4" RESILIENT WEDGE GATE VALVE, FL W/POST INDICATOR W/TAMPER SWITCH.
- 25) SIGN ON OUTSIDE OF BUILDING.....FIRELINE
DOUBLE CHECK
INSIDE BLDG

		CITY OF KENT ENGINEERING DEPARTMENT	
		DOUBLE CHECK DETECTOR ASSEMBLY - INSIDE BUILDING PARTS LIST (4" OR GREATER)	
DESIGNED <u>JR</u>	SCALE <u>NONE</u>	STANDARD DETAIL	
DRAWN <u>JM</u>	DATE <u>6-11-99</u>		
CHECKED <u>EW</u>	APPROVED <u>Ray Hill</u> CITY ENGINEER	3-14(e)	

**INSIDE BUILDING:
4" OR GREATER DOUBLE CHECK DETECTOR ASSEMBLY NOTES**

- 1) ROOM IN WHICH DCDA IS PROPOSED TO BE LOCATED SHALL:
 - A. HAVE FLOOR DRAINS CONNECTED TO STORM OR SANITARY SEWER.
 - B. HAVE A HEATING SYSTEM (40° F MIN. TEMP.) NO HEAT TAPE.
 - C. NOT BE USED FOR STORAGE AROUND THE DCDA.
 - D. HAVE CLEARLY DELINEATED ACCESS WAYS TO DCDA AND WALL MOUNTED PIVS.
- 2) MINIMUM APPARATUS SIZE SHALL BE 4 INCHES.
- 3) ALL BACKFLOW PREVENTERS SHALL BE ON THE LATEST LIST APPROVED BY THE DEPARTMENT OF HEALTH AND THE CITY OF KENT.
- 4) MAKE ALL ATTEMPTS TO LOCATE SWING CHECK VAULT IN PLANTING AREA & NOT IN PAVING AREA.
- 5) ALL BENDS AND ELBOWS TO BE CAST IRON, CLASS 250, CEMENT LINED. (SEE APWA AND AWWA).
- 6) TEMPORARY SUPPORT SHALL BE PROVIDED UNDER VALVES AT THE TIME OF INSTALLATION. AFTER COMPLETE INSTALLATION REMOVE THE TEMPORARY SUPPORT AND INSTALL CONCRETE SUPPORT PAD WITH 6" BRICK SHIMS AS REQUIRED.
- 7) GROUT ALL AROUND PIPE WHERE IT ENTERS THE BUILDING.
- 8) ALL PIPE TO BE DUCTILE IRON CEMENT LINED CLASS 52 PIPE EXCEPT WHERE INDICATED. INSTALLATION MUST ALLOW CLEARANCE FOR PROPER OPERATION OF ALL O.S. AND Y'S.
- 9) GALVANIZED STEEL PIPE SHALL BE WRAPPED WITH POLYETHYLENE WRAPPING (10mm THICKNESS).
- 10) IF A NEW CITY HYDRANT IS NOT REQUIRED ON FIRELINE UPSTREAM OF BUILDING, (THERE IS AN EXISTING CITY HYDRANT WITHIN 50' OF FDC) THEN INSTALL A 2" B.O. PER KENT STANDARD DETAIL 3-2 60' FROM CITY MAIN.
- 11) IF PRIVATE HYDRANTS ARE REQUIRED FOR THE PROJECT, ENTIRE SYSTEM (HYDRANTS AND FIRELINE) SHALL BE ISOLATED FROM CITY SYSTEM BY A DCDA LOCATED IN A VAULT AT THE PROPERTY LINE PER STANDARD DETAILS 3-14(a), 3-14(b) AND 3-14(c).
- 12) INSTALLATION OF DCDA IS APPROVED BY HORIZONTAL ALIGNMENT ONLY.
- 13) A HEATED, R-19 INSULATED WOOD FRAMED ENCLOSURE IS AN ACCEPTABLE ALTERNATIVE TO A ROOM IF DCDA IS TO BE LOCATED IN AN UNHEATED BUILDING. THE ENCLOSURE MUST MEET ALL REQUIREMENTS OF THE DEVELOPMENT SERVICES DIVISION.

	CITY OF KENT ENGINEERING DEPARTMENT	
	DOUBLE CHECK DETECTOR ASSEMBLY - INSIDE BUILDING NOTES (4" OR GREATER)	
DESIGNED <u>JB</u>	SCALE <u>NONE</u>	STANDARD DETAIL
DRAWN <u>JM</u>	DATE <u>6-11-99</u>	3-14(f)
CHECKED <u>EW</u>	CITY ENGINEER	
APPROVED <u><i>Harry Shil</i></u>		

PUBLIC WORKS OPERATIONS

STANDARD OPERATING PROCEDURES

9.0 WATER

9.3 New Water Main Connection Procedures

PURPOSE: To avoid connections between the City potable water system and unsafe or newly constructed water systems that have the potential to contaminate the City water system, and to provide optimal cleaning, disinfection and connection procedures for new water mains to ensure safe, potable drinking water for human consumption.

Note: These procedures shall be done in the following sequence or as directed by the City Inspector.

9.3.1 Connection to an Existing Water Main

A physical separation between all untested and potentially contaminated water mains (or main extensions) and the city's existing water system shall be maintained **at all times unless the connection is protected by an approved Department of Health backflow device** (See diagram on page 5). A hydrant meter and an approved backflow prevention device shall be used whenever drawing water from the city system (see Page 5 for schematic details). Hydrant meters and backflow devices may be obtained from the Public Works Operations Division/Water Section at 5821 S. 240th Street by completing the billing forms for a hydrant meter permit and making the required damage deposit. There will be a charge for all water used in accordance with Kent City Ordinance section 7.02.180 "Temporary Water Meters".

Prior to the new water main being installed, the contractor has the option of cutting in the connection tee on the existing water main, or providing potable water from another source to provide a temporary water supply. If the Contractor chooses the option of installing the new connection tee, the Contractor shall install new resilient wedge gate valves on all sides of the tee, or as required by the City. A mechanical joint plug with a 2" minimum tap and proper blocking shall be installed on the new incoming mainline valve at the new tee, with piping accessible to accommodate filling the new water main.

The City Inspector shall notify the Water section of Public Works Operations a minimum of five full working days before the valve and tee installation is scheduled. This will allow water section employees time to schedule the water main shutdown and notify the customers affected.

9.3.2 Cubing

Foam cubes (pigs) shall be inserted into and pushed through the new water main to remove any residue, dirt, debris, obstruction or possible foreign material in the new water main.

- A. The Water Section shall be responsible for supplying the foam cubes to the contractor based on the water system design as shown on the approved construction plans.
- B. The Contractor shall be responsible for picking up the cubes at the Public Works Operations located at 5821 S 240th St Kent, Washington, and shall install two foam cubes at the initial connection and two foam cubes at each lateral connection six inches in diameter and larger (downstream of each connecting valve), as the new main is installed. This would include all six-inch diameter lateral runs to hydrants that are longer than two full pipe lengths, or have more than a single joint in them.
- C. A mechanical joint cap with a 2" minimum tap shall be installed with proper blocking at the initial connection point on the new main with piping accessible to accommodate both flushing and chlorine injection.
- D. The Water Section shall retrieve the foam cubes when the contractor performs the cubing process. All cubing and flushing shall be under the supervision of the Water Section or a City Inspector.
- E. To accommodate the launch and the retrieval of the cubes, the minimum blow-off size shall be four-inch diameter for six-inch and eight-inch mains. A six-inch diameter blow-off shall be installed for 10-inch and 12-inch mains per City of Kent Standards.
- F. It shall be the contractor's responsibility to properly dispose of all flush water per City of Kent Standards as well as locating and retrieving any "lost" or missing cubes or partial cubes from the water main.
- G. In the event that the initial cubing does not adequately clean the new water mains, the contractor shall be required to provide additional point(s) for launching and retrieval of additional cubes, and re-cube those sections of main that have debris in them until clean, as determined by the Water Section.

9.3.3 Pressure and Leakage Test

All new water mains, extensions of existing mains, water system appurtenances and water services shall then be pressure tested for leakage in accordance with Section 7-11.3(11) of the WSDOT Standard Specifications. Water services and appurtenances 2" and smaller installed prior to water main testing shall also be pressure tested with the water main. At **no time** will the temporary water system connection or backflow device remain connected or in place during the pressure test procedures.

9.3.4 Chlorine Injection

After the Contractor has cleaned the water main by cubing and flushing, the Contractor shall inject a liquid chlorine solution evenly throughout the new main and appurtenances for optimal disinfection. The chlorine dosage shall be in accordance with WSDOT 7-11.3(12)B at a minimum of 50 mg/L (see the table on page 4 of this document) and a maximum of 100 mg/l. AWWA C651-99 Standards include detailed procedures for the adequate disinfection, flushing and microbiological testing of all water mains. If the contractor wishes the Water Section to do the injection, the City Inspector shall give the Water Section three working days notification to perform the chlorine injection. The Contractor must sign a waiver holding the City harmless for any failure of purity samples due to the work performed by the Water Section, as well as agreeing to reimburse the city for all city costs associated with the disinfection process. Work may be scheduled after hours due to manpower or workload constraints, in which case the Contractor will reimburse the Water Section for city employee overtime associated with the work performed.

The Chlorine shall remain in the main for the time specified according to the procedure used from AWWA Standards C651-99. After the 24-hour disinfection period, the remaining residual throughout the water main and appurtenances shall not be lower than 25 mg/L. The Contractor shall be responsible for disposing of all chlorinated water. Chlorinated water shall be disposed of in an **approved sanitary sewer**. If a sanitary sewer is not available, or the capacity of the sanitary sewer will be at risk, the Contractor shall be responsible for disposing of the water per City of Kent Construction Standards.

Amount of Chlorine needed to produce 50 mg/L in 18ft of pipe (one pipe length) for 5.25% household bleach (with no additives), 12.5% Sodium Hypochlorite solutions and 65% available dry Calcium Hypochlorite.

Diameter	5.25%(gal)	12.5%(gal)	65%(lb)
4"	0.009	0.005	0.007
6"	0.022	0.011	0.017
8"	0.039	0.019	0.029
10"	0.061	0.031	0.052
12"	0.087	0.044	0.047
16"	0.156	0.078	0.119
18"	0.197	0.098	0.152
24"	0.352	0.176	0.271
30"	0.548	0.275	0.422

Example: How many gallons of **fresh** 5.25% Sodium Hypochlorite will be required to disinfect 5,000 ft of 8" main?

$$5,000 \text{ ft} \div 18 \text{ ft} = 278 \text{ lengths of 8" pipe}$$
$$278 \times 0.039 = \mathbf{11 \text{ gallons required}}$$

9.3.5 Bacteriological Purity Samples

Two consecutive sets of acceptable purity samples, taken at least 24 hours apart, shall be collected from representative points of the new main and appurtenances.

Water section personnel shall take the first bacteriological purity sample(s) after the chlorine is removed, flushing is completed and the chlorine level is no greater than nor less than the level present in the adjacent distribution system. Water services and other appurtenances two inches and smaller installed prior to water main testing shall also be purity tested with the water main. The second set of purity samples shall be taken no less than 24 hours after the first set of samples. A representative background sample of the City water system may be taken from the distribution source at the same time purity samples are taken from the new main.

In the event that the Water Section or the City Inspector determines that trench water, dirt or debris has entered the new main during construction, the first purity samples shall be not be taken until the water has stood in the new main for at least 16 hours after final flushing. As above, the second set of purity samples shall not be taken until the water in the new main has stood for an additional 24 hours.

Note: No water shall be flushed during the 16- or 24-hour incubation periods described above, or prior to the purity samples being taken.

It shall be the contractor's responsibility to make arrangements to transport the sample(s) to a state-certified laboratory approved by the Water Section. The contractor shall be responsible for paying all costs for the purity samples excluding the representative background sample at the distribution source.

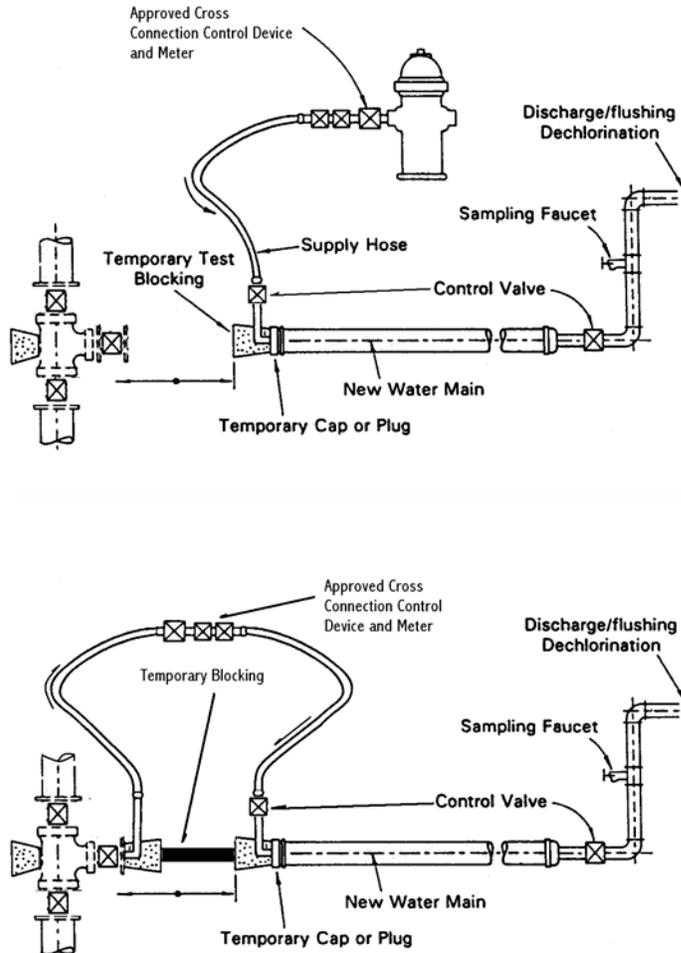
Note: Two consecutive samples, 24 hours apart, must show no coliform presence before performing final connections to the existing water system.

The Water Section may be available during normal working hours, depending upon workload, (7:30 am to 4:00 pm) excluding holidays and weekends, to take purity samples, assist with cubing and chlorine injections. The Contractor shall reimburse the city for all associated costs, including labor, vehicles, materials and overhead charges. Outside of normal working hours, the contractor shall reimburse the City at the most current hourly overtime rate for labor, vehicles, materials and other associated costs.

9.3.6 Final Connection(s) to the Existing Water Main

When both sets of purity sample results are satisfactory and received in writing from the state-certified laboratory, and all other City of Kent water system standards have been met, the contractor shall be allowed to connect the new mains to the existing distribution system following City of Kent and AWWA standards. It shall be the Contractors responsibility to prevent, **at all times**, the contamination of the new and existing water mains with trench water, dirt, debris, or other foreign material.

A City of Kent inspector and/or Water Section representative must be present to witness the final connection(s) to the existing water system, to turn on and flush the new water system, and to place the new water system and appurtenances into service.



Reference Guide

Ordinance 2394

Water Purveyor Authority on Public Property	7.06.184
Local Administrative Authority (LAA)	7.06.184
Authority on Private Property	7.06.184
Enforcement:	7.06.183
Access to Premises	7.06.184
Shut Off Water	7.06.182B
Requiring a Backflow Assembly	7.06.182A

Cross-Connection Program

Authority to Operate the Program	Section 9.16
Customers Responsibility	9.16.1
CCS Responsibilities	9.16.1
Installation Time Frames.	9.16.2
Schedule for Evaluation and Reevaluation	9.16.3
New Connections	9.16.4
Existing Connections Survey Premises	9.16.5
Existing Commercial Connections	9.16.6
With No Backflow Assembly	
With A DCVA or DCDA	9.16.7
All Connections	9.16.7
Premises Isolation	9.16.7A
In-Premises Isolation.	9.16.7B
Fire Connections	9.16.8
Procedures for Field Evaluation	9.16.9
Reinspection	9.16.9
Enforcement	9.16.9
Backflow Preventers, Eliminate Cross-Connection	9.16.10
High and Low Hazards	9.16.10
Approval of Backflow Preventers	9.16.10A
Installation of Backflow Preventers	9.16.10B

Time Frames	9.16.10B
By-pass Piping	9.16.10B
CCS for Inspection of Assemblies	9.16.10B
Inspection and/or testing of Backflow Preventers	9.16.10C
Backflow Assembly Testing Quality Control	9.16.11
Backflow Incident Response Procedure	9.16.12
Cross-Connection Education	9.16.13
Records and Reports	9.16.14
Reclaimed Water	9.16.15
Recommended Protection at Fixtures and Equipment	Appedix K

APPENDIX G

Water System Construction Standards

Please find *Appendix G – Water System Construction Standards* on the flash drive that accompanies this Water System Plan.

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SECTION 3: Standards for Water System Improvements



3.0 STANDARDS FOR WATER SYSTEM IMPROVEMENTS

These Standards contain the design criteria and improvement standards for the extension or connections to the City of Kent Water System. The conditions as stated herein apply to all improvements made by public agencies and private Developers. These improvements may include the following:

- Watermain extensions, modifications and replacements
- Fire line and/or yard hydrant or fire hydrant connections to City mains
- Water service and water use only meter installations
- Cross connection control devices

3.1 EASEMENTS AND RIGHTS-OF-WAY

Permanent on-site easements for access, maintenance, and construction are required for all watermain extensions located outside of public right-of-way. Easements shall be provided by the Developer for all public water system infrastructure including the pipe, valves, backflow preventers, etc. Whenever an easement or right-of-way is fenced, a gate shall be installed matching the width of the easement and a City lock must be placed in "series" to facilitate access by the City. When easements are required, legal descriptions shall be prepared by a Professional Land Surveyor licensed by the State of Washington. A title report, dated within thirty (30) days, covering the properties to be encumbered by the easements shall accompany the description.

When off-site and/or on-site easements for the extension of approved comprehensive water plans are required, these easements shall be approved and recorded by the City before any civil construction permit is issued unless the easements are being dedicated to the City as a part of the recorded final subdivision.

Private improvements such as buildings, fences, garages, carports, retaining walls, utilities, signs, light standards, etc., are not allowed in public easements and rights-of-way. Watermain easements and rights-of-way are not allowed within the setbacks between two residential structures. Where an encroachment occurs, the Developer shall remove and relocate the conflicting private improvement immediately upon direction from the Engineer.

3.1.A Easement Requirements

Easements shall be accessible for construction equipment normally used for the operation and maintenance of the facility. Cross slopes exceeding 5 percent will require approval from the Engineer. The minimum easement widths, centered on the utility system, are as follows:

1. Watermain under 5' deep – 15' wide minimum
2. Watermain 5' – 9' deep – 25' wide minimum
3. Watermain over 9' deep – The formula for half of the width of the easement shall be the sum of the total depth from the top of pipe to

the surface, plus the pipe diameter, plus 3', rounded to the nearest even foot up to a maximum of 50' total width.

4. Special conditions or installation requirements may require greater easement widths as determined by the Engineer.
5. In easements with multiple utility systems, the easement width shall be increased by the minimum separation distance between the lines.

3.1.B Right-of-way

Where feasible, the utility system extensions shall be located within the City's right-of-way. Work inside adjacent City, County and/or State right-of-way requires special permits from the respective agencies. Adjacent City, County and State permits and others must be obtained by the Developer or the City if required by franchise prior to Engineering Plans approval by the City.

3.2 STANDARD SPECIFICATIONS

The installation of all watermains and appurtenances shall be in accordance with the applicable provisions of the latest edition of the Washington State Department of Health (WSDOH) Water System Design Manual, AWWA or WSDOT Standard Specifications. The manufacturer's recommended installation procedures should be adhered to and not conflict with AWWA or WSDOT Standard Specifications. In the event of conflict, the Engineer shall determine any exceptions to WSDOH, AWWA or WSDOT Standard Specifications.

3.3 WATERMAIN EXTENSION DESIGN REQUIREMENTS

All watermain extensions shall conform to these Standards and WSDOH. Main extensions are also subject to appropriate permits and plan review fees. Contact the City's Permit Center at 253-856-5300, or see the web site at www.ci.kent.wa.us for the latest permit fee schedules.

3.4 COMPREHENSIVE WATER SYSTEM PLAN

The Comprehensive Water System Plan (WSP) indicates the location and configuration of the major elements of the existing and proposed water supply mains, distribution system, inter-ties and loops. The exact location or configuration of this system may be modified, provided the proposed system remains consistent with the overall intent of the plan. Minor modifications to the WSP require specific approval by the Engineer. In some instances, where existing pressures are not met or cannot be provided, as determined by the Engineer, portions of the WSP may be the direct responsibility of the Developer to complete in order to meet the minimum development requirements. Specific conditions may be placed in the permit approval or conditions of approval for the project.

3.5 MAINLINE WATER EXTENSIONS

Mainline extensions will be required when the property does not front on a watermain, or when the existing main is deemed inadequate for the proposed use. The extension shall be in accordance with the latest adopted WSP and these Standards.

The watermain must be extended to the far edge of the property to be serviced, as approved by the Engineer, regardless of where the service connection is to be made to serve properties in the same service area.

3.6 WATER SYSTEM DESIGN STANDARDS

3.6.A Improvements and/or Alterations

All improvements and/or alteration to the water system must be designed to incorporate the standards described below:

1. The desirable system working pressure shall be approximately 60-70 pounds per square inch (psi), but not less than 35 psi under peak hourly demand (PHD). The minimum pressure in the water system under fire flow conditions shall be 20 psi.
2. A pressure reducing valve (PRV) shall be installed and maintained on water service lines by the property owner when system pressures are in excess of 80 psi. See Standard Plan 3-13 for service applications up to 2" in size.
3. The minimum diameter of watermain for commercial, industrial, multi-family and residential developments shall be 8", except as described in Section 3.6.A.7 below. The minimum pipe diameter may also be reduced to be consistent with the existing water system if the existing pipe is smaller, in good condition, and provides the required fire flows and pressures. The size of the main in all cases must meet fire flow requirements as determined by the Fire Marshal.
4. Connections to existing watermains shall be accomplished by "extension", "wet tap" or "cut in" when mainline valves are required on the existing main. Once the new valve has been installed on the existing watermain, the City Water Section shall be responsible for placing a lock on the connecting valve and any operations. The Developer shall not operate the connecting valve for any reason. The Developer shall contact the Inspector assigned to the project for filling or flushing of the new main, or any other need for operation of the connecting valve. No direct connection to the City's existing water system will be allowed until all purity and leakage testing results for the new water main extension have met the requirements of WAC 246.290.125.2b for purity.
5. Two cubes for "cubing" shall be installed in the new watermain at the initial connection and at each lateral from the new watermain. The Water Section shall provide the cubes, which can be picked up by the

Developer at the Water Section Shop located at 5821 South 240th Street.

6. Dead end mains shall be avoided whenever possible. Where dead end mains are unavoidable, a minimum 6" blowoff assembly is required. The diameter of the blowoff and tap must be sized to achieve a minimum flow of 2.5 fps in the watermain. Where cubes for "cubing" are required in the main installation, the watermain shall terminate with a fire hydrant as long as pressures and flows meet the minimum requirements for a fire hydrant. If these requirements are not met, then a blowoff assembly shall be used.
7. The City may approve a 4" diameter dead end watermain for a single-family residential area serving less than fifteen (15) single-family residences, providing the following conditions are met:
 - a. There is no potential for a future looped system.
 - b. The project is not within an area of known low pressure.
 - c. The proposed 4" diameter watermain extends or "branches" from a looped system. The 4" watermain shall not extend from a line that starts as a larger diameter watermain and then reduces down to 4" diameter.
 - d. No fire hydrants are required to be connected to the 4" diameter watermain.
 - e. The total length of the 4" diameter watermain is no longer than 350'.
 - f. If a 4" diameter watermain is approved by the City, a 4" blowoff assembly shall be installed at the end of the watermain for cubing.

3.6.B Watermain Locations

1. Watermains shall be installed at least 10' horizontally from any existing or proposed sanitary sewer. The distance shall be measured from the outside edge of an existing or proposed watermain. Any deviation from this requirement shall meet DOE and WSDOH requirements and be allowed only upon approval of the Engineer.
2. Perpendicular watermain crossings of sanitary sewers shall be installed to provide a minimum vertical distance of 18" above the sewer line, measured from the bottom of the water line to the top of the sewer line with no joint in the watermain within 10' of the sewer line. Where separation between the water line and sewer line is less than 18", the sewer line shall be PVC C900 or ductile iron per Section 4.7.B Gravity Sewer Pipe. All sanitary sewer lines which cross above a watermain, regardless of the separation, shall be PVC C900 or ductile iron, with no joints within 10' of the watermain.

3. Installation of watermains near other potential sources of contamination may be subject to written approval by the Engineer on a case-by-case basis. The sources may include, but are not limited to, storage ponds, land disposal sites for wastewater or industrial process water containing toxic materials or pathogenic organisms, solid waste disposal sites, or any other facility where failure of the facility would subject the water in the main to toxic chemical or pathogenic contamination.
4. Watermains shall be located at least 5' away from any other utility system, including, but not limited to, storm drains, other watermains, power, natural gas, cable television (CATV), private fire lines, etc.

3.6.C Water Valves

1. Water valves are required at the following locations:
 - a. 400' maximum spacing in commercial/industrial and multi-family residential areas. Locations involving hospitals, medical clinics, and others determined by the City to be critical applications may be required to have the spacing reduced.
 - b. 800' maximum spacing in residential areas.
 - c. All sides of mainline tees and crosses.
 - d. At all fire line and hydrant connections to the City's watermain system. When fire hydrants are installed on a fire line run, a valve is required prior to the fire line vault but after the fire hydrant connections.
 - e. At both sides of all bridge crossings, railroad crossings and casings/bores.
 - f. Existing gate valves may be subject to replacement with a new resilient wedge gate valve installed at the discretion of the Engineer.
2. Water Valve Types:
 - a. 16" diameter valves and smaller shall be resilient wedge gate valves.
 - b. Valves larger than 16" shall be butterfly valves and have a bypass with a 6" gate valve. See Standard Plan 3-8.

3.6.D Combination Air/Vacuum Release Valves

Combination air/vacuum release valves shall be located at high points along the main. As a guide, valves are necessary where the difference in elevation between high and low point is 2' or more on a gradual rise, or any abrupt rise. Actual locations shall be approved by the Engineer. The air inlet/discharge opening shall be 36" above finished grade and provided with a screened downward facing vent opening. It shall be located outside of traffic and sidewalk areas, and installed to prevent damage to

landscaping or hazards to pedestrians and bicyclists. See Standard Plan 3-20.

3.6.E Blowoffs

1. Blowoffs shall be located at the dead end of all mains for flushing and "cubing" purposes. Blowoff assemblies must be sized and designed to achieve a minimum flow of 2.5 fps in the watermain. These flows are to be used as a guideline but do not relieve the Developer from assuring a clean line. The minimum blowoff size for a permanent installation is 4" for 4" diameter watermain and 6" for pipe diameters from 6" to 12". Temporary blowoff assembly installations may be reduced to a 2" size. See Standard Plan 3-19.
2. Where cubes for "cubing" are required in the main line installation, the watermain shall terminate with a fire hydrant as long as pressures and flows meet the minimum requirements for a fire hydrant. If these requirements are not met, then a blowoff assembly shall be used. See Standard Plan 3-19.
3. Using water from blowoffs requires a temporary hydrant meter and check valve assembly, issued by the Water Section. Persons using water illegally will be prosecuted.

3.6.F Fire Hydrants

1. Location:

Proposed fire hydrant locations shall be reviewed and approved by the Fire Marshal prior to engineering plan approval. In general, fire hydrants shall be installed at the following locations:

- a. At all street intersections.
- b. 600' maximum spacing in single-family residential areas.
- c. 300' foot spacing in multi-family and commercial areas.
- d. At locations noted on approved project plans.
- e. Within 50' of the fire department connection.
- f. At other locations as directed by the Engineer and/or the Fire Marshal.

Fire hydrants shall not be installed in areas with contaminated soils unless there are no other feasible options. If a fire hydrant must be installed within an area with contaminated soils, it shall be isolated from the City's water system with an approved backflow prevention device per Section 3.16 Backflow Prevention.

2. Connection to Existing Main:

- a. Hydrant lead shall be Class 52 ductile iron.
- b. Hydrant lead shall not exceed 50' in length.

- c. Wet tap connection with heavy-duty full circumference ductile iron or stainless steel long tapping sleeve and resilient wedge tapping valve is required. No size on size wet tapping will be allowed. No service connections are allowed to hydrant leads.
- d. Using water from hydrants requires a temporary hydrant meter and check valve assembly issued by the Water Section. Persons using water illegally will be prosecuted.
- e. No bends will be allowed on hydrant leads.
- f. The breakaway connection shall be installed no higher than 4" above the finished grade of the surrounding area.

3. Assemblies:

Fire hydrant assemblies shall be shackled on runs of 18' or less, or restrained with an approved type of mechanical restrained joint on runs longer than 18', to the mainline per Standard Plan 3-1.

- a. Public fire hydrants shall be painted white.
- b. Private fire hydrants shall be painted yellow.
- c. Private fire hydrant assemblies require an approved double check detector assembly (DCDA) located on private property as near as possible to the right-of-way line. Installation of the DCDA shall be per Section 3.16 Backflow Prevention and Standard Plan 3-18
- d. An isolation valve shall be installed at the connection to the City watermain.

3.6.G Access Roads

Access roads to all appurtenances are required for maintenance. Access and/or maintenance roads (where required) shall be 15' wide and shall accommodate turning movements for a BUS-40 design vehicle. Access and/or maintenance roads will require an approved all-weather surface, and shall be designed to support an HS-20 vehicle load. The profile grade of an access road shall not exceed 15 percent. Access roads with grades exceeding 12 percent shall be paved. All access roads longer than 150' from the nearest face of curb or edge of pavement of the connecting street shall have approved standard hammerhead turnaround per Standard Plan 3-21, or shall be looped to connect back to a public street. Whenever an easement or right-of-way is fenced, a gate shall be installed matching the width of the easement and a City lock must be placed in "series".

3.6.H Casings

Where a water line passes under or through a retaining wall or is attached to a bridge structure, the pipe shall be cased in steel pipe at least 4" larger than the largest outer diameter of the bell or joint of the water line. No pipe joints will be allowed within the casing, except on bridge

structures or unless otherwise approved by the Engineer. The casing shall extend on either side of the wall a distance equal to the height of the retaining wall, plus 4'. All voids within the casing shall be filled with blown sand except on bridge structures. Casing spacers shall be Cascade Waterworks Manufacturing Company stainless steel casing spacers or approved equal. The casing spacers shall be installed such that the water line is centered and restrained within the casing and spaced such that a uniform profile grade will be maintained within the casing.

3.7 DELETION OF MAINS, STUBS, VALVES AND WATER SERVICES

The Developer shall be responsible for abandoning existing watermains, stubs, valves, water services, and/or appurtenances adjacent to the property being developed when there is no further need for them, or when required by the Engineer as described below:

3.7.A Watermains and Appurtenances

Watermains and appurtenances shall be abandoned by removal and disposal, capping, and/or plugging the cut ends with concrete at the discretion of the Engineer. The plug shall be a minimum of two and one-half (2.5) times as long as the inside diameter of the pipe being abandoned. Any asbestos cement pipe which is to be removed or abandoned in place shall be done in accordance with State and Federal regulations.

3.7.B Stubs, Stub Valves and Appurtenances

Stubs, their valves and appurtenances shall be removed and disposed of, and the tee shall be plugged with a mechanical joint plug or blind flange.

3.7.C Gate Valves

Gate valves on stubs to properties being served by the proposed development not meeting these Standards shall be removed and replaced with new resilient wedge gate valves.

3.7.D Water Services Deletion

1. The Developer must write a letter to the City of Kent Finance Customer Service Section requesting that the service be deleted. The water service(s) shall then be abandoned by turning the corporation stop off at the main, cutting and removing a minimum 1' section of the service line from the corporation stop and capping the corporation stop with a brass cap. The City will remove the meter once the Developer has removed the 1' of service line and capped the service.
2. Water services larger than 2" shall be abandoned per Section 3.7.A above.

3. The Engineer or designee reserves the right to change the above requirements to better fit unforeseen existing conditions in the field as they are discovered.

3.8 PRIVATE FIRE SYSTEMS

Backflow prevention assemblies shall be installed at each fire service connection to the City watermain. All backflow assemblies shall be from the latest approved list from the WSDOH, and approved by the Engineer prior to installation.

The double check detector assembly, reduced pressure detector assembly, or double check valve assembly shall be designed in accordance with the latest edition of the AWWA's "Cross Connection Control Manual" Pacific Northwest Section; and the Standard Plans. Single detector check assemblies are not allowed by the City as backflow prevention assemblies.

3.8.A Double Check Detector Assemblies (DCDA)

Approved DCDA's are required on the following fire protection systems:

1. Wet systems including those with an in-line booster pump or buildings over 30' high.
2. Systems with a pumper connection within seventeen hundred (1,700') of an approved auxiliary water supply source, as designated by the Fire Marshal and the Engineer.
3. Private looped systems or any system with private yard hydrants.

3.8.B Reduced Pressure Detector Assembly (RPDA)

Approved RPDA's are required for all high hazard fire systems including, but not limited to, the following:

1. Systems where an unapproved (non-City potable) source is permanently connected to the fire system, including private storage reservoirs.
2. All foamite or chemically charged installations.
3. Systems in which anti-freeze is allowed.

3.8.C Double Check Valve Assembly (DCVA)

Approved DCVA's are required for all residential fire systems including, but not limited to, the following:

1. When grades exceed 12 percent on accessible routes of travel from designated fire department locations.
2. When the residence exceeds 3,600 square feet.
3. Where fire hydrants are not within acceptable limits from the residence as determined by the Fire Marshal.

4. Where fire flows are less than 1,500 gallons per minute.

3.8.D Installation Requirements

The required backflow prevention assembly shall be installed in accordance with the following:

1. DCDAs shall be located on private property, at or as near as possible to the edge of the City right-of-way, in a location approved by the Engineer in an above ground enclosure of adequate size and structural design for the specific Site application, as indicated on Standard Plan 3-18. DCDAs may be allowed in a below grade reinforced concrete vault per Standard Plan 3-18, only with the approval of the Engineer.
2. The DCDA may be installed in a building only where zoning allows for a 0' setback in the Downtown Overlay District. See Standard Plan 3-18.

3.8.E System Upgrade

Where an existing fire line and/or yard hydrant system is extended to serve a new building or a building addition, the existing fire line, fire hydrant(s) and/or yard hydrant and all related backflow protection assemblies shall be upgraded to comply with current City codes, these Standards, Standard Plan 3-18 and the latest edition of the AWWA "Cross Connection Control Manual" Pacific Northwest Section.

3.9 DOMESTIC WATER SERVICE

Each service connection to the City watermain shall be metered. Unless specifically approved otherwise, all buildings shall have a separate service connection and a single meter.

All domestic and industrial consumption of water, except for fire systems, shall be metered. Water service connections and plumbing shall conform to relevant Washington State Plumbing Codes and these Standards. All domestic water service connections require an approved water permit from the City. The City shall own and maintain the water service from the watermain to, and including, the water meter, as well as the meter box and setter. The service line, from the connection to the setter to the premises or building is the sole responsibility of the Developer per Kent City Code 7.02.040.

3.10 WATER METERS

All water meters shall be located within an easement or right-of-way, and shall be located in such a manner as to provide easy access for the meter reader and maintenance and operations crews.

3.10.A Service Installation

The Developer shall be responsible for the installation of all new domestic water services from the water main. The Developer shall also be responsible for relocation, reconnection, replacement and abandonment of existing services. All new construction, service upsizing, or service relocations shall require the service to be renewed back to the main. Water services may be required to be upgraded to these Standards at the discretion of the Engineer when a remodel, demolition, or change in type of use is made. Existing services no longer providing service shall be abandoned in accordance with these Standards. All costs are to be borne by the Developer.

The location of the service line shall be as shown on the approved Engineering Plans, or as directed by the Engineer. There shall be a minimum 3' separation between service taps at the water main, and installed as near perpendicular as possible to the street centerline where applicable. The Engineer, or designee, shall inspect the installation and verify the pressure test prior to approval to backfill. The meter box shall be installed to final grade, and final approval granted prior to the installation of the water meter. See Section 3.12 for meters larger than 2".

3.10.B Meter and Meter Box Location

1. New Service - The meter shall be located so that the meter box is directly behind the sidewalk, or curb if there is no sidewalk, and perpendicular to the street, with the top of the angle stop 8-10" below the finish grade. See Standard Plans 3-10 and 3-11.
2. Exception – If there is no sidewalk between the edge of pavement and the property line, the meter box will be installed behind the shoulder and/or ditch at a location approved by the Engineer. It will be necessary to culvert the ditch at the meter location for meter reading access.
3. It may be necessary to place the meter box in the sidewalk. In such cases, the edge of the meter box shall be no closer than 6" to any edge of the sidewalk. A minimum of 2" (edge to edge) must be maintained between adjacent meter boxes. See Standard Plans 3-10 and 3-11.
4. Meter boxes shall not be installed within driveway approaches unless no other location is feasible. In that case, traffic bearing meter boxes and lids shall be used.
5. It shall be the Developer's, and subsequent Owner's, responsibility to install and maintain the service from the setter connection to the premises or building served by City water, per KCC 7.02.040.

When wireless meter readers are required, they shall be installed by the Developer and become a part of the installation.

3.10.C Meter Box

The type of box shall be as follows, or an approved equal in writing by the Engineer:

Table 3.1

Meter Size	Location	Type
5/8 x 3/4 to 1"	Planters*	Carson 1220-12
5/8 x 3/4 to 3/4 "	Sidewalks, driveways or pavement, or within 5' of a driveway	Olympic Foundry #SM29
1 1/2" to 2"	Planters*	Carson 1730-15
1" to 2"	Sidewalks, driveways or pavement, or within 5' of a driveway	Olympic Foundry #SM30
3" and larger	Planters***	Concrete Vault***

* All plastic boxes are to be black polyethylene

** Installation in sidewalks, driveways or pavement will not be allowed unless there is no other feasible alternative

*** See Standard Plan 3-12

3.10.D Irrigation Box

The type of box will be as follows or approved equal in writing by the Engineer:

Table 3.2

DCVA or PRV Size	Box Type
3/4" to 1" (and all PRV's)	Carson 1324-15G
(Green lid, solid)	Carson 1324-2L
(Extension Boxes, 6")	Carson 1324B-1L
1 1/2" to 2"	Carson 1730C-1B for 15" high Carson 1730D-1B for 18" high
(Green lid, solid)	Carson 1730-P2L

3.10.E Premise Isolation

The type of box will be as follows or approved equal in writing by the Engineer:

Table 3.3

DCVA	Box Type
¾" to 2"	Same as section (D) above
3" and larger	Concrete Vault*

* See Standard Plan 3-12

Table 3.4

RPBA	Box Type
¾" and larger	Insulated Enclosure – above ground

Enclosures shall be large enough to meet the minimum clearances noted on Standard Plan 3-14.

3.10.F Meter Setter

The meter setter shall have dual-purpose end connections for iron pipe thread male adapters on both ends. It will be used with type "K" copper tubing or polyethylene plastic pipe, with a brace pipe eye and pipe to hold the setter vertical. The setter will be equipped with an angle shut-off valve with padlock wings, and on the outgoing side a check valve to prevent backflow. The check valve is to be spring loaded, of brass and stainless steel construction with a removable back for maintenance purposes. This check must be of the same type used at the present time by the Public Works Department. See Standard Plans 3-10 through 3-12.

The following products are standard. Other approved equal products require written approval of the Engineer:

Table 3.5

Meter Setter Size	Type
¾"	Ford VH 72-15W
¾" x 15"	Mueller H1422-2(Double purpose connection)
1"	Ford VH74-15W
1" x 15"	Mueller H1422-2(Double purpose connection)
1½"	Ford VFH66-15 x 13 L/BP
1½" x 15"	Mueller H1422-2L/BP
2"	Ford VFH77-15x17 L/BP

3.11 WATER SERVICE LATERALS

3.11.A Depth

The service lateral shall have a minimum cover of 24" at the meter connection and shall increase in depth to the elevation at the main. The corporation stop shall be installed at a 22 degree upward angle from the center line of the main, and must be tapped on the same side of the watermain as the service lateral. A minimum separation of 3' must be maintained between service taps through the end of the service run.

3.11.B Material

1. Shall be a minimum of 1" diameter (Iron Pipe Size).
2. Copper – Type K, per Section 9-30.6(3)A of the WSDOT Standard Specifications. Copper shall be used for all 2" diameter and smaller service laterals in areas of know contaminated soils.
3. Polyethylene – Conforming to AWWA C901, high molecular weight with a 200 psi rating, per Section 9-30-6(3)B of the WSDOT Standard Specifications. Plastic pipe shall not be used in areas subject to contamination by petroleum distillates or other contamination that potentially could leach into pipe as determined by the Engineer.
4. Service laterals that are 1-½" and 2" diameter shall be polyethylene.
5. In situations where the flow needs exceed the capacity of a 2" diameter pipe, the service lateral shall be increased to a minimum 4" diameter and shall be ductile iron pipe.

3.11.C Locator Wire

A 12-gauge solid copper, single strand continuous locating wire with plastic insulation is to be wound on the outside of all polyethylene laterals. The wire shall be stripped of insulation at the connection and then securely and permanently connected to the corporation stop at the watermain and to the meter setter so as to maintain continuity. See Standard Plans 3-10 through 3-12. No splices will be allowed in the locator wire.

3.11.D Service Saddles

The service saddle shall be an approved equal to Smith Blair, Romac, or Mueller double strap style. A 3' minimum separation will be required between other services, saddles and appurtenances.

3.11.E Corporation Stops

Ford corporation stops, or approved equals, shall be brass and are to be used to isolate the service lateral from the City watermain. They are to have iron pipe thread to connect to the saddle and the adapter. 1-½" and 2" diameter laterals shall have ball corporation stop type.

3.11.F Connections

Ford or Mueller pack joint adapters or approved equals shall be brass and are to be used to connect the service line pipe to the corporation stop and meter setter. All connections and service lines shall be placed, as near as practical, at 90 degrees to the water line.

3.11.G Water Meter Installation

The water meter shall be set by the Water Section following approval of the water permit and approval of the water service installation and final inspection. Contact the Permit Center for a current fee schedule.

3.11.H Water Use

Using water from water services prior to meter installation requires a temporary hydrant meter and check valve assembly, issued by the Water Section. Persons using water illegally will be prosecuted.

3.11.I Service Markings

In new projects or subdivisions where street improvements are to be made, each service lateral shall be marked by a "WS" in the curb where it crosses perpendicular to the curb. The marking shall be done at the time the curb is installed and shall be as-built by stationing. Lettering shall be 3" high and a minimum ¼" deep.

3.12 3" AND LARGER COMPOUND METERS

Compound meters for service connections larger than 2" shall be installed within a pre-cast concrete vault in accordance with Standard Plan 3-12. Compound meters shall be the Sensus OMNI T2 and installed by the Developer. Turbine type compound meters will only be allowed on a case-by-case basis. All services larger than 2", not including the meter, shall be pressure tested, disinfected, flushed, and have acceptable purity sample results prior to being accepted and turned on by the City. All meters are to be tested by an approved meter testing company for accuracy after installation. The test report shall be reviewed and approved by the Engineer prior to acceptance of the meter. An isolation valve in accordance with Section 3.21 shall be installed at the connection to the City watermain.

3.13 WATER USE ONLY OR DEDUCT METERS

The deduct meter is a private meter purchased, installed and maintained by the Developer downstream of the domestic meter. The reading on the deduct meter is deducted from the reading on the domestic meter to determine the monthly sewer charge. The installation of a deduct meter requires an approved Water Permit and the approval of both City and King County Department of Natural Resources Wastewater Treatment Division (KC/DNR-WTD). The City obtains approval from KC/DNR-WTD on behalf of the Developer. Contact the Permit Center for a current fee schedule.

The landscape irrigation deduct meter shall be located on private property adjacent to the City meter. The location shall be as indicated in Standard Plan 3-16. The Engineer may approve other locations prior to installation. Deduct meters located inside buildings or in access restricted areas require remote readouts to be located near the City meter. The type of meter and remote assembly shall be approved by the City and shall be subject to periodic inspections and certifications. Irrigation deduct meters do not require KC/DNR-WTD approval.

When the water use only meter is a direct service connection to the City main, the meter assembly and installation is the same as all domestic meters, however, there is no sanitary sewer charge computed for this type of service. See Standard Plan 3-16 for landscape irrigation deduct meter installation, and Standard Plans 3-10 through 3-12 for water use only service installation. A drawing is required for deduct meters used for processing equipment.

3.14 SEWER RATE METERS

The sewer rate meter is a private meter purchased, installed and maintained by the Developer. The metering system is subject to approval by the City and KC/DNR-WTD. Meter shall read cubic feet. There are several use applications:

3.14.A All Sources Discharged Metering

When the sewer rate meter is used to meter all public and/or private sources of water discharged to the sewer, the domestic meter is changed to water use only. Deduct meters are not used in this system. The sewer rate meter determines the sewer charges. This application is installed in two ways:

1. In a manhole, in line with the side sewer.
2. In the building, in plumbing pipes at location(s) that will read all public and private water that discharges to sewer.

3.14.B Partial Sources Discharged Metering

When the sewer rate meter is used to meter part of public and/or private sources of water discharged to the sewer and deduct meters are used to meter the uses not discharged to the sewer. The domestic meter determines water and sewer charges. The sewer rate meter is added to the sewer charges. The deduct meter(s) are deducted from the sewer charges. The meter for this type of installation is located in three ways:

1. In the building, in plumbing pipes at location(s) that will pick up that portion of the public and/or private sources of water discharged to the sewer but prior to its use.
2. In line with the discharge pipes of processing equipment fed from the public meter prior to discharge to the building plumbing or side sewer. This water must be free of debris that could clog the meter used.

3. In line with the discharge pipes of processing equipment fed from the public meter or private source of water. This water may contain debris.

The sewer rate meter shall be located on private property in a location that is convenient to the Developer with a remote readout located near the City water meter as approved by the Engineer. The type of meter and remote used is subject to the approval of the Engineer and shall read in cubic feet only.

The sewer rate meter requires a sewer permit from the City and waste discharge approval from KC/DNR-WTD. An industrial rate charge is normally added to the sewer bill for sewer permits with waste discharge approval as determined by KC/DNR-WTD.

3.15 CROSS CONNECTIONS

There shall be no cross connection whatsoever between the City water distribution system and any unapproved pipes, wells, pumps, private hydrants, tanks, non-potable fluid or any other contaminating materials that may backflow into the potable water system. The City's potable water distribution system includes all City owned watermain, service pipe up to and including the meter for residential services and appurtenances up to the DCVAs or DCDAs located after the water service meter.

3.16 BACKFLOW PREVENTION

The degree of public health protection required must be commensurate with the degree of hazard presented as defined in WAC 246.290. In situations of high health hazards, whether known or potential physical or toxic health hazards, air gap separation and/or reduced pressure backflow assemblies (RPBAs) shall be required. DCVAs or pressure vacuum breakers are generally utilized where low health hazard, aesthetic or detrimental effects on water quality may occur.

Each water system connection has unique problems arising from location, climatic conditions, service demands, and other factors. Consequently, each cross-connection shall be evaluated on an individual basis and the City shall make the final determination as to the degree of backflow protection required. See testing and annual inspection requirements set forth in KCC 7.02.050 through 7.02.105.

Backflow protection assemblies proposed for use can be found on the current list of approved assemblies by the WSDOH. All backflow assemblies are required to be tested annually by a Washington State certified backflow assembly tester. Copies of these inspection reports shall be sent to the City: Public Works Operations, Attn: Water Manager, 5821 South 240th St., Kent, WA 98032.

A separate water permit will be required for each backflow device installed. An annual inspection and fee will be required for each backflow device.

3.17 PREMISE ISOLATION

Where the City determines protection of the public water distribution system is necessary, a backflow preventer shall be installed at the property line commensurate with the degree of hazard as defined in WAC 246.290.490. A sample use requiring such protection would be a medical/dental office building. Installation of air gaps shall be approved by the City based on submitted drawings in accordance with the latest edition of the City of Kent Cross-Connection Control Program Manual. RPBA's shall be per Standard Plan 3-14.

In situations where a non-residential building has multiple tenants or the potential to have future multiple tenants, an RPBA per Standard Plan 3-14 shall be required at the property line.

3.18 IRRIGATION SYSTEM

Irrigation system cross connection protection is required for all irrigation systems. In areas of flooding, on hillside installations, or where injection systems are used, an RPBA is required. See Standard Plan 3-14.

3.19 WATERMAIN MATERIALS

The installation of watermains and the materials used shall be in accordance with the applicable sections of the WSDOT Standard Specifications, except as herein modified.

3.19.A Watermains and Fittings

The following materials and appurtenances are accepted for City watermains:

1. Pipe – Ductile iron pipe, Class 52, with cement mortar lining.
2. Joints – Mechanical or push-on joints with rubber gaskets.
3. Fittings – Cast iron or ductile iron, with cement mortar lining.
4. Fitting Joints – Mechanical or flanged joints with rubber gaskets.
5. Jointing – Coupling pipes and cut-ins shall be joined by mechanical joint ductile iron long pattern sleeves unless prior approval is given by the Engineer. "Dresser type" couplings will not be allowed, except to join different sizes or dissimilar piping materials, and only upon approval by the Engineer.
6. Installation of watermains and/or appurtenances in known contaminated materials should be avoided whenever possible. If a watermain must be installed in a location with contaminated materials, the rubber gaskets used for all joints shall be Viton gaskets composed of FE, fluoroelastomer, or fluorocarbon rubber.

3.19.B Water Valves

1. Gate Valves – Shall be used for 16" diameter and smaller applications and shall be resilient wedge per AWWA standards.
2. Butterfly Valves – Shall be used for larger than 16" diameter applications and shall be per AWWA standards. Valves larger than 16" shall have a 6" by-pass with a gate valve.
3. Valve Operation – All valves must open by rotating the valve stem in the counter clockwise direction.
4. Valve Joints – Mechanical or flanged fittings.
5. Stem Nuts – Valve stem nuts shall be no shallower than 1-½' and no deeper than 3' below finished grade. In cases where valves are deeper, an extension rod assembly with a rock guard must be installed on the operating nut. See Standard Plan 3-7.
6. Valve Marker Posts – Concrete valve marker posts shall be furnished and installed for each valve located outside of the paved street. Marker posts shall be white with black lettering. See Standard Plan 3-4.

3.19.C Valve Box

1. Valve boxes in all areas, except as described in Section 3.19.C.2 below, shall include the following components:
 - a. Valve Box Bottom Section –VB1C or Rich 24" bottom compatible with the top section.
 - b. Valve Box Top Section with Covers –VB 940 with a 2" "deep skirt" cover and "WATER" cast in the cover.
 - c. Covers shall be installed with the ears in line with the water flow. See Standard Plan 3-7. Alternates must be standard equals.
2. Transmission Main:
 - a. Zone Separation or other applications specified by the Engineer.
 - b. Valve Box Bottom Section –VB1C or Rich 24" bottom compatible with the top section.
 - c. Valve Box Top Section with Covers –VB-045D/T with compatible cover and "WATER" cast in the cover. Covers shall be installed with set screws in line with the water flow. See Standard Plan 3-7. Alternates must be standard equals.

3.19.D Fire Hydrant Assemblies

Fire hydrants shall be compression type, break-away (traffic model) hydrants conforming to AWWA C502, except as herein modified. See Standard Plan 3-1.

1. Valves and Nozzles:

Fire hydrants shall have a bottom valve size of at least 5", one 4-½" pumper nozzle and two 2-½" nozzles. Nozzles shall have National Standard Threads (NST), with 1-1/4" pentagonal nuts on the nozzle caps and operating nut.

2. Hydrant Leads:

The hydrants leads shall be a minimum of 6" in diameter. An auxiliary valve shall be installed in the hydrant lead located at the connection to the City main.

3. Drainage:

All hydrants shall be equipped with a drain. A gravel pit or dry well shall be provided. Hydrant drains shall not be connected to, or located within, 10' horizontally of sanitary sewers or storm drains.

4. Painting:

Public owned hydrants shall be painted with two (2) coats of Farwest Wonderglow Quickset white gloss enamel #1100 series - V1814-W. Private hydrants shall be painted with two (2) coats of Farwest Wonderglow Quickset yellow gloss #1100 series - V1814-Y, #3472.

5. Fire Hydrant Guard Posts:

Concrete fire hydrant guard posts shall be furnished and installed with fire hydrants as required by the City. After installation, the posts shall be painted with two (2) coats of Farwest Wonderglow Quickset Gloss Alkyd Enamel #1100 series and match the color of the hydrant installed.

6. Standard Fire Hydrant Types:

Standard Fire Hydrant types shall be Clow Medallion, Mueller Centurion or M&H 929. No Corey type hydrants allowed.

7. Fire Hydrant Clearance:

3' clearance with maximum 2 percent slope shall be provided around all fire hydrants, as well as clear access to/from the traveled way.

3.20 WATERMAIN INSTALLATION

3.20.A Pipe Bedding and Foundation Material

Pipe bedding shall be placed under and all around the pipe meeting the requirements of Gravel Backfill for Pipe Zone Bedding per Section 9-03.12(3) of the WSDOT Standard Specifications, latest edition. It shall be compacted in layers around the pipe and to a sufficient height above the pipe to adequately support and protect the pipe to 95 percent compaction ASTM D-1557. See WSDOT Standard Specifications and Standard Plan 3-22 in this chapter.

Where determined necessary by the Engineer, ballast material shall be used below the pipe bedding to stabilize the trench. This ballast shall meet the requirements of shoulder ballast per Section 9.03.9(2) of the WSDOT Standard Specifications.

3.20.B Pipeline Cover (Backfill)

All watermains shall be covered with sufficient earth or other insulation to prevent freezing. The pipe shall be placed at a constant profile grade to provide the minimum cover as shown below and to allow for the release of air within the system. The minimum depth of cover for watermains is:

Table 3.6

Main Size	Minimum Cover
10" and smaller	36" cover
12" and larger	48" cover

Pipe trench backfill shall be crushed surfacing top course (CSTC) under all arterial classifications of roadways and those local streets adjacent to commercial or industrial land uses. Gravel borrow shall be used for pipe trench backfill in all other locations if, in the opinion of the Engineer, existing trench Excavation soils are unsuitable. CSTC or gravel borrow shall be from a pit approved by the Engineer and shall meet the requirements of CSTC per Section 9.03.9(3) or gravel borrow per Section 9.03.14(1) of the WSDOT Standard Specifications. Each layer shall be compacted to 95 percent in paved areas and 90 percent in unpaved areas in accordance with ASTM D 1557, in lifts not to exceed 18". The maximum particle size shall not exceed 6" or 2/3 the depth of the layer being placed, whichever is less.

Pipe trench backfill for lateral runs crossing existing or proposed improved City streets shall be CSTC meeting the requirements of Section 9.03.9(3) of the WSDOT Standard Specifications.

In paved areas, the trench patching shall be in accordance with Standard Plans 3-64 through 3-69.

3.20.C. Blocking

All fittings changing the horizontal or vertical alignment of the pipe shall be installed with Class 3000 cement concrete thrust blocking in conformance with Section 6-02.3 of the WSDOT Standard Specifications. Blocking shall bear against solid undisturbed earth at the sides and bottom of the trench Excavation and shall be securely wrapped with 4-mil polyethylene sheeting. Restrained joint pipe shall be required in areas where soils consist of peat or other low bearing strength materials or other areas as determined by the Engineer. Tie rods can be used in conjunction with thrust blocking for hydrant installations See Standard

Plan 3-1 or fittings as approved by the Engineer. Mega Lugs or Mechanical Restrained Joint Pipe may be used in place of blocking only upon approval by the Engineer.

3.20.D Corrosive Soils

In areas with corrosive soils, and at the sole discretion of the City Engineer, the watermain shall be encased in 4-mil high density polyethylene, in accordance with Method A of the most recent M41 AWWA Manual and all applicable AWWA Standards.

3.21 CONNECTION TO AN EXISTING WATER MAIN

A physical separation between all untested and potentially contaminated watermains (or main extensions) and the City's existing water system shall be maintained at all times unless the connection is protected by an approved City and WSDOH backflow device. See Standard Plan 3-2.

A hydrant meter and an approved backflow prevention device shall be used whenever drawing water from the City's water system. Hydrant meters and backflow prevention devices may be obtained from the Public Works Operations Division, Water Section located at 5821 South 240th Street. The Developer will be required to complete the billing forms for a Water Permit and making the required damage deposit. There will be a charge for all water used in accordance with KCC 7.02.180 - Temporary Water Meters.

Prior to the new watermain being installed, the contractor has the option of cutting in the connection tee on the existing watermain, or providing potable water from an existing hydrant or blowoff to provide a temporary water supply. If the contractor chooses the option of installing a new connection tee, the contractor shall install new resilient wedge valves on all sides of the tee, or otherwise as required by the Engineer. A mechanical joint plug with a 2" minimum tap and proper blocking shall be installed on the new incoming mainline valve at the new tee with piping accessible to accommodate filling the new water main.

3.22 CUBING

Foam cubes (pigs) shall be inserted into and pushed through the new water main to remove any residue, dirt, debris, obstruction or possible foreign material in the new water main.

3.22.A Cube Usage

1. The Water Section will supply the foam cubes to the contractor based on the water system design as shown on the approved Engineering Plan.
2. The Developer shall pickup the cubes at Public Works Operations and shall install two (2) foam cubes at the initial connection and two (2) foam cubes at each lateral connection 6" in diameter and larger

(downstream of each connecting valve), as the new main is installed. This would include all 6" and larger diameter lateral runs to hydrants that are longer than one full pipe length, or have more than a single joint in them.

3. A mechanical joint cap with a 2" minimum tap shall be installed with proper blocking at the initial connection point on the new main with piping accessible to accommodate both flushing and chlorine injection.
4. The Water Section shall retrieve the foam cubes when the contractor performs the cubing process. All cubing and flushing shall be under the supervision of the Water Section or the Inspector.
5. To accommodate the launch and the retrieval of the cubes, the minimum blow-off size shall be 6" for watermain diameters up to 12".
6. It shall be the contractor's responsibility to properly dispose of all flush water per Section 3.23 below as well as locating and retrieving any "lost" or missing cubes or partial cubes from the watermain.
7. In the event that the initial cubing does not adequately clean the new water mains, the contractor shall be required to provide additional point(s) for launching and retrieval of additional cubes, and re-cube those sections of main that have debris in them until clean, as determined by the Water Section.

3.23 CHLORINE INJECTION

After the Developer has cleaned the watermain by Cubing and flushing, the Developer shall inject a liquid chlorine solution evenly throughout the new main and all connections and Appurtenances for complete and optimal disinfection. The chlorine dosage shall be a minimum of 50 mg/l and a maximum of 100 mg/l. AWWA C651-99 Standards include detailed procedures for the adequate disinfection, flushing and microbiological testing of all watermains. If the Developer wishes the Water Section to do the injection, the Inspector shall give the Water Section five (5) working days notification to perform the chlorine injection. The Contractor must sign a waiver holding the City harmless for any failure of purity samples due to the work performed by the Water Section, as well as agreeing to reimburse the City for all costs associated with the disinfection process. Work may be scheduled after hours, outside of the 5-day notification period, or refused by the City due to manpower or workload constraints.

The chlorine shall remain in the main for the time specified according to the procedure used from AWWA Standards C651-99. After the 24-hour disinfection period, the remaining residual throughout the watermain and Appurtenances shall not be lower than 25 mg/L, if so it would require reapplication of chlorine. The Contractor shall be responsible for disposing of all chlorinated water. Chlorinated water shall be disposed of in an approved sanitary sewer. If a sanitary sewer is not available, or the capacity of the sanitary sewer will be at risk, the Developer shall be responsible for disposing of the water per all applicable regulations.

Amount of chlorine needed to produce 50mg/L in 18' of pipe (one pipe length) for 5.25% household bleach (with no additives), 12.5% sodium hypochlorite solutions and 65% available dry calcium hypochlorite is shown in the following table.

Table 3.7

Diameter	5.25% (gal)	12.5% (gal)	65% (lb)
4"	0.009	0.005	0.007
6"	0.022	0.011	0.017
8"	0.039	0.019	0.029
10"	0.061	0.031	0.052
12"	0.087	0.044	0.047
16"	0.156	0.078	0.119
18"	0.197	0.098	0.152
24"	0.352	0.176	0.271
30"	0.548	0.275	0.422

Formula: Gals Required = (Pipe Length/18) x Disinfectant Amount

Example: How many gallons of fresh 5.25% sodium hypochlorite will be required to disinfect 5,000' of 8" main?

$$5,000' \div 18' = 278 \text{ lengths of } 8" \text{ pipe}$$

$$278 \times 0.039 = 11 \text{ gallons required}$$

All Costs for re-injecting, including the Inspector's time to come back due to the Developer "not being ready," will be the responsibility of the Developer. Costs shall be the actual costs including hourly overtime rate for labor, overhead, equipment and materials and any other associated charges. The costs shall be based on the latest cost schedule prepared and approved annually by the Engineer.

3.24 BACTERIOLOGICAL PURITY SAMPLES

Two (2) consecutive sets of acceptable purity samples, taken at least 24 hours apart, shall be collected from representative points of the new watermain, all appurtenances and all other connections to the new watermain(s).

Water Section personnel will take the first bacteriological purity sample(s) after the chlorine is removed, flushing is completed and the chlorine level is no greater than, or less than, the level present in the adjacent distribution system. Water services installed prior to watermain testing shall also be purity tested with the water main and all other connections to the new watermain. The second set of purity samples shall be taken 24 hours after the first set of samples. A representative background

sample of the City water system may be taken from the distribution source at the same time purity samples are taken from the new main.

In the event that the Water Section or the Inspector determines that trench water, dirt or debris has entered the new main during construction, the first purity samples shall not be taken until the water has stood in the new main for at least 16 hours after final flushing. As above, the second set of purity samples shall not be taken until the water in the new main has stood for an additional 24 hours.

No water shall be flushed during the 16- or 24-hour incubation periods described above, or prior to the purity samples being taken.

It shall be the Developer's responsibility to make arrangements to transport the sample(s) to a state-certified laboratory approved by the Water Section. The Developer shall be responsible for paying all costs for the purity samples.

Two (2) consecutive samples, 24 hours apart, must show no coliform presence before performing final connections to the existing water system.

The Water Section may be available during normal working hours, depending upon workload, (7:30 am to 4:00 pm), excluding holidays and weekends, to take purity samples, assist with cubing and chlorine injections. The Developer shall reimburse the City for all associated costs including labor, overhead, equipment, and material charges. Outside of normal working hours, the Developer shall reimburse the City at the most current hourly overtime rate for labor, overhead, equipment and material and any other associated charges. The costs shall be based on the latest cost schedule prepared and approved annually by the Engineer.

3.25 PRESSURE AND LEAKAGE TESTS

All new water mains, extensions of existing mains, water system appurtenances and water services larger than 2" shall be pressure tested for leakage in accordance with Section 7-17.3(2) of the WSDOT Standard Specifications. Water appurtenances 2" and smaller installed prior to watermain testing shall also be pressure tested with the watermain. At no time will the temporary water system connection or backflow device remain connected or in place during the pressure test procedures.

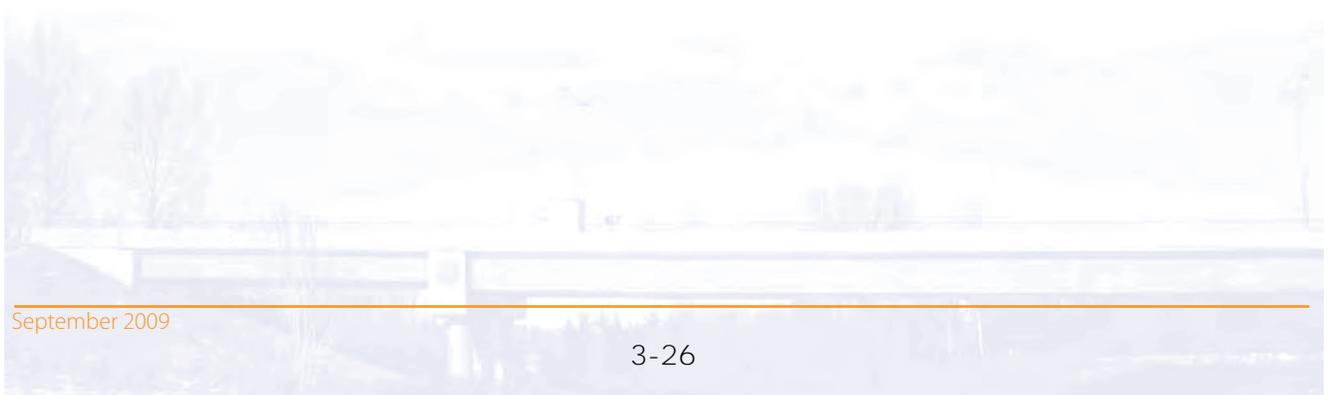
All costs for re-testing, including the Inspector's time to come back due to the Developer "not being ready," will be the responsibility of the Developer. Costs shall include labor at overtime rates, overhead, equipment, material and any other associated charges. The costs shall be based on the latest cost schedule prepared and approved annually by the Engineer.

3.26 FINAL CONNECTION(S) TO THE EXISTING WATER MAIN

When both sets of purity sample results are satisfactory and received in writing from the state-certified laboratory, and all other City water system standards have been met, the Developer shall be allowed to connect the new mains to the existing distribution system following City and AWWA Standards. It shall be the

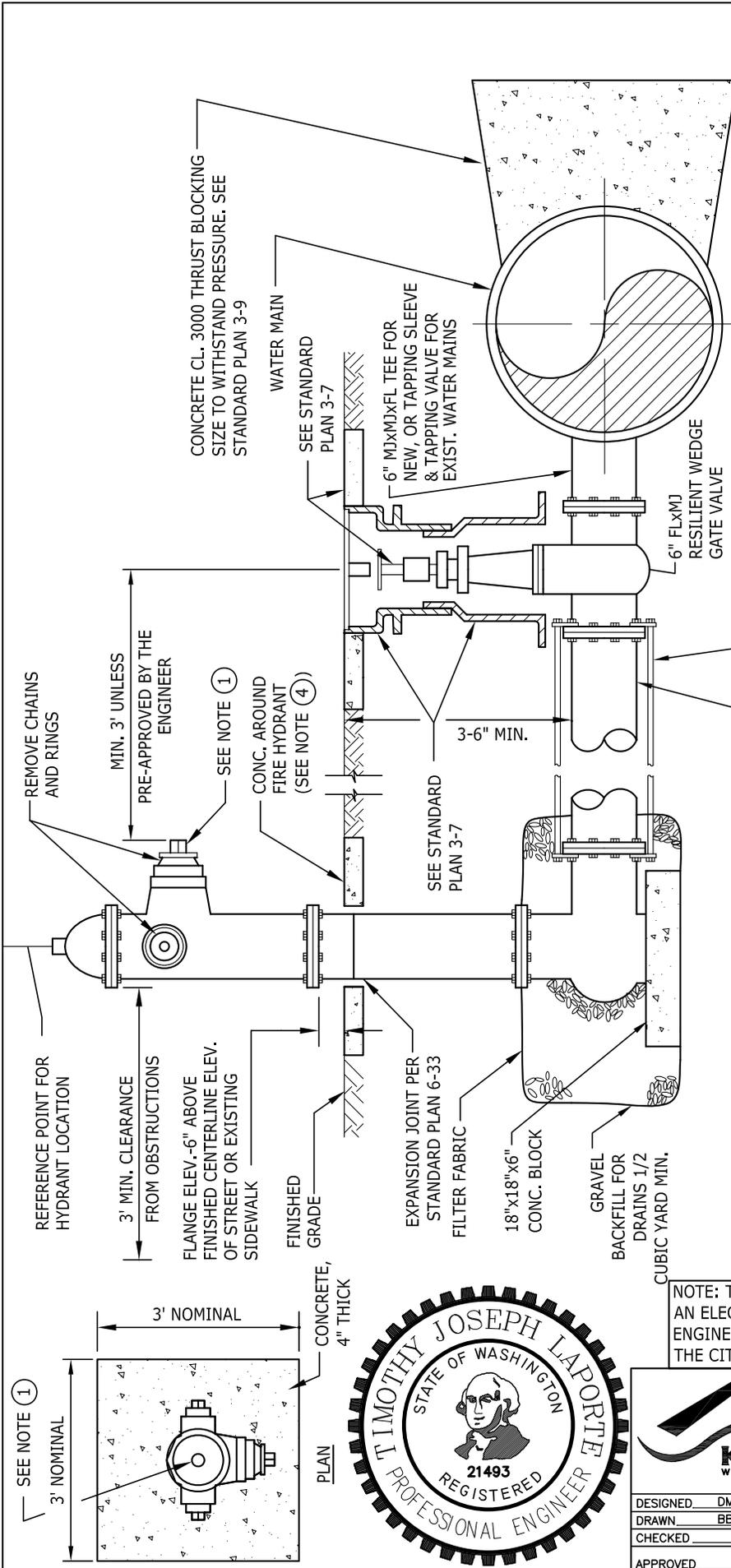
Contractor's responsibility to prevent, at all times, the contamination of the new and existing watermains with trench water, dirt, debris, or other foreign material.

The Inspector and/or Water Section representative must be present to witness the final connection(s) to the existing water system, to turn on and flush the new water system, and to place the new water system and appurtenances into service.



3.27 WATER SYSTEM STANDARD PLANS

- 3-1 Standard Fire Hydrant
- 3-2 Temporary Hydrant Connection
- 3-3 Guard Post
- 3-4 Valve Marker Post
- 3-5 Connection to Concrete Cylinder Main (4" to 12")
- 3-6 2" Connection to Concrete Cylinder Main
- 3-7 Valve Box and Operating Nut Extender
- 3-8 18" or Greater Valve By-Pass
- 3-9 Concrete Blocking
- 3-10 Service Connection 1" Service
- 3-11 Service Connection 1½" and 2" Service
- 3-12 Compound Water Meter with By-Pass
- 3-13 Pressure Reducing Valve with Box for ¾", 1", 1½" or 2" Service Lines
- 3-14 Domestic Service Connection Premise Isolation
- 3-15 Irrigation Service Installation
- 3-16 Single-Family Residential Domestic Waterline / Fireline
- 3-17 Multi-Family Residential Domestic Waterline / Fireline
- 3-18 Double Check Detector Assembly
- 3-19 Standard 6" Blowoff Assembly
- 3-20 Combination Air/Vacuum Valve and Vault
- 3-21 Tapping Sleeve and Valve Assemblies
- 3-22 Typical Pipe Trench



CONCRETE CL. 3000 THRUST BLOCKING SIZE TO WITHSTAND PRESSURE. SEE STANDARD PLAN 3-9

WATER MAIN

SEE STANDARD PLAN 3-7

6" MIX/MFL TEE FOR NEW, OR TAPPING SLEEVE & TAPPING VALVE FOR EXIST. WATER MAINS

6" FLX/MJ RESILIENT WEDGE GATE VALVE

RESTRAINED JOINT PIPE OR 3/4" STEEL SHACKLE ROD (2 PLACES) (18' MAX. LENGTH) TAR COAT OR ZINC PLATED. RESTRAINED MECHANICAL JOINT PIPE TO BE USED FOR ALL RUNS OVER 18 FEET.

REMOVE CHAINS AND RINGS

MIN. 3' UNLESS PRE-APPROVED BY THE ENGINEER

SEE NOTE (1)

CONC. AROUND FIRE HYDRANT (SEE NOTE (4))

3-6" MIN.

SEE STANDARD PLAN 3-7

6" D.I., CL. 52 LENGTH AS REQ'D

EXPANSION JOINT PER STANDARD PLAN 6-33

18"x18"x6" CONC. BLOCK

GRAVEL FOR DRAINS 1/2 CUBIC YARD MIN.

NOTES:

(1) SEE SECTION 3.6.F FOR FIRE HYDRANT TYPE.

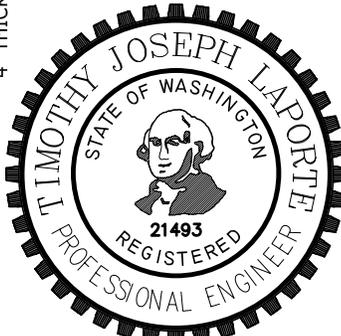
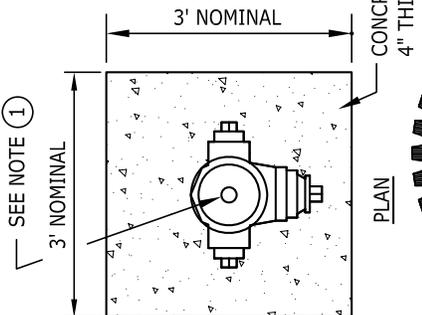
(2) PAINT HYDRANTS WITH TWO (2) COATS OF FARWEST WONDERGLOW QUICKSET HI-PERFORMANCE ENAMEL. PUBLIC HYDRANTS ARE WHITE #1100 SERIES AND PRIVATE HYDRANTS ARE YELLOW #X3472.

(3) ALL FIRE HYDRANTS SHALL BE LOCATED BEHIND SIDEWALK OR AS SHOWN ON PLANS. THE PORT CAP SHALL NOT BE OVER THE SIDEWALK.

(4) PROVIDE EXPANSION JOINT MATERIAL PER STANDARD PLAN 6-35 AROUND HYDRANT WHERE ADJACENT TO CONCRETE. PROVIDE NOMINAL 3 FT. SQUARE CONC. PAD IN ALL AREAS.

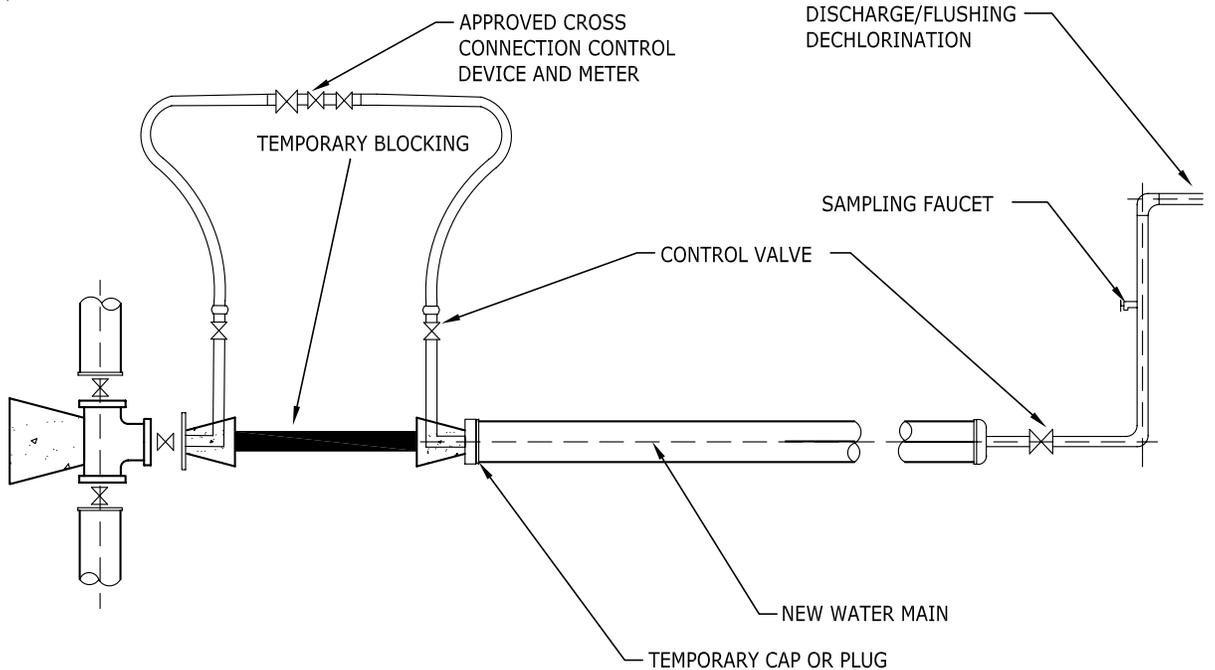
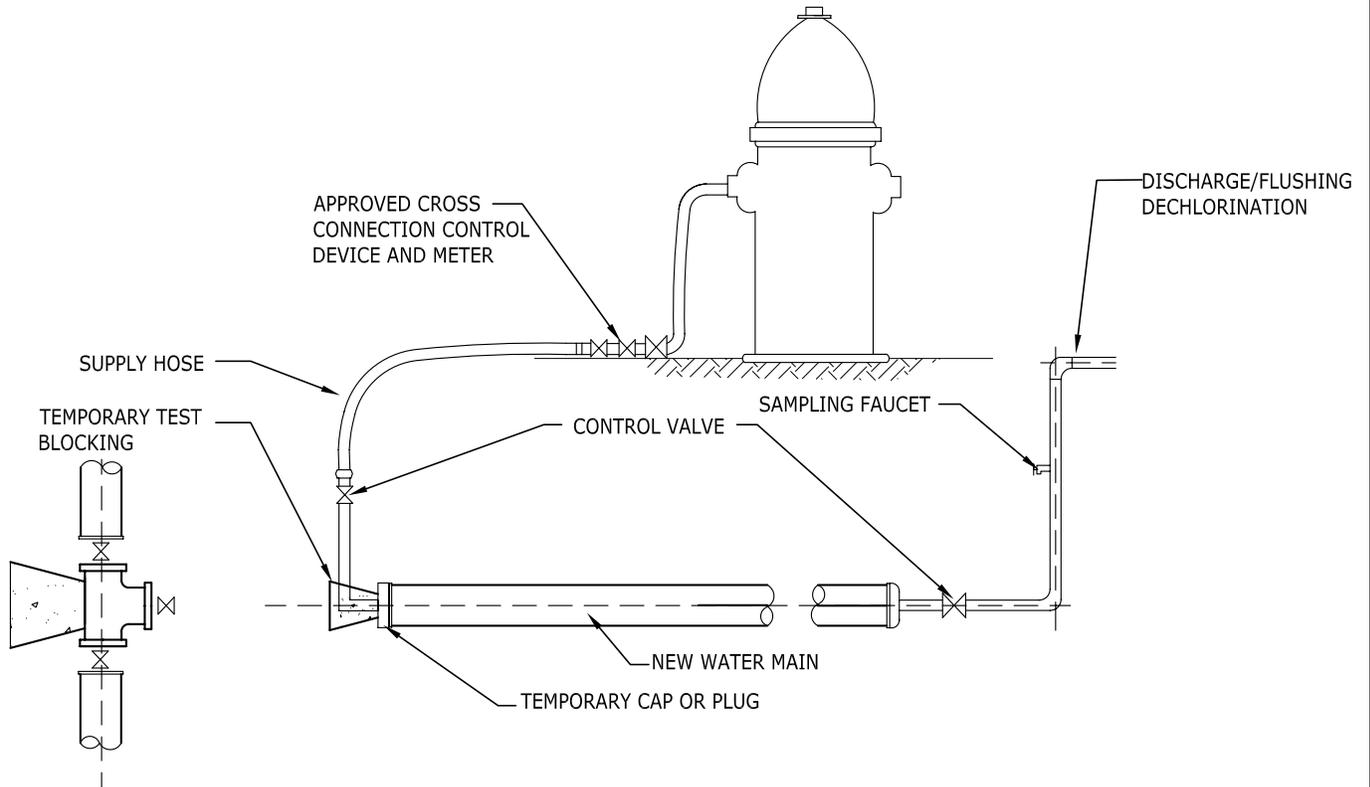
(5) SEE STANDARD PLAN 3-3 FOR GUARD POST DETAILS.

6. WHEN FIRE HYDRANTS FALL BEHIND DITCH LINE, PLACE CULVERT IN DITCH FOR MIN. OF 10' & BACK FILL WITH CRUSHED SURFACING TOP COURSE. RIP RAP ENDS AS NEEDED FOR EROSION CONTROL.
7. NO HYDRANT SHALL BE INSTALLED LESS THAN 10 FEET FROM THE EDGE OF A PRIVATE STREET OR DRIVEWAY APPROACH.
8. FIRE HYDRANT SHALL FACE THE ADJACENT STREET UNLESS DIRECTED OTHERWISE BY THE ENGINEER.
9. A TEMPORARY USE HYDRANT PERMIT, METER AND CHECK VALVE ASSEMBLY ARE REQUIRED FOR DRAWING WATER FROM HYDRANTS. PERSONS DRAWING WATER ILLEGALLY WILL BE PROSECUTED.



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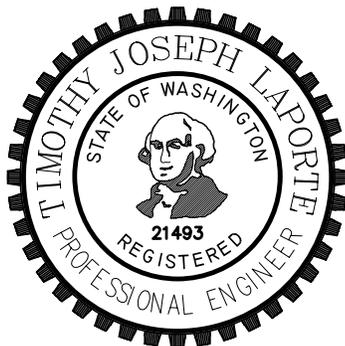
		CITY OF KENT ENGINEERING DEPARTMENT	
		STANDARD FIRE HYDRANT	
DESIGNED: DMW	SCALE: NONE	STANDARD PLAN 3-1	
DRAWN: BB	DATE: _____		
CHECKED: _____	ENGINEER: _____		
APPROVED: _____			



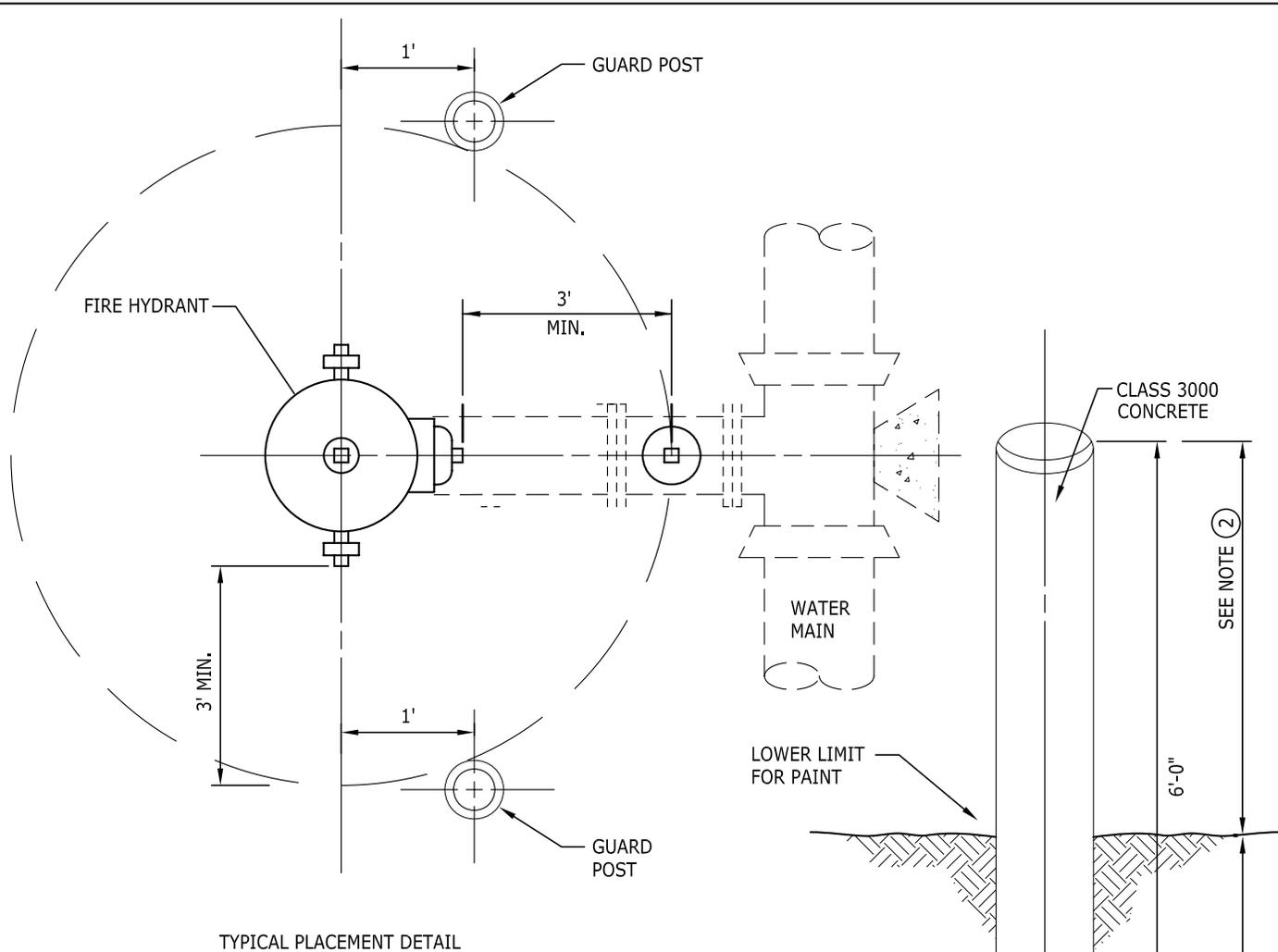
NOTES:

1. THE USER SHALL PROVIDE THEIR OWN GATE VALVE BETWEEN THE METER AND DISCHARGE POINT.
2. CROSS CONNECTION CONTROL DEVICE AND METER SHALL BE SUPPORTED IF NOT RESTING ON THE GROUND.

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		CITY OF KENT ENGINEERING DEPARTMENT	
		TEMPORARY HYDRANT CONNECTION	
DESIGNED _____	SCALE	NONE	STANDARD PLAN
DRAWN _____	DATE	6-11-99	3-2
CHECKED _____	ENGINEER		
APPROVED _____			

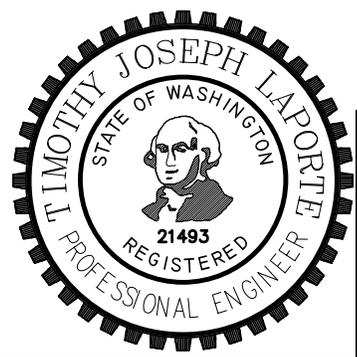


TYPICAL PLACEMENT DETAIL

NOTES:

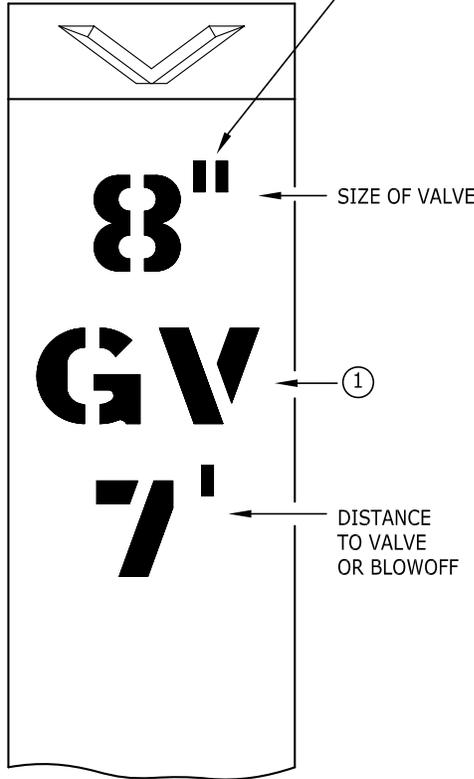
1. THE FOG-TITE HYDRANT GUARD POST IS PRE- APPROVED. ALL OTHERS REQUIRE WRITTEN APPROVAL OF THE ENGINEER PRIOR TO INSTALLATION
- ② GUARD POST ARE INSTALLED WITH TOPS SET AT THE SAME HEIGHT AS THE HYDRANT. IF MORE THAN ONE POST IS SET, THEY SHALL BE SET AT THE SAME HEIGHT.
3. PAINT EXPOSED POST THE SAME COLOR AS THE FIRE HYDRANT. SEE STANDARD PLAN 3-1
4. SEE STANDARD PLAN 3-1 FOR FIRE HYDRANT DETAILS.
5. GUARD POSTS ARE NOT USED WHERE FIRE HYDRANT IS LOCATED BEHIND CURB AND GUTTER OR POSTED SPEED LESS THAN 40 MPH
6. GUARD POST SHALL BE LOCATED OUTSIDE OF THE CLEAR ZONE. SEE STANDARD PLAN 6-50.
7. FOR USE ON PRIVATE PROPERTY.

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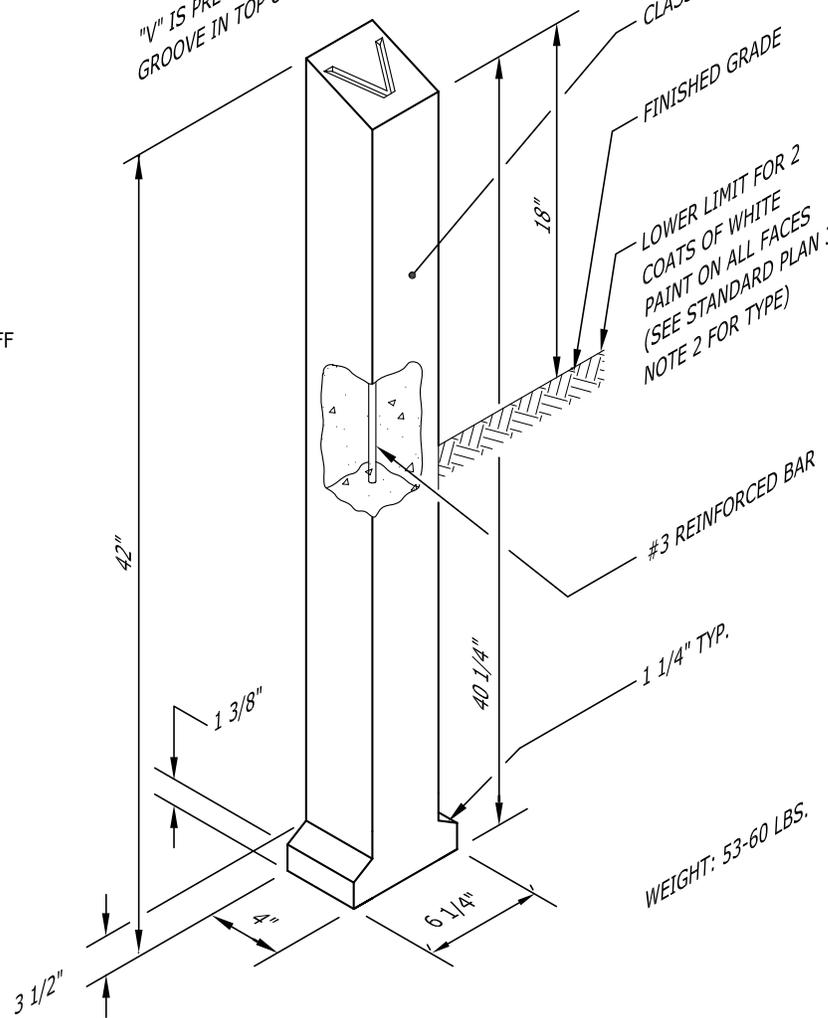
		CITY OF KENT ENGINEERING DEPARTMENT	
		GUARD POST	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN 3-3	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			

TYPICAL 2" HIGH BLACK STENCIL MARKINGS ON THIS FACE ONLY. HOMERIGHT PAINT.



"V" IS PRE-CAST GROOVE IN TOP OF POST.

CLASS 3000 CONCRETE
FINISHED GRADE
LOWER LIMIT FOR 2 COATS OF WHITE PAINT ON ALL FACES (SEE STANDARD PLAN 3-1 NOTE 2 FOR TYPE)

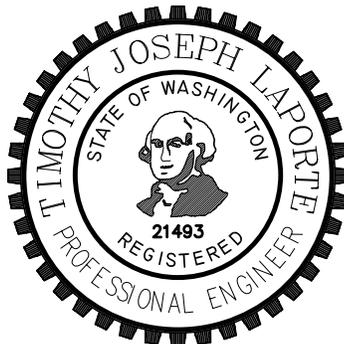


- ①. USE
"GV" FOR GATE VALVE
OR
"BV" FOR BUTTERFLY VALVE
OR
"BO" FOR BLOWOFF ASSEMBLY

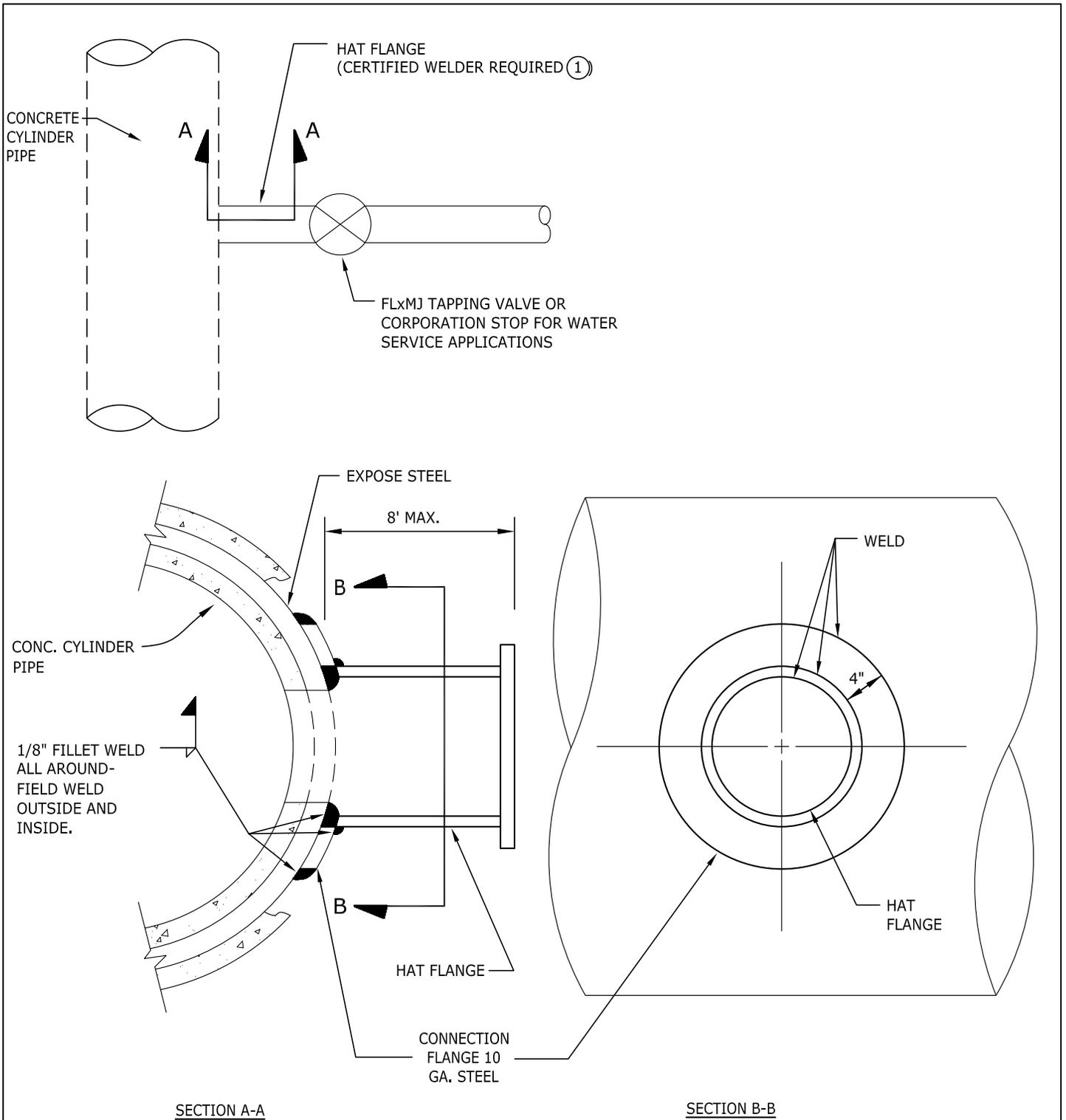
NOTES:

- FOR USE ON PRIVATE PROPERTY.
- THE FOG TITE INC. VALVE MARKER POST WITH THE "WATER" LEGEND IS THE PRE-APPROVED PRODUCT. ALL OTHERS REQUIRE THE WRITTEN APPROVAL OF THE ENGINEER PRIOR TO INSTALLATION.

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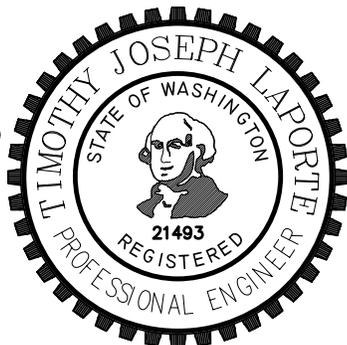


		CITY OF KENT ENGINEERING DEPARTMENT	
		VALVE MARKER POST	
DESIGNED: DMW	SCALE: NONE	STANDARD PLAN 3-4	
DRAWN: BB	DATE:		
CHECKED:	ENGINEER		
APPROVED:			



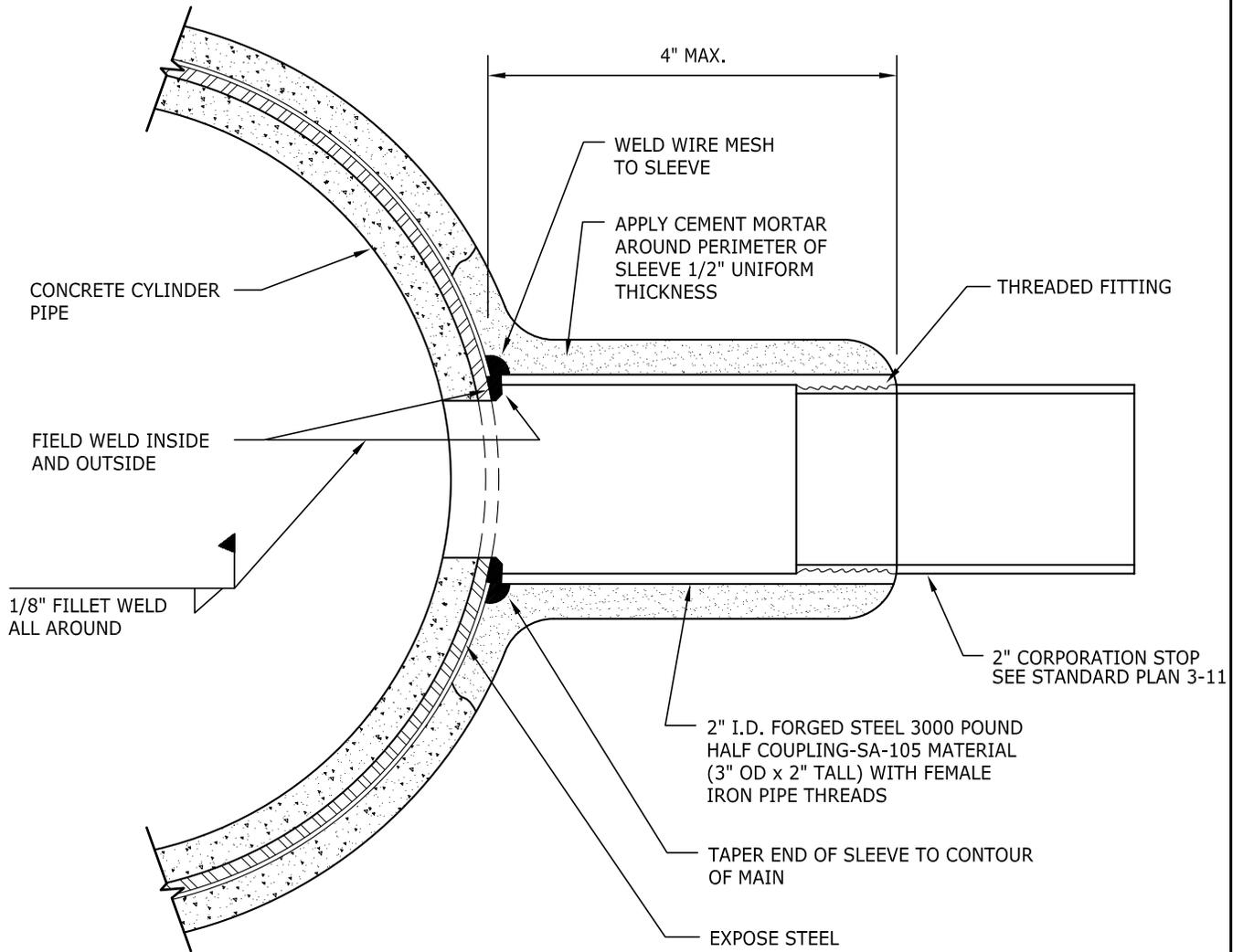
NOTES:

- ① CERTIFIED WELDER SHALL BE PRE-APPROVED BY THE CITY OF KENT WATER DEPARTMENT.
2. FLANGE & VALVE TO BE PRE-APPROVED BY THE CITY OF KENT.
3. APPLY CEMENT MORTAR TO COVER ALL EXPOSED STEEL. (1/2" UNIFORM THICKNESS) EXCEPT THE BOLTED FLANGE AREA.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		CONNECTION TO CONCRETE CYLINDER MAIN (4" TO 12")	
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED			
APPROVED		ENGINEER	
			3-5



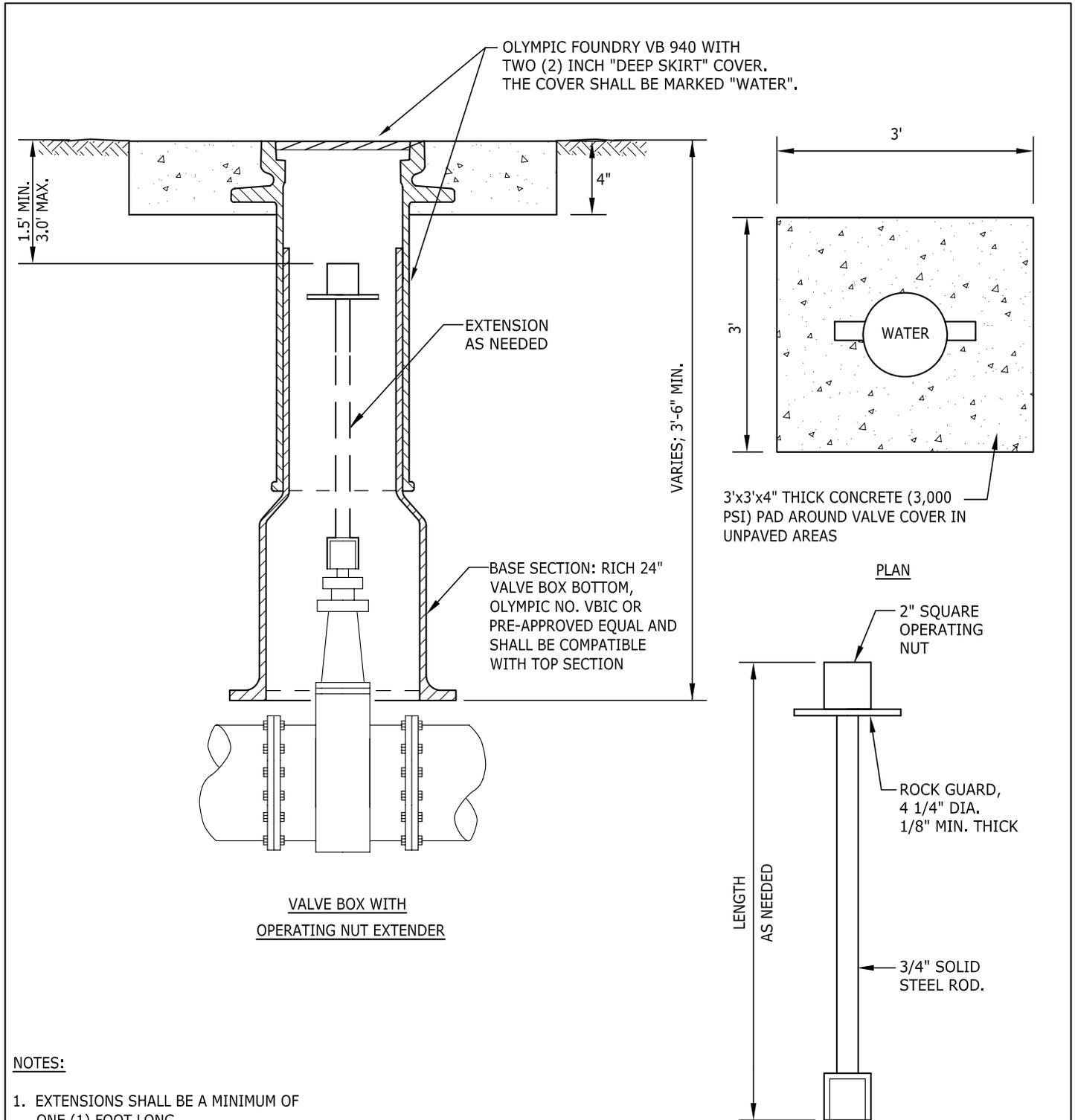
NOTE:

CERTIFIED WELDER SHALL BE PRE-APPROVED BY THE CITY OF KENT WATER DEPARTMENT.

NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION IS KEPT ON FILE AT THE CITY OF KENT. A COPY MAY BE OBTAINED UPON REQUEST.

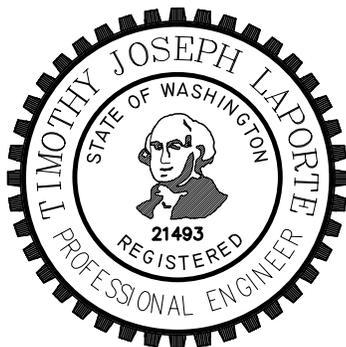


		CITY OF KENT ENGINEERING DEPARTMENT	
		2" CONNECTION TO CONCRETE CYLINDER MAIN	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN 3-6	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			



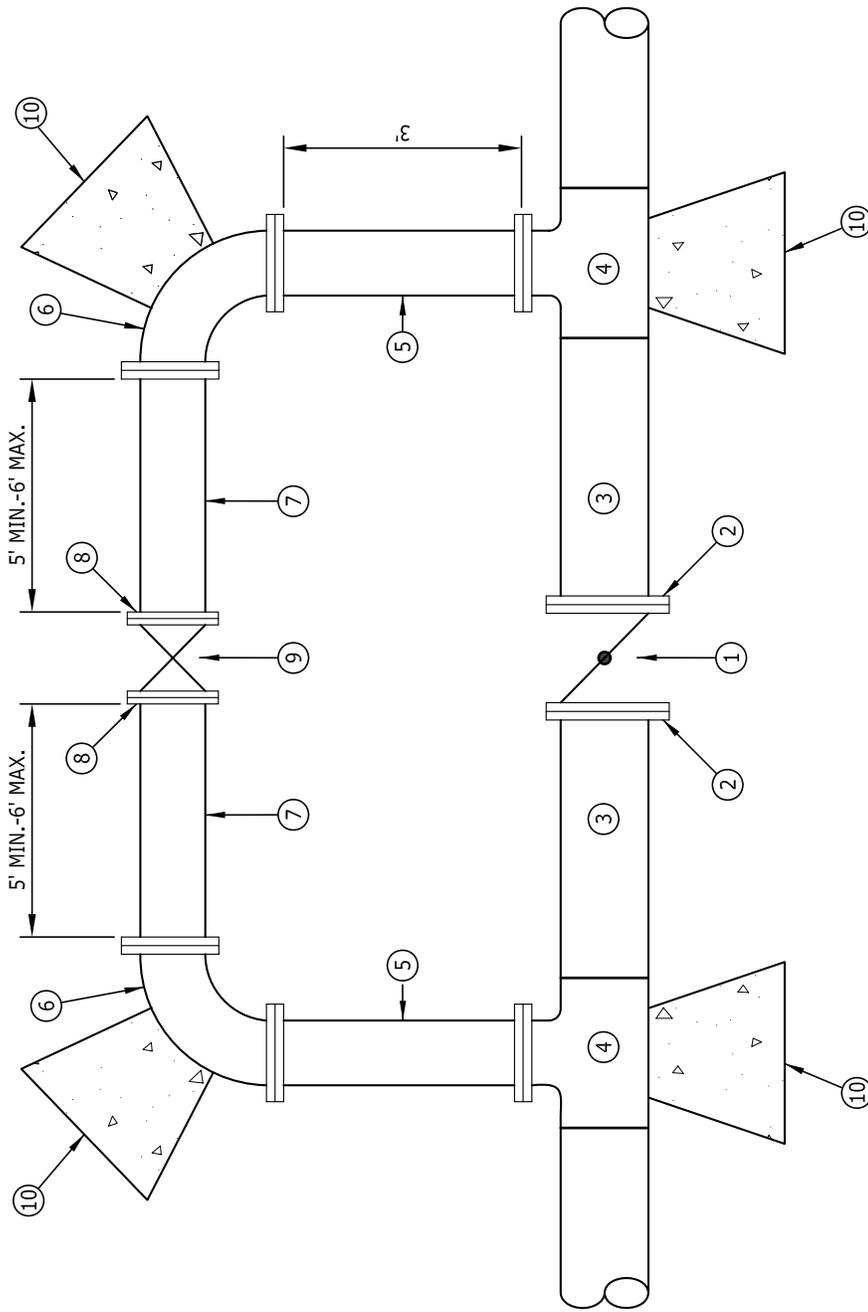
NOTES:

1. EXTENSIONS SHALL BE A MINIMUM OF ONE (1) FOOT LONG.
2. EXTENSIONS SHALL BE SIZED AS NEEDED, AND PAINTED WITH TWO (2) COATS OF METAL PAINT.
3. EARS, LUGS OR STAINLESS CAP SCREWS ON COVER SHALL BE ALIGNED WITH DIRECTION OF WATER FLOW.
4. FOR ADDITIONAL REQUIREMENTS AND USE SEE WSDOT STD. SPECIFICATIONS SECTION 3.19
5. VALVE BOX SHALL BE CENTERED OVER 2" SQUARE OPERATING NUT.

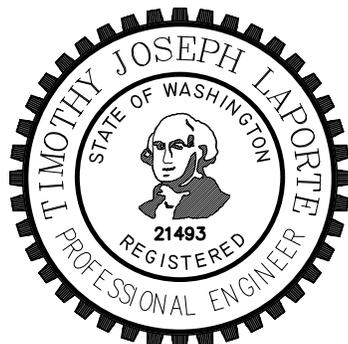


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		CITY OF KENT ENGINEERING DEPARTMENT	
		VALVE BOX AND OPERATING NUT EXTENDER	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN 3-7	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			



- ① 18" OR GREATER BUTTERFLY VALVE FLXFL OPERATOR ON OPPOSITE SIDE OF BY-PASS CENTER BUTTERFLY VALVE BETWEEN TEE'S.
- ② FLXMJ ADAPTER WITH MEGA LUG FOLLOWERS.
- ③ DI PIPE, LENGTH AS NEEDED.
- ④ X"X6" TEE M3XFL WITH MEGA LUG FOLLOWERS.
- ⑤ 3'-6"Ø SPOOL FLXMJ.
- ⑥ 6" 90° BEND FLXFL.
- ⑦ 6" FL X PE SPOOL.
- ⑧ 6" FLXMJ ADAPTER WITH MEGA LUG FOLLOWERS.
- ⑨ 6" GATE VALVE FLXFL.
- ⑩ THRUST BLOCKING.

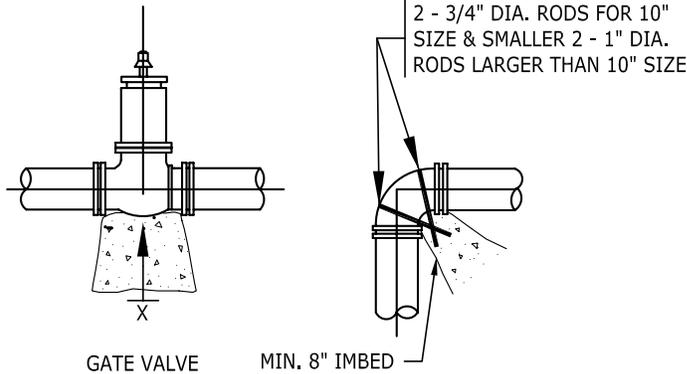


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		CITY OF KENT ENGINEERING DEPARTMENT	
		18" OR GREATER VALVE BY-PASS	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN 3-8	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			

THRUST BLOCK - TABLE							
PIPE SIZE	PRESSURE PSI	MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL SQUARE FEET					
		A	B	C	D	E	X (100 PSI)
4"	200	2/(1)	1/(NONE)	1/(NONE)	NONE	NONE	NONE
	300	3/(2)	2/(2)	2/(1)	1/(1)	NONE	NONE
6"	200	4/(3)	3/(2)	3/(1)	1/(1)	1/(NONE)	NONE
	300	6/(4)	4/(3)	3/(2)	2/(1)	1/(NONE)	NONE
8"	200	7/(5)	5/(3)	4/(3)	2/(2)	1/(1)	3/(2)
	300	11/(8)	8/(5)	6/(4)	3/(2)	2/(1)	3/(2)
10"	200	11/(8)	8/(6)	6/(4)	3/(2)	2/(1)	4/(3)
	275	16/(11)	11/(7)	9/(6)	5/(3)	3/(2)	4/(3)
12"	200	16/(11)	11/(8)	9/(6)	5/(3)	3/(2)	5/(4)
	250	24/(16)	17/(11)	13/(9)	7/(5)	4/(3)	5/(4)
14"	200	22/(13)	16/(11)	12/(8)	6/(4)	3/(2)	7/(6)
	250	33/(22)	23/(16)	18/(12)	9/(6)	5/(3)	7/(6)
16"	200	29/(19)	21/(14)	16/(11)	8/(6)	5/(3)	10/(7)
	225	32/(21)	23/(16)	17/(12)	9/(6)	5/(3)	10/(7)
18"	200	36/(24)	26/(17)	20/(13)	10/(7)	5/(4)	13/(9)
20"	200	45/(29)	32/(21)	24/(16)	13/(8)	7/(4)	16/(11)
24"	200	64/(43)	46/(30)	35/(23)	18/(12)	9/(6)	23/(16)

NOTE: ADDITIONAL BLOCKING MUST BE PROVIDED IF GATE VALVE IS AT END OF LINE DURING TESTING. ADDITIONAL BLOCKING SHALL ALSO BE PROVIDED UNDER TEES AND CROSSES.

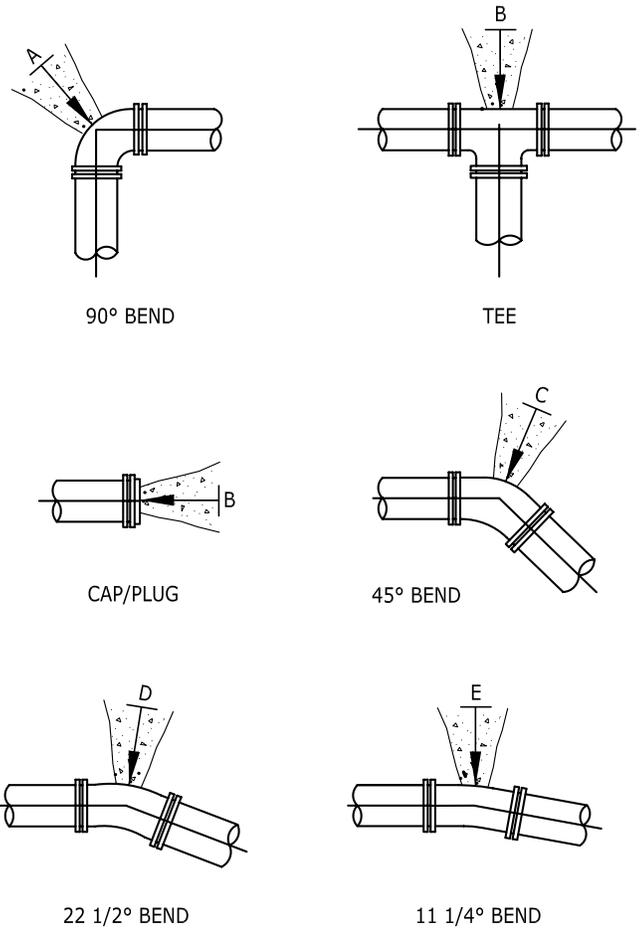


SAFE BEARING LOADS IN LB./SQ. FT.
THE SAFE BEARING LOADS GIVEN IN THE FOLLOWING TABLE ARE FOR HORIZONTAL THRUSTS WHEN THE DEPTH OF COVER OVER THE PIPE EXCEEDS 2 FEET.

<u>SOIL</u>	<u>SAFE BEARING LOAD</u> LB. PER SQ. FT.
-------------	---

* MUCK, PEAT, ETC.	0
SOFT CLAY	1,000
SAND	2,000
SAND & GRAVEL	3,000
SAND & GRAVEL	3,000
CEMENTED WITH CLAY	4,000
HARD SHALE	10,000

* IN MUCK OR PEAT, ALL THRUSTS SHALL BE RESTRAINED BY PILES OR TIE RODS TO SOLID FOUNDATIONS OR BY REMOVAL OF MUCK OR PEAT AND REPLACEMENT WITH BALLAST OF SUFFICIENT STABILITY TO RESIST THRUST.

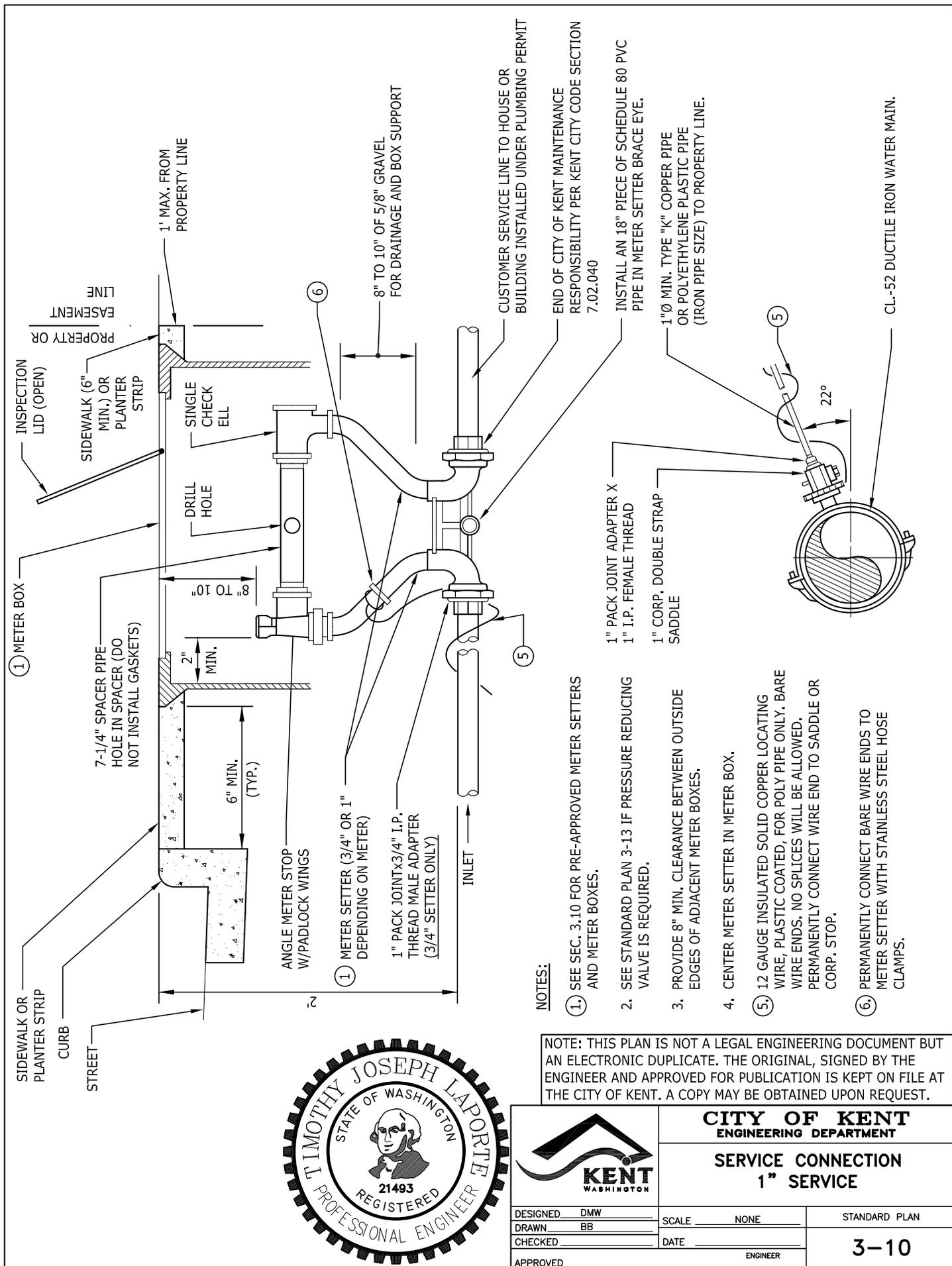


NOTES:

1. SQUARE FEET OF CONCRETE THRUSTS - BLOCK AREA BASED ON SAFE BEARING LOAD OF 2000/(3000) POUNDS PER SQUARE FOOT.
2. AREAS MUST BE ADJUSTED FOR OTHER SIZE PIPE, PRESSURES & SOIL CONDITIONS.
3. CONCRETE BLOCKING SHALL BE CAST IN PLACE, CLASS 3,000 & HAVE MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING. VALVES MAY ALSO BE SUPPORTED WITH 10"x10"x4" CONCRETE CINDER BLOCKS WITH COMPOSITE SHIMS.
4. BLOCK SHALL BEAR AGAINST FITTINGS ONLY & SHALL BE CLEAR OF JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT.
5. CONTRACTOR SHALL INSTALL BLOCKING ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY WITHSTAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.
6. WRAP WATER MAIN WITH 4 MIL POLYETHYLENE SHEETING IN AREA OF THRUST BLOCK.

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CITY OF KENT ENGINEERING DEPARTMENT		CONCRETE BLOCKING	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN	
DRAWN <u>BB</u>	DATE _____	3-9	
CHECKED _____	ENGINEER _____		
APPROVED _____			

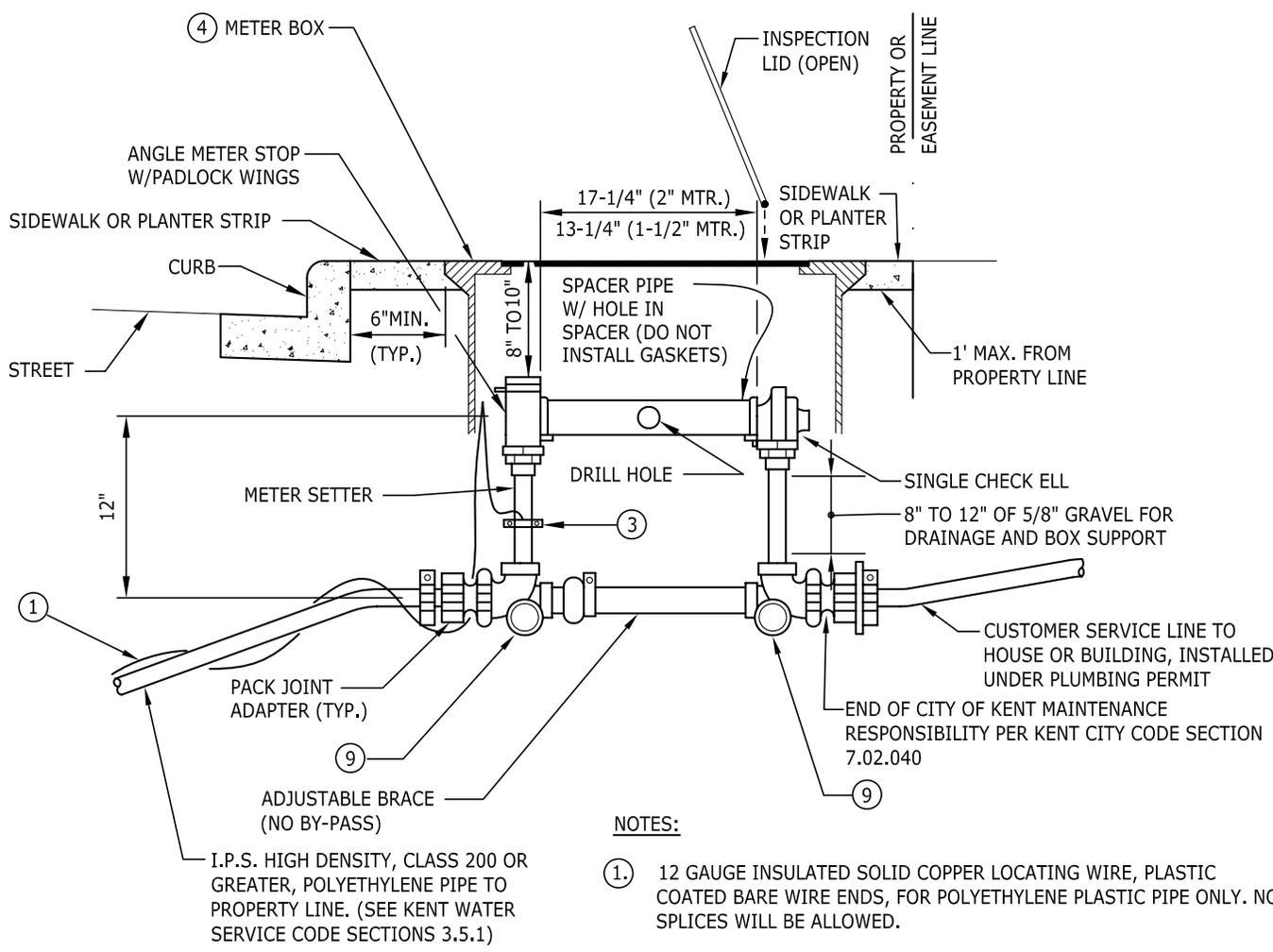


- NOTES:
- SEE SEC. 3.10 FOR PRE-APPROVED METER SETTERS AND METER BOXES.
 - SEE STANDARD PLAN 3-13 IF PRESSURE REDUCING VALVE IS REQUIRED.
 - PROVIDE 8" MIN. CLEARANCE BETWEEN OUTSIDE EDGES OF ADJACENT METER BOXES.
 - CENTER METER SETTER IN METER BOX.
 - 12 GAUGE INSULATED SOLID COPPER LOCATING WIRE, PLASTIC COATED, FOR POLY PIPE ONLY. BARE WIRE ENDS. NO SPLICES WILL BE ALLOWED. PERMANENTLY CONNECT WIRE END TO SADDLE OR CORP. STOP.
 - PERMANENTLY CONNECT BARE WIRE ENDS TO METER SETTER WITH STAINLESS STEEL HOSE CLAMPS.

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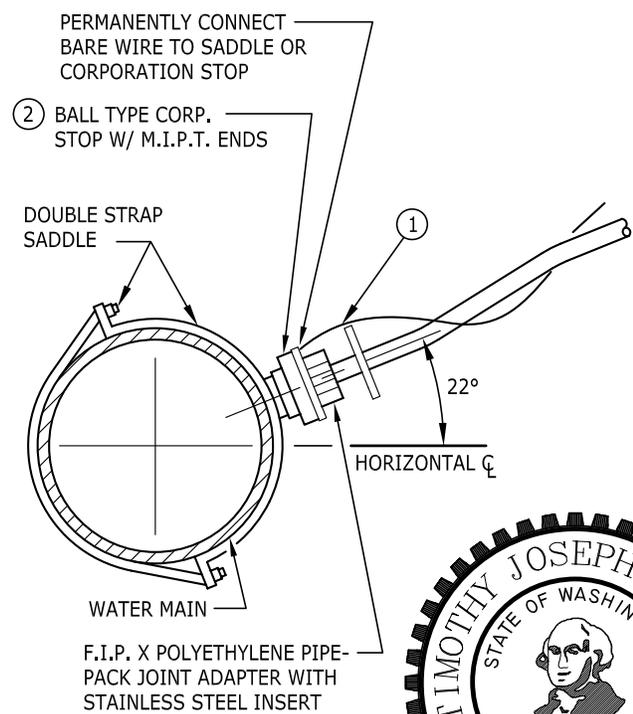


		CITY OF KENT ENGINEERING DEPARTMENT	
		SERVICE CONNECTION 1" SERVICE	
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED		ENGINEER	
APPROVED		3-10	



NOTES:

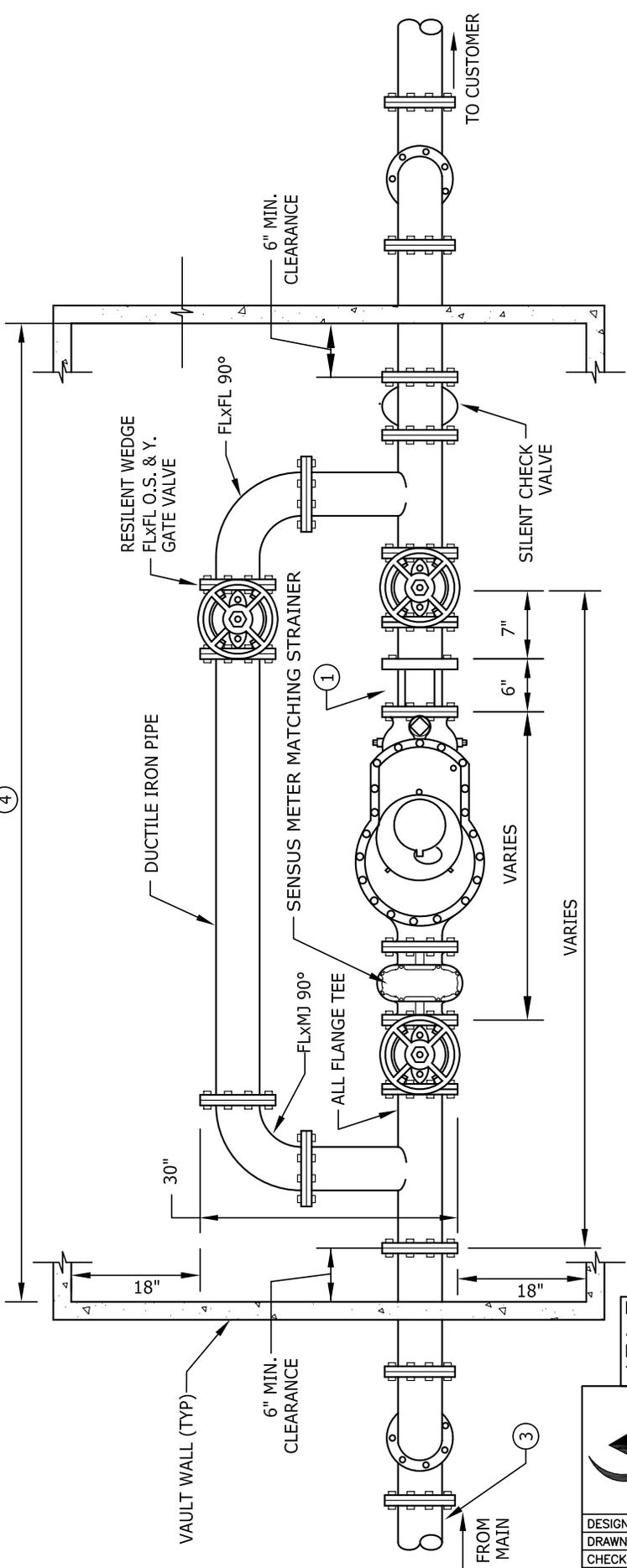
- ① 12 GAUGE INSULATED SOLID COPPER LOCATING WIRE, PLASTIC COATED BARE WIRE ENDS, FOR POLYETHYLENE PLASTIC PIPE ONLY. NO SPLICES WILL BE ALLOWED.
- ② FORD NO. FB-500 CORPORATION STOP OR APPROVED EQUAL.
- ③ PERMANENTLY CONNECT BARE WIRE ENDS TO METER SETTER WITH STAINLESS STEEL HOSE CLAMPS.
- ④ SEE SEC. 3.10 FOR PRE-APPROVED METER SETTERS AND METER BOXES.
- 5. SEE STANDARD PLAN 3-13 IF PRESSURE REDUCING VALVE IS REQUIRED.
- 6. PROVIDE 8" CLEARANCE BETWEEN OUTSIDE EDGES OF ADJACENT METER BOXES.
- 7. CENTER METER SETTER IN METER BOX.
- 8. REDUCERS INSIDE SETTERS ARE NOT ALLOWED.
- ⑨ INSTALL AN 18" PIECE OF SCHEDULE 40 PVC PIPE IN EACH OF THE METER SETTER BRACE EYES.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		SERVICE CONNECTION 1-1/2" & 2" SERVICE	
DESIGNED: DMW	DRAWN: BB	SCALE: NONE	STANDARD PLAN
CHECKED:	DATE:	DATE:	3-11
APPROVED:	ENGINEER:	ENGINEER:	

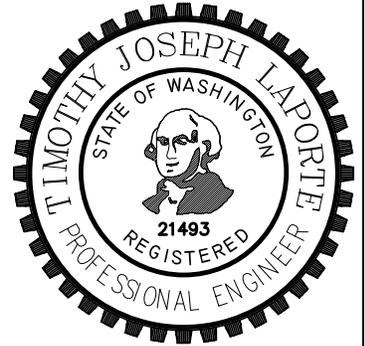


PLAN VIEW
SENSUS/SRH WATER METER W/ BY-PASS

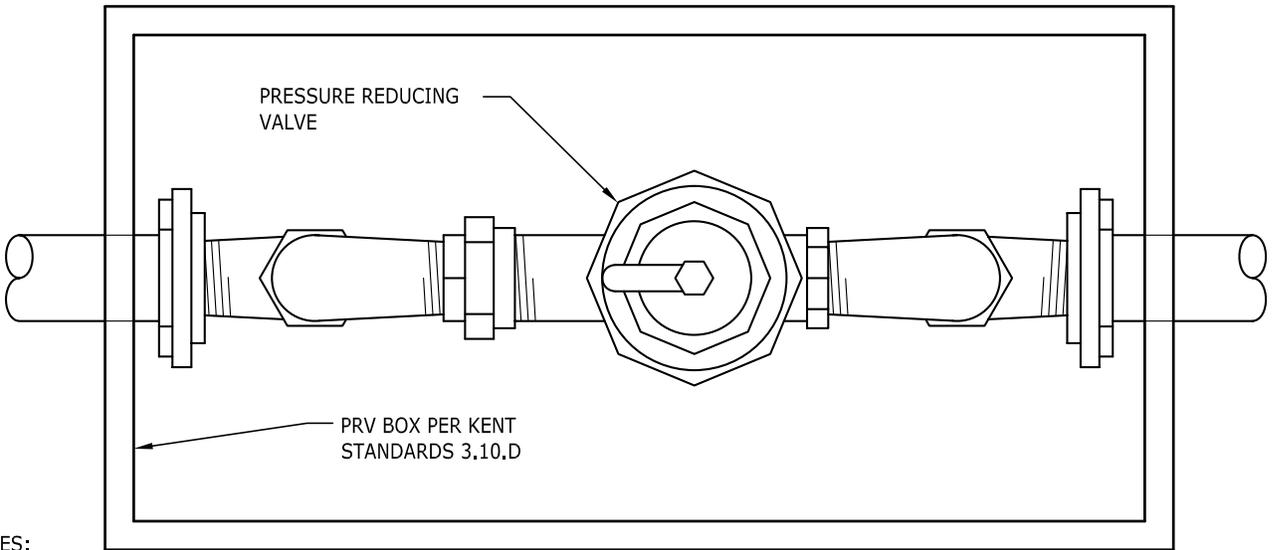
NOTES:

- ① FLANGE COUPLING ADAPTER
- ② 3"-6" COMPOUND WATER METERS TO BE TESTED BY APPROVED TESTING COMPANY FOR ACCURACY AFTER INSTALLATION
- ③ AN ISOLATION VALVE SHALL BE INSTALLED AT THE CONNECTION TO THE CITY MAIN.
- ④ USE UTILITY VAULT 4484 LA OR EQUIVALENT WITH AN OVERALL DEPTH OF 5'-7" AND HAVE A DOUBLE HATCH LID WITH RECESSED LOCKING HASP.
- ⑤ SEE SHEET 2 FOR ELEVATION VIEW

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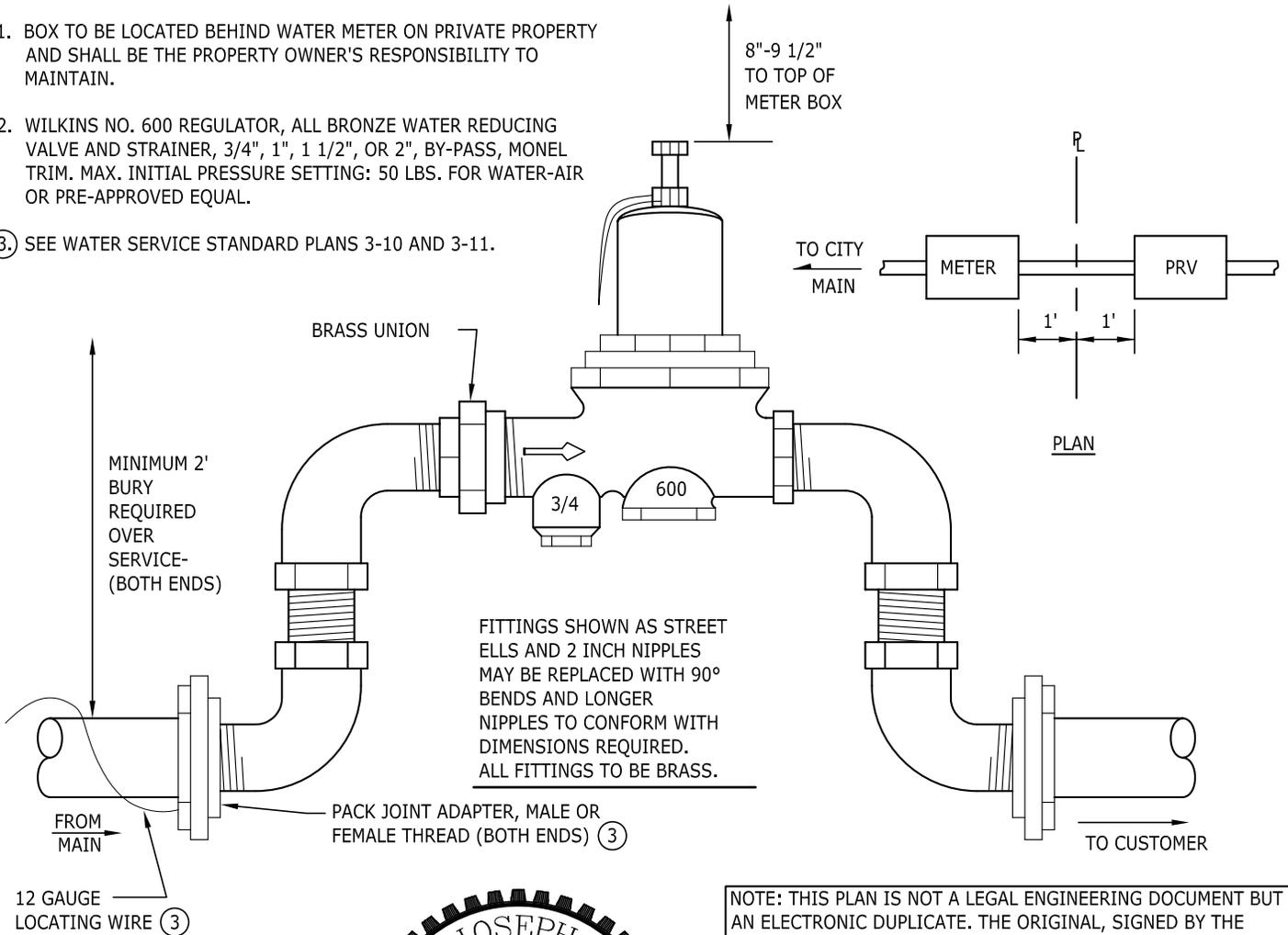


	CITY OF KENT ENGINEERING DEPARTMENT	
	COMPOUND WATER METER WITH BY-PASS SHEET 1 OF 2	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN
DRAWN <u>BB</u>	DATE _____	3-12
CHECKED _____	ENGINEER _____	
APPROVED _____		

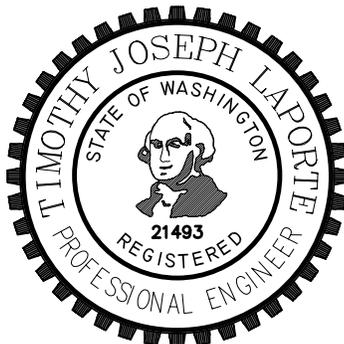


NOTES:

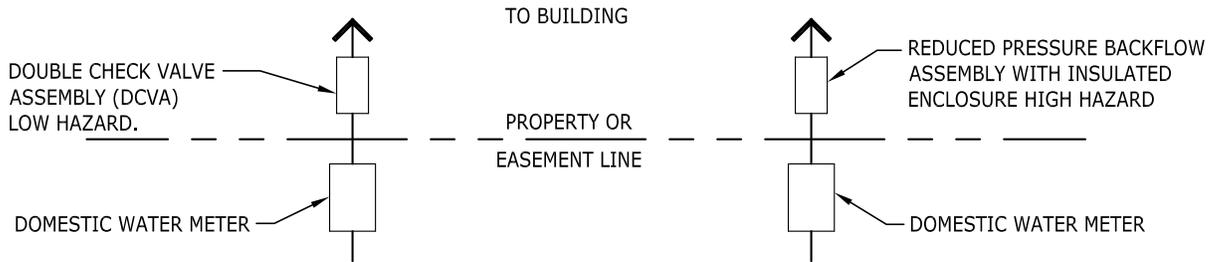
1. BOX TO BE LOCATED BEHIND WATER METER ON PRIVATE PROPERTY AND SHALL BE THE PROPERTY OWNER'S RESPONSIBILITY TO MAINTAIN.
2. WILKINS NO. 600 REGULATOR, ALL BRONZE WATER REDUCING VALVE AND STRAINER, 3/4", 1", 1 1/2", OR 2", BY-PASS, MONEL TRIM. MAX. INITIAL PRESSURE SETTING: 50 LBS. FOR WATER-AIR OR PRE-APPROVED EQUAL.
3. SEE WATER SERVICE STANDARD PLANS 3-10 AND 3-11.



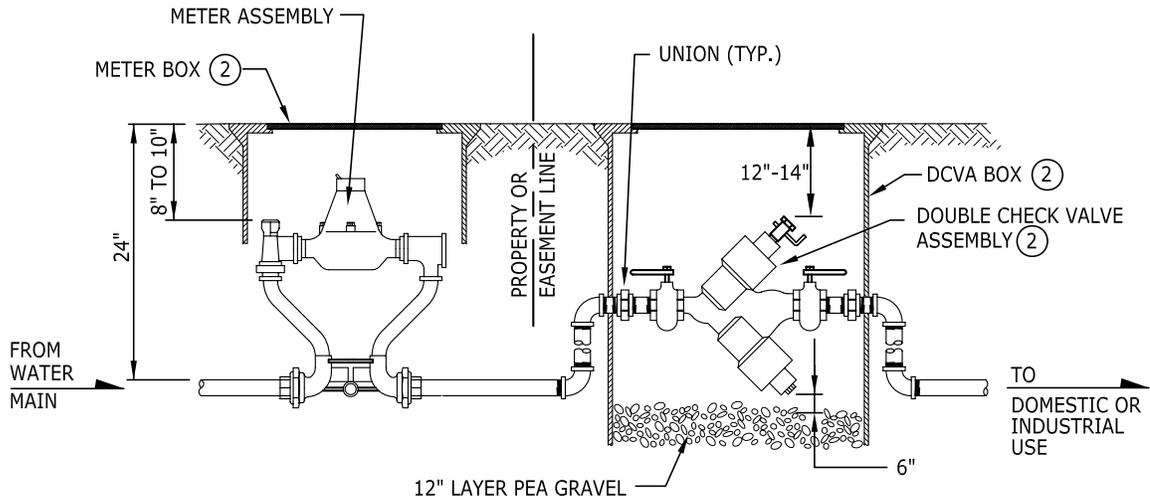
NOTE: THIS PLAN IS NOT A LEGAL ENGINEERING DOCUMENT BUT AN ELECTRONIC DUPLICATE. THE ORIGINAL, SIGNED BY THE ENGINEER AND APPROVED FOR PUBLICATION IS KEPT ON FILE AT THE CITY OF KENT. A COPY MAY BE OBTAINED UPON REQUEST.



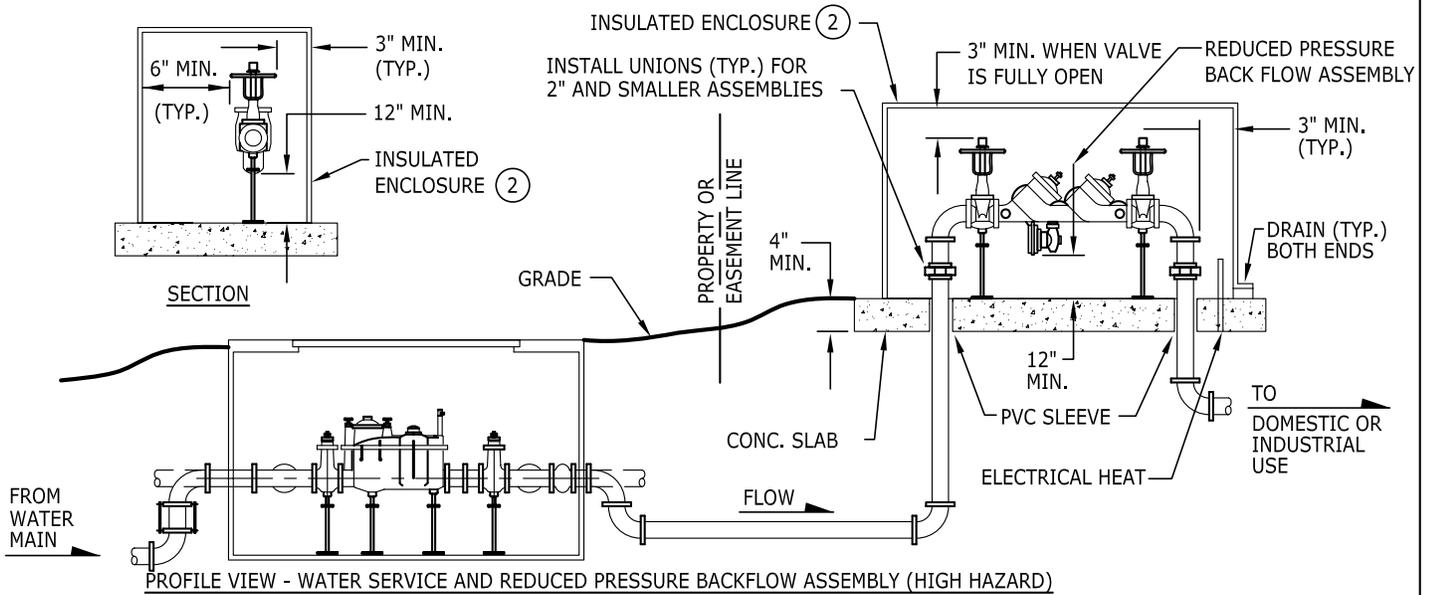
		CITY OF KENT	
		ENGINEERING DEPARTMENT	
PRESSURE REDUCING VALVE WITH BOX FOR 3/4", 1", 1-1/2", OR 2" SERVICE LINES			
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED			
APPROVED		ENGINEER	
			3-13



PLAN VIEW - TYPICAL INSTALLATION



PROFILE VIEW - WATER SERVICE AND DOUBLE CHECK VALVE ASSEMBLY (LOW HAZARD)



PROFILE VIEW - WATER SERVICE AND REDUCED PRESSURE BACKFLOW ASSEMBLY (HIGH HAZARD)

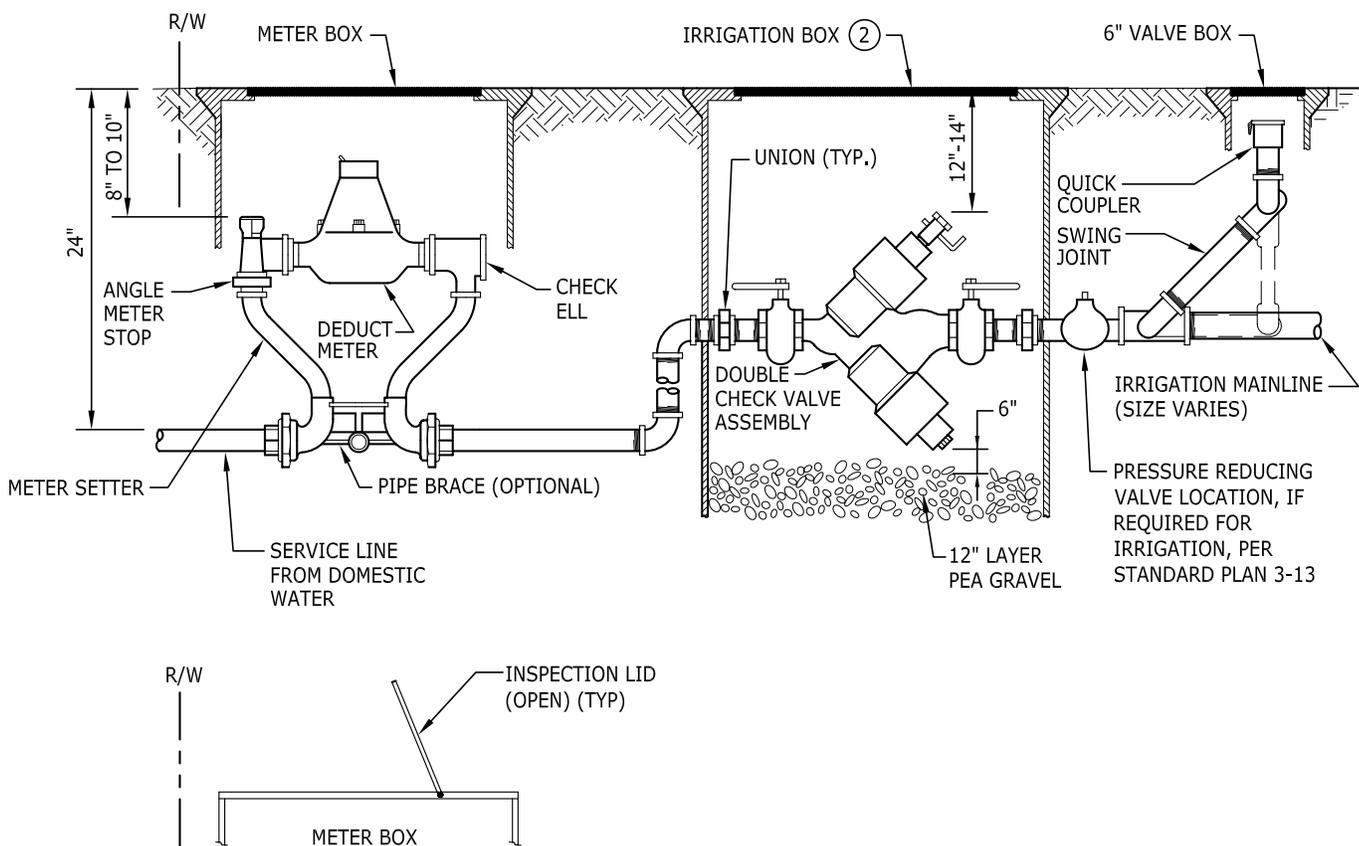
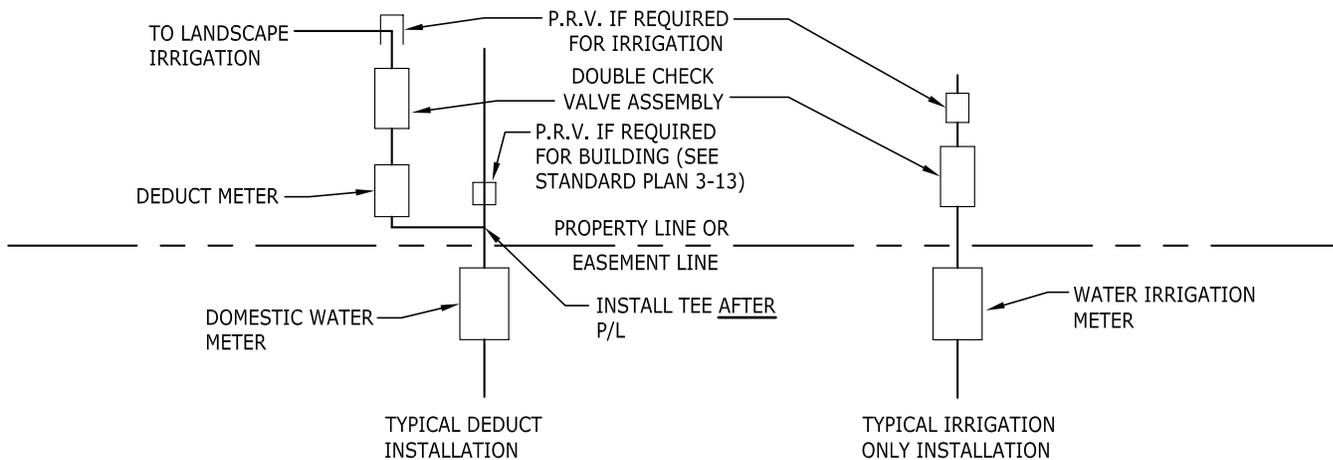
NOTES:

1. DRAWINGS ARE ILLUSTRATIONS ONLY. SIZE OF METER AND BACKFLOW PREVENTER SHALL BE PER THE APPROVED PLANS.
2. BOXES OR VAULTS SHALL PER SECTION 3.10.
3. INSULATED ENCLOSURES SHALL ALLOW MINIMUM CLEARANCES.
4. BACKFLOW PREVENTION SHALL BE PER SECTION 3.16.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		DOMESTIC SERVICE CONNECTION PREMISE ISOLATION	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	3-14	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			



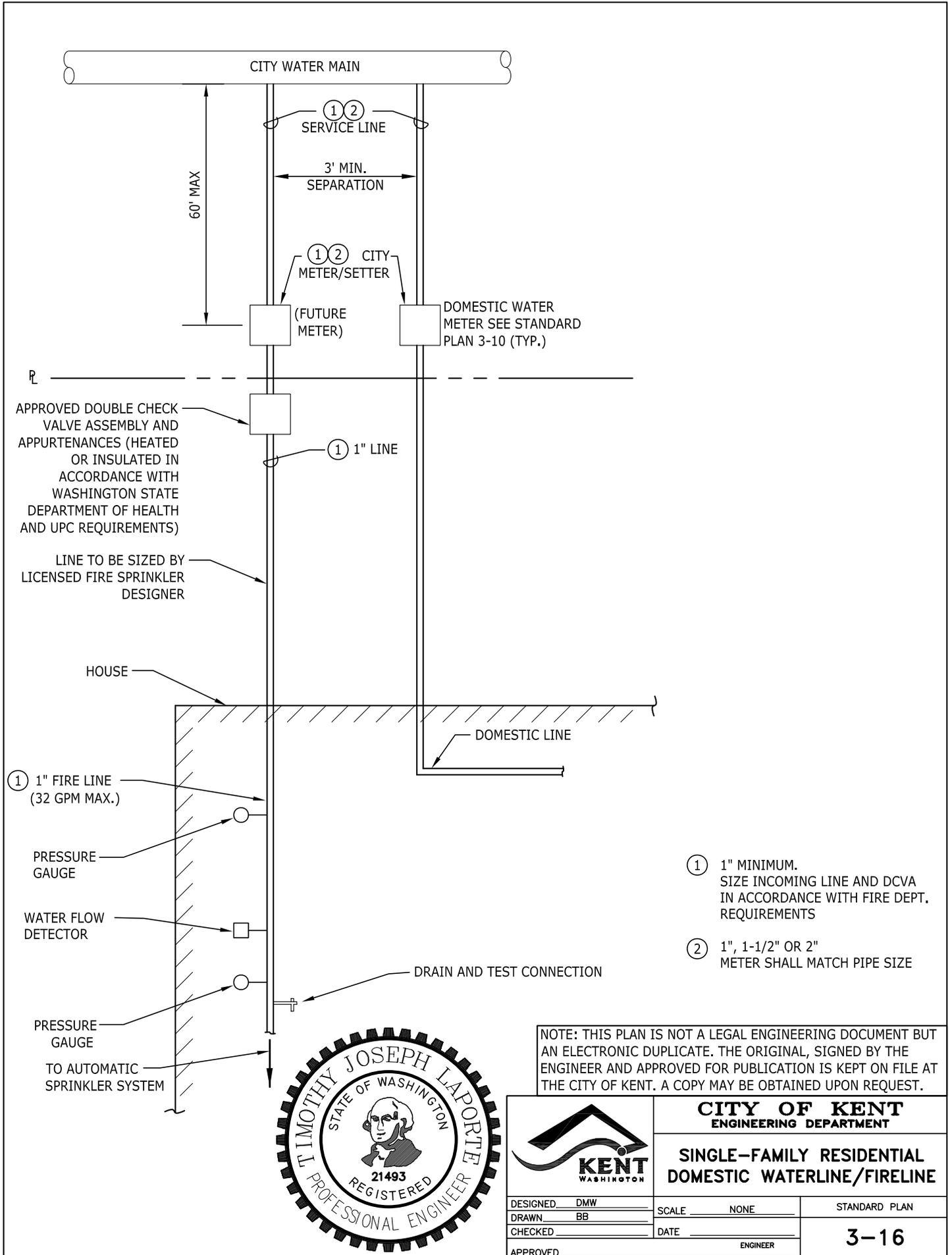
NOTES:

1. DRAWINGS ARE ILLUSTRATIONS ONLY. SIZE OF METER AND BACKFLOW PREVENTER SHALL BE PER THE APPROVED PLANS
2. BOXES OR VAULTS SHALL BE PER SECTION 3.10.
3. BACKFLOW PREVENTION SHALL BE PER SECTION 3.16.
4. FOR IRRIGATION USE ONLY INSTALLATION. THE DCVA AND IRRIGATION BOX SHALL BE INSTALLED PRIOR TO THE METER BEING SET. THE DCVA CAN BE CERTIFIED AFTER INSTALLATION OF THE METER.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		IRRIGATION SERVICE INSTALLATION	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	3-15	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____	STANDARD PLAN	
APPROVED _____			

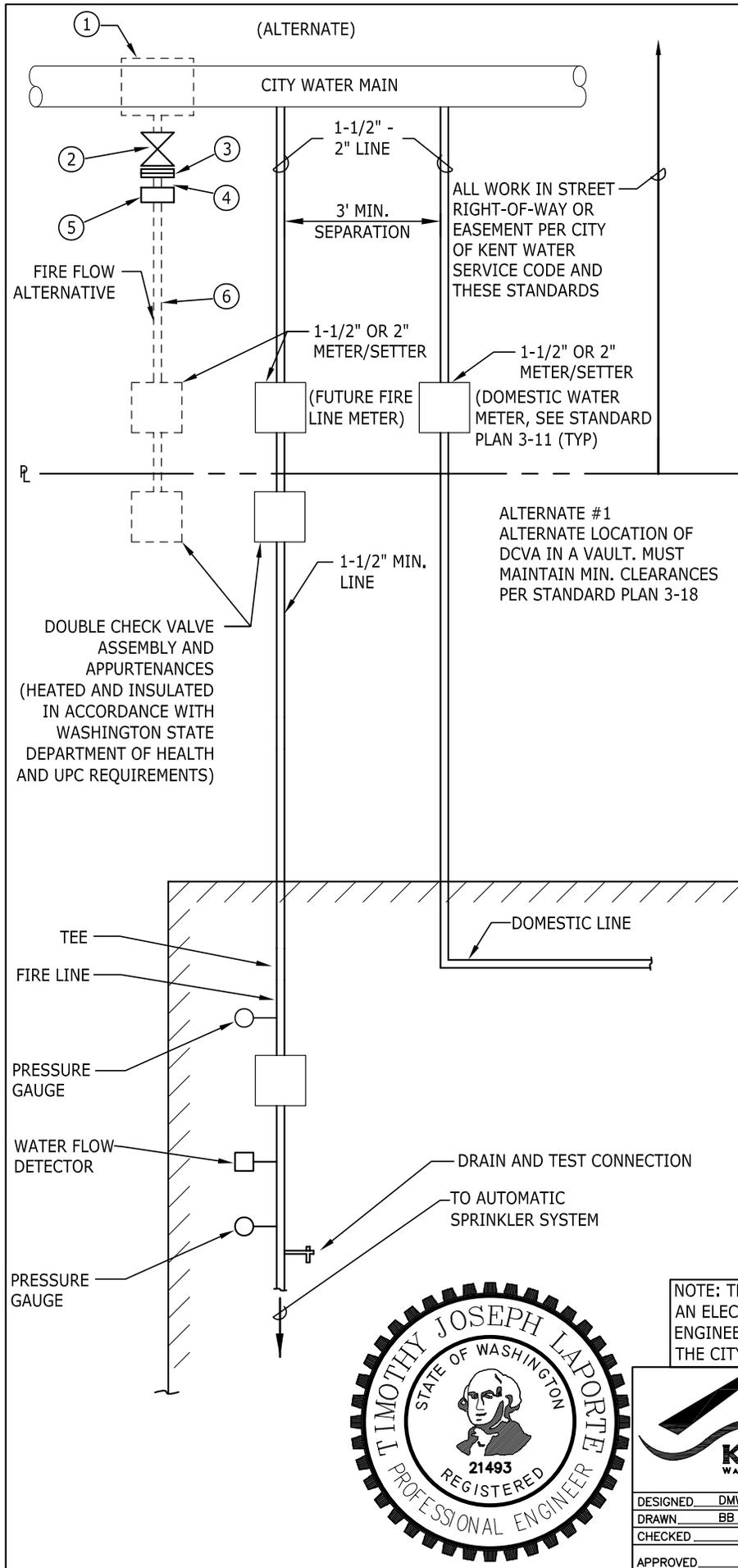


- ① 1" MINIMUM. SIZE INCOMING LINE AND DCVA IN ACCORDANCE WITH FIRE DEPT. REQUIREMENTS
- ② 1", 1-1/2" OR 2" METER SHALL MATCH PIPE SIZE

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		CITY OF KENT ENGINEERING DEPARTMENT	
		SINGLE-FAMILY RESIDENTIAL DOMESTIC WATERLINE/FIRELINE	
DESIGNED: <u>DMW</u>	SCALE: <u>NONE</u>	3-16	
DRAWN: <u>BB</u>	DATE: _____		
CHECKED: _____	APPROVED: _____ ENGINEER		



NOTE:

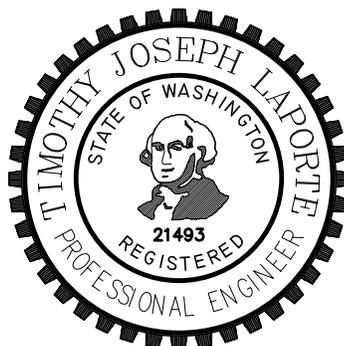
ALL MATERIALS, CONSTRUCTION, APPARATUS, CONNECTIONS AND APPURTENANCES SHALL BE IN ACCORDANCE WITH KENT CITY CODES, STANDARDS AND DETAILS

FIRE LINE SYSTEMS EXCEEDING FLOW RATES OF 2 INCH DOMESTIC WATER METER, SHALL BE REQUIRED TO USE DOUBLE DETECTOR CHECK VALVE ASSEMBLIES PER STANDARD PLAN 3-18.

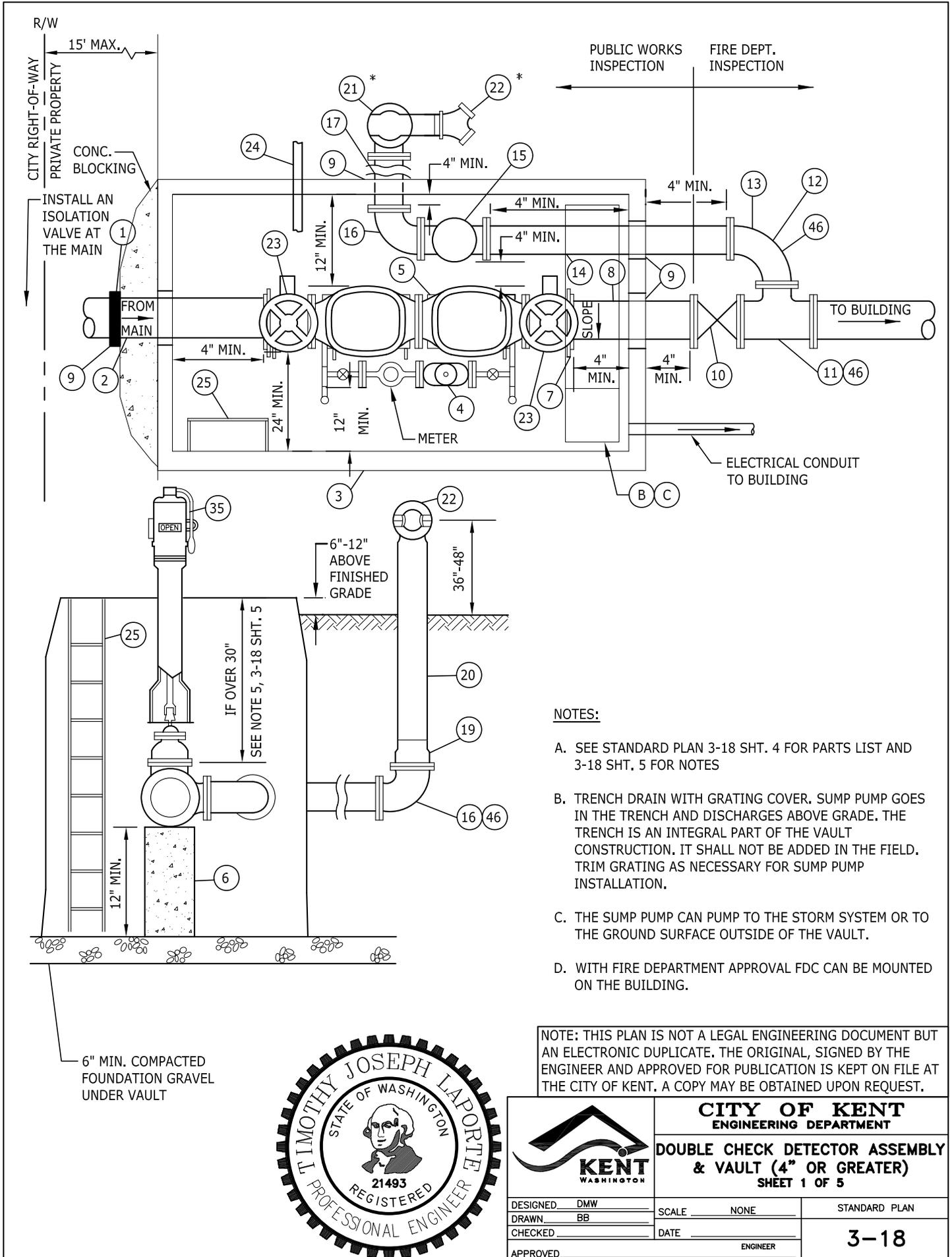
FOR SERVICES LARGER THAN 2"

- 1. WET TAPPING SLEEVE (FL) ON EXISTING MAIN, OR 4" TEE (FL) ON NEW MAIN
- 2. 4" RESILIENT WEDGE GATE VALVE (FLxFL)
- 3. 4" REDUCER COMPANION (FL W/ 2" TAP)
- 4. 2" NIPPLE, BRASS M.I.P.T.xM.I.P.T.
- 5. 2" FEMALE IP THREAD x 2" PACK JOINT ADAPTER
- 6. 2" HDPE
- 7. 1-1/2" MINIMUM, OR SIZE INCOMING LINE AND DCVA IN ACCORDANCE WITH FIRE DEPT. REQUIREMENTS. ACCESS TO DOUBLE CHECK HAS TO BE APPROVED
- 8. SPRINKLER SYSTEMS WITH 20 HEADS OR MORE REQUIRE A FIRE DEPT. CONNECTION CHECK VALVE ASSEMBLY
- 9. OUTSIDE LOCATION REQUIRES APPROVAL OF UNDERGROUND FIRELINE PLAN

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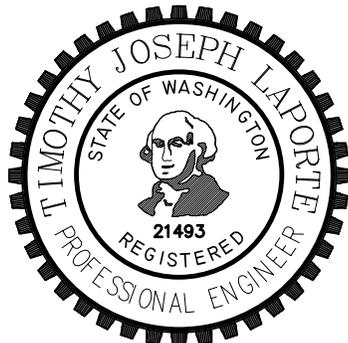
		CITY OF KENT ENGINEERING DEPARTMENT	
		MULT-FAMILY RESIDENTIAL DOMESTIC WATERLINE/FIRELINE	
DESIGNED: DMW	SCALE: NONE	STANDARD PLAN	
DRAWN: BB	DATE: _____	3-17	
CHECKED: _____	ENGINEER: _____		
APPROVED: _____			



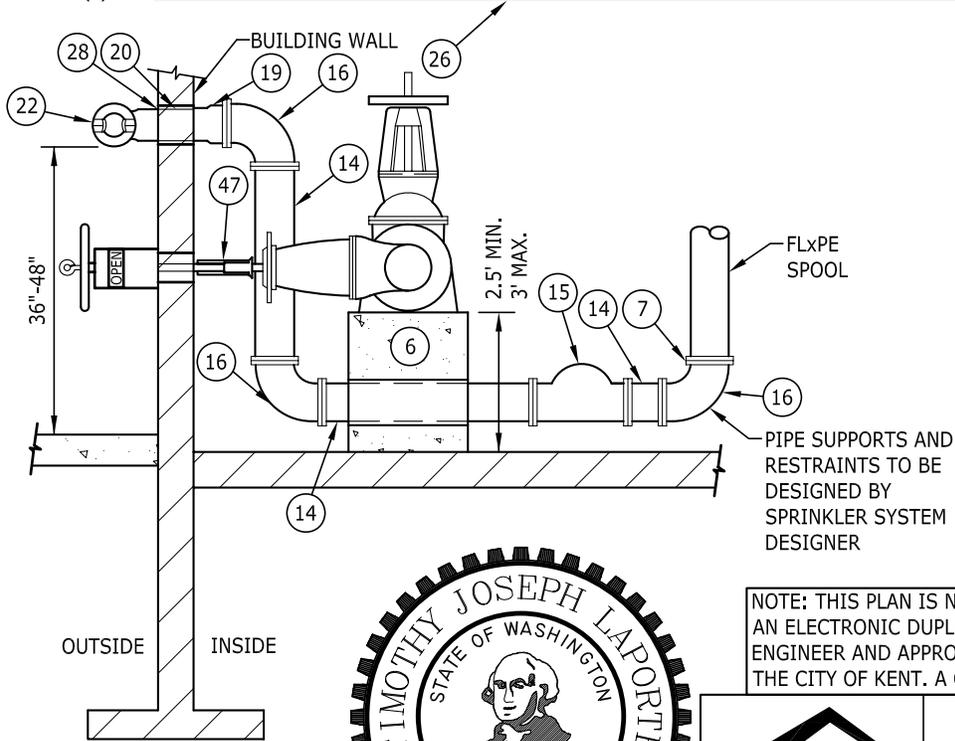
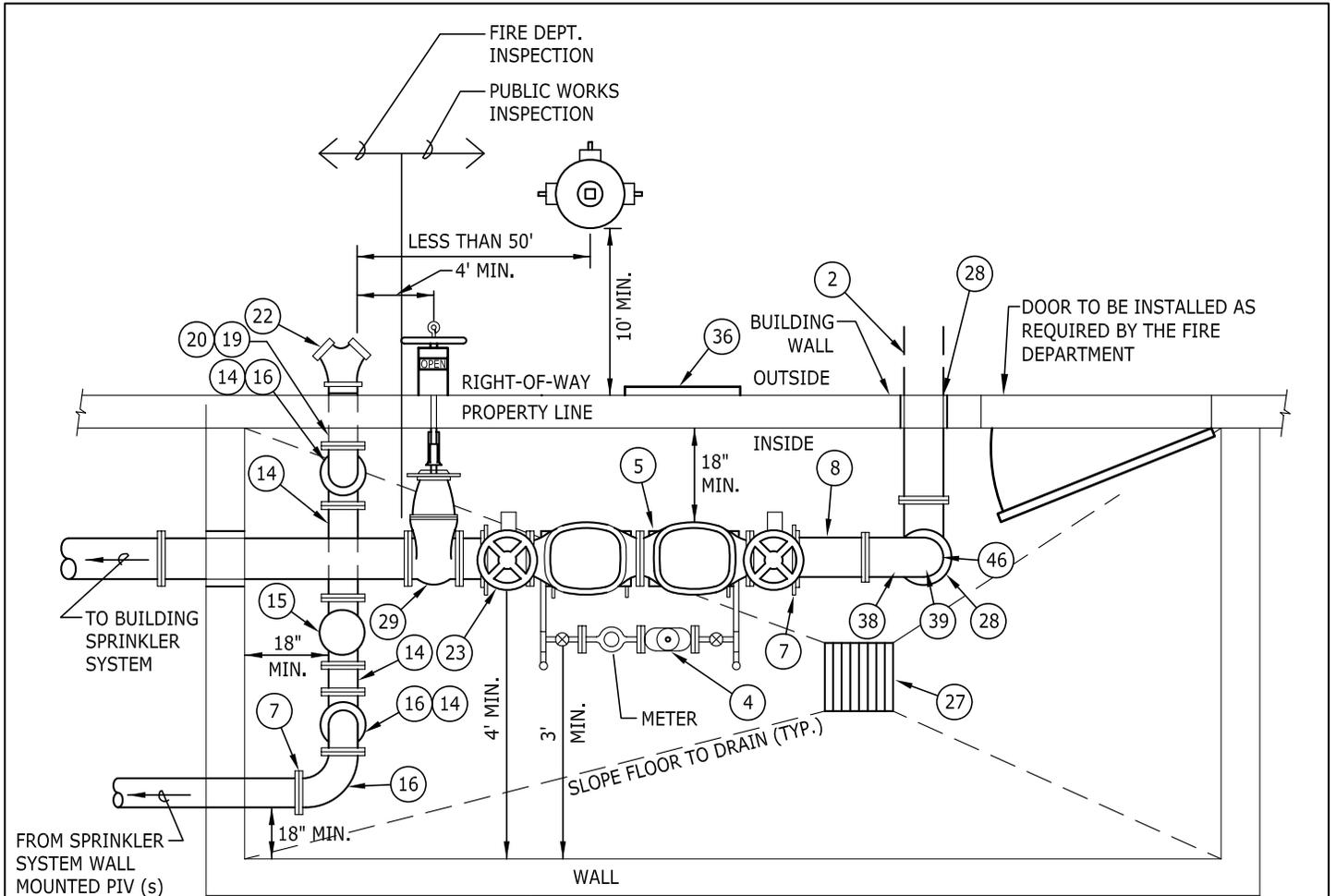
NOTES:

- A. SEE STANDARD PLAN 3-18 SHT. 4 FOR PARTS LIST AND 3-18 SHT. 5 FOR NOTES
- B. TRENCH DRAIN WITH GRATING COVER. SUMP PUMP GOES IN THE TRENCH AND DISCHARGES ABOVE GRADE. THE TRENCH IS AN INTEGRAL PART OF THE VAULT CONSTRUCTION. IT SHALL NOT BE ADDED IN THE FIELD. TRIM GRATING AS NECESSARY FOR SUMP PUMP INSTALLATION.
- C. THE SUMP PUMP CAN PUMP TO THE STORM SYSTEM OR TO THE GROUND SURFACE OUTSIDE OF THE VAULT.
- D. WITH FIRE DEPARTMENT APPROVAL FDC CAN BE MOUNTED ON THE BUILDING.

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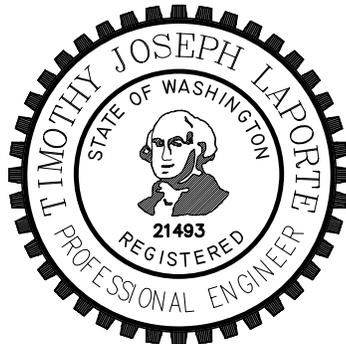
CITY OF KENT ENGINEERING DEPARTMENT		
DOUBLE CHECK DETECTOR ASSEMBLY & VAULT (4" OR GREATER) SHEET 1 OF 5		
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	STANDARD PLAN
DRAWN <u>BB</u>	DATE _____	3-18
CHECKED _____	ENGINEER _____	
APPROVED _____		



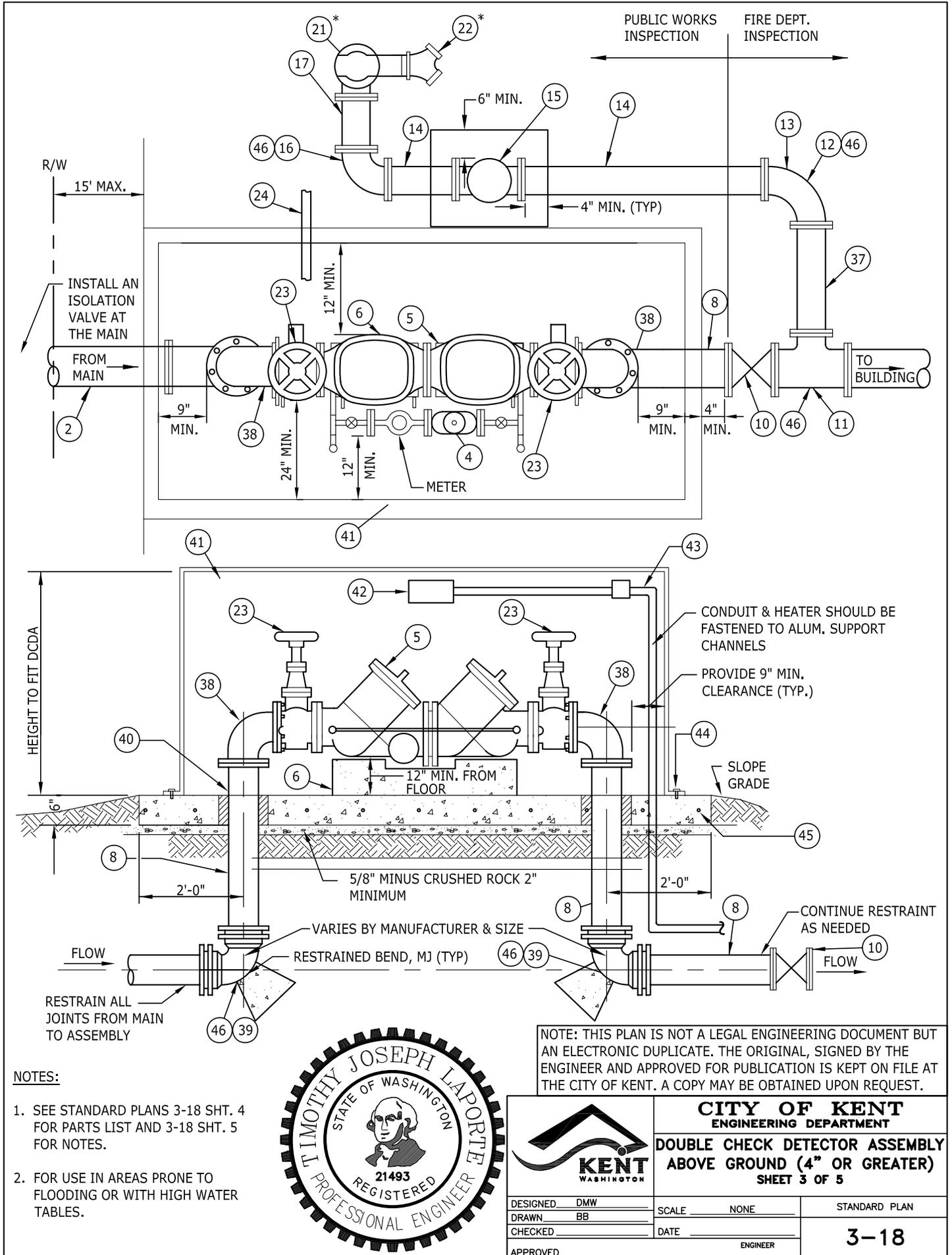
NOTES:

1. SEE STANDARD PLANS 3-18 SHT. 4 FOR PARTS LIST AND 3-18 SHT. 5 FOR NOTES.
2. INTERIOR DCDA SHALL ONLY BE ALLOWED IN ZONING AREAS THAT HAVE ZERO SETBACK REQUIREMENTS BETWEEN THE BUILDING AND THE PROPERTY LINE.

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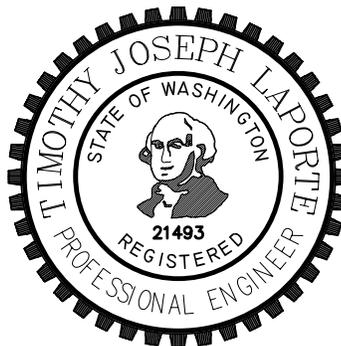


		CITY OF KENT	
		ENGINEERING DEPARTMENT	
		DOUBLE CHECK DETECTOR ASSEMBLY	
		INSIDE BUILDING (4" OR GREATER)	
DESIGNED <u>DMW</u> DRAWN <u>BB</u> CHECKED _____ APPROVED _____		SCALE <u>NONE</u>	STANDARD PLAN
		DATE _____	3-18



NOTES:

1. SEE STANDARD PLANS 3-18 SHT. 4 FOR PARTS LIST AND 3-18 SHT. 5 FOR NOTES.
2. FOR USE IN AREAS PRONE TO FLOODING OR WITH HIGH WATER TABLES.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		DOUBLE CHECK DETECTOR ASSEMBLY ABOVE GROUND (4" OR GREATER) SHEET 3 OF 5	
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED		DATE	
APPROVED		ENGINEER	

3-18

DOUBLE CHECK DETECTOR ASSEMBLY PARTS LIST

SEE KCC CHAPTER 13
AND STANDARD PLAN 3-18 SHEET 5 FOR NOTES.
SEE STANDARD PLAN 3-18 SHEETS 1, 2 AND 3 FOR PLAN, ELEVATION & SECTION.

- | | |
|---|---|
| <p>① LOCKING FOLLOWER RING.</p> <p>② 4" MIN. RESTRAINED JOINT D.I. CLASS 52.</p> <p>③ PRECAST CONC. VAULT. SEE KCC TITLE 13 FIRE PREVENTION AND PROTECTION</p> <p>④ APPROVED DCVA IN BYPASS LINE (LATEST HEALTH DEPARTMENT AND CITY OF KENT APPROVED LIST) SHALL BE ON OPPOSITE SIDE OF PUMPER LINE. (PART OF DCDA).</p> <p>⑤ DCDA IN MAIN LINE (LATEST DEPARTMENT OF HEALTH APPROVED LIST).</p> <p>⑥ CONC. SUPPORT PADS UNDER CHECK VALVES.</p> <p>⑦ 10", 8", 6" OR 4" FL COUPLING ADAPTER.</p> <p>⑧ 10", 8", 6" OR 4" PEXFL PIPE.</p> <p>⑨ GROUT INTERIOR & EXTERIOR ALL AROUND PIPE TO MAKE WATER TIGHT SEAL.</p> <p>⑩ 10", 8", 6" OR 4" RESILIENT WEDGE GATE VALVE, FLxFL W/ POST INDICATOR W/ TAMPER SWITCH.</p> <p>⑪ 10", 8", 6" OR 4" TEE, FLxFL</p> <p>⑫ 10", 8", 6" OR 4" REDUCING 90° BEND, FLxFL AS REQ'D.</p> <p>⑬ 6" OR 4" LONG RADIUS 90° BEND, FLxFL</p> <p>⑭ 6" OR 4" SPOOL, FLxFL</p> <p>⑮ 6" SWING TYPE GRAVITY OPERATED CHECK VALVE, FL W/ BALL DRIP IN VAULT OR INSIDE BUILDING DEPENDING ON DCDA APPLICATION.</p> <p>⑯ 6" OR 4" 90° BEND, FLxFL</p> <p>⑰ 6" OR 4" SPOOL, FLxFL.</p> <p>⑱ NOT USED</p> <p>⑲ FLxIP ADAPTER.</p> <p>⑳ 6" OR 4" GALV. PIPE, THREADED, LENGTH AS REQ'D (SEE STD. PLAN 3-18 SHT. 5).</p> <p>㉑* 4"x4"x6" BULL HEAD THREADED TEE.</p> <p>㉒* UL LISTED FD CONNECTION & UL LISTED LOCKING CAPS, LOCATE WITHIN 50' MAX. OF A PUBLIC FIRE HYDRANT. WITH FIRE DEPARTMENT APPROVAL, FDC CAN BE MOUNTED ON THE BUILDING.</p> <p>㉓ O.S & Y VALVES TO BE RESILIENT WEDGE WITH TAMPER SWITCHES. ADD WIRING IN ACCORDANCE WITH L & I (SEE NOTE 18 ON STD. PLAN 3-18 SHT. 5).</p> <p>㉔ GALV. CONDUIT SLEEVE, SEALED BOTH ENDS, FOR ELECTRONIC MONITORING WIRES.</p> <p>㉕ LADDER AS REQ'D PER OSHA.</p> <p>㉖ WALL AS REQUIRED BY THE FIRE MARSHALL</p> <p>㉗ FLOOR DRAIN TO BUILDING PLUMBING STORM SYSTEM.</p> <p>㉘ 2" CLEARANCE INTERIOR AND EXTERIOR ALL AROUND PIPE.</p> | <p>⑳ 10", 8", 6" OR 4" NON-RISING STEM RESILIENT WEDGE GATE VALVE WITH 2" OPERATING NUT.</p> <p>㉑ APPROVED DCVA IN BYPASS LINE (LATEST HEALTH DEPARTMENT AND CITY OF KENT APPROVED LIST) SHALL BE ON OPPOSITE SIDE OF EXTERIOR WALL. (PART OF DCDA)</p> <p>㉒ 6" OR 4" RESTRAINED JOINT DIP, CL 52.</p> <p>㉓ DRAIN ROCK, 1/2 C.Y.</p> <p>㉔ 4"x4"x6" BULL, ELBOW, THREADED.</p> <p>㉕ 10", 8", 6", OR 4" RESILIENT WEDGE GATE VALVE, FL W/POST INDICATOR W/TAMPER SWITCH.</p> <p>㉖ SIGN ON OUTSIDE OF BUILDING..... FIRELINE
DCDA
INSIDE BLDG.</p> <p>㉗ 10", 8", 6" OR 4" SPOOL, FLxFL.</p> <p>㉘ 10", 8", 6" OR 4" 90° BEND, FLxFL.</p> <p>㉙ 10", 8", 6" OR 4" 90° BEND, MJ.</p> <p>㉚ WRAP PIPE WITH 1/2" EXPANSION JOINT MATERIAL.</p> <p>㉛ FIBERGLASS OR ALUMINUM ENCLOSURE</p> <p>㉜ HOT BOX HEATER.</p> <p>㉝ 120 VOLT PULL BOX FOR HEATER CONDUIT AND WIRES FROM SEPARATE ELECTRICAL CIRCUIT FROM SERVED FACILITY. ALSO INCLUDE ELECTRICITY FOR ELECTRONIC SUPERVISION OF CONTROL VALVES.</p> <p>㉞ 3/8" SS EXP BOLTS 24" O.C.</p> <p>㉟ REINFORCED CONCRETE SLAB WITH #4 AT 15" O.C. EACH WAY.</p> <p>㊱ CONCRETE BLOCKING AS REQUIRED.</p> <p>㊲ DISTANCE FROM THE OPERATING NUT TO THE INSIDE WALL SHALL BE 18" MIN. OR PER THE MANUFACTURER'S RECOMMENDATION.</p> |
|---|---|

* ㉑ & ㉒ ARE GENERALLY 6" WITH THE BULLHEAD, ELBOW AS INDICATED. IN CASES WHERE A 4" DCVA IS APPROVED THE BULL, ELBOW IS ELIMINATED AND THE FD CONNECTION IS ATTACHED DIRECTLY TO THE GALV. PIPE.

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		CITY OF KENT ENGINEERING DEPARTMENT	
DOUBLE CHECK DETECTOR ASSEMBLY & VAULT PARTS LIST SHEET 4 OF 5			
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED		ENGINEER	
APPROVED		STANDARD PLAN	
		3-18	

DOUBLE CHECK DETECTOR ASSEMBLY

MINIMUM CLEARANCES IN VAULT ARE DEPENDENT UPON LOCATION OF PUMPER CONNECTION.

GENERAL NOTES:

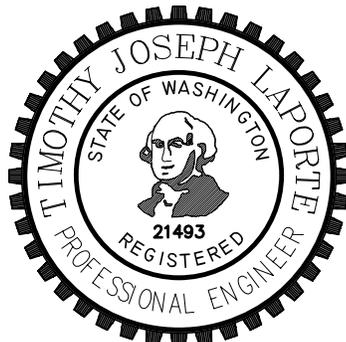
1. VAULT DIMENSIONS BASED ON SIZE OF APPARATUS AND MEETING MINIMUM CLEARANCES.
2. ALL VAULT LIDS SHALL BE GALVANIZED STEEL AND HAVE DOUBLE DOORS WITH LID UNDER DRAINS WHICH DRAIN TO EXTERIOR OF VAULT.
3. MINIMUM APPARATUS SIZE SHALL BE 4 INCHES.
4. VAULT SHALL BE SEALED TO PREVENT WATER LEAKAGE.
5. LADDERS WITHIN VAULTS SHALL BE REQUIRED WHEN DEPTH FROM TOP OF LID TO TOP OF APPARATUS EXCEEDS 30", AND/OR THE APPARATUS IS MORE THAN 12" ABOVE THE FLOOR. INSTALLATION OF ALL LADDERS SHALL BE IN COMPLIANCE TO OSHA.
6. ALL BACKFLOW PREVENTERS SHALL BE ON THE LATEST LIST APPROVED BY THE DEPARTMENT OF HEALTH AND THE CITY OF KENT.
7. MAKE ALL ATTEMPTS TO LOCATE DCDA VAULT OR INSULATED ENCLOSURE AND SWING CHECK VAULT IN PLANTING AREA & NOT IN PAVING AREA.
8. ALL BENDS AND ELBOWS TO BE CAST IRON, CLASS 250, CEMENT LINED. (SEE APWA AND AWWA).
9. BYPASS LINE TO BE ON OPPOSITE SIDE OF PUMPER LINE.
10. INSTALL THREADED PLUGS IN ALL 8 TEST COCKS.
11. TEMPORARY SUPPORT SHALL BE PROVIDED UNDER VALVES AT THE TIME OF INSTALLATION. AFTER COMPLETE INSTALLATION REMOVE THE TEMPORARY SUPPORT AND INSTALL CONCRETE SUPPORT PAD WITH 6" BRICK SHIMS AS REQUIRED.
12. FOR FIRE PIPING SYSTEM INSTALLATIONS ON PRIVATE SIDE OF VAULT, THE CONTRACTOR MUST HAVE SPECIAL FIRE CERTIFICATION.
13. GROUT INTERIOR AND EXTERIOR ALL AROUND PIPE MAKING A WATER TIGHT SEAL.
14. ALL PIPE TO BE DUCTILE IRON CEMENT LINED CLASS 52 PIPE EXCEPT WHERE INDICATED. INSTALLATION MUST ALLOW CLEARANCE FOR PROPER OPERATION OF ALL O.S AND Y's.
15. GALVANIZED STEEL PIPE SHALL BE WRAPPED WITH POLYETHYLENE WRAPPING 10mm THICKNESS.
16. COMPLETE ALL WORK IN ACCORDANCE WITH STATE, CITY AND MANUFACTURER STANDARDS.
17. SYSTEM SHALL NOT BE PUT INTO SERVICE UNTIL DCDA IS APPROVED BY THE CITY AND TESTED/CERTIFIED BY A WASHINGTON STATE LICENSED TESTER.
18. DCDA IS PRIVATE AND SHALL BE MAINTAINED BY THE PROPERTY OWNER WITH ANNUAL CERTIFICATIONS REQUIRED.
19. ELECTRONIC SUPERVISION OF CONTROL VALVES IS REQUIRED.
20. THE INSTALLATION OF THE FIRE DEPARTMENT CONNECTION SHALL BE PER THE FIRE CODE OFFICIAL.
21. AN ISOLATION VALVE SHALL BE PROVIDED AT THE CITY WATER MAIN.
22. BY-PASS AND FIRE DEPARTMENT CONNECTION AS SHOWN IN 3-18 SHEETS 1, 2 AND 3 ARE REQUIRED.
23. SEE STANDARD PLAN 3-18 SHEETS 1, 2 AND 3 FOR PLAN, ELEV. & SECTION.
24. SEE STANDARD PLAN 3-18 SHEET 4 FOR PARTS LIST.

INSIDE BUILDING NOTES:

1. ROOM IN WHICH DCDA IS PROPOSED TO BE LOCATED SHALL:
 - A. HAVE FLOOR DRAINS CONNECTED TO STORM OR SANITARY SEWER.
 - B. HAVE A HEATING SYSTEM (40° F MIN. TEMP.) NO HEAT TAPE.
 - C. NOT BE USED FOR STORAGE AROUND THE DCDA.
 - D. HAVE CLEARLY DELINEATED ACCESS WAYS TO DCDA AND WALL MOUNTED PIVS.
2. GROUT ALL AROUND PIPE WHERE IT ENTERS THE BUILDING.
3. IF PRIVATE HYDRANTS ARE REQUIRED FOR THE PROJECT, ENTIRE SYSTEM (HYDRANTS & FIRELINE) SHALL BE ISOLATED FROM CITY SYSTEM BY A DCDA LOCATED AT THE PROPERTY LINE PER STANDARD PLAN 3-18 SHTS 1 & 3.
4. INSTALLATION OF DCDA IS APPROVED BY HORIZONTAL ALIGNMENT ONLY.
5. A HEATED, R-19 INSULATED WOOD FRAMED ENCLOSURE IS AN ACCEPTABLE ALTERNATIVE TO A ROOM IF DCDA IS TO BE LOCATED IN AN UNHEATED BUILDING. THE ENCLOSURE MUST MEET ALL REQUIREMENTS OF THE DEVELOPMENT SERVICES DIVISION.
6. INTERIOR DCDA SHALL ONLY BE ALLOWED IN ZONING AREAS THAT HAVE ZERO SETBACK REQUIREMENTS BETWEEN THE BUILDING AND THE PROPERTY LINE.
7. FOR INSIDE BUILDING DCDA, THE CITY'S RESPONSIBILITY SHALL CEASE TEN FEET (10') OUT SIDE OF THE BUILDING.

ABOVE GROUND NOTES:

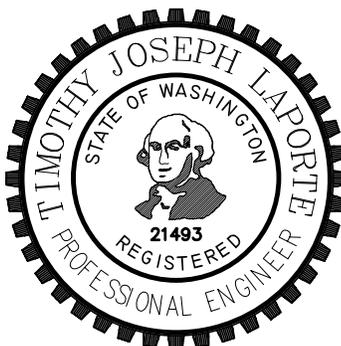
1. "HOT BOX" TO BE LOCATED OUTDOORS AND ACCESSIBLE TO THE CITY. ALTERNATE LOCATION REQUIRES THE CITY APPROVAL.
2. HEATERS AND WIRING SHALL BE RATED AT 2,000 WATT FOR 8" AND UNDER: 3,000 WATT FOR 10".
3. CONCRETE TO BE 2500 PSI (MINIMUM) MIX WITH AIR ENTRAINMENT.
4. DRAIN TO DAYLIGHT WITH BIRD SCREEN LOCATED AT SLAB LEVEL (SIZED PER MANUFACTURERS RECOMMENDATION).
5. NO BRANCH CONNECTIONS ALLOWED BETWEEN METER AND DCDA.



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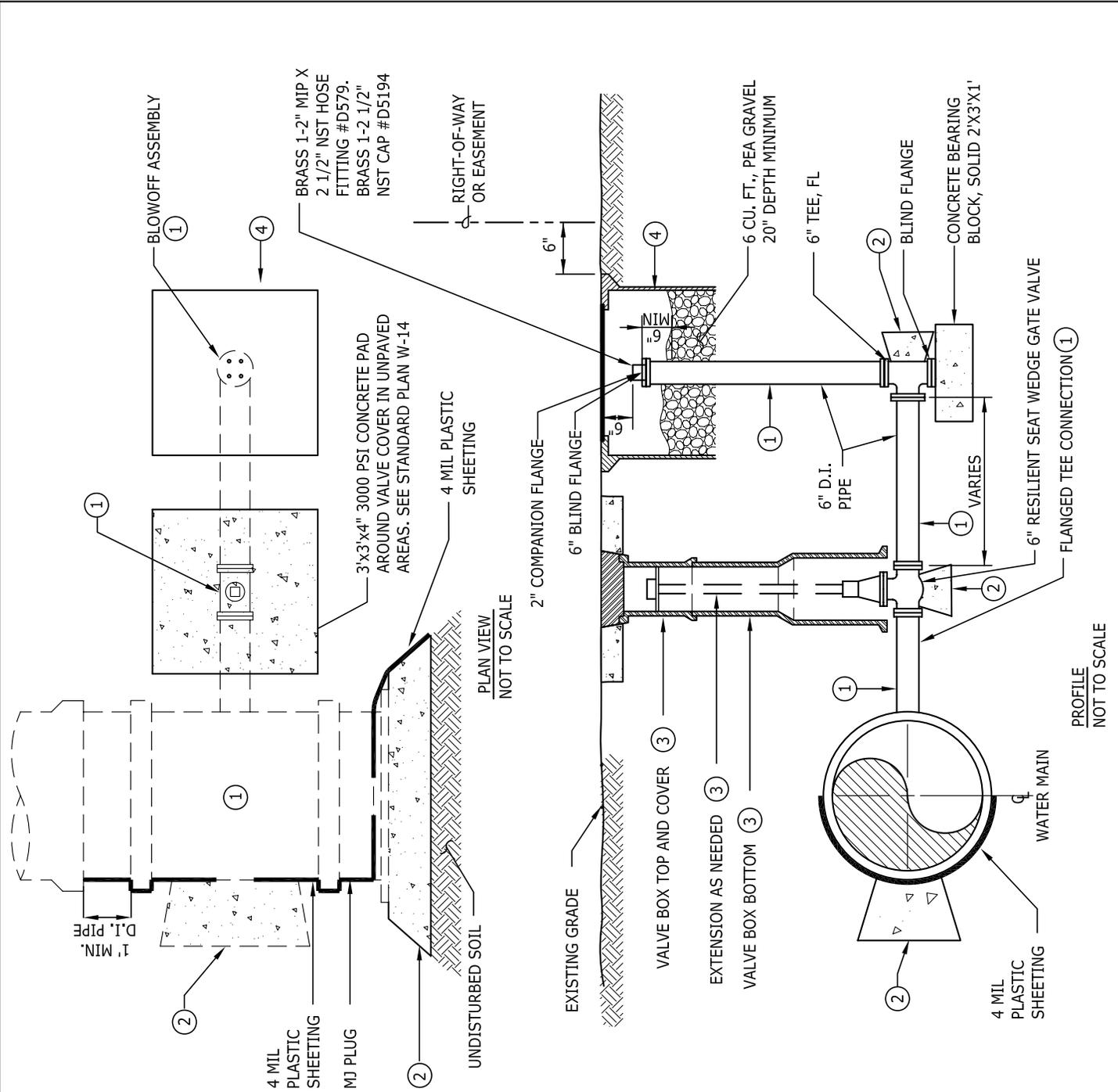
		CITY OF KENT ENGINEERING DEPARTMENT	
DOUBLE CHECK DETECTOR ASSEMBLY & VAULT NOTES SHEET 5 OF 5			
DESIGNED: <u>DMW</u>	SCALE: <u>NONE</u>	STANDARD PLAN 3-18	
DRAWN: <u>BB</u>	DATE: _____		
CHECKED: _____	APPROVED: _____	ENGINEER	

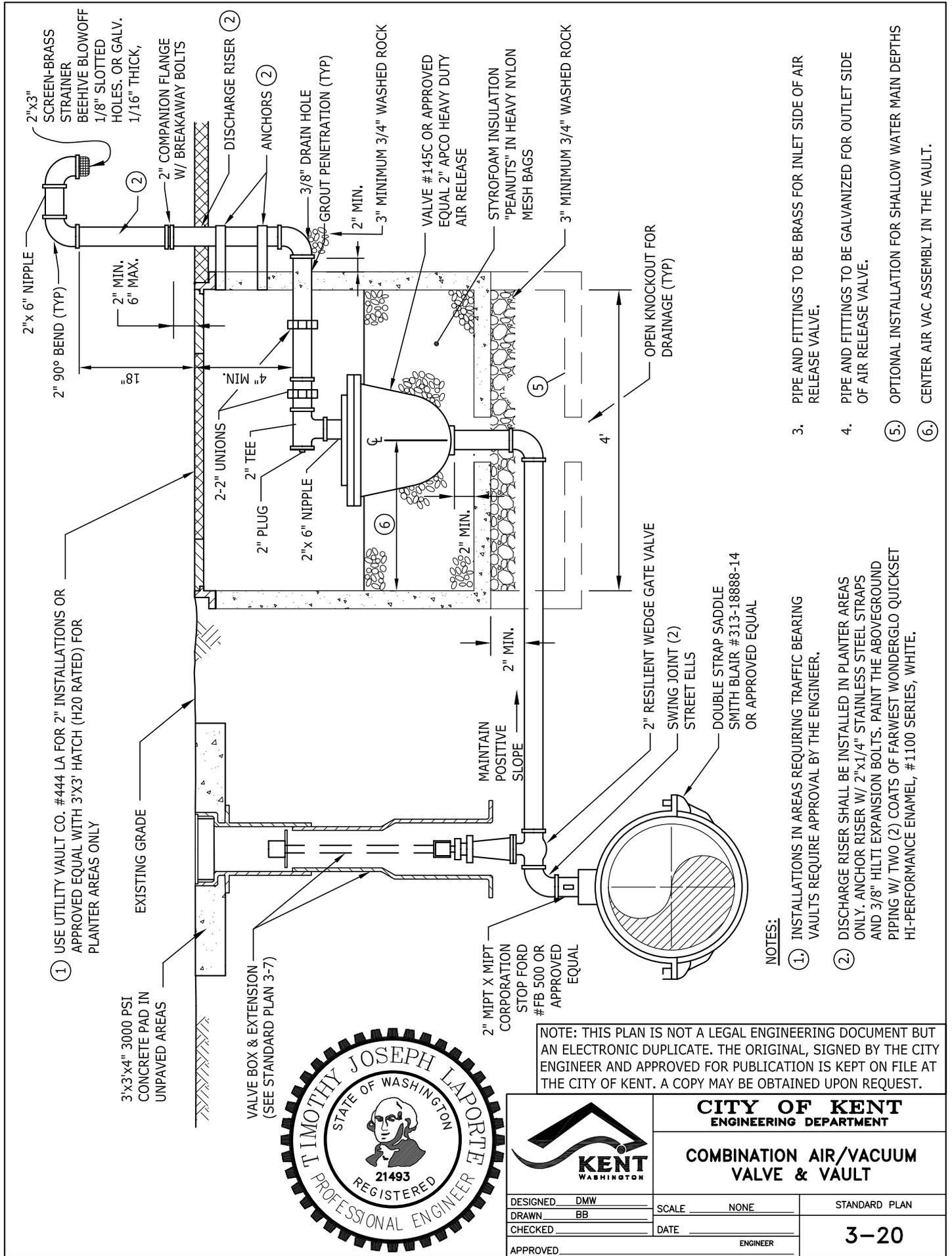
- NOTES:**
1. TEE, VALVE AND PIPING SHALL BE PER SECTION 3.19.
 2. CONCRETE BLOCKING SHALL BE CLASS 3000 (SEE SECTION 3.20.C.)
 3. VALVE BOX SHALL BE OLYMPIC FOUNDRY VB940 WITH TWO (2) INCH "DEEP SKIRT" COVER. THE COVER SHALL BE MARKED "WATER" THE EARS SHALL ALIGN IN THE DIRECTION OF FLOW. (SEE STANDARD PLAN 3-7).
 4. OLYMPIC FOUNDRY #SM30 METER BOX.



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		CITY OF KENT ENGINEERING DEPARTMENT	
		STANDARD 6" BLOWOFF ASSEMBLY	
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED		ENGINEER	
APPROVED		3-19	





① USE UTILITY VAULT CO. #444 LA FOR 2" INSTALLATIONS OR APPROVED EQUAL WITH 3'X3' HATCH (H20 RATED) FOR PLANTER AREAS ONLY

3'X3'X4" 3000 PSI CONCRETE PAD IN UNPAVED AREAS

EXISTING GRADE

VALVE BOX & EXTENSION (SEE STANDARD PLAN 3-7)

2" MIPT X MIPT CORPORATION STOP FORD #FB 500 OR APPROVED EQUAL

MAINTAIN POSITIVE SLOPE

2" RESILIENT WEDGE GATE VALVE

SWING JOINT (2) STREET ELLS

DOUBLE STRAP SADDLE SMITH BLAIR #313-18888-14 OR APPROVED EQUAL

OPEN KNOCKOUT FOR DRAINAGE (TYP)

2"X6" NIPPLE
2"X3" SCREEN-BRASS STRAINER BEEHIVE BLOWOFF 1/8" SLOTTED HOLES, OR GALV. 1/16" THICK,
2" 90° BEND (TYP)
2" MIN. 6" MAX.
2" COMPANION FLANGE W/ BREAKAWAY BOLTS
DISCHARGE RISER
ANCHORS
3/8" DRAIN HOLE
GROUT PENETRATION (TYP)
2" MIN.
3" MINIMUM 3/4" WASHED ROCK

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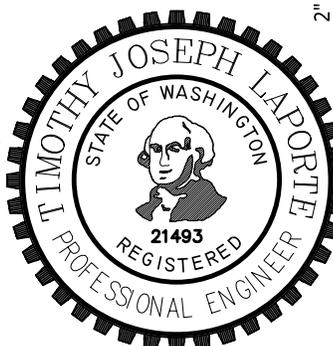
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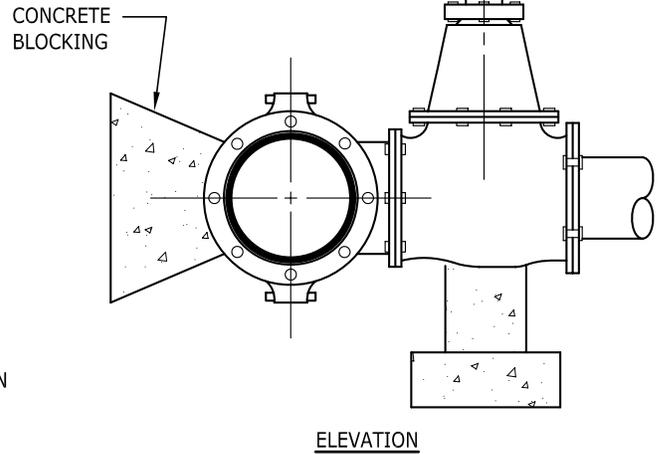
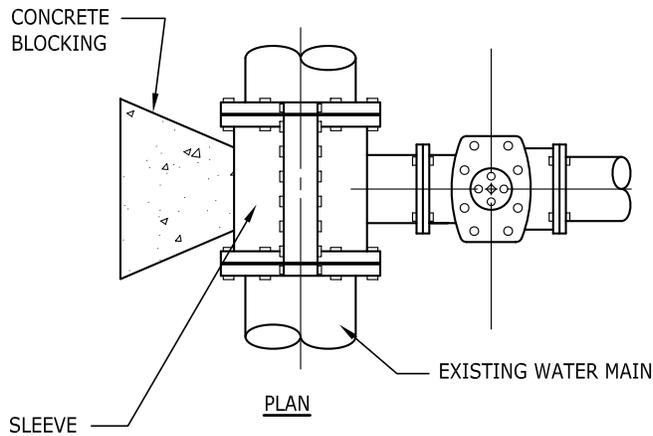
NOTES:

- ① INSTALLATIONS IN AREAS REQUIRING TRAFFIC BEARING VAULTS REQUIRE APPROVAL BY THE ENGINEER.
- ② DISCHARGE RISER SHALL BE INSTALLED IN PLANTER AREAS ONLY. ANCHOR RISER W/ 2"X1/4" STAINLESS STEEL STRAPS AND 3/8" HILTI EXPANSION BOLTS. PAINT THE ABOVEGROUND PIPING W/ TWO (2) COATS OF FARWEST WONDERGLO QUICKSET HI-PERFORMANCE ENAMEL, #1100 SERIES, WHITE.
- ③ PIPE AND FITTINGS TO BE BRASS FOR INLET SIDE OF AIR RELEASE VALVE.
- ④ PIPE AND FITTINGS TO BE GALVANIZED FOR OUTLET SIDE OF AIR RELEASE VALVE.
- ⑤ OPTIONAL INSTALLATION FOR SHALLOW WATER MAIN DEPTHS
- ⑥ CENTER AIR VAC ASSEMBLY IN THE VAULT.

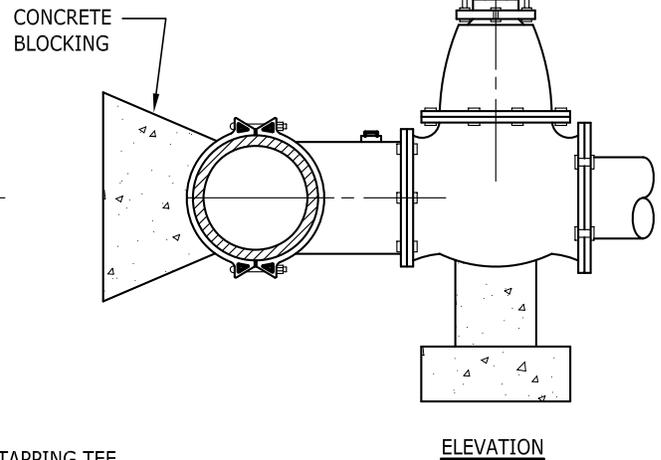
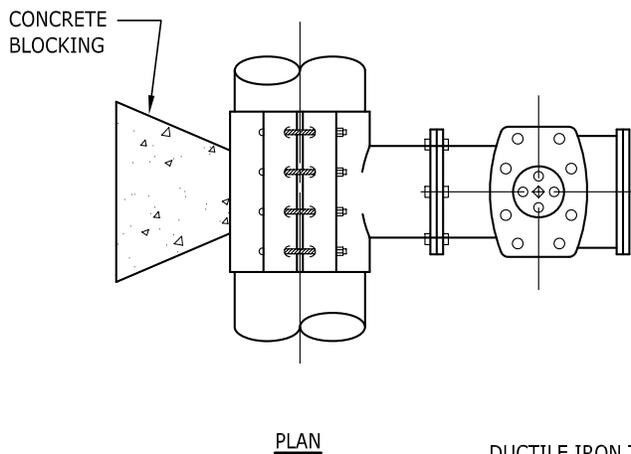
		CITY OF KENT ENGINEERING DEPARTMENT	
		COMBINATION AIR/VACUUM VALVE & VAULT	
DESIGNED: DMW	SCALE: NONE	STANDARD PLAN	
DRAWN: BB	DATE:		
CHECKED:	ENGINEER:	3-20	
APPROVED:			

NOTES:

1. MECHANICAL JOINT LONG SLEEVES SHALL BE HEAVY DUTY CAST DUCTILE IRON, HAVE END AND SIDE GASKETS.
2. LONG TAPPING SLEEVE & VALVE ASSEMBLY TO BE PRE-APPROVED BY THE ENGINEER. PRESSURE TESTING SHALL BE APPROVED BY CONSTRUCTION INSPECTOR PRIOR TO TAPPING. FOLLOW AWWA REQUIREMENTS FOR DISINFECTION OF TAPPING SLEEVES (AWWA STD. C651)
3. WET TAPS SHALL NOT BE ALLOWED ON SAME SIZE OR SMALLER MAINS.

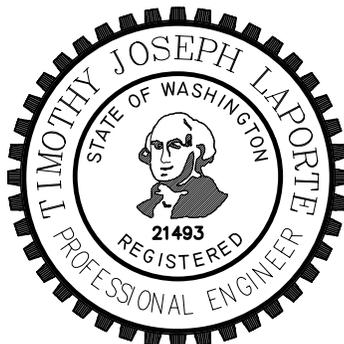


**HEAVY DUTY CAST DUCTILE
IRON TAPPING TEE**

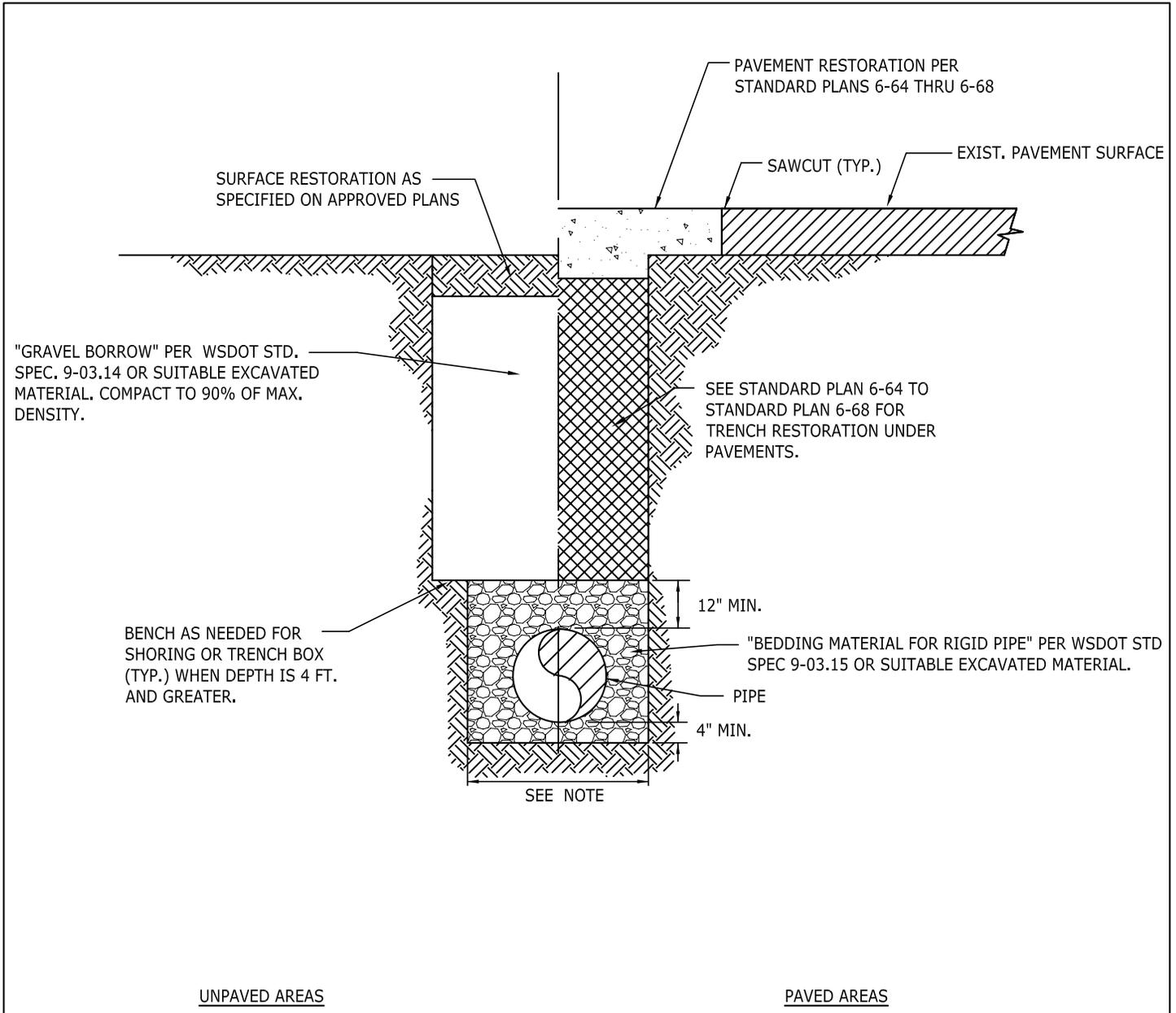


DUCTILE IRON TAPPING TEE

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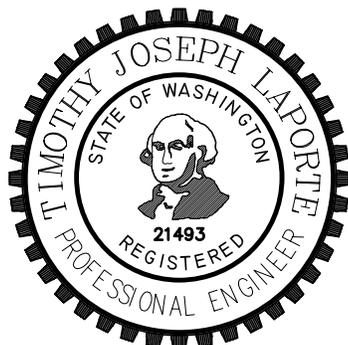
		CITY OF KENT ENGINEERING DEPARTMENT	
		TAPPING SLEEVE AND VALVE ASSEMBLIES	
DESIGNED	DMW	SCALE	NONE
DRAWN	BB	DATE	
CHECKED			
APPROVED		ENGINEER	
			3-21



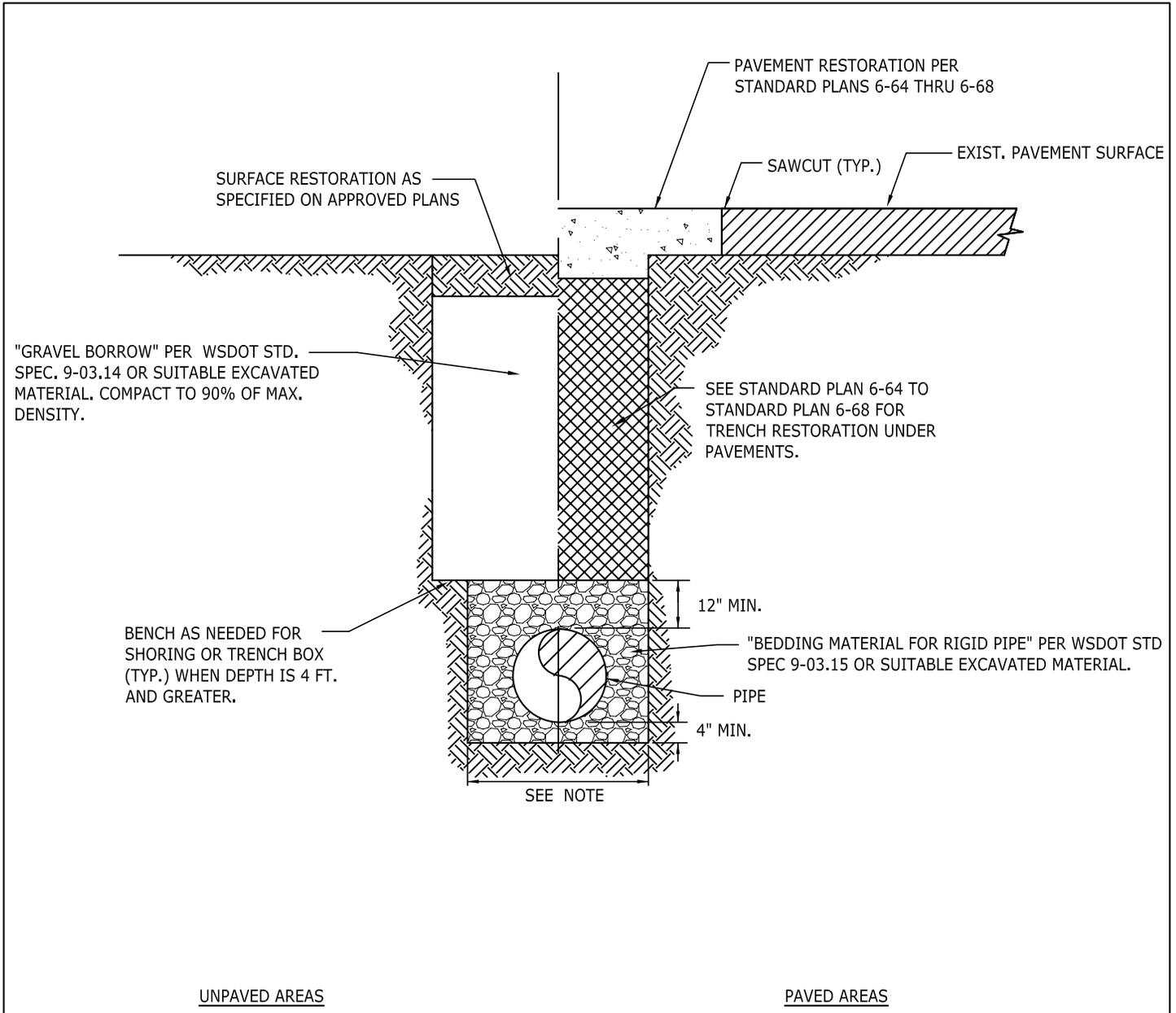
NOTE:

MAXIMUM WIDTH OF TRENCH AT TOP OF PIPE
 * 30" FOR PIPE UP TO AND INCLUDING 12" NOMINAL DIAMETER.
 * O.D. PLUS 16" FOR PIPE LARGER THAN 12" NOMINAL DIAMETER.

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		CITY OF KENT ENGINEERING DEPARTMENT	
		TYPICAL PIPE TRENCH	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	3-22	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			



UNPAVED AREAS

PAVED AREAS

NOTE:

MAXIMUM WIDTH OF TRENCH AT TOP OF PIPE
 * 30" FOR PIPE UP TO AND INCLUDING 12" NOMINAL DIAMETER.
 * O.D. PLUS 16" FOR PIPE LARGER THAN 12" NOMINAL DIAMETER.

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		CITY OF KENT ENGINEERING DEPARTMENT	
		TYPICAL PIPE TRENCH	
DESIGNED <u>DMW</u>	SCALE <u>NONE</u>	3-22	
DRAWN <u>BB</u>	DATE _____		
CHECKED _____	ENGINEER _____		
APPROVED _____			

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APPENDIX H

Water Rights Information

Please find the remainder of *Appendix H – Water Rights Information* on the flash drive that accompanies this Water System Plan.

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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 # <small>*If water right is interruptible, identify limitation in yellow section below</small>	WFI Source # <small>If a source has multiple water rights, list each water right on separate line</small>	Existing Water Rights <small>Qi= Instantaneous Flow Rate Allowed (GPM or CFS) Qa= Annual Volume Allowed (Acre-Feet/Year) This includes wholesale water sold</small>				Current Source Production – Most Recent Calendar Year <small>Qi = Max Instantaneous Flow Rate Withdrawn (GPM or CFS) Qa = Annual Volume Withdrawn (Acre-Feet/Year) This includes wholesale water sold</small>				10-Year Forecasted Source Production (determined from WSP) <small>This includes wholesale water sold</small>				20-Year Forecasted Source Production (determined from WSP) <small>This includes wholesale water sold</small>			
		Primary Qi <small>Maximum Rate Allowed</small>	Non-Additive Qi <small>Maximum Rate Allowed</small>	Primary Qa <small>Maximum Volume Allowed</small>	Non-Additive Qa <small>Maximum Volume Allowed</small>	Total Qi <small>Maximum Instantaneous Flow Rate Withdrawn</small>	Current Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume Withdrawn</small>	Current Excess or (Deficiency) Qa	Total Qi <small>Maximum Instantaneous Flow Rate in 10 Years</small>	10-Year Forecasted Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume in 10 Years</small>	10-Year Forecasted Excess or (Deficiency) Qa	Total Qi <small>Maximum Instantaneous Flow Rate in 20 Years</small>	20-Year Forecasted Excess or (Deficiency) Qi	Total Qa <small>Maximum Annual Volume in 20 Years</small>	20-Year Forecasted Excess or (Deficiency) Qa
1 G1-123225CL	S01 – Kent Springs	4,488 gpm	0 gpm	965 afy	0 afy	0 gpm	4,488 gpm	0 afy	965 afy	0 gpm	4,488 gpm	0 afy	965 afy	0 gpm	4,488 gpm	0 afy	965 afy
2 G1-22956C	S01 – Kent Springs	3,690 gpm	0 gpm	5904 afy	0 afy	3,680 gpm	10 gpm	2,381 afy	3,523 afy	3,680 gpm	10 gpm	2,534 afy	3,370 afy	3,680 gpm	10 gpm	2,704 afy	3,200 afy
3 SWC 7232	S02 – Clark Springs	2,244 gpm	0 gpm	3,600 afy	0 afy	2,244 gpm	0 gpm	1,460 afy	2,140 afy	2,244 gpm	0 gpm	1,554 afy	2,046 afy	2,244 gpm	0 gpm	1,658 afy	1,942 afy
4 GWC 3107-A	S02 – Clark Springs	2,250 gpm	0 gpm	1,350 afy	0 afy	2,250 gpm	0 gpm	548 afy	802 afy	2,250 gpm	0 gpm	583 afy	767 afy	2,250 gpm	0 gpm	622 afy	728 afy
5 GWC 7660-A 1	S02 – Clark Springs	906 gpm	4,494 gpm	3,706 afy	4,950 afy	906 gpm	0 gpm	1,503 afy	2,203 afy	906 gpm	0 gpm	1,600 afy	2,106 afy	906 gpm	0 gpm	1,707 afy	1,999 afy
6 G1-24189C	S18 – Armstrong Sp.	1,300 gpm	0 gpm	0 afy	500 afy	1,050 gpm	250 gpm	60 afy	440 afy	1,050 gpm	250 gpm	64 afy	436 afy	1,050 gpm	250 gpm	69 afy	431 afy
7 G1-23614C	S10 North Kent Wellfield & S16 – Garrison Creek	500 gpm	0 gpm	0 afy	800 afy	500 gpm	0 gpm	0 afy	800 afy	500 gpm	0 gpm	0 afy	800 afy	500 gpm	0 gpm	0 afy	800 afy
8 G1-24190C	S10 North Kent Wellfield & S16 – Garrison Creek	2,700 gpm	0 gpm	0 afy	1,400 afy	2,700 gpm	0 gpm	26 afy	1,374 afy	2,700 gpm	0 gpm	28 afy	1,372 afy	2,700 gpm	0 gpm	29 afy	1,371 afy
9 G1-24404C	S10 North Kent Wellfield & S16 – Garrison Creek	1,200 gpm	0 gpm	0 afy	600 afy	800 gpm	400 gpm	0 afy	600 afy	800 gpm	400 gpm	0 afy	600 afy	800 gpm	400 gpm	0 afy	600 afy
10 GWC 42-D	S05 – East Hill (104 th)	60 gpm	0 gpm	90 afy	0 afy	0 gpm	60 gpm	0 afy	90 afy	0 gpm	60 gpm	0 afy	90 afy	0 gpm	60 gpm	0 afy	90 afy
11 GWC 44-A	S05 – East Hill (104 th)	90 gpm	0 gpm	135 afy	0 afy	0 gpm	90 gpm	0 afy	135 afy	0 gpm	90 gpm	0 afy	135 afy	0 gpm	90 gpm	0 afy	135 afy
12 GWC 2890-A	S05 – East Hill (104 th)	120 gpm	0 gpm	146 afy	0 afy	0 gpm	120 gpm	0 afy	146 afy	0 gpm	120 gpm	0 afy	146 afy	0 gpm	120 gpm	0 afy	146 afy
13 G1-23285C	S05 – East Hill (104 th)	1,900 gpm	0 gpm	3,040 afy	0 afy	1,900 gpm	0 gpm	328 afy	2,712 afy	1,900 gpm	0 gpm	349 afy	2,691 afy	1,900 gpm	0 gpm	372 afy	2,668 afy
14 GWC 651-A	NA – East Hill (108 th)	60 gpm	0 gpm	42 afy	0 afy	0 gpm	60 gpm	0 afy	42 afy	0 gpm	60 gpm	0 afy	42 afy	0 gpm	60 gpm	0 afy	42 afy
15 GWC 2428-A	NA – East Hill (108 th)	120 gpm	0 gpm	78.4 afy	0 afy	0 gpm	120 gpm	0 afy	78.4 afy	0 gpm	120 gpm	0 afy	78.4 afy	0 gpm	120 gpm	0 afy	78.4 afy
16 GWC 767-A	S12 – O'Brien	243 gpm	0 gpm	45 afy	0 afy	0 gpm	243 gpm	0 afy	45 afy	0 gpm	243 gpm	0 afy	45 afy	0 gpm	243 gpm	0 afy	45 afy
17 G1-24073C	S07 – Soos Creek (Seven Oaks)	900 gpm	0 gpm	0 afy	864 afy	350 gpm	550 gpm	0 afy	864 afy	350 gpm	550 gpm	0 afy	864 afy	350 gpm	550 gpm	0 afy	864 afy
18 GWC 1116-A	NA – Summit	200 gpm	0 gpm	320 afy	0 afy	0 gpm	200 gpm	0 afy	320 afy	0 gpm	200 gpm	0 afy	320 afy	0 gpm	200 gpm	0 afy	320 afy
19 GWC 494-A	NA – Hamilton Road	38 gpm	0 gpm	30 afy	0 afy	0 gpm	38 gpm	0 afy	30 afy	0 gpm	38 gpm	0 afy	30 afy	0 gpm	38 gpm	0 afy	30 afy
20 GWC 4534-A	NA – Hamilton Road	12 gpm	0 gpm	19.2 afy	0 afy	0 gpm	12 gpm	0 afy	19.2 afy	0 gpm	12 gpm	0 afy	19.2 afy	0 gpm	12 gpm	0 afy	19.2 afy
21 G1-23713C	NA – High Meadows	7 gpm	0 gpm	11 afy	0 afy	0 gpm	7 gpm	0 afy	11 afy	0 gpm	7 gpm	0 afy	11 afy	0 gpm	7 gpm	0 afy	11 afy
22 GWC 1957-A	NA - Chappellear	140 gpm	0 gpm	60 afy	0 afy	0 gpm	140 gpm	0 afy	60 afy	0 gpm	140 gpm	0 afy	60 afy	0 gpm	140 gpm	0 afy	60 afy
TOTALS =		23,168 gpm		19,595.6 afy		16,380 gpm	6,788 gpm	6,306 afy	13,289.6 afy	16,380 gpm	6,788 gpm	6,711 afy	12,884.6 afy	16,380 gpm	6,788 gpm	7,162 afy	12,433.6 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
G1-27619A	New	May 22, 1995	1,200 gpm	0 gpm	500 afy	0 afy
G1-27620A	New	May 22, 1995	7,000 gpm	0 gpm	6,496 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	Maximum Qa		Maximum Qi	Current Excess or (Deficiency) Qi	Maximum Qa	Current Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa	Maximum Qi	Future Excess or (Deficiency) Qi	Maximum Qa	Future Excess or (Deficiency) Qa
	Instantaneous Flow Rate	Annual Volume		Instantaneous Flow Rate		Annual Volume		10-Year Forecast		10-Year Forecast		20-Year Forecast		20-Year Forecast	
1 Tacoma RWSS	8,778 gpm	14,159 afy	NA	8,778 gpm	0 gpm	2,321 afy	11,838 afy	8,778 gpm	0 gpm	2,469 afy	11,690 afy	8,778 gpm	0 gpm	2,636 afy	11,523 afy
2															
3															
TOTALS =	8,778 gpm	14,159 afy		8,778 gpm	0 gpm	2,321 afy	11,838 afy	8,778 gpm	0 gpm	2,469 afy	11,690 afy	8,778 gpm	0 gpm	2,636 afy	11,523 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 GWC 7660-A	Minimum flow conditions in Rock Creek	Potentially Year Round
2		
3		

ADDITIONAL COMMENTS:

¹ This water right has minimum instream flows in Rock Creek as a provision.

The City also holds ground water certificate G1-25204C for municipal irrigation of the River Bend Golf Course. This water right is not included above since it is a stand-alone irrigation system with no projected changes.

The breakdown in annual volume used by source in the future demands is based on the same percentage of use as occurred in 2016.

Demands based on without water use conservation.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

IN THE MATTER OF AN)
ADMINISTRATIVE ORDER AGAINST)
City of Kent)

ORDER NO. DE 02WRNR-3754

TO: **Mr. Don Wickstrom**
City of Kent
220 Fourth Avenue S
Kent, WA 98032

This is an Administrative Order requiring the **City of Kent** to comply with RCW 90.03.360 by taking certain actions which are described below. RCW 43.21A.064 authorizes the Department of Ecology (Ecology) to issue Administrative Orders in order to more effectively manage the State's resources.

Ecology recently completed rulemaking of Chapter 173-173 WAC which outlines new metering installation, maintenance, and reporting requirements for water users in this state. For these reasons and in accordance with RCW 90.03.360, IT IS ORDERED that the **City of Kent** take the following actions:

1. An approved measuring device shall be installed and maintained for the source diversion(s) and withdrawal(s) for the following water right claim(s), permit(s) and certificate(s) No. **GWC 1116, GWC 7660, G1-22956C, G1-23285C, G-23614C, G1-23713C, G1-24073C, G1-24189C, G1-24190C, G1-24404C, GWC 3107, SWC 7232, Claim # 123225, Claim # 123226, Claim # 123227, G1-25204C, GWC 42, GWC 44, GWC 651, GWC 2428, GWC 2890, GWC 4534, GWC 494.**

Such measuring devices shall be in accordance with the rule "Requirements for Measuring and Reporting Water Use", Chapter 173-173 WAC. The rule above 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. Summary information on installation, operation and maintenance requirements is enclosed.

2. At a minimum, water use data shall be recorded **weekly** and shall be submitted annually to Ecology by January 31st of each calendar year.

3. At a minimum, the following information shall be included with each annual submittal of water use data on a form prescribed by the Department:
 - water right holder name, mailing address and daytime phone number,
 - contact name and phone number if different than water right holder,
 - Water Resource Inventory Area (WRIA),
 - parcel number for place of use of water rights (except for public water systems),
 - Permit, Certificate or Claim number(s),
 - source name (for public water systems, the public water system identification number and source number assigned by the department of health),
 - annual quantity of diversion or withdrawal (“Qa”),
 - maximum instantaneous rate of diversion or withdrawal during the entire year (“Qi”),
 - date (if available) of maximum rate of diversion or withdrawal,
 - monthly meter readings (Note: From the recorded data as specified in condition 2, Ecology is requiring submittal of monthly meter readings and maximum instantaneous rate of diversion or withdrawal for each month to collect seasonal information for water resource planning, management and compliance),
 - maximum instantaneous rate of diversion or withdrawal during each month,
 - type of meter,
 - last meter calibration or inspection date, and
 - period of use.

4. Within sixty (60) days of the date of this Order, notify Ecology in writing; whether metering is occurring for the claim(s), permits(s) and certificate(s) referenced in this Order and if each of the data elements listed in condition 3 above is currently being collected. If these data are not being collected, include in the notification to Ecology when that data collection will begin.

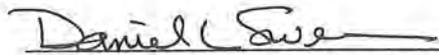
Department of Ecology personnel, upon presentation of proper credentials, shall have access at reasonable times, to the records of water use that are kept to meet the above conditions, and to inspect at reasonable times any measuring device used to meet the above conditions.

Failure to comply with this Order may result in the issuance of civil penalties or other actions, whether administrative or judicial, to enforce the terms of this Order.

This Order may be appealed pursuant to RCW Chapter 43.21B. The person to whom this Order is issued, if he or she wishes to file an appeal, must file the appeal with the Pollution Control Hearings Board **within thirty (30) days of receipt of this Order**. Send the appeal to: Pollution Control Hearings Board, P.O. Box 40903, Olympia, Washington 98504-0903. At the same time, a copy of the appeal **must** be sent to: Department of Ecology, Water Resources Appeals Coordinator, P.O. Box 47600, Olympia, Washington 98504-7600. All others receiving notice of

this Order, who wish to file an appeal, must file the appeal with the Pollution Control Hearings Board within **thirty (30) days of the date the Order was mailed.** The appeal must be filed, with both the Pollution Control Hearings Board and the Department of Ecology, in the same manner as described above.

DATED this 1st day of April, 2002 at Bellevue, Washington.



Daniel L. Swenson, Section Manager
Water Resources Program
Northwest Regional Office



STATE OF WASHINGTON

DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Avenue SE • Bellevue, Washington 98008-5452 • (425) 649-7000

April 1, 2002

CERTIFIED MAIL

7000 0520 0021 6763 7738

Mr. Don Wickstrom
City of Kent
220 Fourth Avenue S
Kent, WA 98032

RE: Source Water Metering and Reporting

Enclosed is Order No. DE 02WRNR-3754 requiring source water metering and reporting. It describes the recording frequency, data parameters and reporting deadline for your water right(s).

The Department of Ecology (Ecology) is preparing forms to assist water right holders in submitting the required data. In the future, you will be able to submit data over the Internet at Ecology's website. In the interim, water use data should be submitted on Ecology-approved forms. A sample form to submit water use data is enclosed for your use. Ecology is also working on a metering compliance form to assist you in responding to the terms of Condition 4 in the enclosed Order. This form will be sent to you.

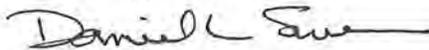
The state Legislature is providing \$3.4 million in grants to assist water users in purchasing water measuring devices. Ecology has grant funds for the cost of purchase, installation, and initial calibration of water measuring devices. Some funds are also available for telemetry equipment for water measurement data. Maximum cost share by Ecology ranges from 50% to 85% depending on total eligible costs. The maximum eligible project cost is \$50,000. Applications for funds must be postmarked within ninety (90) days of the postmark of this Order.



Source Water Metering and Reporting
April 1, 2002
Page 2 of 2

If you have any questions concerning the content of the document or funding applications, please call or write Greg Stegman, at telephone/address 425-649-7217, Department of Ecology, Northwest Regional Office, 3190 160th Avenue SE, Bellevue, WA 98008-5452. The enclosed Order may be appealed. The appeal procedures are described in the Order. A copy of the updated water measurement rule is available on Ecology's web site at <http://www.ecy.wa.gov/programs/wr/measuring/measuringhome.html>

Sincerely,



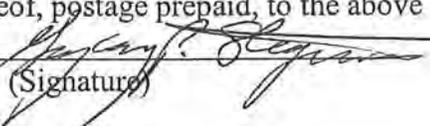
Daniel L. Swenson, Section Manager
Water Resources Program
Northwest Regional Office

GS:gs

Enclosure(s):

Cc: Greg Stegman, Dept. of Ecology, NWRO
Darlene Treece, WR/HQ
CELP

I certify that I mailed this letter or an identical copy thereof, postage prepaid, to the above addressee(s) this 1st day of April, 2002.



(Signature)

City of Kent Water Rights Cross-Reference

Water Right Number	Ecology Record/Document Number	Source Location
SWC 7232	S1-*3533CWRIS	Clark Springs
GWC 3107-A	G1-*04526CWRIS	Clark Springs
GWC 7660-A	G1-*10006CWRIS	Clark Springs
G1-123225CL	G1-123225CL	Kent Springs
G1-22956C	G1-22956C	Kent Springs
G1-24189C	G1-24189CWRIS	Armstrong Springs
GWC 42-D	G1-*00012SWRIS	East Hill (104th)
GWC 44-A	G1-*00014CWRIS	East Hill (104th)
GWC 2890-A	G1-*04435CWRIS	East Hill (104th)
G1-23285C	G1-23285CWRIS	East Hill (104th)
GWC 651-A	G1-*00785CWRIS	East Hill (108th)
GWC 2428-A	G1-*03022CWRIS	East Hill (108th)
G1-23614C	G1-23614C	North Kent Wellfield
G1-24190C	G1-24190C	North Kent Wellfield
G1-24404C	G1-24404C	North Kent Wellfield
G1-24073C	G1-24073CWRIS	Soos Creek (Seven Oaks)
GWC 767-A	G1-*01787C	O'Brien
GWC 1116-A	G1-*01562CWRIS	Summit
GWC 494-A	G1-*00594CWRIS	Hamilton Road
GWC 4534-A	G1-*06285CWRIS	Hamilton Road
G1-23713C	G1-23713CWRIS	High Meadows
GWC 1957-A	G1-*02408CWRIS	Chappelear
G1-25204C	G1-25204NWRIS	River Bend Golf Course

STATE OF WASHINGTON, COUNTY OF King

CERTIFICATE OF SURFACE WATER RIGHT

(In accordance with the provisions of Chapter 117, Laws of Washington for 1917, and amendments thereto, and the rules and regulations of the State Supervisor of Water Resources thereunder.)

This is to certify that CITY OF KENT

of Kent, State of Washington, has made proof to the satisfaction of the State Supervisor of Water Resources of Washington, of a right to the use of the waters of Rock Creek, a tributary of Cedar River, with point or points of diversion within the S¹ Sec. 26, Twp. 22 N., R. 6 E., W. M., under and subject to provisions contained in Appropriation Permit No. 2745 issued by the State Supervisor of Water Resources, and that said right to the use of said 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 15, at Page 7232, on the 22nd day of July, 1958 that the priority date of the right hereby confirmed is October 14, 1931; that the amount of water under the right hereby confirmed, for the following purposes is limited to an amount actually beneficially used and shall not exceed 5 cubic feet per second for domestic supply.

A description of the lands under such right to which the water right is appurtenant, and the place where such water is put to beneficial use, is as follows:

City of Kent, King County, Washington

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 Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 22nd day of July, 1958.

M. G. Walker
State Supervisor of Water Resources.

ENGINEERING DATA
O.K. *[Signature]*

Proof of Appropriation of Water

RECEIVED
DEPARTMENT OF CONSERVATION

Permit No. 2745

Application No.

JUL 16 1958

1. Name of Permittee City of Kent

2. Postoffice address Kent, Washington A. M. 7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6 P. M.

3. Source of appropriation Rock Creek

4. Name or number of works (if any) Rock Creek Intake Facilities

5. For what purpose or purposes is water used? Municipal Supply

6. Give date of beginning of construction May 1957

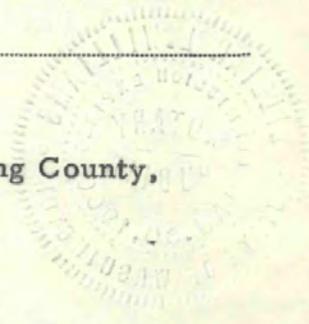
7. Give date of completion of construction work, including water distribution system May 1958

8. Give date when water was completely applied to proposed use May 1958

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:
Water to be used for a municipal supply for the City of Kent, King County, Washington.



12. During what months is water used? Continuous

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? Yes

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. See Enclosed Map

15. Actual measured discharge or diversion of permanent system: 5 C. F. S. (~~gpm or cfs~~)

money in

5 CFS
[Signature]

(Sign certification on reverse side)

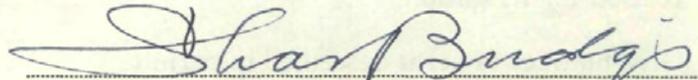
STATE OF WASHINGTON,

County of KING

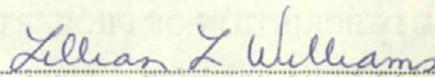
} ss.

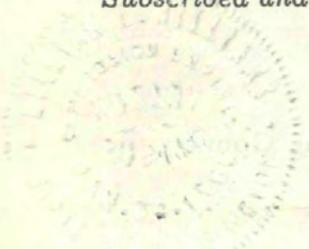
I, Chas. Bridges, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 15 day of July, 1958


Chas. Bridges, City Clerk

Subscribed and sworn to before me this 15th day of July, 1958


Lillian Z Williams
Notary Public.



PERMIT

This is to certify that I have examined the foregoing application and do hereby grant the same, subject to the following limitations and conditions: If for irrigation, this appropriation shall be subject to such reasonable rotation system as may be ordered by the State Supervisor of Hydraulics; and it is further provided that Permittee, in the use of water under this permit, shall comply with all fisheries and game laws now in force or hereafter enacted, this provision being in accordance with Chap. 127, Laws of 1939.

The amount of water appropriated shall be limited to the amount which can be applied to beneficial use and not to exceed 12.0 cubic feet per second, or its equivalent in case of rotation. The priority date of this permit is October 14, 1931

Actual construction work shall begin on or before July 1, 1940 and shall thereafter be prosecuted with reasonable diligence and be completed on or before October 1, 1946

Complete application of the water to the proposed use shall be made on or before October 1, 1947 See letter May 10 1949 G. J. G. G. G.

Given under my hand and the seal of this office at Olympia, Washington this 6th day of July, 1939

Chas. J. Bartholet
State Supervisor of Hydraulics.

Application No. 3533
Permit No. 2745

PERMIT

To Appropriate Public Waters of the State of Washington
Issued to King County
City of Kent

County of Kent, Washington

This instrument was first received in the office of the State Supervisor of Hydraulics, Olympia, Washington, on the 14th day of October, 1931, at 11:30 o'clock A. M.

Approved July 6, 1939
Recorded in Book No. 11 of
Permits, on Page 2745

CHAS. J. BARTHOLET
State Supervisor of Hydraulics.

JAY THOMAS, PUBLIC PRINTER

Before your certificate of water right is issued it will be necessary for you to file with the State Supervisor of Hydraulics a copy of each of the following reports:

- 1st. Progress reports (in case temporary permit is issued).
2nd. Affidavit of publication of notice of water right application.
3rd. Notice of beginning of construction.
4th. Notice of prosecution of work with diligence.
5th. Notice of completion of construction.
6th. Notice of application of water to a beneficial use.
7th. Proof of appropriation of water.

Upon a satisfactory showing that the appropriation has been perfected as provided by statute the State Supervisor of Hydraulics will issue a water right certificate.

(Blanks will be furnished by the office of State Supervisor of Hydraulics)

Application No. 3533

CITY OF KENT

This application is for the appropriation of 15.00 c.f.s. of water, for municipal supply for the City of Kent, from Rock Creek, tributary of Cedar River, in King County.

Rock Creek heads in springs in Section 35, Township 22 N., Range 6 E. W. M., probably little more than a mile above applicant's proposed point of diversion.

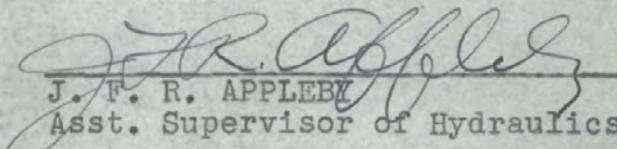
Owing to the rapid development of industries requiring large quantities of water, it was found necessary to seek other sources, and after a long study of the surrounding country it was decided that Rock Creek offered the best opportunity for developing a supply.

Meter measurements of the stream, by the U. S. Geological Survey, at about the proposed point of diversion vary from a minimum of 3.0 c.f.s. on October 1, 1935 to 91.8 c.f.s. on January 22, 1936. No use is being made of these waters.

It is believed that about 12.00 c.f.s. will be available during a large portion of the year and that permit should issue for this quantity, subject to existing rights.

Applicant should be given one year in which to begin construction and seven years in which to complete same.

Signed this 26
day of June, 1939.


J. F. R. APPLEBY
Asst. Supervisor of Hydraulics

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics



APPLICATION FOR A PERMIT

To Appropriate Public Waters of the State of Washington

Application No. 3533

Permit No. 2745

I, Erving C. Clark -- Assigned 11-18-31 to City of Kent,
(Name of applicant)
of Kem, County of King
(Postoffice)

State of Washington, do hereby make application for a permit to appropriate
the following described public waters of the State of Washington subject to existing rights:

If the applicant is a corporation, give date and place of incorporation

1. The source of the proposed appropriation is Rock Creek
(Name of stream)
tributary of Cedar River (Allowed 12.0 c.f.s.)

2. The amount of water which the applicant intends to apply to beneficial use is Fifteen
cubic feet per second.

3. The use to which the water is to be applied is Domestic Supply
(Irrigation, power, mining, manufacturing, domestic supplies, etc.)

4. Time during which water will be required each year continuous

5. The approximate point of diversion is located Near the West Quarter Corner
(Give distance and bearing to section corner)
of Section 26

being within the South Half of Sec. 26, Tp. 22 N., R. 6 E W. M.,
(Give smallest legal subdivision) (No. E. or W.)
in the county of King

6. The Pipe Line to be 10 to 15 ft. or miles in length, terminating
(Main ditch, canal, or pipe line)
in the Vicinity of Kent Wash near of Sec. 24, Tp. 22 N. R. 4 E W. M.,
(Smallest legal subdivision) (No. E. or W.)
the proposed location being shown on the accompanying map.

7. The name of the ditch, canal or other works is unknown at this time

8. Estimated cost of development necessary to utilize fully the appropriation herein asked for
\$ 75,000 to \$150,000

9. Does the stream from which you wish to appropriate water flow through the tract of land on
which the water is to be used?

10. Do you own the required right-of-way for the proposed works?

DESCRIPTION OF WORKS.

DIVERSION WORKS—

11. (a) Height of diversion dam _____ feet; length on top _____ feet;
length at bottom _____ feet; material to be used and character of construction

(Loose rock, concrete, masonry, rock and brush, timber crib, etc., wasteway over or around dam)

(b) Description of headgate _____
(Timber, concrete, etc.; number and size of openings)

Type of construction to be decided later

When storage works are contemplated a storage permit must be filed in addition to the above. These forms can be secured, together with instructions, by addressing the State Supervisor of Hydraulics, Olympia, Washington.

CANAL SYSTEM—

12. (a) Give approximate dimensions at each point of canal where materially changed in size, stating miles from headgate. At headgate: Width on top (at water line).....feet; width on bottom.....feet; depth of water.....feet; grade.....feet fall per one thousand feet.

(b) At.....miles from headgate: Width on top (at water line).....feet; width on bottom.....feet; depth of water.....feet; grade.....feet fall per one thousand feet.

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

IRRIGATION—

13. The land to be irrigated has a total area of.....acres, described as follows:.....

(Give legal subdivision by section, township and range)

(If more space is required, attach separate sheet)

14. Give the legal description of land when water is to be used for purposes other than irrigation, power and municipal supply..... Sec....., Tp..... N., Rge..... W. M. (Legal subdivisions) (E. or W.)

(a) To what stream is water returned.....

(b) Locate the point of return..... Sec....., Tp..... N., Rge..... W. M. (Smallest legal subdivision of section) (E. or W.)

POWER—

15. (a) Total amount of power to be developed..... H. P. (Theoretical horsepower)

(b) Total fall to be utilized.....feet. (Head)

(c) The nature of the works by means of which the power is to be developed.....

(d) Such works to be located in..... of Sec..... (Legal subdivision) Tp..... N., Rge..... W. M. (No. E. or W.)

(e) To what stream is the water to be returned.....

(f) Locate point of return..... Sec..... Tp..... N., Rge..... W. M. (No. E. or W.)

(g) The use to which power is to be applied is.....

MUNICIPAL SUPPLY—

16. To supply the city of Kear & Tributary Territory,
(Name)
County, having a present population of 6,000
and an estimated population of _____ in 19_____.

- (a) Estimated present requirement _____
(b) Estimated future requirement _____

- 17. Construction work will begin on or before _____
18. Construction work will be completed on or before _____

Duplicate maps of the proposed ditch or other works, prepared in accordance with the rules of the State Supervisor of Hydraulics accompany this application.

Irving C. Clark
(Name of applicant)

Signed in the presence of us as witnesses:

- (1) G. Hallahan, Olympia Wash
(Name) (Address of witness)
(2) _____, _____
(Name) (Address of witness)

Remarks: _____

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 Hydraulics, with corrections, on or before _____, 19_____.

WITNESS my hand this _____ day of _____, 19_____.

State Supervisor of Hydraulics.

Proof of Appropriation of Water

RECEIVED
DEPARTMENT OF CONSERVATION

Application No.

Permit No. 4227

JUL 16 1958

1. Name of Permittee City of Kent

2. Postoffice address Kent, Washington

A. M. 7 8 9 10 11 12 1 2 3 4 P. M. 5 6

3. Source of appropriation Rock Creek

4. Name or number of works (if any) Rock Creek Intake Facilities

5. For what purpose or purposes is water used? Municipal Supply

6. Give date of beginning of construction May 1957

7. Give date of completion of construction work, including water distribution system May 1958

8. Give date when water was completely applied to proposed use May 1958

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:

Water to be used for a municipal supply for the City of Kent, King County, Washington

12. During what months is water used? Continuous

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? yes

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. See Enclosed Map

15. Actual measured discharge or diversion of permanent system: 2250 (gpm ~~or cfs~~)

2250 GPM.

(Sign certification on reverse side)

1350 AF

STATE OF WASHINGTON,

County of KING } ss.

I, Chas. Bridges, 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 15 day of July, 1958

Chas Bridges
Chas. Bridges, City Clerk

Subscribed and sworn to before me this 15th day of July, 1958

Lillian L Williams
Notary Public.



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. 9 of Ground Water Permits, on page 4227 under Application No. 4526

CITY OF KENT, 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 February 18, 1957

Source of the proposed ground water appropriation is an infiltration trench
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 5390 gallons per minute; 1340 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 approx. 1500 feet north and 500 feet - 3500 feet west of southeast corner of sec.26

being within S $\frac{1}{2}$, sec.26, T.22 N., R.6 E.W.M.

county of King

Use, or uses to which water is to be applied:

For municipal supply: 5390 gallons per minute; 1340 acre-feet per year,
to supply the City of Kent.

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

City of Kent, King County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be and have a diameter of inches, and depth of feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

Perforated pipe bedded in a gravel pack infiltration trench.

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources:

Construction work shall begin on or before May 1, 1958
and shall thereafter be prosecuted with reasonable diligence and completed on or before
November 1, 1958
and complete application of water to proposed use shall be made on or before
November 1, 1959

Given under my hand and the seal of this office at Olympia, Washington, this 23d day of
April, 1957.

M. G. Walker
State Supervisor of Water Resources

Report of Examination on Ground Water

Received date 2-18-57 Date of exam. 3-25-57 Appli. No. 4526
Name City of Kent Address City Hall, Kent, Wash.
Type of works infiltration trench Dimensions perforated pipe bedded in a gravel packed infiltration trench
Progress of works not begun
Quantity ~~claimed or~~ applied for 5390 g.p.m. 8800 acre-feet per year
Legal sub. S $\frac{1}{2}$ Sec. 26 Twp. 22 N. Rge. 6 E. County King
Use municipal supply

Irrigation-acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 6,000 as of 1970

Industrial _____

Time pump will be operated continuously

Other water rights appurtenant to this land S. W. Permit #2745: 12.0 cfs; G. W. Cert. #976-A 900 gpm; G. W. Cert. #1116-A: 500 gpm - 320 AF

Proximity to existing works, springs, wells, or streams location of infiltration trench will not be determined until after completion of subsurface exploration program. At this time it appears that the trench will be located 10 to 200 feet east of Rock Creek. Elevation difference approx. 5 to 30 feet.

Area _____ Sub-area _____ Zone _____

RECOMMENDATIONS

Approved for 5390 g.p.m. 1340 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The water requirement of this municipality is calculated on a per capita consumption of 0.224 acre-feet a year, or 1340 acre-feet a year for 6000 persons, less any amount diverted to this use under existing rights.

The planned appropriation will be made from an infiltration trench developed adjacent to the Rock Creek channel, said trench being supplied by springs and stream seepage.

Signed this 8th day of April, 1957.

Dee Molenaar
DEE MOLENAAR, Geologist
Division of Water Resources

RECEIVED
MAR 11 1957
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

} ss.

Moira McPeck being first duly sworn on

oath, deposes and says that she is the chief clerk of THE KENT NEWS-JOURNAL, a weekly newspaper. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a weekly newspaper in Kent, King 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 Kent News-Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County, Washing-

ton. That the annexed is a Notice of Ground Water

Right Application No. 4526 - City of Kent

as it was published in regular issues (and not in supplement form of said newspaper) once each week for a period

of two consecutive weeks, commencing on the

28th day of February, 1957, and ending the

7th day of March, 1957, 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 \$7.50, which has been paid in full at the rate of \$2.40 per folio of one hundred words for the first insertion and \$1.80 per folio of one hundred words for each subsequent insertion.

Moira McPeck

Chief Clerk

Subscribed and sworn to before me this 7th day of

February, 1957.

[Signature]
Notary Public in and for the State of Washington,
residing at Kent, King County.

—Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

—Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

STATE OF WASHINGTON
OFFICE OF SUPERVISOR
OF WATER RESOURCES
OLYMPIA
NOTICE OF GROUND WATER
RIGHT APPLICATION No. 4526
TAKE NOTICE:

That City of Kent, Washington on February 18, 1957 filed application for permit to withdraw public ground waters through an infiltration trench situated within S½ of Section 26, Township 22 N., Range 6 E.W.M., in King County, in the amount of 5390 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 March 7, 1957.

Witness my hand and official seal this 26th day of February, 1957.

M. G. WALKER

State Supervisor of Water Resources.

Published in the Kent News Journal February 28 and March 7, 1957.



\$10.00 examination fee should accompany each application.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources

APPLICATION FOR A PERMIT

To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

4526



Application No. G. W. _____

I, CITY OF KENT
(Name of applicant)

of CITY HALL, KENT, 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 Infiltration Trench
(Well, tunnel, infiltration trench)

located 11 miles East of Kent on State Highway No. 5-A
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)

Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any Rock Creek Springs

2. The quantity of water which applicant intends to withdraw for beneficial use is 5,390 gallons per minute; ~~8,800~~ ¹³⁴⁰ acre feet per year.

3. The use or uses to which water is to be applied Municipal Supply
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year Continuous

5. Location of well or other works for withdrawal of water: In county of King
Approx. 1500' North & 500' - 3500' West of the S.E. Corner of
(a) Sec. 26, Twp. 22 North, Range 6 East W.M.
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the South Half of Sec. 26, Twp. 22 N., Rge. 6 EWM
(Give smallest legal subdivision) (E. or W.)

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.

OK request add exam fee. \$10.00
ok 8/24/67
RMP

6. DESCRIPTION OF WORKS:

(a) Well will be.....and have a diameter of.....inches and an estimated depth of.....feet.
(Dug or drilled)

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

Perforated pipe bedded in a gravel packed infiltration trench.

(c) Distribution system to be described:

Existing and proposed 4" through 18" water distribution system of the City of Kent.

(d) If pumps are to be used, give size and type:

Not Known

(e) Give capacity and type of motor or engine to be used:

Not Known

(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:

Location of Infiltration Trench will not be determined until after completion of sub-surface exploration program. At this time, it appears that the trench will be located 10 to 200 feet East of Rock Creek. Elevation difference approx. 5 to 30 feet.

(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:

NOT KNOWN

(Name)	(Direction)	(Distance)

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. For Municipal Supply: To supply the city, town, or community of Kent, in the county of King, having a present population of 4100, and an estimated population of 6,000, in 1970.

8. For Irrigation: Number of acres to be irrigated.....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)

MUNICIPAL SUPPLY

(On accompanying plat show location of the existing wells or works)

10. What interest do you have in the above described property?

(Owner, lessee, contract buyer, etc.)

11. Do you have any other water rights appurtenant to the above described property?

Present Water Source of the City of Kent -
If so, from what source? Kent Springs located in Sec. 33, T. 22 N. R. 6 EWM.

12. Construction work will begin on or before Aug. 1, 1957

13. Construction work will be completed on or before Febr. 1, 1958

14. Water will be put to complete beneficial use on or before Aug. 1, 1958

City of Kent
By Thomas Bridges
(Signature of applicant) City Clerk

15. Name and address of owner of land on which well or works are located:

CITY OF KENT
(Name)

City Hall, Kent, Washington
(Address)

City of Kent
(Signature of legal landowner)
Thomas Bridges
City Clerk

Signed in the presence of us as witnesses:

Walter J. Ramsey
(Name)

1728 E. Madison, Seattle
(Address of witness)

L. J. Cavanaugh
(Name)

611 N. Central Ave. Kent
(Address of witness)

STATE OF WASHINGTON, } ss.
COUNTY OF THURSTON.

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.

11-1-58

Progress Sheet—Ground Water Application

NAME City of Kent, City Hall Assigned to _____
 G. W. APPLI. NO. 4526 PERMIT NO. 4227 CERT. NO. 3107 A
 AMENDED _____ CANCELLED _____

Application received 2-18-57 Initial \$10.00 fee received 2-18-57
 Statement of additional examination fee \$ 14.00 Sent 2-19-57 Received 2-21-57
 Application returned for completion or correction _____ Received _____

TEMPORARY PERMIT: Approved by _____ Issued _____

PUBLICATION:
 O.K.'d by AMH Date 2-25-57 Notice sent 2-26-57
 Protests _____
 Filed _____
 Affidavit received and checked 3-11-57 Time expired 4-8-57
 Amended notice sent _____ Affidavit received _____
 Time expires _____

DEPT. OF GAME REPORT _____

EXAMINATION Made 3-25-57 by AMH
 O.K.'d for permit 4-18-57 by RHP
 Statement of permit fee sent 4-3-57 Amount \$ 48.00 Received 4-18-57

PERMIT NO. 4227 ISSUED 4-23-57

BEGINNING OF CONSTRUCTION: Notice sent 4-23-57 Filed 9-6-57
 Extension fee \$ _____ Extended to _____
 Extended to _____

WELL DRILLER'S REPORT: Sent 2-26-57 Filed filed -
Geology report in Bob Russell

COMPLETION OF CONSTRUCTION: Notice sent 4-23-57 Filed 1-23-58
 \$2.00 extension fee _____ Extended to _____
 To _____

PROOF OF APPROPRIATION: Sent 1-23-58 Filed 7-16-58
 \$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent 1-23-58 \$ 3.00 Received 7-16-58

CERTIFICATE OF GROUND WATER RIGHT NO. 3107 A ISSUED 7-21-58

STATE OF WASHINGTON, COUNTY OF King

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 Department of Ecology thereunder.)

THIS IS TO CERTIFY That CITY OF KENT

of Kent, Washington, has made proof

to the satisfaction of the Department of Ecology of a right to the use of the public ground waters of the State of Washington from three wells

located within E 1/2 SW 1/4

Sec. 26, Twp. 22 N., R. 6 E. W.M.,

for the purpose of municipal supply

under and specifically subject to provisions contained in Ground Water Permit No. 9235

issued by the Department of Ecology 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 Department of Ecology

and entered of record in Volume 16 at page 7660-A; that the priority of the right hereby confirmed

dates from February 4, 1969; that the quantity of ground water under the right hereby con-

firmed for the aforesaid purposes, is limited to an amount actually beneficially used for said purposes,

and shall not exceed 5400 gallons per minute, 8710 acre-feet per year, during entire year, for municipal supply.

A description of the lands to which such ground water right is appurtenant is as follows:

Area served by City of Kent.

The right to use of 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 ground water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and seal of this office at Olympia, Washington, this 17th day of March, 19 72.

JOHN A. BIGGS, Director Department of Ecology

Engineering Data

OK [Signature]

by R. Jerry Bollen

Proof of Appropriation of Water

Application No. 10006

Permit No. 9235

1. Name of Permittee City of Kent
2. Postoffice address (include zip code) P O Box 310; Kent, WA. 98031
3. Actual source of appropriation Three wells
4. For what purpose or purposes is water used? Municipal water supply
5. Give date of beginning of construction of hydraulic system: Jan 1, 1969
6. Give date of completion of construction of this work, including water distribution system July 30, 1969
7. Give date when water was completely applied to permitted use July 30, 1969
8. If used for irrigation:
 - Give number of acres described in permit Not applicable
 - Give number of acres actually irrigated Not applicable
9. If used for power: HP actually developed Not applicable
10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

Area served with water by the City of Kent

11. If source is a well, is an access port or airline now installed? Yes
12. During what months is water used? As required throughout year
13. Does map filed with your application show correctly the location of well(s) or point(s) of diversion for withdrawal of water, and area of land where water is used? Yes
14. If the dimensions, location, or type of hydraulic system and structure do not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. No changes made

15. Actual measured discharge or diversion of permanent system: 5400 gpm (gpm or cfs).
O.K. For Cert.
L. Ke Perry
3-13-72
 (Sign certification on reverse side) **Test pumping produced this quantity**

STATE OF WASHINGTON,
County of King } ss.

I, Glen W. Sherwood, 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 7 day of March, 1972.

Glen W. Sherwood

Subscribed and sworn to before me this 7th day of March, 1972.

Paul McCough
Notary Public.

File Original and First Copy with the Division of Water Management
 Second Copy - Owner's Copy
 Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. **10006**
 Permit No. **9235**

(1) **OWNER:** Name City of Kent Address Kent, Washington
 (2) **LOCATION OF WELL:** County King SE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 26 T. 22 N., R. 6E W.M.
 Bearing and distance from section or subdivision corner 1253.23 ft. North + 2007.00 East from SW Corner of Sec. 26

(3) **PROPOSED USE:** Domestic Industrial Municipal
 Irrigation Test Well Other

(4) **TYPE OF WORK:** Owner's number of well (if more than one) No. 1
 New well Method: Dug Bored
 Deepened Cable Driven
 Reconditioned Rotary Jerted

(5) **DIMENSIONS:** Diameter of well 18 inches
 Drilled 72 ft. Depth of completed well 56 ft.

(6) **CONSTRUCTION DETAILS:**
 Casing installed: 18" Diam. from 0 ft. to 28 ft.
 Threaded 16" Diam. from 40 ft. to 43 ft.
 Welded 16" Diam. from 53 ft. to 56 ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perforations _____ in. by _____ in.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.

Screens: Yes No
 Manufacturer's Name UOP-Johnson
 Type 18" Telescope Model No. Stainless
 Diam. 18" Slot size 40 from 28 ft. to 35 ft.
 Diam. 18" Slot size 60 from 35 ft. to 40 ft.
 Diam. 18" Slot size 40 from 43 ft. to 53 ft.

Gravel packed: Yes No Size of gravel: _____ ft. to _____ ft.
 Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? _____ ft.
 Material used in seal _____
 Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____
 Method of sealing strata off _____

(7) **PUMP:** Manufacturer's Name Jacuzzi
 Type: Turbine H.P. 100

(8) **WATER LEVELS:** Land-surface elevation above mean sea level 560 ft.
 Static level 7 ft. below top of well Date 12-1-67
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? Driller
 Yield: 1970 gal./min. with 9.6 ft. drawdown after 24 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
2	10.3				
5	10.0				
35	9.0				

Date of test Dec. 1-2, 1967
 Haller test _____ gal./min. with _____ ft. drawdown after _____ hrs.
 Artesian flow _____ g.p.m. Date _____
 Temperature of water _____ Was a chemical analysis made? Yes No

(10) **WELL LOG:**
 Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Soil and boulders	0	3
Gravel, boulders & brown clay	3	9
Gravel, boulders, some brown clay and sand	9	22
Gravel and sand (water)	22	38
Gravel & sand, some grey clay	38	40
Grey clay, some sand & gravel	40	43
Gravel and sand	43	52
Gravel, sand & grey clay	52	61
Sand and grey clay	61	67
Grey clay and fine sand	67	72

Work started 11-7 1967 Completed 12-2 1967

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Richardson Well Drilling Company, Inc.
 NAME _____ (Person, firm, or corporation) (Type or print)

Address P.O. Box 2266, Tacoma, Wash. 98404

(Signed) _____ (Well Driller)

License No. 223-02-6500 Date Sept. 9 1969

(USE ADDITIONAL SHEETS IF NECESSARY)

OK/WRA

File Original and First Copy with the Division of Water Management
 Second Copy - Owner's Copy
 Third Copy - Driller's Copy

WATER WELL REPORT

STATE OF WASHINGTON

Application No. **10006**
 Permit No. **9235**

(1) **OWNER:** Name City of Kent Address Kent, Washington
 (2) **LOCATION OF WELL:** County King SE 1/4 SW 26 T. 22 N. R. 6E W.M.
 Bearing and distance from section or subdivision corner 1161.91 ft. North and 2092.36 East from SW corner of Sec. 26

(3) **PROPOSED USE:** Domestic Industrial Municipal
 Irrigation Test Well Other

(4) **TYPE OF WORK:** Owner's number of well No. 2
 (if more than one)
 New well Method: Dug Bored
 Deepened Cable Driven
 Reconditioned Rotary Jetted

(5) **DIMENSIONS:** Diameter of well 18 inches.
 Drilled 60 ft. Depth of completed well 60 ft.

(6) **CONSTRUCTION DETAILS:**
 Casing installed: 18 " Diam. from 0 ft. to 30 ft.
 Threaded 16 " Diam. from 45 ft. to 52 ft.
 Welded 16 " Diam. from 57 ft. to 60 ft.

Perforations: Yes No
 Type of perforator used _____
 SIZE of perforations _____ in. by _____ in.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.
 _____ perforations from _____ ft. to _____ ft.

Screens: Yes No
 Manufacturer's Name UOP-Johnson
 Type 18" Telescope Model No. Stainless
 Diam. 18" Slot size 80 from 52 ft. to 45 ft.
 Diam. 18" Slot size 80 from 57 ft. to 57 ft.

Gravel packed: Yes No Size of gravel: _____
 Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? _____ ft.
 Material used in seal _____
 Did any strata contain unusable water? Yes No
 Type of water? _____ Depth of strata _____
 Method of sealing strata off _____

(7) **PUMP:** Manufacturer's Name Jacuzzi
 Type: Turbine H.P. 60

(8) **WATER LEVELS:** Land-surface elevation 560 ft.
 Static level 4.5 ft. below top of well Date 2-5-68
 Artesian pressure _____ lbs. per square inch Date _____
 Artesian water is controlled by _____ (Cap, valve, etc.)

(9) **WELL TESTS:** Drawdown is amount water level is lowered below static level
 Was a pump test made? Yes No If yes, by whom? Driller
 Yield: 1400 gal./min. with 20.5 ft. drawdown after 2 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
2	10.0	33	8.1		
4	9.7	48	7.7		
20	9.4				

Date of test Jan. 29-30, 1968
 Batter test _____ gal./min with _____ ft. drawdown after _____ hrs.
 Artesian flow _____ g.p.m. Date _____
 Temperature of water _____ Was a chemical analysis made? Yes No

(10) **WELL LOG:**
 Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Rock, boulders and gravel	0	17
Sand and gravel (water)	17	47
Brown and grey clay with sand and gravel	47	51
Sand and gravel (water)	51	58
Clay with some gravel	58	60

Work started 12-19 10 67. Completed 1-10 1968.

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

Richardson Well Drilling Company, Inc.
 NAME _____ (Person, firm, or corporation) (Type or print)

Address P.O. Box 2266, Tacoma, Wash. 98404

(Signature) _____ (Well Driller)

License No. 223-02-6500 Date Sent 8 1968

(USE ADDITIONAL SHEETS IF NECESSARY)

STATE OF WASHINGTON
DEPARTMENT OF WATER RESOURCES
DIVISION OF WATER MANAGEMENT

Permit to appropriate Public Waters of the State of Washington

Book No. 29 of Ground Water Permits, on page 9235 under Application No. 10006

CITY OF KENT

Kent, Washington

of _____
is, pursuant to the Report of Examination which has been accepted by the applicant, 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 February 4, 1969

Source(s) of the proposed ground water appropriation is/are three wells

The quantity of water appropriated shall be limited to the amount which can be beneficially applied and not to exceed 5400 gallons per minute; 8710 acre-feet per year, to be used for the following purposes: municipal supply

_____, as more definitely set out below.

Approximate location(s) of the point(s) of withdrawal is/are: Well 1: 1253.23 feet north and 2007.00 feet east; 2: 1161.91 feet north and 2092.36 feet east; 3: 1076.00 feet north and 2177.72 feet east; ALL from the southwest corner of Sec. 26

being within E3SW4

of Sec. 26, Twp. 22 N., Rge. 6 E. W.M., King County,

The use, or uses, to which water is to be applied:

~~Domestic~~/municipal supply: 5400 gallons per minute; 8710

acre-feet per year, during entire year, for a population of 80,000 by 1985.

Irrigation: _____ gallons per minute; _____ acre-feet per year from

to _____, each year, for the irrigation of _____ acres.

Other use(s): _____ gallons per minute; _____ acre-feet per year, from

to _____ each year, for _____

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Kent.

ADDITIONAL LIMITATIONS AND PROVISIONS: The installation and maintenance of an access port as described in Ground Water Bulletin No. 1 shall be required prior to issuance of final Certificate of Water Right.

1. The City of Kent install and maintain a permanent gaging station to the satisfaction of the Department of Water Resources on Rock Creek at its intersection with the Kent-Rangley Road.
2. As provided under RCW 43.21.130, 90.03.360, 90.44.250 and 90.44.020, a master meter shall be installed in this system to measure the total amount of the withdrawal.
3. The recommendations as proposed by the Department of Fisheries and the Department of Game be strictly adhered to by the City of Kent and at no time shall withdrawals under this application be made by the City of Kent when natural stream flow or stream flow as augmented by pump discharge and Rock Creek as measured at the gaging station to be located at the intersection of Rock Creek and the Kent-Rangley Road fall below the quantity of water indicated as follows: 15.0 cubic feet per second from January 1 through April 30; 15.0 cubic feet per second on May 1 arithmetically decreasing to 2.0 cubic feet per second on June 30; 2.0 cubic feet per second from July 1 to October 31, and 15.0 cubic feet per second from November 1 to December 31.
4. Provisions shall be made by the City of Kent to have the capability of discharging untreated water into Rock Creek from its pumping station to insure that the minimum flow characteristics are maintained during periods of pumping.
5. It is the intent of recommendations 3 and 4 that the minimum flows as measured at the aforementioned gaging station be maintained in Rock Creek to its confluence with the Cedar River and that at no time will Rock Creek be completely devastated.
6. The water requirement for the City of Kent is based upon information contained in the reports by the City of Kent's consulting engineers and studies by this department which indicate a per capita consumption of 150 gallons per day, a population of 80,000 to be served by 1985 which gives a total of 13,440 acre-feet per year. Since the existing recorded rights total only 1910 acre-feet, approval is herein granted for 8710 acre-feet. The continuous pumping of 5400 gallons per minute includes those quantities granted under the existing rights on the Rock Creek development.
7. This permit shall be subject to cancellation should the permittee fail to comply with the development schedule contained herein and/or fail to give notice to the Division of Water Management on forms provided by said office documenting such compliance.

DESCRIPTION OF PROPOSED WORKS:

The well will be drilled and have a diameter of 10 inches, and depth of 56 feet.
(Dug or drilled)

Description of tunnel or infiltration trench: _____

DEVELOPMENT SCHEDULE:

Construction work shall begin on or before Started

and shall thereafter be prosecuted with reasonable diligence and completed on or before _____

September 1, 1970

and complete application of water to proposed use shall be made on or before _____

September 1, 1971

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 Water Resources on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Olympia, Washington, this 20th

day of August, 1969

Alfred L. Linder
Assistant Director
Division of Water Management
Department of Water Resources

ENGINEERING DATA

OK 

STATE OF WASHINGTON
DEPARTMENT OF WATER RESOURCES
Division of Water Management
Olympia

IN THE MATTER OF THE REQUEST OF THE
CITY OF KENT FOR
APPROPRIATION PERMIT UNDER GROUND WATER
APPLICATION NUMBER 10006

)
)
)
)

REPORT
FINDINGS OF FACT
AND
DECISION

REPORT

On February 4, 1969 the City of Kent filed a ground water application for the appropriation of 5400 gallons per minute; 8760 acre-feet per year to be used for municipal supply in the area served by the City of Kent. It was proposed that the aforementioned withdrawal be made from three wells located in the SW of Section 26, T. 22 N., R. 6 E.W.M. in King County.

The application was assigned the number 10006 and on February 11, 1969 a legal notice of water right application was prepared by this Department and forwarded to the City of Kent together with instructions for publication. An affidavit of publication was received in this office on February 27, 1969, such affidavit attesting to proper publication in accordance with RCW 90.03.280 and WAC 136-12-150.

OBJECTIONS:

Formal objections to the approval of the subject application were received in the office of the Assistant Director as follows:

On March 5, 1969 an objection was received from Mrs. Rattie H. Schade of Eatonville, Washington. In her letter of protest Mrs. Schade indicated that she was the owner of lands fronting on Rock Creek and has sold these lands to various people under contract. This protestant is in fear that if the flow of Rock Creek should be lowered, the individuals to whom she is selling the property would default on their payments as a result of the devaluation of their property.

On March 6, 1969 an objection was received from Gerry Lochner of Portland, Oregon. Mr. Lochner's objection was based upon the contention that if the subject application were granted the flow of Rock Creek would be depleted to the degree that property values of those lands abutting Rock Creek would be seriously jeopardized.

On March 24, 1969 this Department received an objection from Mr. O. P. Jensen of Ravensdale, Washington. Mr. Jensen indicated that he is the owner of land fronting on Rock Creek and this protestant feels that the appropriation of water as proposed by the City of Kent would serve to dry up Rock Creek and devalue his property.

On March 21, 1969 an objection was received from C. A. Kirkland of Auburn, Washington. Protestant Kirkland stated in his letter of objection that he owns property fronting on Rock Creek and if a permit were granted under the above referenced application Rock Creek

may be irreparably damaged thus causing a subsequent decrease in property value.

On March 25, 1969 a letter of objection was received from Mr. Dave H. Larsen of Seattle, Washington. Mr. Larsen stated that he is purchasing land fronting on Rock Creek and he would suffer a great financial loss if Rock Creek were to dry up.

In addition to the formal objection filed by the aforementioned, two letters of general objection were also received from Mr. Carl Hatcher and Mr. Allen H. Hugford. The comments contained in these letters were essentially the same as the protestants who filed formal objection.

INVESTIGATIONS:

In consideration of the subject application and the protest to approval thereof, several field trips were made by representatives of this Department of the Rock Creek area in King County. On February 25, 1969 the writer conducted the initial examination under this application. At that time representatives of the City of Kent were contacted and information pertinent to the development and use of the waters in question was obtained. Subsequently, the writer was in contact with protestant Lechner. Additionally on April 14, 1969 Mr. Dean Reed, Water Resources Inspector, contacted protestant Johnson and protestant Riveland. On June 3, 1969 the writer in the company of Glen H. Fiedler, Assistant Director, and Eugene P. Valicco, Supervising Hydrologist, visited the site of the applicant's development. Additionally, numerous meetings have been held with representatives of this Department, City of Kent officials, representatives of the City of Kent's consulting engineering firms, Hill, Ingann, Chase and Company, Anderson and Kelly, and representatives of the Department of Fisheries.

A search of the records of this office has determined that the City of Kent enjoys the following listed water rights: Ground Water Certificate No. 976 for the appropriation of 200 gallons per minute; 240 acre-feet for municipal supply. Ground Water Certificate No. 1116 for 200 gallons per minute 320 acre-feet per year both of the aforementioned being from wells located in the vicinity of the City of Kent. The city also has Surface Water Certificate No. 7232 for the diversion of 5.0 cubic feet per second from Rock Creek, and Ground Water Certificate No. 3107 for the withdrawal of 2250 gallons per minute; 1380 acre-feet per year from an infiltration gallery situated in the vicinity of Rock Creek. Additionally, the City of Kent claims a vested right through a claimed use prior to June 6, 1917 for the diversion of waters from Kent Springs which are situated in the SE1/4 of Section 39, T. 22 N., R. 6 E., W. 1. The City of Kent claims the use of these waters by virtue of use initiated about 1910. The quantity of water utilized by the City of Kent from this source according to the records of their consulting engineering firm is approximately 2.8 million gallons per day which is equivalent to approximately 6.3 cubic feet per second.

A search of the records of this office has disclosed that other than the aforementioned filing by the City of Kent there is only one surface water right on Rock Creek. This right

is for the appropriation of 0.01 cubic feet per second for domestic supply and lawn irrigation. This diversion is located several miles below the location of the City of Kent's diversion point.

Prior to the time that the subject application was filed this Department was advised by the Department of Fisheries that a request by the City of Kent for a hydraulic application was received by the Department of Fisheries. At the time that subject application was received by this Department notification was given to the Department of Fisheries that such application had been filed and a request was made by this office of the Department of Fisheries for their views and recommendations on subject application. As was indicated in a preceding paragraph numerous meetings were held between this Department, the City of Kent and the Department of Fisheries in an effort to resolve the question of the quantity of water which would be necessary to remain in the stream channel for the sustenance of the fisheries resource. As a result of these meetings and independent research on the part of the Department of Fisheries that Department has determined that there are certain minimum flows which are required in the Rock Creek channel to sustain the fisheries value of that stream. The Department of Fisheries had established that Rock Creek is utilized by Coho, Chinook and Sockeye Salmon and also utilized by Steelhead and native Cutthroat trout. The Department of Game has also contributed to this finding as it relates to their interest in game fish.

As a consequent result the Department of Fisheries and the Department of Game have arrived at certain values relating to low flows in the reach of Rock Creek in which they have interest. These values of minimum stream flows are graphically displayed on Exhibit A attached hereto, which by this reference is incorporated herein and made a part of this report.

A check of the records of this office has disclosed that none of the protestants enjoy recorded water rights on Rock Creek. However, it is noted that all protestants do own property riparian to Rock Creek.

EVALUATION OF OBJECTIONS:

In consideration of the objections of the protestants it is noted that all objections are basically the same in that the protestants fear that the proposed development by the City of Kent will either dry up or degrade Rock Creek to the extent that their property values will be diminished.

Objections of the protestants may basically be characterized as a contention that a riparian owner is entitled to have a stream flow across his land undiminished in quantity in consideration of the property value resulting therefrom. This "natural flow" variation of the riparian rights doctrine has been expressly rejected by the Washington State Supreme Court (see the case of Brown vs. Chaco 125 Wash. 562 (1929)). Additionally, this office has never considered this variation of the riparian rights doctrine to be applicable to this state.

Rather than pursuing the scope and extent of any limited riparian rights of the protestants as pertains to aesthetic values and natural stream flows if any they have, the

Department shall rest its decision on the statutory guideline of RCW 90.03.290 which provides that no application for a water right shall be granted if the Department concludes that its granting would be detrimental to the public interest.

Additionally, the protestants have expressed concern relative to the degradation of the fisheries resources of Rock Creek. The Departments of Fisheries and Game have also expressed their concern along these same lines. It is the opinion of the writer that the development of ground waters by the City of Kent under this filing will have some effect upon stream flow in Rock Creek; however, the extent of that effect is unpredictable at this time. Where independent research by the Departments of Fisheries and Game has resulted in the requirement that minimum flows as graphically shown on Exhibit A be maintained at all times in Rock Creek when pumping under this application is taking place, and where the City of Kent has agreed to these conditions, questions relating to the effect of this appropriation upon the fisheries resource have been answered. Preservation of these minimum flows, when occurring naturally, is found to be in the best public interest as related to the fisheries resource as well as maintaining a flowing stream for benefit of the riparian property owners.

CONCLUSIONS AND RECOMMENDATIONS:

In view of the foregoing I conclude that:

- 1) There is water available for appropriation under subject application.
- 2) The applicant's project is feasible and use of waters under this filing will be beneficial.
- 3) Rock Creek is a distinct benefit to lower riparian lands and also as a fisheries resource stream; therefore, complete dewatering would not be in the best public interest.
- 4) Maintenance of flows to sustain the fisheries resources is mandatory and this will also assure a continuous flowing stream through the lower riparian lands; therefore, the objections of the protestant's do not warrant rejection of the application.

I, therefore, respectfully recommend that:

- 1) Favorable action be taken on the application of the City of Kent in the amount of 5600 gallons per minute; 8710 acre-foot per year for municipal supply in the area served by the City of Kent.
- 2) The City of Kent install and maintain a permanent gaging station to the satisfaction of the Department of Water Resources on Rock Creek at its intersection with the Kent - Kengley Road.
- 3) The recommendations as proposed by the Department of Fisheries and the Department of Game be strictly adhered to by the City of Kent and at no time shall withdrawal under this application be made by the City of Kent when natural stream flow or stream flow as augmented by pump discharge and Rock Creek as measured at the gaging station is to be located at the intersection of Rock Creek and the Kent - Kengley Road fall below the quantity of water indicated as follows: 15.0 cubic feet per second from January 1 through April 30; 15.0 cubic feet per second on May 1

arithmetically decreasing to 2.0 cubic feet per second on June 30; 2.0 c.f.s. from July 1 to October 31, and 15.0 c.f.s. from November 1 to December 31.

4) Provisions shall be made by the City of Kent to have the capability of discharging untreated water into Rock Creek from its pumping station to insure that the minimum flow characteristics are maintained during periods of pumping.

5) It is the intent of recommendations 3 and 4 that the minimum flows as measured at the aforementioned gaging station be maintained in Rock Creek to its confluence with the Cedar River and that at no time will Rock Creek be completely dewatered.

6) The water requirement for the City of Kent is based upon information contained in the reports by the City of Kent's consulting engineers and studies by this department which indicate a per capita consumption of 150 gallons per day, a population of 69,000 to be served by 1965 which gives a total of 10,350 acre-feet per year. Since the existing recorded rights total only 1910 acre-feet, approval is herein granted for 8710 acre-feet. The continuous pumping of 5400 gallons per minute includes those quantities granted under the existing rights on the Rock Creek development.

7) The installation of an access port as described in attached Ground Water Collection No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for its own convenience, wish to install air-lines and gauges in addition to the access ports.

8) As provided under RCW 43.21.130, 90.09.360, 90.46.290 and 90.44.020, a meter shall be installed in this system to measure the total amount of the withdrawal.

9) 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 State Director of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Department of Health, 204 Public Health Building, Olympia, with regard to the need for compliance.

Signed at Olympia, Washington

this 4 day of April, 1969.

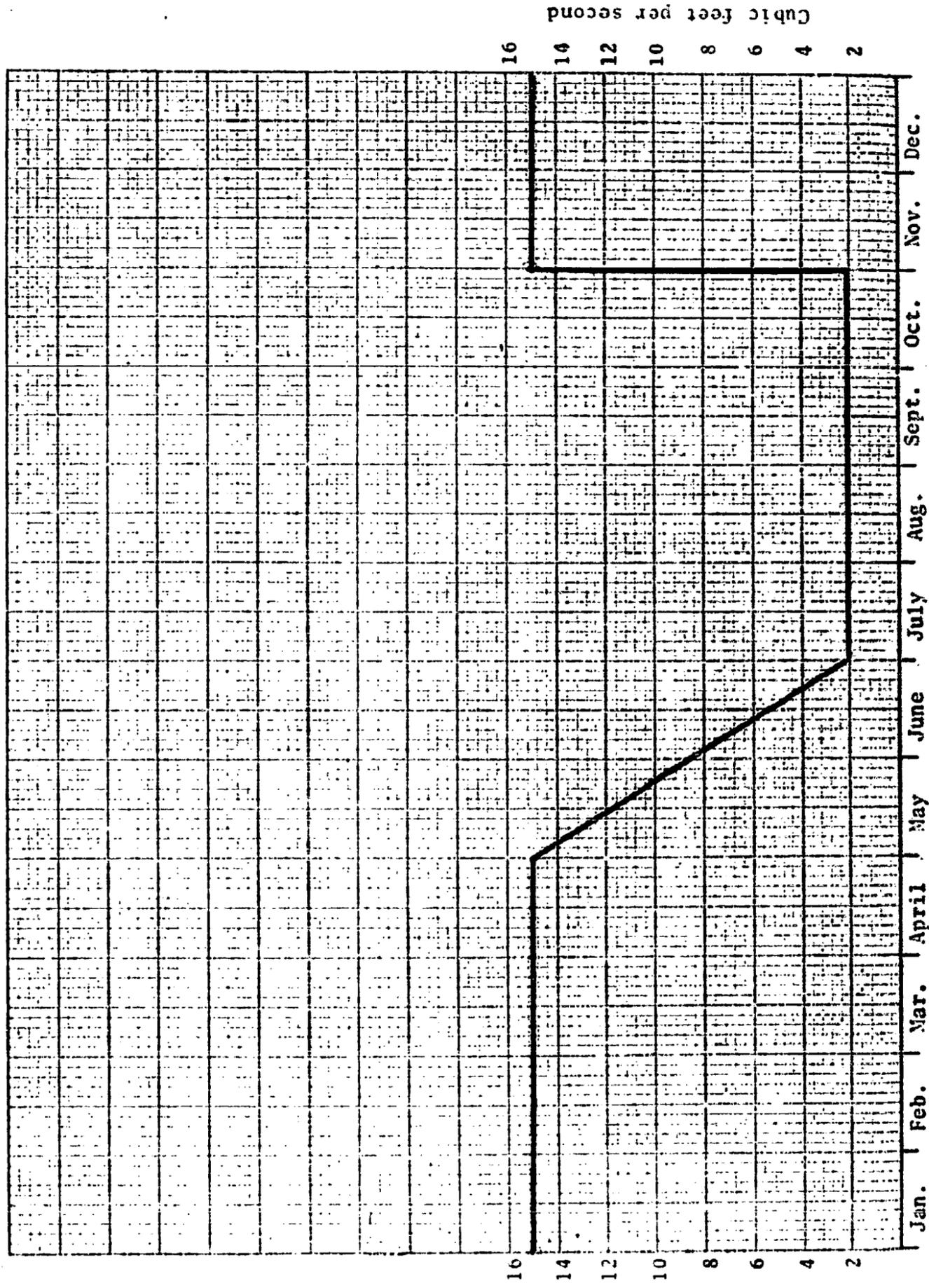

WILLIAM R. SMITH, Geologist
Division of Water Management

PINDINGS OF FACT AND DECISION

Upon review of the above report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find that water is available for appropriation for beneficial use and the appropriation thereof as recommended in the above will not impair existing rights or be detrimental to the public welfare. It is, therefore, **ORDERED**, that, subject to existing rights, permit issue under Ground Water Application Number 10006 for the appropriation of 5400 gallons per minute and 3710 acre-feet per year for municipal supply in accordance with the examiner's conclusions and recommendations.

Signed in Olympia, Washington
this 24th day of June, 1969.

Glen H. Fidler
GLEN H. FIDLER, Assistant Director
Division of Water Management



Minimum Flow Rule Curve - Rock Creek

Exhibit A

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

} ss

Ann Marshfield being first duly sworn on

oath, deposes and says that she is the Chief Clerk of THE KENT NEWS JOURNAL, a weekly newspaper. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a weekly newspaper in Kent, King 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 Kent News Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County, Washington.

That the annexed is a State of Washington - Division of Water Resources

Water Right Application No. 10006

as it was published in regular issues (and not in supplement form of said newspaper) once each week for a period

of consecutive weeks, commencing on the

1st day of February, 1969, and ending the

11th day of February, 1969, 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 has been paid in full at the rate of \$ per folio of one hundred words for the first insertion and \$ per folio of one hundred words for each subsequent insertion.

Ann Marshfield

Subscribed and sworn to before me this

 day of

 , 19

Mona McQuest

Notary Public in and for the State of Washington,
residing at Kent, King County.

- Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

- Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

STATE OF WASHINGTON
DEPARTMENT OF WATER RESOURCES
OLYMPIA
NOTICE OF GROUND WATER RIGHT APPLICATION
NO. 10006

TAKE NOTICE:

That CITY OF KENT of Kent, Washington on February 4, 1969 filed application for permit to withdraw public ground waters through 3 wells situated within SW of Section 26, Township 22 N., Range 6 E.W.M., in King County, in the amount of 5,400 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 Department of Water Resources within thirty (30) days from February 23, 1969.

Witness my hand and official seal this 11th day of February, 1969.

GLEN H. FIEDLER
Assistant Director

Division of Water Management
Department of Water Resources
Published in the Kent News Journal February 16 and 23 1969.

10.00 examination fee should accompany each application.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
Division of Water Resources

2-4-69
2 P.M.
B.B.L.

APPLICATION FOR A PERMIT

To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 10006

CITY OF KENT

(Name of applicant)

of City Hall, Kent, 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, Division of Water Resources.

1. The proposed appropriation will be from Three Wells (Well, tunnel, infiltration trench)

located twelve miles east of Kent, Washington
(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. City of Kent

2. The quantity of water which applicant intends to withdraw for beneficial use is 5,400 gallons per minute; 8,760 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 King

(a) 610 ft. North & 1060 ft. East from the SW corner of Sec. 26, Twp. 22-N.
(Give distance and bearing from nearest corner of section or legal subdivision) R. 6 E.W.M.

being within the South 1/2 E 1/2 SW 1/4 of Sec. 26, Twp. 22 N., Rge 6 E.
(Give smallest legal subdivision) (E. of W.)

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. Other adequate maps or drawings will be acceptable.

Additional fees submitted with application.

send copy of Notice to Dept of Fisheries & Game.

6. DESCRIPTION OF WORKS:

(a) Well will be **drilled** and have a diameter of **18"** inches and an estimated depth of **56** 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:

- #1 - line shaft turbine - 12"
- #2 - Submersible 8"
- #3 - " 10"

(e) Give capacity and type of motor or engine to be used:

- #1 - 150 H.P. Part winding
- #2 - 60 H.P.
- #3 - 100 H.P.

(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:

50 ft. NE of Rock Creek -
difference in elevation between creek bed and
ground surface at well is 6 ft.±

1

(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)
--		
(Name)	(Direction)	(Distance)
--		
(Name)	(Direction)	(Distance)

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. For Municipal Supply: To supply the city, town, or community of **Kent's Service Area**, in the county of **King**, having a present population of **24,000** and an estimated population of **80,000** in 1985.

8. For Irrigation: Number of acres to be irrigated _____ 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)

~~South one-half of the Northwest one-quarter of the Northwest one-quarter, Section 26, Township 22 North, Range 6 East W.M.~~

Area served by City of Kent *2-11-69*
EW

(On accompanying plat show location of the existing wells or works)

10. What interest do you have in the above described property? Owned by the City of Kent

(Owner, lessee, contract buyer, etc.)

11. Do you have any other water rights appurtenant to the above described property? Yes.
If so, from what source? SH LEFT 7292 #6 WELLS 5107 976A & 1116A
Infiltration Piping in same area!

12. Construction work will begin on or before January 2, 1969

13. Construction work will be completed on or before June 30, 1969

14. Water will be put to complete beneficial use on or before July 1969

CITY OF KENT, By: *Oliver Thomas*
(Signature of applicant)

15. Name and address of owner of land on which well or works are located:

CITY OF KENT
(Name)

City Hall, Kent, Washington
(Address)

City of Kent, By: *Oliver Thomas*
(Signature of legal landowner)

Signed in the presence of us as witnesses:

Mario J. ...
(Name)

(Name)

10608 SE 24th Kent
(Address of witness)

(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.

Hill, Ingman, Chase, & Co.
Consulting Engineers
2909 Third Ave.
Seattle, Wash. 98121

DL 2-2412

9-1-71
PA

Progress Sheet—Ground Water Application

City of Kent
City Hall
NAME Kent, Washington 98031 Assigned to _____
G. W. APPLI. NO. **10006** PERMIT NO. **9235** CERT. NO. **7660** A
AMENDED _____ CANCELLED _____

Application received February 4, 1969 Initial ~~\$10.00~~^{24.00} fee received February 4, 1969
Statement of additional examination fee \$ 14.00 Sent Received
Application returned for completion or correction _____ Received _____

TEMPORARY PERMIT: Approved by _____ Issued _____

PUBLICATION:
O.K.'d by _____ Date 2/11/69 Notice sent 2-11-69
Protests Henry Jackson Walter M. Schaker CA. KIRKLAND ESTER G. WILSON
Filed 3-10-69 3-10-69 3-21-69 3-24-69
Affidavit received and checked 2-27-69 Time expired 3-25-69
Amended notice sent _____ Affidavit received _____
Time expires _____ 3-25-69

DEPT. OF GAME REPORT _____
EXAMINATION Made 2-25-69 by WRD
O.K.'d for permit 7-28-69 by WRD
Statement of permit fee sent 6-24-69 Amount \$ 48.00 Received 8-28-69

PERMIT NO. **9235** ISSUED 8-20-69

BEGINNING OF CONSTRUCTION: Notice sent Started Filed _____
Extension fee \$ _____ Extended to _____
Extended to _____

WELL DRILLER'S REPORT: Sent (3) 8-20-69 Filed 9-16-69

COMPLETION OF CONSTRUCTION: Notice sent 8-20-69 Filed 9-2-70
\$2.00 extension fee _____ Extended to _____
To _____

PROOF OF APPROPRIATION: Sent 10-6-70 Filed _____
\$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent _____ Received _____
\$ 7660

CERTIFICATE OF GROUND WATER RIGHT NO. 7660 A ISSUED 3-17-72



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION

WATER RIGHT CLAIM

RECEIVED
JUN 27 1974
WATER RIGHTS DIVISION

1. NAME City of Kent
ADDRESS P.O. Box 310
Kent, Washington ZIP CODE 98031

2. SOURCE FROM WHICH THE RIGHT TO TAKE AND MAKE USE OF WATER IS CLAIMED: Ground Water
(SURFACE OR GROUND WATER)
W.R.I.A. φ9
(LEAVE BLANK)

A. IF GROUND WATER, THE SOURCE IS Spring

B. IF SURFACE WATER, THE SOURCE IS _____

3. THE QUANTITIES OF WATER AND TIMES OF USE CLAIMED:

A. QUANTITY OF WATER CLAIMED 10 cu/ft/sec PRESENTLY USED 6 c.f.s.
(CUBIC FEET PER SECOND OR GALLONS PER MINUTE)

B. ANNUAL QUANTITY CLAIMED 965 PRESENTLY USED 579 Acre Feet
(ACRE FEET PER YEAR)

C. IF FOR IRRIGATION, ACRES CLAIMED _____ PRESENTLY IRRIGATED _____

D. TIME(S) DURING EACH YEAR WHEN WATER IS USED: continuously

4. DATE OF FIRST PUTTING WATER TO USE: MONTH May YEAR 1909

5. LOCATION OF THE POINT(S) OF DIVERSION/WITHDRAWAL: 800 FEET East AND 1400
FEET North FROM THE S.E. CORNER OF SECTION 33

BEING WITHIN SE $\frac{1}{4}$ of SW $\frac{1}{4}$ & SW $\frac{1}{4}$ of SE $\frac{1}{4}$ OF SECTION 33 T. 22 N., R. 6 E (E. ~~1/4~~) W.M.

IF THIS IS WITHIN THE LIMITS OF A RECORDED PLATTED PROPERTY, LOT _____ BLOCK _____ OF

(GIVE NAME OF PLAT OR ADDITION)

6. LEGAL DESCRIPTION OF LANDS ON WHICH THE WATER IS USED: City of Kent
State of Washington

COUNTY King

7. PURPOSE(S) FOR WHICH WATER IS USED: Municipal Water Supply

8. THE LEGAL DOCTRINE(S) UPON WHICH THE RIGHT OF CLAIM IS BASED: Riparian Owner

DO NOT USE THIS SPACE

THE FILING OF A STATEMENT OF CLAIM DOES NOT CONSTITUTE AN ADJUDICATION OF ANY CLAIM TO THE RIGHT TO USE OF WATERS AS BETWEEN THE WATER USE CLAIMANT AND THE STATE OR AS BETWEEN ONE OR MORE WATER USE CLAIMANTS AND ANOTHER OR OTHERS. THIS ACKNOWLEDGEMENT CONSTITUTES RECEIPT FOR THE FILING FEE.

DATE RETURNED _____ THIS HAS BEEN ASSIGNED
WATER RIGHT CLAIM REGISTRY NO. FEB 14 75 123725

John Biggs

DIRECTOR - DEPARTMENT OF ECOLOGY

I HEREBY SWEAR THAT THE ABOVE INFORMATION IS TRUE AND ACCURATE TO THE BEST OF MY KNOWLEDGE AND BELIEF.

X G. W. Ulett

DATE June 24, 1974

IF CLAIM FILED BY DESIGNATED REPRESENTATIVE, PRINT OR TYPE FULL NAME AND MAILING ADDRESS OF AGENT BELOW.

G. W. Ulett, P. E.
Director of Public Works
City of Kent
P. O. Box 310, Kent, WA 98031

ADDITIONAL INFORMATION RELATING TO WATER QUALITY AND/OR WELL CONSTRUCTION IS AVAILABLE.

A FEE OF \$2.00 MUST ACCOMPANY THIS WATER RIGHT CLAIM

RETURN ALL THREE COPIES WITH CARBONS INTACT, ALONG WITH YOUR FEE TO:
DEPARTMENT OF ECOLOGY
WATER RIGHT CLAIMS REGISTRATION
OLYMPIA, WASHINGTON 98504

ORIGINAL DWR

WATER WELL REPORT

Notice of Intent W135794

Department of Ecology

UNIQUE WELL ID # AEC866

Second Copy - Owner's Copy
Third Copy - Driller's Copy

STATE OF WASHINGTON

Water Right Permit No G1-22956P

96307
22-6E-23P

(1) OWNER Name City of Kent Address 220 4th Ave. S. Kent, WA 98032-5895

(2) LOCATION OF WELL County King SE 1/4 SW 1/4 Sec. 33 T 22 NR 6E WM

(2a) STREET ADDRESS OF WELL (or nearest address) W. of SE 288 St. E of 216th Ave. SE Maple Valley

TAX PARCEL NO N/A

(3) PROPOSED USE Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

(10) WELL LOG or DECOMMISSIONING PROCEDURE DESCRIPTION
Formation Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. Indicate all water encountered

(4) TYPE OF WORK Owner's number of well (if more than one) _____
 New Well Method
 Deepened Dug Bored
 Reconditioned Cable Driven
 Decommission Rotary Jetted

MATERIAL	FROM	TO
Brown top soil	0	1.5
Br med sand med. to	1.5	
large gravel & cobbles		16
Cobbles, medium sand	16	19.5
Medium-coarse gravel	19.5	31
Coarse sand & med. gravel	31	35
Coarse sand medium to	35	
large gravel		56
Gravel water bearing	56	79
Coarse sand med to Lg	79	
gravel medium cobbles		87
Silt bound sand & gravel	87	91
Med. sand med to large	91	
gravel water bearing		93
Silt bound sand & gravel	93	105

(5) DIMENSIONS. Diameter of well 20 inches
Drilled 105 feet Depth of completed well 104 ft

(6) CONSTRUCTION DETAILS
Casing Installed
 Welded 20" Diam from +4 ft to 104 ft
 Liner installed
 Threaded

Perforations Yes No
Type of perforator used _____
SIZE of perforations _____ in by _____ in
_____ perforations from _____ ft to _____ ft

Screens Yes No K-Pac Location 41'
Manufacturer's Name Houston
Type S S. Wire Wrap Model No _____
Diam 1.8" Slot Size _____ from _____ ft to _____ ft
Diam _____ Slot Size _____ from _____ ft to _____ ft

Gravel/Filter packed Yes No Size of gravel/sand _____
Material placed from _____ ft to _____ ft

Surface seal Yes No To what depth? 20 ft
Material used in seal Portland cement-Volclay Bent
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP Manufacturer's Name _____
Type _____ HP _____

(8) WATER LEVELS Land-surface elevation above mean sea level _____ ft
Static level 5.2 ft below top of well Date 4-27-01
Artesian pressure _____ lbs per square inch Date _____
Artesian water is controlled by _____
(Cap, valve etc)

(9) WELL TESTS Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? Arcadia/H.C.
Yield 2250 gal/min with 2.2 ft drawdown after 1 hrs
Yield 2250 gal/min with 4.6 ft drawdown after 10 hrs
Yield 2250 gal/min with 4.7 ft drawdown after 19 hrs
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
0 57.7 0.5 hr 54.3
1 hr 54.25 1.5 hr 54.17
2 hr 54.1
Date of test 4-24-01
Bailer test 100 gal/min with 0 ft drawdown after 2 hrs
Airtest _____ gal/min with _____ ft drawdown after _____ hrs
Artesian flow _____ gpm Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

RECEIVED

JUN 05 2001

Washington State
Work Started 4-9-01 Department of Ecology Completed 4-27-01

WELL CONSTRUCTION CERTIFICATION
I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief
Dwane Knapp License No 1706
(Licensed Driller/Engineer)
Trainee Name _____ License No _____
Drilling Company Arcadia Drilling Inc.
(Signed) Dwane Knapp License No 1706
(Licensed Driller/Engineer) Shelton,
Address 170 SE Walker Park Rd WA 98584
Contractor's Registration No ARCADD1098K1 Date 5-4-01

(USE ADDITIONAL SHEETS IF NECESSARY)

Ecology is an Equal Opportunity and Affirmative Action employer. For special accommodation needs, contact the Water Resources Program at (360) 407-6600. The TDD number is (360) 407-6006.

96307

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.



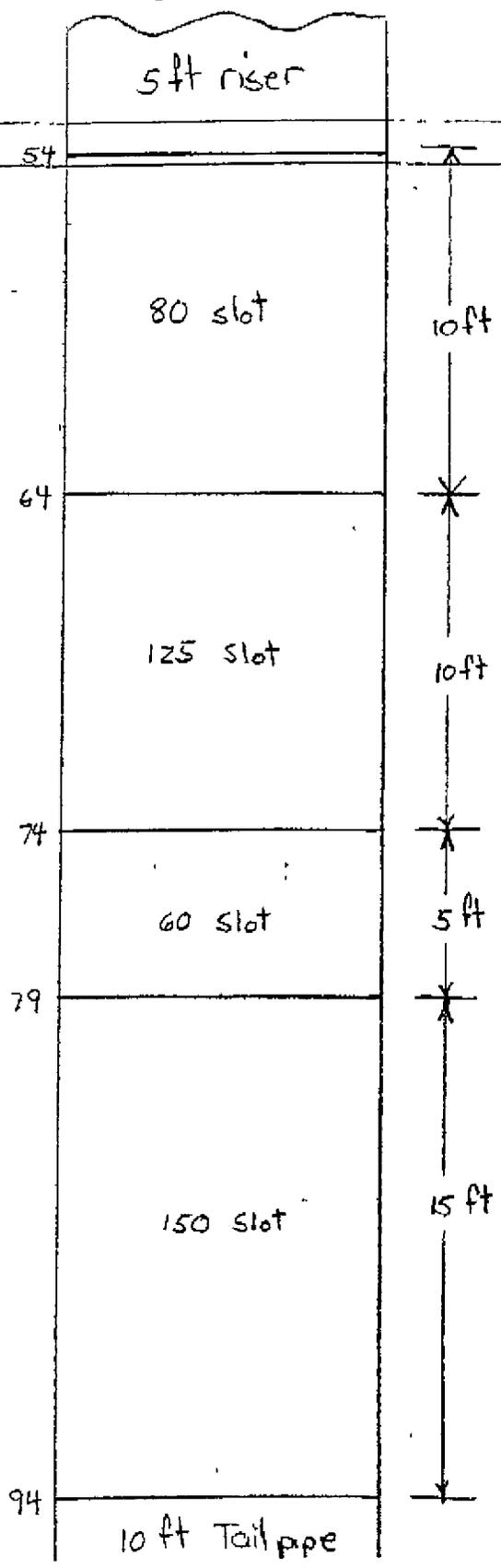
Kent Springs PW-3 Screen Design

Calculations

Project _____
Calculations for _____

54

Page _____ of _____
Job No _____
Date _____
Made by _____



Sump/Tail pipe 10ft
from 94' to 104'

RECEIVED

JUN 05 2001

TOTAL P 02
Washington State
Department of Ecology

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.)

PRIORITY DATE September 2, 1977	APPLICATION NUMBER G1-22956	PERMIT NUMBER G1-22956P	CERTIFICATE NUMBER G1-22956C
------------------------------------	--------------------------------	----------------------------	---------------------------------

NAME
CITY OF KENT

ADDRESS (STREET) P. O. Box 310 (CITY) Kent (STATE) Washington (ZIP CODE) 98031

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
two wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 3690	MAXIMUM ACRE-FEET PER YEAR 5904
-------------------------------	------------------------------------	------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal Water Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
700 feet and 650 feet north and 450 feet west of S $\frac{1}{4}$ corner of Sec. 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE $\frac{1}{4}$ SW $\frac{1}{4}$	SECTION 33	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 6 E.	W.R.I.A. 9	COUNTY King
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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 Kent Water Supply System.

PROVISIONS

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.

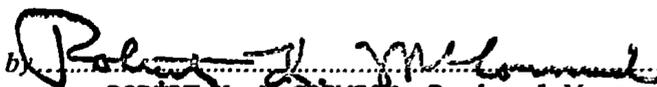
This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Redmond Washington, this...15th... day
ofFebruary....., 19 79.....

Department of Ecology

ENGINEERING DATA

OK.....

b) 
ROBERT K. MCCORMICK, Regional Manager

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-22956		PERMIT NUMBER G1-22956 P	
NAME OF PERMITTEE City of Kent			
POST OFFICE ADDRESS P. O. Box 310	(CITY) Kent	(STATE) WA	(ZIP CODE) 98031
ACTUAL SOURCE OF APPROPRIATION Well			
PURPOSE OR PURPOSES WATER IS USED FOR Municipal Supply			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE 9/30/78		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED N/A	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED Continuous	
PUMP SIZE Two 1800 gpm pumps			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM 3690		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO		IF NO, EXPLAIN As builts will be sent as soon as they are prepared. Meters will be installed with the Kent Springs Chlorination project that is bidding in January.	
LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)			

Area served by City of Kent Municipal Water System.

*OK FEES -
OK 7 CERTIFICATE
PER PERMIT
12-28-78*

STATE OF WASHINGTON, }
County of King } ss.

I, Don E. Wickstrom, 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 20 day of DEC, 1978.

Don E. Wickstrom
Permittee Signature

Subscribed and sworn to before me this 20TH day of December, 1978.

Paula J. Morgan
Notary Public

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 September 2, 1977	APPLICATION NUMBER G1-22956	PERMIT NUMBER G1-22956P	CERTIFICATE NUMBER
------------------------------------	--------------------------------	----------------------------	--------------------

NAME
CITY OF KENT

ADDRESS (STREET) P. O. Box 310 (CITY) Kent (STATE) Washington (ZIP CODE) 98031

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 WATER TO BE APPROPRIATED

SOURCE
two wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 3690	MAXIMUM ACRE-FEET PER YEAR 5904
-------------------------------	------------------------------------	------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal Water Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
700 feet and 650 feet north and 450 feet west of S $\frac{1}{4}$ corner of Sec. 33

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE $\frac{1}{4}$ SW $\frac{1}{4}$	SECTION 33	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 6 E.	W.R.I.A. 9	COUNTY King
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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 Kent Water Supply System.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: July 14, 1979 80	WATER PUT TO FULL USE BY THIS DATE: July 14, 1980 81
--	---	--

PROVISIONS

Prior to issuance of a Certificate of Water Right, the applicant will be required to furnish information to this office as part of his Proof of Appropriation as to the size and type of equipment installed and the rate at which water is withdrawn in gallons per minute.

A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040.

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. The applicant may, for his own convenience, wish to install an airline and gage in addition to the access port.

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 Redmond Washington, this.....30th.....day
of June 19 78

ENGINEERING DATA

K.....
ff

Department of Ecology

by *Robert K. McCormick*
ROBERT K. MCCORMICK, Regional Manager

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 September 2, 1977	APPLICATION NUMBER G1-22956	PERMIT NUMBER	CERTIFICATE NUMBER
------------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

Examination Date: March 21, 1978

PUBLIC WATERS TO BE APPROPRIATED

SOURCE two wells		
TRIBUTARY OF (IF SURFACE WATERS) ---		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 3690	MAXIMUM ACRE-FEET PER YEAR 5904
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Water Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 700 feet and 650 feet north and 450 feet west of S $\frac{1}{4}$ corner of Sec. 33
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE $\frac{1}{4}$ SW $\frac{1}{4}$	SECTION 33	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 6 E.	W.R.I.A. 9	COUNTY King
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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 Kent Water Supply System.

DESCRIPTION OF PROPOSED WORKS

Wells drilled 16" diameter and 72' and 75' deep.
Detailed plans of system to be supplied prior to issuance of final Water Right Certificate.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	1 yr from permit issuance	2 yrs from permit issuance

PROVISIONS

I recommend approval of the requested instantaneous withdrawal of 3690 gallons per minute with an annual withdrawal of 5904 acre-feet per year (maximum annual capability pumping at requested gallons per minute).

It is noted that current use is from claimed rights. This claimed right has no bearing on the evaluation of this application as this use will be considered a primary right.

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.

"Prior to issuance of a Certificate of Water Right, the applicant will be required to furnish information to this office as part of his Proof of Appropriation as to the size and type of equipment installed and the rate at which water is withdrawn in gallons per minute."

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 Assistant Secretary, Division of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Division of Health, Public Health Building No. 4, Thurston Airdustrial Center, Olympia, with regard to the need for compliance.

"A suitable measuring device shall be installed and maintained in accordance with WAC 508-64-020 through WAC 508-64-040." (Installation, operation and maintenance requirements attached hereto.)

All new water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

"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.

Signed at Redmond, Washington,

this 19 day of May, 1978


ROY C. BISHOP
Resource Management
Department of Ecology

452

Kent Springs

Affidavit of Publication

STATE OF WASHINGTON }
COUNTY OF KING } ss.

.....Anita Teernstra..... being first duly sworn on

oath, deposes and says that she is thechief clerk..... of THE KENT NEWS-JOURNAL, a newspaper published four (4) times a week. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a newspaper published four (4) times a week in Kent, King 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 Kent News-Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County,

Washington. That the annexed is a Appl to Approc.....

..... as it was published in regular issues (and not in supplement form of said newspaper) once each issue for a period

of2..... consecutive issues, commencing on the

..28... day ofOct....., 19..77.., and ending the

..4... day ofNOV....., 19..77.., 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

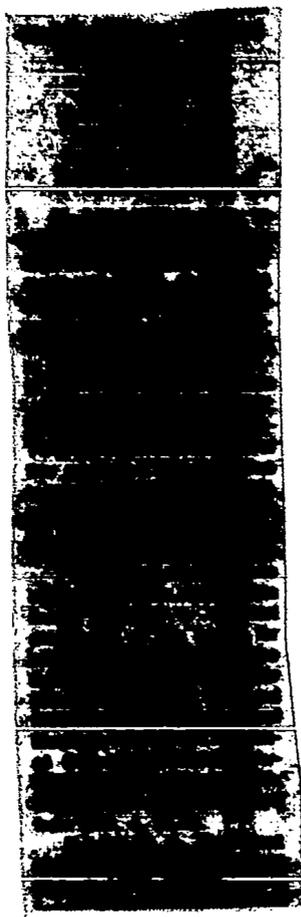
charged for the foregoing publication is the sum of \$21.40 which has been paid in full at the rate of per folio of one hundred words for the first insertion and per folio of one hundred words for each subsequent insertion.

Anita Teernstra

Subscribed and sworn to before me this4..... day ofNov....., 19..77..

Lee Bailey
Notary Public in and for the State of Washington,
residing at Kent, King County.

- Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.
- Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.



PUB. OK
1-9-78
J.

cc: State Dept
(Mike Stebbins)
11/14/77
by

Kent Spgs Well Drilling
(Cingroff)

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS

TAKE NOTICE:

That CITY OF KENT
of KENT, WASHINGTON on SEPTEMBER 2, 1977 under
Application No. G1-22956 filed for permit to appropriate public waters, subject to existing rights,
from 2 WELLS
in the amount of 3690 GALLONS PER MINUTE
each year, for MUNICIPAL WATER SUPPLY - CONTINUOUSLY

The source of the proposed appropriation is located within SE 1/4 SW 1/4
of Section 33 Township 22 N., Range 6 E W.M. in KING 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, Northwest Regional Office, [REDACTED] Redmond, WA. 98052... within thirty (30) days from 4350-150th Avenue N. E.
(Last date of publication to be entered above by publisher)



APPLICATION FOR PERMIT TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON. I have examined this application and find that it is: not an "action".

SURFACE WATER GROUND WATER (theoretically exempt).

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION SIGNATURE

(GRAY BOXES FOR OFFICE USE ONLY)

APPLICATION NO. <i>GW-22956</i>	W.R.T.A. <i>9</i>	COUNTY <i>King</i>	PRIORITY DATE <i>9/2/77</i>	TIME RECEIVED <i>1542</i>	ACCEPTED <i>9/19/77 TBH</i>
APPLICANT'S NAME <i>City of Kent</i>				BUSINESS TEL. <i>872-3383</i>	
ADDRESS (STREET) <i>P. O. Box 310</i>				HOME TEL.	
(CITY) <i>Kent</i>				(STATE) <i>WA</i>	
(ZIP CODE) <i>98031</i>					
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.)
TRIBUTARY	SIZE AND DEPTH
	<i>Wells - 2</i>
	<i>16" x 72' & 16" x 75'</i>

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)

Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECOND <i>8.2 CFS</i>	OR	GALLONS PER MINUTE <i>3690</i>	ACRE FEET PER YEAR <i>3600 GPM</i>
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TIMES DURING YEAR WATER WILL BE REQUIRED

Constant Availability CONTINUOUSLY

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 <i>60,000</i>
DATE PROJECT WAS OR WILL BE STARTED <i>September 15, 1977</i>	DATE PROJECT WAS OR WILL BE COMPLETED <i>April 1, 1978</i>	

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.

2200' east and 700' north of S.W. corner (700' & 650' N & 450' W OF S/4 COR.)

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) <i>SE 1/4 SW 1/4</i>	SECTION <i>33</i>	TOWNSHIP N. <i>22</i>	RANGE (E. OR W.) W.M. <i>6 E.</i>	COUNTY <i>King</i>
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4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER

Yes

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 CITY OF KENT WATER SUPPLY SYSTEM.

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PURCHASER, ETC.)

Property Owner

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

Ground Water - water right claim filed by City of Kent on June 24, 1974.

TISH 9/19/77

(also, cancelled SWA # 1906 - 10 c.f.s. - cancelled Jan. 1927)

Kent Springs - infiltration gallery TISH 9/19/77

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.)

REMARKS

7. The City of Kent has been using water from this source continuously since 1909. Water right claim was filed by City of Kent in 1974 per State of Washington requirement.

At that time, the City claimed rights to 10 c.f.s. and was using 6 c.f.s. City of Kent now wishes to extend use to 14.2 c.f.s.

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

G. W. Ulett
APPLICANT'S SIGNATURE
G. W. Ulett
G. W. Ulett
Director of Public Works
LEGAL LANDOWNER'S SIGNATURE

City of Kent
P. O. Box 310, Kent WA 98031
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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

RECEIVED
SEP 2
DEPT. OF ECOLOGY
REGIONAL OFFICE
REDMOND, WA. 98052

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME CITY OF KENT		TELEPHONE NO. 872-3383	
ADDRESS P.O. Box 310	(CITY) Kent,	(STATE) Washington	(ZIP CODE) 98031
ASSIGNED TO		TELEPHONE NO.	DATE ASSIGNED
ADDRESS		(CITY)	(STATE) (ZIP CODE)
APPLICATION NO. G122956	PERMIT NO. G122956P	CERTIFICATION NO. G122956C	
DATE AMENDED	DATE CANCELLED	W.R.I.A.	
APPLICATION			
DATE APPLICATION RECEIVED September 2, 1977	INITIAL FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED September 2, 1977	
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 F.	DATE APPROVED 10-17-77	DATE NOTICE SENT 10-18-77	
PROTESTED BY AND DATE			
DATE AFFIDAVIT RECEIVED 1-5-78	CHECKED BY F.	TIME EXPIRED 12-4-77	DATE AMENDED NOTICE SENT
DATE AFFIDAVIT RECEIVED	TIME EXPIRED		
DEPARTMENT OF GAME AND FISHERIES REPORT			
APPROVED	PROVISO	PROTEST	
EXAMINATION			
DATE EXAMINATION MADE 3/21/78	MADE BY Roy	DATE REPORT OF EXAM. WRITTEN 4/14/78	WRITTEN BY Roy
DATE PERMIT FEE REQUESTED 5-19-78	AMOUNT DUE 20.00	DATE RECEIVED 6-14-78	CHECKED BY JH 5/17/78
PERMIT			
PERMIT APPROVED BY JH	DATE APPROVED 6/30/78	PERMIT NO. G122956P	DATE ISSUED 6-30-78
BEGINNING OF CONSTRUCTION			
DATE NOTICE SENT	DATE FILED	EXTENSION FEE	
EXTENDED TO	EXTENDED TO		
WELL DRILLER'S AND/OR CONSTRUCTION REPORT			
DATE SENT	DATE FILED 1-24-78 (2)		
COMPLETION OF CONSTRUCTION			
DATE NOTICE SENT 7-10-78	DATE FILED 10-4-78	EXTENSION FEE	
EXTENDED TO 7-14-80/	EXTENDED TO		
PROOF OF APPROPRIATION			
DATE SENT	DATE FILED 12-27-78	EXTENSION FEE	EXTENDED TO
DATE CERTIFICATE FEE REQUESTED 5-19-78	AMOUNT DUE 20.00	DATE RECEIVED 12-27-78	DATE APPROVED FOR CERTIFICATE 12-28-78
CERTIFICATION			
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO	CERTIFICATE NUMBER G122956C	DATE ISSUED 2/15/79	
REMARKS			

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.)

PRIORITY DATE October 6, 1982	APPLICATION NUMBER G1-24189	PERMIT NUMBER G1-24189P	CERTIFICATE NUMBER G1-24189C
---	---------------------------------------	-----------------------------------	--

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Two wells		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1,300	MAXIMUM ACRE-FEET PER YEAR 500 - supplemental to existing rights
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal water supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL Well A-4, 750 feet west and 1300 feet south of NE corner of Sec. 36
Well A-5, 100 feet west and 800 feet south of NE corner of Sec. 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) E$\frac{1}{2}$NE$\frac{1}{4}$	SECTION 36	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.L.A. 9	COUNTY King
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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 Kent.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, 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 Redmond, Washington, this 15th day of January, 1986.

Department of Ecology

ENGINEERING DATA

OK. *JJ*

by *Joan K. Thomas*
Joan K. Thomas, Regional Manager

FOR COUNTY USE ONLY

000 35923

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-24189		PERMIT NUMBER G1-24189P	
NAME OF PERMITTEE City of Kent, Department of Public Works		BUS. TEL. 872-3383	
POST OFFICE ADDRESS (CITY) 220 South 4th Kent		(STATE) Washington	(ZIP CODE) 98032
ACTUAL SOURCE OF APPROPRIATION Two wells - 17975 S.E. 275th Place, Kent			
PURPOSE OR PURPOSES WATER IS USED FOR Municipal Water Supply - Potable Water			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE June 1985		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED N/A	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED June, July, August	
PUMP SIZE Two pumps - 1) 700 GPM; 2) 530 GPM			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM Varied based on demand		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
1300 ± GPM maximum			
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN	

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

SEE ATTACHED

RECEIVED
DEC 10 1985

DEPARTMENT OF ECOLOGY
NORTHWEST REGION

STATE OF WASHINGTON,
County of King } ss.

I, Gary Gill, 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 5TH day of December, 19 85.

Gary Gill
Permittee Signature

Subscribed and sworn to before me this 5th day of December, 19 85.

Carol S. Storm
Notary Public

P/A

(1) OWNER: Name City of Kent Address P.O. Box 310, Kent, WA 98031

(2) LOCATION OF WELL: County NE 1/4 NE 1/4 Sec 26 T 22 N R 5E W.M

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic Industrial Municipal
Irrigation Test Well Other

(4) TYPE OF WORK: Owner's number of well (if more than one) A4
New well Method: Dug Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) DIMENSIONS: Diameter of well 12 inches
Drilled 112 ft. Depth of completed well 107 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 16 - Diam. from 8 ft. to 80 ft.
Threaded 12 - Diam. from 8 ft. to 80 ft.
Welded - Diam. from 8 ft. to 80 ft.

Perforations: Yes No
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.

Screens: Yes No Johnson UOP
Manufacturer's Name _____
Type _____ Model No _____
Diam. 10" Slot size 100 from 80 ft. to 100 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? 10 ft.
Material used to seal concrete gravel
Did any strata contain unclean water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ HP _____

(8) WATER LEVELS: Land-surface elevation 375
Static level 5.57' ft. below mean sea level Date 8/12/02
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? _____
Yield: 420 gal./min. with 49 ft. drawdown after 0 hrs.

Recovery data (time taken to raise when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
1 min	23.5'	150	16.74'		
10 min	20.0'	1477	14.92'		
61 min	17.9'				

Date of test _____
Ratier test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian Sew _____ g.p.m. Date _____
Temperature of water 48.5°F Was a chemical analysis made? Yes No

(10) WELL LOG:

Formation Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation

MATERIAL	FROM	TO
Brown, silty sand and gravel, cobbles below 37.	0	46
Brown, clay-bound gravel	46	56
Gray-brown, dirty sand and gravel. Gravel coarser. Boulder at base.	56	72
Green to brown, clay-bound sand and gravel.	72	80
Yellow-brown, bimodal sand and gravel. Water-bearing.	80	105
Gray, silty sand.	105	112

Work started May 22, 02 Completed Aug 20, 02

WELL DRILLER'S STATEMENT:

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

NAME _____ (Type or print)

Address _____

(Signed) sent to Driller for signature 8/12/02 (Well Driller)

License No. _____ Date _____, 19____

(1) OWNER: Name City of Kent Address P.O. Box 310, Kent, WA 98031

(2) LOCATION OF WELL: County NE 1/4 NE 1/4 Sec 36 T22 N. R. SE W4

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic Industrial Municipal
Irrigation Test Well Other

(4) TYPE OF WORK: Owner's number of well (if more than one) A5
New well Method: Dig Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) DIMENSIONS: Diameter of well 16 inches
Drilled 110 ft. Depth of completed well 90 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 16 " Diam. from 0 ft. to 66 ft.
Threaded " Diam. from ___ ft. to ___ ft.
Welded " Diam. from ___ ft. to ___ ft.
Perforations: Yes No
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
perforations from _____ ft. to _____ ft.
perforations from _____ ft. to _____ ft.
perforations from _____ ft. to _____ ft.

Screens: Yes No look
Manufacturer's Name _____
Type _____ Model No. _____
Diam. 16 " Slot size 60 from 66 ft. to 80 ft.
Diam. _____ Slot size _____ from _____ ft. to _____ ft.

Gravel packed: Yes No Size of gravel: _____
Gravel placed from _____ ft. to _____ ft.

Surface seal: Yes No To what depth? 20 ft.
Material used in seal cement grout
Did any strata contain unsuitable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

(8) WATER LEVELS: Lead-surface elevation above mean sea level 310
Static level 14.75' ft. below top of well Date 8/1/02
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? _____
Yield: 600 gal./min. with 43 ft. drawdown after 24 hrs.

Recovery data (time taken to zero when pump turned off) (water level measured from well top to water level)
Time Water Level | Time Water Level | Time Water Level
1 min 47.1 | 115 min 9.6 | _____
10 min 20.45 | _____ | _____
1 hr. 10.45 | _____ | _____
Date of test _____

Flow test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

(10) WELL LOG:

Formation Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

MATERIAL	FROM	TO
Gravel sand, clay - tightly bound, grades to gray at 24'	0	37
sand and gravel, dirty, gray-brown.	37	42
Gravel to 10' and sand, Water bearing.	42	56
Yellow-brown gravel and sand with clay binder. Thin intervals of tan, sandy clay.	56	63
Well-graded, gray-brown sand and gravel. Very thin silt seams interspersed. Clay seam at bottom. Water bearing.	63	82
Brown sand, coarse to fine downward.	82	96
Brown, sandy clay.	96	100
Gray-brown, clayey sand	100	110

Work started July 2, 2002 Completed Aug. 20, 2002

WELL DRILLER'S STATEMENT:

This well was drilled under my supervision and this report is true to the best of my knowledge and belief.

NAME _____ (Type or print)

Address _____

(Signed) _____ (Well Driller)

License No. _____ Date _____, 10 _____

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 October 6, 1982	APPLICATION NUMBER G1-24189	PERMIT NUMBER G1-24189P	CERTIFICATE NUMBER
----------------------------------	--------------------------------	----------------------------	--------------------

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Two wells	TRIBUTARY OF (IF SURFACE WATERS)		
---------------------	----------------------------------	--	--

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1,300	MAXIMUM ACRE-FEET PER YEAR 500 - supplemental to existing rights
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Water Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL Well A-4, 750 feet west and 1300 feet south of NE corner of Sec. 36
Well A-5, 100 feet west and 800 feet south of NE corner of Sec. 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) E-NE 1/4	SECTION 36	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
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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 Kent.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:
Started

COMPLETE PROJECT BY THIS DATE:
September 15, 1984

WATER PUT TO FULL USE BY THIS DATE:
September 15, 1985

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040.

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 Redmond Washington, this...15th.....day

of September....., 19 83.....

Department of Ecology

by *Robert K. McCormick*
ROBERT K. McCORMICK, Regional Manager

ENGINEERING DATA

OK.....

JH

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 October 6, 1982	APPLICATION NUMBER G1-24189	PERMIT NUMBER	CERTIFICATE NUMBER
----------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Two wells

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1,300	MAXIMUM ACRE-FEET PER YEAR 500 - inclusive in existing rights held by applicant
-------------------------------	-------------------------------------	--

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal Water Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
Well A-4, 750 feet west and 1300 feet south of NE corner of Sec. 36

Well A-5, 100 feet west and 800 feet south of NE corner of Sec. 36

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) E $\frac{1}{2}$ NE $\frac{1}{4}$	SECTION 36	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.F.A. 9	COUNTY King
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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 Kent.

DESCRIPTION OF PROPOSED WORKS

Well A-4, 12" x 107', screened from 80-100 feet
Well A 5, 16" x 90', screened from 66-80 feet

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	1 yr from permit issuance	2 yrs from permit issuance

REPORT

Background:

This application to withdraw 2100 gallons per minute from three wells near Kent to supplement the Kent municipal water supply was received on October 6, 1982.

Public notice was made on December 8 and 15, 1982 in the Daily News Journal and no protests or objections were filed.

Investigations:

This proposed municipal well field was examined in office on July 7 and was field investigated on July 8, 1983. Detailed site plans, well reports, aquifer tests and consultant's report on the hydraulic relation between the well field and nearby Jenkins Creek were available at the time of the investigation. The well field is located on City of Kent property at the intersection of 272nd Street and Auburn-Maple Valley Highway, approximately one-half mile northeast of Puget Power's Covington Substation. The site is called Armstrong Springs because of small springs (approximately 0.3 cfs) outcropping on the City's property.

Reports accompanying this application show that three test wells (A-1, A-2, A-3) were drilled at Armstrong Springs in 1969 adjacent to Jenkins Creek. Two production wells (A-4 and A-5) were completed in 1982 and were observed during the field investigation as two steel casings with caps welded at 3 feet above ground surface. The City plans to install a 550 gpm capacity pump at A-4 and 700 gpm capacity pump at A-5. It was determined that construction of a third well at the site would not economically increase the expected installed capacity of 1,230 gpm and therefore the original plan of constructing three wells was reduced to two.

Well A-4 is located about 500 feet southeast of Jenkins Creek at an elevation about 20 feet above the channel. Well A-4 is 12 inches in diameter, 107 feet deep and screened between 80 and 100 feet in an artesian sand and gravel aquifer.

Well A-5 is located about 700 feet southeast of Jenkins Creek at an elevation about 25 feet higher than the creek channel. Well A-5 is 16 inches in diameter, 90 feet deep and screened between 66 and 80 feet in the same artesian sand and gravel aquifer as A-4. Well A-5 is located 925 feet southwest of A-4.

Jenkins Creek was closed for further consumptive appropriation with the adoption of WAC 173-509. Since the adopted closure includes groundwater withdrawals with significant hydraulic continuity with closed streams, the relationship of the Armstrong Springs well field to Jenkins Creek is an issue under consideration in this water right investigation. Under the departmental "Guideline For Determining Significant Continuity", the distance between a well and stream is used as a criterion when there is no "impermeable" layer separating the aquifer and the stream. Although different contractors were used in the construction of the five wells at Armstrong Springs, driller's well reports consistently demonstrate the presence of low permeability zones that act as a general confining bed for the artesian aquifer system. The top of the artesian aquifer of wells A-4 and A-5 is from 60 to 28 feet below the Jenkins Creek channel, while static water levels in the wells were measured at 14.4 and 13.2 feet above the Creek channel, respectively. The geologic materials overlying the aquifer and underlying the stream are logged as "clay", "hardpan", "clay-bound gravel" and "with clay binder". These materials are known as typically poorly permeable and often serve as confining layers over artesian aquifers. The confined nature of the aquifer was apparently first noted in 1969 when the flowing head of test well A-2 was over 6 feet above land surface at the time of its completion. Considerable available data all indicate there is not significant hydraulic continuity between Armstrong Springs well field and Jenkins Creek.

Consultant's reports on wells A-4 and A-5 show that a nearby domestic well may be adversely affected. The well, owned by Timothy O'Rourke, is 50 feet deep and is located about 200 feet northwest of Well A-4. Since the static water level in the

O'Rourke well was measured at 5 feet below land surface and there are approximately 40 feet of available drawdown in the well, there should not be an adverse effect due to a possible 20-foot interference drawdown. However, this application is subject to existing rights and should the O'Rourke well be adversely affected by this appropriation, the City will be regulated in order to protect existing rights.

Although the maximum design capacity of the two production wells at Armstrong Springs is 1,230 gpm, it is anticipated that the wells will average 800-950 gpm during the summer period of use. The wells will be used primarily to meet peak summer-use demands in the Kent municipal water system. A maximum capacity of 1,300 gpm should serve as a reasonable estimate of instantaneous quantity until actual installed capacity is determined.

Existing water rights held by the City of Kent are as follows:

<u>Water Right File No.</u>	<u>Source Name</u>	<u>Quantity gpm</u>	<u>Annual Q (acre-feet)</u>
3107-A	Clark Springs Trench	2,250	1,350 (supplemental)
7232-A	Clark Springs	2,220	3,600 (supplemental)
7660-A	Clark Springs Wells	5,400	8,710
G1-22956C	Kent Springs	3,690	5,904
G1-23285C	East Hill Well	1,900	3,040
G1-23614C	Garrison Creek Well	500	800 (supplemental)
G1-23713P	High Meadows	7	11
G1-23852P	Reservoir Well	160	256
G1-24073	Seven Oaks	900	864 (supplemental)
G1-24189	Armstrong Springs	1,300	500 (supplemental)
G1-24190	212th St. Well	3,500	1,400 (supplemental)
TOTAL:		Primary	17,921
		Supplemental	(8,514)

As shown, the City of Kent presently has 17,921 acre-feet in primary water rights. The City has about 12,000 services and a current average demand of 6,400 acre-feet per year. Kent is expected to have an annual demand of approximately 16,800 acre-feet (15 MGD average annual demand) by the year 2000, so existing rights held by the City should provide for projected demand through the next 20 years. For this reason, the annual quantity on this water right is issued as supplemental or inclusive in existing rights held by the applicant.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendation:

I recommend that this application to withdraw 2100 gpm from three wells near Kent be reduced to the maximum design capacity of 1,300 gpm from wells A-4 and A-5 at the Armstrong Springs well field. It is further recommended that a permit be issued under this application with an annual quantity of 500 acre-feet which are inclusive in the existing water rights for the City of Kent.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

REPORT BY: David Garland DATE: 7-28-83

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

ss.

..... Mitzi Moser being first duly sworn on

oath, deposes and says that she is the chief clerk of
THE DAILY NEWS JOURNAL, a newspaper published six (6) times a week.
That said newspaper is a legal newspaper and it is now and has been for
more than six months prior to the date of publication referred to, printed
and published in the English language continually as a newspaper
published four (4) times a week in Kent, King 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 Daily News
Journal has been approved as a legal newspaper by order of the Superior
Court of the County in which it is published, to-wit, King County,

Washington. That the annexed is a Notice of Application
.....
to Appropriate Public Waters.....

..... as it was published in regular issues (and
not in supplement form of said newspaper) once each issue for a period
of 2 consecutive issues, commencing on the
3th day of December, 1982, and ending the
15th day of December, 1982, both dates
inclusive, and that such newspaper was regularly distributed to its sub-
scribers during all of said period. That the full amount of the fee

charged for the foregoing publication is the sum of \$40.32 which
has been paid in full at the rate of per folio of one hundred words for the
first insertion and per folio of one hundred words for each subsequent
insertion.

Mitzi Moser

Subscribed and sworn to before me this 17th day of

December, 1982.

George L. Heath
Notary Public in and for the State of Washington,
residing at Kent, King County,
Federal Way

— Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

— Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

**STATE OF WASHINGTON
DEPARTMENT OF
ECOLOGY
NOTICE OF APPLICATION
TO APPROPRIATE**

Public Water

That the applicant, Mitzi Moser, of the County of King, State of Washington, on October 8, 1982 under Application No. G1-34186 filed for permit to appropriate public waters, subject to existing rights, from well in the amount of 2100 gallons per minute each year, for municipal water supply continuously.

The source of the proposed appropriation is located within E4, NE1/4 of Section 36, Township 22 N., Range 52 W.M. in King 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 check for \$2.00. Notices are filed with the Department of Ecology at the address shown below.

**Department of Ecology
Northwest Region
4300 180th Ave. N.E.
Seattle, WA 98148**

1-17-83

OK
jj

RECEIVED

JAN 0 1983

DEPARTMENT OF ECOLOGY
NORTHWEST REGION

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS

TAKE NOTICE:

That CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)
of KENT, WASHINGTON on OCTOBER 6, 1982 under
Application No. G1-24189 filed for permit to appropriate public waters, subject to existing rights,
from WELL
in the amount of 2100 GALLONS PER MINUTE
each year, for MUNICIPAL WATER SUPPLY - CONTINUOUSLY

The source of the proposed appropriation is located within E 1/2 NE 1/4

of Section 36 Township 22 N., Range 5E W.M., in KING 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

Department of Ecology
Northwest Regional Office
4350 - 150th Ave. N. E.
Redmond, Washington 98052

(Last date of publication to be entered above by publisher)

NOTICE



APPLICATION FOR PERMIT

TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

GROUND WATER

categorically exempt.

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

SIGNATURE

APPLICATION NO. G12A189	W.R.T.A. 9	COUNTY King	PRIORITY DATE 10/6/82	TIME	ACCEPTED mm
APPLICANT'S NAME City of Kent (Department of Public Works)				BUSINESS TEL. 872-3383	HOME TEL.
ADDRESS (STREET) 220 S. 4th		(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032	
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION N/A					

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.) Well (Armstrong Springs)
TRIBUTARY	SIZE AND DEPTH 16" Casing - 110 Feet No. 1 16" Casing - 108 Feet No. 2

2. USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: Municipal Water Supply - Continuously	CUBIC FEET PER SECOND ... CFS	OR	GALLONS PER MINUTE 2100	ACRE FEET PER YEAR
TIMES DURING YEAR WATER WILL BE REQUIRED Constant Availability				

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 60,000
DATE PROJECT WAS OR WILL BE STARTED Early 1983	DATE PROJECT WAS OR WILL BE COMPLETED Late 1983	

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

From NE Property Corner #1 - 155' S, 130' W #2 - 685' S, 965' W

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) E-1/2 NE 1/4 36-22-5	SECTION 36	TOWNSHIP N. 22	RANGE (E, OR, W), W.M. 5 E	COUNTY KING
--	----------------------	--------------------------	--------------------------------------	-----------------------

#3 - Exact location unknown

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
Yes

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 City of Kent is property on which water will be used. See attached legal of actual well site or property on which water will be taken from.

RECEIVED

OCT 6 1982

DEPARTMENT OF ECOLOGY
NORTHWEST REGION

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PUMP USER, ETC.)

Area is City of Kent Water District service area. The City is responsible for supply water

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 during design phase.

REMARKS

7. Please refer to this application as "Armstrong Springs Wells".

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

Don E. Colubakis

APPLICANT'S SIGNATURE

Don E. Colubakis

LEGAL LANDOWNER'S SIGNATURE

220 So. 4th
Kent, Washington 98032

LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT

APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent (Department of Public Works)			TELEPHONE NO. 872-3383		
ADDRESS 220 S. 4th		(CITY) Kent,	(STATE) Washington	(ZIP CODE) 98032	
ASSIGNED TO			TELEPHONE NO.	DATE ASSIGNED	
ADDRESS		(CITY)	(STATE)	(ZIP CODE)	
APPLICATION NO. G-24189	PERMIT NO. G-124189P	CERTIFICATION NO. G-24189C			
DATE AMENDED	DATE CANCELLED	W.R.I.A.			
APPLICATION					
DATE APPLICATION RECEIVED October 6, 1982	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED October 6, 1982			
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 11-30-82		
PROTESTED BY AND DATE					
DATE AFFIDAVIT RECEIVED 1-4-83	CHECKED BY JK	TIME EXPIRED 1-15-83	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
DEPARTMENT OF GAME AND FISHERIES REPORT					
APPROVED		PROVISO	PROTEST		
EXAMINATION					
DATE EXAMINATION MADE 7-7-83	MADE BY DPG	DATE REPORT OF EXAM. WRITTEN 7-12-83	WRITTEN BY DPG	CHECKED BY	
DATE PERMIT FEE REQUESTED 7-28-83	AMOUNT DUE \$20.00	DATE RECEIVED 8-9-83 OK FOR PERMIT JK			
PERMIT					
PERMIT APPROVED BY JK	DATE APPROVED 9-12-83	PERMIT NO. G-124189P	DATE ISSUED 9-15-83		
BEGINNING OF CONSTRUCTION					
DATE NOTICE SENT		DATE FILED	EXTENSION FEE		
EXTENDED TO			EXTENDED TO		
WELL DRILLER'S AND/OR CONSTRUCTION REPORT					
DATE SENT		DATE FILED In file			
COMPLETION OF CONSTRUCTION					
DATE NOTICE SENT 9-15-83		DATE FILED 10-18-84	EXTENSION FEE		
EXTENDED TO			EXTENDED TO		
PROOF OF APPROPRIATION					
DATE SENT 10-8-85	DATE FILED 12-10-85	EXTENSION FEE	EXTENDED TO		
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 12-10-85	DATE APPROVED FOR CERTIFICATE 12-11-85	APPROVED BY JK	
CERTIFICATION					
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER G-24189C		DATE ISSUED 1-15-86		
REMARKS					

City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895



**STATE OF WASHINGTON
 SUPERSEDING CERTIFICATE OF WATER RIGHT**

Document Title: Certificate of Water Right

Agency: Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008

Applicant: City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895

Reference Number: NA

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
June 4, 1980	G1-23614	G1-23614P	G1-23614C

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)		
4 wells			
MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR	
	500	800*	

QUANTITY/TYPE OF USE/PERIOD OF USE

Municipal supply – continuously

*Supplemental to existing right held by City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

- 1) Garrison Creek well (G1-23614C) – 940 feet south and 800 feet west of E¹/₄ corner of Section 7
- 2) 212th Street well #1 (G1-24190C) – 1200 feet north and 300 feet west of center of Section 7
- 3) 212th Street well #2 (G1-24190C) – 1100 feet north and 300 feet west of center of Section 7
- 4) 208th Street well (G1-24404C) – 30 feet north and 500 feet west of S¹/₄ corner of Section 6

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
1) NE ¹ / ₄ SE ¹ / ₄ 2) and 3) SE ¹ / ₄ NW ¹ / ₄	7	22N	5E	9	King
4) SE ¹ / ₄ SW ¹ / ₄	6				

PARCEL # 8802400066

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

PARCEL #

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their most recently approved water system plan.

PROVISIONS

Use of water under this certificate will remain at a maximum of 500 gallons per minute, 800 acre-feet per year supplemental to existing rights held by the City of Kent. The purpose of use will remain municipal supply.

If it can be shown that the requested change has a detrimental effect on existing rights, it shall be the responsibility of the operator to mitigate for this impact and/or alter or cease withdrawal of water.

An access port as described in Ground Water Bulletin No. 1 is required. An air line gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each withdrawal 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 weekly. The maximum monthly instantaneous rate of withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly 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, Certificate No., source name, volume including units, Department of Health WFI water system number and source number(s), and well tag number. 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.

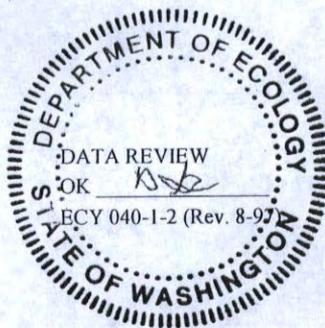
Chapter 173-173 WAC describes the requirements for data accuracy, device installation and operation, and information reporting. It also allows a water user to petition Ecology for modifications to some of the requirements. Installation, operation and maintenance requirements are contained in the document 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.

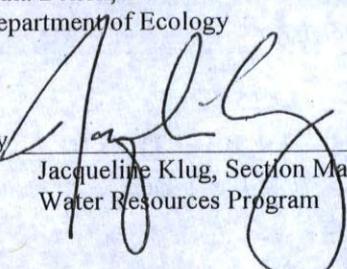
The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Bellevue, Washington,
this 19 day of September, 2013.



Maia Bellon, Director
Department of Ecology

By 
Jacqueline Klug, Section Manager
Water Resources Program

JUN 13 2013

DEPT OF ECOLOGY
NWRO - WR

Reviewed by:



Water Resources Program
PROOF OF APPROPRIATION OF WATER

PERMIT NUMBER G1-23614C	CHANGE APPROVAL NUMBER G1-23614C
NAME OF PERMITTEE City of Kent	CONTACT NAME (IF DIFFERENT) Kevin Swinford

MAILING ADDRESS (STREET) 220 4th Ave So.	CITY Kent	STATE WA	ZIP CODE 98032-5895
PHONE NUMBER (253-) 856-5610	FAX NUMBER (253) 856-6500		

SOURCE(S) OF WATER Groundwater - Garrison Well	LOCATION OF SOURCE(S)					
	NO.	¼ NE	¼ SE	SECTION 7	TOWNSHIP N. 22	RANGE, (E/W)M 5E

LIST ALL PURPOSES WATER IS USED FOR:
Municipal Purposes

DATE WATER WAS COMPLETELY APPLIED TO BENEFICIAL USE Not Applicable (NA)	TIME OF YEAR WATER IS USED: <input checked="" type="checkbox"/> Continuous/Year round <input type="checkbox"/> Seasonal	IF SEASONALLY, LIST THE START AND END DATE Start: NA End: NA
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DESCRIBE HOW CONSTRUCTION AND DEVELOPMENT RELATED PROVISIONS (AS REQUIRED BY PERMIT) HAVE BEEN OR ARE TO BE MET (USE ADDITIONAL PAPER IF NECESSARY)
Garrison Replacement Well and Filtration/Treatment facility are completed and on-line with capacity to beneficially use and treat full authorized instantaneous and annual quantities.

DESCRIPTION OF SPECIFIC AREA ON WHICH WATER IS BENEFICIALLY USED(USE ADDITIONAL PAPER IF NECESSARY)
Area Served by City of Kent as reflected in their approved 2011 water system plan.
System ID 381501

NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE, (E/W)M
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PHYSICAL WITHDRAWAL OR DIVERSION INFORMATION

Point of Diversion/Withdrawal Tax Parcel #:8802400066

For Pump Designed Water System Information:

TYPE OF PUMP: <input checked="" type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other _____			
MAKE Byron Jackson	MODEL # 10MQL	SERIAL # NA	HORSEPOWER 75
MOTOR Submersible	BHP NA	SPEED Continuous	RPM 1770
<input checked="" type="checkbox"/> Water lubricated <input type="checkbox"/> Oil Lubricated			
BOOSTER PUMP <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	BREAK HORSEPOWER	PRESSURE	OPEN DISCHARGE <input type="checkbox"/> Yes <input type="checkbox"/> No
PUMP DISCHARGE HEAD PRESSURE 166 psi	DISCHARGE PIPE DIAMETER 6"		

For Ground Water Withdrawal (if more than one, please include attachment)

Ecology Unique Well Identification Number(s) AFT320 [Include a copy of the well log(s)]

PUMP SETTING (DEPTH) 351	STATIC WATER LEVEL 149 feet below land surface	DYNAMIC (PUMPING) LEVEL 185 feet below land surface
ACCESS PORT INSTALLED? <input checked="" type="checkbox"/> Yes	AIRLINE INSTALLED? <input type="checkbox"/> Yes	AIRLINE LENGTH NA Ft.

For Non-Pump Designed Water Systems

METHOD OF WATER DIVERSION	DESCRIPTION OF WORKS
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NA	SCREEN MESH SIZE NA	METHOD OF CONTROL NA
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USE OF WATER FOR:

1. Irrigation (Please include map of all irrigated lands):

TYPE OF SYSTEM NA		NUMBER OF SPRINKLERS OR EMMITERS NA	SPRINKLER/EMMITER MAKE NA	MODEL & RATED DISCHARGE NA
SIZE NOZZLE/EMMITER OPENINGS NA	AVERAGE PRESSURE AT SPRINKLER/EMMITER HEADS NA	NUMBER OF ACRES DEVELOPED NA	TYPE OF CROP(S) NA	

2. Municipal or Domestic Supply

NUMBER OF DOMESTIC UNITS CURRENTLY SERVED: 38,810 ERUs	NUMBER OF DOMESTIC UNITS TO BE SERVED 38,810 ERUs	POPULATION CURRENTLY SERVED 66,500
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ALSO, provide the following information, if applicable:

- Department of Health public water system identification number.
- 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 NA
--

If a waste discharge permit is required for the facility, include a reference to the permit number: **NA**

4. Other Use of Water (describe): NA

WATER USE AND *MEASUREMENT

IS A FLOW METER OR MEASURING DEVICE INSTALLED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	LOCATION OF METER(S) OR MEASURING DEVICE(S) Well Discharge		
MAKE McCrometer	SERIAL NUMBER 04-04370-6	INSTALLATION DATE 2004	INSTALLED BY: City of Kent
METER READING 0	DATE 2004		

*Include copy of meter specifications

Report 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 NA	ACRE FEET PER YEAR N/A	GALLONS PER MINUTE N/A	TOTAL GALLONS PER YEAR N/A
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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 of paper.

James R Swinford, and Bradley D. Lake do certify that I/we have completed appropriation of water under Water Right Permit or approved water right change number, G1-23614C. This notice and attached documents are true and accurate statements and describe and support my/our assertion that I/we have satisfied the terms of the permit/change in compliance with the law.

[Signature] Permittee(s) Signature Bradley D. Lake Permittee(s) Signature 6/11/2013 Date

State of: Washington
County of: King } §

Signed and sworn to (or affirmed) before me on this 11 day of June 2013



Kristin M. Lykken
(Signature)
Kristin M Lykken
(Printed Name)

Notary Public

(Title)

My appointment expires: 1-09-16

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**REPORT OF EXAMINATION FOR CHANGE OF CERTIFICATE
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 June 4, 1980	APPLICATION NUMBER G1-23614	PERMIT NUMBER G1-23614 P	CERTIFICATE NUMBER G1-23614 C
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NAME City of Kent			
ADDRESS (STREET) 220 - 4 th Avenue South	(CITY) Kent	(STATE) WA	(ZIP CODE) 98032-5895

PUBLIC WATERS TO BE APPROPRIATED

SOURCE 4 wells
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 500	MAXIMUM ACRE FEET PER YEAR 800*
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QUANTITY, TYPE OF USE, PERIOD OF USE:

Municipal supply - continuously

* Supplemental to existing right held by City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

- 1) Garrison Creek well (G1-23614C) - 940 feet south and 800 feet west of E¹/₄ corner of Section 7
- 2) 212th Street well #1 (G1-24190C) - 1200 feet north and 300 feet west of center of Section 7
- 3) 212th Street well #2 (G1-24190C) - 1100 feet north and 300 feet west of center of Section 7
- 4) 208th Street well (G1-24404C) - 30 feet north and 500 feet west of S¹/₄ corner of Section 6

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) 1) NE ¹ / ₄ SE ¹ / ₄ 2) and 3) SE ¹ / ₄ NW ¹ / ₄ 4) SE ¹ / ₄ SW ¹ / ₄	SECTION 7 6	TOWNSHIP N. 22N	RANGE, (E. OR W.) W.M. 5E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their approved 2002 water system plan.

DESCRIPTION OF PROPOSED WORKS

Well: Garrison Creek well: 435' by 12"; 212th Street wells – 1) 367' by 12"; 2) 375' by 16"; 208th Street well – 231' by 12".
Kent public water supply distribution system.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: Complete	WATER PUT TO FULL USE BY THIS DATE: 1 year from approval <i>3/25/2013</i>
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REPORT

BACKGROUND INFORMATION

The city of Kent is located in south King County and as of 1997 served water to a population of 49,259 through approximately 11,234 connections. Kent's 2002 water system plan indicates that Kent holds 22 water right certificates and a water right claim. Under the emergency drought legislation in 2001, Kent submitted applications for temporary changes to several of their existing water right certificates. Soon after submittal of the temporary change applications, Kent requested Ecology to treat four of the applications as permanent applications for change. For better management of the water system, Kent requests that four wells located within sections 6 and 7 of township 22N, range 5 E, and covered by ground water certificates G1-24404C, G1-24190C, and G1-23614C (this application) be operated as a well field. Each certificate would include the points of withdrawal of the other two ground water certificates.

The following map shows locations of Kent's wells for the proposed well field.

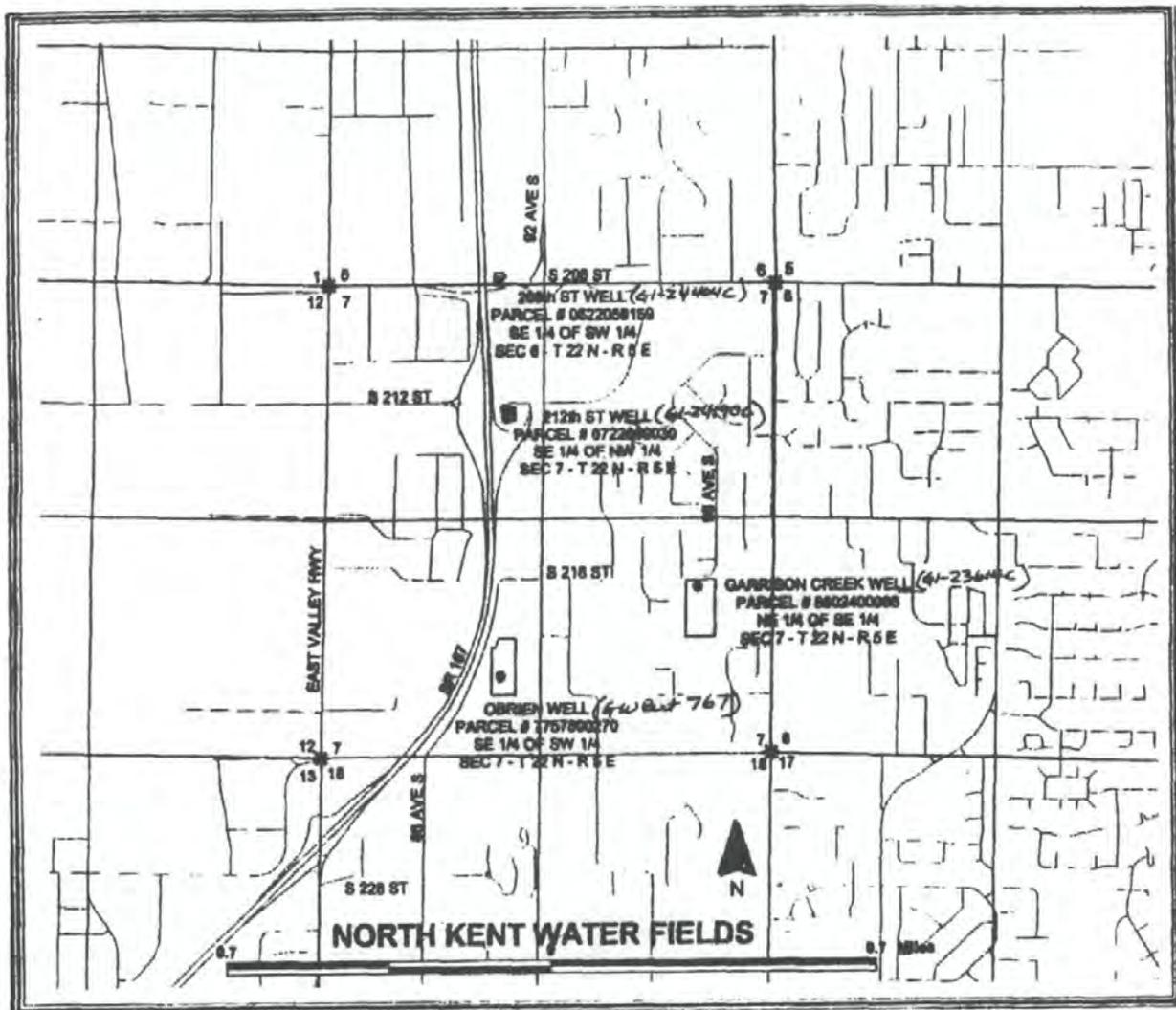


Figure 1: City of Kent's proposed well field.

Attributes of the Original Certificate G1-23614C

Certificate issued to:	City of Kent
Priority Date:	June 4, 1980
Source:	Well (known as the Garrison Creek well)
Quantity:	500 gallons per minute, 800 acre-feet per year supplemental to existing rights
Purpose of Use:	Municipal supply
Place of Use:	Area served by the City of Kent

Proposed Change

Applicant:	City of Kent
Date of application for change:	July 2, 2001
Request:	Additional points of withdrawal
Notice of publication:	Nov. 8 & 15, 2002, in the Daily News Journal
Protests:	None

INVESTIGATION

Evaluation of this application included but was not limited to research and/or review of:

- The State Water Code
- Existing water rights on file for the City of Kent
- Records of other water rights in the vicinity
- Information provided by the City of Kent
- Topographic and local area maps
- 2002 Water System Plan for Kent
- Knowledge of area from previous field visits

State Water Code

Chapters 90.03 and 90.44 Revised Code of Washington (RCW) authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights including the process to amend or change existing rights. Laws specifically governing the water right permitting process are RCW 90.03.250 through 90.03.340 and RCW 90.44.060. Changes or amendments to these rights are covered under RCW 90.03.380 and 90.44.100.

Existing rights for the City of Kent Water System

Information contained in Ecology water right records and the 2002 Kent water system plan indicate that Kent holds twenty-two water right certificates plus a surface water claim. The total primary rights, granted by the various documents, amounts to 19,843 acre-feet.

Kent's water right certificates and water right claim are shown in the table below. The data shown in the table was adapted from the table on page 5-7 of the 2002 Kent water system plan. The asterisk in the table denotes annual quantities that are not to be added to the total existing primary water rights held by Kent but are considered supplemental to those rights. Kent would be allowed to use the maximum annual quantity granted on the supplemental right but only to the extent that the total annual quantities from all sources did not exceed the amount held in primary rights.

WATER RIGHTS HELD BY THE CITY OF KENT				
File No.	Priority: Month/Yr.	Source	GPM/CFS	AF/Yr.
GW Cert. 3107	02/57	Clark Springs "trench"	2250*	*1350
SW Cert. 7232	10/31	Clark Springs Rock Creek	5 cfs	
GW Cert. 7660	02/69	Clark Springs wells	5400	8710
G1-22956C	09/77	Kent Springs wells	3690	5904
SWcl 123225	05/09	Kent Springs (springs)	4488	965
G1-23285C	01/79	East Hill well	1900	3040
G1-23614C	06/80	Garrison Creek well	500	*800
G1-23713C	10/80	High Meadows well	7	11
G1-24073C	04/82	Seven Oaks (Soos Creek) well	900	*864
G1-24189C	10/82	Armstrong Springs wells	1300	*500
G1-24190C	10/82	212 th Street wells	2700	*1400
G1-24404C	08/83	208 th Street well	1200	*600
GW Cert. 2890	09/56	East Hill well	120	146
GW Cert. 651	03/48	East Hill well (#1)	60	*45
GW Cert. 2428	02/53	East Hill well (#2)	120	78.4
GW Cert. 1116	06/50	Summit well	200	320
GW Cert. 494	07/47	Hamilton Road well	38	30
GW Cert. 4534	05/62	Hamilton Road well	12	19.2
GW Cert. 767	01/51	O'Brien well	243	45
GW Cert. 1957	03/52	Impoundment well	140	60
GW 42-D	09/23	East Hill well	60	90
GW 44-D	09/45	East Hill well	90	135
G1-25204C	03/88	Parks and Recreation	290	290

* issued as supplemental to primary rights already held by Kent

Ground Water Certificate G1-23614C

The annual quantity for this certificate was granted for a maximum of 800 acre-feet. Since Kent already held sufficient annual water right quantities to meet their twenty-year projected water demand, the annual quantity under this certificate could be used to supplement existing sources but not add to the total annual quantity already held by Kent. The instantaneous quantity (500 gpm) as granted by this certificate was not considered supplemental to other Kent water rights.

The well covered by this certificate is referred to as the Garrison Creek well and is located close to the intersection of 218th Street and 98th Avenue in the east Kent area. The legal description for the well location is 940 feet south and 800 feet west from the E1/4 corner (being within the NE1/4 SE1/4) of section 7, township 22 N, range 5 E. The well was constructed in February 1981 to a depth of 435 feet by 12 inches in diameter with elevation estimated at 260 feet above mean sea level. Prior to issuing the certificate, Kent notified Ecology that the well was pumping at a rate of 500 gpm with the installed 75 HP pump.

Proposed change

The request made by this change application is to add three additional wells to the certificate. The additional wells are covered with water right certificates (also held by Kent) for municipal supply purposes. All wells are within a one-mile radius of each other. The wells to be added are described as follows.

1. The 212th Street well #1 is within the SE1/4 NW1/4 of section 7, township 22 N, range 5 E. It is 1200 feet north and 300 feet west of the center of section 7. It is one of two wells covered by ground water certificate G1-24190C issued to Kent for 2700 gpm, 1400 acre-feet per year with a priority date of 1982. The annual quantity was conditioned as being supplemental to existing rights held by the City of Kent. Well #1 was constructed in November 1982 to a depth of 267 feet by 12 inches in diameter.
2. The 212th Street well #2 is 100 feet away from well #1 and also covered by certificate G1-24190C. It is located 1100 feet north and 300 feet west of the center of section 7 also placing it within the SE1/4 NW1/4. This well was constructed in June 1983 to a depth of 366 feet by 16 inches in diameter. Prior to finalizing wells #1 & 2 to certificate, Kent notified Ecology that well #1 had a pumping capacity of 1300 gpm and well #2 had a pumping capacity of 1400 gpm for a combined total of 2700 gpm.
3. The 208th Street well is within the SE1/4 SW1/4 of section 6, township 22 N, range 5 E, and covered by ground water certificate G1-24404C with a priority date of 1983. The well is on the southern border of section 6 approximately 30 feet north and 500 feet west of the S1/4 corner of section and could almost be considered being within section 7. This well is within a mile from the Garrison Creek well and within one-half mile from the 208th Street wells. The well was constructed in June 1983 to a depth of 231 feet by 12 inches in diameter. Prior to Ecology issuing the water right certificate, Kent stated that the well was pumping 1200 gpm. The certificate of water right was then issued for 1200 gpm, 600 acre-feet per year with the annual quantity being supplemental to existing rights held by Kent.

Consultant Report

In 2001 Kent had the consulting firm of Hart Crowser conduct a technical review and analysis of five of their public supply wells located within sections 6 and 7 for possible designation as a well field. Hart Crowser submitted their report to the City of Kent in May 2001.

The report indicates that all five wells are on the eastern side of the Green River approximately two miles north of downtown Kent. The wells are identified as the Garrison Creek well, the 208th Street well, the 212th Street wells (1 & 2), and the O'Brien well. The five wells draw from a confined aquifer that originates beneath the Covington Upland to the east and extends beneath the Green River Valley to the west.

Figure 1 (included as part of this report) shows the locations of all five wells. Though the O'Brien well was originally to be part of this well field, Kent decided to withdraw the well from consideration.

The consultants used Department of Health criteria for assessing a proposed well field designation. The four requirements consist of the following: well depth must be within 20 percent of each other; individual wells must draw water from the same aquifer; individual wells must discharge through a common pipe; and all wells must be under the control of the same purveyor. Two of the criteria are essential in evaluating this change application.

Well depths must be within 20% of each other. The analysis showed that once the well depths were adjusted to topographic differences, the depths ranged from 231 feet to 276 feet. The difference in depths was below the 20 percent criteria.

Individual wells must draw water from the same aquifer. Inorganic chemical analysis was done from water samples of each well. The analysis showed a relatively narrow range of variation that would be consistent with waters drawn from different points within the same aquifer.

Other findings in the consultant's report are of value in evaluating this change application for additional points of withdrawal. With adjustment for topographic differences, the static water levels in the wells ranged from 103 to 115 feet above mean sea level. It was also noted in the report that water levels in the subject Kent wells showed similar responses to pumping and similar seasonal declines during the late summer periods.

Hydrogeological Evaluation of Change Application

Department of Ecology Water Resources hydrogeologist, Doug Wood, provided a technical evaluation for this request. A memorandum was prepared on February 24, 2003, and placed in the application file. Portions of his technical memorandum are presented below. The various figures referenced in the following text are in the full memorandum as contained in the change application file.

South King County Hydrogeological Setting

The Kent area and South King County occupy an area located between the Seattle Fault Zone, extending from near North Bend westward to the Bremerton area, and a parallel fault zone, extending between the Gig Harbor area of Kitsap Peninsula and the Tacoma/Puyallup area of Pierce County (See Figure 1 in full memorandum). These structural features create a basin in South King County where the interface between bedrock and younger unconsolidated materials is generally southwesterly dipping (Figure 1 in full memorandum).

Bedrock is overlain by unconsolidated Quaternary sediments deposited in glacial and interglacial streams and lakes during the period between 100,000 and 10,000 years before present. Kent area stratigraphy, as defined by Woodward et al. (1995), is summarized below in Table 1:

Unit	Time* and Climate	Geological Significance	Hydrogeological Significance
Qal	Holocene (Interglacial?) 10,000 ybp to present	Holocene alluvium Sand/Gravel Silt/Clay	Aquifer Aquitard
Qvr	Fraser Glaciation	Vashon Recessional Outwash	Aquifer
Qvt	23,000 to 10,000 ybp	Vashon Till	Aquitard
Qva		Vashon Advance Outwash	Aquifer
Q(A)f	Olympia Interglacial 60,000 to 23,000 ybp	Fine grained interglacial sediments	Aquitard
Q(A)c	Possession Glaciation 80,000 to 60,000 ybp	Glacial outwash deposits	Aquifer
Q(B)f	Whidbey Interglacial ~100,000 to 80,000 ybp	Fine grained interglacial sediments	Aquitard
Q(B)c	Double Bluffs Glaciation Pre ~100,000 ybp	Glacial outwash deposits	Aquifer
Q(C)u	Pre ~100,000 ybp	Undifferentiated, unconsolidated fine to coarse sediments	Unknown

* ybp = years before present

The major stream valleys within the Kent area are in part carved by glacial meltwater streams during the latter stages of the Vashon Stade of the Fraser Glaciation between ~15,000 and 10,000 years before present. Within these outwash channels, modern streams such as the Green River have created alluvial deposits consisting of river channel sands and fine grained over bank deposits related to flooding episodes. The Green River alluvial aquifer is recharged directly from stream flows, from springs draining the upper aquifer zones, and from upwelling of groundwater from deeper aquifer zones.

The Quaternary record in South King County is represented by unconsolidated glacial and interglacial sediments that document repeated advances and retreats of piedmont glaciers into the southern part of Puget Sound region during the past approximately 100,000 years.

Glacial sediments include sand and gravel deposited by glacial meltwater streams, silt deposited in ice marginal lakes, and compacted till, composed of poorly sorted clay to gravel sized sediments deposited mainly at the base of the glaciers. Sand and gravel dominated layers are more permeable than finer sediments, and therefore more likely to form productive aquifer layers.

Aquifers within South King County include, from oldest to youngest, Q(B)c, Q(A)c, Qva, and Qvr.

The Fraser Glaciation (Vashon outwash and till) produced the last and best preserved glacial sequence which lasted from approximately 23,000 to 10,000 years before present. It is composed of Qva, advance outwash, formed by meltwater streams as the glaciers moved south, Qvt, till which formed under the ice, and Qvr, recessional outwash that formed in streams as the glacier rapidly retreated northward.

At least two older glaciations are represented in the Puget Sound area - The Possession Glaciation, extending from 60,000 to 80,000 years before present, and the Double Bluffs Glaciation, which occurred prior to approximately 100,000 years before present. Outwash deposits related to the Possession Glaciation are identified in South King County as Q(A)c and those deposits during the Double Bluff Glaciation, identified as Q(B)c.

Groundwater within shallow aquifers zones (Qvr and Qva) is recharged primarily from surface percolation on the Covington and Des Moines uplands (Figure 1 in full memorandum). Groundwater within the basin's deeper aquifer zones, Q(A)c and Q(B)c, is recharged through percolation from the surface and from shallower aquifers throughout the basin.

Groundwater flow within the shallow aquifer zones generally follows local topography, while flow within the deeper aquifer zones is generally east to west and contributes to upward flows into the Green River alluvial plain and to Puget Sound (Figure 2 in full memorandum).

Local Hydrogeology

The wells that are the subject of proposed changes are located on the western margin of the Covington Upland Area of South King County where it borders the Green River Valley immediately east of Highway 167 (Figure 3 in full memorandum).

The Green River Valley occupies a glacial outwash channel that is currently occupied by the northerly flowing Green River. An alluvial hosted aquifer occupies the Green River Valley, drawing recharge from adjacent glacial deposits and from river drainage.

All three water rights (G1-23614C, G1-24190C, and G1-24404C) that are the subject of the application for change penetrate the same aquifer zone within an interconnected aquifer system that is hosted in unconsolidated glacial sediments deposited during the Quaternary Period. Analysis of cross sections included in Woodward, et al (1995) suggests that the aquifer providing water to these wells is either Q(B)c, outwash deposited during the Double Bluff Glaciation or possibly Q(C)u, an unclassified assemblage of pre-Double Bluff aged (older than 100,000 years) glacial and interglacial sediments.

The stratigraphy, as represented in the well logs, shows that all four wells are screened in interbedded sand, gravel, and silt/clay containing occasional peat and wood rich horizons - typical of a fluvial depositional environment. Based on available data it is not possible to determine with certainty whether these deposits resulted from glacial or inter-glacial depositional conditions.

The similarity of the host suggests that all four wells are completed in the same hydrostratigraphic unit. The wells therefore can be considered to be utilizing the same aquifer and would thus conform to the requirement of RCW 90.44.100(2)(a) that requires changes in groundwater rights to tap the same body of public groundwater.

Hart-Crowser, Inc. (Kenrick, 2001), in its analysis of the criteria for Washington Department of Health (DOH) wellfield designation, reports that the difference in well depth for the three wells included in these applications does not exceed the 20% allowed by DOH for well to included in a wellfield. Kenrick appears to have only considered the topmost screened interval for the 212th Street Wells.

Table 2: Well Field Data (After Kenrick, 2001[†] and Ecology Well Logs[‡])

Well Name	Well Elev.*	Depth to Base of Screen	Base of Screen Elev.*	Base of Screen Diff. from Avg.	Depth to Top of Screen	Top of Screen Elev.*	Top of Screen Diff. from Avg.	SWL Elev.*	SWL Diff. from Avg.
Garrison Ck.	240	432	-192	-21%	422	-182	7%	115	4%
208 th St.	44	221	-177	-27%	184	-140	-18%	110	0%
212 th St. #1	61	356	-295	21%	231	-170	0%	113	2%
212 th St. #2	56	367	-311	28%	247	-191	12%	103	-7%

*Feet Relative to Mean Sea Level

[†]Well Elevation and SWL data from Kenrick, 2001.

[‡]Screen Depths Data for 212th Wells from 1987 well logs; 208th from 1987; Garrison Ck from 1981.

Well logs for the three locations indicate that there are at least two water producing zones; an upper zone utilized at all three sites, and a lower zone utilized only in the 212th Street wells (1987). The elevation of the top of the screened interval for the four wells is within 20% of the average elevation for the top of the screens. If the lower water bearing zone is considered, the percent difference in elevation of the base of productive zone would exceed the 20% for DOH wellfield designation based on well depth (see Table 1 - base of screen difference from average). The comparison of screen elevations is good evidence of the wells tapping the same aquifer, but it is not a measure of well depth. Based on well logs, the Garrison Ck well is completed at 435 ft, the 208th St. well at 231 ft, 212th St. well #1 at 356 ft, and 212th St. well #2 at 367 ft.

Artesian pressures, where static water level is higher than surface elevation, are encountered at the 208th Street and 212th Street wells. Artesian conditions are indicative of a significant degree of separation by low permeability units between the source aquifer and the alluvial aquifer within the Green River Valley. They are also indicative of the existence of an upward flow of water between the deep aquifer zones and the Green River alluvial aquifer.

Correspondence Received

In a letter dated July 24, 2001, Kent requested Ecology to change their applications for temporary changes for a well field to applications for permanent changes to establish the wells as a well field. Ecology agreed to the request and used the temporary applications that had already been submitted to Ecology as applications for permanent changes.

Historic Water Use

Based on annual water use data submitted by Kent for the years 1993 through 2001, the 208th Street well and the 212th Street wells have been utilized at or above the certificate quantities of 600 acre-feet and 1400 acre-feet respectively. The maximum annual production from the Garrison Creek well during this same period was 202 acre-feet (approximately 600 acre-feet less than the allowed certificate amount).

Water System Plan

According to the 2002 final draft water system plan, Kent's highest annual production between 1994 and 1996 was 9,908 acre-feet. Their stated demand for 2002 was 9.33 million gallons per day (MGD) for an average annual quantity of 10,450 acre-feet.

The water system plan states that almost 75% of current water use is supplied by the Clark and Kent Springs sources. All other wells and sources are mostly used during high demand summer periods to supplement the main spring sources.

The water system plan indicates that the 212th Street wells (G1-24190C) and the 208th Street well (G1-24404C) have shown no significant deterioration since their construction and represent a dependable supply of 5 MGD. The indication is that the Garrison Creek well (this application) has lost some capacity since it was first constructed and is currently considered a dependable supply for .5 MGD.

Other Water Rights in the Vicinity

A search of office records for existing water right certificates and claims in the area of the proposed change indicates 20 water right certificates and 65 claims on file within sections 6 and 7 of township 22 N, range 5 E. Kent holds four of the water rights and one of the claims. Except for the rights held by Kent, the records identify that eight are surface water certificates and ten are surface water claims. The remaining records are for ground water uses, most of which are claims. The majority of the ground water claims indicate small quantities for general domestic use and some irrigation use included.

FINDINGS

In accordance with state law, the following considerations must be addressed during the process of evaluating this change request:

- Is water available at the additional points of withdrawal?
- Do the additional points of withdrawal tap the same source of water as the original right?
- Will the change cause impairment to other existing rights?
- Will the public interest be impaired?
- Will the change create an enlargement of the original right?
- Is there potential for different impacts on the water source?

Is Water Available at the Additional Points of Withdrawal

Prior to issuing the water right certificates for the 208th Street well and the 212th Street wells, Kent provided documentation that the wells were pumping at permitted capacities. The 2002 water system plan and additional information submitted by Kent further supports the fact that the wells are able to produce adequate quantities of water and have been pumping at designated quantities with no significant signs of deterioration.

Same Source of Water

Staff hydrogeologist, Doug Wood, agrees with the Hart Crowser report that the subject Kent wells are tapping the same aquifer.

Impairment to other existing rights

Adding additional points of withdrawal to certificate G1-23614C does not represent an increase in quantities as all additional wells have been established and used for at least twenty years. All additional wells plus this application well are supplemental to earlier rights held by Kent.

Doug Wood concludes in his technical evaluation memorandum the following:

The well field designation does not seek to change the total quantity of water utilized by the three water rights included in the proposal. The quantities at each point of withdrawal shall also remain unchanged. It is therefore concluded that the proposed change will have no impact in addition to those already authorized under certificates G1-23614C, G1-24190C, and G1-24404C.

Public Interest

No detriment to the public interest could be identified during the investigation of this application for change.

Enlargement of the Original Right

Allowing the three wells to be added to this certificate so Kent could operate them as a well field would not conflict with RCW 90.44.100 (2) (c). The combined total withdrawal from the original and additional wells would not enlarge the right conveyed by the original certificate for the following reasons.

Kent states that 75% of their water supply comes from the Clark/Kent Springs sources. The primary rights held by the Clark/Kent Springs sources amounts to 14,579 acre-feet. Based on Kent's 1994 annual water use of 9,908 acre-feet, it is calculated that approximately 7,431 acre-feet would be from the Clark/Kent Springs sources.

The maximum annual quantity that could be produced from the four well field wells is limited to 2800 acre-feet all of which is supplemental to earlier existing rights held by Kent. The additional wells included on this certificate would not allow any new water to be produced from the area and the total acre-feet that could be used from the well field is well within the perfected and beneficially used primary right sources.

Information provided by Kent, indicates that annual quantities granted by the certificates for the 208th and 212th Street wells were met and/or exceeded between the years of 1993 and 2001. During the same time period, the Garrison Creek well has not pumped its maximum annual quantity by approximately 600 acre-feet. However, the maximum annual quantities that could be produced by the well field wells have already been perfected and beneficially used by the primary rights on the Clark/Kent Springs sources.

Information presented in this report support a tentative determination that G1-23614C represents a valid right for the elements stated on the certificate document.

Potential for Different Impacts on the Water Source

The approval of the change request to add three wells to this certificate will not change the time of use or manner of use. This certificate and the certificates covering the other three wells are conditioned as being supplemental to existing rights held by Kent (mainly the Kent and Clark Springs sources). All wells were intended and continue to be used for the intended purpose of meeting peak demands to supplement the primary water supply source for Kent.

DISCUSSION

The legal description on certificate G1-23614C states "Area served by the City of Kent". An updated legal description, reflecting current program practices, needs to include reference to the place of use as described in the latest water system plan. At this time Kent has their 2002 water system plan in for review and approval with the Department of Health (DOH). Consequently any superseding document issued regarding this requested change should state, "Area served by the City of Kent as reflected in their approved 2002 water system plan".

Before Ecology would proceed to issue a superseding certificate for G1-23614C, the requested changes must be accomplished including approval of their water system plan. Allowing one year from approval of the change would allow sufficient time for Kent to accomplish the change and notify Ecology.

CONCLUSIONS

In accordance with chapters 90.03 and 90.44 RCW, it is concluded that G1-23614C is in good standing and is eligible for the change as requested. The change as recommended will not enlarge the original intent of the certificate and the water use will be beneficial. Approval of this change request will not cause impairment of existing rights or be detrimental to the public interest.

RECOMMENDATION

It is recommended that the request to add additional wells to ground water certificate G1-23614C be approved, subject to the conditions and provisions listed below.

The source of water for this certificate will be four wells described as follows:

The Garrison Creek well (G1-23614C), 940 feet south and 800 feet west from the E1/4 corner of section 7, township 22N, range 5 E, being within the NE1/4 SE1/4.

The 212th Street well #1 (G1-24190C), 1200 feet north and 300 feet west of center of section 7, township 22 N, range 5 E, being within the SE1/4 NW1/4.

The 212th Street well #2 (G1-24190C), 1100 feet north and 300 feet west of center of section 7, township 22 N, range 5 E, being within the SE1/4 NW1/4.

The 208th Street well (G1-24404C), 30 feet north and 500 feet west of the S1/4 corner of section 6, township 22 N, range 5 E, being within the SE1/4 SW1/4.

Use of water under this certificate will remain at a maximum of 500 gallons per minute, 800 acre-feet per year supplemental to existing rights held by the City of Kent. The purpose of use will remain municipal supply.

The legal description for place of use is "Area served by the City of Kent as reflected in their approved 2002 water system plan." Prior to issuance of a superseding certificate, Kent shall verify that their 2002 water system plan is approved.

One year from approval of the change is allowed to accomplish the change.

If it can be shown that the requested change has a detrimental effect on existing rights, it shall be the responsibility of the operator to mitigate for this impact and/or alter or cease withdrawal of water.

An access port as described in Ground Water Bulletin No. 1 is required. An air line gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each withdrawal 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 weekly. The maximum monthly instantaneous rate of withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly 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, Certificate No., source name, volume including units, Department of Health WFI water system number and source number(s), and well tag number. 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.

REPORT BY James Jung DATE 3/25/03

AFFIDAVIT OF PUBLICATION

Barbara Alther, first duly sworn on oath states that he/she is the Legal Clerk of the

SOUTH COUNTY JOURNAL

600 S. Washington Avenue, Kent, Washington 98032

a daily newspaper published seven (7) times a week. Said newspaper is a legal newspaper of general publication and is now and has been for more than six months prior to the date of publication, referred to, printed and published in the English language continually as a daily newspaper in Kent, King County, Washington. The South County Journal has been approved as a legal newspaper by order of the Superior Court of the State of Washington for King County.

The notice in the exact form attached, was published in the South County Journal (and not in supplemental form) which was regularly distributed to the subscribers during the below stated period. The annexed notice, a

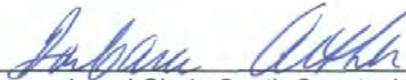
Change to Groundwater Certificate G1-23614C (PO 37222)

as published on: 11/10, 11/17

The full amount of the fee charged for said foregoing publication is the sum of \$166.50, charged to Acct. No. 8031430.

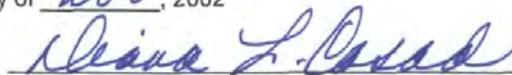
The cost above includes a \$6.00 fee for the printing of the affidavits.

Legal Number 848561



Legal Clerk, South County Journal

Subscribed and sworn before me on this 17th day of Nov, 2002



Notary Public of the State of Washington
residing in Renton
King County, Washington



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION
TO CHANGE AN EXISTING
WATER RIGHT

TAKE NOTICE:

That City of Kent Public Works Department of Kent, Washington on July 2, 2001, has filed an application of change to Ground Water Certificate G1-23614C. Certificated use is for 500 (gpm) 800 acre-feet per year for Municipal Supply, as granted under Ground Water Right G1-23614C, priority date June 4, 1980. That the original point of withdrawal is located

in NE1/4 SE1/4, Section 7, Township 22N, Range 5E, W.M. in King County. The place of use is located within the area served by the City of Kent.

The request here is to add points of withdrawal covered by Ground Water Certificates G1-24190C, G1-24404C, located in the SE1/4 SW1/4, Section 6, Township 22N, Range 5E, W.M.; the SE1/4 NW1/4, Section 7, Township 22N, Range 5E, W.M. to be managed as a well field.

No increase will be made to the instantaneous diversion/withdrawal rate or annual quantity.

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 (\$2.00 check or money order) recording fee and filed with the Department of Ecology at the address shown below, within thirty (30) days from November 10, 2002.

Department of Ecology
Northwest Regional Office
3190 - 160th SE
Bellevue, WA 98008

Published in the South County Journal November 10 and 17, 2002.
848561

affidavit OK
DLB.

EMERGENCY DROUGHT ACTION



STATE OF WASHINGTON APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF \$10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)

- Change purpose(s) of use
- Add purpose(s) of use
- Change point(s) of diversion/withdrawal
- Add point(s) of diversion/withdrawal
- Change/transfer place of use
- Other (i.e. consolidation, intertie, trust water)

Explain (Well Field) Common Point of Withdrawal

FOR OFFICE USE ONLY	
CHANGE No. <u>CG1-23614C</u>	WRIA <u>9</u>
DATE ACCEPTED <u>7 / 2 / 01</u>	BY <u>DAB.</u>
FEE \$ <u>10</u>	REC'D <u>07/02/01</u>
CHECK No. <u>6292</u>	
SEPA: <input type="checkbox"/> Exempt	<input type="checkbox"/> Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)

1. Applicant Information:

APPLICANT/BUSINESS NAME <u>City of Kent</u>	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>
ADDRESS <u>220 4th Avenue South</u>		
CITY <u>Kent</u>	STATE <u>WA</u>	ZIP CODE <u>98032-5895</u>

CONTACT NAME (IF DIFFERENT FROM ABOVE) <u>Brad Lake</u>	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>
ADDRESS <u>220 4th Avenue South</u>		
CITY <u>Kent</u>	STATE <u>WA</u>	ZIP CODE <u>98032-5895</u>

FOR OFFICE USE ONLY			
APP. NO. _____	PERMIT NO. _____	CERT. NO. <u>CG1-23614</u>	CERT. OF CHANGE NO. <u>CG1-23614C</u>

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER G1-23614C	RECORDED NAME(S) City of Kent
DO YOU OWN THE RIGHT TO BE CHANGED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
IF NO, PROVIDE OWNER(S) NAME:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
Garrison Creek Well	S06	NE	SE	07	22N	5E	8802400066	

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
(Wellfield) See attachment								

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?
 EXISTING: YES NO PROPOSED: YES NO – IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / Garrison Creek Well	500 GPM	800 AF/YR	Annually

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / See Attachments	Consolidate for a	quantities well field	July through December 2001
Operate as a well field.	4,643 GPM	2,845 AF/YR	July through December 2001

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Area served by City of Kent							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		
DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME: Individual businesses and residences within the City of Kent water service area.							

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? <input type="checkbox"/> YES <input type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME:							

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

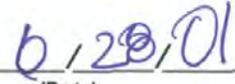
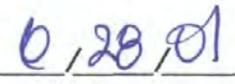
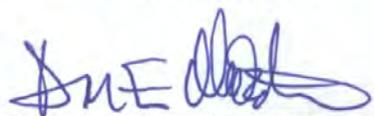
Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

<p>The City of Kent is requesting temporary approval to classify five (5) different wells (one primary well/4 supplemental wells) in the area as a well field, as they have been shown to be drawing water from a common aquifer. The primary purpose is to share water rights granted to individual wells with others withdrawing from the same aquifer. This will greatly improve the reliability and flexibility of all the water sources, as well as optimizing the amount of yield available during seasonal peaking periods. The benefit to the city of Kent and the citizens therein would be significant, providing more reliable sources of supply during drought conditions for municipal use as well as adequate water for fire protection requirements during higher demand periods. This request would allow the withdrawal of water to be distributed more evenly from the aquifer, as well as allowing Kent the flexibility to shift water rights away from less productive or failing wells to wells that are more productive under current drought conditions.</p>
<p>IF FOR SEASONAL OR TEMPORARY, START DATE <u>7 / 1 / 2001</u> END DATE <u>12 / 31 / 2001</u></p>

7. Signatures:

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 am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

 _____ (Applicant)	 _____ (Date)
 _____ (Water Right Holder)	 _____ (Date)
 _____ (Land Owner(s) of Existing Place of Use)	 _____ (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

- APPLICATION FEE NOT ENCLOSED
- MAP NOT INCLUDED or INCOMPLETE
- ADDITIONAL SIGNATURES REQUIRED
- SECTION _____ IS INCOMPLETE
- OTHER/EXPLANATION: _____

STAFF: _____ **DATE:** ____/____/____

ATTACHMENT FOR APPLICATION FOR CHANGE

Point(s) of Diversion/Withdrawal - Existing Proposed:

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #	CERTIFICATE
212 th Street Well #1	S10	SE	NW	07	22N	5E	0722059030	AFJ239	G1-24190C
212 th Street Well #2	S10	SE	NW	07	22N	5E	0722059030	AFJ240	G1-24190C
208 th Street Well	S11	SE	SW	06	22N	5E	0622059159	AFJ241	G1-24404C
Garrison Creek Well	S06	NE	SE	07	22N	5E	8802400066		G1-23614C
O'Brien Well	S12	SE	SW	07	22N	5E	7757800270	AEJ475	767-A

DO YOU OWN THE ABOVE POINT(S) OF DIVERSION/WITHDRAWAL? YES NO - IF NO, PROVIDE OWNER(S) NAME:

Purpose(s) of Use - Existing Proposed:

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply	4,643 GPM	2,845 AF/YR	Throughout the year

Place of Use - Existing Proposed:

LEGAL DESCRIPTION OF LANDS							
City of Kent water service area							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		

DO YOU OWN ALL THE LANDS IN ABOVE PLACE OF USE? YES NO - IF NO, PROVIDE OWNER(S) NAME:

Individual businesses and residences within the City of Kent water service area.

IMPORTANT!

Submit your application to Ecology at the regional office for the area of proposed or existing water use or at a Conservancy Board with jurisdiction. Below is a map of the State of Washington, with outlines of the four Ecology regional offices. If you have questions about your application or whether a County Conservancy Board with jurisdiction exists, contact the Water Resources program at the regional office in which your project is located.



Department of Ecology
Central Regional Office
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902
Telephone: (509) 575-2490

Department of Ecology
Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
Telephone: (509) 456-2926

Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Telephone: (425) 649-7000

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Telephone: (360) 407-6300

Persons of disability needing assistance in the application process or those needing this application in an alternate format, may call (360) 407-6607 (voice) or (360) 407-6006 (TDD).

Ecology is an Equal Opportunity and Affirmative Action employer...

PROGRESS SHEET - APPLICATION FOR CHANGE

Of Water Right Certificate # CG1-23614C (Garrison Creek Well)

NAME: City of Kent
Public Works Department
220 - 4th Avenue South
Kent, WA 98032-5895

ATTN: Brad Lake, Engineering Department

PHONE: 253-856-5610
FAX 253-856-6600

Appurtenant to Water Right Claim No. CG1-23614C

Purpose of Application: Emergency Drought (Garrison Creek Well) - request point of withdrawal temporarily transferred to its Armstrong Springs Well/groundwater right (G1-24073C).

Application received on 7/2/01 Fee Paid \$10.00 7/2/01

Returned for completion or correction _____

Returned _____

PUBLICATION: OK'd by _____ Date _____ Notice Sent 10/10/02

Protests _____ by _____

_____ by _____

_____ by _____

Affidavit received and checked _____ Expires _____

EXAMINATION: Made POE 3/03 by 3/25/03 / Reviewed by Buck Smith 3/7/03

Sup's CERTIFICATE: OK'd for issue by J. King date 9-19-2013

Statement of fee mailed _____ Amount _____

Fee received _____

Sup's Certificate of Change Issued 9-19-2013 No. CG1-23614C

WR DOC ID: 2285873

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 1948, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE June 4, 1980	APPLICATION NUMBER G1-23614	PERMIT NUMBER G1-23614P	CERTIFICATE NUMBER G1-23614C
--------------------------------------	---------------------------------------	-----------------------------------	--

NAME
CITY OF KENT

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)
220 South 4th Kent Washington 98031

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
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 500	MAXIMUM ACRE-FEET PER YEAR 800.0 - Supplemental to existing rights held by the City of Kent
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
1700 feet north and 800 feet west of SE corner of Sec. 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NELSEL	SECTION 7	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.T.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF FLAT OR ADDITION)
LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED		

Area served by the City of Kent.

[Faint, illegible text, likely bleed-through from the reverse side of the document]

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 509-64-020 through WAC 509-64-040.

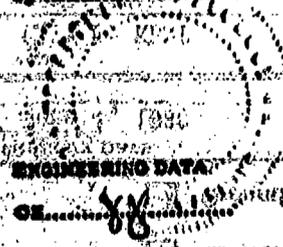
[Faint, mostly illegible text, likely bleed-through from the reverse side of the page.]

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 **Redmond** Washington, this **15th** day

of **May** 19 **85**



Department of Ecology

ENGINEERING DATA

by *Robert K. McCormick*
ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

[Faint text, likely bleed-through from the reverse side.]

[Faint text, likely bleed-through from the reverse side.]

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 June 4, 1980	APPLICATION NUMBER G1-23614	PERMIT NUMBER G1-23614P	CERTIFICATE NUMBER
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NAME CITY OF KENT			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

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 WATER TO BE APPROPRIATED

SOURCE Well	TRIBUTARY OF (IF SURFACE WATERS)		
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MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 500	MAXIMUM ACRE-FEET PER YEAR 800.0 - Supplemental to existing rights held by the City of Kent
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 1700 feet north and 800 feet west of SE corner of Sec. 7
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NELSEL	SECTION 7	TOWNSHIP N. 22	RANGE (E. OR W.) W.M. 5 E	W.R.T.A. 9	COUNTY King
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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 Kent.

[Faint, illegible text, likely bleed-through from the reverse side of the page]

PERMIT

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: March 15, 1983	WATER PUT TO FULL USE BY THIS DATE: March 15, 1984
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PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040.

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 Redmond Washington, this 15th day of March 19 82

Department of Ecology

Robert K. McCormick

ROBERT K. MCCORMICK, Regional Manager

ENGINEERING DATA

OK *jj*

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 203, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE June 4, 1980	APPLICATION NUMBER GI-23614	PERMIT NUMBER	CERTIFICATE NUMBER
-------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 500	MAXIMUM ACRE-FEET PER YEAR 800.0 - Supplemental to existing rights held by the City of Kent
-------------------------------	-----------------------------------	--

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
1700 feet north and 800 feet west of SE corner of Sec. 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NELSEL	SECTION 7	TOWNSHIP N. 22	RANGE (E. OR W.) W.M. 5 E	W.R.T.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent.

DESCRIPTION OF PROPOSED WORKS

Well, 12 inches diameter by 435 feet deep; submersible pump designed for discharge of 500 gpm from pumping level of 370 feet below ground level.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	1 yr from permit issuance	2 yrs from permit issuance

REPORT RECOMMENDS

Background:

This application to withdraw 1400 gallons per minute from a well near Kent to supplement the City's municipal supply was received on June 4, 1980 from the City of Kent.

Public notice of this application was made in the Daily News Journal on June 30 and July 7, 1980 and no protests or objections were filed.

Investigations:

This is a 435 foot deep well located about one mile north of the City of Kent on the east valley wall. The well is 12 inches in diameter and screened at the bottom 10 feet in water-bearing sand and gravel. The well is approximately 200 feet north of Garrison Creek and so is named the Garrison Creek well. The Garrison Creek well was completed in February 1981 and was tested on February 9, 1981 at 400 gpm with 111 feet of drawdown after 24 hours. These data indicate that the well is capable of a maximum pumping rate of 500 gpm.

There is one other well on record in Section 7 which is probably tapping the aquifer of the Garrison Creek well. This is the 380 foot well owned by the Kent Nursery. The nursery well is pumped at a rate of only 20 gpm. The low withdrawal rate of the nursery well means that its pumping level will not be lowered to where the well will be adversely affected by interference from the Garrison Creek well. Other existing rights are not expected to be adversely affected by this appropriation.

Water rights presently held by the City of Kent are as follows:

<u>File No.</u>	<u>Source</u>	<u>Rate</u>	<u>Quantity (acre-feet/yr)</u>
1116-A	Well	200 gpm	320
3107-A	Trench	2200 gpm	50
7232	Rock Creek	5 cfs	
7660-A	3 Wells	5400 gpm	8710
GI-22956C	2 Wells	3690 gpm	5904
GI-23285P	Well	2100 gpm	3360
GI-23713P	Well	7 gpm	11
(from Arvid Grenstad)			18,355.0

Table 1. Water right files held by the City of Kent in permit or certificate status.

The estimated population within Kent's service area twenty years from today is about 90,000. Assuming approximately 3.5 persons per household and the local consumption average of 0.4 acre-foot per service per year, annual consumption within the city's service area will be about 10,300 acre-feet per year. As is shown in Table 1, the city's present water rights of over 18,000 acre-feet per year far exceed this projected demand. For this reason, the annual quantity associated with this appropriation will be issued supplemental to existing rights held by the City of Kent. The annual quantity associated with pumping 500 gpm continuously is 800.0 acre-feet per year.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

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 209, Laws of Washington for 1948, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE June 4, 1980	APPLICATION NUMBER G1-23614	PERMIT NUMBER	CERTIFICATE NUMBER
-------------------------------	--------------------------------	---------------	--------------------

NAME City of Kent			
ADDRESS (STREET) 220 S. 4th	(CITY) Kent,	(STATE) Washington	(ZIP CODE) 98031

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1400 500	MAXIMUM ACRE-FOOT PER YEAR 800.0 - supplemental
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QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously

to existing rights held by the City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
~~Well will be centrally located within property~~

1700 feet north and 800 feet west of
SE corner of Section 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) E 1/2 SW 1/4 NE 1/4 SE 1/4	SECTION 7	TOWNSHIP N. 22	RANGE, (S. OR W.) W.M. 5B	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

near Hwy 167

Garrison Creek
tested @ 500
design stage

Kelly Anderson
Geo. But

Area served by the City
of Kent.

DESCRIPTION OF PROPOSED WORKS

well, 12 inches diameter x 435 feet deep, submersible pump, designed for discharge of 500 gpm from pumping level of 370 feet below ground level.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: STARTED	COMPLETE PROJECT BY THIS DATE: 1 9/8	WATER PUT TO FULL USE BY THIS DATE: 2 4/5
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PROVISIONS

Recommendation:

I recommend that this application to withdraw 1400 gpm from a well near Kent be reduced to 500 gpm according to maximum well capability and permit issue with an annual quantity of 800.0 acre-feet per year supplemental to existing rights held by the City of Kent.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

REPORT BY:

David P. Gula

DATE:

12/7/81



APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

GROUND WATER

Application as required by SEPA and find that "action" is categorically exempt.

6/4/80
JH

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION (GRAY BOXES FOR OFFICE USE ONLY)

SIGNATURE

APPLICATION NO. G123614	W.P.A. 9	COUNTY King	PRIORITY DATE 6/4/80	TIME	APPLICANT
-----------------------------------	--------------------	-----------------------	--------------------------------	------	-----------

APPLICANT'S NAME - PLEASE PRINT
City of Kent - Washington

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)
220 S. 4th Kent Washington 98031

DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION
None

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.)
TRIBUTARY	SIZE AND DEPTH
	Well 400 feet, 12 inch diameter

2 USE
USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Municipal

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CUBIC FEET PER SECOND OR GALLONS PER MINUTE ACRE FEET PER YEAR
1400gpm 2252

TIMES DURING YEAR WATER WILL BE REQUIRED
All times

IF IRRIGATION, NUMBER OF ACRES
None

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
90,000

DATE PROJECT WAS OR WILL BE STARTED
August, 1980

DATE PROJECT WAS OR WILL BE COMPLETED
June, 1991

3 LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWNSHIP	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.

Well will be centrally located within property.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
E 1/2 of SW 1/4 of NE 1/4 of SE 1/4 of	7	22	R 5 E W.M.	King

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
Land is owned by Applicant - the City of Kent.

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.

The east half of the SW 1/4 of the NE 1/4 of the SE 1/4 of Section 7, Township 22 North, Range 5 East, W.M., in King County, Washington; except that portion thereof conveyed to King County for road by deed recorded under Auditor's File No. 5106051; being known as Tract 6 UNEEDAN, Orchard Tracts according to the unrecorded plat thereof; except said portion thereof conveyed to King County for road.

JUN 4 1980

DEPT. OF ECOLOGY

APPLICATION

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, 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

DESCRIPTION OF SYSTEM PROPOSED OR INSTALLED

(FOR EXAMPLE: SIZE OF PUMP, CAPACITY OF PUMP, PUMP MOTOR HORSE POWER, PIPE DIAMETER, NUMBER OF SPRINKLERS, ETC.)

1400 gpm, 12" deep well to be placed inside a 16" casing, 250 HP, 12" riser column

REMARKS

7

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

Don E. Wulfsberg

APPLICANT'S SIGNATURE

City of Kent
LEGAL LANDOWNER'S NAME
(PLEASE PRINT)

Don E. Wulfsberg

LEGAL LANDOWNER'S SIGNATURE

220 S 4th Ave
Kent, WA 98031

LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROGRESS SHEET

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

SURFACE WATER GROUND WATER

NAME City of Kent		TELEPHONE NO.	
ADDRESS 220 South 4th	(CITY) Kent,	(STATE) Washington	(ZIP CODE) 98031
ASSIGNED TO	TELEPHONE NO.	DATE ASSIGNED	
ADDRESS	(CITY)	(STATE)	(ZIP CODE)
APPLICATION NO. G123614	PERMIT NO. G123614 P	CERTIFICATION NO. G123614 C	
DATE AMENDED	DATE CANCELLED	W.R.T.A.	
APPLICATION			
DATE APPLICATION RECEIVED June 4, 1980	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED June 4, 1980	
STATEMENT OF ADDITIONAL EXAMINATION FEE \$	DATE SENT	DATE RECEIVED	
DATE RETURNED FOR COMPLETION OR CORRECTION	DATE RECEIVED		
TEMPORARY PERMIT			
APPROVED BY	DATE APPROVED		DATE ISSUED
PUBLICATION			
APPROVED BY	DATE APPROVED	DATE NOTICE SENT 6-20-80	
PROTESTED BY AND DATE			
DATE AFFIDAVIT RECEIVED 9-5-80	CHECKED BY JH	TIME EXPIRED 9-7	DATE AMENDED NOTICE SENT
DATE AFFIDAVIT RECEIVED		TIME EXPIRED	
DEPARTMENT OF GAME AND FISHERIES REPORT			
APPROVED	PROVISO	PROTEST	
EXAMINATION			
DATE EXAMINATION MADE 7-15-81	MADE BY DPG	DATE REPORT OF EXAM. WRITTEN 9-21-81	WRITTEN BY DPG
DATE PERMIT FEE REQUESTED 12-17-81	AMOUNT DUE 20.00	DATE RECEIVED 3-18-82	CHECKED BY DPG
PERMIT			
PERMIT APPROVED BY JH	DATE APPROVED 3-9-82	PERMIT NO. G123614 P	DATE ISSUED 3-16-82
BEGINNING OF CONSTRUCTION			
DATE NOTICE SENT	DATE FILED	EXTENSION FEE	
EXTENDED TO	EXTENDED TO		
WELL DRILLER'S AND/OR CONSTRUCTION REPORT			
DATE SENT	DATE FILED 9/17/81 - DPG -		
COMPLETION OF CONSTRUCTION			
DATE NOTICE SENT 3-16-82	DATE FILED 4/5/83	EXTENSION FEE	
EXTENDED TO	EXTENDED TO		
PROOF OF APPROPRIATION			
DATE SENT	DATE FILED 5/2	EXTENSION FEE	EXTENDED TO
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 5/2	DATE APPROVED FOR CERTIFICATE 5/3/83
APPROVED BY JH			
CERTIFICATION			
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER G123614 C	DATE ISSUED 5-13-83	

ECY 040-1-80

PROGRESS

City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895



STATE OF WASHINGTON
 SUPERSEDING CERTIFICATE OF WATER RIGHT

Document Title: Certificate of Water Right

Agency: Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008

Applicant: City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895

Reference Number: NA

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
October 6, 1982	G1-24190	G1-24190P	G1-24190C

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)	
4 wells		
MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	2700	*1400

QUANTITY/TYPE OF USE/PERIOD OF USE

Municipal supply – continuously

*Annual quantity from this certificate is supplemental to existing rights held by City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

- 1) 212th Street well #1 (G1-24190C) – 1200 feet north and 300 feet west of center of Section 7
- 2) 212th Street well #2 (G1-24190C) - 1100 feet north and 300 feet west of center of Section 7
- 3) 208th Street well (G1-24404C) – 30 feet north and 500 feet west of S¹/₄ corner of Section 6
- 4) Garrison Creek well (G1-23614C) – 940 feet south and 800 feet west of E¹/₄ corner of Section 7

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
SE ¹ / ₄ NW ¹ / ₄ and NE ¹ / ₄ SE ¹ / ₄	7	22N	5E	9	King
SE ¹ / ₄ SW ¹ / ₄	6				

PARCEL # 0722059243

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

PARCEL #

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their most recently approved water system plan.

PROVISIONS

Use of water under this certificate will remain at a maximum of 2700 gallons per minute, 1400 acre-feet per year supplemental to existing rights held by the City of Kent. The purpose of use will remain municipal supply.

If it can be shown that the requested change has a detrimental effect on existing rights, it shall be the responsibility of the operator to mitigate for this impact and/or alter or cease withdrawal of water.

An access port as described in Ground Water Bulletin No. 1 is required. An air line gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each withdrawal 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 weekly. The maximum monthly instantaneous rate of withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly 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, Certificate No., source name, volume including units, Department of Health WFI water system number and source number(s), and well tag number. 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 contained in the 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.

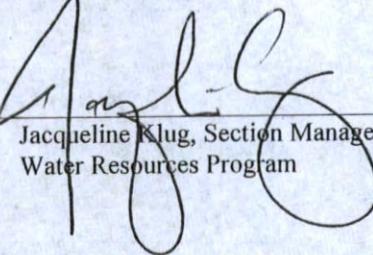
The right to use of the water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in RCW 90.03.380, 90.03.390, and 90.44.020.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Bellevue, Washington,
this 19 day of September, 2013.



Maia Bellon, Director
Department of Ecology

By 
Jacqueline Klug, Section Manager
Water Resources Program



Water Resources Program PROOF OF APPROPRIATION OF WATER

RECEIVED

JUN 13 2013

Reviewed by:
DEPT OF ECOLOGY
NWRO - WR

PERMIT NUMBER GI-24190C	CHANGE APPROVAL NUMBER GI-24190C
NAME OF PERMITTEE City of Kent	CONTACT NAME (IF DIFFERENT) Kevin Swinford

MAILING ADDRESS (STREET) 220 4th Ave So	CITY Kent	STATE WA	ZIP CODE 98032-5895
PHONE NUMBER (253) 856-5610	FAX NUMBER (253) 856-6500		

SOURCE(S) OF WATER 212th Street Wells 1, 2, & 3	LOCATION OF SOURCE(S)					
	NO.	¼ SE	¼ NW	SECTION 7	TOWNSHIP N. 22	RANGE, (E/W)M 5E

LIST ALL PURPOSES WATER IS USED FOR:
Municipal Purposes

DATE WATER WAS COMPLETELY APPLIED TO BENEFICIAL USE Not Applicable (NA)	TIME OF YEAR WATER IS USED: <input checked="" type="checkbox"/> Continuous/Year round <input type="checkbox"/> Seasonal	IF SEASONALLY, LIST THE START AND END DATE Start: _____ End: _____
--	---	---

DESCRIBE HOW CONSTRUCTION AND DEVELOPMENT RELATED PROVISIONS (AS REQUIRED BY PERMIT) HAVE BEEN OR ARE TO BE MET (USE ADDITIONAL PAPER IF NECESSARY)

212th Wells are a small combined well field consisting of (3) municipal wells. Filtration/Treatment facility is completed and on-line with capacity to beneficially treat full authorized instantaneous and annual quantities.

DESCRIPTION OF SPECIFIC AREA ON WHICH WATER IS BENEFICIALLY USED(USE ADDITIONAL PAPER IF NECESSARY)

Area Served by City of Kent as reflected in their approved 2011 water system plan.
System ID 381501

NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE, (E/W)M
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PHYSICAL WITHDRAWAL OR DIVERSION INFORMATION

Point of Diversion/Withdrawal Tax Parcel #:0722059243

For Pump Designed Water System Information:

TYPE OF PUMP: <input type="checkbox"/> Submersible <input type="checkbox"/> Turbine <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other _____			
MAKE See attachment for all	MODEL #	SERIAL #	HORSEPOWER
MOTOR	BHP	SPEED	RPM
<input type="checkbox"/> Water lubricated <input type="checkbox"/> Oil Lubricated			
BOOSTER PUMP <input type="checkbox"/> Yes <input type="checkbox"/> No	BREAK HORSEPOWER	PRESSURE	OPEN DISCHARGE <input type="checkbox"/> Yes <input type="checkbox"/> No
PUMP DISCHARGE HEAD PRESSURE psi	DISCHARGE PIPE DIAMETER		

For Ground Water Withdrawal (if more than one, please include attachment)

Ecology Unique Well Identification Number(s) See attachment for all [Include a copy of the well log(s)]

PUMP SETTING (DEPTH)	STATIC WATER LEVEL feet below land surface	DYNAMIC (PUMPING) LEVEL feet below land surface
ACCESS PORT INSTALLED? <input checked="" type="checkbox"/> Yes	AIRLINE INSTALLED? <input type="checkbox"/> Yes	AIRLINE LENGTH NA Ft.

For Non-Pump Designed Water Systems

METHOD OF WATER DIVERSION	DESCRIPTION OF WORKS
---------------------------	----------------------

NA

SCREEN MESH SIZE
NA

METHOD OF CONTROL
NA

USE OF WATER FOR:

1. Irrigation (Please include map of all irrigated lands):

TYPE OF SYSTEM NA		NUMBER OF SPRINKLERS OR EMMITERS NA	SPRINKLER/EMMITER MAKE NA	MODEL & RATED DISCHARGE NA
SIZE NOZZLE/EMMITER OPENINGS NA	AVERAGE PRESSURE AT SPRINKLER/EMMITER HEADS NA	NUMBER OF ACRES DEVELOPED NA	TYPE OF CROP(S) NA	

2. Municipal or Domestic Supply

NUMBER OF DOMESTIC UNITS CURRENTLY SERVED: 38,810 ERUs	NUMBER OF DOMESTIC UNITS TO BE SERVED 38,810 ERUs	POPULATION CURRENTLY SERVED 66,500
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ALSO, provide the following information, if applicable:

- Department of Health public water system identification number.
- 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 NA
--

If a waste discharge permit is required for the facility, include a reference to the permit number: NA

4. Other Use of Water (describe): NA

WATER USE AND *MEASUREMENT

IS A FLOW METER OR MEASURING DEVICE INSTALLED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	LOCATION OF METER(S) OR MEASURING DEVICE(S) Wellfield production measured at 212th Treatment Plant Treated Water effluent meter		
MAKE Badger Magnetoflow	SERIAL NUMBER 15627261	INSTALLATION DATE 10/3/2000	INSTALLED BY: City of Kent
METER READING 0	DATE 2004		

*Include copy of meter specifications

Report 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 NA	ACRE FEET PER YEAR NA	GALLONS PER MINUTE NA	TOTAL GALLONS PER YEAR NA
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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 of paper.

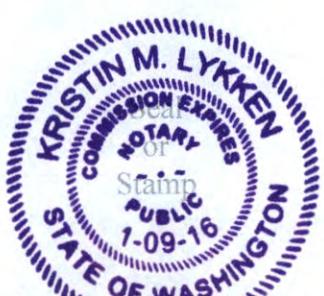
I, Drew R Swinford, and Bradley D. Lake do certify that I/we have
(Please Print) (Please Print)

completed appropriation of water under Water Right Permit or approved water right change number, GI-24190C. This notice and attached documents are true and accurate statements and describe and support my/our assertion that I/we have satisfied the terms of the permit/change in compliance with the law.

[Signature] Permittee(s) Signature [Signature] Permittee(s) Signature 6/11/2013 Date

State of: Washington
County of: King } §

Signed and sworn to (or affirmed) before me on this 11 day of June 2013.



[Signature]
(Signature)
Kristin M Lykken
(Printed Name)
Notary Public

(Title)

My appointment expires: 1-09-16

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**REPORT OF EXAMINATION FOR CHANGE OF CERTIFICATE
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 October 6, 1982	APPLICATION NUMBER G1-24190	PERMIT NUMBER G1-24190 P	CERTIFICATE NUMBER G1-24190 C
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NAME City of Kent (Department of Public Works)			
ADDRESS (STREET) 220 4 th Avenue South	(CITY) Kent	(STATE) WA	(ZIP CODE) 98032-5895

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Four wells
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 2700	MAXIMUM ACRE FEET PER YEAR * 1400
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QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply – continuously

*Annual quantity from this certificate is supplemental to existing rights held by City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

- APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL
- 1) 212th Street well #1 (G1024190C) 1200 ft. north and 300 ft. west of center of Section 7
 - 2) 212th Street well #2 (G1-24190C) 1100 ft. north and 300 ft. west of center of Section 7
 - 3) 208th Street well (G1-24404C) 30 ft. north and 500 ft. west of the S¹/₄ corner of Section 6
 - 4) Garrison Creek well (G1-23614C) 940 ft. south and 800 ft. west from E¹/₄ corner of Section 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE ¹ / ₄ NW ¹ / ₄ and NE ¹ / ₄ SE ¹ / ₄ SE ¹ / ₄ SW ¹ / ₄	SECTION 7 6	TOWNSHIP N. 22N	RANGE, (E. OR W.) W.M. .5E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their approved 2002 water system plan.

DESCRIPTION OF PROPOSED WORKS

Wells: Garrison Creek well 435' x 12"; 212th Street well 367' x 16"; 208th Street well 231' x 12"
 Kent public water supply distribution system

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: Complete	WATER PUT TO FULL USE BY THIS DATE: 1 year from change approval <i>3/25/2013</i>
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REPORT

BACKGROUND INFORMATION

The city of Kent is located in south King County and as of 1997 served water to a population of 49,259 through approximately 11,234 connections. Kent's 2002 water system plan indicates that Kent holds 22 water right certificates and a water right claim. Under the emergency drought legislation in 2001, Kent submitted applications for temporary changes to several of their existing water right certificates. Soon after submittal of the temporary change applications, Kent requested Ecology to treat four of the applications as permanent applications for change. For better management of the water system, Kent requests that four wells located within sections 6 and 7 of township 22N, range 5 E, and covered by ground water certificates G1-24404C, G1-24190C (this application), and G1-23614C be operated as a well field. Each certificate would include the points of withdrawal of the other two ground water certificates.

This application was inadvertently processed for removal from the active files. As the applicant had not requested the application be dropped and no justification was found in the file to substantiate actions for removal, the application was reactivated in November 2002.

The following map shows city of Kent's wells for the proposed well field.

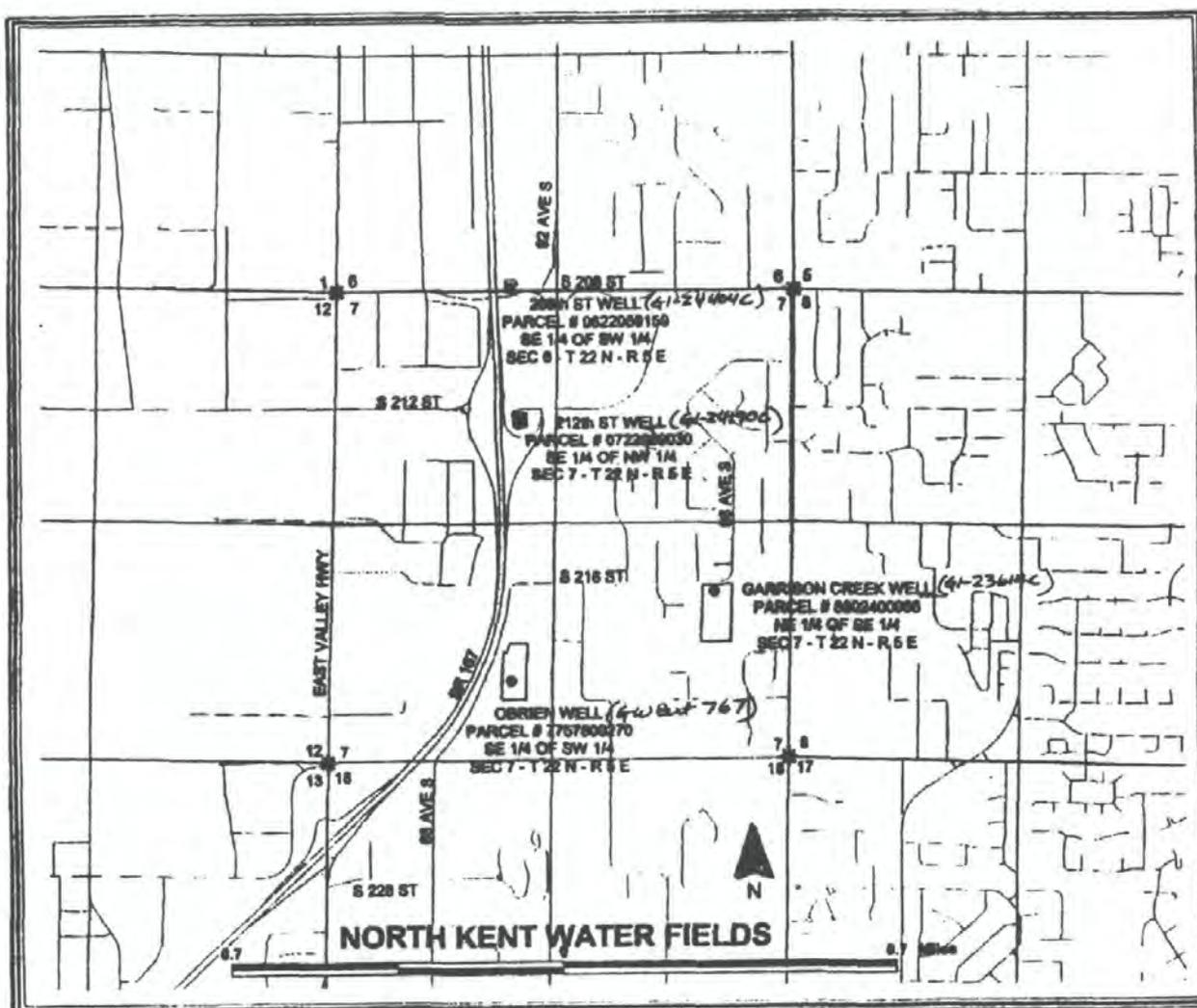


Figure 1: City of Kent's proposed well field.

Attributes of the Original Certificate G1-24190C

Certificate issued to:	City of Kent
Priority Date:	October 6, 1982
Source:	Two Wells (known as the 212 th Street well #1 & #2)
Quantity:	2700 gallons per minute (gpm), 1400 acre-feet per year supplemental to existing rights
Purpose of Use:	Municipal supply
Place of Use:	Area served by the City of Kent

Proposed Change

Applicant:	City of Kent
Date of application for change:	July 2, 2001
Request:	Two additional points of withdrawal
Notice of publication:	Nov. 8 & 15, 2002, in the Daily News Journal
Protests:	None

INVESTIGATION

Evaluation of this application included but was not limited to research and/or review of:

- The State Water Code
- Existing water rights on file for the City of Kent
- Records of other water rights in the vicinity
- Information provided by the City of Kent
- Topographic and local area maps
- 2002 Water System Plan for Kent
- Knowledge of area from previous field visits

State Water Code

Chapters 90.03 and 90.44 Revised Code of Washington (RCW) authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights including the process to amend or change existing rights. Laws specifically governing the water right permitting process are RCW 90.03.250 through 90.03.340 and RCW 90.44.060. Changes or amendments to these rights are covered under RCW 90.03.380 and 90.44.100.

Existing rights for the City of Kent Water System

Information contained in Ecology water right records and the 2002 Kent water system plan indicate that Kent holds twenty-two water right certificates plus a surface water claim. The total primary rights granted by the various documents amounts to 19, 843 acre-feet.

Kent's water right certificates and water right claim are shown in the table below. The data shown in the table was adapted from the table on page 5-7 of the 2002 Kent water system plan. The asterisk in the table denotes annual quantities that are not to be added to the total existing primary water rights held by Kent but are considered supplemental to those rights. Kent would be allowed to use the maximum annual quantity granted on the supplemental right but only to the extent that the total annual quantities from all sources did not exceed the amount held in primary rights.

WATER RIGHTS HELD BY THE CITY OF KENT				
File No.	Priority: Month/Yr.	Source	GPM/CFS	AF/Yr.
GW Cert. 3107	02/57	Clark Springs "trench"	2250*	*1350
SW Cert. 7232	10/31	Clark Springs Rock Creek	5 cfs	
GW Cert. 7660	02/69	Clark Springs wells	5400	8710
G1-22956C	09/77	Kent Springs wells	3690	5904
SWcl 123225	05/09	Kent Springs (springs)	4488	965
G1-23285C	01/79	East Hill well	1900	3040
G1-23614C	06/80	Garrison Creek well	500	*800
G1-23713C	10/80	High Meadows well	7	11
G1-24073C	04/82	Seven Oaks (Soos Creek) well	900	*864
G1-24189C	10/82	Armstrong Springs wells	1300	*500
G1-24190C	10/82	212 th Street wells	2700	*1400
G1-24404C	08/83	208 th Street well	1200	*600
GW Cert. 2890	09/56	East Hill well	120	146
GW Cert. 651	03/48	East Hill well (#1)	60	*45
GW Cert. 2428	02/53	East Hill well (#2)	120	78.4
GW Cert. 1116	06/50	Summit well	200	320
GW Cert. 494	07/47	Hamilton Road well	38	30
GW Cert. 4534	05/62	Hamilton Road well	12	19.2
GW Cert. 767	01/51	O'Brien well	243	45
GW Cert. 1957	03/52	Impoundment well	140	60
GW 42-D	09/23	East Hill well	60	90
GW 44-D	09/45	East Hill well	90	135
G1-25204C	03/88	Parks and Recreation	290	290

* issued as supplemental to primary rights already held by Kent

Ground Water Certificate G1-24190C

The annual quantity granted by this certificate is 1400 acre-feet. As indicated in the report of examination for the original certificate, the annual quantity was recommended as being supplemental to existing right held by Kent because Kent held sufficient water rights to meet their projected twenty-year water needs. The instantaneous quantity of 2700 gpm was not considered supplemental to other rights held by Kent.

The two wells associated with this certificate are referred to as the 212th Street wells. The wells are located to the east of SR 167 and south of SE 212th Street. Both wells are within the SE1/4 NW1/4 of section 7, township 22N, range 5E. Well #1, the northern most of the two, is located 1200 feet north and 300 feet west of the center of section. It was constructed in November 1982 to a depth of 267 feet by 12 inches in diameter. The other well (known as well #2 and 100 feet from well #1) is 1100 feet north and 300 feet west from the center of section 7. This well was constructed in June 1983 to a depth of 366 feet by 16 inches in diameter. Prior to finalizing the permit to a certificate of water right, Kent provided notice that well #1 had a pumping capacity of 1300 gpm and well #2 had a pumping capacity of 1400 gpm for a combined total of 2700 gpm.

Proposed Change

The applicant proposes to add two additional wells as additional points of withdrawal for this certificate. The two additional wells are referred to as the Garrison Creek well and the 208th Street well. Each well is covered with a water right certificate (held by Kent) for municipal supply purposes. All wells including the 212th Street wells are within a one-mile radius of each other. The wells to be added to the certificate are described as follows.

1. The Garrison Creek well is covered by ground water certificate G1-23614C that issued for 500 gpm, 800 acre-feet per year for municipal supply for the area served by Kent. The annual quantity was identified as being supplemental to Kent's existing water rights. The well is located close to the intersection of 218th Street and 98th Avenue in east Kent. It is identified as being 940 feet south and 800 feet west from the E1/4 corner (being within the NE1/4 SE1/4) of section 7, township 22N, range 5E. The well was constructed in February 1981 to a depth of 435 feet by 12 inches in diameter. Prior to issuance of the certificate of water right, Kent notified Ecology that the well was pumping at a rate of 500 gpm with the installed 75 HP pump.
2. The 208th Street well is within the SE1/4 SW1/4 of section 6, township 22 N, range 5 E, and covered by ground water certificate G1-24404C with a priority date of 1983. The well is on the southern border of section 6 approximately 30 feet north and 500 feet west of the S1/4 corner of section 6 and could almost be considered being within section 7. This well is within a mile from the Garrison Creek well and within one-half mile from the 212th Street wells. The well was constructed in June 1983 to a depth of 231 feet by 12 inches in diameter. Prior to Ecology issuing the water right certificate, Kent stated that the well was pumping 1200 gpm. The certificate of water right was then issued for 1200 gpm, 600 acre-feet per year with the annual quantity being supplemental to existing rights held by Kent.

Consultant Report

In 2001 Kent had the consulting firm of Hart Crowser conduct a technical review and analysis of five of their public supply wells located within sections 6 and 7 for possible designation as a well field. Hart Crowser submitted their report to the City of Kent in May 2001.

The report indicates that all five wells are on the eastern side of the Green River approximately two miles north of downtown Kent. The wells are identified as the Garrison Creek well, the 208th Street well, the 212th Street wells (1 & 2), and the O'Brien well. The five wells draw from a confined aquifer that originates beneath the Covington Upland to the east and extends beneath the Green River Valley to the west.

Figure 1 (included as part of this report) shows the locations of all five wells. Though the O'Brien well was originally to be part of this well field, Kent decided to withdraw the well from consideration.

The consultants used Department of Health criteria for assessing a proposed well field designation. The four requirements consist of the following: well depth must be within 20 percent of each other; individual wells must draw water from the same aquifer; individual wells must discharge through a common pipe; and all wells must be under the control of the same purveyor. Two of the criteria are essential in evaluating this change application.

Well depths must be within 20 percent of each other. The analysis showed that once the well depths were adjusted to topographic differences, the depths ranged from 231 feet to 276 feet. The difference in depths was below the 20% criteria.

Individual wells must draw water from the same aquifer. Inorganic chemical analysis was done from water samples of each well. The analysis showed a relatively narrow range of variation that would be consistent with waters drawn from different points within the same aquifer.

Other findings in the consultant's report are of value in evaluating this change application for additional points of withdrawal. With adjustment for topographic differences, the static water levels in the wells ranged from 103 to 115 feet above mean sea level. It was also noted in the report that water levels in the subject Kent wells showed similar responses to pumping and similar seasonal declines during the late summer periods.

Hydrogeological Evaluation of Change Application

Department of Ecology Water Resources hydrogeologist, Doug Wood, provided a technical evaluation for this change application and the other applications for the proposed well field. A memorandum was prepared on February 24, 2003, and placed in the application file. Portions of the technical memorandum are presented below. The various figures referenced in the following text are found in the full memorandum contained in the change application file.

South King County Hydrogeological Setting

The Kent area and South King County occupy an area located between the Seattle Fault Zone, extending from near North Bend westward to the Bremerton area, and a parallel fault zone, extending between the Gig Harbor area of Kitsap Peninsula and the Tacoma/Puyallup area of Pierce County (Figure 1). These structural features create a basin in South King County where the interface between bedrock and younger unconsolidated materials is generally southwesterly dipping (See Figure 1 in the full memorandum).

Bedrock is overlain by unconsolidated Quaternary sediments deposited in glacial and interglacial streams and lakes during the period between 100,000 and 10,000 years before present. Kent area stratigraphy, as defined by Woodward et al. (1995), is summarized below in Table 1.

Unit	Time* and Climate	Geological Significance	Hydrogeological Significance
Qal	Holocene (Interglacial?) 10,000 ybp to present	Holocene alluvium Sand/Gravel Silt/Clay	Aquifer Aquitard
Qvr	Fraser Glaciation	Vashon Recessional Outwash	Aquifer
Qvt	23,000 to 10,000 ybp	Vashon Till	Aquitard
Qva		Vashon Advance Outwash	Aquifer
Q(A)f	Olympia Interglacial 60,000 to 23,000 ybp	Fine grained interglacial sediments	Aquitard
Q(A)c	Possession Glaciation 80,000 to 60,000 ybp	Glacial outwash deposits	Aquifer
Q(B)f	Whidbey Interglacial ~100,000 to 80,000 ybp	Fine grained interglacial sediments	Aquitard
Q(B)c	Double Bluffs Glaciation Pre ~100,000 ybp	Glacial outwash deposits	Aquifer
Q(C)u	Pre ~100,000 ybp	Undifferentiated, unconsolidated fine to coarse sediments	Unknown

* ybp = years before present

The major stream valleys within the Kent area are in part carved by glacial meltwater streams during the latter stages of the Vashon Stade of the Fraser Glaciation between ~15,000 and 10,000 years before present. Within these outwash channels, modern streams such as the Green River have created alluvial deposits consisting of river channel sands and fine grained over bank deposits related to flooding episodes. The Green River alluvial aquifer is recharged directly from stream flows, from springs draining the upper aquifer zones, and from upwelling of groundwater from deeper aquifer zones.

The Quaternary record in South King County is represented by unconsolidated glacial and interglacial sediments that document repeated advances and retreats of piedmont glaciers into the southern part of Puget Sound region during the past approximately 100,000 years.

Glacial sediments include sand and gravel deposited by glacial meltwater streams, silt deposited in ice marginal lakes, and compacted till, composed of poorly sorted clay to gravel sized sediments deposited mainly at the base of the glaciers. Sand and gravel dominated layers are more permeable than finer sediments, and therefore more likely to form productive aquifer layers.

Aquifers within South King County include, from oldest to youngest, Q(B)c, Q(A)c, Qva, and Qvr.

The Fraser Glaciation (Vashon outwash and till) produced the last and best preserved glacial sequence which lasted from approximately 23,000 to 10,000 years before present. It is composed of Qva, advance outwash, formed by meltwater streams as the glaciers moved south, Qvt, till which formed under the ice, and Qvr, recessional outwash that formed in streams as the glacier rapidly retreated northward.

At least two older glaciations are represented in the Puget Sound area - The Possession Glaciation, extending from 60,000 to 80,000 years before present, and the Double Bluffs Glaciation, which occurred prior to approximately 100,000 years before present. Outwash deposits related to the Possession Glaciation are identified in South King County as Q(A)c and those deposits during the Double Bluff Glaciation, identified as Q(B)c.

Groundwater within shallow aquifers zones (Qvr and Qva) is recharged primarily from surface percolation on the Covington and Des Moines uplands (Figure 1 in the full memorandum). Groundwater within the basin's deeper aquifer zones, Q(A)c and Q(B)c, is recharged through percolation from the surface and from shallower aquifers throughout the basin.

Groundwater flow within the shallow aquifer zones generally follows local topography, while flow within the deeper aquifer zones is generally east to west and contributes to upward flows into the Green River alluvial plain and to Puget Sound (Figure 2 in the full memorandum).

Local Hydrogeology

The wells that are the subject of proposed changes are located on the western margin of the Covington Upland Area of South King County where it borders the Green River Valley immediately east of Highway 167 (Figure 3 in the full memorandum).

The Green River Valley occupies a glacial outwash channel that is currently occupied by the northerly flowing Green River. An alluvial hosted aquifer occupies the Green River Valley, drawing recharge from adjacent glacial deposits and from river drainage.

All three water rights (G1-23614C, G1-24190C, and G1-24404C) that are the subject of the application for change penetrate the same aquifer zone within an interconnected aquifer system that is hosted in unconsolidated glacial sediments deposited during the Quaternary Period. Analysis of cross sections included in Woodward, et al (1995) suggests that the aquifer providing water to these wells is either Q(B)c, outwash deposited during the Double Bluff Glaciation or possibly Q(C)u, an unclassified assemblage of pre-Double Bluff aged (older than 100,000 years) glacial and interglacial sediments.

The stratigraphy, as represented in the well logs, shows that all four wells are screened in interbedded sand, gravel, and silt/clay containing occasional peat and wood rich horizons - typical of a fluvial depositional environment. Based on available data it is not possible to determine with certainty whether these deposits resulted from glacial or inter-glacial depositional conditions.

The similarity of the host suggests that all four wells are completed in the same hydrostratigraphic unit. The wells therefore can be considered to be utilizing the same aquifer and would thus conform to the requirement of RCW 90.44.100(2)(a) that requires changes in groundwater rights to tap the same body of public groundwater.

Hart-Crowser, Inc. (Kenrick, 2001), in its analysis of the criteria for Washington Department of Health (DOH) wellfield designation, reports that the difference in well depth for the three wells included in these applications does not exceed the 20% allowed by DOH for well to included in a wellfield. Kenrick appears to have only considered the topmost screened interval for the 212th Street Wells.

Table 2: Well Field Data (After Kenrick, 2001[†] and Ecology Well Logs[‡])

Well Name	Well Elev.*	Depth to Base of Screen	Base of Screen Elev.*	Base of Screen Diff. from Avg.	Depth to Top of Screen	Top of Screen Elev.*	Top of Screen Diff. from Avg.	SWL Elev.*	SWL Diff. from Avg.
Garrison Ck.	240	432	-192	-21%	422	-182	7%	115	4%
208 th St.	44	221	-177	-27%	184	-140	-18%	110	0%
212 th St. #1	61	356	-295	21%	231	-170	0%	113	2%
212 th St. #2	56	367	-311	28%	247	-191	12%	103	-7%

*Feet Relative to Mean Sea Level

[†]Well Elevation and SWL data from Kenrick, 2001.

[‡]Screen Depths Data for 212th Wells from 1987 well logs; 208th from 1987; Garrison Ck from 1981.

Well logs for the three locations indicate that there are at least two water producing zones; an upper zone utilized at all three sites, and a lower zone utilized only in the 212th Street wells (1987). The elevation of the top of the screened interval for the four wells is within 20% of the average elevation for the top of the screens. If the lower water bearing zone is considered, the percent difference in elevation of the base of productive zone would exceed the 20% for DOH wellfield designation based on well depth (see Table 1 - base of screen difference from average). The comparison of screen elevations is good evidence of the wells tapping the same aquifer, but it is not a measure of well depth. Based on well logs, the Garrison Ck well is completed at 435 ft, the 208th St. well at 231 ft, 212th St. well #1 at 356 ft, and 212th St. well #2 at 367 ft.

Artesian pressures, where static water level is higher than surface elevation, are encountered at the 208th Street and 212th Street wells. Artesian conditions are indicative of a significant degree of separation by low permeability units between the source aquifer and the alluvial aquifer within the Green River Valley. They are also indicative of the existence of an upward flow of water between the deep aquifer zones and the Green River alluvial aquifer.

Correspondence Received

In a letter dated July 24, 2001, Kent requested Ecology to change their applications for temporary changes for a well field to applications for permanent changes to establish the wells as a well field. Ecology agreed to the request and used the temporary applications that had already been submitted to Ecology as applications for permanent changes.

Historic Water Use

Based on annual water use data submitted by Kent for the years 1993 through 2001, the 208th Street well and the 212th Street wells have been utilized at or above the certificate quantities of 600 acre-feet and 1400 acre-feet respectively. The maximum annual production from the Garrison Creek well during this same period was 202 acre-feet (approximately 600 acre-feet less than the allowed certificate amount).

Water System Plan

According to the 2002 final draft water system plan, Kent's highest annual production between 1994 and 1996 was 9,908 acre-feet. Their stated demand for 2002 was 9.33 million gallons per day (MGD) for an average annual quantity of 10,450 acre-feet.

The water system plan states that almost 75% of current water use is supplied by the Clark and Kent Springs sources. All other wells and sources are mostly used during high demand summer periods to supplement the main spring sources.

The water system plan indicates that the 212th Street wells (G1-24190C) and the 208th Street well (G1-24404C) have shown no significant deterioration since their construction and represent a dependable supply of 5 MGD. The indication is that the Garrison Creek well (G1-23614C) has lost some capacity since it was first constructed and is currently considered a dependable supply for .5 MGD.

Other Water Rights in the Vicinity

A search of office records for existing water right certificates and claims in the area of the proposed change indicates 20 water right certificates and 65 claims on file within sections 6 and 7 of township 22 N, range 5 E. Kent holds four of the water rights and one of the claims. Except for the rights held by Kent, the records identify that eight are surface water certificates and ten are surface water claims. The remaining records are for ground water uses, most of which are claims. The majority of the ground water claims indicate small quantities for general domestic use and some irrigation use included.

FINDINGS

In accordance with state law, the following considerations must be addressed during the process of evaluating this change request:

- Is water available at the additional points of withdrawal?
- Do the additional points of withdrawal tap the same source of water as the original right?
- Will the change cause impairment to other existing rights?
- Will the public interest be impaired?
- Will the change create an enlargement of the original right?
- Is there potential for different impacts on the water source?

Is Water Available at the Additional Points of Withdrawal?

Prior to issuing the water right certificates for the 208th Street well and the Garrison Creek well, Kent provided documentation that the wells were pumping at permitted capacities. The 2002 water system plan and additional information submitted by Kent further supports the fact that the wells are able to produce adequate quantities of water and that the 208th Street well has been pumping at designated quantities with no significant signs of deterioration.

Same Source of Water

Staff hydrogeologist, Doug Wood, agrees with the Hart Crowser report that the subject Kent wells are tapping the same aquifer.

Impairment to Other Existing Rights

Adding additional points of withdrawal to certificate G1-24190C does not represent an increase in quantities as all additional wells have been established and used for at least twenty years. All additional wells plus this application well are supplemental to earlier rights held by Kent.

Doug Wood concludes in his technical evaluation the following:

The well field designation does not seek to change the total quantity of water utilized by the three water rights included in the proposal. The quantities at each point of withdrawal shall also remain unchanged. It is therefore concluded that the proposed change will have no impact in addition to those already authorized under certificates G1-23614C, G1-24190C, and G124404C.

Public Interest

No detriment to the public interest could be identified during the investigation of this application for change.

Enlargement of the Original Right

Allowing the two wells to be added to this certificate so Kent could operate them as a well field would not conflict with RCW 90.44.100 (2) (c). The combined total withdrawal from the original and additional wells would not enlarge the right conveyed by the original certificate for the following reasons.

Kent states that 75 percent of their water supply comes from the Clark/Kent Springs sources. The primary rights held by the Clark/Kent Springs sources amounts to 14,579 acre-feet. Based on Kent's 1994 annual water use of 9,908 acre-feet, it is calculated that approximately 7,431 acre-feet would be from the Clark/Kent Springs sources.

The maximum annual quantity that can be used from the four wells is limited to 2800 acre-feet. This total annual quantity is considerably within the perfected and beneficially used primary rights of the Kent/Clark spring sources. Approval of the additional wells for this certificate would not allow any new water to be produced from the area and would not represent an enlargement of the original right.

Information provided by Kent, indicates that annual quantities granted by the certificates for the 208th and 212th Street wells were met and/or exceeded between the years of 1993 and 2001. During the same time period, the Garrison Creek well has not pumped its maximum annual quantity by approximately 600 acre-feet. However, the maximum annual quantities that could be produced by the well field wells have already been perfected and beneficially used by the primary rights on the Clark/Kent Springs sources.

Information presented in this report support a tentative determination that G1-24190C represents a valid right for the elements stated on the certificate document.

Potential for Different Impacts on the Water Source

The approval of the change request to add two wells to this certificate will not change the time of use or manner of use. This certificate and the certificates covering the other two wells are conditioned as being supplemental to existing rights held by Kent (mainly the Kent and Clark Springs sources). All wells were intended and continue to be used for the intended purpose of meeting peak demands to supplement the primary water supply source for Kent.

DISCUSSION

The legal description on certificate G1-24190C states "Area served by the City of Kent". An updated legal description, reflecting current program practices, needs to include reference to the place of use as described in the latest water system plan. At this writing Kent has their 2002 water system plan in for review and approval by the Department of Health (DOH). Consequently any superseding document issued regarding this requested change should state, "Area served by the City of Kent as reflected in their approved 2002 water system plan."

Before Ecology would proceed to issue a superseding certificate for G1-24190C, the requested changes must be accomplished including approval of their water system plan. Allowing one year from approval of the change would allow sufficient time for Kent to accomplish the change and notify Ecology.

CONCLUSIONS

In accordance with chapters 90.03 and 90.44 RCW, it is concluded that G1-24190C is in good standing and is eligible for the change as requested. The change as recommended will not enlarge the original intent of the certificate and the water use will be beneficial. Approval of this change request will not cause impairment of existing rights or be detrimental to the public interest.

AFFIDAVIT OF PUBLICATION

Barbara Alther, first duly sworn on oath states that he/she is the Legal Clerk of the

SOUTH COUNTY JOURNAL

600 S. Washington Avenue, Kent, Washington 98032

a daily newspaper published seven (7) times a week. Said newspaper is a legal newspaper of general publication and is now and has been for more than six months prior to the date of publication, referred to, printed and published in the English language continually as a daily newspaper in Kent, King County, Washington. The South County Journal has been approved as a legal newspaper by order of the Superior Court of the State of Washington for King County.

The notice in the exact form attached, was published in the South County Journal (and not in supplemental form) which was regularly distributed to the subscribers during the below stated period. The annexed notice, a

Change to Groundwater Certificate G1-24190C (PO 37222)

as published on: 11/10, 11/17

The full amount of the fee charged for said foregoing publication is the sum of \$166.50, charged to Acct. No. 8031430.

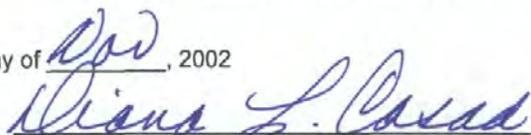
The cost above includes a \$6.00 fee for the printing of the affidavits.

Legal Number 848563



Legal Clerk, South County Journal

Subscribed and sworn before me on this 17 day of Nov, 2002



Notary Public of the State of Washington
residing in Renton
King County, Washington



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION
TO CHANGE AN EXISTING
WATER RIGHT

TAKE NOTICE:

That City of Kent Public Works Department of Kent, Washington on July 2, 2001, has filed an application of change to Ground Water Certificate G1-24190C. Certificated use is for 2700 (gpm) 1400 acre-feet per year for Municipal Supply, as granted under Ground Water Right G1-24190C, priority date October 6, 1982. That the original points of withdrawal are located in SE1/4 NW1/4, Section 7, Township 22N, Range 5E, W.M. in King County. The place of use is located within the area served by the City of Kent.

The request here is to add points of withdrawal covered by Ground Water Certificates G1-23614C, G1-24404C, located in the SE1/4 SW1/4, Section 6, Township 22N, Range 5E, W.M., and the NE1/4 SE1/4, Section 7, Township 22N, Range 5E, W.M.

No increase will be made to the instantaneous diversion/withdrawal rate or annual quantity.

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 (\$2.00 check or money order) recording fee and filed with the Department of Ecology at the address shown below, within thirty (30) days from November 10, 2002.

Department of Ecology
Northwest Regional Office
3190 - 160th SE
Bellevue, WA 98008

Published in the South County Journal November 10 and 17, 2002.
848563

affid of
D.B.



PUBLIC WORKS
Don E. Wickstrom, P.E.
Director of Public Works

**PUBLIC WORKS
OPERATIONS**
Larry R. Blanchard
Operations Manager

Mailing Address
220 Fourth Ave. S.
Kent, WA 98032-5895

Location Address:
5821 South 240th
Kent, Washington

Phone: 253-856-5600
Fax: 253-856-6600

RECEIVED

AUG 15 2001

DEPT OF ECOLOGY

August 13, 2001

Northwest Regional Office
3190 160th Avenue SE
Bellevue, WA 98008-5452

Attention: Water Resources Department

Enclosed is the Department of Ecology Showing of Compliance with RCW 90.44.100 (3) and the Water Well Report for the 212th Street Treatment Facility.

If you have any additional questions, do not hesitate to call me at (253) 856-5610.

Sincerely,

Brad Lake, Water Superintendent
City of Kent

BL/sma

cc: Don Wickstrom, Public Works Director
Larry Blanchard, Operations Manager
Washington State Department of Health



DEPARTMENT OF ECOLOGY

Showing of Compliance with RCW 90.44.100(3)

Water Right Certificate or Permit Number: G1-24190C

Parcel tax identification number: 8102240374

Landowner(s) name: City of Kent

Part of complying with RCW 90.44.100(3) is for the project proponent to notify the Department of Ecology (Ecology) that the statutory criteria of RCW 90.44.100(3) have been satisfied. Please attach to this document the water well report for the additional or replacement well and any additional information you have to support your affidavit.

Affidavit:

I, Brad Lake, do certify that I caused the well described in the attached water well report to be drilled as an additional or replacement well(s) for use under Water Right Number G1-24190C. This notice and attached documents describe and support my assertion that the replacement or additional well(s) complies with RCW 90.44.100(3) (a-g) and RCW 90.44.100(4):

- a. The well is an additional or replacement well(s) that will tap the same body of public ground water as the original well;
- b. If a replacement well is constructed, the use of the original well(s) shall be discontinued and the original well(s) shall be properly decommissioned;
- c. The combined withdrawal of water from the additional or replacement well(s) and the original well authorized by the water right certificate does not enlarge the water right conveyed by the original water right certificate to the extent the certificate has been developed (perfected) and maintained by use of water;
- d. The construction and use of the additional or replacement well(s) does not interfere with or impair water rights with an earlier priority date;
- e. The additional or replacement well(s) is located no closer than the original well to a well or surface water body it might interfere with;
- f. A specified manner of construction for the additional or replacement well(s) has been complied with, if required, and the new well was constructed in compliance with chapter 18.104 RCW and chapter 173-160 WAC;
- g. The additional or replacement well(s) is located within the area described as the point of withdrawal in the public notice published for the original application for water right, or the most current legal description published for the right. Both the original well and the additional or replacement well(s) are located in NE 1/4, SE 1/4, NW 1/4 Section 7
Township 22, Range 5E, King County (legal description).

Therefore the well is in compliance with the requirements for a statutorily granted amendment to the water right permit or certificate.

I understand the acceptance of this affidavit, and any attachments, by the Department of Ecology shall not be construed as affirming the validity of any water right permit or certificate. The responsibility to comply with RCW 90.44.100(3) is with the water right permit or certificate holder asserting an amendment pursuant to RCW 90.44.100(3).

Bradley Lake
Name

7/31/01
Date

Acknowledgement:

State of Washington
County of King

I certify that I know or have satisfactory evidence that Bradley Lake is the person who appeared before me, and said person acknowledged that (he/she) signed this affidavit and acknowledged it to be (his/her) free and voluntary act for the uses and purposes mentioned in the affidavit.

Dated: 7-31-01

Gerald B. McLaughan
Gerald B. McLaughan
(Signature)
Des Moines Wash.
Residing in
City of West Property Manager
Title
My appointment expires: 1-6-05

If you have any questions please contact the Water Resources Section of the closest regional office. Please submit copies of new well logs and decommissioned well logs along with this completed and notarized form to the nearest regional office.

Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
(425) 649-7000; TDD (425) 649-4259

Southwest Regional Office
P.O. Box 47775
Olympia, WA 98504-7775
(360) 407-6300; TDD (360) 407-6306

Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
(509) 456-2926; TDD (509) 458-2055

Central Regional Office
15 W. Yakima Ave., Suite 200
Yakima, WA 98902-3452
(509) 575-2597; TDD (509) 454-7673

Vancouver Field Office
2108 Grand Boulevard
Vancouver, WA 98661-4622
(360) 690-7171; TDD (360) 690-7147

Nooksack Field Office
1204 Railroad Ave., Suite 200
Bellingham, WA 98225
(360) 738-6250; TDD (425) 649-4259

WATER WELL REPORT

STATE OF WASHINGTON

Start Card No. W 135386
AFR 915

Water Right Permit No. _____

(1) OWNER: Name CITY OF KENT Address 220 FOURTH AVE S., KENT, WA 98032

(2) LOCATION OF WELL: County KING SE & NW 1/4 Sec 7 T. 22 N., R. 5E W.M.

(2a) STREET ADDRESS OF WELL (or nearest address) 212th ST. TREATMENT FACILITY

(3) PROPOSED USE: Domestic Industrial Municipal
 Irrigation Test Well Other
 DeWater

(4) TYPE OF WORK: Owner's number of well (if more than one) WELL 3
Abandoned New well Method: Dug Bored
Deepened Cable Driven
Reconditioned Rotary Jetted

(5) DIMENSIONS: Diameter of well 16/12 inches.
Drilled 522 feet. Depth of completed well 495 ft.

(6) CONSTRUCTION DETAILS:
Casing installed: 20 Diam. from +0.3 ft. to 120 ft.
Welded 16 Diam. from +3.4 ft. to 293 ft.
Liner installed
Threaded 12 Diam. from 213 ft. to 290 ft.
Perforations: Yes No
Type of perforator used _____
SIZE of perforations _____ in. by _____ in.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
_____ perforations from _____ ft. to _____ ft.
Screens: Yes No
Manufacturer's Name WOP JOHNSON
Type STAINLESS Model No. 304
Diam. 10" Slot size 290-300 from 320-330 ft. to 340-360 ft.
Diam. _____ Slot size 365-375 from 385-395 ft. to 400-410 ft.
Gravel packed: Yes No Size of gravel 4EC-480, 4XE
Gravel placed from 222 ft. to 495 ft.
Surface seal: Yes No To what depth? 50' ft.
Material used in seal CEMENT GROUT
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

(7) PUMP: Manufacturer's Name N/A
Type: _____ H.P. _____

(8) WATER LEVELS: Land-surface elevation ~55 ft. above mean sea level
Static level ~45 ft. below top of well Date _____
Artesian pressure ~20.33 lbs. per square inch Date _____
Artesian water is controlled by CAP + VALVE (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? HOLT, RAN
Yield: 2,500 gal./min. with 66.5 ft. drawdown after 12 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
372M FLOWS
Date of test 6/7/01
Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airtest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow 200T g.p.m. Date _____
Temperature of water 32.0 Was a chemical analysis made? Yes No

(10) WELL LOG or ABANDONMENT PROCEDURE DESCRIPTION

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information.

MATERIAL	FROM	TO
Brown Silty CLAY SAND GRAVEL	0	40
DARK GRAY SAND AND GRAVEL	40	43
BROWN SILTY CLAY BOUND SAND + GRAVEL	43	50
BROWN SILTY CLAY WITH SAND	50	70
GREEN AND GRAY SILT AND CLAY	70	90
GRAY SILTY SAND AND GRAVEL	90	100
GREEN GRAY SILTY CLAY SAND + GRAVEL	100	180
GRAY GREEN SILTY SAND AND GRAVEL	180	193.5
GRAY GREEN CLAY	193.5	195.5
GRAY BROWN SAND AND SILT	195.5	229
BLUE, GREEN, GRAY CLAY	229	244
GRAY FINE SAND	244	257
BLUE GRAY BROWN CLAY SOME MATT	257	290
GRAY SAND AND GRAVEL WITH	290	
CLAY LAYERS, WEED CURD		495
GRAY SILTY SAND	490	522

Work started 4/24 Completed 5/11

WELL CONSTRUCTOR CERTIFICATION:

I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

NAME Holt Drilling Inc. (PERSON, FIRM, OR CORPORATION) (TYPE OR PRINT)
Address P.O. Box 139
(Signed) [Signature] License No. 2000
(WELL DRILLER)
Contractor's Registration No. 12-20003 Date 5-2-01



EMERGENCY DROUGHT ACTION

STATE OF WASHINGTON APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF \$10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)

- Change purpose(s) of use
- Add purpose(s) of use
- Change point(s) of diversion/withdrawal
- Add point(s) of diversion/withdrawal
- Change/transfer place of use
- Other (i.e. consolidation, intertie, trust water)

Explain (Well Field) Common Point of Withdrawal

FOR OFFICE USE ONLY	
CHANGE No.	<u>CG1-24190C</u> WRIA <u>9</u>
DATE ACCEPTED	<u>7/2/01</u> BY <u>DB</u>
FEE \$	<u>10⁻</u> REC'D <u>07/02/01</u>
CHECK No.	<u>6291</u>
SEPA:	<input checked="" type="checkbox"/> Exempt <input type="checkbox"/> Not exempt

****IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)****

1. Applicant Information:

APPLICANT/BUSINESS NAME <u>City of Kent</u>	REJECTED RE-INSTATED	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>
ADDRESS <u>220 4th Avenue South</u>		CITY <u>Kent</u>	STATE <u>WA</u>

CONTACT NAME (IF DIFFERENT FROM ABOVE) <u>Brad Lake</u>	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>	
ADDRESS <u>220 4th Avenue South</u>	CITY <u>Kent</u>	STATE <u>WA</u>	ZIP CODE <u>98032-5895</u>

FOR OFFICE USE ONLY			
APP. NO. _____	PERMIT NO. _____	CERT. NO. <u>61-24190C</u>	CERT. OF CHANGE NO. <u>CG1-24190</u>

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER G1-24190C	RECORDED NAME(S) City of Kent
DO YOU OWN THE RIGHT TO BE CHANGED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
IF NO, PROVIDE OWNER(S) NAME:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
212 th Street Wells (2)	S10	SE	NW	07	22N	5E	0722059030	#1 - AFJ239 #2 - AFJ240

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
(Wellfield) See attachment								

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?
 EXISTING: YES NO PROPOSED: YES NO - IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / 212 th Street Wells (2)	2,700 GPM	1,400 AF/YR	Annually

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / See Attachments	Consolidate for a	quantities well field	July through December 2001
Operate as a well field.	4,643 GPM	2,845 AF/YR	July through December 2001

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Area served by City of Kent							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		
DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME: Individual businesses and residences within the City of Kent water service area.							

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? <input type="checkbox"/> YES <input type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME:							

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

<p>The City of Kent is requesting temporary approval to classify five (5) different wells (one primary well/4 supplemental wells) in the area as a well field, as they have been shown to be drawing water from a common aquifer. The primary purpose is to share water rights granted to individual wells with others withdrawing from the same aquifer. This will greatly improve the reliability and flexibility of all the water sources, as well as optimizing the amount of yield available during seasonal peaking periods. The benefit to the city of Kent and the citizens therein would be significant, providing more reliable sources of supply during drought conditions for municipal use as well as adequate water for fire protection requirements during higher demand periods. This request would allow the withdrawal of water to be distributed more evenly from the aquifer, as well as allowing Kent the flexibility to shift water rights away from less productive or failing wells to wells that are more productive under current drought conditions.</p>
<p>IF FOR SEASONAL OR TEMPORARY, START DATE <u>7 / 1 / 2001</u> END DATE <u>12 / 31 / 2001</u></p>

7. Signatures:

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 am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

Am E. [Signature] 6 / 28 / 01
(Applicant) (Date)

Am E. [Signature] 6 / 28 / 01
(Water Right Holder) (Date)

Am E. [Signature] 6 / 28 / 01
(Land Owner(s) of Existing Place of Use) (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

- APPLICATION FEE NOT ENCLOSED
- MAP NOT INCLUDED or INCOMPLETE
- ADDITIONAL SIGNATURES REQUIRED
- SECTION _____ IS INCOMPLETE
- OTHER/EXPLANATION: _____

STAFF: _____ **DATE:** ____ / ____ / ____

ATTACHMENT FOR APPLICATION FOR CHANGE

Point(s) of Diversion/Withdrawal - Existing Proposed:

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #	CERTIFICATE
212 th Street Well #1	S10	SE	NW	07	22N	5E	0722059030	AFJ239	G1-24190C
212 th Street Well #2	S10	SE	NW	07	22N	5E	0722059030	AFJ240	G1-24190C
208 th Street Well	S11	SE	SW	06	22N	5E	0622059159	AFJ241	G1-24404C
Garrison Creek Well	S06	NE	SE	07	22N	5E	8802400066		G1-23614C
O'Brien Well	S12	SE	SW	07	22N	5E	7757800270	AEJ475	767-A

DO YOU OWN THE ABOVE POINT(S) OF DIVERSION/WITHDRAWAL? YES NO – IF NO, PROVIDE OWNER(S) NAME:

Purpose(s) of Use - Existing Proposed:

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply	4,643 GPM	2,845 AF/YR	Throughout the year

Place of Use - Existing Proposed:

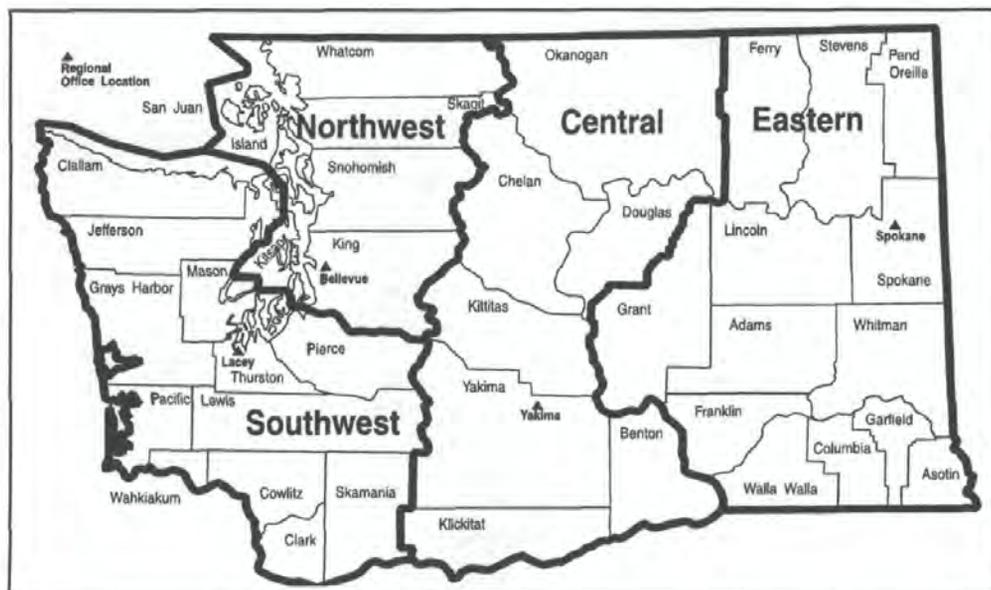
LEGAL DESCRIPTION OF LANDS							
City of Kent water service area							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		

DO YOU OWN ALL THE LANDS IN ABOVE PLACE OF USE? YES NO – IF NO, PROVIDE OWNER(S) NAME:

Individual businesses and residences within the City of Kent water service area.

IMPORTANT!

Submit your application to Ecology at the regional office for the area of proposed or existing water use or at a Conservancy Board with jurisdiction. Below is a map of the State of Washington, with outlines of the four Ecology regional offices. If you have questions about your application or whether a County Conservancy Board with jurisdiction exists, contact the Water Resources program at the regional office in which your project is located.



Department of Ecology
Central Regional Office
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902
Telephone: (509) 575-2490

Department of Ecology
Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
Telephone: (509) 456-2926

Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Telephone: (425) 649-7000

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Telephone: (360) 407-6300

Persons of disability needing assistance in the application process or those needing this application in an alternate format, may call (360) 407-6607 (voice) or (360) 407-6006 (TDD).

Ecology is an Equal Opportunity and Affirmative Action employer...

PROGRESS SHEET - APPLICATION FOR CHANGE

Of Water Right Certificate # CG1-24190C (212th Wells)

REJECTED
RE-INSTATED

NAME: City of Kent
Public Works Department
220 - 4th Avenue South
Kent, WA 98032-5895

ATTN: Brad Lake, Engineering Department

PHONE: 253-856-5610
FAX 253-856-6600

Appurtenant to Water Right Claim No. CG1-24190C

Purpose of Application: Emergency Drought (212th Wells) - request point of withdrawal temporarily transferred to its Armstrong Springs Well/groundwater right (G1-24073C).

Application received on 7/2/01 Fee Paid \$10.00 7/2/01

Returned for completion or correction _____

Returned _____

PUBLICATION: OK'd by DOB Date 11/17/02 Notice Sent 10/10/02

Protests _____ by _____

_____ by _____

_____ by _____

Affidavit received and checked _____ Expires _____

EXAMINATION: Made ROE 3/03 JJ by 3/25/03 / Reviewed by Buck Smith 3/17/03

Supps CERTIFICATE: OK'd for issue by J Klug date 9-19-2013

Statement of fee mailed _____ Amount _____

Fee received _____

Supps Certificate of Change Issued 9-19-2013 No. CG1-24190C

WR DOC ID: 2285872

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 880, Laws of Washington for 1946, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE October 6, 1982	APPLICATION NUMBER G1-24190	PERMIT NUMBER G1-24190P	CERTIFICATE NUMBER G1-24190C
----------------------------------	--------------------------------	----------------------------	---------------------------------

NAME
City of Kent (Department of Public Works)

ADDRESS (STREET) 220 South 4th Avenue (CITY) Kent (STATE) Washington (ZIP CODE) 98032

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
Two wells

TRIBUTARY OF (OF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
	2700	1,400.0

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously
(Supplemental to existing rights)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL

Well No. 1 - 1200 feet north and 300 feet west of center of Section 7
Well No. 2 - 1100 feet north and 300 feet west of center of Section 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.L.A.	COUNTY
NE¼ SE¼ NW¼	7	22	5E	9	King

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 Kent.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through 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.

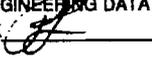
This certificate of water right is specifically subject to relinquishment for nonuse of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Bellevue, Washington,

this 15th day of April, 1993.

Department of Ecology

ENGINEERING DATA

OK 

by Stephen J. Hirschey
Stephen J. Hirschey, Section Supervisor, Water Resources

FOR COUNTY USE ONLY

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 1946, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE October 6, 1982	APPLICATION NUMBER G1-24190	PERMIT NUMBER G1-24190P	CERTIFICATE NUMBER
----------------------------------	--------------------------------	----------------------------	--------------------

NAME City of Kent (Department of Public Works)			
ADDRESS (STREET) 220 South 4th Avenue	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Two wells
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 3500 2700	MAXIMUM ACRE-FEET PER YEAR 1,400.0
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QUANTITY, TYPE OF USE, PERIOD OF USE Municipal water supply - continuously (Supplemental to existing rights)
--

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL Well No. 1 - 1200 feet north and 300 feet west of center of Sec. 7 Well No. 2 - 1100 feet north and 300 feet west of center of Sec. 7
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE 1/4 Sec. 7 NW 1/4	SECTION 7	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5E	W.R.I.A. 9	COUNTY King
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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 Kent.

DESCRIPTION OF PROPOSED WORKS

Well #1 - 12" x 367' deep, screened at bottom 31' in sand and gravel.
Well #2 - 16" x 400' deep (to be constructed).

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: October 15, 1985 <i>89-90</i>	WATER PUT TO FULL USE BY THIS DATE: October 15, 1986 <i>10/15/86</i>
--	---	---

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040.

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.

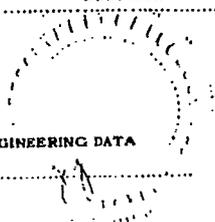
Given under my hand and the seal of this office at Redmond Washington, this 15th day of October 19 84

Department of Ecology

by Robert K. McCormick
ROBERT K. McCORMICK, Regional Manager

ENGINEERING DATA

OK *[Signature]*



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 October 6, 1982	APPLICATION NUMBER G1-24190	PERMIT NUMBER	CERTIFICATE NUMBER
----------------------------------	--------------------------------	---------------	--------------------

NAME City of Kent (Department of Public Works)			
ADDRESS (STREET) 220 South 4th Avenue	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Two wells		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 3500	MAXIMUM ACRE-FEET PER YEAR 1,400.0
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal water supply - continuously		
(Supplemental to existing rights)		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL Well No. 1 - 1200 feet north and 300 feet west of center of Sec. 7
Well No. 2 - 1100 feet north and 300 feet west of center of Sec. 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE 1/4 SE 1/4 NW 1/4	SECTION 7	TOWNSHIP N. 22	RANGE (E. OR W.) W.M. 5E	W.R.I.A. 9	COUNTY King
---	--------------	-------------------	-----------------------------	---------------	----------------

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 Kent.

DESCRIPTION OF PROPOSED WORKS

Well #1 - 12" x 367' deep, screened at bottom 31' in sand and gravel.
 Well #2 - 16" x 400' deep (to be constructed).

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	1 yr from permit issuance	2 yrs from permit issuance

REPORT

Background:

This application to withdraw 3,500 gpm from two wells near Kent for the purpose of municipal water supply was received from the City of Kent on October 6, 1982.

Public notice of this application was made in the Daily News Journal on December 8, and 15, 1982 and no protests or objections were filed.

Investigation:

These wells were field examined on October 11, 1983 during an extended pumping test. The first well was constructed by cable tool with a diameter of 12 inches to a depth of 367 feet on October 11, 1982. Well No. 2 was completed in June 1983 with a diameter of 16 inches to a depth of 356 feet and screened at the bottom 25 feet in sand and gravel.

Well No. 1 was aquifer tested on July 6, 1982 at varying pumping rates up to 1,500 gpm. From an original static water level of 50 feet above land surface, the well experienced a water level drawdown of 50 feet after 150 minutes of pumping. The test results indicate that the well No. 1 design pumping rate should be 1,500 gpm. Similar testing of well No. 2 indicated a maximum well capacity of 2,000 gpm. Well No. 2 drew down from an initial water level of 43 feet above land surface to 119 feet below land surface after pumping 1,860 gpm for 24 hours.

During two later tests of Well No. 2, complaints were received from Kent Nursery on July 21, 1983 and October 10, 1983 from Bob Mauritsen and Peter Mauritsen, respectively.

Kent Nursery holds Water Right Claim No. 49898 and Groundwater Certificate No. G1-21106C for the withdrawal of 400 gpm up to 78.0 acre-feet per year for the group domestic supply of 4 homes and irrigation of approximately 37 acres from a 6 inch by 380 foot well. The Kent Nursery well is located approximately 375 feet west of the City's 212 St. wells. The complaints apparently arose when aquifer pressure was temporarily lowered during testing of Well No. 2 and as a result the Kent Nursery well, which has always enjoyed artesian pressure, stopped flowing. Pressure returned to the Kent Nursery well upon stopping the pumping of the City's Well No. 2. Since the City of Kent has been aware of this interference problem, they have attempted to mitigate the effect on the Kent Nursery well. The Kent Nursery was informed that their water rights do not guarantee that certain artesian pressures will be maintained.

The annual quantity associated with this application is 1,400.0 acre-feet per year which is equivalent to pumping at the total design rate of 3,500 gpm for 25 percent of the time. An analysis of the City of Kent's water rights and present and future consumption follows.

<u>Water Right File No.</u>	<u>Source Name</u>	<u>Quantity gpm</u>	<u>Annual Q (acre-feet)</u>
651-A	East Hill Well #1	60	42 (supplemental)
2428-A	East Hill Well #2	120	78.4
3107-A	Clark Springs Trench	2,250	1,350 (supplemental)
7232-A	Clark Springs	2,220	3,600 (supplemental)
7660-A	Clark Springs Wells	5,400	8,710
G1-22956C	Kent Springs	3,690	5,904
G1-23285C	East Hill Well	1,900	3,040
G1-23614C	Garrison Creek Well	500	800 (supplemental)
G1-23713P	High Meadows	7	11
G1-23852P	Reservoir Well	160	256
G1-24073P	Seven Oaks	900	864 (supplemental)
G1-24189P	Armstrong Springs	1,300	500 (supplemental)
G1-24190	212th St. Wells	3,500	1,400 (supplemental)
G1-24404	208th St. Well	1,500	600 (supplemental)

TOTAL: Primary.....17,999.4
 Supplemental..... 9,156.0

As shown, the City of Kent presently has 17,999.4 acre-feet in primary water rights. The City has about 12,000 service connections and a current average demand of 6,400 acre-feet per year. Kent is expected to have an annual demand of approximately 1,800 acre-feet (15 MGD).

average annual demand) by the year 2000, so existing rights held by the City should provide for projected demand through the next 20 years. For this reason, the annual quantity of this water right should be issued as supplemental to existing rights held by the applicant.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendation:

I recommend that this application to withdraw 3,500 gpm from the 212th St. well field near Kent be granted and that a permit be issued under this application with an annual quantity of 1,400.0 acre-feet which are supplemental to the existing water rights for the City of Kent.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508,64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

REPORT BY: David P. Carlend
GEOLOGIST

DATE: 8/13/86



APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

GROUND WATER

DATE examined this application as required by SEPA and find that it is: not an "action". categorically exempt.

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION.

(GRAY BOXES FOR OFFICE USE ONLY)

SIGNATURE

APPLICATION NO. G124190	W.R.I.A. 9	COUNTY King	PRIORITY DATE 10/6/82	TIME	ACCEPTED mt
APPLICANT'S NAME CITY OF KENT (Department of Public Works)				BUSINESS TEL 872-3383	
ADDRESS (STREET) 220 S. 4th		(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032	
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION N/A					

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.) WELL (212th Street Well)
TRIBUTARY	SIZE AND DEPTH
	12" casing - 371 feet + No. 1
	16" casing - 400 feet + No. 2

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF	CUBIC FEET PER SECOND CFS	OR	GALLONS PER MINUTE GPM	ACRE FEET PER YEAR
			3500	

TIMES DURING YEAR WATER WILL BE REQUIRED
Municipal Water Supply - Summer months

Well No. 1 (1500 gpm) Summer months 60 - 90 days

Well No. 2 (2000 gpm) Summer months 60 - 90 days

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
		60,000

DATE PROJECT WAS OR WILL BE STARTED Early 1983	DATE PROJECT WAS OR WILL BE COMPLETED Late 1983
--	---

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

Well No. 1 is located 210' East and 50' South of Northwest property corner.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE 1/4, SE 1/4, NW 1/4. (2 wells)	SECTION 7	TOWNSHIP N 22	RANGE (E OR W) WM 5 E	COUNTY KING
---	---------------------	-------------------------	---------------------------------	-----------------------

Well No. 2 will be approximately 100 feet south of Well No. 1.

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED IF NOT, INSERT NAME & ADDRESS OF OWNER
Yes

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 City of Kent is property on which water will be used. See attached legal of actual well site or property on which water will be taken.

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACTOR, CHASER, ETC.)

Area is City of Kent Water District service area. The City is responsible for supplying water

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 during design phase.

REMARKS

7. Please refer to this application as "212th Street Wells."

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

Den E. Walsh
APPLICANT'S SIGNATURE

Den E. Walsh
LEGAL LANDOWNER'S SIGNATURE
220 So. 4th Ave.
Kent, Washington 98032
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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: *letter dated 8.22.82 re comment #5.56 in addition. See App. requesting 3,500 gpm; Council to CFS would be 7.78 C.F.S.*

In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before *Nov 19* 19 *82*

Witness my hand this *19* day of *Oct* 19 *82*

Marlene Wolfe
Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent (Department of Public Works)			TELEPHONE NO. 872-3383		
ADDRESS 220 S. 4th		(CITY) Kent,	(STATE) Washington	(ZIP CODE) 98032	
ASSIGNED TO			TELEPHONE NO.	DATE ASSIGNED	
ADDRESS		(CITY)	(STATE)	(ZIP CODE)	
APPLICATION NO. G124190	PERMIT NO. G-34390P	CERTIFICATION NO. G1-2A-190C			
DATE AMENDED	DATE CANCELLED	W.R.I.A.			
APPLICATION					
DATE APPLICATION RECEIVED October 6, 1982		INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		DATE FEE RECEIVED October 6, 1982	
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 11.30.82		
PROTESTED BY AND DATE					
DATE AFFIDAVIT RECEIVED 1-4-83	CHECKED BY XX	TIME EXPIRED 1-15-83	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
DEPARTMENT OF GAME AND FISHERIES REPORT					
APPROVED		PROVISO	PROTEST		
EXAMINATION					
DATE EXAMINATION MADE 10-11-83	MADE BY DPG	DATE REPORT OF EXAM. WRITTEN 5-7-84	WRITTEN BY DPG	CHECKED BY (Signature)	
DATE PERMIT FEE REQUESTED 8-13-84	AMOUNT DUE \$31.12	DATE RECEIVED 9-6-84 OK FOR PERMIT			
PERMIT					
PERMIT APPROVED BY XX	DATE APPROVED 10-12-84	PERMIT NO. G-34390P	DATE ISSUED 10-15-84		
BEGINNING OF CONSTRUCTION					
DATE NOTICE SENT	DATE FILED	EXTENSION FEE			
EXTENDED TO		EXTENDED TO			
WELL DRILLER'S AND/OR CONSTRUCTION REPORT					
DATE SENT	DATE FILED 7-30-84				
COMPLETION OF CONSTRUCTION					
DATE NOTICE SENT 10-15-84	DATE FILED 10-13-82	EXTENSION FEE			
EXTENDED TO 10-15-87 / 10-15-88 / 10-15-89 / 10-15-90		EXTENDED TO 10-15-91 / 10-15-92			
PROOF OF APPROPRIATION					
DATE SENT	DATE FILED 3/19/93	EXTENSION FEE	EXTENDED TO		
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 3/19/93	DATE APPROVED FOR CERTIFICATE 3/31/93	APPROVED BY (Signature)	
CERTIFICATION					
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO		CERTIFICATE NUMBER G1-2A-190C	DATE ISSUED 4/15/93		

REMARKS

City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895



**STATE OF WASHINGTON
 SUPERSEDING CERTIFICATE OF WATER RIGHT**

Document Title: Certificate of Water Right

Agency: Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008

Applicant: City of Kent
 c/o Kevin Swinford, Public Works Dept.
 220 Fourth Avenue S
 Kent WA 98032-5895

Reference Number: NA

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
August 24, 1983	G1-24404	G1-24404P	G1-24404C

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)	
4 wells		
MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR
	1200	*600

QUANTITY/TYPE OF USE/PERIOD OF USE

Municipal supply – continuously

*Annual quantity from this certificate is supplemental to existing rights held by City of Kent

LOCATION OF DIVERSION/WITHDRAWAL

- 1) 208th Street well (G1-24404C) – 30 feet north and 500 feet west of S¹/₄ corner of Section 6
- 2) Garrison Creek well (G1-23614C) – 940 feet south and 800 feet west of E¹/₄ corner of Section 7
- 3) 212th Street well #1 (G1-24190C) – 1200 feet north and 300 feet west of center of Section 7
- 4) 212th Street well #2 (G1-24190C) – 1100 feet north and 300 feet west of center of Section 7

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
SE ¹ / ₄ SW ¹ / ₄	6	22N	5E	9	King
NE ¹ / ₄ SE ¹ / ₄ and SE ¹ / ₄ NW ¹ / ₄	7				

PARCEL # 0622059159

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

PARCEL #

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their most recently approved water system plan.

PROVISIONS

Use of water under this certificate will remain at a maximum of 1200 gallons per minute, 600 acre-feet per year supplemental to existing rights held by the City of Kent. The purpose of use will remain municipal supply.

If it can be shown that the requested change has a detrimental effect on existing rights, it shall be the responsibility of the operator to mitigate for this impact and/or alter or cease withdrawal of water.

An access port as described in Ground Water Bulletin No. 1 is required. An air line gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each withdrawal 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 weekly. The maximum monthly instantaneous rate of withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly 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, Certificate No., source name, volume including units, Department of Health WFI water system number and source number(s), and well tag number. 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 contained in the 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.

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 90.44.020.

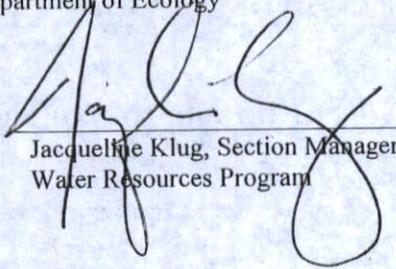
This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

*Given under my hand and the seal of this office at Bellevue, Washington,
this 19 day of September, 2013.*



Maia Bellon, Director
Department of Ecology

By


Jacqueline Klug, Section Manager
Water Resources Program

RECEIVED

JUN 13 2013

DEPT OF ECOLOGY
NWRG-WR

Water Resources Program

PROOF OF APPROPRIATION OF WATER

PERMIT NUMBER GI-24404C	CHANGE APPROVAL NUMBER GI-24404C
NAME OF PERMITTEE City of Kent	CONTACT NAME (IF DIFFERENT) Kevin Swinford

MAILING ADDRESS (STREET) 220 4th Ave So.	CITY Kent	STATE WA	ZIP CODE 98032-5895
PHONE NUMBER (253) 856-5610	FAX NUMBER (253) 856-6500		

SOURCE(S) OF WATER Groundwater-208th Well	LOCATION OF SOURCE(S)					
	NO.	¼ SE	¼ SW	SECTION 6	TOWNSHIP N. 22	RANGE, (E/W)M 5E

LIST ALL PURPOSES WATER IS USED FOR:

Municipal Purposes

DATE WATER WAS COMPLETELY APPLIED TO BENEFICIAL USE Not Applicable (NA)	TIME OF YEAR WATER IS USED: <input checked="" type="checkbox"/> Continuous/Year round <input type="checkbox"/> Seasonal	IF SEASONALLY, LIST THE START AND END DATE Start: NA End: NA
--	---	--

DESCRIBE HOW CONSTRUCTION AND DEVELOPMENT RELATED PROVISIONS (AS REQUIRED BY PERMIT) HAVE BEEN OR ARE TO BE MET (USE ADDITIONAL PAPER IF NECESSARY)

208th well and filtration/treatment facility are completed and on-line with capacity to beneficially use and treat full authorized instantaneous and annual quantities.

DESCRIPTION OF SPECIFIC AREA ON WHICH WATER IS BENEFICIALLY USED(USE ADDITIONAL PAPER IF NECESSARY)

Area served by City of Kent as reflected in their approved 2011 water system plan
System I.D 381501

NO.	¼	¼	SECTION	TOWNSHIP N.	RANGE, (E/W)M
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PHYSICAL WITHDRAWAL OR DIVERSION INFORMATION

Point of Diversion/Withdrawal Tax Parcel #: 0622059159

For Pump Designed Water System Information:

TYPE OF PUMP: <input type="checkbox"/> Submersible <input checked="" type="checkbox"/> Turbine <input type="checkbox"/> Centrifugal <input type="checkbox"/> Other _____			
MAKE Byron Jackson	MODEL # 10HQH	SERIAL # NA	HORSEPOWER 200
MOTOR US Motors	BHP	SPEED Continuous	RPM 1800
<input type="checkbox"/> Water lubricated <input checked="" type="checkbox"/> Oil Lubricated			
BOOSTER PUMP <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	BREAK HORSEPOWER	PRESSURE	OPEN DISCHARGE <input type="checkbox"/> Yes <input type="checkbox"/> No
PUMP DISCHARGE HEAD PRESSURE NA psi	DISCHARGE PIPE DIAMETER 8"		

For Ground Water Withdrawal (if more than one, please include attachment)

Ecology Unique Well Identification Number(s) AFJ 241 [Include a copy of the well log(s)]

PUMP SETTING (DEPTH) 181 top of screen	STATIC WATER LEVEL Artesian feet below land surface	DYNAMIC (PUMPING) LEVEL 85 feet below land surface
ACCESS PORT INSTALLED? <input checked="" type="checkbox"/> Yes	AIRLINE INSTALLED? <input type="checkbox"/> Yes	AIRLINE LENGTH NA Ft.

For Non-Pump Designed Water Systems

METHOD OF WATER DIVERSION	DESCRIPTION OF WORKS
---------------------------	----------------------

NA

SCREEN MESH SIZE
NA

METHOD OF CONTROL
NA

USE OF WATER FOR:

1. Irrigation (Please include map of all irrigated lands):

TYPE OF SYSTEM NA		NUMBER OF SPRINKLERS OR EMMITERS NA	SPRINKLER/EMMITER MAKE NA	MODEL & RATED DISCHARGE NA
SIZE NOZZLE/EMMITER OPENINGS NA	AVERAGE PRESSURE AT SPRINKLER/EMMITER HEADS NA	NUMBER OF ACRES DEVELOPED NA		TYPE OF CROP(S) NA

2. Municipal or Domestic Supply

NUMBER OF DOMESTIC UNITS CURRENTLY SERVED: 38,810 ERU's	NUMBER OF DOMESTIC UNITS TO BE SERVED 38,810 ERU's	POPULATION CURRENTLY SERVED 66,500
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ALSO, provide the following information, if applicable:

- Department of Health public water system identification number.
- 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 NA
--

If a waste discharge permit is required for the facility, include a reference to the permit number: **NA**

4. Other Use of Water (describe): NA

WATER USE AND *MEASUREMENT

IS A FLOW METER OR MEASURING DEVICE INSTALLED? <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	LOCATION OF METER(S) OR MEASURING DEVICE(S) Wellfield production measured at 212th Treatment Plant Treated Water effluent meter		
MAKE Badger Magnetoflow	SERIAL NUMBER 15627261	INSTALLATION DATE 10/3/2000	INSTALLED BY: City of Kent
METER READING 0	DATE 2000		

*Include copy of meter specifications

Report 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 NA	ACRE FEET PER YEAR NA	GALLONS PER MINUTE NA	TOTAL GALLONS PER YEAR NA
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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 of paper.

I, Kevin R Swinford, and Bradley D. Jahn do certify that I/we have
(Please Print) (Please Print)

completed appropriation of water under Water Right Permit or approved water right change number, GI-24404C. This notice and attached documents are true and accurate statements and describe and support my/our assertion that I/we have satisfied the terms of the permit/change in compliance with the law.

[Signature] Permittee(s) Signature Bradley D. Jahn Permittee(s) Signature 6/11/2013 Date

State of: Washington
County of: King } §

Signed and sworn to (or affirmed) before me on this 11 day of June 2013.



Kristin M Lykken
(Signature)
Kristin M Lykken
(Printed Name)
Notary Public
(Title)

My appointment expires:

1-09-14

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

**REPORT OF EXAMINATION FOR CHANGE OF CERTIFICATE
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 August 24, 1983	APPLICATION NUMBER G1-24404	PERMIT NUMBER G1-24404 P	CERTIFICATE NUMBER G1-24404 C
----------------------------------	--------------------------------	-----------------------------	----------------------------------

NAME City of Kent Public Works Department			
ADDRESS (STREET) 220 - 4 th Avenue South	(CITY) Kent	(STATE) WA	(ZIP CODE) 98032-5895

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Four wells
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1200	MAXIMUM ACRE FEET PER YEAR *600
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QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously

*Annual quantity from this certificate is supplemental to existing rights held by City of Kent.

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION--WITHDRAWAL

- 1) 208th Street well (G1-24404C) 30 ft. north and 500 ft. west of the S¹/₄ corner of Section 6
- 2) Garrison Creek well (G1-23614C) 940 ft. south and 800 ft. west from E¹/₄ corner of Section 7
- 3) 212th Street well #1 (G1024190C) 1200 ft. north and 300 ft. west of center of Section 7
- 4) 212th Street well #2 (G1-24190C) 1100 ft. north and 300 ft. west of center of Section 7

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE ¹ / ₄ SW ¹ / ₄ NE ¹ / ₄ SE ¹ / ₄ and SE ¹ / ₄ NW ¹ / ₄	SECTION 6 7	TOWNSHIP N. 22 N	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent as reflected in their approved 2002 water system plan.

DESCRIPTION OF PROPOSED WORKS

Wells: Garrison Creek well - 435' x 12"; 212th Street wells #1 - 367' x 12"; #2 - 375' x 16" 208th Street well - 231' x by 12"
 Kent public water supply distribution system.

DEVELOPMENT SCHEDULE

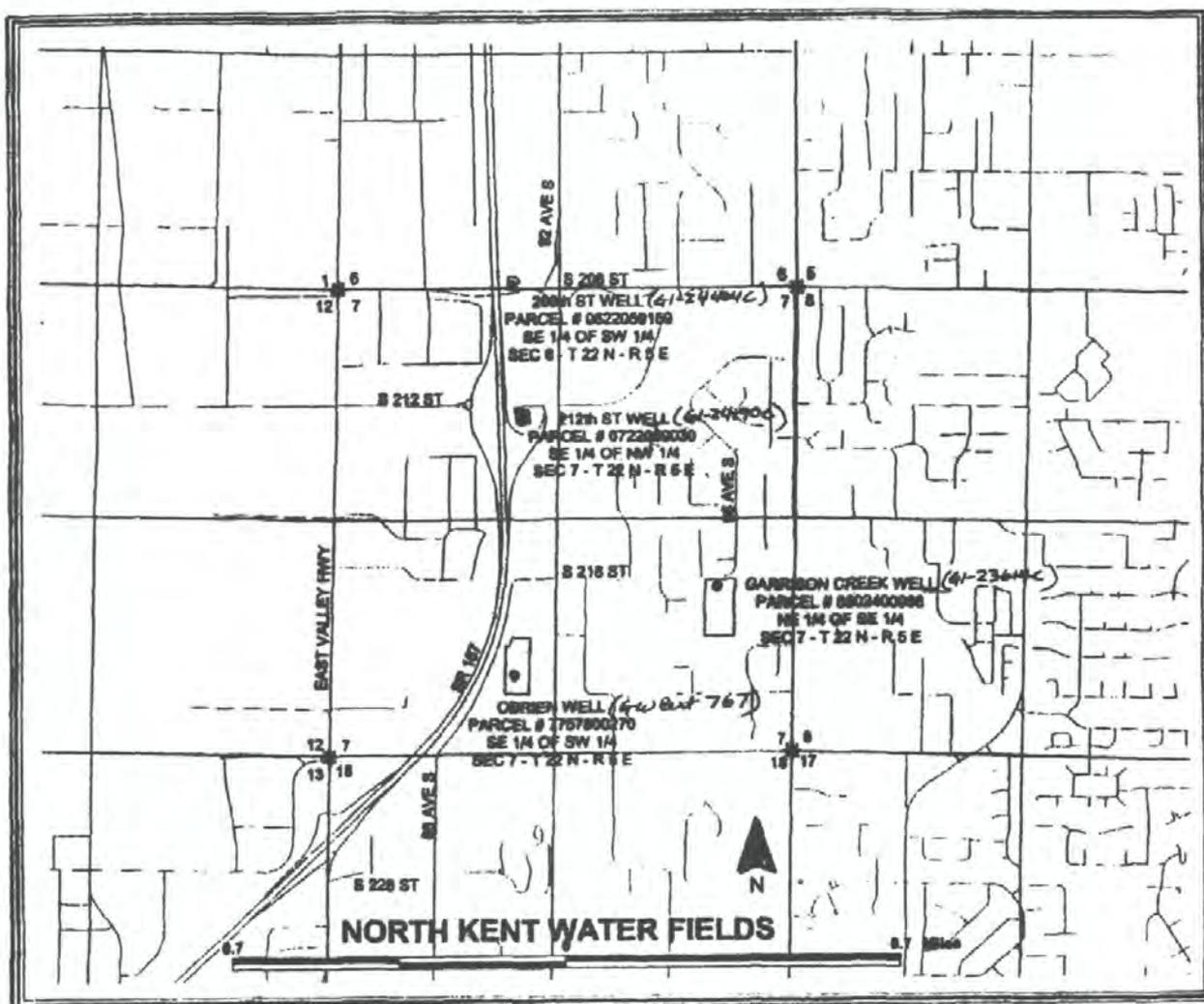
BEGAN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: Complete	WATER PUT TO FULL USE BY THIS DATE: 1 year from change approval <i>3/25/2013</i>
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REPORT

BACKGROUND INFORMATION

The city of Kent is located in south King County and as of 1997 served water to a population of 49,259 through approximately 11,234 connections. Kent's 2002 water system plan indicates that Kent holds 22 water right certificates and a water right claim. Under the emergency drought legislation in 2001, Kent submitted applications for temporary changes to several of their existing water right certificates. Soon after submittal of the temporary change applications, Kent requested Ecology to treat four of the applications as permanent applications for change. For better management of the water system, Kent requests that four wells located within sections 6 and 7 of township 22N, range 5 E, and covered by ground water certificates G1-24404C (this application), G1-24190C, and G1-23614C be operated as a well field. Each certificate would include the points of withdrawal of the other two ground water certificates.

The following map shows the locations of Kent's wells for the proposed well field.



INVESTIGATION

Evaluation of this application included but was not limited to research and/or review of:

- The State Water Code
- Existing water rights on file for the City of Kent
- Records of other water rights in the vicinity
- Information provided by the City of Kent
- Topographic and local area maps
- 2002 Water System Plan for Kent
- Knowledge of area from previous field visits

State Water Code

Chapters 90.03 and 90.44 Revised Code of Washington (RCW) authorize the appropriation of public water for beneficial use and describe the process for obtaining water rights including the process to amend or change existing rights. Laws specifically governing the water right permitting process are RCW 90.03.250 through 90.03.340 and RCW 90.44.060. Changes or amendments to these rights are covered under RCW 90.03.380 and 90.44.100.

Existing rights for the City of Kent Water System

Information contained in Ecology water right records and the 2002 Kent water system plan indicate that Kent holds twenty-two water right certificates plus a surface water claim. The total primary rights, granted by the various documents, amounts to 19, 843 acre-feet.

Kent's water right certificates and water right claim are shown in the table below. The data shown in the table was adapted from the table on page 5-7 of the 2002 Kent water system plan. The asterisk in the table denotes annual quantities that are not to be added to the total existing primary water rights held by Kent but are considered supplemental to those rights. Kent would be allowed to use the maximum annual quantity granted on the supplemental right but only to the extent that the total annual quantities from all sources did not exceed the amount held in primary rights.

WATER RIGHTS HELD BY THE CITY OF KENT				
File No.	Priority: Month/Yr.	Source	GPM/CFS	AF/Yr.
GW Cert. 3107	02/57	Clark Springs "trench"	2250*	*1350
SW Cert. 7232	10/31	Clark Springs Rock Creek	5 cfs	
GW Cert. 7660	02/69	Clark Springs wells	5400	8710
G1-22956C	09/77	Kent Springs wells	3690	5904
SWcl 123225	05/09	Kent Springs (springs)	4488	965
G1-23285C	01/79	East Hill well	1900	3040
G1-23614C	06/80	Garrison Creek well	500	*800
G1-23713C	10/80	High Meadows well	7	11
G1-24073C	04/82	Seven Oaks (Soos Creek) well	900	*864
G1-24189C	10/82	Armstrong Springs wells	1300	*500
G1-24190C	10/82	212 th Street wells	2700	*1400
G1-24404C	08/83	208 th Street well	1200	*600
GW Cert. 2890	09/56	East Hill well	120	146
GW Cert. 651	03/48	East Hill well (#1)	60	*45
GW Cert. 2428	02/53	East Hill well (#2)	120	78.4
GW Cert. 1116	06/50	Summit well	200	320
GW Cert. 494	07/47	Hamilton Road well	38	30
GW Cert. 4534	05/62	Hamilton Road well	12	19.2
GW Cert. 767	01/51	O'Brien well	243	45
GW Cert. 1957	03/52	Impoundment well	140	60
GW 42-D	09/23	East Hill well	60	90
GW 44-D	09/45	East Hill well	90	135
G1-25204C	03/88	Parks and Recreation	290	290
* issued as supplemental to primary rights already held by Kent				

Ground Water Certificate G1-24404C

The annual quantity, granted by this water right certificate, is limited to 600 acre-feet per year. At the time of evaluation on the original application, Ecology determined that Kent already held sufficient annual quantities to meet their twenty year projected water needs. The approved annual quantity was conditioned as supplemental to existing rights held by Kent. By conditioning the annual quantity, it allowed Kent to use the source to a maximum of 600 acre-feet to supplement existing sources but only to the extent it did not increase the total annual primary rights held by Kent. The instantaneous quantity of 1200 gpm granted by the certificate was not subject to the same restriction as the annual quantity.

The well covered by this certificate is referred to as the 208th Street well and is located east of SR 167 near 208th Street in the east Kent area. Kent's 212th Street wells are approximately 2000 feet south of this well and at a similar elevation. The legal description for the well location is 30 feet north and 500 feet west from the S1/4 corner (being within the SE1/4 SW1/4) of section 6, township 22 N, range 5 E. Due to the close proximity to the section line between sections 6 and 7, the well has also been identified as being within section 7. The 208th Street well is within a mile from the Garrison Creek well (NE1/4 SE1/4 of section 7) and the two 212th Street wells (SE1/4 NW1/4 of section 7). The well was constructed in June 1983 to a depth of 231 feet by 12 inches in diameter. Prior to issuance of the water right certificate, Kent notified Ecology that the well was pumping at a rate of 1200 gpm.

Proposed Change

The request made by this change application is to add three additional wells to the certificate. The additional wells are covered with water right certificates (also held by Kent) for municipal supply purposes. All wells are within a one-mile radius of each other. The wells to be added are described as follows.

1. The 212th Street well #1 is within the SE1/4 NW1/4 of section 7, township 22 N, range 5 E. It is 1200 feet north and 300 feet west of the center of section 7. It is one of two wells covered by ground water certificate G1-24190C issued to Kent for 2700 gpm, 1400 acre-feet per year with a priority date of 1982. The annual quantity was conditioned as being supplemental to existing rights held by the City of Kent. Well # 1 was constructed in November 1982 to a depth of 267 feet by 12 inches in diameter.
2. The 212th Street well #2 is 100 feet away from well #1 and also covered by certificate G1-24190C. It is located 1100 feet north and 300 feet west of the center of section 7 also placing it within the SE1/4 NW1/4. This well was constructed in June 1983 to a depth of 366 feet by 16 inches in diameter. Prior to finalizing wells #1 & 2 to certificate, Kent notified Ecology that well #1 had a pumping capacity of 1300 gpm and well #2 had a pumping capacity of 1400 gpm for a combined total of 2700 gpm.
3. The Garrison Creek well is covered by ground water certificate G1-23614C that issued for 500 gpm and 800 acre-feet per year supplemental to existing rights held by Kent. The use is for municipal supply and the place of use is described on the certificate as, 'Area served by the City of Kent'. The Garrison Creek well is located close to the intersection of 218th Street and 98th Avenue in east Kent. It is identified as being 940 feet south and 800 feet west from the E1/4 corner (being within the NE1/4 SE1/4) of section 7, township 22N, range 5E. The well was constructed in February 1981 to a depth of 435 feet by 12 inches in diameter. Prior to issuance of the water right certificate, Kent notified Ecology that the well was pumping at a rate of 500 gpm with the installed 75 HP pump.

Consultant Report

In 2001 Kent had the consulting firm of Hart Crowser conduct a technical review and analysis of five of their public supply wells located within sections 6 and 7 for possible designation as a well field. Hart Crowser submitted their report to the City of Kent in May 2001.

The report indicates that all five wells are on the eastern side of the Green River approximately two miles north of downtown Kent. The wells are identified as the Garrison Creek well, the 208th Street well, the 212th Street wells (1 & 2), and the O'Brien well. The five wells draw from a confined aquifer that originates beneath the Covington Upland to the east and extends beneath the Green River Valley to the west.

Figure 1 (included as part of this report) shows the locations of all five wells. Though the O'Brien well was originally to be part of this well field, Kent decided to withdraw the well from consideration.

The consultants used Department of Health criteria for assessing a proposed well field designation. The four requirements consist of the following: well depth must be within 20 percent of each other; individual wells must draw water from the same aquifer; individual wells must discharge through a common pipe; and all wells must be under the control of the same purveyor. Two of the criteria are essential in evaluating this change application.

Well depths must be within 20% of each other. The analysis showed that once the well depths were adjusted to topographic differences, the depths ranged from 231 feet to 276 feet. The difference in depths was below the 20% criteria.

Individual wells must draw water from the same aquifer. Inorganic chemical analysis was done from water samples of each well. The analysis showed a relatively narrow range of variation that would be consistent with waters drawn from different points within the same aquifer.

Other findings in the consultant's report are of value in evaluating this change application for additional points of withdrawal. With adjustment for topographic differences, the static water levels in the wells ranged from 103 to 115 feet above mean sea level. It was also noted in the report that water levels in the subject Kent wells showed similar responses to pumping and similar seasonal declines during the late summer periods.

Hydrogeological Evaluation of Change Application

Department of Ecology Water Resources hydrogeologist, Doug Wood, provided a technical evaluation for this change application and the other applications for the proposed well field. A memorandum was prepared on February 24, 2003, and placed in the application file. Portions of the technical memorandum are presented below. Reference to figures in the following text can be found in the full memorandum as contained in the change application file.

The Kent area and South King County occupy an area located between the Seattle Fault Zone, extending from near North Bend westward to the Bremerton area, and a parallel fault zone, extending between the Gig Harbor area of Kitsap Peninsula and the Tacoma/Puyallup area of Pierce County (Figure 1 in full memorandum). These structural features create a basin in South King County where the interface between bedrock and younger unconsolidated materials is generally southwesterly dipping (See Figure 1 in full memorandum).

Bedrock is overlain by unconsolidated Quaternary sediments deposited in glacial and interglacial streams and lakes during the period between 100,000 and 10,000 years before present. Kent area stratigraphy, as defined by Woodward et al. (1995), is summarized below in Table 1:

Table 1: South King County Hydrostratigraphy

Unit	Time* and Climate	Geological Significance	Hydrogeological Significance
Qal	Holocene (Interglacial?) 10,000 ybp to present	Holocene alluvium Sand/Gravel Silt/Clay	Aquifer Aquitard
Qvr	Fraser Glaciation	Vashon Recessional Outwash	Aquifer
Qvt	23,000 to 10,000 ybp	Vashon Till	Aquitard
Qva		Vashon Advance Outwash	Aquifer
Q(A)f	Olympia Interglacial 60,000 to 23,000 ybp	Fine grained interglacial sediments	Aquitard
Q(A)c	Possession Glaciation 80,000 to 60,000 ybp	Glacial outwash deposits	Aquifer
Q(B)f	Whidbey Interglacial ~100,000 to 80,000 ybp	Fine grained interglacial sediments	Aquitard
Q(B)c	Double Bluffs Glaciation Pre ~100,000 ybp	Glacial outwash deposits	Aquifer
Q(C)u	Pre ~100,000 ybp	Undifferentiated, unconsolidated fine to coarse sediments	Unknown

* ybp = years before present

The major stream valleys within the Kent area are in part carved by glacial meltwater streams during the latter stages of the Vashon Stage of the Fraser Glaciation between ~15,000 and 10,000 years before present. Within these outwash channels, modern streams such as the Green River have created alluvial deposits consisting of river channel sands and fine grained over bank deposits related to flooding episodes. The Green River alluvial aquifer is recharged directly from stream flows, from springs draining the upper aquifer zones, and from upwelling of groundwater from deeper aquifer zones.

The Quaternary record in South King County is represented by unconsolidated glacial and interglacial sediments that document repeated advances and retreats of piedmont glaciers into the southern part of Puget Sound region during the past approximately 100,000 years.

Glacial sediments include sand and gravel deposited by glacial meltwater streams, silt deposited in ice marginal lakes, and compacted till, composed of poorly sorted clay to gravel sized sediments deposited mainly at the base of the glaciers. Sand and gravel dominated layers are more permeable than finer sediments, and therefore more likely to form productive aquifer layers.

Aquifers within South King County include, from oldest to youngest, Q(B)c, Q(A)c, Qva, and Qvr.

The Fraser Glaciation (Vashon outwash and till) produced the last and best preserved glacial sequence which lasted from approximately 23,000 to 10,000 years before present. It is composed of Qva, advance outwash, formed by meltwater streams as the glaciers moved south, Qvt, till which formed under the ice, and Qvr, recessional outwash that formed in streams as the glacier rapidly retreated northward.

At least two older glaciations are represented in the Puget Sound area - The Possession Glaciation, extending from 60,000 to 80,000 years before present, and the Double Bluffs Glaciation, which occurred prior to approximately 100,000 years before present. Outwash deposits related to the Possession Glaciation are identified in South King County as Q(A)c and those deposits during the Double Bluff Glaciation, identified as Q(B)c.

Groundwater within shallow aquifers zones (Qvr and Qva) is recharged primarily from surface percolation on the Covington and Des Moines uplands (Figure 1 in full memorandum). Groundwater within the basin's deeper aquifer zones, Q(A)c and Q(B)c, is recharged through percolation from the surface and from shallower aquifers throughout the basin.

Groundwater flow within the shallow aquifer zones generally follows local topography, while flow within the deeper aquifer zones is generally east to west and contributes to upward flows into the Green River alluvial plain and to Puget Sound (See Figure 2 in full memorandum).

Local Hydrogeology

The wells that are the subject of proposed changes are located on the western margin of the Covington Upland Area of South King County where it borders the Green River Valley immediately east of Highway 167 (See Figure 3 in full memorandum.)

The Green River Valley occupies a glacial outwash channel that is currently occupied by the northerly flowing Green River. An alluvial hosted aquifer occupies the Green River Valley, drawing recharge from adjacent glacial deposits and from river drainage.

All three water rights (G1-23614C, G1-24190C, and G1-24404C) that are the subject of the application for change penetrate the same aquifer zone within an interconnected aquifer system that is hosted in unconsolidated glacial sediments deposited during the Quaternary Period. Analysis of cross sections included in Woodward, et al (1995) suggests that the aquifer providing water to these wells is either Q(B)c, outwash deposited during the Double Bluff Glaciation or possibly Q(C)u, an unclassified assemblage of pre-Double Bluff aged (older than 100,000 years) glacial and interglacial sediments.

The stratigraphy, as represented in the well logs, shows that all four wells are screened in interbedded sand, gravel, and silt/clay containing occasional peat and wood rich horizons - typical of a fluvial depositional environment. Based on available data it is not possible to determine with certainty whether these deposits resulted from glacial or inter-glacial depositional conditions.

The similarity of the host suggests that all four wells are completed in the same hydrostratigraphic unit. The wells therefore can be considered to be utilizing the same aquifer and would thus conform to the requirement of RCW 90.44.100(2)(a) that requires changes in groundwater rights to tap the same body of public groundwater.

Hart-Crowser, Inc. (Kenrick, 2001), in its analysis of the criteria for Washington Department of Health (DOH) wellfield designation, reports that the difference in well depth for the three wells included in these applications does not exceed the 20% allowed by DOH for well to included in a wellfield. Kenrick appears to have only considered to topmost screened interval for the 212th Street Wells.

Table 2: Well Field Data (After Kenrick, 2001[†] and Ecology Well Logs[‡])

Well Name	Well Elev.*	Depth to Base of Screen	Base of Screen Elev.*	Base of Screen Diff. from Avg.	Depth to Top of Screen	Top of Screen Elev.*	Top of Screen Diff. from Avg.	SWL Elev.*	SWL Diff. from Avg.
Garrison Ck.	240	432	-192	-21%	422	-182	7%	115	4%
208 th St.	44	221	-177	-27%	184	-140	-18%	110	0%
212 th St. #1	61	356	-295	21%	231	-170	0%	113	2%
212 th St. #2	56	367	-311	28%	247	-191	12%	103	-7%

*Feet Relative to Mean Sea Level

[†]Well Elevation and SWL data from Kenrick, 2001.

[‡]Screen Depths Data for 212th Wells from 1987 well logs; 208th from 1987; Garrison Ck from 1981.

Well logs for the three locations indicate that there are at least two water producing zones; an upper zone utilized at all three sites, and a lower zone utilized only in the 212th Street wells (1987). The elevation of the top of the screened interval for the four wells is within 20% of the average elevation for the top of the screens. If the lower water bearing zone is considered, the percent difference in elevation of the base of productive zone would exceed the 20% for DOH wellfield designation based on well depth (see Table 1 - base of screen difference from average). The comparison of screen elevations is good evidence of the wells tapping the same aquifer, but it is not a measure of well depth. Based on well logs, the Garrison Ck well is completed at 435 ft, the 208th St. well at 231 ft, 212th St. well #1 at 356 ft, and 212th St. well #2 at 367 ft.

Artesian pressures, where static water level is higher than surface elevation, are encountered at the 208th Street and 212th Street wells. Artesian conditions are indicative of a significant degree of separation by low permeability units between the source aquifer and the alluvial aquifer within the Green River Valley. They are also indicative of the existence of an upward flow of water between the deep aquifer zones and the Green River alluvial aquifer.

Correspondence Received

In a letter dated July 24, 2001, Kent requested Ecology to change their applications for temporary changes for a well field to applications for permanent changes to establish the wells as a well field. Ecology agreed to the request and used the temporary applications that had already been submitted to Ecology as applications for permanent changes.

Historic Water Use

Based on annual water use data submitted by Kent for the years 1993 through 2001, the 208th Street well and the 212th Street wells have been utilized at or above the certificate quantities of 600 acre-feet and 1400 acre-feet respectively. The maximum annual production from the Garrison Creek well during this same period was 202 acre-feet (approximately 600 acre-feet less than the allowed certificate amount).

Water System Plan

According to the 2002 final draft water system plan, Kent's highest annual production between 1994 and 1996 was 9,908 acre-feet. Their stated demand for 2002 was 9.33 million gallons per day (MGD) for an average annual quantity of 10,450 acre-feet.

The water system plan states that almost 75% of current water use is supplied by the Clark and Kent Springs sources. All other wells and sources are mostly used during high demand summer periods to supplement the main spring sources.

The water system plan indicates that the 212th Street wells (G1-24190C) and the 208th Street well (G1-24404C) have shown no significant deterioration since their construction and represent a dependable supply of 5 MGD. The indication is that the Garrison Creek well (G1-23614C) has lost some capacity since it was first constructed and is currently considered a dependable supply for .5 MGD.

Other Water Rights in the Vicinity

A search of office records for existing water right certificates and claims in the area of the proposed change indicates 20 water right certificates and 65 claims on file within sections 6 and 7 of township 22 N, range 5 E. Kent holds four of the water rights and one of the claims. Except for the rights held by Kent, the records identify that eight are surface water certificates and ten are surface water claims. The remaining records are for ground water uses, most of which are claims. The majority of the ground water claims indicate small quantities for general domestic use and some irrigation use included.

FINDINGS

In accordance with state law, the following considerations must be addressed during the process of evaluating this change request:

- Is water available at the additional points of withdrawal?
- Do the additional points of withdrawal tap the same source of water as the original right?
- Will the change cause impairment to other existing rights?
- Will the public interest be impaired?
- Will the change create an enlargement of the original right?
- Is there potential for different impacts on the water source?

Prior to issuing the water right certificates for the Garrison Creek well and the 212th Street wells, Kent provided documentation that the wells were pumping at permitted capacities. The 2002 water system plan and additional information submitted by Kent further supports the fact that the wells are able to produce adequate quantities of water and have been pumping at designated quantities with no significant signs of deterioration.

Same Source of Water

Staff hydrogeologist, Doug Wood, agrees with the Hart Crowser report that the subject Kent wells are tapping the same aquifer.

Impairment to other existing rights

Adding additional points of withdrawal to certificate G1-24404C does not represent an increase in quantities as all additional wells have been established and used for at least twenty years. All additional wells plus this application well are supplemental to earlier rights held by Kent.

Doug Wood concludes in his technical evaluation the following:

The well field designation does not seek to change the total quantity of water utilized by the three water rights included in the proposal. The quantities at each point of withdrawal shall also remain unchanged. It is therefore concluded that the proposed change will have no impact in addition to those already authorized under certificates G1-23614C, G124190C, and G1-24404C.

Public Interest

No detriment to the public interest could be identified during the investigation of this application for change.

Enlargement of the Original Right

Allowing the three wells to be added to this certificate so Kent could operate them as a well field would not conflict with RCW 90.44.100 (2) (c). The combined total withdrawal from the original and additional wells would not enlarge the right conveyed by the original certificate for the following reasons.

Kent states that 75 percent of their water supply comes from the Clark/Kent Springs sources. The primary rights held by the Clark/Kent Springs sources amounts to 14,579 acre-feet. Based on Kent's 1994 annual water use of 9,908 acre-feet, it is calculated that approximately 7,431 acre-feet would be from the Clark/Kent Springs sources.

The maximum annual quantity that could be produced from the four well field wells is limited to 2800 acre-feet all of which is supplemental to earlier existing rights held by Kent. The additional wells included on this certificate would not allow any new water to be produced from the area and the total acre-feet that could be used from the well field is well within the perfected and beneficially used primary right sources.

Information provided by Kent, indicates that annual quantities granted by the certificates for the 208th and 212th Street wells were met and/or exceeded between the years of 1993 and 2001. During the same time period, the Garrison Creek well has not pumped its maximum annual quantity by approximately 600 acre-feet. However, the maximum annual quantities that could be produced by the well field wells have already been perfected and beneficially used by the primary rights on the Clark/Kent Springs sources.

Information presented in this report support a tentative determination that G1-24404C represents a valid right for the elements stated on the certificate document.

Potential for Different Impacts on the Water Source

The approval of the change request to add three wells to this certificate will not change the time of use or manner of use. This certificate and the certificates covering the other three wells are conditioned as being supplemental to existing rights held by Kent (mainly the Kent and Clark Springs sources). All wells were intended and continue to be used for the intended purpose of meeting peak demands to supplement the primary water supply source for Kent.

DISCUSSION

The legal description on certificate G1-24404C states "Area served by the City of Kent". An updated legal description, reflecting current program practices, needs to include reference to the place of use as described in the latest water system plan. At this time the Department of Health (DOH) is reviewing Kent's 2002 water system plan for approval. Consequently any superseding document issued regarding this requested change should state, "Area served by the City of Kent as reflected in their approved 2002 water system plan."

Before Ecology would proceed to issue a superseding certificate for G1-24404C, the requested changes must be accomplished including approval of their water system plan. Allowing one year from approval of the change would allow sufficient time for Kent to accomplish the change and notify Ecology.

CONCLUSIONS

In accordance with chapters 90.03 and 90.44 RCW, it is concluded that G1-24404C is in good standing and is eligible for the change as requested. The change as recommended will not enlarge the original intent of the certificate and the water use will be beneficial. Approval of this change request will not cause impairment of existing rights or be detrimental to the public interest.

RECOMMENDATION

It is recommended that the request to add additional wells to ground water certificate G1-24404C be approved, subject to the conditions and provisions listed below.

The source of water for this certificate will be four wells described as follows:

The Garrison Creek well (G1-23614C), 940 feet south and 800 feet west from the E1/4 corner of section 7, township 22N, range 5 E, being within the NE1/4 SE1/4.

The 212th Street well #1 (G1-24190C), 1200 feet north and 300 feet west of center of section 7, township 22 N, range 5 E, being within the SE1/4 NW1/4.

The 212th Street well #2 (G1-24190C), 1100 feet north and 300 feet west of center of section 7, township 22 N, range 5 E, being within the SE1/4 NW1/4.

The 208th Street well (G1-24404C), 30 feet north and 500 feet west of the S1/4 corner of section 6, township 22 N, range 5 E, being within the SE1/4 SW1/4.

Use of water under this certificate will remain at a maximum of 1200 gallons per minute, 600 acre-feet per year supplemental to existing rights held by the City of Kent. The purpose of use will remain municipal supply.

The legal description for place of use is "Area served by the City of Kent as reflected in their approved 2002 water system plan. Prior to issuance of a superseding certificate, Kent shall verify that their 2002 water system plan is approved.

If it can be shown that the requested change has a detrimental effect on existing rights, it shall be the responsibility of the operator to mitigate for this impact and/or alter or cease withdrawal of water.

An access port as described in Ground Water Bulletin No. 1 is required. An air line gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained for each withdrawal 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 weekly. The maximum monthly instantaneous rate of withdrawal and the monthly total volume shall be submitted to Ecology by January 31st of the following year. Ecology is requiring submittal of monthly 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, Certificate No., source name, volume including units, Department of Health WFI water system number and source number(s), and well tag number. 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.

REPORT BY: Janet Jorg

DATE: 3/25/03

AFFIDAVIT OF PUBLICATION

Barbara Alther, first duly sworn on oath states that he/she is the Legal Clerk of the

SOUTH COUNTY JOURNAL

600 S. Washington Avenue, Kent, Washington 98032

a daily newspaper published seven (7) times a week. Said newspaper is a legal newspaper of general publication and is now and has been for more than six months prior to the date of publication, referred to, printed and published in the English language continually as a daily newspaper in Kent, King County, Washington. The South County Journal has been approved as a legal newspaper by order of the Superior Court of the State of Washington for King County.

The notice in the exact form attached, was published in the South County Journal (and not in supplemental form) which was regularly distributed to the subscribers during the below stated period. The annexed notice, a

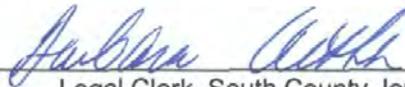
Change to Groundwater Certificate G1-24404C (PO 37222)

as published on: 11/10, 11/17

The full amount of the fee charged for said foregoing publication is the sum of \$166.50, charged to Acct. No. 8031430.

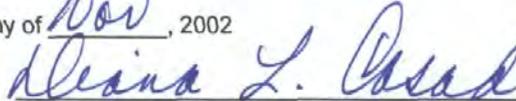
The cost above includes a \$6.00 fee for the printing of the affidavits.

Legal Number 848562



Legal Clerk, South County Journal

Subscribed and sworn before me on this 17 day of Nov, 2002



Notary Public of the State of Washington
residing in Renton
King County, Washington



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
NOTICE OF APPLICATION
TO CHANGE AN EXISTING
WATER RIGHT

TAKE NOTICE:

That City of Kent Public Works Department of Kent, Washington on July 2, 2001, has filed an application of change to Ground Water Certificate G1-24404C. Certificated use is for 1200 (gpm) 600 acre-feet per year for Municipal Supply, as granted under Ground Water Right G1-24404C, priority date August 24, 1983. That the original point of withdrawal is located in SE1/4 SW1/4, Section 6, Township 22N, Range 5E, W.M. in King County. The place of use is located within the area served by the City of Kent.

The request here is to add points of withdrawal covered by Ground Water Certificates G1-23614C, G1-24190C, located within the SE1/4 NW1/4 and NE1/4 SE1/4, Section 7, Township 22N, Range 5E, W.M. to be managed as a well field.

No increase will be made to the instantaneous diversion/ withdrawal rate or annual quantity.

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 (\$2.00 check or money order) recording fee and filed with the Department of Ecology at the address shown below, within thirty (30) days from November 10, 2002.

Department of Ecology
Northwest Regional Office
3190 - 160th SE
Bellevue, WA 98008

Published in the South County Journal November 10 and 17, 2002.
848562

*affid OK
D.S.*

EMERGENCY DROUGHT ACTION



STATE OF WASHINGTON APPLICATION FOR CHANGE/TRANSFER OF WATER RIGHT

For filing with Ecology or with County Conservancy Boards

A MINIMUM FEE OF \$10.00 PAYABLE TO ECOLOGY MUST ACCOMPANY THIS APPLICATION

(Check all that apply.)

- Change purpose(s) of use
- Add purpose(s) of use
- Change point(s) of diversion/withdrawal
- Add point(s) of diversion/withdrawal
- Change/transfer place of use
- Other (i.e. consolidation, intertie, trust water)

Explain (Well Field) Common Point of Withdrawal

FOR OFFICE USE ONLY	
CHANGE No. <u>CGI-24404C</u>	WRIA <u>9</u>
DATE ACCEPTED <u>7 / 2 / 01</u>	BY <u>D.B.</u>
FEE \$ <u>10.00</u>	REC'D <u> </u> / <u> </u> / <u> </u>
CHECK No. <u> </u>	
SEPA: <input checked="" type="checkbox"/> Exempt	<input type="checkbox"/> Not exempt

IF MORE SPACE IS NEEDED, ATTACH ADDITIONAL SHEETS (PLEASE PRINT OR TYPE CLEARLY)

1. Applicant Information:

APPLICANT/BUSINESS NAME <u>City of Kent</u>	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>
ADDRESS <u>220 4th Avenue South</u>		
CITY <u>Kent</u>	STATE <u>WA</u>	ZIP CODE <u>98032-5895</u>

CONTACT NAME (IF DIFFERENT FROM ABOVE) <u>Brad Lake</u>	PHONE NO. <u>(253) 856-5610</u>	FAX NO. <u>(253) 856-6600</u>
ADDRESS <u>220 4th Avenue South</u>		
CITY <u>Kent</u>	STATE <u>WA</u>	ZIP CODE <u>98032-5895</u>

FOR OFFICE USE ONLY			
APP. NO. _____	PERMIT NO. _____	CERT. NO. <u>61-24404C</u>	CERT. OF CHANGE NO. <u>CGI-24404C</u>

2. Water Right Information:

WATER RIGHT OR CLAIM NUMBER G1-24404C	RECORDED NAME(S) City of Kent
DO YOU OWN THE RIGHT TO BE CHANGED? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	
IF NO, PROVIDE OWNER(S) NAME:	
HAS THE WATER BEEN PUT TO BENEFICIAL USE IN THE LAST FIVE (5) YEARS? <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	

Please attach copies of any documentation that demonstrates consistent, historical use of water since the right was established. Also, if you have a water system plan or conservation plan, please include a copy with your application.

3. Point(s) of Diversion/Withdrawal:

A. Existing

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
208 th Well	S11	SE	SW	06	22N	5E	0622059159	AFJ241

B. Proposed

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #
(Wellfield) See attachment								

DO YOU OWN THE EXISTING AND PROPOSED POINT(S) OF DIVERSION/WITHDRAWAL?
 EXISTING: YES NO PROPOSED: YES NO - IF NO, PROVIDE OWNER(S) NAME:

Please include copies of all water well reports involved with this proposal. Also, if you know the distances from the nearest section corner to the above point(s) of diversion/withdrawal, please include that information in Item No. 6 (remarks) or as an attachment.

4. Purpose of Use:

A. Existing

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / 208 th Well	1,200 GPM	600 AF/YR	Annually

B. Proposed

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply / See Attachments	Consolidate for a	quantities well field	July through December 2001
Operate as a well field.	4,643 GPM	2,845 AF/YR	July through December 2001

5. Place of Use:

A. Existing

LEGAL DESCRIPTION OF LANDS WHERE WATER IS PRESENTLY USED:							
Area served by City of Kent							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		
DO YOU OWN ALL THE LANDS IN THE EXISTING PLACE OF USE? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME: Individual businesses and residences within the City of Kent water service area.							

B. Proposed

LEGAL DESCRIPTION OF LANDS WHERE NEW USE IS PROPOSED:							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
DO YOU OWN ALL THE LANDS IN THE PROPOSED PLACE OF USE? <input type="checkbox"/> YES <input type="checkbox"/> NO – IF NO, PROVIDE OWNER(S) NAME:							

Attach a detailed map of your proposed change/transfer. The map should show existing and proposed point(s) of diversion/withdrawal, place of use and any other features involved with this application. If platted property, please include a certified copy of the plat map.

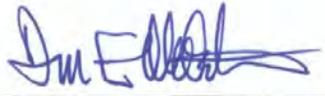
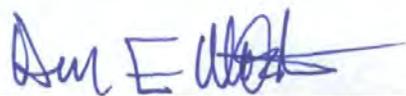
Are there any ADDITIONAL WATER rights OR CLAIMS RELATED to the same property as the ONE PROPOSED FOR CHANGE/TRANSFER? <input type="checkbox"/> YES <input checked="" type="checkbox"/> NO – IF YES, PROVIDE THE WATER RIGHT/CLAIM NUMBER(S):

6. Remarks and Other Relevant Information:

<p>The City of Kent is requesting temporary approval to classify five (5) different wells (one primary well/4 supplemental wells) in the area as a well field, as they have been shown to be drawing water from a common aquifer. The primary purpose is to share water rights granted to individual wells with others withdrawing from the same aquifer. This will greatly improve the reliability and flexibility of all the water sources, as well as optimizing the amount of yield available during seasonal peaking periods. The benefit to the city of Kent and the citizens therein would be significant, providing more reliable sources of supply during drought conditions for municipal use as well as adequate water for fire protection requirements during higher demand periods. This request would allow the withdrawal of water to be distributed more evenly from the aquifer, as well as allowing Kent the flexibility to shift water rights away from less productive or failing wells to wells that are more productive under current drought conditions.</p>
<p>IF FOR SEASONAL OR TEMPORARY, START DATE <u>7 / 1 / 2001</u> END DATE <u>12 / 31 / 2001</u></p>

7. Signatures:

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 am hereby granting staff from the Department of Ecology or the County Conservancy Board access to the above site(s) for inspection and monitoring purposes. If assisted in the preparation of the above application, I understand that all responsibility for the accuracy of the information rests with me.

 _____ (Applicant)	<u>6/28/01</u> _____ (Date)
 _____ (Water Right Holder)	<u>6/28/01</u> _____ (Date)
 _____ (Land Owner(s) of Existing Place of Use)	<u>6/28/01</u> _____ (Date)

IMPORTANT! APPLICATION FILING INFORMATION IS PROVIDED ON THE NEXT PAGE.

WE ARE RETURNING YOUR APPLICATION FOR THE FOLLOWING REASON(S):

- APPLICATION FEE NOT ENCLOSED
- MAP NOT INCLUDED or INCOMPLETE
- ADDITIONAL SIGNATURES REQUIRED
- SECTION _____ IS INCOMPLETE
- OTHER/EXPLANATION: _____

STAFF: _____ **DATE:** ____/____/____

ATTACHMENT FOR APPLICATION FOR CHANGE

Point(s) of Diversion/Withdrawal - Existing Proposed:

SOURCE	NO.	¼	¼	SEC.	TWP.	RGE.	PARCEL #	WELL TAG #	CERTIFICATE
212 th Street Well #1	S10	SE	NW	07	22N	5E	0722059030	AFJ239	G1-24190C
212 th Street Well #2	S10	SE	NW	07	22N	5E	0722059030	AFJ240	G1-24190C
208 th Street Well	S11	SE	SW	06	22N	5E	0622059159	AFJ241	G1-24404C
Garrison Creek Well	S06	NE	SE	07	22N	5E	8802400066		G1-23614C
O'Brien Well	S12	SE	SW	07	22N	5E	7757800270	AEJ475	767-A

DO YOU OWN THE ABOVE POINT(S) OF DIVERSION/WITHDRAWAL? YES NO - IF NO, PROVIDE OWNER(S) NAME:

Purpose(s) of Use - Existing Proposed:

PURPOSE OF USE	GPM or CFS	ACRE-FT/YR	PERIOD OF USE
Municipal Supply	4,643 GPM	2,845 AF/YR	Throughout the year

Place of Use - Existing Proposed:

LEGAL DESCRIPTION OF LANDS							
City of Kent water service area							
¼	¼	SEC.	TWP.	RGE.	COUNTY	PARCEL #	# OF ACRES
					King		

DO YOU OWN ALL THE LANDS IN ABOVE PLACE OF USE? YES NO - IF NO, PROVIDE OWNER(S) NAME:

Individual businesses and residences within the City of Kent water service area.

IMPORTANT!

Submit your application to Ecology at the regional office for the area of proposed or existing water use or at a Conservancy Board with jurisdiction. Below is a map of the State of Washington, with outlines of the four Ecology regional offices. If you have questions about your application or whether a County Conservancy Board with jurisdiction exists, contact the Water Resources program at the regional office in which your project is located.



Department of Ecology
Central Regional Office
15 W. Yakima Avenue, Suite 200
Yakima, WA 98902
Telephone: (509) 575-2490

Department of Ecology
Eastern Regional Office
N. 4601 Monroe, Suite 202
Spokane, WA 99205-1295
Telephone: (509) 456-2926

Department of Ecology
Northwest Regional Office
3190 - 160th Avenue SE
Bellevue, WA 98008-5452
Telephone: (425) 649-7000

Department of Ecology
Southwest Regional Office
PO Box 47775
Olympia, WA 98504-7775
Telephone: (360) 407-6300

Persons of disability needing assistance in the application process or those needing this application in an alternate format, may call (360) 407-6607 (voice) or (360) 407-6006 (TDD).

Ecology is an Equal Opportunity and Affirmative Action employer...

PROGRESS SHEET - APPLICATION FOR CHANGE
Of Water Right Certificate # CG1-24404C (208th Well)

NAME: City of Kent
Public Works Department
220 - 4th Avenue South
Kent, WA 98032-5895

ATTN: Brad Lake, Engineering Department

PHONE: 253-856-5610
FAX 253-856-6600

Appurtenant to Water Right Claim No. G1-24404C

Purpose of Application: Emergency Drought (208th Well) - request point of withdrawal temporarily transferred to its Armstrong Springs Well/groundwater right (G1-24073C).

Application received on 7/2/01 Fee Paid \$10.00 7/2/01

Returned for completion or correction _____

Returned _____

PUBLICATION: OK'd by AK Date 11/17/02 Notice Sent 10/10/02

Protests _____ by _____

_____ by _____

_____ by _____

Affidavit received and checked _____ Expires _____

EXAMINATION: Made ROE 3/03 by jk 3/25/03 / Reviewed by Buck Smith 3/7/03

Sup CERTIFICATE: OK'd for issue by JKlug date 9-19-2013

Statement of fee mailed _____ Amount _____

Fee received _____

Sup Certificate of Change Issued 9-19-2013 No. CG1-24404C

WR DOC ID: 2285874

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 203, Laws of Washington for 1945, and amendments thereto, and the rules and regulations of the Department of Ecology.)

PRIORITY DATE August 24, 1983	APPLICATION NUMBER G1-24404	PERMIT NUMBER G1-24404P	CERTIFICATE NUMBER G1-24404C
----------------------------------	--------------------------------	----------------------------	---------------------------------

NAME
City of Kent Engineering Department

ADDRESS (STREET) (CITY) (STATE) (ZIP CODE)
220 South 4th Avenue Kent Washington 98032

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
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1200	MAXIMUM ACRE-FEET PER YEAR 600.0
-------------------------------	------------------------------------	-------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously
(Supplemental to existing rights)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
500 feet west and 30 feet north of the south quarter corner of Section 6

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE¼ SE¼ SW¼	SECTION 6	TOWNSHIP N. 22	RANGE, (E OR W) W.M. 5E	W.R.L.A. 9	COUNTY King
--	--------------	-------------------	----------------------------	---------------	----------------

RECORDED PLATTED PROPERTY

LOT OF 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 Kent.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through 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 Bellevue, Washington,

this 15th day of April, 1993.

Department of Ecology

ENGINEERING DATA
OK 

by Stephen J. Hirschey
Stephen J. Hirschey, Section Supervisor, Water Resources

FOR COUNTY USE ONLY

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 August 24, 1983	APPLICATION NUMBER G1-24404	PERMIT NUMBER G1-24404P	CERTIFICATE NUMBER
----------------------------------	--------------------------------	----------------------------	--------------------

NAME City of Kent Engineering Department			
ADDRESS (STREET) 220 South 4th Avenue	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1500 1200	MAXIMUM ACRE-FEET PER YEAR 600.0
-------------------------------	---	-------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE Municipal water supply - continuously

(Supplemental to existing rights)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL 500 feet west and 30 feet north of the S $\frac{1}{2}$ corner of Sec. 6

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE $\frac{1}{2}$ SE $\frac{1}{2}$ SW $\frac{1}{4}$	SECTION 6	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5E	W.R.I.A. 9	COUNTY King
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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 Kent.

DESCRIPTION OF PROPOSED WORKS

Well, 12"x231' deep and screened at bottom 37 feet in sand and gravel.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: October 15, 1985	WATER PUT TO FULL USE BY THIS DATE: October 15, 1985
--	--	---

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040.

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 Redmond Washington, this 15th day of October, 1984.

Department of Ecology

ENGINEERING DATA

OK

by Robert K. McCormick
ROBERT K. McCORMICK, Regional Manager

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 August 24, 1983	APPLICATION NUMBER G1-24404	PERMIT NUMBER	CERTIFICATE NUMBER
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NAME City of Kent Engineering Department			
ADDRESS (STREET) 220 South 4th Avenue	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1500	MAXIMUM ACRE-FEET PER YEAR 600.0
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal water supply - continuously		
(Supplemental to existing rights)		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 500 feet west and 30 feet north of the SW corner of Sec. 6
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SE 1/4 SW 1/4	SECTION 6	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent.

DESCRIPTION OF PROPOSED WORKS

Well, 12"x231' deep and screened at bottom 37 feet in sand and gravel.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: 1 yr from permit issuance	WATER PUT TO FULL USE BY THIS DATE: 2 yrs from permit issuance
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REPORT

Background:

This application to withdraw 1,500 gpm from a well near Kent for the purpose of municipal water supply was received from the City of Kent on August 24, 1983.

Public notice of this application was made in The Daily News Journal on January 9, and 16, 1984 and no protests or objections were filed.

Investigation:

This well was field examined on October 11, 1983 and the 16 inch diameter surface casing was found welded shut and accurately located as described. Since this well is located immediately north east of the intersection of State Road 167 and South 208th Street, it is known as the 208th Street Well. The 208th Street Well was completed in June 1983 with a 12 inch diameter casing, 231 feet deep and screened at the bottom 37 feet in sand and gravel. Since this well had an original artesian pressure head of 50 feet above land surface, and is affected by pumping at the 212th Street wells No. 1 and No. 2, the 208th Street Well is believed to be drafting the same artesian aquifer as those wells.

There are two other wells in the vicinity of the 208th St. well which may be affected by its pumping. These wells are the Melby well (1,000 feet west of 208th St. well) which serves the Ruth residence (approximately 150 feet north of 208th St. well) and the Kent Nursery well (approximately 3,000 feet south of 208th St.). Pressure gauges installed on these wells during testing of 208th St. did not show marked decreases in artesian head. However, there were complaints from Kent Nursery during testing of the 212th St. wells in July and October of 1983.

The City of Kent was informed that the Kent Nursery's Groundwater Certificate No. G1-21106C has priority over the city's more recent applications.

Since the City of Kent has been aware of this interference problem, they have attempted to mitigate the effect on the Kent Nursery well. The Kent Nursery was informed that their water rights do not guarantee that certain artesian pressures will be maintained.

The annual quantity associated with this application is 600.0 acre-feet per year which is equivalent to pumping at the total design rate of 1,500 gpm for 25 percent of the time. An analysis of the City of Kent's water rights and present and future consumption follows.

<u>Water Right File No.</u>	<u>Source Name</u>	<u>Quantity gpm</u>	<u>Annual Q (acre-feet)</u>
651-A	East Hill Well # 1	60	42 (supplemental)
2428-A	East Hill Well # 2	120	78.4
3107-A	Clark Springs Trench	2,250	1,350 (supplemental)
7232-A	Clark Springs	2,220	3,600 (supplemental)
7660-A	Clark Springs Wells	5,400	8,710
G1-22956C	Kent Springs	3,690	5,904
G1-23285C	East Hill Well	1,900	3,040
G1-23614C	Garrison Creek Well	500	800 (supplemental)
G1-23713P	High Meadows	7	11
G1-23852P	Reservoir Well	160	256
G1-24073P	Seven Oaks	900	864 (supplemental)
G1-24189P	Armstrong Springs	1,300	500 (supplemental)
G1-24190	212th St. Wells	3,500	1,400 (supplemental)
G1-24404	208th St. Well	1,500	600 (supplemental)

TOTAL: Primary..... 17,999.4
Supplemental..... (9,156.0)

As shown, the City of Kent presently has 17,999.4 acre-feet in primary water rights. The City has about 12,000 services and a current average demand of 6,400 acre-feet per year. Kent is expected to have an annual demand of approximately 16,800 acre-feet (15 MGD average annual demand) by the year 2000, so existing rights held by the City should provide for projected demand through the next 20 years. For this reason, the annual

quantity of this water right should be issued as supplemental to existing rights held by the applicant.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendation:

I recommend that this application to withdraw 1,500 gpm from the 208th St. well near Kent be granted and that a permit be issued under this application with an annual quantity of 600.0 acre-feet which are supplemental to the existing water rights for the City of Kent.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-02 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

REPORT BY: David P. Gierke
Geologist

DATE: 8-13-84



APPLICATION FOR ~~DMT~~ 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 C124404	W.R.# 9	COUNTY King	PRIORITY DATE Aug 29, 1983	TIME 2PM	ACCEPT RB
APPLICANT'S NAME CITY OF KENT ENGINEERING DEPARTMENT				BUSINESS TEL 872-3383	
ADDRESS (STREET) 220 S. 4th Avenue		(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032	
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION N/A					

1. SOURCE OF SUPPLY

IF SURFACE WATER SOURCE (NAME OF STREAM LAKE SPRING ETC) (IF UNNAMED SO STATE)	IF GROUND WATER SOURCE (WELL TUNNEL INFILTRATION TRENCH ETC)
TRIBUTARY	SIZE AND DEPTH 12" - 231' depth

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY IRRIGATION MINING MANUFACTURING ETC.)
Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF	CUBIC FEET PER SECOND CFS	OR	GALLONS PER MINUTE	ACRE FEET PER YEAR
			1500PM	

TIMES DURING YEAR WATER WILL BE REQUIRED
Summer Months 60-90 Days

IF IRRIGATION NUMBER OF ACRES
Continuous period with city of Kent 8/29/83 (RB)

IF DOMESTIC USE NUMBER OF UNITS BY TYPE (E.G. HOME MOBILE HOME 2 CAMPSITES ETC)

IF MUNICIPAL USE ESTIMATED POPULATION FROM TODAY
60,000

DATE PROJECT WAS OR WILL BE STARTED
Mid 1985

DATE PROJECT WAS OR WILL BE COMPLETED
Early 1986

RECEIVED

DEPT OF ECOLOGY

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

500' West and 30' North of the South quarter corner of Section 6-22-5

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N	RANGE E OR W W M	COUNTY
SE 1/4, SE 1/4, SW 1/4	6	22	5E	King

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED IF NOT INSERT NAME & ADDRESS OF OWNER
Yes

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 City of Kent is property on which water will be used. Legal of actual well site or property on which water will be taken is as follows:

South 40.00 feet of the west 150.00 feet of the East 585.00 feet of the Southwest quarter of Section 6 Township 22 N Range 5E

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACTOR, CHASER, ETC.)

Area is City of Kent Water District Service Area. The City is responsible for supplying water

IF YES, FROM WHAT SOURCE (SURFACE OR GROUND WATER) AND UNDER WHAT AUTHORITY

YES

NO

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 during design phase.

REMARKS

7. Please refer to this application as "208th Street Well"

J. S. [unclear]

IF 10 ACRES 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

Merrill Vesper
APPLICANT'S SIGNATURE

Don E. Webster
LEGAL LANDOWNER'S SIGNATURE

220 S. 4th Avenue, Kent, Wa 98032
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent Engineering Department			TELEPHONE NO. 872-3383		
ADDRESS (CITY) 220 S. 4th Ave., Kent,		STATE Washington		ZIP CODE 98032	
ASSIGNED TO			TELEPHONE NO.		DATE ASSIGNED
ADDRESS (CITY)		STATE		ZIP CODE	
APPLICATION NO. G100101	PERMIT NO. G100101P		CERTIFICATION NO. C1-1001		
DATE AMENDED		DATE CANCELLED		W.R.I.A.	
APPLICATION					
DATE APPLICATION RECEIVED August 24, 1983		INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		DATE FEE RECEIVED August 24, 1983	
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 10-15-83	
PROTESTED BY AND DATE					
DATE AFFIDAVIT RECEIVED 1-17-84	CHECKED BY JH	TIME EXPIRED 2-16	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
DEPARTMENT OF GAME AND FISHERIES REPORT					
APPROVED		PROVISO		PROTEST	
EXAMINATION					
DATE EXAMINATION MADE 10-11-83	MADE BY SPG	DATE REPORT OF EXAM. WRITTEN 5-10-84	WRITTEN BY DPL	CHECKED BY (Signature)	
DATE PERMIT FEE REQUESTED 1-13-84		AMOUNT DUE \$20.00		DATE RECEIVED	
PERMIT					
PERMIT APPROVED BY JH	DATE APPROVED		PERMIT NO. G100101P	DATE ISSUED 1-15-84	
BEGINNING OF CONSTRUCTION					
DATE NOTICE SENT		DATE FILED		EXTENSION FEE	
EXTENDED TO			EXTENDED TO		
WELL DRILLER'S AND/OR CONSTRUCTION REPORT					
DATE SENT			DATE FILED 7-5-83		
COMPLETION OF CONSTRUCTION					
DATE NOTICE SENT 10-15-84		DATE FILED 10-13-92		EXTENSION FEE 5.00	
EXTENDED TO 10-15-87 / 10-15-88 / 10-15-89 / 10-15-90 / 10-15-91 / 10-15-92			EXTENDED TO		
PROOF OF APPROPRIATION					
DATE SENT		DATE FILED 3/19/93		EXTENSION FEE	
DATE CERTIFICATE FEE REQUESTED		AMOUNT DUE	DATE RECEIVED 3/19/93	DATE APPROVED FOR CERTIFICATE 3/31/93	APPROVED BY (Signature)
CERTIFICATION					
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO		CERTIFICATE NUMBER C1-1001		DATE ISSUED 4/15/93	

REMARKS

CERTIFICATE RECORD No. 1 PAGE No. 42-D UNDER DECLARATION OF CLAIM No. 12

STATE OF WASHINGTON, COUNTY OF King

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That EAST HILL COMMUNITY WELL COMPANY
of Kent, Washington has filed
in the office of the State Supervisor of Hydraulics of Washington Declaration of Claim No. 12
to withdraw ground waters of the State from a Pump Well,
located within Tract 20 of R. O. Smith Orchard Tracts, In Sec. 20, Twp. 22 N.,
Rge. 5 E.W.M.

for the purpose of Domestic supply and watering livestock for community

The right to the use of said ground waters has been sustained and approved by the Supervisor of Hydraulics in accordance with Chapter 263, Laws of Washington for 1945, and is hereby entered of record in Volume 1 of Ground Water Certificates at page 42-D; the right approved has a priority of September 1, 1923; the amount of water which the Declarant is entitled to withdraw for the aforesaid purpose is limited to the amount actually beneficially used and shall not exceed 60 gallons per minute; 90 acre-feet per year; and is appurtenant to the following described lands or place of use:

East Hill Community, King 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 Hydraulics affixed this 22nd day of March, 19 46

RODNEY RYKER

State Supervisor of Hydraulics.

By: Chas. J. Bartholomew
CHAS. J. BARTHOLOMEW Deputy

STATE OF WASHINGTON
Office of Supervisor of Hydraulics
Olympia

NOTICE OF DECLARATION OF
CLAIM TO RIGHT TO WITH-
DRAW GROUND WATER NO. 12.

To Whom It May Concern:

Notice is hereby given that East Hill Community Well Company of Kent, State of Washington, under date of August 22, 1945, filed with the State Supervisor of Hydraulics, Olympia, Washington, a declaration of claim of vested right existing prior to June 7, 1945, to withdraw public ground waters from a pump well, about 2 miles east of Kent, Washington, in the amount of 60 gallons per minute; with priority (date of first beneficial use of water) of September, 1923, which water is used continuously each year for the purpose of domestic supply and livestock; that the location of the well from which water is withdrawn is within Tract 20 of the R. O. Smith Orchard Tracts, Addition to Kent, in Sec. 20, Twp. 22 N., Rge. 5 E., W. M., county of King, and has requested a Certificate of Water Right under such claim.

Any person, firm or corporation disputing such claim or protesting that the right claimed is not a vested right to be recognized under Chap. 263 of the 1945 Session Laws of the State of Washington, may file with the State Supervisor of Hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make, within thirty (30) days after date of last publication, which date is November 2, 1945.

Witness my hand and official seal this 5th day of September, 1945.

(Seal) CLARENCE B. SHAIN,
State Supervisor of Hydraulics.
By CHAS. J. BARTHOLET,
(1691) Deputy.

Affidavit of Publication

STATE OF WASHINGTON, } ss.
COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a
Declaration to Withdraw Water No. 12

as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of

two (2) consecutive weeks, commencing on the 25th day of September, 1945,

and ending on the 2nd day of October, 1945,

both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

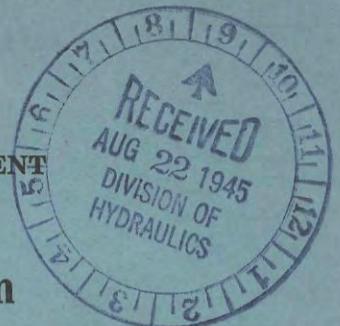
2nd day of October, 1945

J. C. James

Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.



STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics



Declaration of Ground Water Claim

(Separate claims should be filed for each well, tunnel or infiltration trench)

No. 1 12

I, East Hill Community Well Co
(Name of claimant)

of Kent Wash
(Complete postoffice address)

do hereby make declaration of claim of vested right to ground water by use prior to June 7, 1945, and file the same with the State Supervisor of Hydraulics, in accordance with Section 9, Chapter 263, Laws of 1945 of the State of Washington, and request a Certificate of Ground Water Right thereunder.

1. SOURCE from which water is withdrawn is Pump Well
(Flowing well, pump well, infiltration trench, or tunnel)

2. LOCATION is: 2 miles east of Kent Wash
(Approximate distance and direction from nearest city or town)

and is more particularly described as follows:

(a) On Benson Road 660 feet north of Moltke Road
Tract 20
(Give distance and bearing to corner of section or other legal subdivision)

being within R.D. Smith Orchard Tract of Sec. 20, Twp. 22 N., Rge. 5 E. W.M.
Addition to Kent
(Smallest legal subdivision) (E. or W.)

or (b) Within limits of incorporated city or town of _____

in Lot _____, Block _____ of _____
(Name of addition or plat)

County of _____ within _____ area
(Leave blank)

_____ sub-area _____ zone
(Leave blank) (Leave blank)

(c) The location of the well or other works is shown on the accompanying plat, or other adequate maps or drawings.

(d) The owner of property on which the works are constructed is:

East Hill Community Well Co Kent Wash
(Name) (Post office address)

3. CONSTRUCTION WORK was begun on July 1-1923 was completed on Aug. 10-1923
(Date) (Date)

and the ground water claimed was first used for the purposes set out below on About Sept 1-1923
(Date)

since which time the water has been used Continuously
(Continuously or intermittently)

from Sept 1923 to Aug 1945
(Date) (Date)

4. QUANTITY of water claimed and used is 50 gallons per minute; 90 acre feet per year.

5. PURPOSE OR PURPOSES for which water is used Domestic and for Livestock
(Domestic, irrigation, municipal, manufacturing, industrial, etc.)

5. (Continued)

(a) FOR MUNICIPAL SUPPLY: To supply the city, town or community of.....
in the county of....., having a present population of....., and an estimated
population of..... in 19.....

(b) FOR IRRIGATION: The land irrigated has a total area of..... acres, and water is
used each year for this purpose from..... to.....
(Date) (Date)

(c) Legal description of property on which water is used for all purposes other than municipal
supply:

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 221 feet. Diameter 6 inches or feet. Dug or drilled drilled
Flowing or pump well Pump

IF PUMP WELL: Type and size of pump is Portona Turbine 6000 m
Type and size of motor or engine is 5 H.P. Single phase
Depth from ground surface to water level before pumping 200 feet.

After continuous operation for at least four hours, the measured discharge of pump is 30
g.p.m., and the drawdown of water level is Have lost record. drawback was little feet.

Date of test Aug. 1923

IF FLOWING WELL: Measured discharge g.p.m. on..... (Date)

Shut-in pressure at ground surface..... lbs. per sq. in. on..... (Date)

Water is controlled by..... (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each
casing size.)

- inch diameter..... from..... to..... feet

Describe and show depth of shoe, plug, adapter, liner or other details:

PERFORATED CASINGS OR SCREENS:

Perforated from 212 to 220
(Number per foot and size of perforations, or describe screen)

Have no record of number and from to

size of perforations from to

from to

LOG OF WELL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)
We have no log of the old well.		
Our new well is 130 feet from the old well and I will give you the log of it. It is about the same formation as the old well		
35 feet	Hard pan full of boulders	
35 ft to 151 ft	Brown sand and gravel	
175 ft to 183	Brown sand clay	
183 ft to 206	Blue clay	
206 ft to 223	Hardpan	
223 ft to 225	Brown water sand and gravel	
225 ft to 236	Brown cement gravel water	
The old well hit Brown sand cement gravel and plenty of water at 210 ft		

(b) INFILTRATION TRENCH: Covered or open.....

Dimensions: Length.....ft. Minimum depth.....ft. Maximum depth.....ft.

Bottom width.....ft. Discharge.....g.p.m. Date of test.....

(c) TUNNEL: Type of lining.....

Dimensions:
(Length, course, and cross-sectional size)

Position of water bearing stratum with reference to portal of tunnel.....

Log of tunnel: (Preceding table for log of well may be used, if desired. Give footage from portal and character of materials, as pertinent.)

7. Ownership of each existing well or other works for withdrawal of ground water within a radius of one-quarter mile and the distance and direction from well or other works being reported herein:

Keogh well (Name of owner) to the East (Direction) 1/2 mile (Distance)

.....
.....
.....
.....
.....

(On accompanying plat or map show location of these existing wells or works.)

8. Remarks:

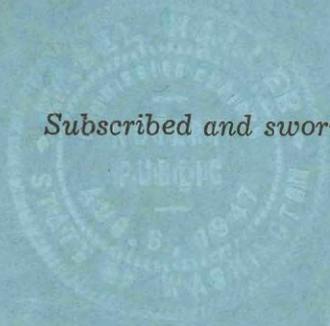
.....
(Signature of claimant)

STATE OF WASHINGTON, }
COUNTY OF King } ss.

I, the claimant named in the foregoing claim, being first duly sworn, depose and say that I have read the above and foregoing claim to ground water right; that I know the contents thereof; and that to the best of my knowledge, information and belief, the facts therein stated are true and correct.

East Hill Com. Well Co.
By: Henry D. Wilson Sec

Subscribed and sworn to before me this 21st day of August, 1945



Mabel Haller
Notary Public in and for the State of Washington,

Residing at Reed

✓

GROUND WATER
DECLARATION OF CLAIM
PROGRESS SHEET

NAME: East Hill Community Well Co.
Kent, Washington

DECLARATION NO. 12

CERTIFICATE NO. 42-D

Declaration received 8-22-45 Initial fee received 8-22-45

Returned for completion or correction _____ Received _____

Statement of add. fee sent _____ Amount \$ _____ Received _____

Approved - Bonds 10-11-45

Amended _____

Cancelled _____

O.K'd for publication Aug 22-45 by g. B.

Notice of declaration sent 9-5-45

Protests filed _____

Affidavit of Publication received and checked 10-3-45 (November 2)

Time for making protests expires _____

Examination made _____ by _____

O.K'd for Certificate Dec 3 by g. B.

Statement of filing and recording fee sent 3-18-46 Amount \$1.50

Fee received 3-21-46 with Permit fee on a. 14

Ground Water Certificate issued 3-22-46 No. D. 42-D

*0
428*

CERTIFICATE RECORD No. 1 PAGE No. 44-A

STATE OF WASHINGTON, COUNTY OF King

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That EAST HILL COMMUNITY WELL COMPANY

of Kent, Washington, has made proof to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the

ground waters of a Well

located within Tract 20 of Smith's Orchard Tracts of Kent, in Sec. 20, Twp. 22 N., Rge. 5 E.W.M.

for the purpose of Municipal supply

under Ground Water Permit No. 62 issued by the State Supervisor of Hydraulics, 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 Hydraulics of Washington and entered of record

in Volume 1 at page 44-A; that the quantity of ground water to which such right is en-

titled and hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially

used for said purposes, and shall not exceed 90 gallons per minute; 135 acre-feet

per year; That the right hereby confirmed dates from September 12, 1945.

~~x for irrigation of xxxxxxxxxxxxxxxx acres.~~

A description of the lands under such right to which the ground water hereby confirmed is ap-
purtenant, and the place where such water is put to beneficial use, is as follows:

Smith's Orchard Tracts Addition to Kent, King 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 Hydraulics affixed this 11th day
of April, 19 47.

By: Chas. J. Bartholet
RODNEY RYKER
State Supervisor of Hydraulics.
CHAS. J. BARTHOLET, Deputy

Proof of Appropriation of Ground Water

Application No. G.W. 14

Permit No. G.W. 62

1. Name of Permittee East Hill Community Well Co.
2. Postoffice address Kent Wash.
3. Source of appropriation Well
4. Name or number of works (if any) _____
5. For what purpose or purposes is water used? Domestic
6. Give date of beginning of construction May 18th 1945
7. Give date of completion of construction work, including water distribution system
About July 1 - 1946
8. Give date when ground water was completely applied to proposed use Aug 1st 1946
9. If used for irrigation:
Give number of acres described in permit _____
Give number of acres actually irrigated _____

10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

Smith's Orchard Tracts Addition to Kent. Wash.



OK. 6413

11. During what months is water used? The full year
12. Does map filed with your application show correctly the location of well or other works for withdrawal of water, and area of land where water is used? yes
13. If the dimensions, location or type of structure does not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. _____

14. Certified record by well driller or other constructor must be attached hereto, as provided by the Ground Water Code. I have previously sent in the well drillers report
(Sign certification on reverse side)

STATE OF WASHINGTON,

County of

} ss.

I,, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of ground water; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this day of, 19.....

Henry D Wilson

Subscribed and sworn to before me this *3rd* day of *April*, 19*47*

J. J. Bennett

Notary Public.



LOG OF WELL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)
Hardpan and large boulders	0	35
Brown sand and gravel	116	151
Brown sand, some water	34	175
Brown sandy clay	8	183
Blue clay	23	206
Hardpan	17	223
Brown, water bearing sand and gravel	2	225
Brown cemented water bearing gravel	11	236

(b) INFILTRATION TRENCH: Covered or open.....

Dimensions: Length.....ft. Minimum depth.....ft. Maximum depth.....ft.

Bottom width.....ft. Discharge.....g.p.m. Date of test.....

(c) TUNNEL: Type of lining.....

Dimensions:
(Length, course, and cross-sectional size)

Position of water bearing stratum with reference to portal of tunnel.....

LOG OF TUNNEL: (Preceding table for log of well may be used if desired. Give footage from portal and character of materials, as pertinent.)

James J. Bell
(Signature of well driller or other constructor)
6116 4th Ave South
(Address)
Seattle 8

STATE OF WASHINGTON,

County of ss.

I, *James J. Bell*, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

James J. Bell
(Signature)

Subscribed and sworn to before me this *27th* day of *March*, 194*7*

Robert K. Thompson
Notary Public



STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF HYDRAULICS

Permit to Appropriate Public Ground Waters
of the State of Washington

Book No. 1 of Ground Water Permits, on page 62 under Application No. 14

EAST HILL COMMUNITY WELL COMPANY

of Kent, Washington

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 September 12, 1945

Source of the proposed ground water appropriation is 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 90 gallons per minute; 135 acre-feet per year, to be used for the following purposes: Domestic supply and water for livestock, and

irrigation of lawns and gardens

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is _____

being within Tract 20 of Smith Orchard Tracts of Kent, in Sec. 20, Twp. 22 N., Rge. 5 E.W.M.
county of King

Use, or uses to which water is to be applied:

For municipal supply: 90 gallons per minute; 135 acre-feet per year,
to supply East Hill Community,

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

East Hill Community, King County, Washington

*See Proof of Appropriation
Smith's Orchard Tracts Addition
to Kent, Wash.*

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 236 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Hydraulics for the purpose of preventing waste of public waters:

Construction work shall begin on or before March 1, 1947
and shall thereafter be prosecuted with reasonable diligence and completed on or before
March 1, 1948
and complete application of water to proposed use shall be made on or before
March 1, 1949

Given under my hand and the seal of this office at Olympia, Washington, this 22nd day of
March, 1946

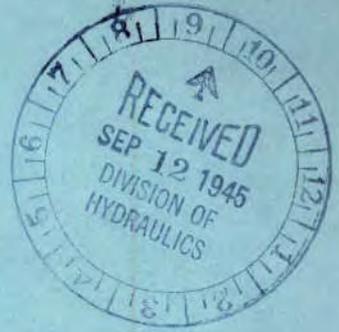
RODNEY RYKER

State Supervisor of Hydraulics.

By:

Chas. J. Bartholet
CHAS. J. BARTHOLET, Deputy

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics



APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 12

I, Henry D. Wilson Sec. East Hill Community Well Co.
(Name of applicant)

of Route 3 Box 57 Kent Wash
(Complete postoffice 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 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. The source of the proposed appropriation is Well
(Well, tunnel, infiltration trench)
located Two miles East of Kent from 1st Ave
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)
Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any East Hill Corn Well

2. The quantity of water which applicant intends to apply to beneficial use is ~~50~~ 90
gallons per minute; 135 acre feet per year.
The capacity of pump we will install is 90 gal Per min.

3. The use or uses to which water is to be applied. Domestic & Livestock
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year The whole year
5. Location of well or other works for withdrawal of water: In County of King
(a) Near north East corner of ~~Tract 20~~
(Give distance and bearing to nearest corner of section or legal subdivision)

Tract 20 of Smith Orchard Tracts of Kent of Sec. 20, Twp. 22 N., Rge. 3-E
being within the _____
(Give smallest legal subdivision) (E. or W.)

or (b) If within limits of incorporated town or city: Lot _____, Block _____,
of Smith Orchard Tracts Addition to Kent of Kent
(Give name of addition or plat) (Give name of town or city)

(c) Show this location on accompanying section plat, in triplicate. Other adequate maps or drawings will be acceptable.

6. Name and address of owner of land on which well or works are located:
East Hill Community Well Co
(Name)
Kent Wash
(Address)

7. DESCRIPTION OF WORKS:

(a) Well will be ^{is} drilled ^{has} and have a diameter of ^{has a} eight inches and an estimated depth of 236 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)

8. SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PRO

(a) For Municipal Supply: To supply the city, town, or community of.....
in the county of....., having a present population of....., and an
estimated population of..... in 19.....

(b) For Irrigation: The land to be irrigated has a total area of..... acres.

(c) Legal Description of Property on which water is to be used for all purposes other than mu-
nicipal supply: (If more space is required, attach separate sheet.)

We have 70 water users at the present time. The district is made up of small farms of 5 acre tracts and larger acreages. It is probable that within the next ten years the number of users will increase to around 90. Little water is used for irrigation. This is a cooperative company and the 70 water users are all members of the organization. This well has been drilled and we are waiting for the pump to be delivered for installation. Drilling started May 1st & completed June 5th - 1945-

- 9. Construction work will begin on or before.....
- 10. Construction work will be completed on or before probably pump will be set up around 7th of Oct - 1945
- 11. Water will be put to complete beneficial use on or before and will be put to use.

Nervey D. Nilson Sec
(Signature of applicant)

East Hill Corn Well Co



Signed in the presence of us as witnesses:

Harry G. Cook
(Name)
William Smith
(Name)

Route 2, Box 1734 Kent Wash.
(Address of witness)
Route 2 Kent 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 Hy-
draulics, with corrections, on or before....., 19.....

WITNESS my hand this..... day of....., 19.....

State Supervisor of Hydraulics.

GROUND WATER

PROGRESS SHEET

Name: East Hill Community Well Co. Assigned to: Kent, Washington Date Route #3, Box 57, Kent, Washington APPLICATION NO. 14 PERMIT NO. 62

CERT. NO. 44-A

Appli. received 9-12-45 Initial Exam. fee received 9-12-45
Appli. returned for completion or correction Received
Statement of add. exam. fee sent Amount
Additional examination fee received

Application amended
Application cancelled

O.K'd for publication by leg 10 Date Sep 19 45
Notice of Application sent 9-21-45
Protests filed

Affidavit of Publication received and checked 10-13-45 (Nov. 2)

Report of Game Approved 10-11-45
Report of Fisheries

Examination made by
O.K'd for Permit Dec 23 by leg 10
Statement of filing and recording fee sent 3-18-46 Amount \$10.00
Filing and recording fee received 3-21-46
Permit issued 3-22-46 No. 62

Notice of Beginning of Construction sent 3-22-46
Time for Beginning of Construction extended to
Fee for extension \$
Notice of beginning of construction received 3-29-47

Notice of Completion of Construction sent
Notice of Completion extended to
Notice of Completion filed 3-29-47 included in notice of beginning

Notice of Complete Application of Water sent 3-29-47
Notice of Complete Application extended to
Notice filed 4-4-47

Proof of Appropriation sent 3-29-47 Filed 4-4-47
Well Driller's Report sent 3-22-46 Filed 3-29-47
Statement of certificate fee sent 4-5-47 Received 4-9-47

Final Certificate of Ground Water Right Issued 4-11-47 No. 44-A

CERTIFICATE RECORD No. 6 PAGE No. 2890-A

STATE OF WASHINGTON, COUNTY OF King

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 EAST HILL COMMUNITY WELL COMPANY

of Kent, Washington, 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 Lot 1 of R.J. Bower's Addition to King County

Sec. 20, Twp. 22 N., R. 5 E. W. M.,

for the purpose of community domestic supply

under and subject to provisions contained in Ground Water Permit No. 4150 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 2890-A;

that the right hereby confirmed dates from September 12, 1956; 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 120 gallons per minute; 146 acre-

feet per year for community domestic supply.

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:

Community served by East Hill Community Well Company.

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

30th day of August, 1957.

[Signature] State Supervisor of Water Resources.

ENGINEERING DATA [Signature]

Proof of Appropriation of Water

Application No. 4435

Permit No. 4150

1. Name of Permittee East Hill Community Well Company

2. Postoffice address c/o J. J. Waggett, 23620 104th Southeast, Kent, Wash.

3. Source of appropriation drilled well

RECEIVED
DEPARTMENT OF CONSERVATION

4. Name or number of works (if any) none

AUG 22 1957

5. For what purpose or purposes is water used? municipal water supply

AM
7 8 9 10 11 12 1 2 3 4 5 6 PM

6. Give date of beginning of construction January 3, 1957

7. Give date of completion of construction work, including water distribution system

February 25, 1957

8. Give date when water was completely applied to proposed use June 10, 1957

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:

Various property on the hill east of Kent, in sections 17, 18, 19 and 20, township 22 north, range 5 east W.M.

12. During what months is water used? year around

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? Yes

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. no changes

15. Actual measured discharge or diversion of permanent system: 120 gpm (gpm or cfs)

(Sign certification on reverse side)

*OK to permit
RMR*

STATE OF WASHINGTON,

County of King

} ss.

I, Harry G. Cook, 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 21st day of August, 1957.

Harry G. Cook

Subscribed and sworn to before me this 21st day of August, 1957.

Dunson B. Thatcher

Notary Public.

RETURN TO:
DIV. OF WATER RESOURCES
406 TRANSPORTATION BLDG., OLYMPIA

RECEIVED
MAY 6 1957
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

Under Permit No. G. W. _____

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. East Hill Community Water Co. Kent, Washington
(Name and address of owner of well or other works for withdrawal of water)
2. Type; name or number of works where water is taken Drilled & Cased Well #3
(Well, tunnel or infiltration trench)
3. Date on which work on well or other structure was started January 3, 1957
4. Date on which work was completed February 25, 1957
5. If work on well or other structure was abandoned, give date _____
and reason for abandonment _____

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 248 ft. Diameter 8 in. or ft. Dug or drilled Drilled

Flowing or pump well Pump

IF PUMP WELL: Type and size of pump is Peerless - 15 H.P.

Type and size of motor or engine is 15 HP motor 3 phase 1800 RPM

Depth from ground surface to water level before pumping 182 feet

After continuous operation for 8 hours, the measured discharge of the pump is
(At least four)
200 g.p.m., and the drawdown of water level is 2 feet

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
.....
.....
.....
.....

Date of test _____

IF FLOWING WELL: Measured discharge _____ g.p.m. on _____ (Date)

Shut-in pressure at ground surface _____ lbs. per sq. in. on _____ (Date)

Water is controlled by _____ (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

10 in. diameter Steel Casing from 0 to 11 ft.

8 in. diameter Steel Casing from 0 to 248 ft.

..... in. diameter from to ft.

..... in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

10" Casing for Sanitary Seal
8" Casing 0 to 248' with Forged Steel Drive Shoe

OK
- DM

Perforated casing or screen:

8" Casing Perforated approximately 135 from 228 to 242 ft.
 (Number per foot and size of perforations, or describe screen)
 holes 3/16" x 2" from to ft.
 from to ft.
 from to ft.
 from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Top Soil	2	2
Blue Hardpan	33	35
Brown Semi-hardpan	3	38
Brown Sand & Gravel some H ₂ O at 170-175	137	175
Brown Sandy Clay	5	180
Blue Clay	15	195
Brown Cemented Gravel	14	209
Sand & Gravel H ₂ O	2	211
Cemented Gravel H ₂ O	36	247
Hardpan	3	250

(b) INFILTRATION TRENCH OR TUNNEL: Type

Dimensions: (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel

James L. Bell Water Well Drilling
 (Signature of well driller or other constructor) *James L. Bell*
 6116 - 4th Ave So.
 (Address) *Seattle,*

STATE OF WASHINGTON, }
County of } ss.

I,, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

(Signature)

Subscribed and sworn to before me this day of, 195.....

NOTARIZATION NOT NECESSARY.

Notary Public

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. 9 of Ground Water Permits, on page 4150 under Application No. 4435

EAST HILL COMMUNITY WELL COMPANY

of Kent, Washington

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 September 12, 1956

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 120 gallons per minute; 146 acre-feet per year, to be used for the following purposes: community domestic supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 30 feet south and 250 feet west of northeast corner of Lot 1, R.J.Bower's Addition to King County
being within Lot 1 of R. J. Bower's Addition to King County, sec.20, T.22 N., R.5 E.W.M.
county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year, to supply _____

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: 120 gallons per minute; 146 acre-feet per year, for community domestic supply.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Community served by East Hill Community Well Company.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 6 inches, and depth of 220 to 260 feet.
(Dug or drilled)

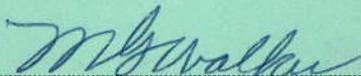
Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources:

Construction work shall begin on or before December 1, 1957
and shall thereafter be prosecuted with reasonable diligence and completed on or before June 1, 1958
and complete application of water to proposed use shall be made on or before June 1, 1959

Given under my hand and the seal of this office at Olympia, Washington, this 28th day of November, 1956.


State Supervisor of Water Resources

Report of Examination on Ground Water

Received date 9-12-56 Date of exam. 10-11-56 Appli. No. 4435

Name East Hill Community Well Co. Address 23620 - 104th S.E., Kent

Type of works Well Dimensions 6" x 220 to 260'

Progress of works Not begun

Quantity ~~claimed~~ or applied for 120 g.p.m. _____ acre-feet per year

Legal sub. R.J. Bower's Addn. to King County
Lot 1, / Sec. 20 Twp. 22 N., Rge. 5 E. County King

Use Community domestic supply

Irrigation-acreage: Present _____ Planned _____ Feasible _____

Municipal: Population Additional 650 as of 1960 (160 families)

Industrial _____

Time pump will be operated Continuously

Other water rights appurtenant to this land _____

Proximity to existing works, springs, wells, or streams East Hill Community Well Co. north on next lot.

Area _____ Sub-area _____ Zone _____

RECOMMENDATIONS

Approved for 120 g.p.m. 146 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

Water requirements are calculated on 200 gallons per day per capita, or 146 acre-feet annually for 650 additional persons.

The installation of an access port to well as described in attached Ground Water Bulletin No. 1, is recommended.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished. The size of hole openings and number of sprinklers operated, if such be the case, will give this information.

The applicant, for his own protection, should take precautions in not overdrawing from any one of the three structures supplying water to the system, since one may drop the static level in an adjacent well to the detriment of that well and the machinery therein.

Other than this permit may issue as recommended, subject to existing rights and provisions.

Signed this 14th day of November, 1956.


FRED D. HAHN, Deputy Supervisor
Division of Water Resources

RECEIVED
OCT 8 1956
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

} ss.

Moira McPeck being first duly sworn on

oath, deposes and says that she is the chief clerk of THE KENT NEWS-JOURNAL, a weekly newspaper. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a weekly newspaper in Kent, King 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 Kent News-Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County, Washing-

ton. That the annexed is a Notice of Ground Water Right Application No. 4435-East Hill Comm.

Well Company as it was published in regular issues (and not in supplement form of said newspaper) once each week for a period of two consecutive weeks, commencing on the

27th day of September, 1956, and ending the

4th day of October, 1956, 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 \$ 7.50, which has been paid in full at the rate of \$2.40 per folio of one hundred words for the first insertion and \$1.80 per folio of one hundred words for each subsequent insertion.

Moira McPeck
Chief Clerk

Subscribed and sworn to before me this 5th day of

October 1956
Emerson B. Thatcher
Notary Public in and for the State of Washington,
residing at Kent, King County.

EMERSON B. THATCHER
Lawyer
STATE OF WASHINGTON
OFFICE OF SUPERVISOR OF
WATER RESOURCES
Olympia
NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 4435
TAKE NOTICE:
That EAST HILL COMMUNITY WELL COMPANY of Kent, Washington on September 12, 1956 filed application for permit to withdraw public ground waters through a well situated within Lot 1, of R. J. Bower's Addition to King County of Section 20, Township 22 N., Range 5E.W.M., in King County, in the amount of 120 gallons per minute, subject to existing rights continuously, each year for the purpose of community domestic 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 4, 1956.
Witness my hand and official seal this 20th day of September, 1956.
M. G. WALKER
State Supervisor of Water Resources.
Published in the Kent News Journal September 27 and October 4, 1956.

—Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.
—Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

6. DESCRIPTION OF WORKS:

(a) Well will be drilled and have a diameter of six inches and an estimated depth of 220 to 260 feet
(Dug or drilled)

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

none

(c) Distribution system to be described:

already in existence, being served by two other wells of the corporation

(d) If pumps are to be used, give size and type:

not yet determined, but of sufficient capacity to draw the water from a six-inch well

(e) Give capacity and type of motor or engine to be used:

7½ H.P. electric

(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:

none

(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:

East Hill Community Well Co.	North	on next lot
(Name)	(Direction)	(Distance)
No others		
(Name)	(Direction)	(Distance)
(Name)	(Direction)	(Distance)
(Name)	(Direction)	(Distance)

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. For Municipal Supply: To supply the city, town, or community of _____, in the county of _____, having a present population of _____, and an estimated population of _____, in 19____ to furnish additional water to 160 members of the corporation

8. For Irrigation: Number of acres to be irrigated _____ 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, lessee, contract buyer, etc.)

11. Do you have any other water rights appurtenant to the above described property?

If so, from what source?

12. Construction work will begin on or before immediately on permit

13. Construction work will be completed on or before June 1, 1957

14. Water will be put to complete beneficial use on or before June 1, 1957

East Hill Community Well Company

By Harry G. Cook
(Signature of applicant)

President

15. Name and address of owner of land on which well or works are located:

East Hill Community Well Company

(Name)

23620 104th S. E., Kent, Washington

(Address)

Harry G. Cook
(Signature of legal landowner)

President

Signed in the presence of us as witnesses:

Emerson B. Thatcher
(Name)

Emerson B. Thatcher

210 First Avenue South, Kent, Wash.

(Address of witness)

Lillian C. Cavender
(Name)

Lillian C. Cavender

812 East Temperance St., Kent, 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.....

Resources, with corrections, on or before, 19.....

WITNESS my hand this day of, 19.....

State Supervisor of Water Resources.

Emerson B. Thatcher, Lawyer
Kent, Wash.

Progress Sheet—Ground Water Application

12-1-57 ✓

NAME East Hill Community Well Co. Assigned to _____
23620 -104th SE. Kent
 G. W. APPLI. NO. 4435 PERMIT NO. 4150 CERT. NO. 2890 A
 AMENDED _____ CANCELLED _____

Application received 9-12-56 Initial \$10.00 fee received 9-12-56
 Statement of additional examination fee \$ _____ Sent _____ Received _____
 Application returned for completion or correction _____ Received _____

TEMPORARY PERMIT: Approved by _____ Issued _____

PUBLICATION: JNH
 O.K.'d by _____ Date 9-19-56 Notice sent 9-20-56
 Protests _____
 Filed _____
 Affidavit received and checked 10-8-56 Time expired 11-6-56
 Amended notice sent _____ Affidavit received _____
 Time expires _____

DEPT. OF GAME REPORT _____

EXAMINATION Made 10-11-56 by JNH
 O.K.'d for permit 11-16-56 by PNR
 Statement of permit fee sent 11-14-56 Amount \$ 20.00 Received 11-16-56

PERMIT NO. 4150 ISSUED 11-28-56

BEGINNING OF CONSTRUCTION: Notice sent 11-28-56 Filed _____
 Extension fee \$ _____ Extended to _____
 Extended to _____

WELL DRILLER'S REPORT: Sent 9-20-56 Filed 5-6-57

COMPLETION OF CONSTRUCTION: Notice sent 11-28-56 Filed 8-6-57
 \$2.00 extension fee _____ Extended to _____
 To _____

PROOF OF APPROPRIATION: Sent _____ Filed 8-22-57
 \$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent _____ \$ _____ Received 8-22-57

CERTIFICATE OF GROUND WATER RIGHT NO. 2890 A ISSUED 8-30-57

WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

Construction/Decommission ("x" in circle) 150052

Construction
 Decommission ORIGINAL CONSTRUCTION Notice of Intent Number _____

CURRENT Notice of Intent No. WE 01722

Unique Ecology Well ID Tag No. AFT 321

Water Right Permit No. 2890-A

Property Owner Name City of Kent

Well Street Address 24525-104TH AVE SE, Kent, WA 98032

City Kent County: King

Location SW 1/4- 1/4 NW 1/4 Sec 20 Twn 22 R 5E ^{EWM circle} or ^{WWM} one

Lat/Long: (s,t,r still REQUIRED) Lat Deg NA Lat Min/Sec NA

Long Deg NA Long Min/Sec NA

Tax Parcel No. 783080-0273

PROPOSED USE: Domestic Industrial Municipal
 DeWater Irrigation Test Well Other

TYPE OF WORK: Owner's number of well (if more than one) _____
 New Well Reconditioned Method Dug Bored Driven
 Deepened Cable Rotary Jetted

DIMENSIONS: Diameter of well 12 inches, drilled 268 ft
Depth of completed well 257 ft

CONSTRUCTION DETAILS
Casing Welded 12" Diam from +2'-6" ft to 268 ft
Installed: Liner installed _____" Diam from _____ ft to _____ ft
 Threaded _____" Diam from _____ ft to _____ ft

Perforations: Yes No
Type of perforator used _____
SIZE of perms _____ in by _____ in and no of perms _____ from _____ ft to _____ ft

Screens: Yes No K-Pac Location 215' BGS
Manufacturer's Name ALLOY MACHINE WORKS
Type 304 STAINLESS STEEL Model No _____
Diam 10" PS Slot Size 40 from 216 ft to 221 ft
Diam 10" PS Slot Size 40 from 221 ft to 231 ft

Gravel/Filter packed: Yes No Size of gravel/sand _____
Materials placed from _____ ft to _____ ft

Surface Seal: Yes No To what depth? 30 ft
Materials used in seal HIGH SOLIDS BENTONITE
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name NA
Type _____ HP

WATER LEVELS: Land-surface elevation above mean sea level _____ ft
Static level 188.5 ft below top of well Date 5/19/04
Artesian pressure _____ lbs per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? HOKKAI DO
Yield 810 gal/min with 0.91 ft drawdown after 1 hrs
Yield 810 gal/min with 1.02 ft drawdown after 12 hrs
Yield 810 gal/min with 1.24 ft drawdown after 24 hrs
Recovery data (time taken as zero when pump turned off)(water level measured from well top to water level)
Time Water Level Time Water Level Time Water Level
0 191.61 40 190.14 4HR 189.34
5 190.85 1HR 190.00 8HR 189.04
20 190.47 2HR 189.66 15HR 188.67
Date of test 5/19/04
Bailer test _____ gal/min with _____ ft drawdown after _____ hrs
Arrest _____ gal/min with stem set at _____ ft for _____ hrs
Artesian flow _____ g p m Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information Indicate all water encountered (USE ADDITIONAL SHEETS IF NECESSARY)

MATERIAL	FROM	TO
Gravel and Sand, Tan	0'	39'
Brown Gravelly Sand	39'	52'
Gray Sand and Gravel	52'	58'
Brown Sand and Gravel	58'	71'
Tan Sand and Gravel	71'	109'
Tan Sand Gravel some cobbles	109'	168'
Brown Sand and Gravel	168'	184'
Blue Clay	184'	189'
Gray Sand and Gravel	189'	196'
Tan Sand and Gravel	196'	207'
Tan Sand and Gravel w/	207'	224'
Brown Siltier some water		
Tan Sand and Gravel water bearing	224'	239'
Gray Sand and Gravel water bearing	239'	243'
Brown sand and Gravel w/	243'	248'
silt water bearing		
Brown Silty Sand	248'	264'
Gray Silty Sand	264'	268'

RECEIVED
JUN 04 2004
DEPT OF ECOLOGY

Start Date 12/22/03 Completed Date 6/1/04

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief

Driller Engineer Trainee Name (Print) Bob Carper
Driller/Engineer/Trainee Signature Bob Carper
Driller or Trainee License No. 1239

Drilling Company HOKKAI DO DRILLING, INC.
Address P.O. BOX 100

City, State, Zip GRAHAM, WA 98338-0100

Contractor's Registration No. HOKKADI017M8 Date 6/2/2004

Ecology is an Equal Opportunity Employer ECY 050-1-20 (Rev 4/01)

If trainee, licensed driller's Signature and License no. _____

The Department of Ecology does NOT Warranty the Data and/or the Information on this Well Report.

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.)

PRIORITY DATE January 4, 1979	APPLICATION NUMBER G1-23285	PERMIT NUMBER G1-23285P	CERTIFICATE NUMBER G1-23285C
----------------------------------	--------------------------------	----------------------------	---------------------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

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 Well

TRIBUTARY OF (IF SURFACE WATERS) --
--

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 1900	MAXIMUM ACRE-FEET PER YEAR 3040.0
-------------------------------	------------------------------------	--------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 700 feet north and 1100 feet east of W $\frac{1}{4}$ corner of Sec. 20
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION 20	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	-------------------------------	---------------	----------------

RECORDED PLATTED PROPERTY

LOT	BLOCK 20	OF (GIVE NAME OF PLAT OR ADDITION) R. O. Smiths Orchard Tracts
-----	-------------	---

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Kent.

PROVISIONS

All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

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 Redmond Washington, this 16th day of February, 1982.

Department of Ecology

ENGINEERING DATA

OK *JS*

by *Robert K. McCormick*
ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

Auditor's bk. 003880

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-23285		PERMIT NUMBER G1-23285P	
NAME OF PERMITTEE CITY OF KENT			
POST OFFICE ADDRESS 220 S. 4th Avenue		(CITY) Kent	(STATE) Wa
		(ZIP CODE) 98031	
ACTUAL SOURCE OF APPROPRIATION Groundwater Aquifer via a well			
PURPOSE OR PURPOSES WATER IS USED FOR Municipal Supply - Continuously			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE July 25, 1980		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED N/A	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED Jan-Dec	
PUMP SIZE 1600GPM at 375'TDH			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM 1900		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN	

RECEIVED

JAN 29 1982

DEPARTMENT OF ECOLOGY
NORTHWEST REGION

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Area served by City of Kent

STATE OF WASHINGTON, }
County of King } ss.

I, Don E. Wickstrom, 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 27th day of January, 19 82.

Don E. Wickstrom

Permittee Signature

Subscribed and sworn to before me this 27th day of January, 19 82.

Kathryn McClurg
Notary Public

2-4-82
Issue cert for 1900 gpm, 3040 at/yr.
ECY 040-1-26

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 January 4, 1979	APPLICATION NUMBER G1-23285	PERMIT NUMBER G1-23285P	CERTIFICATE NUMBER
----------------------------------	--------------------------------	----------------------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

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 WATER TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS) --		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 2100.0 1900	MAXIMUM ACRE-FEET PER YEAR 3360.0 3040
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 700 feet north and 1100 feet east of W $\frac{1}{4}$ corner of Sec. 20
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION 20	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	-------------------------------	---------------	----------------

RECORDED PLATTED PROPERTY

LOT	BLOCK 20	OF (GIVE NAME OF PLAT OR ADDITION) R. O. Smiths Orchard Tracts
-----	-------------	---

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Kent.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: March 31, 1981	COMPLETE PROJECT BY THIS DATE: March 31, 1982	WATER PUT TO FULL USE BY THIS DATE: March 31, 1983
---	--	---

PROVISIONS

All water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gage may be installed in addition to the access port.

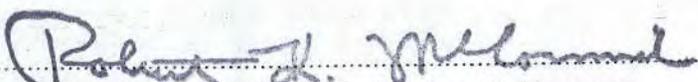
This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Redmond Washington, this 31st day of March, 19 80

Department of Ecology

ENGINEERING DATA

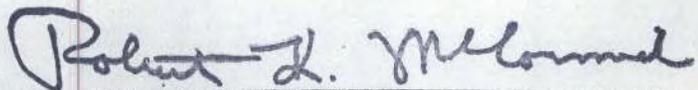
OK 

by 
ROBERT K. McCORMICK, Regional Manager

FINDINGS OF FACT AND DECISION

Upon review of the above report, I find that all facts relevant and material to the subject application have been thoroughly investigated. Furthermore, I find that water is available for appropriation for a beneficial use and that the appropriation thereof as recommended in the above report will not impair existing rights or be detrimental to the public welfare. Therefore, permit will issue under Ground Water Application No. 23285 for the appropriation of public waters in the amount and for the uses set forth in the foregoing report, in accordance with the examiner's conclusions and recommendations, subject to existing rights and the provisions herein.

Signed at Redmond, Washington, this 21 day of May, 1979.



ROBERT K. McCORMICK
Regional Manager
Northwest Regional Office

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY
PROTESTED

**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 January 4, 1979	APPLICATION NUMBER G1-23285	PERMIT NUMBER	CERTIFICATE NUMBER
----------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

Field Examination: May 9, 1979

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS) --		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 2100.0	MAXIMUM ACRE-FEET PER YEAR 3360.0
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal Supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 700 feet north and 1100 feet east of W $\frac{1}{4}$ corner of Sec. 20
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION 20	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	-------------------------------	---------------	----------------

RECORDED PLATTED PROPERTY

LOT	BLOCK 20	OF (GIVE NAME OF PLAT OR ADDITION) R. O. Smiths Orchard Tracts
-----	-------------	---

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Kent.

DESCRIPTION OF PROPOSED WORKS

16 inch diameter well (approximate depth 250-275 feet).

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: 1 yr from permit issuance	COMPLETE PROJECT BY THIS DATE: 2 yrs from permit issuance	WATER PUT TO FULL USE BY THIS DATE: 3 yrs from permit issuance
--	--	---

PROVISIONS

The City of Kent submitted an application (G1-23285) on January 4, 1979, requesting an instantaneous withdrawal of 1400.0 gallons per minute for municipal supply. On January 10, 1979, the city requested the amount be changed to 2100.0 gallons per minute to reflect the actual needs. The change was granted.

Our records show that the City of Kent has the following water rights for municipal supply.

<u>Certificate No.</u>	<u>Instantaneous Rate</u>	<u>Yearly Volume</u>
G.W. 1116	200 gallons per minute	320 acre-feet per year
G.W. 3107	2200 " " "	50 " " " "
G.W. 7660	5400 " " "	8710 " " " "
G.W. G1-22956	3690 " " "	5904 " " " "
S.W. 7232	5 cubic feet per second	

The legal notice was published in the Kent News-Journal on March 28 and April 1, 1979.

Ten (10) official protests were received in this office before the end of the thirty (30) day protest period (May 1, 1979). One protest was received after the protest period.

All protestants were concerned that the granting of a permit for such a large quantity of water would be detrimental to their well water supply.

CONSIDERATION OF PROTESTS:

On May 9, 1979 a visit to the area was made by Janet Jorg. The proposed well site was visited as well as each of the protestants' wells. Information on approximate elevation, well depth, and static water level was obtained when available. All the protestants' wells except the East Hill Community wells were at least 1¼ miles away from the proposed well site and were for small single domestic uses (under 5,000 gallons per day). Of the single domestic wells the depths ranged from approximately 46 feet to depths of around 200 feet.

The East Hill Community Well Company has two wells located within a few hundred feet of the proposed well site and are about the same depth (248 feet and 286 feet). They have several water right certificates for community domestic supply.

A report prepared by the engineering firm, Anderson and Kelly, provided data and analysis for an estimated water availability at the proposed well site of two million gallons per day or more. The data collected came from a pump test done on April 10, 1979 of East Hill Community well No. 3. The drawdown and recovery rates were monitored in East Hill Community well No. 2 (90 feet away). During pumping at a rate of 290 gallons per minute for 5½ hours very little drawdown occurred (approximately 0.2 feet).

The recovery rate was fairly rapid. Static water level in observed well prior to commencing the test was 180.85 feet. When the pump was shut off after the test, static level reading was at 180.45 in the monitored well. Approximately 40 minutes later the reading was at 180.37 feet below top of the well.

Under State Ground Water Code 90.44, three conditions must be met before a permit to develop water use can be issued. Those conditions are:

1. Availability of water for beneficial use.
2. Existing rights not impaired.
3. The appropriation is not detrimental to public welfare.

As a result of the pump test and analysis report by Anderson and Kelly, water appears to be available. Further testing and aquifer analysis will be needed however.

Water rights are based on a priority date. The large pumping rate of the proposed Kent well may have some effect on the protestants wells especially the East Hill Community wells directly to the south. Granting the City of Kent a permit to develop a large production well would be subject to existing rights. Should the requested withdrawal prove to infringe on the prior rights of existing wells in the area regulation of the pumping rate would take place.

The current request for water use is for a municipal supply and is not considered to be detrimental to the public welfare.

CONCLUSION AND RECOMMENDATIONS:

Therefore, I recommend approval of this application subject to the following conditions and limitations.

"The permit shall issue for development of a production well in the amount not exceeding 2100 gallons per minute and shall be supplemental to existing rights for the City of Kent. The annual withdrawal shall not exceed 3360.0 acre-feet per year."

A complete pump test and aquifer analysis will need to be done by an engineering firm to adequately assess the actual sustained withdrawal rate that can be pumped without detriment to those wells in the area. This office is to be notified when the testing is to take place and a copy of the data and analysis is to be submitted to this office.

Advisory Statements:

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 Assistant Secretary, Division of Health prior to any new construction or alterations of a public water supply. The applicant is advised to contact the Washington State Division of Health, Public Health Building No. 4, Thurston Airdustrial Center, Olympia, with regard to the need for compliance.

"It is noted that the well site and/or water transmission facilities are not wholly located upon the land owned by the applicant. Applicant is, accordingly, advised that the issuance of 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. Obtainment of such right is a private matter between applicant and owner of that land. Copy(ies) of easement agreement(s) must be furnished this Department prior to issuance of Certificate of Water Right."

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.

Provisos:

All new water wells constructed within the state shall meet the minimum standards for construction and maintenance as provided under RCW 18.104 (Washington Water Well Construction Act of 1971) and Chapter 173-160 WAC (Minimum Standards for Construction and Maintenance of Water Wells).

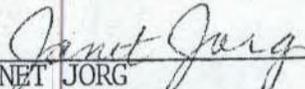
"The installation of an access port as described in attached Ground Water Bulletin No. 1 shall be required prior to issuance of final certificate of water right. The applicant may, for his own convenience, wish to install an air-line and gage in addition to the access port."

Additionally, the permit when issued shall carry the following provision: "Nothing in this permit shall be construed as excusing the permittee from compliance with any applicable federal, state, or local statutes, ordinances, or regulations including those administered by local agencies under the Shoreline Management Act of 1971."

"Prior to issuance of a Certificate of Water Right, the applicant will be required to furnish information to this office as part of his Proof of Appropriation as to the size and type of equipment installed and the rate at which water is withdrawn in gallons per minute."

Signed at Redmond, Washington,

this 17 day of May, 1979



JANET JORG
Resource Management
Department of Ecology

Ground Water Application #51-23285

Affidavit of Publication

STATE OF WASHINGTON }
COUNTY OF KING } ss.

Audrey DeJolie being first duly sworn on

oath, deposes and says that she is the chief clerk of THE KENT NEWS-JOURNAL, a newspaper published four (4) times a week. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a newspaper published four (4) times a week in Kent, King 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 Kent News-Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County,

Washington. That the annexed is a Notice of Application

..... as it was published in regular issues (and not in supplement form of said newspaper) once each issue for a period

of 2 consecutive issues, commencing on the

28th day of March, 1979, and ending the

1st day of April, 1979, 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 \$25.20, which has been paid in full at the rate of per folio of one hundred words for the first insertion and per folio of one hundred words for each subsequent insertion.

Audrey DeJolie

Subscribed and sworn to before me this 1st day of

April, 1979

Anto C. Luminato
Notary Public in and for the State of Washington,
residing at ~~Kent~~ King County.
Auburn

— Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

— Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

State of Washington
Department of Ecology
Notice of Application
to appropriate
Public Waters
TAKE NOTICE:
That CITY OF KENT of KENT, WASHINGTON on JANUARY 4, 1979 under Application No. G1-23285 filed for permit to appropriate public waters, subject to existing rights, from WELL in the amount of 2100 GALLONS PER MINUTE each year, for MUNICIPAL WATER SUPPLY - CONTINUOUSLY. The source of the proposed appropriation is located within BLOCK 20, R.O. SMITH'S ORCHARD TRACTS of section 20, Township 22 N., Range 5E W.M., in KING 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, Northwest Regional Office, 4350-150th Avenue N.E. within thirty (30) days from April 1, 1979.
Published in the Kent News-Journal March 28 and April 1, 1979. K3846

RECEIVED
CITY ENGINEER

APR - 5 1979
AM PM
7,8,9,10,11,12,1,2,3,4,5,6



APPLICATION FOR PERMIT TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

GROUND WATER

have examined this application and find that it is: not an "action".

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

1/4/79 Janet Jung

APPLICATION NO. G-23285	W.R.I.A. 9	COUNTY King	PRIORITY DATE 1/4/79	TIME	ACCEPTED JJ
APPLICANT'S NAME CITY OF KENT			BUSINESS TEL. 872-3383		HOME TEL.
ADDRESS (STREET) P.O. BOX 310		(CITY) KENT	(STATE) WASHINGTON	(ZIP CODE) 98031	
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION Not Applicable					

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.) Well
TRIBUTARY	SIZE AND DEPTH Unknown

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECONDCFS	OR	GALLONS PER MINUTE 2100 1400 GPM	ACRE FEET PER YEAR
---	-----------------------------------	----	--	--------------------

1/10/79 Per telecon quantity was increased JJ

TIMES DURING YEAR WATER WILL BE REQUIRED
~~Constant availability~~ **Continuously**

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 60,000
DATE PROJECT WAS OR WILL BE STARTED February, 1979	DATE PROJECT WAS OR WILL BE COMPLETED July, 1979	

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

LOT	BLOCK 20	OF (GIVE NAME OF PLAT OR ADDITION) R.O. Smith's Orchard Tracts Addition to Kent	SECTION 20	TOWN 22	RANGE 5E	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.
700' N & 1100' E of W 1/4 cor of sec 20

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	COUNTY
---	---------	-------------	-----------------------	--------

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
Howard A. Edline, P.O. Box 98, Kent, Washington 98031

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.

~~South 158 feet less the South 30 feet of the East 168 feet of Block 20, R. O. Smith's Orchard Tracts Addition to Kent~~

Area served by City of Kent

TO BE PURCHASED

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

Existing Water Rights held by City of Kent: G.W. cert # ~~974~~^{1116-A} (200 gpm, 320 af/yr); 3107-A (2250 gpm, 50 af/yr); 7660-A (5400 gpm, 8710 af/yr); G1-22956P (3690 gpm, 5904 af/yr)

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.)

Proposed system is a 16-inch diameter well with pump, motor and pipe to connect with existing distribution system on 104th Avenue S.E. to be selected after test pumping is completed.

REMARKS

7. The property adjoining on south side is owned by East Hill Community Well Company, who have two operating wells on that property. Kent will provide that company with water if the proposed well drawdown interferes with the present wells.

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

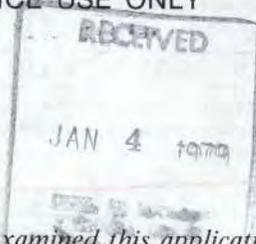
CITY OF KENT By *J. G. Wilett*
APPLICANT'S SIGNATURE

Howard A. Coline
LEGAL LANDOWNER'S SIGNATURE

P.O. Box 98, Kent, WA 98031
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
DEPARTMENT 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

G.W. Ulet
Department of Ecology

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT

- APPLICATION
- PERMIT
- CERTIFICATE
- OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent		TELEPHONE NO. 872-3383
ADDRESS P.O. Box 310	(CITY) Kent,	(STATE) Washington
		(ZIP CODE) 98031
ASSIGNED TO	TELEPHONE NO.	DATE ASSIGNED
ADDRESS	(CITY)	(STATE) (ZIP CODE)
APPLICATION NO. G123285	PERMIT NO. G123285P	CERTIFICATION NO. G123285C
DATE AMENDED	DATE CANCELLED	W.R.I.A.

APPLICATION

DATE APPLICATION RECEIVED January 4, 1979	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED January 4, 1979
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 jj	DATE APPROVED 3/16/79	DATE NOTICE SENT 3-16-79
PROTESTED BY AND DATE L.C. Wren, Jr. 5/1/79	M. Whipple 4/27/79	L. Simpson 4/24/79
W.A. Kuehlthaw Sr 5/1/79	C.L. Jones 4/25/79	N.R. Buetow 4/23/79
DATE AFFIDAVIT RECEIVED 4/6/79	CHECKED BY jj	TIME EXPIRED 5/1/79
DATE AMENDED	NOTICE SENT	DATE AFFIDAVIT RECEIVED
		TIME EXPIRED

DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST
----------	---------	---------

EXAMINATION

DATE EXAMINATION MADE 5/9/79	MADE BY jj	DATE REPORT OF EXAM. WRITTEN 5/14/79	WRITTEN BY jj	CHECKED BY jj
DATE PERMIT FEE REQUESTED 1-23-80	AMOUNT DUE 20.00	DATE RECEIVED 2-4-80	OK FOR PERMIT 2-7-80 jj	

PERMIT

PERMIT APPROVED BY jj	DATE APPROVED 3/24/80	PERMIT NO. G123285P	DATE ISSUED 3-31-80
--------------------------	--------------------------	------------------------	------------------------

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT 5-31-80	DATE FILED 5/22/80	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED 6/4/80
-----------	----------------------

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED 11-4-81 (see 11-2-81 letter)	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED 1-29-82	EXTENSION FEE	EXTENDED TO
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 1-29-82	DATE APPROVED FOR CERTIFICATE 2-4-82
			APPROVED BY jj

CERTIFICATION

PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER G123285C	DATE ISSUED 2-16-82
--	--------------------------------	------------------------

REMARKS

CERTIFICATE RECORD No. 2 PAGE No. 651-A

STATE OF WASHINGTON, COUNTY OF King

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That EAST HILL WATER CO., INC.

of Kent, Washington, has made proof

to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the ground waters of a well

located within the NE 1/4 of NW 1/4 of Sec. 29, Twp. 22 N., Rge. 5 E.W.M.

for the purpose of water supply for community

under Ground Water Permit No. 692 issued by the State Supervisor of Hydraulics, 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 Hydraulics of Washington and entered of record in Volume 2 at page 651-A;

that the right hereby confirmed dates from March 23, 1948;

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 60 gallons per minute; 42 acre-feet per year,

for irrigation of XXXXXXXXXXXXXXXXXX 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:

Community served by East Hill Water Company, Inc., King 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 Hydraulics affixed this 6th day of June, 1951.

Deputy M. G. Walker State Supervisor of Hydraulics

ENGINEERING DATA RHP

Proof of Appropriation of Ground Water

Application No. G.W. 785

Permit No. G.W. 692

RECEIVED
MAY 29 1951
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

- Name of Permittee East Hill Water Co.
- Postoffice address RT 1 Box 224, Kent Wash.
- Source of appropriation Well
- Name or number of works (if any) Well or water supply of Community.
- For what purpose or purposes is water used? Commercial use.
- Give date of beginning of construction July 6, 1948
- Give date of completion of construction work, including water distribution system Sept 15, 1948
- Give date when ground water was completely applied to proposed use Oct 1, 1948.
- If used for irrigation: no.

Give number of acres described in permit.....

Give number of acres actually irrigated.....

10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED: Beginning within the N.E. 1/4 of NW 1/4 of Sec. 29. Twp. 22 N., R. 26. 5 E. W. M. County of King.

- During what months is water used? all 12 months.
- Does map filed with your application show correctly the location of well or other works for withdrawal of water, and area of land where water is used? yes.
- If the dimensions, location or type of structure does not correspond to those described in your permit, state what changes have been made, giving dimensions, etc.....
- Certified record by well driller or other constructor must be attached hereto, as provided by the Ground Water Code.

(Sign certification on reverse side)

ok
mm

STATE OF WASHINGTON,

County of King } ss.

I, Eare Harris, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of ground water; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 28 day of May, 1957

Carl Harris
Secy & Treasr East Hill Water Co.

Subscribed and sworn to before me this 28 day of May, 1957

Lafetta Allen
Notary Public.

RECEIVED
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

Under Permit No. G. W.

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. East Hill Water Co., Kent, Washington
(Name and address of owner of well or other works for withdrawal of water)
2. Nature of works from which water is withdrawn Well
(Well, tunnel, or infiltration trench)
3. Name or number of works (if any)
4. Date on which work on well or other structure was started July 6, 1948
5. Date on which work was completed Sept. 15, 1948
6. If work on well or other structure was abandoned, give date
and reason for abandonment

7. DESCRIPTION OF WORKS:

(a) WELL: Depth 268 ft. Diameter 6 in. or ft. Dug or drilled drilled
Flowing or pump well pump

IF PUMP WELL: Type and size of pump is Fairbanks Morse Pomona Turbine
Type and size of motor or engine is 7 1/2 H.P. Electric

Depth from ground surface to water level before pumping 188 feet

After continuous operation for at least four hours, the measured discharge of the pump is
45 g.p.m., and the drawdown of water level is 25' feet

Date of test Sept. 14, 1948

IF FLOWING WELL: Measured discharge g.p.m., on
(Date)

Shut-in pressure at ground surface lbs. per sq. in. on
(Date)

Water is controlled by
(Cap, valve etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

6 in. diameter Standard Steel Weld Casing from 0 to 258 ft.

..... in. diameter with a forged Steel Shoe from to ft.

..... in. diameter from to ft.

..... in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Perforated casing or screens:

10' of #16 Slot Everdur, Johnson Wire Wound from 258 to 268 ft.
(Number per foot and size of perforations, or describe screen)

screen, fitted with a 4" Bail Down Shoe from to ft.

properly plugged, 6'8" of 5 1/4" I.D. steel tubing from to ft.

brazed to the top end, telescoping in 6" from to ft.

casing. from to ft.

LOG OF WELL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)
Top Soil	2	2
Semi Brown Hardpan , Boulders	21	23
Blue Hardpan, Boulders	67	90
Brown cement gravel	16	106
Brown sand and gravel	10	116
Cemented brown sand and gravel	36	152
Cement gravel, some water	2	154
Brown hard sand, some clay & gravel	18	172
Brown sand & gravel, some water	6	178
Blue hardpan	5	183
Dry blue sand	3	186
Blue grey fine dry sand	9	195
Brown cement gravel	5	200
Water bearing brown gravel	31	231

(b) INFILTRATION TRENCH: Covered or open.....

Dimensions: Length.....ft. Minimum depth.....ft. Maximum depth.....ft.

Bottom width.....ft. Discharge.....g.p.m. Date of test.....

(c) TUNNEL: Type of lining.....

Dimensions:

(Length, course, and cross-sectional size)

Position of water bearing stratum with reference to portal of tunnel.....

LOG OF TUNNEL: (Preceding table for log of well may be used if desired. Give footage from portal and character of materials, as pertinent.)

James J. Bell & son
 (Signature of well driller or other constructor)
 6116 - 4th Ave. S.
 Seattle 5, Wash.
 (Address)

STATE OF WASHINGTON.

County of *King* } ss.

I, *James J. Bell*, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

James J. Bell
 (Signature)

Subscribed and sworn to before me this *22* day of *September*, 194*8*

Sevilla C. Bell
 My Commission Expires Apr. 21, 1951 Notary Public

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF HYDRAULICS

Permit to Appropriate Public Ground Waters
of the State of Washington

Book No. 2 of Ground Water Permits, on page 692 under Application No. 785

EAST HILL WATER CO., INC.

of Kent, Washington

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 March 23, 1948

Source of the proposed ground water appropriation is 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 60 gallons per minute; 42 acre-feet per year, to be used for the following purposes: Water supply for community

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is _____

being within the NE 1/4 of NW 1/4 of Sec. 29, Twp. 22 N., Rge. 5 E.W.M.

county of King

Use, or uses to which water is to be applied:

For municipal supply: 60 gallons per minute; 42 acre-feet per year,
to supply Community of East Hill, King County, Washington

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

Community served by East Hill Water Company, Inc., King
County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 275 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Hydraulics for the purpose of preventing waste of public waters:

Construction work shall begin on or before May 1, 1949
and shall thereafter be prosecuted with reasonable diligence and completed on or before
October 1, 1949
and complete application of water to proposed use shall be made on or before
October 1, 1950

Given under my hand and the seal of this office at Olympia, Washington, this 25th day of
May, 1948.

H. W. POLLOCK

State Supervisor of Hydraulics.

By

Chas J Bartholet

CHAS. J. BARTHOLET, Deputy

REPORT OF FINDINGS ON GROUND WATER Application #785

NAME East Hill Water Company, Inc.

TYPE OF WORKS: Well Date of Examination April 20, 1948

Dimensions: 8" x 275' Progress of Works Not started

QUANTITY ~~60~~

Applied for: 60 g.p.m. _____ acre feet per year

LOCATION NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 29, Twp. 22 N., Rge. 5 E.W.M.

USE: Community water supply

Irrigation- acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 300 as of 1948

Industrial: _____

Time Pump Will be Operated: Daily

Other Water Rights of Applicant: Old abandoned well Northwest 50 feet

Proximity to existing works, springs or streams: _____

None within 1/4 mile

Water Bearing Zone: _____



RECOMMENDATIONS

Approved for 60 g.p.m. 42 acre-feet

per year, subject to existing water rights. (1 acre-foot = 325,850 gallons)

The East Hill Water Company now gets its water from the City of Kent. However, this water supply is cut off in the summer when there is not sufficient water to go around for the City and the Water Company.

At present about 12 acre-feet a year are used to supply around 200 people. This is lower than average for Western Washington. Calculating that 300 people will ultimately be served from this well at 200 gallons per day for each person during the 3 summer months and 100 gallons a day during the 9 winter months, a maximum of 42 acre-feet a year will be delivered.

Signed this 1st day of May, 1948

Fred B. Roberts
Fred B. Roberts
Ground Water Geologist
Division of Hydraulics

State of Washington
Office of Supervisor of Hydraulics
Olympia

NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 785

To Whom It May Concern:

Notice is hereby given that East Hill Water Company, Inc., of Kent, Washington, under date of March 23, 1948, filed with the State Supervisor of Hydraulics, Olympia, Washington, an application for a permit to withdraw public ground waters by means of well, in the amount of 60 gallons per minute subject to existing rights continuously, each year for the purpose of domestic supply for community; that the location of the withdrawal works is within NE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 29, Twp. 22 N., Rge. 5 E., W. M., in King County. A map showing the location and plan of said works and the place of the proposed use is on file in the office of the State Supervisor of Hydraulics, Olympia, Washington, together with such other information as is required by law.

Any person, firm or corporation whose right will be injuriously affected by said application may file with the State Supervisor of Hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make, within thirty (30) days after date of last publication, which date is April 15, 1948.

Witness my hand and official seal this 26th day of March, A. D. 1948.

(Seal) RODNEY RYKER,
State Supervisor of Hydraulics.
By CHAS. J. BARTHOLET,
(3514) Deputy.

Affidavit of Publication

STATE OF WASHINGTON, } ss.
COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a
Notice of Water Right Application

as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of two (2) consecutive weeks, commencing on the 8th day of April 1948, and ending on the 15th day of April 1948, both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

15th day of April 1948

Marilyn Booras

Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.



STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON



Application No. G. W. 785 EAST HILL WATER CO., INC.

I, Carl Harris
(Name of applicant)

of Route I Box 224, Kent Wash.
(Complete postoffice 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 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. The proposed appropriation will be from Well
(Well, tunnel, infiltration trench)

located _____
(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 _____

2. The quantity of water which applicant intends to apply to beneficial use is 60
gallons per minute; 424 acre feet per year.

3. The use or uses to which water is to be applied Community water
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year 12 mo.

5. Location of well or other works for withdrawal of water: In county of King

(a) East Hill community system about 1 mile north west.
(Give distance and bearing from nearest corner of section or legal subdivision)
being within the NE 1/4 of NW 1/4 of Sec. 29, Twp. 22 N., Rge. 5 E
(Give smallest legal subdivision) (E. or W.)

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 triplicate. Other adequate maps or drawings will be acceptable.

6. Name and address of owner of land on which well or works are located:

Carl Harris
(Name)
Route I Box 224 Kent, Wash.
(Address)

7. DESCRIPTION OF WORKS:

(a) Well will be Drilled and have a diameter of 8 inches inches and an estimated
(Dug or drilled)

depth of 275 feet.

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described:

Domestic supply for community use.
Fifty-four members or more.

(d) If pumps are to be used, give size and type:

Pomona Pump. Turbine pump.

(e) Give capacity and type of motor or engine to be used:

7 1/2 horse motor single phase motor

(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)

(On accompanying plat show location of the existing wells or works.)

8. SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

EAST HILL WATER CO. INC.

(a) For Municipal Supply: To supply the city, town, or community of _____
in the county of King, having a present population of 54 Stockholders more and an
estimated population of 300 in 1948.

(b) For Irrigation: The land to be irrigated has a total area of _____ acres.

(c) Legal Description of Property on which water is to be used for all purposes other than mu-
nicipal supply: _____
(If more space is required, attach separate sheet.)

(d) Do you have any other water rights appurtenant to the above described property? _____

If so, from what source _____

9. Construction work will begin on or before Immediately

10. Construction work will be completed on or before May 15, 1948

11. Water will be put to complete beneficial use on or before Immediately

EAST HILL WATER CO. INC.

(Signature of applicant)

Carl Harris
Secy Treasr

Signed in the presence of us as witnesses:

(Name)

(Address of witness)

(Name)

(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 Hy-
draulics, with corrections, on or before _____, 19_____

WITNESS my hand this _____ day of _____, 19_____

State Supervisor of Hydraulics.

PROGRESS SHEET - GROUND WATER APPLICATION

Mr. Earl Har... Secretary-Treas.
 NAME: East Hill Water Co. Inc. Assigned to:
 Route #1 Box 224
 Kent, Washington

G.W. APPLI. NO. 785 PERMIT NO. 692 CERT. NO. 651 A
 AMENDED CANCELLED

Appli. received 3-23-48 Initial \$5.00 fee received 3-23-48
 Statement of Additional Examination Fee \$ Sent
 Received

Application returned for completion or correction
 Received

TEMPORARY PERMIT: Approved by Issued

PUBLICATION:
 O.K'd by FBR Date March 25, 1948 Notice sent 3-26-48
 Protests filed

Affidavit received and checked 4-22-48 Time Expires 5-15-48

REPORT: Game Fisheries

EXAMINATION:
 Made April 20, 1948 by F.B.R.
 O.K'd for Permit by C.J.B.

Statement of Permit Fee sent 5-17-48 Amount \$ 10.00
 Received 5-20-48

PERMIT NO. 692 Issued 5-25-48

BEGINNING OF CONSTRUCTION: Notice sent 5-25-48 Filed 5-26-49
 Extension fee \$ Extended to
 Extended to and 5-26-49

WELL DRILLER'S REPORT: Sent 5-25-48 Filed 6-2-49

COMPLETION OF CONSTRUCTION: Notice sent Filed 5-26-49 included
 Time extended to in notice of ~~EE~~ beginning

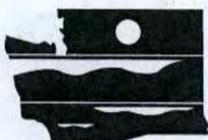
COMPLETE APPLICATION OF WATER: Notice sent 5-26-49 Filed
 Time extended to

PROOF OF APPROPRIATION: Sent 5-26-49 Filed 5-29-51

Statement of Certificate Fee sent Received 5-29-51

CERTIFICATE OF GROUND WATER RIGHT NO. 651 A Issued 6-6-51

City of Kent
 c/o Sean M Bauer
 Public Works Operations
 220 Fourth Avenue S
 Kent WA 98032



WASHINGTON STATE
 DEPARTMENT OF
 E C O L O G Y

**STATE OF WASHINGTON
 SUPERSEDING CERTIFICATE OF WATER RIGHT**

Document Title: Certificate of Water Right

Agency: Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008

Applicant: City of Kent
 c/o Sean M Bauer
 Public Works Operations
 220 Fourth Avenue S
 Kent WA 98032

Reference Number: NA

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
February 25, 1953	3022	2809	GWC 2428-A

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			
MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR	
	120	78.4	

QUANTITY/TYPE OF USE/PERIOD OF USE

Municipal supply

LOCATION OF DIVERSION/WITHDRAWAL

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
NW1/4 NE1/4	29	22N	5E	9	King

PARCEL # 292205-9114

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

PARCEL #

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

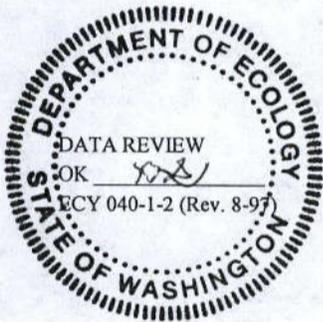
Area served by City of Kent, King County, Washington.

PROVISIONS

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 90.44.020.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

Given under my hand and the seal of this office at Bellevue, Washington,
this 2nd day of July, 2015.



Maia Bellon, Director
Department of Ecology

By [Signature]
Tom Buroker, Section Manager
Water Resources Program

CERTIFICATE RECORD No. 5 PAGE No. 2428-A

STATE OF WASHINGTON, COUNTY OF King

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 EAST HILL WATER CO., INC. of Kent, Washington, 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 NW 1/4 of NW 1/4 of NE 1/4 of Sec. 29, Twp. 22 N., Rge. 5 E.W.M.

for the purpose of domestic supply for community under and subject to provisions contained in Ground Water Permit No. 2809 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 5 at page 2428-A; that the right hereby confirmed dates from February 25, 1953; 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 120 gallons per minute; 78.4 acre-feet per year for domestic supply / for irrigation of 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:

Community of East Hill, King 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 13th day of December, 1955.

M. G. Walker State Supervisor of Water Resources.

Proof of Appropriation of Water

RECEIVED
DEC 2 1955

Application No.

DEPARTMENT OF PERMIT No. 2809
CONSERVATION & DEVELOPMENT

1. Name of Permittee East Hill Water Co.
2. Postoffice address 11210 Kent - Blk. Div. Rd - Kent, Wash.
3. Source of appropriation well
4. Name or number of works (if any) East Hill Water Co
5. For what purpose or purposes is water used? supply individual homes for domestic use
6. Give date of beginning of construction June 30, 1953
7. Give date of completion of construction work, including water distribution system Sept. 14, 1953
8. Give date when water was completely applied to proposed use Sept. 14, 1953
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:

Community of East Hill served by East Hill Water Co., Inc.
King County
Kent, Washington

12. During what months is water used? 12 months of the year
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? yes
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. none
15. Actual measured discharge or diversion of permanent system: 170 (gpm or cfs)

OK like permit
RMM

(Sign certification on reverse side)

STATE OF WASHINGTON,

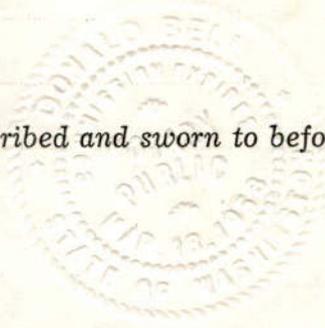
County of KING } ss.

I, June Parmenter, 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 1 day of Dec '55, 19

East Hill Water Co.
Mrs. June Parmenter
Sec. Treas.

Subscribed and sworn to before me this 1st day of Dec '55, 19



Donald Bell
Notary Public.

Notary Public in and for the State of Washington residing at Kent.

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

RECEIVED
JUN 21 1954
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Under Permit No. G. W.

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. East Hill Water Co.
(Name and address of owner of well or other works for withdrawal of water)
2. Type; name or number of works where water is taken Well #2
(Well, tunnel or infiltration trench)
3. Date on which work on well or other structure was started June 30, 1953
4. Date on which work was completed Sept. 14, 1953
5. If work on well or other structure was abandoned, give date
and reason for abandonment

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 286 ft. Diameter 12 in. or ft. Dug or drilled drilled
Flowing or pump well pump

If PUMP WELL: Type and size of pump is 150 gpm Jacuzzi Submersible
Type and size of motor or engine is 20 HP

Depth from ground surface to water level before pumping 170 feet

After continuous operation for 4 hours, the measured discharge of the pump is
(At least four)
170 g.p.m., and the drawdown of water level is 50 feet

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
<u>2 pumping test on consecutive days of 4 hrs. each.</u>			
.....
.....
.....

Date of test Sept. 12, 13, 1953

If FLOWING WELL: Measured discharge g.p.m. on (Date)

Shut-in pressure at ground surface lbs. per sq. in. on (Date)

Water is controlled by (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

- 12 in. diameter from 0 to 270 ft.
- in. diameter from to ft.
- in. diameter from to ft.
- in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

12 in. forged steel shoe

OK
RMR

Perforated casing or screens:

(Number per foot and size of perforations, or describe screen) from to ft.
 10' of 12", #20 slot Everdur Screen from 270 to 280 ft.
 with 4'8" of 10" pipe brazed to top from to ft.
 with baildown shoe on bottom. from to ft.
 from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Top soil	2	2
Semi brown hardpan	18	20
Blue hardpan and boulders	70	90
Brown cemented gravel	15	105
Brown sand and gravel, loose	11	116
Hard brown cemented sand and gravel	36	152
Cemented gravel, water bearing	2	154
Brown sand, some clay and gravel	18	172
Brown sand and gravel, water bearing	8	180
Blue hardpan	3	183
Dry blue sand	12	195
Brown cemented gravel	5	200
Brown cemented gravel, water bearing	31	231
Sandy blue clay	22	253

(b) INFILTRATION TRENCH OR TUNNEL: Type

Dimensions: (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel

(Signature of well driller or other constructor)

(Address)

STATE OF WASHINGTON,

County of } ss.

I, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

James J. Bell & Son
 (Signature) *James J. Bell*
 Nov 3

Subscribed and sworn to before me this day of 1953

Notary Public

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. 6 of Ground Water Permits, on page 2809 under Application No. 3022

EAST HILL WATER CO., INC.

of Kent, Washington

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 February 25, 1953

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 120 gallons per minute; 78.4 acre-feet per year, to be used for the following purposes: domestic supply for community

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 650 feet South and 20 feet East of North quarter corner of Sec. 29

being within the NW $\frac{1}{4}$ of NW $\frac{1}{4}$ of NE $\frac{1}{4}$ of Sec. 29, Twp. 22 N., Rge. 5 E.W.M.

county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year, to supply _____

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: 120 gallons per minute; 78.4 acre-feet per year, for domestic supply for community.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Community of East Hill, King County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 12 inches, and depth of 275 feet.
(Dug or drilled)

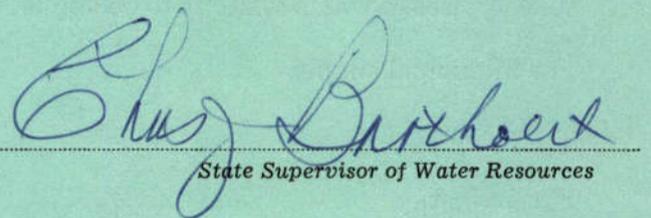
Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources for the purpose of preventing waste of public waters:

Construction work shall begin on or before June 1, 1954
and shall thereafter be prosecuted with reasonable diligence and completed on or before December 1, 1954
and complete application of water to proposed use shall be made on or before December 1, 1955

Given under my hand and the seal of this office at Olympia, Washington, this 5th day of June, 1953.


State Supervisor of Water Resources

Report Examination on Ground Water

Received date 2-25-53 Date of exam. 5-6-53 Appli. No. 3022

Name East Hill Water Co. Inc. Address 10618 Kent-Black Diamond Rd.

Kent, Washington

Type of works well Dimensions 12" x 275'

Progress of works Not begun

Quantity ~~claimed~~ 120 g.p.m. NE 1/4 acre-feet per year
applied for

Legal sub. NW 1/4 NW 1/4 Sec. 29 Twp. 22 N. Rge. 5 E. County King

Use domestic supply for community

Irrigation-acreage: Present _____ Planned _____ Feasible _____

Municipal: Population 350 as of 1960

Industrial _____

Time pump will be operated continuously

Other water rights appurtenant to this land G. W. Certificate #651

Proximity to existing works, springs, wells, or streams East Hill Water Co. SW 100 ft.

Area _____ Sub-area _____ Zone _____

RECOMMENDATIONS

Approved for 120 g.p.m. 78.4 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The total annual withdrawal recommended above is based on a maximum of 200 gallons per person per day being the domestic requirement for this community. Thus, for an estimated population of 350 people by the year 1960, the total withdrawal would approximate 78.4 acre-feet per year.

It should be noted that the applicant also holds ground water Certificate #651 which covers well #1. This well presently supplies the community but it will be used only for standby purposes after the new well is complete.

In view of this existing certificate it is recommended that this application be approved as a supplemental supply. Permit should thus include the provision that the total withdrawal from well #1 and #2 shall not exceed 78.4 acre-feet per year.

The installation of an access port to well as described in attached Ground Water Bulletin No. 1, is recommended.

Signed this 14th day of May, 1953.

Glen H. Fiedler
GLEN H. FIEDLER
Engineer

STATE OF WASHINGTON
Office of Supervisor of Water
Resources, Olympia

NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 3022

Take notice:

That East Hill Water Co., Inc., of
Kent, Washington, on February 25,
1953, filed application for permit to
withdraw public ground waters
through a well situated within the
NW¹/₄ of NW¹/₄ of NE¹/₄ of Section
29, Township 22 N., Range 5 E.,
W. M., in King County, in the
amount of 120 gallons per minute,
subject to existing rights continu-
ously, each year for the purpose of
domestic supply for community.

Any objections must be accompa-
nied by a two dollar (\$2.00) record-
ing fee and filed with the State
Supervisor of Water Resources
within thirty (30) days from March
31, 1953.

Witness my hand and official seal
this 5th day of March, 1953.

(Seal) CHAS. J. BARTHOLET,
State Supervisor of Water
Resources, (6981)

Affidavit of Publication

RECEIVED
APR 15 1953

STATE OF WASHINGTON, } ss.
COUNTY OF KING

DEPARTMENT OF
CONSERVATION & DEVELOPMENT

L. J. Brown, being first duly sworn, on
oath deposes and says that he is one of the publishers of The
Daily Journal of Commerce, a daily newspaper. That said
newspaper is a legal newspaper and it is now and has been for
more than six months prior to the date of the publication here-
inafter referred to, published in the English language continu-
ously as a daily newspaper in Seattle, King County, Washing-
ton, 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 said Daily Journal of Commerce was on
the 12th day of June, 1941, approved as a legal newspaper by
the Superior Court of said King County.

That the annexed is a true copy of a

.....
Water Right Application No 3022
.....
as it was published in regular issues (and not in supplement
form) of said newspaper once each..... for a period of
..... week
two (..... 2) consecutive..... weeks, com-
mencing on the..... day of.....
24th March 1953
and ending on the..... day of.....
31st March 1953
both dates inclusive, and that said newspaper was regularly
distributed to its subscribers during all of said period.

L. J. Brown

Subscribed and sworn to before me this

..... day of.....
31st March 1953
E. Campbell

Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.



STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources



APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 3022

I, East Hill Water Co., Inc.
(Name of applicant)

of 10618 Kent - Black Diamond Rd. Kent, Wn.
(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 Drilled Well
(Well, tunnel, infiltration trench)

located 2 1/4 miles east of Kent
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)

Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any Well # 2

2. The quantity of water which applicant intends to withdraw for beneficial use is 12.0
gallons per minute; 78.4 acre feet per year.

3. The use or uses to which water is to be applied Community Domestic 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 King

(a) 650' S 8' 20' E of N 1/4 corner of Sec 29
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the NW 1/4 of NW 1/4 of NE 1/4 of Sec 29, Twp. 22 N., Rge. 5E
(Give smallest legal subdivision) (E. or W.)

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 and have a diameter of 12 inches and an estimated depth of 275 feet.
(Dug or drilled)

(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:

Not determined as yet

(e) Give capacity and type of motor or engine to be used:

Same

(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:

<u>East Hill Water Co.</u>	<u>S-West</u>	<u>100'</u>
(Name)	(Direction)	(Distance)
.....
(Name)	(Direction)	(Distance)
.....
(Name)	(Direction)	(Distance)
.....
(Name)	(Direction)	(Distance)

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. For Municipal Supply: To supply the city, town, or community of East Hill, in the county of King, having a present population of 230, and an estimated population of 350, in 1960.

8. For Irrigation: Number of acres to be irrigated.....

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? Yes

If so, from what source? Q.W. Certificate 651

12. Construction work will begin on or before Soon as possible

13. Construction work will be completed on or before Summer '53

14. Water will be put to complete beneficial use on or before Summer '53

Earl M Harris

(Signature of applicant)

Secretary - Treasurer

15. Name and address of owner of land on which well or works are located:

East Hill Water Co., Inc

(Name)

Same

(Address)

(Signature of legal landowner)

Signed in the presence of us as witnesses:

Glen H. Fiedler

(Name)

(Address of witness)

(Name)

(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.

Progress Sheet—Ground Water Application

12-1-55

NAME East Hill Water Co. Inc. Assigned to Kent-Black Diamond Rd., Kent
G. W. APPLI. NO. 3022 10618 11210 PERMIT NO. 2809 CERT. NO. 2428 A

AMENDED _____ CANCELLED _____

Application received 2-25-53 Initial \$10.00 fee received 2-25-53
Statement of additional examination fee \$ _____ Sent _____ Received _____
Application returned for completion or correction _____ Received _____

TEMPORARY PERMIT: Approved by _____ Issued _____

PUBLICATION:
O.K.'d by RNR Date 3-3-53 Notice sent 3-5-53
Protests _____
Filed _____
Affidavit received and checked 4-15-53 Time expired 5-1-53
Amended notice sent _____ Affidavit received _____
Time expires _____

DEPT. OF GAME REPORT _____

EXAMINATION Made 5-6-53 by J.F. M...
O. K.'d for permit 6/1/53 by M...
Statement of permit fee sent 5-15-53 Amount \$ 2000 Received 6-1-53

PERMIT NO. 2809 ISSUED 6-5-53

BEGINNING OF CONSTRUCTION: Notice sent 6-5-53 Filed 6-10-54
Extension fee \$ _____ Extended to _____
Extended to _____

WELL DRILLER'S REPORT: Sent 3-5-53 Filed 6-21-54

COMPLETION OF CONSTRUCTION: Notice sent 6-5-53 Filed 6-21-54
\$2.00 extension fee _____ Extended to _____
To _____

PROOF OF APPROPRIATION: Sent 6-21-54 Filed 12-2-55
\$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent 6-21-54 \$ 3.00 Received 12-2-55

CERTIFICATE OF GROUND WATER RIGHT NO. 2428 A ISSUED 12-13-55

City of Kent
 c/o Sean M Bauer
 Public Works Operations
 220 Fourth Avenue S
 Kent WA 98032



**STATE OF WASHINGTON
 SUPERSEDING CERTIFICATE OF WATER RIGHT**

Document Title: Certificate of Water Right

Agency: Department of Ecology
 Northwest Regional Office
 3190 160th Avenue SE
 Bellevue, WA 98008

Applicant: City of Kent
 c/o Sean M Bauer
 Public Works Operations
 220 Fourth Avenue S
 Kent WA 98032

Reference Number: NA

PRIORITY DATE	APPLICATION NUMBER	PERMIT NUMBER	CERTIFICATE NUMBER
January 18, 1951	1787	1606	GWC 767-A

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)		
O'Brien Well			
MAX. CUBIC FEET PER SECOND	MAX. GALLONS PER MINUTE	MAX. ACRE-FEET PER YEAR	
	243	45	

QUANTITY/TYPE OF USE/PERIOD OF USE

Municipal supply

LOCATION OF DIVERSION/WITHDRAWAL

LEGAL DESCRIPTION OF LOCATION OF DIVERSION/WITHDRAWAL

1/4 1/4 SW1/4	SECTION	TOWNSHIP N.	RANGE (E. OR W.) W.M.	W.R.I.A.	COUNTY
	7	22N	5E	9	King

PARCEL # 7757800270

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

PARCEL #

ADDITIONAL LEGAL IS ON PAGE 2

CONTINUED LEGAL DESCRIPTION FOR LOCATION OF DIVERSION/WITHDRAWAL

CONTINUED LEGAL DESCRIPTION FOR PROPERTY ON WHICH WATER IS TO BE USED

Area served by City of Kent, King County, Washington.

PROVISIONS

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 90.44.020.

This certificate of water right is specifically subject to relinquishment for non-use of water as provided in RCW 90.14.180.

*Given under my hand and the seal of this office at Bellevue, Washington,
this 29th day of July, 2015.*



Maia Bellon, Director
Department of Ecology

By

Tom Buroker, Section Manager
Water Resources Program

RECEIVED
SEP 24 1951

Proof of Appropriation of Ground Water

DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Application No. G.W. 1787

Permit No. G.W. 1606

1. Name of Permittee O'BRIEN WATER USERS ASSOCIATION, INC.
2. Postoffice address Route 2, Kent, Washington
3. Source of appropriation Drilled well in Tract 27, of Shinn's Cloverdale Addition to Kent.
4. Name or number of works (if any) O'Brien Water Users Association, Inc. Well
5. For what purpose or purposes is water used? Domestic supply of community
6. Give date of beginning of construction about April 6, 1951
7. Give date of completion of construction work, including water distribution system Aug. 15, 1951
8. Give date when ground water was completely applied to proposed use Aug. 15, 1951
9. If used for irrigation:
Give number of acres described in permit.....
Give number of acres actually irrigated.....
10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

The community of O'Brien, King County, Washington

NOTE: Application was made for 250 gallons per minute. The well produces and there is being used 243 gallons per minute.

11. During what months is water used? all year
12. Does map filed with your application show correctly the location of well or other works for withdrawal of water, and area of land where water is used? yes
13. If the dimensions, location or type of structure does not correspond to those described in your permit, state what changes have been made, giving dimensions, etc.....
14. Certified record by well driller or other constructor must be attached hereto, as provided by the

Ground Water Code.

(Sign certification on reverse side)

ok
change
gpm to
243

STATE OF WASHINGTON,

County of King

} ss.

I, John M. Anderson, Pres. of, being first duly sworn, depose and say that I have
O'Brien Water Users, Ass'n, Inc.
read the above and foregoing proof of appropriation of ground water; that I know the contents thereof;
and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 21st day of September, 1951

John M. Anderson

Subscribed and sworn to before me this 21st day of September, 1951

Amerson B. Hatcher

in and for the State of ^{Notary Public} Washington
residing at Kent.



RECEIVED
MAY 16 1951
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS
FOR WITHDRAWAL OF GROUND WATER

Under Permit No. G. W. 1606

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

- 1. O'Brien Water Users Assn Inc. Kent Wash
(Name and address of owner of well or other works for withdrawal of water)
- 2. Type; name or number of works where water is taken Well
(Well, tunnel or infiltration trench)
- 3. Date on which work on well or other structure was started 4-3-51
- 4. Date on which work was completed 4-14-51
- 5. If work on well or other structure was abandoned, give date no
and reason for abandonment

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 170 ft. Diameter 8 in. or ft. Dug or drilled Drilled
Flowing or pump well Both. Flows 60 G.P.M.

IF PUMP WELL: Type and size of pump is _____
Type and size of motor or engine is _____
Depth from ground surface to water level before pumping _____ feet
After continuous operation _____ four hours, the measured discharge of the pump is
(At least four) _____
100 g.p.m., and the drawdown of water level is _____ feet

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
<u>When pumping steady at 100 G.P.M., can pump down 18 ft and recovers at the rate of 60 G.P.M. at which the well flows</u>			

Date of test 4-14-51

IF FLOWING WELL: Measured discharge 60 g.p.m., on 4-12-13-14-1951
(Date)
Shut-in pressure at ground surface _____ lbs. per sq. in. on _____
(Date)
Water is controlled by Cap and valves
(Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

<u>8</u> in. diameter	<u>Ground Level</u>	from <u>0</u>	to <u>150</u>	ft.
<u>8</u> in. diameter	<u>Open hole</u>	from <u>150</u>	to <u>170</u>	ft.
_____ in. diameter	_____	from _____	to _____	ft.
_____ in. diameter	_____	from _____	to _____	ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Perforated casing or screens:

..... from to ft.
 (Number per foot and size of perforations, or describe screen)
 from to ft.
 from to ft.
 None from to ft.
 from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Blue Clay & Gravel	10	10
Brown sand & Clay	25	35
sand-gravel some clay	11	46
Sandy clay - some water	5	51
compacted sand & gravel	4	55
Brown sand and clay	5	60
Blue muddy sand & gravel	9	69
sand clay & water	11	80
Course bearing sand.	1	81
Hard Blue Clay & sand	39	120
Course sand gravel capacity 60 g.p.m. @ 5 ft. PD underneath water built with gravel	1	121
Sandy Clay	5	126
Hard dry green clay	24	150
sand gravel some water	2	152
Green clay	11	163
Sand gravel & Water	1	164
(b) INFILTRATION TRENCH OR TUNNEL: Type Green clay	6	170

Dimensions: (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel

Jacoma Pump & Well Drill Co.
 By M. H. Hansen, Driller
 (Signature of well driller or other constructor)

Rt. 7 Box 316 Jacoma, Wn
 (Address)

STATE OF WASHINGTON.

County of Pierce } ss.

I, M. H. Hansen, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

M. H. Hansen
 (Signature)

Subscribed and sworn to before me this 15th day of May, 1951

J. L. Young
 Notary Public

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF HYDRAULICS

Permit to appropriate Public Ground Waters
of the State of Washington

Book No. 4 of Ground Water Permits, on page 1606 under Application No. 1787

O'BRIEN WATER USERS ASSOCIATION, INC.

of Kent, Washington

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 January 18, 1951

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 250 gallons per minute; 45 acre-feet per year, to be used for the following purposes: domestic supply of community.

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is North 66° East 2180 feet from Southwest corner of Sec. 7

being within Tract 27 of Shinn's Cloverdale Addition to Kent, Washington, Sec. 7, Twp. 22 N., Rge. 5 E.W.M.
county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year, to supply _____

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: 250 gallons per minute; 45 acre-feet per year, for domestic supply of community.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

The Community of O'Brien, King County, Washington.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 250 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Hydraulics for the purpose of preventing waste of public waters:

Construction work shall begin on or before March 1, 1952
and shall thereafter be prosecuted with reasonable diligence and completed on or before
September 1, 1952
and complete application of water to proposed use shall be made on or before
September 1, 1953

Given under my hand and the seal of this office at Olympia, Washington, this 30th day of
March, 19 51.

Charles J. Bartholomew
State Supervisor of Hydraulics.

REPORT OF FINDINGS ON GROUND WATER Li. #1787

NAME O'Brien Water Users Assn/ADDRESS Rt. 2, Box 600, Kent, Washington
Inc.

TYPE OF WORKS: well Date of Examination 2-28-51

Dimensions: 8" x 250' Progress of Works Not started

QUANTITY ~~claimed~~ on

Applied for: 250 g.p.m. acre-feet per year

of Shinn's Cloverdale Add. to Kent

LEGAL SUB Tract 27/ Sec. 7 Twp. 22 N. Rge. 5 E. County King

USE: domestic supply for community

Irrigation - acreage: Present Planned Feasible

Municipal: Population 70 at present as of 1955-200

Industrial:

Time Pump Will be Operated: Continuously

Other Water Rights of Applicant: Spring

Proximity to existing works, springs or streams: Applicant's (formerly owned by Snyder Water Co.) NE100'; D.D. Lewis SW 1100'; G. Nordyke SW 500'

Area Sub-Area Zone

RECOMMENDATIONS

Approved for 250 g.p.m. 45 acre-feet per year, subject to existing water rights. (1 acre-foot = 325,850 gallons)

The water requirement of this community is calculated on the basis of each person requiring 200 g.p.d., or a total of 45 acre-feet annually for a population of 200 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 size of hole openings and number of sprinklers operated, if such be the case, will give this information.

The installation of an access port to well, as described in attached Ground Water Bulletin No. 1, is recommended.

Signed this 20 day of March, 1951

ROBERT H. RUSSELL
Ground Water Geologist

Affidavit of Publication

STATE OF WASHINGTON, } ss.
 COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a
 Notice of WRA # 1787

as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of two (2) consecutive weeks, commencing on the 12th day of Feb. 1951, and ending on the 19th day of Feb. 1951, both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

19th day of Feb. 1951

V. J. Adams

Notary Public in and for the State of Washington, residing at Seattle.
 (This form officially sanctioned by Washington State Press Association.)
 Form C.

State of Washington
 Office of Supervisor of Hydraulics
 Olympia

NOTICE OF GROUND WATER RIGHT APPLICATION NO. 1787

Take Notice:

That O'Brien Water Users Association, Inc., of Kent, Washington, on January 18, 1951, filed application for permit to withdraw public ground waters through a well situated within Tract 27 of Shinn's Cloverdale Addition to Kent, Washington, Sec. 7, Twp. 22 N., Rge. 5 E., W. M., in King County, in the amount of 250 gallons per minute, subject to existing rights continuously, each year for the purpose of domestic supply of community.

Any objections must be filed with the State Supervisor of Hydraulics within thirty (30) days from February 19, 1951.

Witness my hand and official seal this 7th day of February, 1951.
 (Seal) CHAS. J. BARTHOLET,
 State Supervisor of Hydraulics.
 (6897)

RECEIVED
 FEB 20 1951

DEPARTMENT OF
 CONSERVATION & DEVELOPMENT

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics



APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 1787

I, O'Brien Water Users Association, Inc.
(Name of applicant)

of c/o John M. Anderson, Rt. 2, Box 600, Kent, Washington
(Complete postoffice 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 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. The proposed appropriation will be from drilled well
(Well, tunnel, infiltration trench)

located two miles north and quarter mile east of City of Kent
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)

Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any Proposed well under Farmers Home Administration Loan of 1951

2. The quantity of water which applicant intends to withdraw for beneficial use is 250 gallons per minute; 45 acre feet per year.

3. The use or uses to which water is to be applied domestic use of members of this non-profit corporation. Present members about 70, with prospects as area grows of increasing this substantially.
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year all year

5. Location of well or other works for withdrawal of water: In county of King

(a) North 66° east, from southwest corner of Section 7, Tp. 22 North, R 5 East,
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the Southwest 1/4 of Sec. 7, Twp. 22 N., Rge. 5 E.
(Give smallest legal subdivision) (E. or W.)

or (b) If within limits of recorded platted property, town or city: Tract 27, Block

of Shinn's Cloverdale Additon to Kent, in King County, Washington
(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. Name and address of owner of land on which well or works are located:

O'Brien Water Users Association, Inc.,
(Name)

c/o John M. Anderson, Rt. 2, Box 600, Kent, Washington.
(Address)

(Former owner, Maggle Snyder, d/b/a Snyder Water Co .)

Advt.

MS

7. DESCRIPTION OF WORKS:

(a) Well will be drilled and have a diameter of eight inches and an estimated
(Dug or drilled)

depth of 250 feet., unless adequate supply of water is found before that depth.

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

None.

(c) Distribution system to be described: Water will be pumped to a 25,000 gal. reservoir on the south 100 feet of Tract 30, Cloverdale Addition, in process of being acquired. From there will flow thru the present distribution system, covering Alexander road, East Highway, O'Brien Road, Costello Road, Horr Road, Nelson Ave., going as far west as West Highway on the O'Brien Road. This system is to be re-habilitated with monies from the loan from Farmers Home Administration

(d) If pumps are to be used, give size and type: Exact specifications not yet made. However, well pump will be, to start with, 40 gpm at 160' T. D.H. There will also be a spring stand-by pump (for pumping from existing springs now being used) of 20 gpm at 80' T. D. H. Additional pumps to pump more water as needed will be installed, or these pumps replaced by larger

(e) Give capacity and type of motor or engine to be used: No specifications as yet, except that electric motors will 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:

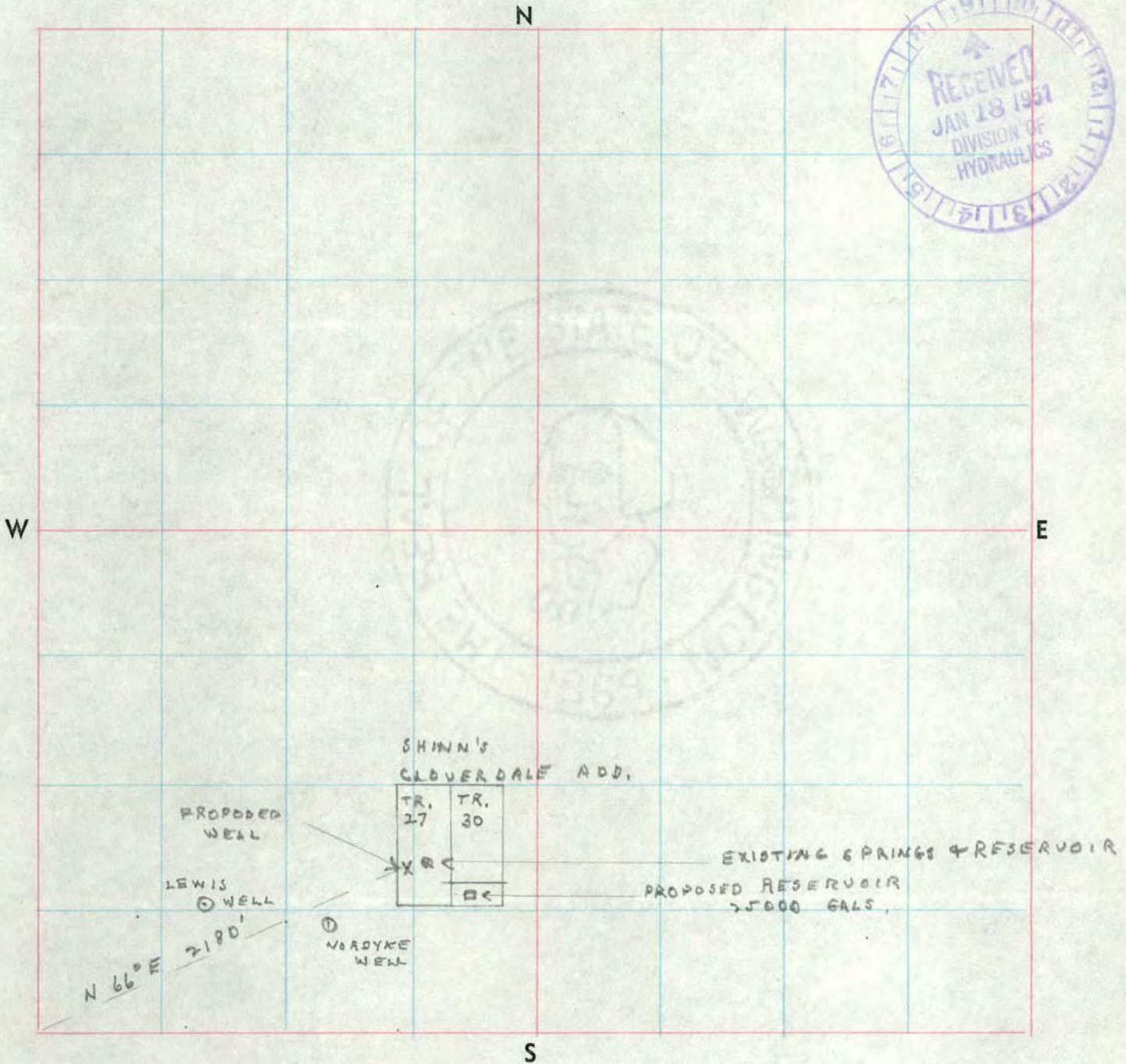
No natural stream or stream channel within one quarter mile

(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:

<u>O'Brien Water Users Ass'n Inc.,</u> springs, formerly owned by Snyder Water Co, and reservoir	<u>northeast</u> <small>(Direction)</small>	<u>100 feet</u> <small>(Distance)</small>
<small>(Name)</small>	<small>(Direction)</small>	<small>(Distance)</small>
<u>D. D. Lewis, artesian well</u>	<u>South 80° west</u> <small>(Direction)</small>	<u>1100 feet</u> <small>(Distance)</small>
<small>(Name)</small>	<small>(Direction)</small>	<small>(Distance)</small>
<u>G. Nordyke, artesian well</u>	<u>South 55° west</u> <small>(Direction)</small>	<u>500 feet</u> <small>(Distance)</small>
<small>(Name)</small>	<small>(Direction)</small>	<small>(Distance)</small>
<small>(Name)</small>	<small>(Direction)</small>	<small>(Distance)</small>

SECTION PLAT

Sec. 7 Twp. 22 N. R. 5 East, W.M.



Show by a cross (X) the location of the well or other works covered by the application or declaration. Show by circle (O) the locations of other wells or works within a quarter of a mile. Also indicate traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

Lewis well bears S 80° west 1100 feet; Nordyke well S 55° west 500 feet. Travel directions from Kent: North approximately 2 miles on Highway 5 A (East Highway) to Alexander Road; turn right (east), continue on Alexander Road (it will become Maple Lane after an S curve) approximately one quarter mile to end of road. Property (Tract 27) will lie on left. Must walk in to site of springs, reservoir, and proposed well.

Corres. to Emerson B. Thatcher, Lawyer
Kent, Washington

PROGRESS SHEET - GROUND WATER APPLICATION
O'Brien Water Users Assn. Inc.

NAME: c/o John M. Anderson
Rt. 2, Box 600, Kent, Washington

Assigned to:

G.W. APPLI. NO. 1787 PERMIT NO. 1606 CERT. NO. 767 A

AMENDED

CANCELLED

Appli. received 1-18-51 Initial \$5.00 fee received 1-18-51
Statement of Additional Examination Fee \$ Sent
Received

Application returned for completion or correction
Received

TEMPORARY PERMIT: Approved by Issued

PUBLICATION:
O.K'd by mmw Date 2/2/51 Notice sent 2-7-51
Protests filed

Affidavit received and checked 2-20-51 Time Expired 3-19-51
Amended notice sent Affidavit recd
Time Expires

DEPT. OF GAME REPORT:

EXAMINATION made 2-28-51 by RHP

O.K'd for Permit 3/23/51 by mmw
Statement of Permit Fee sent 3-20-51 Amount \$ 10.00 Recd 3-23-51

PERMIT NO. 1606 ISSUED 3-30-51

BEGINNING OF CONSTRUCTION: Notice sent 3-30-51 Filed 4-7-51
Extension fee \$ Extended to
Extended to

WELL DRILLER'S REPORT: Sent 3-30-51 Filed 5-16-51

COMPLETION OF CONSTRUCTION: Notice sent 3-30-51 Filed 9-19-51
Time extended to

COMPLETE APPLICATION OF WATER: Notice sent Filed
Time extended to

PROOF OF APPROPRIATION: Sent 9-19-51 Filed 9-24-51

Statement of Certificate Fee sent 9-19-51 Received 9-24-51

CERTIFICATE OF GROUND WATER RIGHT NO. 767-A Issued 9-28-51

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.)

PRIORITY DATE April 26, 1982	APPLICATION NUMBER G1-24073	PERMIT NUMBER G1-24073P	CERTIFICATE NUMBER G1-24073C
---------------------------------	--------------------------------	----------------------------	---------------------------------

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 Well	TRIBUTARY OF (IF SURFACE WATERS)		
----------------	----------------------------------	--	--

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 900	MAXIMUM ACRE-FEET PER YEAR 864.0	Supplemental to existing rights held by applicant
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal supply - continuously			

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 650 feet east and 500 feet north from W $\frac{1}{4}$ corner of Sec. 28

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 28	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
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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 Kent

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, 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 Redmond Washington, this 15th day of November, 1984.

Department of Ecology

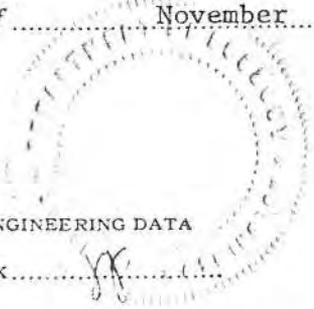
by Robert K. McCormick

ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

ENGINEERING DATA

OK



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RECEIVED
DEPT. OF ECOLOGY

OCT 11 9 1984

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-24073		PERMIT NUMBER G1-24073P	
NAME OF PERMITTEE City of Kent (Department of Public Works)			
POST OFFICE ADDRESS 220 S. 4th		(CITY) Kent	(STATE) Wa
		(ZIP CODE) 98032	
ACTUAL SOURCE OF APPROPRIATION Well			
PURPOSE OR PURPOSES WATER IS USED FOR Public Water Supply			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE 6-2-83		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED N/A	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED Continuous	
PUMP SIZE 8-inch			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM 900		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN	

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Area served by the City of Kent

The well is located approximately 650 feet east and 500 feet north from the West quarter corner of Section 28 Township 22 North Range 5 E.

STATE OF WASHINGTON,
County of KING } ss.

I, Gary M. Gill, 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 18th day of October, 1984.

10-29-84
Issue cert as
per permit

Gary M. Gill
Permittee Signature

Subscribed and sworn to before me this 18th day of October, 1984

Carol S. Isaak
Notary Public

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 April 26, 1982	APPLICATION NUMBER G1-24073	PERMIT NUMBER G1-24073P	CERTIFICATE NUMBER
---------------------------------	--------------------------------	----------------------------	--------------------

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 900	MAXIMUM ACRE-FEET PER YEAR 864.0 Supplemental to existing rights held by applicant
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 650 feet east and 500 feet north from W $\frac{1}{4}$ corner of Sec. 28

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 28	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
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LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by the City of Kent

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: February 15, 1985	WATER PUT TO FULL USE BY THIS DATE: February 15, 1986
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PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

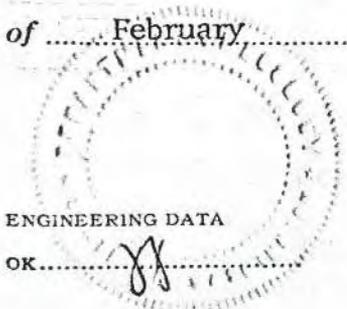
An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

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 Redmond Washington, this...15th.....day of February....., 19 84.....

Department of Ecology

by Robert K. McCormick
ROBERT K. McCORMICK, Regional Manager



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 April 26, 1982	APPLICATION NUMBER G1-24073	PERMIT NUMBER	CERTIFICATE NUMBER
---------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT (DEPARTMENT OF PUBLIC WORKS)			
ADDRESS (STREET) 220 South 4th	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98031

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 900	MAXIMUM ACRE-FEET PER YEAR 864.0 Supplemental to existing rights held by applicant
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 650 feet east and 500 feet north from W $\frac{1}{4}$ corner of Sec. 28

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 28	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E	W.R.I.A. 9	COUNTY King
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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 Kent

DESCRIPTION OF PROPOSED WORKS

Seven Oaks well, 16" x 431', screened in silty sand and gravel from 373' to 388', screened in fine to very coarse sand and gravel from 400' to 410', gravel packed from 346' to 431'.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: 1 yr from permit issuance	WATER PUT TO FULL USE BY THIS DATE: 2 yrs from permit issuance
--	---	---

REPORT

Background:

This application to withdraw 1100 gpm from a well near Kent to supplement the Kent municipal water supply was received on April 26, 1982.

Public notice of this application was made in the Daily News Journal on May 28 and June 4, 1982 and no protests or objections were filed.

Investigation:

This well site was field inspected on July 15, 1981 when a 16-inch diameter casing was observed welded shut and protruding four feet above land surface. The well was constructed, using cable tool drilling method, in February 1981 and was completed at a depth of 373 to 431 feet below land surface. The well location is on Kent-Kangley Road approximately one mile west of Lake Meridian and 80 feet from an 8-inch test well drilled in July of 1980. This well is called the "Seven Oaks Well" because of its location near a development called Seven Oaks Plat. The well is within 600 feet of the headwaters of a tributary to Soos Creek, however no hydraulic continuity between the well and the tributary exists. Aquifer testing of the Seven Oaks well performed in February 1981 led to the determination of 900 gpm for permanent pump design capacity from a pumping water level of about 335 feet below land surface. The initial static water level in the well was 184.0 feet below top of well (2-19-81) and maximum drawdown during pumping is expected to be about 150 feet.

There are seven other single domestic wells on record as being located in Section 28. In addition, there is one institutional well for Valley View Christian Church located approximately 2600 feet NE of the Seven Oaks well which was completed in 1980 at a depth of 237 feet. The initial static water level in the Valley View well was 195 feet deep. The distance between these wells, the over 40 feet of available drawdown in the Valley View well and the 200 foot difference in elevations of the well intakes are all indicators that the Seven Oaks well will not adversely interfere with the Valley View Christian Church well.

Of the seven single domestic supply wells located in Section 28, all are completed above a depth of 180 feet and all are located over 1500 feet from the Seven Oaks well. These wells, being developed in a different aquifer zone and being located over one-quarter mile from the subject well, are not expected to be adversely affected by its pumping. During drilling of the Seven Oaks well, a stratum of glacial till or similar aquitard over 20 feet in thickness was penetrated below a depth of 180 feet. This aquitard further indicates that the Seven Oaks well operation should not impose adverse effects on existing rights.

The ground water recharge area for the Seven Oaks aquifer is approximately 10 square miles located in the southwestern portion of the broad upland called the Covington Drift Plain (Geology and Groundwater Resources of Southwestern King County, Water Supply Bulletin No. 28, 1969). The significantly large recharge area for the Seven Oaks aquifer and the relatively small withdrawals of nearby domestic wells indicate that existing ground water rights will not be adversely affected by this appropriation. The minimum annual aquifer recharge is estimated at approximately 4,200 acre-feet assuming 40 inches of precipitation and 20 percent infiltration.

The annual quantity associated with this application is 864.0 acre-feet per year which is equivalent to pumping at the design rate of 900 gpm for 60 percent of the time. An analysis of the City of Kent's water rights and present and future consumption follows.

Water Right File No.	Source Name	Quantity gpm	Annual Q (acre-feet)
651-A	East Hill Well #1	60	42 (supplemental)
2428-A	East Hill Well #2	120	78.4
3107-A	Clark Springs Trench	2,250	1,350 (supplemental)
7232-A	Clark Springs	2,220	3,600 (supplemental)
7660-A	Clark Springs Wells	5,400	8,710
G1-22956C	Kent Springs	3,690	5,904
G1-23285C	East Hill Well	1,900	3,040
G1-23614C	Garrison Creek Well	500	800 (supplemental)
G1-23713P	High Meadows	7	11
G1-23852P	Reservoir Well	160	256
G1-24073	Seven Oaks	900	864 (supplemental)
G1-24189P	Armstrong Springs	1,300	500 (supplemental)
G1-24190	212th St. Well	3,500	1,400 (supplemental)

TOTAL: Primary..... 17,999.4
Supplemental (8,556.0)

As shown, the City of Kent presently has 17,999.4 acre-feet in primary water rights. The City has about 12,000 services and a current average demand of 6,400 acre-feet per year. Kent is expected to have an annual demand of approximately 16,800 acre-feet (15 MGD average annual demand) by the year 2000, so existing rights held by the City should provide for projected demand through the next 20 years. For this reason, the annual quantity of this water right should be issued as supplemental to existing rights held by the applicant.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendation:

I recommend that this application to withdraw 1100 gpm from the Seven Oaks well near Kent be reduced to the maximum design capacity of 900 gpm and that a permit be issued under this application with an annual quantity of 864 acre-feet which are supplemental to the existing water rights for the City of Kent.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

REPORT BY: David Garland

DATE: 1.19.84

*Barb W.
Soos Creek
Well*

Affidavit of Publication

STATE OF WASHINGTON }
COUNTY OF KING } ss.

Laurie Fieser being first duly sworn on

she Chief Clerk

oath, deposes and says that is the of
THE DAILY NEWS JOURNAL, a newspaper published six (6) times a week.
That said newspaper is a legal newspaper and it is now and has been for
more than six months prior to the date of publication referred to, printed
and published in the English language continually as a newspaper
published four (4) times a week in Kent, King 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 Daily News
Journal has been approved as a legal newspaper by order of the Superior
Court of the County in which it is published, to-wit, King County,

Notice of Application

Washington. That the annexed is a
.....

..... as it was published in regular issues (and
not in supplement form of said newspaper) once each issue for a period

of 2 consecutive issues, commencing on the
28th day of May, 1982, and ending the

4th day of June, 1982, both dates
inclusive, and that such newspaper was regularly distributed to its sub-
scribers during all of said period. That the full amount of the fee

charged for the foregoing publication is the sum of \$30.24, which
has been paid in full at the rate of per folio of one hundred words for the
first insertion and per folio of one hundred words for each subsequent
insertion.

Laurie Fieser

Subscribed and sworn to before me this 4th day of

June 1982

George L. Math
Notary Public in and for the State of Washington,
residing at Kent, King County.
Federal Way

NOTICE OF APPLICATION
TO APPROPRIATE
PUBLIC WATERS
TAKE NOTICE:
That CITY OF KENT (DE-
PARTMENT OF PUBLIC
WORKS) of KENT,
WASHINGTON on APRIL
26, 1982 under Application
No. G1-24073 filed for per-
mit to appropriate public wa-
ters, subject to existing
rights, from WELL in the
amount of 1100 GALLONS
PER MINUTE each year, for
MUNICIPAL SUPPLY —
CONTINUOUSLY. The
source of the proposed ap-
propriation is located within
SW ¼ NW ¼ of Section 28,
Township 22°N., Range 5E
W.M., in KING 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 June 4, 1982.
Department of Ecology
Northwest Regional Office
4350 - 150th Ave. N.E.
Redmond, Wa. 98052
Published in the Daily News
Journal May 28 and June 4,
1982. K5408

RECEIVED
AUG 6 1982

DEPARTMENT OF ECOLOGY
NORTHWEST REGION

8-16-82
OK
W

- Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.
- Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.



APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

I have examined this application and find that it is: GROUND WATER
it is: not an "action".

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION categorically exempt.
(GRAY BOXES FOR OFFICE USE ONLY) *M. Doyle*

APPLICATION NO. G 124073	W.R.I.A. 9	COUNTY King	PRIORITY DATE 4/26/82	SIGNATURE <i>M. Doyle</i>	ACCEPTED
APPLICANT'S NAME - PLEASE PRINT CITY OF KENT (Department of Public Works)				BUSINESS TEL. 872-3383	
ADDRESS (STREET) 220 S. 4th		(CITY) Kent	(STATE) Wa	(ZIP CODE) 98031	
DATE & PLACE OF INCORPORATION IF APPLICANT IS A CORPORATION N/A					

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.) Well
TRIBUTARY -	SIZE AND DEPTH 16" casing - 350 feet

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Municipal Water Supply

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CFS	CUBIC FEET PER SECOND	OR	GALLONS PER MINUTE 1100 GPM	ACRE FEET PER YEAR
TIMES DURING YEAR WATER WILL BE REQUIRED Constant Availability				
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 60,000		
DATE PROJECT WAS OR WILL BE STARTED May 1, 1982	DATE PROJECT WAS OR WILL BE COMPLETED August 1, 1982			

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.
From W $\frac{1}{2}$ Corner Section 28: East 620 feet - North 580 feet -

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) SW, SW, NW	SECTION 28	TOWNSHIP N. 22	RANGE (E. OR W.) W.M. 5E	COUNTY King
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4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
Robert E. and Dorothy Shannon, 606 W. Gowa, Kent, Wa 98031

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 City of Kent (See attached well site easement for legal description of parcel containing the well).

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACTOR, PURCHASER, ETC.)
 Area is City of Kent Water District service area. The City is responsible for supplying water to this area. Also see 7. Remarks below.

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.)
 Pump capacity for design: 900 GPM at 420 feet TDH (1080 GPM at 363 feet TDH, 760 GPM at 458 feet TDH and 630 feet TDH at shut off) 12" discharge piping to transmission main.
 Pump and motor specifications to meet the above criteria to be supplied by manufacturer and bidder.

REMARKS
 7. This well is the result of the nearby proposed Seven Oaks residential plat. The City's current water moratorium on new water service outside the City limits resulted in the proposed plat to supply an offsetting water source or its own source. Therefore, a well site was provided. Since the well testing showed capabilities in excess of 500 GPM, the City will develop and operate the well in accordance with City policies. The property owners have granted the City an easement for

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

the well site along with an affidavit waiving their claim to all water rights for the property on which the well is located.

[Signature]
 Robert E. and Dorothy Shannon
 LEGAL LANDOWNERS NAME
 (PLEASE PRINT)

[Signature]
 APPLICANT'S SIGNATURE
[Signature]
 LEGAL LANDOWNER'S SIGNATURE

Soos Creek Estates Limited +

606 W. Gove St. + 850 W. Hastings St.
 Kent, Wa 98031 Suite 609
 LEGAL LANDOWNER'S ADDRESS Vancouver, B.C. V6C1E2

FOR OFFICE USE ONLY

STATE OF WASHINGTON }
 DEPARTMENT 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

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT

- APPLICATION
- PERMIT
- CERTIFICATE
- OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent (Department of Public Works)		TELEPHONE NO. 872-3383
ADDRESS 220 S. 4th	(CITY) Kent,	(STATE) Washington
		(ZIP CODE) 98031
ASSIGNED TO	TELEPHONE NO.	DATE ASSIGNED
ADDRESS	(CITY)	(STATE)
		(ZIP CODE)
APPLICATION NO. G124073	PERMIT NO. G124073 P	CERTIFICATION NO. G124073 C
DATE AMENDED	DATE CANCELLED	W.R.I.A.

APPLICATION

DATE APPLICATION RECEIVED April 26, 1982	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED April 26, 1982
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 <i>5-20-82 8-3-82</i>
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED 8-6-82	CHECKED BY <i>XX</i>	TIME EXPIRED 7-4	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
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DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST
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EXAMINATION

DATE EXAMINATION MADE 7-15-81	MADE BY DPG	DATE REPORT OF EXAM. WRITTEN 12-14-83	WRITTEN BY DPG	CHECKED BY
DATE PERMIT FEE REQUESTED <i>1-19-84</i>	AMOUNT DUE \$20.00	DATE RECEIVED 1-27-84	<i>OK FOR PERMIT</i>	

PERMIT

PERMIT APPROVED BY <i>XX</i>	DATE APPROVED 2-14-84	PERMIT NO. G124073 P	DATE ISSUED <i>2-15-84</i>
---------------------------------	--------------------------	--------------------------------	-------------------------------

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT	DATE FILED	EXTENSION FEE
EXTENDED TO		EXTENDED TO

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED 6-6-81
-----------	----------------------

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT <i>2-15-84</i>	DATE FILED 3-7-84	EXTENSION FEE
EXTENDED TO		EXTENDED TO

PROOF OF APPROPRIATION

DATE SENT <i>3-16-84</i>	DATE FILED 10-19-84	EXTENSION FEE	EXTENDED TO
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 10-19-84	DATE APPROVED FOR CERTIFICATE 10-29-84
			APPROVED BY <i>XX</i>

CERTIFICATION

PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER G124073 C	DATE ISSUED <i>11-15-84</i>
--	--	--------------------------------

REMARKS

CERTIFICATE RECORD No. 3 PAGE No. 1116-A

STATE OF WASHINGTON, COUNTY OF King

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 CITY OF KENT

of Kent, Washington, 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 Lot 11, Block 4 of City View Addition to Kent, Sec. 19, Twp. 22 N., Rge.

5 E.W.M.

for the purpose of municipal supply

under and subject to provisions contained in Ground Water Permit No. 1416 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 3 at page 1116-A;

that the right hereby confirmed dates from June 17, 1950; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually

beneficially used for said purposes, and shall not exceed 200 gallons per minute; 320 acre-feet per year. for irrigation of 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:

City of Kent, State of Washington.

The right to the use of the ground water aforesaid hereby confirmed is restricted to the lands or place of use herein described, except as provided in Sections 6 and 7, Chapter 122, Laws of 1929.

WITNESS the seal and signature of the State Supervisor of Water Resources affixed this 15th day of July, 1952.

State Supervisor of Water Resources (Signature)

ENGINEERING DATA mlyw

RECEIVED
NOV 9 1951
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Proof of Appropriation of Ground Water

Application No. G.W.

Permit No. G.W. 1416

mhw
6/24/51

1. Name of Permittee City of Kent
2. Postoffice address Kent, Washington
3. Source of appropriation Well
4. Name or number of works (if any)
5. For what purpose or purposes is water used? Municipal Supply
6. Give date of beginning of construction August 8, 1950
7. Give date of completion of construction work, including water distribution system
- July 1951
8. Give date when ground water was completely applied to proposed use August 1, 1951
9. If used for irrigation:
Give number of acres described in permit
- Give number of acres actually irrigated
10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:
City of Kent, State of Washington.

11. During what months is water used? July August & Sept.
12. Does map filed with your application show correctly the location of well or other works for withdrawal of water, and area of land where water is used? yes
13. If the dimensions, location or type of structure does not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. same
-
14. Certified record by well driller or other constructor must be attached hereto, as provided by the Ground Water Code.

(Sign certification on reverse side)

ok
The well
drillers
Record
mhw

STATE OF WASHINGTON, }
County of King } ss.

I, Charles Bridges, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of ground water; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 25 day of October, 19 51

Charles Bridges
City Clerk

Subscribed and sworn to before me this 8th day of November, 1951

Wesley B. Thatcher
Notary Public.



RECEIVED
DEC 26 1950

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS
FOR WITHDRAWAL OF GROUND WATER

DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Under Permit No. G. W. 1416

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

- City of Kent
(Name and address of owner of well or other works for withdrawal of water)
- Type; name or number of works where water is taken well
(Well, tunnel or infiltration trench)
- Date on which work on well or other structure was started Aug. 1950
- Date on which work was completed no
- If work on well or other structure was abandoned, give date --
and reason for abandonment

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 598 ft. Diameter 12 & 8 in. or ft. Dug or drilled drilled

Flowing or pump well pump

IF PUMP WELL: Type and size of pump is --

Type and size of motor or engine is --

Depth from ground surface to water level before pumping 81.7 feet

After continuous operation 3.0 four hours, the measured discharge of the pump is
(At least four)

88 g.p.m., and the drawdown of water level is 51 feet

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
<u>4 mins</u>	<u>103.8</u>		
<u>6 "</u>	<u>103.3</u>		
<u>9 1/2 "</u>	<u>101.5</u>		
<u>20 "</u>	<u>98.0</u>		

Date of test 11-8-50

IF FLOWING WELL: Measured discharge g.p.m., on (Date)

Shut-in pressure at ground surface lbs. per sq. in. on (Date)

Water is controlled by
(Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

- 12 in. diameter Std drive pipe from 0 to 252 ft.
- 8 in. diameter " from 242 to 494 ft.
- in. diameter from to ft.
- in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Perforated casing or screens:

7/ft - 9" apart - total of 91 perfs. from 416 to 426 ft.
 (Number per foot and size of perforations, or describe screen)

..... from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Hardpan - clay, sand & gravel (gravel streaks 61-62 and 11-11 $\frac{1}{2}$)	187	187
clay, blue (gravel streak 202-203)	40	227
gravel, cement	73	300
clay, blue	46	346
gravel, cement	15	361
clay, sandy, blue	19	380
clay, sandy, blue, some gravel	20	400
clay, blue	10	410
sand, w-b	1 $\frac{1}{8}$	411 $\frac{1}{8}$
sand and gravel, w-b, loose	10 $\frac{1}{2}$	422
clay, some sand and gravel	13	435
clay and sand	13	448
sand and gravel, some clay, w-b	10	458
clay, sandy, blue	64	522
clay with gravel	8	530
clay, blue	15	545
clay, sandy, brown	20	565
gravel and clay	5	570
clay, sandy, green	10	580
sand and gravel	2	582
clay, green, hard	16	598
#####		

(b) INFILTRATION TRENCH OR TUNNEL: Type

Dimensions: (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel

N.C. JANNSEN DRILLING & MFG. CO.

BY (Signature of well driller or other constructor)

9407 E. Marginal Way, Seattle, Washington (Address)

STATE OF WASHINGTON.

County of King } ss.

I, F.C. Yett, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

N.C. JANNSEN DRILLING & MFG. CO.

(Signature)

Subscribed and sworn to before me this 21st day of December, 1950

Notary Public

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF HYDRAULICS

Permit to Appropriate Public Ground Waters
of the State of Washington

Book No. 3 of Ground Water Permits, on page 1416 under Application No. 1562

CITY OF KENT

~~of~~ Washington

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 17, 1950

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 500 gallons per minute; 700 acre-feet per year, to be used for the following purposes: municipal supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 550 feet South and 200 feet West of North quarter corner of Sec. 19

being within Lot 11, Block 4 of City View Addition to Kent, Sec. 19, Twp. 22 N., Rge. 5 E.W.M. county of King

Use, or uses to which water is to be applied:

For municipal supply: 500 gallons per minute; 700 acre-feet per year, to supply water to the City of Kent, Washington

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

City of Kent, State of Washington

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 12 inches, and depth of 200 / ^{to 500} feet.
(Dug or drilled)

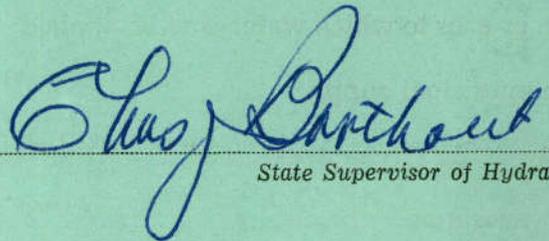
Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Hydraulics for the purpose of preventing waste of public waters:

Construction work shall begin on or before Already started
and shall thereafter be prosecuted with reasonable diligence and completed on or before
June 1, 1951
and complete application of water to proposed use shall be made on or before
June 1, 1952

Given under my hand and the seal of this office at Olympia, Washington, this 22d day of
November, 19 50.


State Supervisor of Hydraulics.

NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 1562
TAKE NOTICE:

That City of Kent, of Kent, Washington, on June 17, 1950, filed application for permit to withdraw public ground waters through a well situated within Lot 11, Block 4 of City View Addition to Kent, Sec. 19, Twp. 22 N., Rge. 5 E., W. M., in King County, in the amount of 500 gallons per minute, to the extent of 700 acre feet, subject to existing rights continuously, each year for the purpose of domestic supply.

Any objections must be filed with the State Supervisor of Hydraulics within thirty (30) days from July 17, 1950.

Witness my hand and official seal this 30th day of June, 1950.
(Seal) CHAS. J. BARTHOLET,
State Supervisor of Hydraulics.
(3608)

Affidavit of Publication

STATE OF WASHINGTON, } ss.
COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a
Notice of Water Right Application #1562

as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of two (2) consecutive weeks, commencing on the 10th day of July 1950, and ending on the 17th day of July 1950, both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

17th day of July 1950

Marilyn Boor

Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.

RECEIVED
JUL 20 1950
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics

APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON



Application No. G. W. 1562

I, CITY OF KENT
(Name of applicant)

of KENT, WASH.
(Complete postoffice 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 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. The proposed appropriation will be from WELL
(Well, tunnel, infiltration trench)

located KENT, 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 NORTHEAST HILL WELL

2. The quantity of water which applicant intends to withdraw for beneficial use is 500
gallons per minute; 700 acre feet per year.

3. The use or uses to which water is to be applied DOMESTIC SUPPLY
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year 6 MONTHS

5. Location of well or other works for withdrawal of water: In county of King

(a) 550 ft south + 200 ft west of N 1/2 corner
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the NE 1/4 NW 1/4 of Sec. 19, Twp. 22 N., Rge. 5E
(Give smallest legal subdivision) (E. or W.)

or (b) If within limits of recorded platted property, town or city: Lot 11, Block 4,
of CITY VIEW ADDITION KENT
(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. Name and address of owner of land on which well or works are located:
CITY OF KENT (Name)
KENT, WASH. (Address)

OK 3/22

7. DESCRIPTION OF WORKS:

(a) Well will be Drilled and have a diameter of 12 inches and an estimated
(Dug or drilled)

depth of 200-500 feet.

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described:

EXISTING CITY SYSTEM

(d) If pumps are to be used, give size and type:

NOT DETERMINED

(e) Give capacity and type of motor or engine to be used:

NOT DETERMINED

(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)

8. SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

(a) For Municipal Supply: To supply the city, town, or community of KENT
in the county of KING, having a present population of 3260, and an
estimated population of 4000 in 1960

(b) For Irrigation: Number of acres to be irrigated _____ acres.

(c) Legal Description of Property on which water is to be used for all purposes other than mu-
nicipal supply: _____
(If more space is required, attach separate sheet.)

(d) Do you have any other water rights appurtenant to the above described property? No

If so, from what source _____

9. Construction work will begin on or before JULY 1, 1950 - (TEST WELL)

10. Construction work will be completed on or before INDEFINITE

11. Water will be put to complete beneficial use on or before INDEFINITE

CITY OF KENT
KENT, WASHINGTON

(Signature of applicant)

[Handwritten Signature]

City Clerk

Signed in the presence of us as witnesses:

(Name)

(Address of witness)

(Name)

(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:

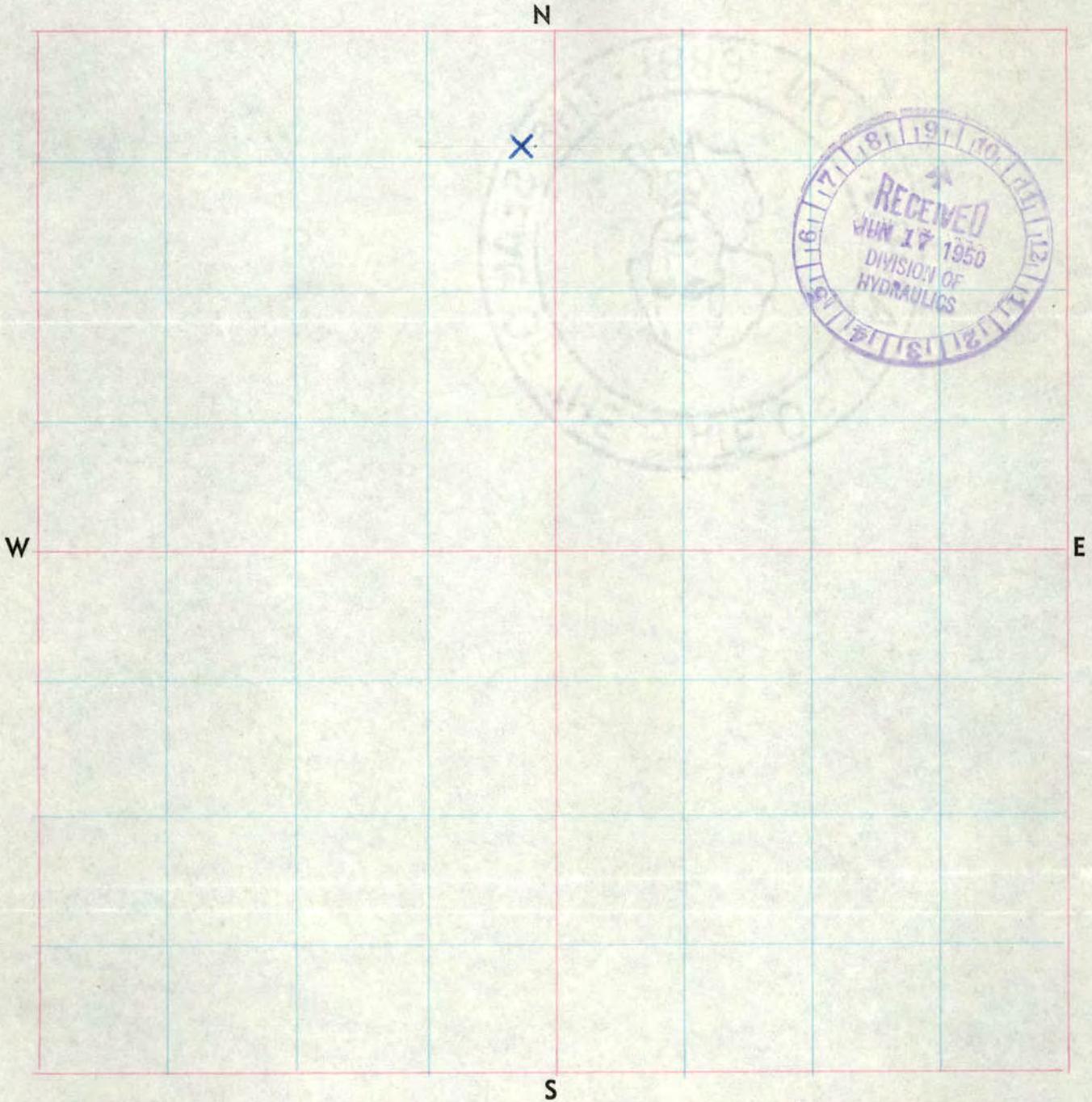
In order to retain its priority, this application must be returned to the State Supervisor of Hy-
draulics, with corrections, on or before _____, 19_____

WITNESS my hand this _____ day of _____, 19_____

State Supervisor of Hydraulics.

SECTION PLAT

Sec. 19 Twp. 22 N. R. 5 E. W.M.



Show by a cross (X) the location of the well or other works covered by the application or declaration. Show by circle (O) the locations of other wells or works within a quarter of a mile. Also indicate traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

WEST SIDE OF SUMMIT AVE. 575' S. OF JAMES ST.
KENT, WASH.

PROGRESS SHEET - GROUND WATER APPLICATION

NAME: City of Kent
Kent, Washington

Assigned to:

G.W. APPLI. NO. 1562 PERMIT NO. 1416 CERT. NO. 1116 A

AMENDED

CANCELLED

Appli. received 6-17-50 Initial \$5.00 fee received 6-17-50
Statement of Additional Examination Fee \$ Sent
Received

Application returned for completion or correction
Received

TEMPORARY PERMIT: Approved by Issued

PUBLICATION:
O.K'd by ZBR Date 6-28-50 Notice sent 6-30-50
Protests filed

Affidavit received and checked 7-20-50 Time Expires 8-17-50
Amended notice sent Affidavit recd
Time Expires

DEPT. OF GAME REPORT:

EXAMINATION made 9-27-50 by PHD

O.K'd for Permit by
Statement of Permit Fee sent 10-18-50 Amount \$ 10.00
Received 11-9-50

PERMIT NO. 1416 Issued 11-22-50

BEGINNING OF CONSTRUCTION: Notice sent started Filed
Extension fee \$ Extended to
Extended to

WELL DRILLER'S REPORT: Sent 11-22-50 Filed 12-26-50

COMPLETION OF CONSTRUCTION: Notice sent completed Filed
Time extended to

COMPLETE APPLICATION OF WATER: Notice sent 11-22-50 Filed
Time extended to

PROOF OF APPROPRIATION: Sent 11-22-50 Filed

Statement of Certificate Fee sent 11-22-50 Received

CERTIFICATE OF GROUND WATER RIGHT NO. 1116- A Issued 7-15-52

CERTIFICATE RECORD No. 1 PAGE No. 494-A

STATE OF WASHINGTON, COUNTY OF King

Certificate of Ground Water Right

Issued in accordance with the provisions of Chapter 263, Laws of Washington for 1945, and the rules and regulations of the State Supervisor of Hydraulics thereunder.

THIS IS TO CERTIFY That HAMILTON ROAD COMMUNITY WATER COMPANY
of Kent, Washington, has made proof
to the satisfaction of the State Supervisor of Hydraulics of Washington, of a right to the use of the
ground waters of a well

located within the SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 18, Twp. 22 N., Rge. 5 E.W.M.

for the purpose of domestic supply for community
under Ground Water Permit No. 548 issued by the State Supervisor of Hydraulics, 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 Hydraulics of Washington and entered of record
in Volume 1 at page 494-A; that the right hereby confirmed dates from
7-29-47; that the quantity of ground water under the right here-
by confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said
purposes, and shall not exceed 38 gallons per minute; 30 acre-feet per year,
for irrigation of _____ 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:

Community of Hamilton Road, King 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 Hydraulics affixed this 8th day
of November, 19 50.

Chas. L. Lathrop
State Supervisor of Hydraulics

ENGINEERING DATA
O.K. *mmw*

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OCT 31 1950

Proof of Appropriation of Ground Water

DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Application No. G.W. 594

Permit No. G.W. 548

HAMILTON ROAD COMMUNITY
WATER COMPANY, Inc.

1. Name of Permittee.....

2. Postoffice address to Jane Halverson, Rte 3 Box 478 Kent, Wash.

3. Source of appropriation Well

4. Name or number of works (if any).....

5. For what purpose or purposes is water used? Domestic supply for community

6. Give date of beginning of construction June 10, 1947

7. Give date of completion of construction work, including water distribution system.....

May 15, 1949

8. Give date when ground water was completely applied to proposed use May 15, 1950

9. If used for irrigation:

Give number of acres described in permit.....

Give number of acres actually irrigated.....

10. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

175' East of the N.W. corner of N¹/₂ of SE¹/₄ of NW¹/₄ of SE¹/₄ of Sec. 18, being within SE¹/₄ of NW¹/₄ of SE¹/₄ of Sec. 18, Twp. 22 N., Range 5 E.W.M. King County, Wash.

11. During what months is water used? 12 months a year

12. Does map filed with your application show correctly the location of well or other works for withdrawal of water, and area of land where water is used? Yes

13. If the dimensions, location or type of structure does not correspond to those described in your permit, state what changes have been made, giving dimensions, etc. No change

14. Certified record by well driller or other constructor must be attached hereto, as provided by the Ground Water Code.

STATE OF WASHINGTON, }
County of } ss.

I, _____, being first duly sworn, depose and say that I have read the above and foregoing proof of appropriation of ground water; that I know the contents thereof; and that the facts therein stated are true.

IN WITNESS WHEREOF, I have hereunto set my hand this 30th day of October, 1950.

HAMILTON ROAD COMMUNITY
WATER COMPANY, Inc.

Jane Selverson, Sec. Treas.

Subscribed and sworn to before me this 30th day of October, 1950.

M. S. Ramsay

Notary Public.

Notary Public in and for the State of
Washington, residing at Kent.

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS FOR WITHDRAWAL OF GROUND WATER

Under Permit No. G. W. X 548

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. HAMILTON ROAD COMMUNITY WATER CO.
(Name and address of owner of well or other works for withdrawal of water)

2. Nature of works from which water is withdrawn well
(Well, tunnel, or infiltration trench)

3. Name or number of works (if any) _____

4. Date on which work on well or other structure was started June 10, 1947

5. Date on which work was completed July 22, 1947

6. If work on well or other structure was abandoned, give date _____
and reason for abandonment _____

7. DESCRIPTION OF WORKS:

(a) WELL: Depth 367 ft. Diameter 8 in. or ft. Dug or drilled Drilled
Flowing or pump well pump

If PUMP WELL: Type and size of pump is _____
Type and size of motor or engine is _____

Depth from ground surface to water level before pumping 170 feet

After continuous operation for at least four hours, the measured discharge of the pump is
40 g.p.m., and the drawdown of water level is to 210 feet

Date of test July 22, 1947

If FLOWING WELL: Measured discharge _____ g.p.m., on _____ (Date)

Shut-in pressure at ground surface _____ lbs. per sq. in. on _____ (Date)

Water is controlled by _____
(Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

8 in. diameter _____ from 0 to 290 ft.

_____ in. diameter _____ from _____ to _____ ft.

_____ in. diameter _____ from _____ to _____ ft.

_____ in. diameter _____ from _____ to _____ ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

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MAY 1 9 1949
DEPARTMENT OF
CONSERVATION

Perforated casing or screens:

132 holes 3/16 x 1 1/2" from 215 to 227 ft.
(Number per foot and size of perforations, or describe screen)

96 holes 3/16 x 1 1/2" from 199 to 208 ft.

_____ from _____ to _____ ft.

_____ from _____ to _____ ft.

_____ from _____ to _____ ft.

LOG OF WELL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to Bottom (Feet)
Top soil	3	3
Brown hardpan	18	21
blue hardpan	42	63
Brown sand & gravel, hard and dry	26	89
Fine brown sand, water bearing	1	90
Brown fine sand & clay, water bearing	19	109
Cemented gravel, brown	3	112
Brown sandy clay	17	129
Blue clay	19	148
Blue hardpan	2	150
Blue clay and rocks	25	175
Cement gravel, blue grey, water bearing	40	215
Grey blue sand, heavy with clay	7	222
Blue clay and silt	32	254
Clay turning to a greenish color	106 1/2	367

(b) INFILTRATION TRENCH: Covered or open.....

Dimensions: Length.....ft. Minimum depth.....ft. Maximum depth.....ft.

Bottom width.....ft. Discharge.....g.p.m. Date of test.....

(c) TUNNEL: Type of lining.....

Dimensions: (Length, course, and cross-sectional size)

Position of water bearing stratum with reference to portal of tunnel.....

LOG OF TUNNEL: (Preceding table for log of well may be used if desired. Give footage from portal and character of materials, as pertinent.)

James J. Bell - Sen
 (Signature of well driller or other constructor)

6116 - Howe St Seattle
 (Address)

STATE OF WASHINGTON, }
 County of } ss.

I, *James L. Bell*, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

James J. Bell - Sen by James L. Bell
 (Signature)

Subscribed and sworn to before me this *24* day of *July*, 194*7*

Lawilla C. Bell
 Notary Public

My Commission Expires Apr. 21, 1951

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
DIVISION OF HYDRAULICS

Permit to Appropriate Public Ground Waters
of the State of Washington

Book No. 2 of Ground Water Permits, on page 548 under Application No. 594

HAMILTON ROAD COMMUNITY WATER COMPANY

of Kent, Washington

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 July 29, 1947

Source of the proposed ground water appropriation is 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 38 gallons per minute; 30 acre-feet per year, to be used for the following purposes: Domestic supply for community

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 175 feet East of the Northwest corner of N $\frac{1}{2}$ of SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 18

being within SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 18, Twp. 22 N., Rge. 5 E.W.M.

county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year, to supply _____

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: 38 gallons per minute; 30 acre-feet per year, for domestic supply for community

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Community of Hamilton Road, King County, Washington

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 367 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Hydraulics for the purpose of preventing waste of public waters:

Construction work shall begin on or before Started
and shall thereafter be prosecuted with reasonable diligence and completed on or before
November 1, 1948 *extended to 11-1-49*
and complete application of water to proposed use shall be made on or before
November 1, 1949 *to 11-1-50*

Given under my hand and the seal of this office at Olympia, Washington, this 4th day of
November, 1947

By CHAS. J. BARTHOLET, Deputy
RODNEY RYKER
State Supervisor of Hydraulics.

REPORT OF FINDINGS ON GROUND WATER Appli. 594 —

NAME Hamilton Road Community Water Company

TYPE OF WORKS: well Date of Examination Sept. 4, 1947

Dimensions: 8" x 367' Progress of Works well in

QUANTITY ~~Claimed on~~
Applied for: 38 g.p.m. 30 acre feet per year

LOCATION NW $\frac{1}{4}$ of SE $\frac{1}{4}$ of Sec. 18-22-5 E.W.M.

USE: domestic supply for community

Irrigation- acreage: Present Planned Feasible

Municipal: Population 180 as of 1950

Industrial:

Time Pump Will be Operated: daily

Other Warer Rights of Applicant: none

Proximity to existing works, springs or streams: E. L. Baxter N 300'; Chas. McCullogh N.W. 750'; W. D. Edmundson NE 1000'; Paul Mohler S. 1200'.

Water Bearing Zone:

RECOMMENDATIONS

Approved for 38 g.p.m. 30 acre-feet per year, subject to existing water rights.

This well will furnish approximately 180 people at an estimated use of 200 gallons a day during the 6 warmer months, and 100 gallons a day during the 6 cooler months. This amounts to 30 acre feet a year.

Signed this 16th day of September, 1947

FBR

FRED B. ROBERTS
Ground Water Geologist

State of Washington
Office of Supervisor of Hydraulics
Olympia

**NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 594**

To Whom It May Concern:
Notice is hereby given that Hamilton Road Community Water Company of Kent, Washington, under date of July 29, 1947, filed with the State Supervisor of Hydraulics, Olympia, Washington, an application for a permit to withdraw public ground waters by means of a well situated one mile east of Kent High School, then 1/4 mile north, in the amount of 38 gallons per minute subject to existing rights, continuously each year for the purpose of domestic supply for community; that the location of the withdrawal works is within NW 1/4 of SE 1/4 of Sec. 18, Twp. 22 N., Rge. 5 E., W. M., in King County. A map showing the location and plan of said works and the place of the proposed use is on file in the office of the State Supervisor of Hydraulics, Olympia, Washington, together with such other information as is required by law.

Any person, firm or corporation whose right will be injuriously affected by said application may file with the State Supervisor of Hydraulics, at Olympia, Washington, such objections or representations, in writing, as he may desire to make, within thirty (30) days after date of last publication, which date is August 30, 1947.

Witness my hand and official seal this 4th day of August, A. D. 1947.
(Seal) **RODNEY RYKER,**
State Supervisor of Hydraulics.
By **CHAS. J. BARTHOLET,**
(9350) Deputy.

Affidavit of Publication

STATE OF WASHINGTON, } ss.
COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a Notice of Water Right Application #594 as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of two (2) consecutive weeks, commencing on the 23rd day of August 1947, and ending on the 30th day of August 1947, both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

30th day of August 1947

Marilyn Bucras



Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Hydraulics



APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

594

Application No. G. W. _____

I, HAMILTON ROAD COMMUNITY WATER COMPANY
(Name of applicant)

of Rt. 3 Box 472 Kent, Wn. J.G.R. Johnson, Pres.
(Complete postoffice 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 of the State of Washington and subject to the rules and regulations of the Department of Conservation and Development, Division of Hydraulics.

1. The source of the proposed appropriation is Well
(Well, tunnel, infiltration trench)

located One mile east of Kent High School, then 1/4 mile north
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)

Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any None prior to this application

2. The quantity of water which applicant intends to apply to beneficial use is 38
gallons per minute; 30 acre feet per year.

3. The use or uses to which water is to be applied Domestic supply
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year All year

5. Location of well or other works for withdrawal of water: In county of King

(a) 175' east of NW corner of N. 1/2 of S.E. 1/4 of NW 1/4 of S.E. 1/4
(Give distance and bearing to nearest corner of section or legal subdivision)

being within the N. 1/2 of 1/16 section of Sec. 18, Twp. 22 N., Rge. 5 E.
(Give smallest legal subdivision) (E. or W.)

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 triplicate. Other adequate maps or drawings will be acceptable.

6. Name and address of owner of land on which well or works are located:
HAMILTON ROAD COMMUNITY WATER COMPANY
(Name)

Rt. 3 Box 472 J.G.R. Johnson, Pres.
(Address)

7. DESCRIPTION OF WORKS:

(a) Well will be Drilled and have a diameter of 8 inches and an estimated
(Dug or drilled)

depth of 367 feet.

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described:

iron pipe

(d) If pumps are to be used, give size and type:

Peerless Hi-Lift Helical Rotar
38 gal / minute

(e) Give capacity and type of motor or engine to be used:

Electric 5 H.P.

(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:

<u>E. L. Baxter</u> <small>(Name)</small>	<u>N.</u> <small>(Direction)</small>	<u>300 ft</u> <small>(Distance)</small>
<u>Charles McCullough</u> <small>(Name)</small>	<u>N. W.</u> <small>(Direction)</small>	<u>750 ft.</u> <small>(Distance)</small>
<u>W. O. Edmundson</u> <small>(Name)</small>	<u>N. E.</u> <small>(Direction)</small>	<u>1000 ft.</u> <small>(Distance)</small>
<u>Paul Mohler</u> <small>(Name)</small>	<u>S.</u> <small>(Direction)</small>	<u>1200 ft</u> <small>(Distance)</small>
_____ <small>(Name)</small>	_____ <small>(Direction)</small>	_____ <small>(Distance)</small>

(On accompanying plat show location of the existing wells or works.)

8. SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

(a) For Municipal Supply: To supply the city, town, or community of Hamilton Road in the county of King, having a present population of 200 ±, and an estimated population of 300 ± in 1950.

(b) For Irrigation: The land to be irrigated has a total area of _____ acres.

(c) Legal Description of Property on which water is to be used for all purposes other than municipal supply: (If more space is required, attach separate sheet.)

as desired
Such homes of Water Co.'s members that are located on the Hamilton Road and that portion of Strawberry Lane that is north of the North Road just north east of Kent, Wn. in King county.

- 9. Construction work will begin on or before 5/47 Some work done on exploration permit.
- 10. Construction work will be completed on or before Not known
- 11. Water will be put to complete beneficial use on or before Not known

HAMILTON ROAD COMMUNITY WATER CO.

(Signature of applicant)
G. R. Johnson, President.

Signed in the presence of us as witnesses:

B. C. Lemby
(Name)

Route 3 Box 468 Kent Wash.
(Address of witness)

Grauer Nelson
(Name)

(Address of witness)

STATE OF WASHINGTON, }
COUNTY OF THURSTON. } ss.

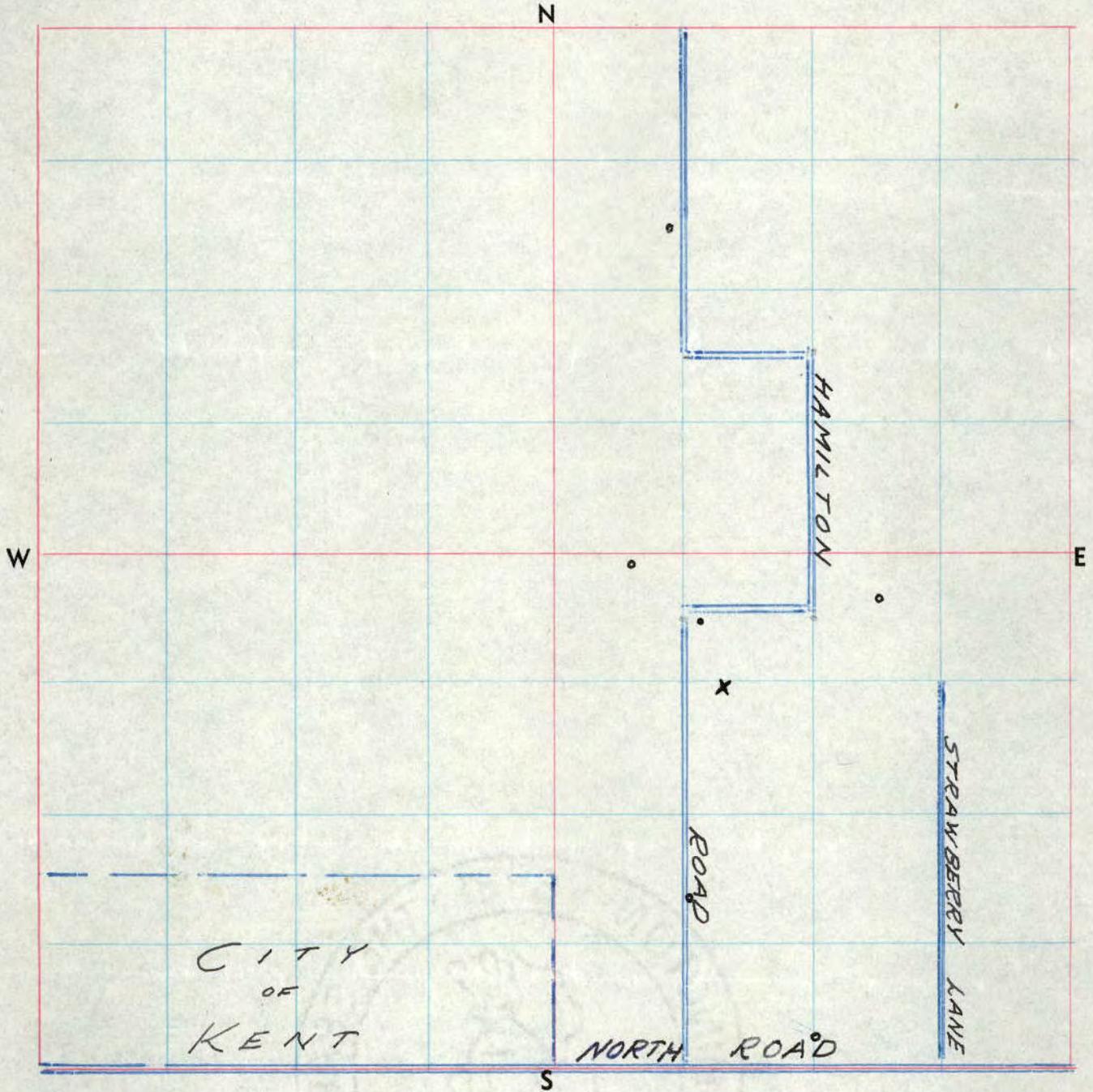
This is to certify that I have examined the foregoing application, together with the accompanying maps and data, and return the same for correction or completion as follows:

In order to retain its priority, this application must be returned to the State Supervisor of Hydraulics, with corrections, on or before _____, 19_____.

WITNESS my hand this _____ day of _____, 19_____.

State Supervisor of Hydraulics.

Sec. 18 Twp. 22 N. R. 5 E



Show by a cross (X) the location of the well or other works covered by the application or declaration. Show by circle (O) the locations of other wells or works within a quarter of a mile. Also traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

One mile east of Kent High School, then one quarter mile north on the Hamilton Road.



PROGRESS SHEET - GROUND WATER APPLICATION

NAME: Hamilton Road Community Water Company Assigned to:
Route 3 Box 472-478
Kent Washington

~~c/o G. R. Johnson, President~~
Jane Halvorsen Secy. Treas

G.W. APPLI. NO. 594 PERMIT NO. 548 CERT. NO. 494 A

AMENDED

CANCELLED

Appli. received 7-29-47 Initial \$5.00 fee received 7-29-47
Statement of Additional Examination Fee \$ Sent
Received

Application returned for completion or correction
Received

TEMPORARY PERMIT: Approved by Issued

PUBLICATION:
O.K'd by *JBR* Date *Aug 4, 1947* Notice sent 8-4-47
Protests filed

Affidavit received and checked 9-2-47 Time Expires 9-30-47

REPORT: Game APPROVED BY DEPT. OF GAME 7-9-47 Fisheries

EXAMINATION:
Made Sept. 4, 1947 by F.B.R.
O.K'd for Permit by

Statement of Permit Fee sent 10-3-47 Amount \$ 10.00
Received 11-3-47

PERMIT NO. 548 Issued 11-4-47

BEGINNING OF CONSTRUCTION: Notice sent Started Filed
Extension fee \$ Extended to
Extended to

WELL DRILLER'S REPORT: Sent 11-5-47 Filed 3-19-49

COMPLETION OF CONSTRUCTION: Notice sent 11-5-47 Filed 7-6-49
Time extended to 11-1-49

COMPLETE APPLICATION OF WATER: Notice sent 7-6-49 Filed 10-31-50
Time extended to 11-1-50

PROOF OF APPROPRIATION: Sent 7-6-49 Filed 10-31-50

Statement of Certificate Fee sent 10-26-50 Received 10-31-50

CERTIFICATE OF GROUND WATER RIGHT NO. 494 A Issued 11-8-50

CERTIFICATE RECORD No. 10 PAGE No. 4534-A

STATE OF WASHINGTON, COUNTY OF King

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 HAMILTON ROAD COMMUNITY WATER COMPANY

of Kent, Washington, 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 N~~2~~NE~~1~~NW~~1~~SE~~1~~

Sec. 18, Twp. 22 N., R. 5 E. W. M.,

for the purpose of Community domestic supply

under and subject to provisions contained in Ground Water Permit No. 5937 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 10 at page 4534-A;

that the right hereby confirmed dates from May 4, 1962; 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 12 gallons per minute; 19.2 acre-feet

per year for Community domestic supply.

Special provisions required by the Supervisor of Water Resources: The total annual withdrawal from both this source and G.W. Certificate 494-A shall not exceed 56 acre-feet per year.

A description of the lands to which such ground water right is appurtenant:

Area served by Hamilton Road Community Water Company.

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

20th day of June, 1963.

Robert H. Russell
State Supervisor of Water Resources.



RECEIVED
DEPARTMENT OF CONSERVATION

Proof of Appropriation of Water

JUN 12 1963

A. M. P. M.
7 | 8 | 9 | 10 | 11 | 12 | 1 | 2 | 3 | 4 | 5 | 6
Permit No. 5937

Application No. 6285

1. Name of Permittee Hamilton Road Community Water Co.
2. Postoffice address c/o Helen V. Loyd, 2401 94th Ave. South, Kent, Washington
3. Source of appropriation drilled well
4. Name or number of works (if any) This is second well of two owned by this company.
5. For what purpose or purposes is water used? community domestic supply
6. Give date of beginning of construction November 1, 1962
7. Give date of completion of construction work, including water distribution system Dec. 3, 1962
8. Give date when water was completely applied to proposed use Dec. 15, 1962
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:
Area served by Hamilton Road Community Water Co., a domestic non-profit membership corporation.

12. During what months is water used? year around.
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? Yes
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. no variation
15. Actual measured discharge or diversion of permanent system: 720 gph (gpm or cfs)

(Sign certification on reverse side)

129 gpm
19.2 AF
RWR

STATE OF WASHINGTON, }
County of King } ss.

I, Helen V. Loyd, 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 11th day of June, 19 63

Helen V. Loyd
Helen V. Loyd

Subscribed and sworn to before me this 11th day of June, 19 63

Emerson B. Thatcher
Emerson B. Thatcher Notary Public.

**RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS
 FOR WITHDRAWAL OF GROUND WATER**

Under Permit No. G. W. 5937

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

1. Hamilton Road Community Water Co.
(Name and address of owner of well or other works for withdrawal of water)
2. Type; name or number of works where water is taken Drilled well
(Well, tunnel or infiltration trench)
3. Date on which work on well or other structure was started November 2, 1962
4. Date on which work was completed December 3, 1962
5. If work on well or other structure was abandoned, give date -----
 and reason for abandonment -----

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 235 ft. Diameter 8 in. or ft. Dug or drilled Drilled

Flowing or pump well Pump Water Temp. _____

IF PUMP WELL: Type and size of pump is 1 H.P. Submersible Gould pump

Type and size of motor or engine is 1 H.P.

Depth from ground surface to water level before pumping 150 Dec 1962 feet

After continuous operation for 4 hours, the measured discharge of the pump is
(At least four)

12 gpm ~~760 G.P.H~~ 760 g.p.m., and the drawdown of water level is _____ feet
(Pumping level minus static water level)

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
.....
.....
.....
.....

Date of test _____

IF FLOWING WELL: Measured discharge ----- g.p.m. on -----
(Date)

Shut-in pressure at ground surface _____ lbs. per sq. in. on _____
(Date)

Water is controlled by _____
(Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

- 8" in. diameter Steel casing from 0 to 225 ft.
- in. diameter from to ft.
- in. diameter from to ft.
- in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Steel shoe --8"

oh jpm

Perforated casing or screens:

Approx. 150 holes, 3/16" x 1 1/2" from 178 to 192 ft.
 (Number per foot and size of perforations, or describe screen)

..... from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

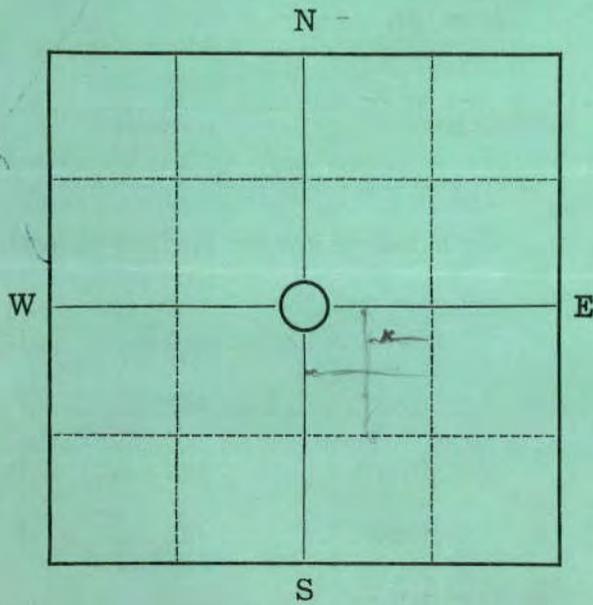
MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Top soil	2	2
Brown hardpan	21	23
Blue hardpan	25	48
Brown semi-hardpan	5	53
Blue semi-hardpan	8	61
Brown sand & clay	22	83
Blue cemented gravel	6	89
Blue clay	36	125
Blue clay, rocks & sand	15	140
Blue hardpan	37	177
Cemented gravel, blue	5	182
Water bearing	8	190
Grey & blue sand, heavy with clay	45	235

(b) INFILTRATION TRENCH OR TUNNEL: Type

Dimensions:
 (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel



Sec. 18 Twp. 22 Rge. 5

Show approximate location of well or other works with (X) on section plat at left.

James L. Bell
 Signature of well driller or other constructor

6116-4th Ave S. Seattle
 Address

Scale: 1" = 2000'



STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION
DIVISION OF WATER RESOURCES

Permit to appropriate Public Ground Waters
of the State of Washington

Book No. 12 of Ground Water Permits, on page 5937 under Application No. 6285

HAMILTON ROAD COMMUNITY WATER CO.

of Kent, Washington

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 May 4, 1962

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 70 gallons per minute; 56 acre-feet per year, to be used for the following purposes: community domestic supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is approx. 85 feet north and 350 feet east of southwest corner of N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$, sec.18

being within N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$, sec.18, T.22 N., R.5 E.W.M.

county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year, to supply _____

For irrigation: _____ gallons per minute; _____ acre-feet per year, for the irrigation of _____ acres.

For miscellaneous uses: 70 gallons per minute; 56 acre-feet per year, for community domestic supply.

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Area served by Hamilton Road Community Water Co.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 200 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources for the purpose of preventing waste of public waters:

The total annual withdrawal from both sources shall not exceed 56 acre-feet per year.

Construction work shall begin on or before September 1, 1963
and shall thereafter be prosecuted with reasonable diligence and completed on or before September 1, 1964
and complete application of water to proposed use shall be made on or before September 1, 1965

Given under my hand and the seal of this office at Olympia, Washington, this 29th day of August, 1962.

M. G. Walker
State Supervisor of Water Resources

Repo of Examination on Gro d Water

Received date May 4, 1962 Date of exam. July 26, 1962 Appli. No. 6285
Name Hamilton Road Community Water/ Co. c/o Helen V. Loyd
Address 23401 - 94th Ave. S., Kent, Wn.
Type of works Well Dimensions 8" x 200'

Progress of works Not begun
Quantity applied for 60-70 g.p.m. acre-feet per year
N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$
Legal sub. Sec. 18 Twp. 22 N. Rge. 5 E., County King
Use Community domestic supply

Irrigation-acreage: Present Planned Feasible
Municipal: Population 63 families as of the present
Industrial
Time pump will be operated Continuously

Other water rights appurtenant to this land Ground Water Certificate No. 494-A (see below)
30 AF/yr

Proximity to existing works, springs, wells, or streams
Hamilton Road Community Water Co. 200 ft. SW

Area Sub-area Zone

RECOMMENDATIONS

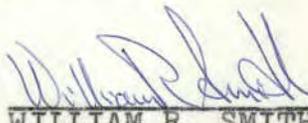
Approved for 70 g.p.m. 56 acre-feet per year, subject to existing
water rights. (1 acre-foot 325,850 gallons.)

The installation of an access port to well as described in attached Ground Water Bulletin No. 1 is recommended.

The water requirement of the Hamilton Road Community Water Co. is based upon a daily per capita water demand of 200 gallons, and a population of 250 (63 families), or a total annual demand of 56 acre-feet.

By virtue of a prior filing, the applicants hold title to the withdrawal of 38 gallons per minute; 30 acre-feet per year for the purpose of community domestic supply. In view of this existing certificate, permit shall issue for 70 g.p.m.; 56 acre-feet per year, 30 acre-feet being supplemental to the existing right and 26 acre-feet per year as a primary right. Permit shall be subject to the provision that: "The total annual withdrawal from both sources shall not exceed 56 acre-feet per year."

Signed at Olympia, Washington
this 8th day of August, 1962


WILLIAM R. SMITH, Geologist
Division of Water Resources

RECEIVED
DEPARTMENT OF CONSERVATION

JUN 4 1962

M. 7 8 9 10 11 12 1 2 3 4 5 6 P. M.

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

} ss.

Ann Harshfield

being first duly sworn on

oath, deposes and says that she is the chief clerk of THE KENT NEWS-JOURNAL, a weekly newspaper. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a weekly newspaper in Kent, King 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 Kent News-Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County, Washing-

ton. That the annexed is a Water Right Application

No. 6285

as it was published in regular issues (and not in supplement form of said newspaper) once each week for a period

of two consecutive weeks, commencing on the

23 day of May, 1962, and ending the

30 day of May, 1962, 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 \$7.50 which has been paid in full at the rate of \$2.40 per folio of one hundred words for the first insertion and \$1.80 per folio of one hundred words for each subsequent insertion.

Ann Harshfield
Chief Clerk

Subscribed and sworn to before me this 31 day of

May, 1962

Mona Mc Beck
Notary Public in and for the State of Washington,
residing at Kent, King County.

EMERSON B. THATCHER
Attorney
State of Washington
OFFICE OF SUPERVISOR
OF WATER RESOURCES
Olympia
NOTICE OF GROUND
WATER RIGHT
APPLICATION NO. 6285
TAKE NOTICE:
That Hamilton Road Community Water Company of Kent, Washington on May 4, 1962 filed application for permit to withdraw public ground waters through a well situated of N½NE¼ NW¼SE¼ of Section 18, Township 22 N, Range 5E.W.M., in King County, in the amount of 70 gallons per minute, subject to existing rights continuously, each year for the purpose of community domestic supply.
Any objections must be accompanied by a two dollar (\$2.00) recording ree and filed with the State Supervisor of Water Resources within thirty (30) days from May 30, 1962.
Witness my hand and official seal this 16th day of May, 1962
M. G. WALKER
State Supervisor of Water Resources
Published in the Kent News-Journal May 23 and 30, 1962

—Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

—Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

\$10.00 examination fee should accompany each application.

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources

RECEIVED
DEPARTMENT OF CONSERVATION
MAY 4 1962
7 8 9 10 11 12 1 2 3 4 5 6 P.M.

APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

6285

Application No. G. W.

I, Hamilton Road Community Water Company, a non-profit Washington corporation
(Name of applicant)
of Kent, Washington (c/o Helen V. Loyd, 23401 94th Ave. S., Kent)
(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 a well located approximately a mile and
(Well, tunnel, infiltration trench)
~~XXXXX~~ located a half southeast of the center of the City of Kent
(Give approximate distance and direction from nearest city or town)

Area Sub-area
(Leave blank) (Leave blank)

Zone
(Leave blank)

Applicant's name or number of well or other works, if any. well #2

2. The quantity of water which applicant intends to withdraw for beneficial use is 60-70
gallons per minute; acre feet per year.

3. The use or uses to which water is to be applied. community domestic supply for members of
the water corporation
(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year. all year continuously

5. Location of well or other works for withdrawal of water: In county of King
approx. 85 ft. North and 350 ft. East of the Southwest corner of the N $\frac{1}{2}$
of the NE $\frac{1}{4}$ of the NW $\frac{1}{4}$ of the SE $\frac{1}{4}$, Sec. 18, Township 22 North, Range 5 East
(a)
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the N $\frac{1}{2}$ NE $\frac{1}{4}$ NW $\frac{1}{4}$ SE $\frac{1}{4}$ of Sec. 18, Twp. 22 N., Rge. 5E
(Give smallest legal subdivision) (E. or W.)

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.

OK
PWR

6. DESCRIPTION OF WORKS:

(a) Well will be drilled and have a diameter of 8 inches and an estimated depth of 200 feet.

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described: from the well the water will be piped to the site of well #1 into a reservoir there where it will then be distributed through existing mains along easements and public rights-of-way to existing members of the corporation, for location of the other well see sub-paragraph "g" below.

(d) If pumps are to be used, give size and type: submersible

(e) Give capacity and type of motor or engine to be used: 5 to 7 1/2 horsepower as required

(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: no stream within a quarter of a mile

(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: Hamilton Road Community Water Company, direction southwest, distance 200 feet

Table with 3 columns: (Name), (Direction), (Distance). Three rows of dotted lines for data entry.

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED: corporation members

7. For Municipal Supply: To supply the city, town, or community of applicant, in the county of King, having a present population of 63 families and an estimated population of, in 19.

8. For Irrigation: Number of acres to be irrigated 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, lessee, contract buyer, etc.)

11. Do you have any other water rights appurtenant to the above described property?.....

If so, from what source?.....

12. Construction work will begin ~~on or before~~ as soon as permit granted.....

13. Construction work will be completed ~~on or before~~ within month of permit.....

14. Water will be put to complete beneficial use on or before September 1, 1962 - as soon as well is proved and tested Hamilton Road Community Water Company

by: Alex Butenko
President (Signature of applicant)

15. Name and address of owner of land on which well or works are located:

Ernest Swanson
(Name)

23212- 94th Ave. S., Kent, Wash.
(Address)

Ernest Swanson
(Signature of legal landowner)

Signed in the presence of us as witnesses:

Edward H. Amundson
(Name)

9625 So. 232nd Kent, Wa.
(Address of witness)

Virginia Loyd
(Name)

23401 - 94th So. Kent Wn.
(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.

DIRECTIONS FOR PREPARING APPLICATIONS

1. Initial examination fee of \$10.00 should accompany each application. If additional fee is required, you will be notified.
2. Write plainly in ink or use typewriter.
3. Read carefully all questions. Answer only those that apply to your project.
4. Under Question 2 estimate in gallons per minute and acre-feet per year the quantity of water that will be required for your proposed use.
5. Maps, showing the location of well or other works and place of use, must be made in duplicate on the enclosed section plats. If for irrigation, show the approximate area to be irrigated. Show also location of other existing wells or other works for withdrawing ground water within a radius of one-quarter mile.
6. In answering Question 5, give the distance and direction of location of well or other construction works for withdrawal of water from the nearest 40-acre corner or other legal subdivision, as
"320 feet north and 1100 feet east from the southwest corner of Sec. 1, Twp. 13 N., Rge. 2 E.W.M.," or
"North 36° 20' east 500 feet from the northeast corner of NW $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 33, Twp. 12 N., Rge. 3 E.W.M.," or
If within the limits of incorporated town or city:
"Lot 4, Block 6 of Churchill's Addition to the City of Spokane, Washington."
7. Be sure to give on the map brief directions for driving to the location of the well or other works from some town or easily located point on a state highway. This is for our convenience in making the examination.
8. If you have been using ground water since **before** June 7, 1945, it will not be necessary to secure a permit from the state for this purpose.
9. Sign application on the line indicated under Section 14.

SCHEDULE OF FEES DUE IN CONNECTION WITH OBTAINING GROUND WATER RIGHTS

Examination Fees: There is a minimum fee of \$10.00 for each application received. This fee covers all withdrawals up to and including 2250 gallons per minute. There is an additional examination fee of \$2.00 for each 450 gallons per minute, or fraction thereof, over 2250 gallons per minute.

Fees for Filing and Recording Permits: There is a minimum fee of \$4.00 for filing and recording permit. This fee covers irrigation of up to and including 20 acres.

For irrigation of over 20 acres, there is an additional fee as follows:

20¢ per acre over 20 acres to 100 acres, inclusive;

10¢ per acre over 100 acres to 1000 acres, inclusive;

5¢ per acre over 1000 acres.

Permit fee for other uses: Twice the examination fee.

Fee for filing and recording certificate: There is a minimum fee of \$3.00.

Emerson B. Thatcher
Lawyer
Kent, Washington

9-1-64 ✓

Progress Sheet—Ground Water Application

Hamilton Road Community Water Co.
NAME c/o Helen V. Loyd, 23401 - 94th Ave. S., Kent 5937 Assigned to
G. W. APPLI. NO. 6285 PERMIT NO. 5937 CERT. NO. 4534 A

AMENDED _____ CANCELLED _____

Application received 5-4-62 Initial \$10.00 fee received 5-4-62
Statement of additional examination fee \$ _____ Sent _____ Received _____
Application returned for completion or correction _____ Received _____

TEMPORARY PERMIT: Approved by _____ Issued _____

PUBLICATION:

O.K.'d by *SA* Date 5-14-62 Notice sent 5-16-62
Protests _____
Filed _____
Affidavit received and checked 6-4-62 Time expired 7-2-62
Amended notice sent _____ Affidavit received _____
Time expires _____

DEPT. OF GAME REPORT _____

EXAMINATION Made 7-26-62 by *wpd*
O. K.'d for permit 8-14-62 by *RHR*
Statement of permit fee sent 8-10-62 Amount \$ 20.00 Received 8-14-62

PERMIT NO. 5937 ISSUED 8-29-62

BEGINNING OF CONSTRUCTION: Notice sent 8-29-62 Filed 11-8-62
Extension fee \$ _____ Extended to _____
Extended to _____

WELL DRILLER'S REPORT: Sent 5-16-62 Filed 5-29-63

COMPLETION OF CONSTRUCTION: Notice sent 11-9-62 Filed 5-16-63
\$2.00 extension fee _____ Extended to _____
To _____

PROOF OF APPROPRIATION: Sent 5-16-63 Filed 6-12-63
\$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent 5-16-63 \$ 3.00 Received 6-12-63

CERTIFICATE OF GROUND WATER RIGHT NO. 4534 A ISSUED 6-20-63

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.)

PRIORITY DATE October 15, 1980	APPLICATION NUMBER G1-23713	PERMIT NUMBER G1-23713P	CERTIFICATE NUMBER G1-23713C
-----------------------------------	--------------------------------	----------------------------	---------------------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98021

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
Well

TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 7	MAXIMUM ACRE-FEET PER YEAR 11.0
-------------------------------	---------------------------------	------------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE
Municipal supply - continuously

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
800 feet north of the SE corner of Sec. 17

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 17	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E.	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	--------------------------------	---------------	----------------

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 Kent.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

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 Redmond Washington, this 15th day of November, 19 84

Department of Ecology

ENGINEERING DATA

OK *[Signature]*

by *Robert K. McCormick*
ROBERT K. McCORMICK, Regional Manager

FOR COUNTY USE ONLY

00025060

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-23713		PERMIT NUMBER G1-23713 P	
NAME OF PERMITTEE City of Kent			
POST OFFICE ADDRESS 220 S. 4th Avenue		(CITY) Kent	(STATE) Wa
(ZIP CODE) 98032			
ACTUAL SOURCE OF APPROPRIATION Well			
PURPOSE OR PURPOSES WATER IS USED FOR Municipal Water Supply			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE Unknown		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED N/A	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED Continuous	
PUMP SIZE 11.4 GPM at 371 feet TDH (1 1/2 HP Submersible Pump - Gould 10EJL5 - 156 feet deep)			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM 6		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN	

RECEIVED
OCT 15 1984
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Area served by the City of Kent

Pump house is within NE 1/4, SW 1/4, NW 1/4, Section 17 Township 22 Range 5E in King County.

STATE OF WASHINGTON,
County of King } ss.

I, Gary Gill, 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 10th day of October, 1984.

Gary M. Gill
Permittee Signature

Subscribed and sworn to before me this 10th day of October, 1984.

10-18-84
Issue as per permit
ji

Carol S. Frank
Notary Public

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 October 15, 1980	APPLICATION NUMBER G1-23713	PERMIT NUMBER G1-23713P	CERTIFICATE NUMBER
-----------------------------------	--------------------------------	----------------------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98021

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 WATER TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 7	MAXIMUM ACRE-FEET PER YEAR 11.0
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION—WITHDRAWAL
800 feet north of the SE corner of Sec. 17

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ SW $\frac{1}{4}$ NW $\frac{1}{4}$	SECTION 17	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E.	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	--------------------------------	---------------	----------------

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 Kent.

DESCRIPTION OF PROPOSED WORKS

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: July 31, 1982	COMPLETE PROJECT BY THIS DATE: July 31, 1983	WATER PUT TO FULL USE BY THIS DATE: July 31, 1984
--	---	--

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

A certificate of water right will not be issued until a final investigation is made.

The amount of water granted is a maximum limit that shall not be exceeded and the water user shall be entitled only to that amount of water within the specified limit that is beneficially used and required for the actual crop grown on the number of acres and place of use specified.

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 Redmond Washington, this 31st day of July, 19 81.

Department of Ecology

by *Robert K. McCormick*
ROBERT K. McCORMICK, Regional Manager

ENGINEERING DATA

OK *JF*

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 October 15, 1980	APPLICATION NUMBER G1-23713	PERMIT NUMBER	CERTIFICATE NUMBER
-----------------------------------	--------------------------------	---------------	--------------------

NAME CITY OF KENT			
ADDRESS (STREET) P. O. Box 310	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98021

PUBLIC WATERS TO BE APPROPRIATED

SOURCE Well		
TRIBUTARY OF (IF SURFACE WATERS)		
MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE 7	MAXIMUM ACRE-FEET PER YEAR 11.0
QUANTITY, TYPE OF USE, PERIOD OF USE Municipal supply - continuously		

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL 800 feet north of the SE corner of Sec. 17
--

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE 1/4 SW 1/4 NW 1/4	SECTION 17	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 5 E.	W.R.I.A. 9	COUNTY King
---	---------------	-------------------	--------------------------------	---------------	----------------

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 Kent.

DESCRIPTION OF PROPOSED WORKS

Well, 6" x 158'.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
1 yr from permit issuance	2 yrs from permit issuance	3 yrs from permit issuance

REPORT RECOMMENDATIONS

Background:

This application to withdraw 7 gallons per minute from a well near Kent, Washington, for the purpose of municipal supply was received on October 15, 1980 from Arvid and Margaret Grenstad. This was assigned to the City of Kent on May 4, 1981.

Public notice was made on December 11 and 18, 1980 and no protests were filed.

Investigations:

This application refers to a well drilled about 1927. The applicant intends to connect the well to the City of Kent water system in compliance with the city's new policy requiring developers to replace the amount of water consumed by new developments. The well's actual capability is 11.4 gpm.

There is one other water right in Section 17 on a well for 35 gpm which should not be adversely affected by this small rate of withdrawal. Pumping most of the time, the applicant's well will be able to produce 11.0 acre-feet per year.

Municipal supply is considered a beneficial use of water.

Conclusions:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as recommended above will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendations:

I recommend that this application to withdraw 7 gallons per minute from a well near Kent, Washington, for municipal supply be granted and permit issue with an annual quantity of 11.0 acre-feet per year.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

A certificate of water right will not be issued until a final investigation is made.

The amount of water granted is a maximum limit that shall not be exceeded and the water user shall be entitled only to that amount of water within the specified limit that is beneficially used and required for the actual crop grown on the number of acres and place of use specified.

REPORT BY:

David P. Garland

DATE:

May 5, 1981

Affidavit of Publication

STATE OF WASHINGTON
COUNTY OF KING

ss.

Laurie Fieser being first duly sworn on

oath, deposes and says that she the Chief Clerk of THE DAILY NEWS JOURNAL, a newspaper published six (6) times a week. That said newspaper is a legal newspaper and it is now and has been for more than six months prior to the date of publication referred to, printed and published in the English language continually as a newspaper published four (4) times a week in Kent, King 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 Daily News Journal has been approved as a legal newspaper by order of the Superior Court of the County in which it is published, to-wit, King County,

Washington. That the annexed is a Notice of Application

as it was published in regular issues (and not in supplement form of said newspaper) once each issue for a period

of 2 consecutive issues, commencing on the 11th day of December, 1980, and ending the

18th day of December, 1980, 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 \$22.40 which has been paid in full at the rate of per folio of one hundred words for the first insertion and per folio of one hundred words for each subsequent insertion.

Laurie Fieser

Subscribed and sworn to before me this 18th day of December, 1980

Anto Courts
Notary Public in and for the State of Washington,
residing at Kent, King County.
AUBURN

— Passed by the Legislature, 1955, known as Senate Bill 281, effective June 9th, 1955.

— Western Union Telegraph Co. rules for counting words and figures, adopted by the newspapers of the State.

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS TAKE NOTICE:

That ARVID & MARGARET GRENSTAD of PORT ORCHARD, WASHINGTON on OCTOBER 15, 1980 under Application No. G1-23713 filed for permit to appropriate public waters, subject to existing rights, from WELL in the amount of 7 GALLONS PER MINUTE each year, for DOMESTIC SUPPLY — CONTINUOUSLY.

The source of the proposed appropriation is located within NE 1/4 SW 1/4 NW 1/4 of Section 17, Township 22 N., Range 5E W.M., in KING 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 show below, within thirty (30) days from 12-18-80. Department of Ecology Northwest Regional Office 4350-150th Ave. N.E. Redmond, Washington 98052

Published in The Daily News Journal December 11 & 18, 1980. K4753.

OK
DPG
2-11-81

RECEIVED

6 1981

ECOLOGICAL REGION



APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON

SURFACE WATER

GROUND WATER

has reviewed this application as required by RCWA and find that it is not an "action".

categorically exempt.

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION

(GRAY BOXES FOR OFFICE USE ONLY)

SIGNATURE

APPLICATION NO. G123713	W.R.I.A. 9	COUNTY King	PRIORITY DATE 10-15-80	TIME	ACCEPTED DPG
APPLICANT'S NAME - PLEASE PRINT Arvid and Margaret Grenstad				BUSINESS TEL. 876-4161	
ADDRESS (STREET) 4123 Dogwood Hill SW, Port Orchard, Wa 98366		(CITY)	(STATE)	(ZIP CODE)	
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.) Well
TRIBUTARY	SIZE AND DEPTH 6" casing, 150'± deep

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
Domestic

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF:	CUBIC FEET PER SECOND CFS	OR	GALLONS PER MINUTE 7 GPM	ACRE FEET PER YEAR
TIMES DURING YEAR WATER WILL BE REQUIRED Daily				
IF IRRIGATION, NUMBER OF ACRES -	IF DOMESTIC USE, NUMBER OF UNITS BY TYPE, E.G. 1-HOME, 1-MOBILE HOME, 2-CAMPSITES, ETC. 12	IF MUNICIPAL USE, ESTIMATED POPULATION 20 YEARS FROM TODAY		
DATE PROJECT WAS OR WILL BE STARTED Well drilled ±1927	DATE PROJECT WAS OR WILL BE COMPLETED			

3. LOCATION OF POINT OF DIVERSION/WITHDRAWAL

3A. IF IN PLATTED PROPERTY

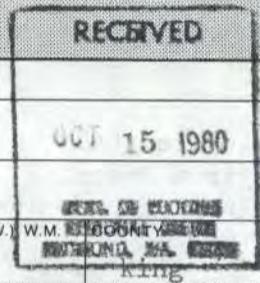
LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)	SECTION	TOWN	RANGE
ALSO, PLEASE ENCLOSE A COPY OF THE PLAT AND MARK THE POINT(S) OF WITHDRAWAL OR DIVERSION					

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.
800' north of the SE corner, SW $\frac{1}{4}$, NW $\frac{1}{4}$, 17-22-5

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE$\frac{1}{4}$, SW$\frac{1}{4}$, NW$\frac{1}{4}$	SECTION 17	TOWNSHIP N. 22	RANGE (E. OR W.) 5E
--	----------------------	--------------------------	-------------------------------



4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
yes

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.

Water is to be used as part of the supply for the City of Kent.

the City of Kent is currently requiring developers to replace, within the Kent water system, the amount of water used for domestic purposes by any new developments outside the City limits but within their service area. Enclosed is a map of the property being developed and the location of the existing well.

Owner

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.)

The existing well is to be connected to an existing main some 30 feet east of the well head.

REMARKS

7.

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

Arvid Grenstad
Maegaret Grenstad

LEGAL LANDOWNERS NAME
(PLEASE PRINT)

Arvid Grenstad

APPLICANT'S SIGNATURE

Margaret A. Grenstad

LEGAL LANDOWNER'S SIGNATURE

1423 Dogwood Hill SW, Port Orchard, Wa 98366

LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON

DEPARTMENT 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:

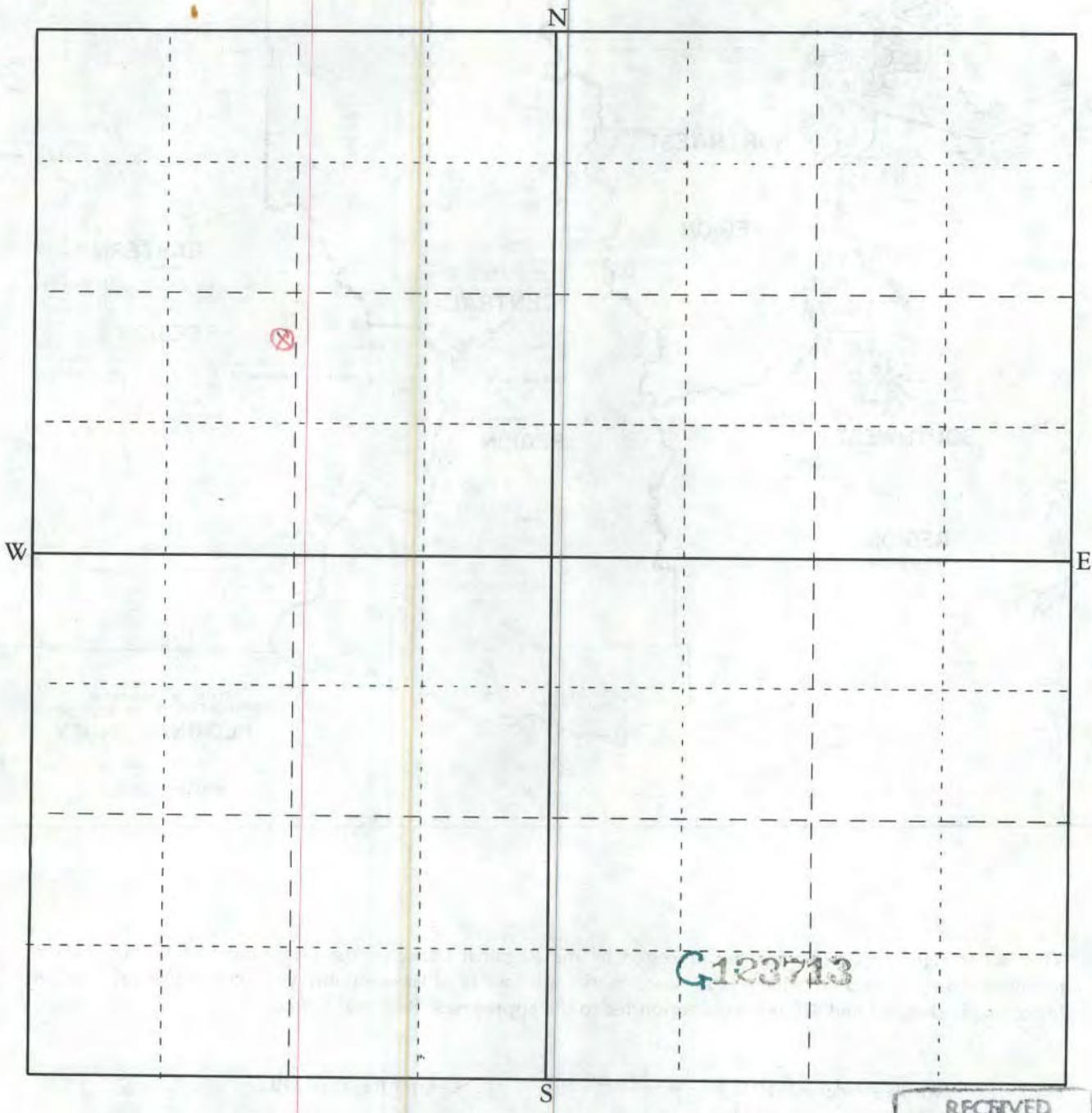
In order to retain its priority date, this application must be returned to the Department of Ecology, with corrections, on or before....., 19.....

Witness my hand this.....day of....., 19.....

Department of Ecology

SECTION MAP

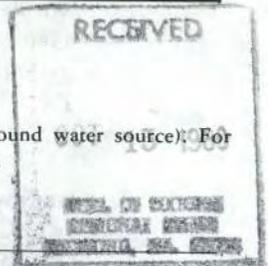
Sec. 17 Twp. 22 N. R. 5E



Scale: 1 inch = 800 feet (each small square = 10 acres)

Show by a cross (X) the location of point of diversion (surface water source) or point of withdrawal (ground water source). For ground water applications, show by a circle (O) the locations of other wells or works within a quarter of a mile. Indicate traveling directions from nearest town in space below.

1 1/2 miles south and 2 miles east to downtown Kent



Detach here

Fold along scale



Detach this scale at the perforation, fold excess paper under or cut off excess by cutting along the scale line. This scale corresponds to the SECTION MAP above. You can read feet directly from this scale to outline property and locate points of diversion or withdrawal on the SECTION MAP. Enclose this map along with the application and \$10.00 examination fee.

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

Assigned to

NAME <i>City of Kent</i> Arvid & Margaret Grenstad	TELEPHONE NO. 876-4161
ADDRESS <i>Kent Wash</i> 4123 Dogwood Hill S.W.	(CITY) (STATE) (ZIP CODE) Port Orchard, Washington 98366
ASSIGNED TO <i>City of Kent</i>	TELEPHONE NO. DATE ASSIGNED 872-3383 5/4/81
ADDRESS <i>PO Box 310</i>	(CITY) (STATE) (ZIP CODE) Kent 98021
APPLICATION NO. <i>G123713</i>	PERMIT NO. CERTIFICATION NO. <i>G123713P G123713C</i>
DATE AMENDED	DATE CANCELLED W.R.I.A.

APPLICATION

DATE APPLICATION RECEIVED October 15, 1980	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED October 15, 1980
STATEMENT OF ADDITIONAL EXAMINATION FEE \$	DATE SENT	DATE RECEIVED <i>Jan 6, 1981</i>
DATE RETURNED FOR COMPLETION OR CORRECTION	DATE RECEIVED	

TEMPORARY PERMIT

APPROVED BY <i>[Signature]</i>	DATE ISSUED
-----------------------------------	-------------

PUBLICATION

APPROVED BY	DATE APPROVED	DATE NOTICE SENT <i>12.1.80</i>
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED	CHECKED BY	TIME EXPIRED	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED <i>Jan. 6, 1981</i>	TIME EXPIRED 1-18-81
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DEPARTMENT OF GAME AND FISHERIES REPORT

APPROVED	PROVISO	PROTEST
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EXAMINATION

DATE EXAMINATION MADE 2-23-81	MADE BY <i>DPG</i>	DATE REPORT OF EXAM. WRITTEN 2-26-81	WRITTEN BY <i>DPG</i>	CHECKED BY <i>RB</i>
DATE PERMIT FEE REQUESTED 5-13-81 <i>lew</i>	AMOUNT DUE 20 ⁰⁰	DATE RECEIVED 6/17/81		

PERMIT

PERMIT APPROVED BY <i>XX</i>	DATE APPROVED 7-22-81	PERMIT NO. <i>G123713P</i>	DATE ISSUED <i>7.31.81</i>
---------------------------------	--------------------------	-------------------------------	-------------------------------

BEGINNING OF CONSTRUCTION

DATE NOTICE SENT <i>7.31.81</i>	DATE FILED <i>8.21.81</i>	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

WELL DRILLER'S AND/OR CONSTRUCTION REPORT

DATE SENT	DATE FILED <i>not available</i>
-----------	------------------------------------

COMPLETION OF CONSTRUCTION

DATE NOTICE SENT <i>9-8-81</i>	DATE FILED <i>12-24-81</i>	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION

DATE SENT	DATE FILED <i>10-15-84</i>	EXTENSION FEE	EXTENDED TO	
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED <i>10-15-84</i>	DATE APPROVED FOR CERTIFICATE <i>10-18-84</i>	APPROVED BY <i>XX</i>

CERTIFICATION

PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER <i>G123713C</i>	DATE ISSUED <i>11.15.84</i>
--	---------------------------------------	--------------------------------

REMARKS

*Certificate should not issue until assigned to City of Kent @ 4/29/81
OK ASSIGNED 5/4/81 DPG*

ECY 040-1-80

PROGRESS

1957

CERTIFICATE RECORD No. 4 PAGE No. 1957-A

STATE OF WASHINGTON, COUNTY OF King

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 HARRY M. CHAPPELEAR

of Kent, Washington, 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 NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 4, Twp. 21 N., Rge. 5 E.W.M.

for the purpose of irrigation and domestic supply

under and subject to provisions contained in Ground Water Permit No. 2315 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 4 at page 1957-A;

that the right hereby confirmed dates from March 24, 1952; that the quantity of ground water under the right hereby confirmed for the purposes aforesaid, is limited to an amount actually beneficially used for said purposes, and shall not exceed 140 gallons per minute; 60 acre-feet per year to be used for domestic supply & for irrigation of 30 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:

S $\frac{1}{2}$ of SE $\frac{1}{4}$ of NW $\frac{1}{4}$ of Sec. 4, Twp. 21 N., Rge. 5 E.W.M., EXCEPT the East 194 feet of N $\frac{1}{2}$ of said S $\frac{1}{2}$ of SE $\frac{1}{4}$ of NW $\frac{1}{4}$, AND EXCEPT County Road right-of-way;

AND NE $\frac{1}{4}$ of SW $\frac{1}{4}$ of Sec. 4, Twp. 21 N., Rge. 5 E.W.M., EXCEPT County Road right-of-way.

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

26th day of August, 1954.

Robert F. Russell
Assistant State Supervisor of Water Resources.

RM

Proof of Appropriation of Water

RECEIVED
MAY 23 1954
DEPARTMENT OF
CONSERVATION & DEVELOPMENT

Application No. 2408

Permit No. 2315

- ✓ 1. Name of Permittee Clay M. Chappelle
- ✓ 2. Postoffice address Rt. 4 Box 720 Kent, Wash.
- ✓ 3. Source of appropriation Well
- 4. Name or number of works (if any) _____
- ✓ 5. For what purpose or purposes is water used? Irrigation and domestic
- ✓ 6. Give date of beginning of construction Sept. 18, 1952
- ✓ 7. Give date of completion of construction work, including water distribution system
Jan. 15, 1953
- ✓ 8. Give date when water was completely applied to proposed use May 18 1954
- 9. If used for irrigation:
 - ✓ Give number of acres described in permit 30
 - ✓ Give number of acres actually irrigated 30
- 10. If used for power: HP actually developed _____

11. LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED:

NE 1/4 of SW 1/4 Sec. 4, Twp. 21, N., Rge. 5E
S 1/2 of SE 1/4 of NW 1/4 Sec. 4, Twp. 21, N., Rge. 5E except:
tract desc. in permit

- 12. During what months is water used? May June July Aug & Sept for irrigation
all years for domestic
- 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? yes
- 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. none
- 15. Actual measured discharge or diversion of permanent system: 140 (gpm or cfs)

(Sign certification on reverse side)

ok; issue for
140 gpm @ 602.5 f.
7/24

STATE OF WASHINGTON,

County of King

} ss.

I, Harry M. Chappelcar, 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 20th day of Aug, 1954

Harry M. Chappelcar

Subscribed and sworn to before me this 20th day of August, 1954

Lyle Sandilins

Notary Public.

RECORD BY WELL DRILLER OR OTHER CONSTRUCTOR OF WORKS
FOR WITHDRAWAL OF GROUND WATER

RECEIVED
JUN 19 1952
DEPARTMENT OF

Under Permit No. G. W. 2315

("The well driller or other constructor of works for the withdrawal of public ground waters shall be obligated to furnish the permittee a certified record of the factual information necessary to show compliance with the provisions of this section." Sec. 8, Chap. 263, Laws of 1945.)

- HARRY M CHAPPALEAR Rt. 4 Box 720 Kent Wash
(Name and address of owner of well or other works for withdrawal of water)
- Type; name or number of works where water is taken Well
(Well, tunnel or infiltration trench)
- Date on which work on well or other structure was started Sept 18, 1952
- Date on which work was completed Oct 1, 1952
- If work on well or other structure was abandoned, give date and reason for abandonment

6. DESCRIPTION OF WORKS:

(a) WELL: Depth 83 ft. Diameter 8 in. or ft. Dug or drilled drilled
Flowing or pump well

IF PUMP WELL: Type and size of pump is

Type and size of motor or engine is

Depth from ground surface to water level before pumping 19 FT feet

After continuous operation for 4 hours, the measured discharge of the pump is 180 g.p.m., and the drawdown of water level is 40 feet
(At least four)

Recovery data (taken after pump has been shut off) (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level
<u>TOTAL</u>	<u>Recovery</u>	<u>to</u>	<u>20 FT</u>
<u>30</u>	<u>Seconds</u>		

Date of test

IF FLOWING WELL: Measured discharge g.p.m. on (Date)

Shut-in pressure at ground surface lbs. per sq. in. on (Date)

Water is controlled by (Cap, valve, etc.)

CASING: (Give diameter, commercial specifications and depth below ground surface of each casing size.)

8 in. diameter from 0 to 83 ft.
 in. diameter from to ft.
 in. diameter from to ft.
 in. diameter from to ft.

Describe and show depth of shoe, plug, adapter, liner or other details:

Three Rows Perforations
70- to 80 Ft. 5 Holes per ft
1" X 1/4"

OK
RWR

Perforated casing or screens:

5 per ft 1 1/2" x 1/4" from 70 to 80 ft.
 (Number per foot and size of perforations, or describe screen)
 from to ft.
 from to ft.
 from to ft.
 from to ft.

LOG OF WELL OR TUNNEL: (Describe each stratum or formation clearly, indicate if water bearing, and give thickness and depth as indicated.)

MATERIAL	Thickness (Feet)	Depth to bottom (Feet)
Top Soil	3	3
HARD PAN	12	15
Peat Moss	5	20
SANDY SLAY	10	30
SAND & GRAVEL	5	35
it is with coarse gravel	5	40
COURSE GR. VERY LITTLE SD. HARD TO DRILL +	14	54
LOOSE COURSE GR. + SAND	2	56
HARD PAN + GRAVEL + WATER	2	58
Loose course gravel + sand + water Bailed down	7	65
HARD PAN WITH COURSE GRAVEL	2	67
COURSE LOOSE GR. SAND + WATER	10	77
COURSE GRAVEL ABOUT 20% SEDIMENT	1	78
HARD PAN. COURSE GR + WATER	2	80
Loose course GRAVEL + SAND + WATER	3	83

(b) INFILTRATION TRENCH OR TUNNEL: Type

Dimensions:
 (Tunnel—length, course, and cross-sectional size) (Trench—minimum and maximum depths)

Bottom width ft. Discharge g.p.m. Date of test

Position of water bearing stratum with reference to portal of tunnel

Harold O. Meyer

(Signature of well driller or other constructor)

274 - Bx 17 Kirkland, Wash

(Address)

STATE OF WASHINGTON.

County of } ss.

I,, being first duly sworn, do hereby certify that I am the driller or constructor of the aforesaid well or tunnel or trench who furnished the foregoing statement of facts; that I have read said statement and each and all of the items therein contained are true to the best of my knowledge and belief.

(Signature)

Subscribed and sworn to before me this day of, 195.....

Notary Public

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. 5 of Ground Water Permits, on page 2315 under Application No. 2408

HARRY M. CHAPPELEAR

of Kent, Washington

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 March 24, 1952

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 180 gallons per minute; 60 acre-feet per year, to be used for the following purposes: irrigation and domestic supply

as more definitely set out below.

Location of the well, tunnel, or infiltration trench is 1980 feet North of Southeast corner of SE 1/4 of SW 1/4 of Sec. 4

being within the NE 1/4 of SW 1/4 of Sec. 4, Twp. 21 N., Rge. 5 E.W.M.
county of King

Use, or uses to which water is to be applied:

For municipal supply: _____ gallons per minute; _____ acre-feet per year,
to supply and domestic supply

For irrigation: 180 gallons per minute; 60 acre-feet per year,
for the irrigation of 30 acres.

For miscellaneous uses: _____ gallons per minute; _____ acre-feet per year,
for _____

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

S 1/2 of SE 1/4 of NW 1/4 of Sec. 4, Twp. 21 N., Rge. 5 E.W.M., EXCEPT the East 194 feet of N 1/2 of said S 1/2 of SE 1/4 of NW 1/4, AND EXCEPT County Road right-of-way;

AND NE 1/4 of SW 1/4 of Sec. 4, Twp. 21 N., Rge. 5 E.W.M., EXCEPT County Road right-of-way.

DESCRIPTION OF WORKS FROM WHICH WATER IS TO BE WITHDRAWN

The well will be drilled and have a diameter of 8 inches, and depth of 100 feet.
(Dug or drilled)

Description of tunnel or infiltration trench:

(Please read carefully provisions below)

Particular specifications required by the Supervisor of Water Resources for the purpose of preventing waste of public waters:

Construction work shall begin on or before August 1, 1953
and shall thereafter be prosecuted with reasonable diligence and completed on or before February 1, 1954
and complete application of water to proposed use shall be made on or before February 1, 1955

Given under my hand and the seal of this office at Olympia, Washington, this 15th day of August, 1952.

M. Walker, Actg. Ass't
State Supervisor of Water Resources

Report of Examination on Ground Water

Received date 3-24-52 Date of exam. 6-26-52 Appli. No. 2408

Name Harry M. Chappellear Address Rt. 4, Box 720; Kent, Wash.

Type of works well Dimensions 8" x 100'

Progress of works Not started

Quantity ~~claimed or~~ applied for 180 g.p.m. 60 acre-feet per year

Legal sub. NE $\frac{1}{4}$ SW $\frac{1}{4}$ Sec. 4 Twp. 21 N. Rge. 5 E. County King

Use irrigation and domestic supply

Irrigation-acreage: Present 0 Planned 30 Feasible 30

Municipal: Population _____ as of _____

Industrial _____

Time pump will be operated during irrigation season & continuously for domestic supply

Other water rights appurtenant to this land none

Proximity to existing works, springs, wells, or streams Roy Campbell E. 300 yds; Mrs. Jessie Evans N. $\frac{1}{4}$ mile

Area _____ Sub-area _____ Zone _____

RECOMMENDATIONS

Approved for 180 g.p.m. 60 acre-feet per year, subject to existing water rights. (1 acre-foot 325,850 gallons.)

The water requirement of this land is calculated on each acre needing 2 acre-feet per year, or a total of 60 acre-feet annually for 30 acres.

The applicant will furnish information to this office as to the size and type of equipment installed and the gallons per minute furnished. The size of hole openings and number of sprinklers operated, if such be the case, will give this information.

The installation of an access port to well as described in attached Ground Water Bulletin No. 1, is recommended.

Signed this 9th day of July, 1952.

Stuart E. Shumway
STUART E. SHUMWAY
Engineer

RECEIVED
APR 11 1952

DEPARTMENT OF
REGISTRATION & DEVELOPMENT

Affidavit of Publication

STATE OF WASHINGTON, } ss.
COUNTY OF KING

M. E. Brown, being first duly sworn, on oath deposes and says that he is one of the publishers of The Daily Journal of Commerce, a daily newspaper. That said newspaper is a legal newspaper 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 continuously as a daily newspaper in Seattle, King 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 said Daily Journal of Commerce was on the 12th day of June, 1941, approved as a legal newspaper by the Superior Court of said King County.

That the annexed is a true copy of a
Water Right Application #2408
as it was published in regular issues (and not in supplement form) of said newspaper once each week for a period of two (.....2.....) consecutive weeks, commencing on the 3rd day of April 1952, and ending on the 10th day of April 1952, both dates inclusive, and that said newspaper was regularly distributed to its subscribers during all of said period.

M. E. Brown

Subscribed and sworn to before me this

10th day of April 1952

J. J. Adams

Notary Public in and for the State of Washington, residing at Seattle.
(This form officially sanctioned by Washington State Press Association.)
Form C.

STATE OF WASHINGTON
Office of Supervisor of
Water Resources, Olympia

**NOTICE OF GROUND WATER
RIGHT APPLICATION NO. 2408**

TAKE NOTICE:
That Harry M. Chappellear, of Kent, Washington, on March 24, 1952, filed application for permit to withdraw public ground waters through a well situated within the NE¼ of SW¼ of Section 4, Township 21 N., Range 5 E., W. M., in King County, in the amount of 180 gallons per minute, subject to existing rights during irrigation season, each year for the purpose of irrigation; and continuously for domestic 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 April 10, 1952.

Witness my hand and official seal this 27th day of March, 1952.
(Seal) CHAS. J. BARTHOLET,
State Supervisor of Water Resources. (1696)

STATE OF WASHINGTON
DEPARTMENT OF CONSERVATION AND DEVELOPMENT
Division of Water Resources



APPLICATION FOR A PERMIT
To Appropriate Public Ground Waters
OF THE STATE OF WASHINGTON

Application No. G. W. 2408

I, Harry M. Chappelle
(Name of applicant)

of Rt. 4 Box 720 Kent Wash.
(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 7 miles South East of Kent
(Give approximate distance and direction from nearest city or town)

Area _____ Sub-area _____
(Leave blank) (Leave blank)

Zone _____
(Leave blank)

Applicant's name or number of well or other works, if any _____

2. The quantity of water which applicant intends to withdraw for beneficial use is 180
gallons per minute; 5 60 acre feet per year.

3. The use or uses to which water is to be applied Domestic and Irrigation

(Domestic supply, irrigation, municipal, manufacturing, industrial use, etc.)

4. The time during which water will be required each year For irrigation season & cont. June, July, Aug, Sept, Oct, Nov, Dec

5. Location of well or other works for withdrawal of water: In county of King

(a) 1980 ft. North of S.E. corner of S.E. 1/4 of S.W. 1/4 of Sec. 4
(Give distance and bearing from nearest corner of section or legal subdivision)

being within the NE 1/4 of South west quarter of Sec. 4, Twp. 21 N., Rge. 5 East
(Give smallest legal subdivision) (E. or W.)

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.

ok mem

6. DESCRIPTION OF WORKS:

(a) Well will be drilled and have a diameter of 8 inches and an estimated depth of 100 feet.
(Dug or drilled)

(b) Tunnels or trenches to be described: (Attach additional sheets if needed for full description.)

(c) Distribution system to be described:

Sprinkler system 4 inch main 3 inch lateral

(d) If pumps are to be used, give size and type:

Submersible or turbine, size depending on exact depth

(e) Give capacity and type of motor or engine to be used:

Electric - 7 horse

(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:

none

(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:

<u>Roy Campbell</u> <small>(Name)</small>	<u>East</u> <small>(Direction)</small>	<u>300 yards</u> <small>(Distance)</small>
<u>Mrs. Jessie Evans</u> <small>(Name)</small>	<u>North</u> <small>(Direction)</small>	<u>1/4 mile</u> <small>(Distance)</small>
 <small>(Name)</small>	 <small>(Direction)</small>	 <small>(Distance)</small>
 <small>(Name)</small>	 <small>(Direction)</small>	 <small>(Distance)</small>

SUPPLY THE FOLLOWING INFORMATION ACCORDING TO USE PROPOSED:

7. For Municipal Supply: To supply the city, town, or community of _____, in the county of _____, having a present population of _____, and an estimated population of _____, in 19_____.

8. For Irrigation: Number of acres to be irrigated 30 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)

South half of Southeast quarter of ~~northwest~~ quarter of section 4 township 21 north, range 5 east, W.M., Except the east 194 ft. of north half of said south half of southeast quarter of north west quarter. And except county road right of way.

And
Northeast quarter of south west quarter of section 4, township 21 north, range 5 east, W.M. Except county right Road right of way.

(On accompanying plat show location of the existing wells or works)

10. What interest do you have in the above described property? Contract buyer

(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 first of May

13. Construction work will be completed on or before first of June

14. Water will be put to complete beneficial use on or before first June

Harry M. Chappellear
(Signature of applicant)

15. Name and address of owner of land on which well or works are located:

Harry M. Chappellear
(Name)

Rt. 4 Box 720 Kent
(Address)

Harry M. Chappellear
(Signature of legal landowner)

Signed in the presence of us as witnesses:

John J. Blake
(Name)

502 'D' St. NE. Auburn, Wash.
(Address of witness)

Lynn A. Barnes
(Name)

Rout 1 Box 701 Auburn
(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:

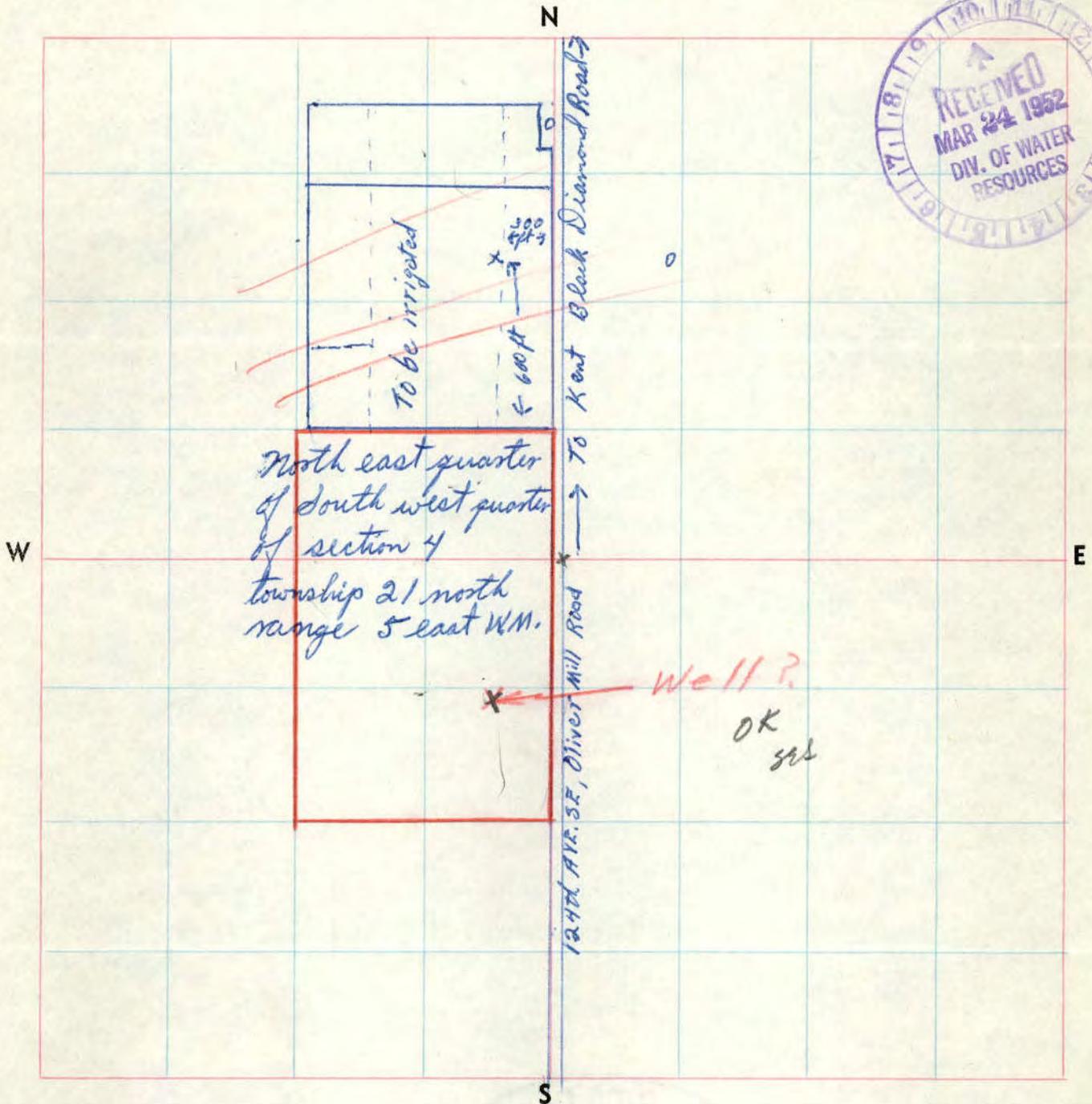
In order to retain its priority, this application must be returned to the State Supervisor of Water Resources, with corrections, on or before _____, 19_____

WITNESS my hand this _____ day of _____, 19_____

State Supervisor of Water Resources.

SECTION PLAT

Sec. 4 Twp. 21 N. R. 5 East



Show by a cross (X) the location of the well or other works covered by the application. Show by circle (O) the locations of other wells or works within a quarter of a mile. Also indicate traveling directions from nearest town on main highway.

Scale: 1 inch = 800 feet.

Check Well Location

PHR

2408

80/528

2-1-55

Progress Sheet—Ground Water Application

NAME Harry M. Chappellear, 720, Kent Rt. 4, Box / Assigned to
 G. W. APPLI. NO. 2408 PERMIT NO. 2315 CERT. NO. 1957 A
 AMENDED _____ CANCELLED _____

Application received 3-24-52 Initial \$10.00 fee received 3-24-52
 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 3-26/52 Notice sent 3-27-52 0
 Protests _____
 Filed _____
 Affidavit received and checked 4-11-52 Time expired 5-10-52
 Amended notice sent _____ Affidavit received _____
 Time expires _____

DEPT. OF GAME REPORT _____

EXAMINATION Made 6-26-52 by SEL
 O. K.'d for permit 8/17/52 by mlw
 Statement of permit fee sent 7-9-52 Amount \$ 6.00 Received 8-12-52

PERMIT NO. 2315 ISSUED 8-15-52

BEGINNING OF CONSTRUCTION: Notice sent 8-15-52 Filed 9-29-52
 Extension fee \$ _____ Extended to _____
 Extended to _____

WELL DRILLER'S REPORT: Sent 8-15-52 Filed 1-19-54

COMPLETION OF CONSTRUCTION: Notice sent 8-15-52 Filed 1-19-54
 \$2.00 extension fee _____ Extended to _____
 To _____

PROOF OF APPROPRIATION: Sent 1-19-54 Filed 8-23-54
 \$2.00 extension fee _____ Extended to _____

Statement of certificate fee sent 1-19-54 \$ 3.00 Received 8-23-54

CERTIFICATE OF GROUND WATER RIGHT NO. 1957-A ISSUED 8-26-54

The Department of Ecology does NOT warrant the Data and/or the Information on this Well Report



WATER WELL REPORT

Original & 1st copy - Ecology, 2nd copy - owner, 3rd copy - driller

DEPARTMENT OF
ECOLOGY
State of Washington

Construction/Decommission ("x" in circle)

Construction

Decommission **ORIGINAL INSTALLATION**

Notice of Intent Number

CURRENT

Golf Course Well No. 2

Notice of Intent No. **WE23834**

Unique Ecology Well ID Tag No. **APP320**

Water Right Permit No. **G1-25204 C**

Property Owner Name **City of Kent Riverbent Golf Complex**

Well Street Address **2019 West Meeker Street**

City **Kent** County **King**

Location **NE1/4-1/4 SE1/4 Sec 22 Twn 22N R 4E EWM**
(s, t, r Still REQUIRED) Or
WWM

Lat/Long

Lat Deg **N 47.37819**

Lat Min/Sec _____

Long Deg **W -122.27095**

Long Min/Sec _____

Tax parcel No. (Required) **2322049010**

PROPOSED USE: Domestic Industrial Municipal
 DeWater Irrigation Test Well Other _____

TYPE OF WORK: Owner's number of well (if more than one) _____
 New well Reconditioned Method: Dug Bored Driven
 Deepened Cable Rotary Jetted

DIMENSIONS: Diameter of well **12** inches, drilled **465** ft.
Depth of completed well **455** ft.

CONSTRUCTION DETAILS

Casing Welded **16"** Diam. from **L.S.** ft. to **87** ft.
Installed: Liner installed **12"** Diam. from **+2** ft. to **427** ft.
 Threaded _____" Diam. From _____ ft. to _____ ft.

Perforations: Yes No
Type of perforator used _____
SIZE of perfs _____ in. by _____ in. and no. of perfs _____ from _____ ft. to _____ ft.

Screens: Yes No K-Pac Location _____
Manufacturer's Name _____
Type **V-Wire** Model No. _____
Diam. **12** Slot size **0.020** from **425** ft. to **437** ft.
Diam. **12** Slot size **0.040** from **447** ft. to **455** ft.

Gravel/Filter packed: Yes No Size of gravel/sand **8x12**
Materials placed from **362** ft. to **462** ft.

Surface Seal: Yes No To what depth? **86** ft.
Material used in seal **cement grout (flow seal)**
Did any strata contain unusable water? Yes No
Type of water? _____ Depth of strata _____
Method of sealing strata off _____

PUMP: Manufacturer's Name _____
Type: _____ H.P. _____

WATER LEVELS: Land-surface elevation above mean sea level _____ ft.
Static level _____ ft. below top of well Date _____
Artesian pressure _____ lbs. per square inch Date _____
Artesian water is controlled by _____ (cap, valve, etc.)

WELL TESTS: Drawdown is amount water level is lowered below static level
Was a pump test made? Yes No If yes, by whom? _____
Yield: **500** gal./min. with **70** ft. drawdown after **8** hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Yield: _____ gal./min. with _____ ft. drawdown after _____ hrs.
Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level)

Time	Water Level	Time	Water Level	Time	Water Level
1 min	31	50 m	18.48	180m	14.8
5 min	24.15	90 m	16.64	1690	7.40
10 m	22.6	120 m	15.67		

Date of test **8-22-2016**

Bailer test _____ gal./min. with _____ ft. drawdown after _____ hrs.
Airstest _____ gal./min. with stem set at _____ ft. for _____ hrs.
Artesian flow _____ g.p.m. Date _____
Temperature of water _____ Was a chemical analysis made? Yes No

CONSTRUCTION OR DECOMMISSION PROCEDURE
Formation: Describe by color, character, size of material and structure, and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of information. (USE ADDITIONAL SHEETS IF NECESSARY.)

MATERIAL	FROM	TO
Brown silty sand and gravel	land sur	11
Brown fine sand	11	14
Brown peaty, silty fine sand	14	40
Brown silty sand and gravel with wood	40	50
Dark gray med to crs sand with some gravel	50	54
Brown silty s & gr with thin gr-brn clay	54	60
Gray sandy silt and clay with some gravel	60	65
Gray sandy silt and grav. w/ abundant shells	65	77
Gray silt w/ some clay and shell fragments	77	100
Brn f to crs snd, gr, cobbles w/silt layers	100	135
Gray silt/clay some interbedded lavender silt	135	170
Gray silt/clay w/ some gravel & wood frags	170	329
Gray clay/silt with occ. thin brittle clay	329	391
Gray clay/silt w/ occ thin sand layers	391	395
Gray clay (nearly pure clay)	395	422
Brown fine to crs sand w/some wood	422	438
Gray silt w/fine to crs sand 7 minor gravel	438	445
Interbedded layers of sand & gravel and silt	445	465

RECEIVED RECEIVED

OCT 19 2016 OCT 19 2016

DEPT OF ECOLOGY DEPT OF ECOLOGY
NWRO - WR NWRO - WR

Start Date **5/16/2016** Completed Date **8/27/2016**

WELL CONSTRUCTION CERTIFICATION: I constructed and/or accept responsibility for construction of this well, and its compliance with all Washington well construction standards. Materials used and the information reported above are true to my best knowledge and belief.

Driller Engineer Trainee Name (Print) **Dave Charon**
Driller/Engineer/Trainee Signature *Dave Charon*
Driller or trainee License No. **1190**
IF TRAINEE: Driller's License No: _____
Driller's Signature: _____

Drilling Company **Charon Drilling**
Address **12719 224th Street East**
City, State, Zip **Graham, WA, 98338**
Contractor's
Registration No. **CHAROD1133NF** Date **10.13.16**

ECY 050-1-20 (Rev 02-2010) To request ADA accommodation including materials in a format for the visually impaired, call Ecology Water Resources Program at 360-407-6872. Persons with impaired hearing may call Washington Relay Service at 711. Persons with speech disability may call TTY at 877-833-6341.

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.)

PRIORITY DATE March 25, 1988	APPLICATION NUMBER G1-25204	PERMIT NUMBER G1-25204P	CERTIFICATE NUMBER G1-25204C
---------------------------------	--------------------------------	----------------------------	---------------------------------

NAME City of Kent Parks & Recreation Department			
ADDRESS (STREET) 220 4th Avenue South	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Well	TRIBUTARY OF (IF SURFACE WATERS)		
----------------	----------------------------------	--	--

MAXIMUM CUBIC FEET PER SECOND ---	MAXIMUM GALLONS PER MINUTE 290	MAXIMUM ACRE-FEET PER YEAR 290
--------------------------------------	-----------------------------------	-----------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE
Irrigation - during irrigation season (145 acres)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
300 feet south and 100 feet west of E $\frac{1}{2}$ corner of Section 22.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ SE $\frac{1}{4}$	SECTION 22	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 4E	W.R.I.A. 9	COUNTY King
--	---------------	-------------------	------------------------------	---------------	----------------

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Irrigated property which constitutes River Bend Golf Course.

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

This authorization to use public waters of the state is classified as a Publicly Owned Land Permit in accordance with Chapter 90.66 RCW (Initiative Measure No. 59).

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

Monitoring of static water levels, pumping levels, and discharge (gpm) shall be done on a monthly basis to be submitted to the Northwest Regional Office, Department of Ecology upon request.

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 Redmond Washington, this ..15th... day of May....., 19..90.....

Department of Ecology

ENGINEERING DATA

OK.....



by *Hermah H. Huggins*.....

Hermah H. Huggins, Section Supervisor Water Resources

FOR COUNTY USE ONLY

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

PROOF OF APPROPRIATION OF WATER

APPLICATION NUMBER G1-25204		PERMIT NUMBER G1-25204P	
NAME OF PERMITTEE City of Kent Parks & Recreation		BUS. TEL. 859-3994	HOME TEL. N/A
POST OFFICE ADDRESS (CITY) 220 4th Ave. S. Kent		(STATE) WA	(ZIP CODE) 98032
ACTUAL SOURCE OF APPROPRIATION Well			
PURPOSE OR PURPOSES WATER IS USED FOR Irrigation of Riverbend Golf Course			
DATE WATER WAS COMPLETELY APPLIED TO PERMITTED USE May 1, 1989		IF USED FOR IRRIGATION: NUMBER OF ACRES ACTUALLY IRRIGATED 145	
IF SOURCE IS A WELL, IS AN ACCESS PORT NOW INSTALLED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		MONTHS DURING WHICH WATER IS USED April - October	
PUMP SIZE 15 HP			
ACTUAL AMOUNT WITHDRAWN OR DIVERTED FROM PERMANENT SYSTEM 290		<input checked="" type="checkbox"/> GPM <input type="checkbox"/> CFS	
HAVE ALL PROVISIONS AS REQUIRED BY PERMIT BEEN ACCOMPLISHED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO		IF NO, EXPLAIN 4-6-90 checked with Hydrogeologists Robinson + Noble for project - indicated quantity	

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS USED (USE ADDITIONAL SHEET IF NECESSARY)

Irrigated property which constitutes River Bend Golf Course.

STATE OF WASHINGTON,
County of King } ss.

I, Helen M. Wickstrom, 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 23rd day of February, 1990.

Helen M. Wickstrom
Permittee Signature

Subscribed and sworn to before me this 23rd day of February, 1990.

4-6-90
Issue cert for 290 gpm

Bill H. Johnson
Notary Public

My Commission Expires 7/28/90
residing in Seattle

P/A

File Original and First Copy with Department of Ecology Second Copy - Owner's Copy Third Copy - Driller's Copy

WATER WELL REPORT STATE OF WASHINGTON

Permit No.

(1) OWNER: Name CITY OF KENT PARKS + REC Address 220 4th Ave. S., KENT, WA 98032

(2) LOCATION OF WELL: County KING - NE 1/4 SE 1/4 Sec. 22 T. 22 N., R. 4E W.M.

Bearing and distance from section or subdivision corner

(3) PROPOSED USE: Domestic [] Industrial [] Municipal [] Irrigation [x] Test Well [] Other []

(4) TYPE OF WORK: Owner's number of well (if more than one) New well [x] Deepened [] Reconditioned [] Method: Dug [] Cable [x] Rotary [] Bored [] Driven [] Jetted []

(5) DIMENSIONS: Diameter of well 12 inches. Drilled 451 ft. Depth of completed well 451 ft.

(6) CONSTRUCTION DETAILS: Casing installed: 12" Diam. from +2.0 ft. to 338 ft. Threaded [] Welded [x] 6" Diam. from 279.3 ft. to 412 ft. 6" Diam. from 440 ft. to 451.3 ft.

Perforations: Yes [] No [x] Type of perforator used SIZE of perforations in. by perforations from ft. to ft.

Screens: Yes [x] No [] Manufacturer's Name Type 6" P.S. Slot size 15 from 412 ft. to 428 ft. 6" P.S. Slot size 20 from 428 ft. to 437 ft. 6" P.S. Slot size 35 from 437 ft. to 440 ft.

Gravel packed: Yes [] No [x] Size of gravel: Gravel placed from ft. to ft. Surface seal: Yes [x] No [] To what depth? 91 ft. Material used in seal: CEMENT GROUT Did any strata contain unusable water? Yes [] No [x] Type of water? Depth of strata Method of sealing strata off

(7) PUMP: Manufacturer's Name Type: H.P.

(8) WATER LEVELS: Land-surface elevation above mean sea level 49' ft. Static level 1.8 ft. below top of well Date 2/19/88 Artesian pressure 6.6' below top of well Date Artesian water is controlled by (Cap, valve, etc.)

(9) WELL TESTS: Drawdown is amount water level is lowered below static level ROBINSON & NOBLE Was a pump test made? Yes [] No [x] If yes, by whom? NOBLE Yield: 293 gal./min. with 88.7 ft. drawdown after 6 hrs.

Recovery data (time taken as zero when pump turned off) (water level measured from well top to water level) Table with columns: Time, Water Level, Time, Water Level, Time, Water Level. Data points: (0, 95.3), (5, 21.0), (85, 14.4), (1, 48.8), (10, 18.6), (144, 13.4), (2, 32.5), (30, 16.5), (1324, 8.3)

(10) WELL LOG:

Formation: Describe by color, character, size of material and structure, and show thickness of aquifers and the kind and nature of the material in each stratum penetrated, with at least one entry for each change of formation.

Table with columns: MATERIAL, FROM, TO. Rows include: FILL (0-20.5), BROWN PEATY SILT AND SILTY PEAT (20.5-32), BROWN SILTY FINE SAND, PEAT, WOOD, WITH SOME GRAVEL MINOR WATER (32-40), DARK GRAY SAND AND SILTY SAND SOME GRAVEL MINOR WATER (40-78), GRAY SANDY SILT AND CLAY ABUNDANT SHELLS (78-87), BROWN SILT, SAND AND GRAVEL LOOSE MATRIX (87-123), LAVENDER GRAY SILTY SAND AND SANDY SILT OCCASIONAL WOOD OCCASIONAL MINOR WATER OCCASIONAL GRAVEL (123-303), BROWN GRAY, GREEN GRAY AND GREEN SILTY CLAY SOME WOOD (303-406), GRAY TO GREEN GRAY SILTY FINE TO MEDIUM SAND WOODY WATER BEARING (406-428), GRAY FINE TO COARSE SAND WITH SOME SILT (428-434), GRAY FINE TO COARSE SAND WITH GRAVEL (434-440), GRAY SILT AND CLAY (440-451.3)

PREPARED BY: [Signature] MAR 25 1988 ROBINSON & NOBLE, INC.

Work started 10/8 1987 Completed 2/15 1988

WELL DRILLER'S STATEMENT:

This well was drilled under my jurisdiction and this report is true to the best of my knowledge and belief.

NAME HOKKAIDO DRILLING & DEVELOPING (Person, firm, or corporation) (Type or print)

Address GRAHAM, WA.

[Signed] Billy Dodge (Well Driller) BY MBS

License No. Date 3/22 1988

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 March 25, 1988	APPLICATION NUMBER G1-25204	PERMIT NUMBER G1-25204P	CERTIFICATE NUMBER
---------------------------------	--------------------------------	----------------------------	--------------------

NAME City of Kent Parks & Recreation Department			
ADDRESS (STREET) 220 4th Avenue South	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032

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 WATER TO BE APPROPRIATED

SOURCE Well	TRIBUTARY OF (IF SURFACE WATERS)		
----------------	----------------------------------	--	--

MAXIMUM CUBIC FEET PER SECOND ---	MAXIMUM GALLONS PER MINUTE 293 290	MAXIMUM ACRE-FEET PER YEAR 290
--------------------------------------	---------------------------------------	-----------------------------------

QUANTITY, TYPE OF USE, PERIOD OF USE Irrigation - during irrigation season (145 acres)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
300 feet south and 100 feet west of E $\frac{1}{4}$ corner of Section 22.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE $\frac{1}{4}$ SE $\frac{1}{4}$	SECTION 22	TOWNSHIP N. 22	RANGE, (E. OR W.) W.M. 4E	W.R.I.A. 9	COUNTY King
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RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)
-----	-------	------------------------------------

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Irrigated property which constitutes River Bend Golf Course.

DESCRIPTION OF PROPOSED WORKS

G1-25204

Well 12" x 451', static water level 1.8 feet below top of well, 15 HP pump, 8" delivery line to pond.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE: Started	COMPLETE PROJECT BY THIS DATE: Complete	WATER PUT TO FULL USE BY THIS DATE: February 15, 1991
--	--	--

PROVISIONS

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

This authorization to use public waters of the state is classified as a Publicly Owned Land Permit in accordance with Chapter 90.66 RCW (Initiative Measure No. 59).

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

Water user should understand that quantities recommended and the number of acres to be irrigated may be reduced at the time of issuance of a final water right commensurate with the capacity of the installed system and the number of acres actually irrigated.

Monitoring of static water levels, pumping levels, and discharge (gpm) shall be done on a monthly basis to be submitted to the Northwest Regional Office, Department of Ecology upon request.

A certificate of water right will not be issued until a final investigation is made.

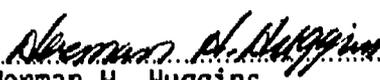
This permit shall be subject to cancellation should the permittee fail to comply with the above development schedule and/or fail to give notice to the Department of Ecology on forms provided by that Department documenting such compliance.

Given under my hand and the seal of this office at Redmond Washington, this...15th..... day of February, 19 90

Department of Ecology

ENGINEERING DATA

OK 

by 
Herman H. Huggins
Section Supervisor
Water Resources

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
March 25, 1988	G1-25204		

NAME			
City of Kent Parks & Recreation Department			
ADDRESS (STREET)	(CITY)	(STATE)	(ZIP CODE)
220 4th Avenue South	Kent	Washington	98032

PUBLIC WATERS TO BE APPROPRIATED

SOURCE
Well
TRIBUTARY OF (IF SURFACE WATERS)

MAXIMUM CUBIC FEET PER SECOND	MAXIMUM GALLONS PER MINUTE	MAXIMUM ACRE-FEET PER YEAR
---	293	290

QUANTITY, TYPE OF USE, PERIOD OF USE
Irrigation - during irrigation season (145 acres)

LOCATION OF DIVERSION/WITHDRAWAL

APPROXIMATE LOCATION OF DIVERSION-WITHDRAWAL
300 feet south and 100 feet west of E $\frac{1}{2}$ corner of Section 22.

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION)	SECTION	TOWNSHIP N.	RANGE, (E. OR W.) W.M.	W.R.I.A.	COUNTY
NE $\frac{1}{4}$ SE $\frac{1}{4}$	22	22	4E	9	King

RECORDED PLATTED PROPERTY

LOT	BLOCK	OF (GIVE NAME OF PLAT OR ADDITION)

LEGAL DESCRIPTION OF PROPERTY ON WHICH WATER IS TO BE USED

Irrigated property which constitutes River Bend Golf Course.

DESCRIPTION OF PROPOSED WORKS

G1-25204

Well 12" x 451', static water level 1.8 feet below top of well, 15 HP pump, 8" delivery line to pond.

DEVELOPMENT SCHEDULE

BEGIN PROJECT BY THIS DATE:	COMPLETE PROJECT BY THIS DATE:	WATER PUT TO FULL USE BY THIS DATE:
Started	Complete	1 year from permit issuance

REPORT

Background:

On March 25, 1988, the City of Kent Parks and Recreation Department submitted this application requesting 300 gallons per minute from a well for irrigation.

Notice was published in the Valley Daily News on May 5 and 12, 1988. No protests were filed on this application.

Investigation:

Evaluation for this application consists of research of office records, visit to the site on August 24, 1989, and conversations with the city parks department staff.

The property is located in Kent between the Kent-DesMoines Road and the Green River. Kent Parks Department has a golf course called River Bend Golf Course that consists of 160 acres. A well on the golf course pumps water into several ponds on the grounds. Water for irrigating is then pumped from the ponds.

The well was drilled in October 1987 to a depth of 451 feet by 12 inches. In February 1989 the consulting firm of Robinson and Noble, Inc. conducted a six hour pump test. The well was pumped at a constant rate of 293 gpm resulting in a total drawdown of 88.7 feet during the test. Recovery to within 8 feet of pre-test water level occurred 1½ hours after pump shut off. Results indicate that after 20 hours the water level was still 2 feet from pre-test water level (6.6 feet from top of the well). The maximum quantity to be considered on this application is 293 gpm.

The applicant has installed a 15 HP pump set at 180 feet down in the well. Using calculations for determining capacity, horsepower, and lift, this well is capable of pumping a maximum of 250 gpm. The applicant will need to provide data as to actual pumping capacity with the installed pump.

Of the 160 acres included in the golf course, only 145 acres are considered for irrigation. The remaining portion is taken up with buildings, parking areas and portions of the land which are not irrigated.

Research of office records indicates no other wells within a quarter mile from the applicant's well.

Allowing a yearly volume two acre feet of water per acre of irrigation would be adequate to meet the irrigation needs in that area and still be within allocation guidelines. The total would amount to 290 acre feet per year.

Conclusion:

In accordance with Section 90.03 and 90.44 RCW, I find that there is water available for appropriation from the source in question and that the appropriation as requested will not impair existing rights or be detrimental to the public welfare. Therefore, permit should issue subject to existing rights and indicated provisions.

Recommendation:

A permit should issue for a reduced quantity of 293 gpm, 290 acre feet per year from a well for irrigation of 145 acres of golf course.

Installation and maintenance of an access port as described in Ground Water Bulletin No. 1 is required. An air line and gauge may be installed in addition to the access port.

This authorization to use public waters of the state is classified as a Publicly Owned Land Permit in accordance with Chapter 90.66 RCW (Initiative Measure No. 59).

An approved measuring device shall be installed and maintained in accordance with RCW 90.03.360, WAC 508-64-020 through WAC 508-64-040 (Installation, operation and maintenance requirements attached hereto).

Water user should understand that quantities recommended and the number of acres to be irrigated may be reduced at the time of issuance of a final water right commensurate with the capacity of the installed system and the number of acres actually irrigated.

Monitoring of static water levels, pumping levels, and discharge (gpm) shall be done on a monthly basis to be submitted to the Northwest Regional Office, Department of Ecology upon request.

A certificate of water right will not be issued until a final investigation is made.

REPORT BY: Janet King DATE: 11.21.89

AFFIDAVIT OF PUBLICATION

Audrey Benner, being first duly sworn on oath states that he/she is the Chief Clerk of the

VALLEY DAILY NEWS

• Kent Edition • Renton Edition • Auburn Edition

Daily newspapers published six (6) times a week. That said newspapers are legal newspapers and are now and have been for more than six months prior to the date of publication referred to, printed and published in the English language continually as daily newspapers in Kent, King County, Washington. The Valley Daily News has been approved as a legal newspaper by order of the Superior Court of the State of Washington for King County.

The notice in the exact form attached, was published in the Kent Edition X, Renton Edition _____, Auburn Edition _____, (and not in supplement form) which was regularly distributed to its subscribers during the below stated period. The annexed notice a _____
Notice of Application

was published on May 5 and 12, 1988 K8085

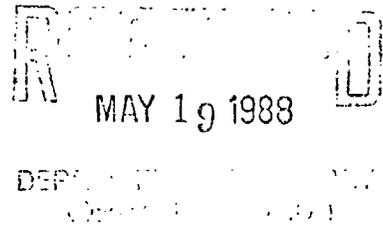
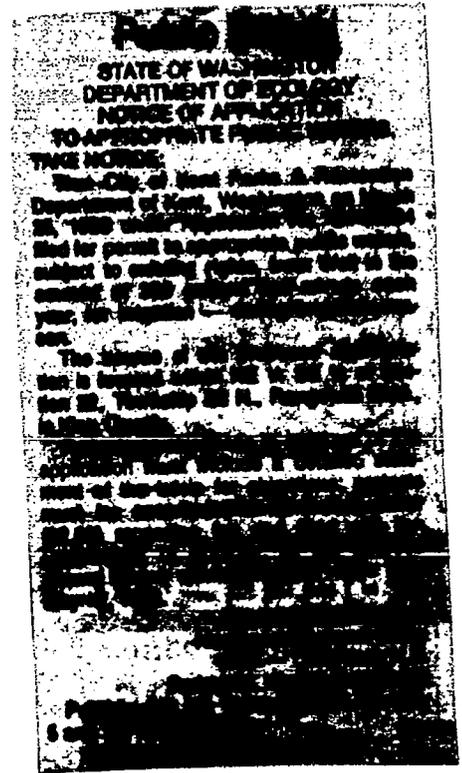
The full amount of the fee charged for said foregoing publication is the sum of \$ 41.79

Audrey Benner

Subscribed and sworn to before me this 12th day of May 19 88

George L. Heath

Notary Public for the State of Washington,
residing at Federal Way,
King County, Washington.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

NOTICE OF APPLICATION TO APPROPRIATE PUBLIC WATERS

TAKE NOTICE:

That CITY OF KENT PARKS & RECREATION DEPARTMENT
of KENT, WASHINGTON on MARCH 25, 1988 under
Application No. G1-25204 filed for permit to appropriate public waters, subject to existing rights,
from WELL
in the amount of 300 GALLONS PER MINUTE
each year, for IRRIGATION - DURING IRRIGATION SEASON

The source of the proposed appropriation is located within NE 1/4 SE 1/4

of Section 22, Township 22 N., Range 4E W.M., in KING 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

Department of Ecology
Northwest Regional Office
4350 - 150th Ave. N. E.
Redmond, Washington 98052

(Last date of publication to be entered above by publisher)

NOTICE



APPLICATION FOR PERMIT
TO APPROPRIATE PUBLIC WATERS OF THE STATE OF WASHINGTON
as required by RCW and find that
a "action".

SURFACE WATER

GROUND WATER categorically exempt.

\$10.00 MINIMUM STATUTORY EXAMINATION FEE REQUIRED WITH APPLICATION m. Kulis
(GRAY BOXES FOR OFFICE USE ONLY) SIGNATURE

APPLICATION NO. G.125204	W.R.I.A. 9	COUNTY King	PRIORITY DATE 3-25-88	TIME	ACCEPTED m
APPLICANT'S NAME CITY OF KENT PARKS & RECREATION DEPT				BUSINESS TEL. 859 3993	HOME TEL.
ADDRESS (STREET) 220 4TH AVE S		(CITY) KENT	(STATE) WA	(ZIP CODE) 98032	
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.) WELL
TRIBUTARY	SIZE AND DEPTH 12" x 440'

2. USE

USE TO WHICH WATER IS TO BE APPLIED (DOMESTIC SUPPLY, IRRIGATION, MINING, MANUFACTURING, ETC.)
IRRIGATION

ENTER QUANTITY OF WATER REQUESTED USING UNITS OF: CUBIC FEET PER SECOND	OR	GALLONS PER MINUTE 300 GPM	ACRE FEET PER YEAR
TIMES DURING YEAR WATER WILL BE REQUIRED IRRIGATION DURING IRIG SEASON			
IRRIGATION SEASON & POND REPLENISHMENT WHEN REQUIRED			

IF IRRIGATION, NUMBER OF ACRES X 160	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
DATE PROJECT WAS OR WILL BE STARTED OCT 1987	DATE PROJECT WAS OR WILL BE COMPLETED JUNE 1989	

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.

2900' S & 100' W OF NE COR OF SEC 22

LOCATED WITHIN (SMALLEST LEGAL SUBDIVISION) NE 1/4 OF SE 1/4	SECTION 22	TOWNSHIP N. 22	RANGE (E. OR W.) W.M. 4E	COUNTY KING
--	----------------------	--------------------------	------------------------------------	-----------------------

N61/4 S61/4

4. DO YOU OWN THE LAND ON WHICH THIS SOURCE IS LOCATED. IF NOT, INSERT NAME & ADDRESS OF OWNER
YES

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.

IRRIGATED PROPERTY WHICH CONSTITUTES RIVER BEND GOLF COURSE

RECEIVED
MAR 25 1988
DEPARTMENT OF ECOLOGY
NORTHWEST REGION

WHAT IS YOUR INTEREST IN THE PROPERTY ON WHICH THE WATER IS TO BE USED (PROPERTY OWNER, LESSEE, CONTRACT PUMP, LEASER, ETC.)

OWN

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.)

NONE KNOWN

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

7. REMARKS

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

x *Barney L. Wilson*
APPLICANT'S SIGNATURE

x *City of Kent*
LEGAL LANDOWNER'S SIGNATURE

220 4th Ave S. 98032
LEGAL LANDOWNER'S ADDRESS

FOR OFFICE USE ONLY

STATE OF WASHINGTON

DEPARTMENT 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

STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

COMPUTER INPUT
 APPLICATION
 PERMIT
 CERTIFICATE
 OTHER

PROGRESS SHEET

SURFACE WATER GROUND WATER

NAME City of Kent Parks & Recreation Department			TELEPHONE NO. 859-3993
ADDRESS 220 4th Ave., S.	(CITY) Kent	(STATE) Washington	(ZIP CODE) 98032
ASSIGNED TO	TELEPHONE NO.	DATE ASSIGNED	
ADDRESS	(CITY)	(STATE)	(ZIP CODE)

APPLICATION NO. C125204	PERMIT NO. G125204P	CERTIFICATION NO. C125204C
DATE AMENDED	DATE CANCELLED	W.R.I.A.

APPLICATION		
DATE APPLICATION RECEIVED March 25, 1988	INITIAL \$10.00 FEE RECEIVED <input checked="" type="checkbox"/> YES <input type="checkbox"/> NO	DATE FEE RECEIVED March 25, 1988
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 4-26-88
PROTESTED BY AND DATE		

DATE AFFIDAVIT RECEIVED 5-19-89	CHECKED BY <i>mw</i>	TIME EXPIRED 6-12-89	DATE AMENDED NOTICE SENT	DATE AFFIDAVIT RECEIVED	TIME EXPIRED
---	-------------------------	--------------------------------	--------------------------	-------------------------	--------------

DEPARTMENT OF GAME AND FISHERIES REPORT		
APPROVED	PROVISO	PROTEST

EXAMINATION					
DATE EXAMINATION MADE 8/89	MADE BY	DATE REPORT OF EXAM. WRITTEN 9-89	WRITTEN BY <i>SK</i>	CHECKED BY	
DATE PERMIT FEE REQUESTED 11-22-89	AMOUNT DUE	DATE RECEIVED 1-2-90	OK FOR PERMIT <i>SK</i>		

PERMIT			
PERMIT APPROVED BY	DATE APPROVED	PERMIT NO. G125204P	DATE ISSUED 2-15-90

BEGINNING OF CONSTRUCTION		
DATE NOTICE SENT	DATE FILED	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	EXTENSION FEE
EXTENDED TO	EXTENDED TO	

PROOF OF APPROPRIATION				
DATE SENT 2-15-90	DATE FILED 3-16-90	EXTENSION FEE	EXTENDED TO	
DATE CERTIFICATE FEE REQUESTED	AMOUNT DUE	DATE RECEIVED 3-16-90	DATE APPROVED FOR CERTIFICATE 4-6-90	APPROVED BY <i>JK</i>

CERTIFICATION		
PROOF EXAM. REQUIRED <input type="checkbox"/> YES <input type="checkbox"/> NO	CERTIFICATE NUMBER C125204C	DATE ISSUED 5-15-90

REMARKS

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APPENDIX I

Water Quality Monitoring Plan/Coliform
Monitoring Plan/Stage 2 DDBP Monitoring
Plan

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WATER QUALITY MONITORING 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. This plan also provides a summary of the existing water system facilities and operation.

EXISTING WATER SYSTEM DESCRIPTION

WATER SYSTEM INFORMATION

The City of Kent (City) is a municipal corporation that owns and operates a public water system within its corporate boundaries. Water system data on file at the Washington State Department of Health (DOH) for the City's system is shown in **Table 1**.

Table 1
Water System Information

Information Type	Description
System Type	Group A - Community - Public Water System
System Name	Kent Water Department
County	King
DOH System ID Number	381501
Owner Number	002950
Address	220 4th Avenue S, Kent, WA 98032
Contact	Mr. Sean Bauer, Water System Manager
Contact Phone Number	(253) 856-5610

WATER SYSTEM OPERATION AND CONTROL

The existing water system is divided into 13 pressure zones, due to the wide range of elevations that are served.

The 240 Zone is the largest pressure zone in the City, serving the lowest elevations in the valley between the East Hill and West Hill. The Kent Springs Transmission Main (KSTM) terminates at the 240 Zone's Guiberson Reservoir, and can provide water to the zone from Kent Springs, the Armstrong Springs Wells, the Seven Oaks Well, and Tacoma. The zone also can be supplied directly with water from the O'Brien Well, the 208th Street/212th Street Wellfield, and the Garrison Creek Well. Pressures in the 240 Zone are established by the Garrison Creek Reservoir and the Guiberson Reservoir. This zone currently serves customers within an elevation range between approximately 20 feet and 135 feet. There are also interties with Tukwila, Auburn, and Renton connected to the 240 Zone.

The 271 Alvord Zone is supplied by one pressure reducing station from the 485 Zone that establishes pressures in the zone. This pressure zone currently serves customers within an elevation range between approximately 60 feet and 170 feet, and is located near the base of the East Hill, just north of Mill Creek, primarily between Alvord Avenue N and Hazel Avenue.

The 308 Hilltop Zone is a very small zone supplied by one pressure reducing station from the 485 Zone that establishes pressures in the zone. This pressure zone currently serves customers within an elevation range of 120 feet and 130 feet. This pressure zone also is located near the base of the East Hill and only provides water to customers along 91st Avenue South.

Water is supplied to the 339 Seattle Zone by one pressure reducing station from the 485 Zone that establishes pressures within the zone. The 339 Seattle Zone is located on a small plateau near the base of East Hill, predominantly between Van De Vanter Avenue to the east and Scenic Way to the west. The zone currently serves customers within an elevation range between approximately 70 feet and 270 feet.

The 366 Stetson Zone is a small pressure zone located on the East Hill; this zone is supplied water by one pressure reducing station from the 485 Zone. The 366 Stetson Zone serves customers on the following four streets: Hazel Avenue N; Valley Place; Stetson Avenue; and Crest Place. This zone currently serves customers within an elevation range between approximately 170 feet and 230 feet.

Water is supplied to the 368 Weiland Zone by one pressure reducing station from the 485 Zone that establishes pressure in this zone. This zone currently serves customers within an elevation range between approximately 110 feet and 210 feet, and is located just north of Mill Creek along Canyon Drive and Weiland Street.

The 416 Zone is a very small zone that consists predominantly of the transmission main from the 416 Zone 6 MG #1 Reservoir to the 240 Zone 6 MG #2 Reservoir. The transmission main follows 98th Avenue S northwards from the 6 MG #1 Reservoir before crossing through several neighborhoods to the northwest until the main intersects S 218th Street, where it heads east to fill the Garrison Creek Reservoir. There are a limited number of customers connected to the transmission main, and the City plans to transfer these customers to other pressure zones in the future. Elevations in this pressure zone range from approximately 80 feet to 380 feet. The Clark Springs Transmission Main (CSTM) terminates at the 6 MG #1 Reservoir, supplying water from Clark Springs, the Armstrong Springs Wells, and the Seven Oaks Well.

The 485 Zone is supplied with water from Pump Station #5 and three pressure reducing stations connected to the 590 Zone. Pressures in this zone are established by the 125K Tank. This zone currently serves customers within an elevation range between approximately 150 feet and 400 feet, and is located between S 218th Street at its northern extent, and East Maple Street to its southern extent.

The 590 Zone is the system's second largest pressure zone and serves the eastern portions of the water system. This zone is supplied water by a direct connection to the Tacoma RWSS at Point of Delivery (POD) #3, the East Hill Well, and Pump Station #5. Pressure is established by the Blue Boy Standpipe, the 3.5 MG Tank, and the 640 Tank. The 640 Tank was constructed to provide storage for a future 640 Pressure Zone but is operated in the 590 Zone until all necessary facilities are constructed for establishment of the 640 Zone. Customers in the 590 Zone are located in an elevation range between approximately 290 feet and 500 feet. The 590 Zone serves customers between SE 225th Place and SE 304th Street.

The 354.5 Zone, the lowest West Hill pressure zone, is supplied water by Pump Station #3. A pressure reducing valve (PRV) at Pump Station #4 also allows the zone to be supplied from the higher elevation zones on the West Hill in a maintenance or emergency situation. The pressure in the 354.5 Zone is established by the Reith Road Standpipe. This zone currently serves customers within an elevation range between approximately 90 feet and 280 feet and is located primarily between Reith Road and Lake Fenwick Road.

Water is supplied to the 529 Zone by Pump Station #4. In an emergency situation, water can be supplied from the 587 Zone through the 42nd Avenue South PRV. Pressure in the zone is established by the Cambridge Tank, located in the southwest corner of the zone. The 529 Zone serves customers within an elevation range between approximately 280 feet and 430 feet and is located in the southwest corner of the system between Military Road South and Lake Fenwick Road South.

The 575 Zone is a small, closed pressure zone that is supplied water from Pump Station #7, which establishes the pressure in this zone. During a fire flow event exceeding the capacity of Pump Station #7, the pump station will shut off and the zone will be supplied through a check valve from the Cambridge Tank, which has an overflow elevation of 529 feet. The check valve is located at Pump Station #7. The 575 Zone is also located in the southwest corner of the City's system between S 268th Street and S 263rd Street. This zone currently serves customers within an elevation range between approximately 410 feet and 450 feet.

The 587 Zone is a closed pressure zone supplied water by Pump Station #6, which establishes the pressure in the zone. Like the 575 Zone, during a fire flow event exceeding the capacity of Pump Station #6, the pump station will shut off and the zone will be supplied from the Cambridge Tank, which has an overflow elevation of 529 feet, via two check valves. One check valve is located at the Pump Station #6 site, and the second is located near the intersection of Military Road South and S 259th Place. Pump Station #8 is also connected to the 587 Pressure Zone. This pump station provides water from the HWD intertie, which is available for emergency supply, fire flow, and maintenance purposes. Pump Station #8 provides the only redundant supply to the West Hill pressure zones, which is otherwise supplied only by Pump Station #3. The 587 Zone is located in the southwest corner of the City's system, between S Reith Road and S 239th Place. This zone provides water to customers located at an elevation between approximately 330 feet and 450 feet.

Pressure Zones

A list of the City's existing pressure zones and their respective 2014 demand is presented in **Table 2**.

Table 2
Pressure Zones

Name	Maximum Hydraulic Elevation	Water Demand Allocation	Estimated Connections	Estimated Population
240 Zone	240 feet	57.4%	8,557	39,985
271 Zone	271 feet	0.2%	33	152
308 Zone	308 feet	0.0%	1	5
339 Zone	339 feet	0.2%	31	145
354.5 Zone	354.5 feet	0.8%	126	589
366 Zone	366 feet	0.0%	7	32
368 Zone	368 feet	0.1%	9	42
416 Zone	416 feet	0.0%	0	0
485 Zone	485 feet	3.5%	517	2,418
529 Zone	529 feet	2.8%	410	1,918
575 Zone	575 feet	0.5%	77	359
587 Zone	587 feet	2.6%	382	1,785
590 Zone	590 feet	31.9%	4,756	22,222
Totals			14,907	69,653

Water Sources

A list of the City's existing water sources is presented in **Table 3**.

Table 3
Water Sources

Facility	Type	Supplies Water To	Year Installed	Use	Existing Capacity (gpm)	Water Treatment	Generator
208th Street/ 212th Street Wellfield	4 wells	240 Zone	1982, 2001	Active	3,500	Chlorination, Fluoridation, Manganese/Iron/Hydrogen Sulfide Removal, pH Adjustment	208th: None 212th: Hookup for portable generator
Armstrong Springs Wells	2 wells	CSTM/ KSTM	1982	Active	1,050	Chlorination, Fluoridation, pH Adjustment	On-site
Clark Springs	Infiltration gallery and collector, 3 wells	CSTM	1957, 1969	Active	5,400	Chlorination, Fluoridation, pH Adjustment	On-site generator partially powers facility
East Hill Well	1 well	590 Zone	1979	Active	1,900	Chlorination, Fluoridation, pH Adjustment	On-site
Garrison Creek Well	1 well	240 Zone	1981	Active	500	Chlorination, Fluoridation	On-site generator for SCADA system only
Kent Springs	Infiltration gallery, 3 wells	KSTM	1908, 1977, 2001	Active	3,680	Chlorination, Fluoridation, pH Adjustment	On-site generator
O'Brien Well	1 well	240 Zone	1951	Active	243	Chlorination, Fluoridation	None on-site, towed generator is used
Seven Oaks Well	1 well	CSTM/ KSTM	1982	Active	350	Chlorination, Fluoridation, pH Adjustment	None
Tacoma RWWS	Intertie	KSTM/ 590 Zone	2005	Active	8,778	Chlorination, Fluoridation, Filtration, Ozone Treatment, pH Adjustment ¹	Site has full backup power

¹ = pH adjustment occurs in Tacoma system and when RWSS water is directed through the KSTM to the Guiberson Reservoir.

Water Storage

A list of the City's existing water storage facilities is presented in **Table 4**.

Table 4
Water Storage Facilities

Reservoir	Approximate Location	Pressure Zone	Year Constructed	Construction Type	Capacity (MG)	Diameter (feet)	Base Elev. (feet)	Overflow Elev. (feet)
6 Million Gallon #2 Reservoir	Garrison Creek Park	240 Zone	1969	Reinforced concrete below grade	6	Variable	212	240
Guiberson Reservoir	E Guiberson St and Kensington Ave S	240 Zone	Late 1930s	Reinforced concrete below grade	3	Variable	222	240
Reith Road Standpipe	Reith Rd S, just north of W Fenwick Park	354.5 Zone	1959	Steel	1.0	66	315.0	354.5
6 Million Gallon #1 Reservoir	98th Ave S and S 239th Pl	416 Zone	1967	Steel	6.0	146	370.0	418.0
125K Tank	98th Ave S and S 239th Pl	485 Zone	1958	Elevated steel	0.125	32	462.0 ¹	485.0
Cambridge Tank	S 264th St and Military Rd S	529 Zone	1959	Elevated steel	0.3	53.33	499.1 ²	529.0
3.5 MG Tank	124th Ave SE and SE 286th Pl	590 Zone	1978	Steel	3.5	74	483.4	592.9
640 Tank	SE 248th St and 124th Ave SE	590 Zone (Future: 640 Zone)	2011	Steel	4.0	75	523.0	595.0 (Future: 645.0)
Blue Boy Standpipe	112th Ave SE and SE 246th Pl	590 Zone	1965	Steel	0.97	42	499.7	593.8

1 = Ground elevation 386.8 feet.

2 = Ground elevation 441 feet.

Pump Stations

A list of the City's existing booster pump stations is presented in **Table 5**.

Table 5
Booster Pump Stations

Pump Station	Suction Pressure Zone	Discharge Pressure Zone	Year Constructed	Existing Pumping Capacity (gpm)	Number of Pumps	Pump Type	Pump Motor Size (HP)	Generator
Pump Station #3	240 Zone	354.5 Zone	1959	1,800	2	Horizontal split case	(2) 50	On-site
Pump Station #4	354.5 Zone	529 Zone	1959	3,800	3	Horizontal split case	(2) 75 (1) 150	On-site
Pump Station #5	416 Zone	485 and 590 Zones	1975	6,350	4	Horizontal split case	(2) 125, (1) 40, (1) 40/125	On-site
Pump Station #6	529 Zone	587 Zone	1984	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator
Pump Station #7	529 Zone	575 Zone	1985	500	2	Horizontal	(2) 10	On-site
Pump Station #8	Highline Water District 560 Zone	587 Zone	1986	1,200	3	Vertical turbine	(3) 20	Has hookup for portable generator

Pressure Reducing, Pressure Sustaining, and Flow Control Stations

A list of the City's existing pressure reducing stations is presented in **Table 6**.

Table 6
Pressure Reducing Stations

Station Name	Upper Pressure Zone	Lower Pressure Zone
218th St PRV	416 Zone	240 Zone
42nd Ave PRV	587 Zone	529 Zone
Pump Station #5 PRV	590 Zone	485 Zone
Alvord PRV	485 Zone	271 Alvord Zone
Hilltop PRV	485 Zone	308 Hilltop Zone
Seattle PRV	485 Zone	339 Seattle
Stetson PRV	485 Zone	366 Stetson Zone
Totem PRV	575 Zone	529 Zone
Weiland PRV	485 Zone	368 Weiland Zone
Woodland Way PRV	590 Zone	485 Zone
234th PRV	590 Zone	485 Zone
Park Orchard PRV	Future 640 Zone	590 Zone
Daniel PRV	Future 640 Zone	590 Zone
Millineum PRV	Future 640 Zone	590 Zone
Pump Station #4 PRV	529 Zone	354.5 Zone
RWSS POD #1 Kent Springs Tacoma Connection PRV	Tacoma RWSS	529 Zone
RWSS POD #3 KSTM Tacoma Connection PRV	Tacoma RWSS	240 Zone
RWSS POD #3 590 Tacoma Connection PRV	Tacoma RWSS	590 Zone

Water Treatment

The City's water system is comprised of multiple treated sources, including a secondary water source from the City of Tacoma. Tacoma Public Utilities is responsible for monitoring and satisfying the water quality requirements of this secondary source. Monitoring indicates that the City's spring sources are not classified as being under the direct influence of surface water. The Kent Springs, Clark Springs, East Hill Well, Seven Oaks Well, and Armstrong Springs Well sources use chlorine gas for disinfection, while the North Kent Wellfield, O'Brien Well, and Garrison Well sources use a 12.5% sodium hypochlorite solution for disinfection. Additionally, the North Kent Wellfield uses a greensand treatment facility to iron and manganese removal. The City fluoridates all its water sources to prevent dental carries, and treats water with sodium hydroxide at the 212th Treatment Plant to adjust pH for corrosion control.

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 surface water purveyors as well as groundwater system monitoring. **Table 7** summarizes the source water quality monitoring requirements through 2025. The table is based on information available at the time that this document was prepared and may change in the future.

Table 7
Monitoring Schedule for 2019 through 2025

When	Monitor	Monitoring Group	Test Method	Upon Violation
2019				
Mar-19	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-19	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-19	S12	IOC and Physical	IOC	Quarterly for 2 Quarters
Jul-19	S07, S10, S12, S16	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Jul-19	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Aug-19	S05	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Aug-19	S07, S10	Manganese	IOC	Quarterly for 2 Quarters
Sep-19	S12	Manganese	IOC	Quarterly for 2 Quarters
Sep-19	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Dec-19	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2020				
Mar-20	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-20	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-20	S16	Manganese	IOC	Quarterly for 2 Quarters
Jul-20	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Sep-20	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Dec-20	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2021				
Mar-21	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Apr-21	S12	Radionuclides	RAD	Quarterly until less than MCL
May-21	S02	Radionuclides	RAD	Quarterly until less than MCL
Jun-21	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-21	S02, S18	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Jul-21	S01, S10, S18	Radionuclides	RAD	Quarterly until less than MCL
Jul-21	S01, S02, S05, S07, S10, S12, S16	Herbicides	VOC - 524.2	Quarterly for 2 Quarters
Jul-21	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Sep-21	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Sep-21	30 Sites in Distribution System	Lead and Copper	LCR	(2) - 6 Mo. Periods
Nov-21	S16	Radionuclides	RAD	Quarterly until less than MCL
Dec-21	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2022				
Mar-22	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-22	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-22	S01	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Jul-22	S05, S07	Radionuclides	RAD	Quarterly until less than MCL
Jul-22	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Aug-22	S07, S10	Manganese	IOC	Quarterly for 2 Quarters
Sep-22	S12	Manganese	IOC	Quarterly for 2 Quarters
Sep-22	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Dec-22	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2023				
2023	All Active Sources	Unregulated Contaminants	UCMR 4	1 per Site per Quarter for 1 Year
Mar-23	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-23	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-23	S16	Manganese	IOC	Quarterly for 2 Quarters
Jul-23	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Sep-23	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Dec-23	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2024				
Mar-24	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
May-24	S05, S07	Radionuclides	RAD	Quarterly until less than MCL
Jun-24	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-24	S07, S10	IOC and Physical	IOC	Quarterly for 2 Quarters
Jul-24	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Sep-24	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Sep-24	30 Sites in Distribution System	Lead and Copper	LCR	(2) - 6 Mo. Periods
Dec-24	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
2025				
Mar-25	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jun-25	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Jul-25	S07, S10, S12, S16	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Jul-25	All Active Sources	Nitrate	NIT	Quarterly for 1 Year
Aug-25	S05	Volatile Organic Chemicals	VOC - 524.2	Quarterly for 2 Quarters
Aug-25	S07, S10	Manganese	IOC	Quarterly for 2 Quarters
Sep-25	S12	Manganese	IOC	Quarterly for 2 Quarters
Sep-25	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter
Dec-25	4 Sites in Distribution System	Stage 2 DBPs	TTHM and HAA5	1 per Site per Quarter

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 2018, the City has a waiver for a 9 year period, during which the City was required to record a single sample at each of its sources. Most sources were sampled in July of 2017, with the exceptions of the Seven Oaks Well and North Kent Wellfield (July 2015) and the O'Brien Well (July 2009). Monitoring for nitrate, asbestos, arsenic, manganese, and iron shall continue be monitored as discussed below.

Monitoring for nitrate shall be accomplished once per year at each source. The repeat monitoring frequency shall be quarterly for at least 1 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 9 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 1998 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 the Seven Oaks Well, North Kent Wellfield, O'Brien Well, and Garrison Creek Well sources. If the secondary MCL is exceeded, quarterly sampling is required for at least two quarters.

Monitoring for iron 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.

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 3 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 3-year compliance period) may be applied for again. The City's sources all currently have a 6-year volatile organic chemical (VOC) waiver and the next VOCs sample should be collected in July 2022 for Kent Springs, June 2021 for Clark Springs and Armstrong Wells 1 and 2, August 2019 for East Hill Well 1, July 2019 for Seven Oaks Well, North Kent Wellfield, O'Brien Well, and Garrison Well 2.

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 3 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 the 2017

through 2019 compliance periods for pesticides and soil fumigants. The next herbicides samples should be collected in July 2021 for all sources except Armstrong Wells 1 and 2, which was last monitored in April of 2018. All sources currently have 9-year waivers for herbicides that expire at the end of 2022.

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 5 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 5 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 5 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 6 years at all sources except Clark Springs, at which it monitors every 3 years. The next gross alpha and radium-228 sampling is required in July 2021 for Kent Springs, North Kent Wellfield, and Armstrong Wells 1 and 2, May 2021 and 2024 for Clark Springs, April 2021 for O'Brien Well, November 2021 for Garrison Well 2, and July 2022 for East Hill Well 1 and Seven Oaks Well. For Edward Springs, and Edward Springs Wells 2, 3 and 1R, gross alpha and radium-228 sampling are required in 2020.

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 80 samples per month from different locations throughout the system, based on estimates of the population served.

Table 8 lists the addresses and schedule of the City’s routine sampling locations, including the upstream and downstream sampling locations in the event that repeat sampling is necessary. A minimum of 80 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 **Appendix I** as part of the City’s Coliform Monitoring Plan.

Table 8
Coliform Monitoring Sampling Locations and Schedule

Route T-1&3	Route T-2&4
1. 12126 SE 284th Street (sample station) 1A: 12005 SE 284th Street 1B: 12025 SE 284th Street	1. 27947 123rd Pl. SE (sample station) 1A: 12132 SE 280th Street 1B: 12301 SE 280th Street
2. 26300 72nd Ave S. (sample station) 2A: 7226 S. 262nd Street 2B: 27402 72nd Avenue S.	2. 10618 Kent Kangley Road (sample station) 2A: 10432 Kent Kangley Road 2B: 10248 S. 256th
3. 10218 SE 244th St. (sample station) 3A: 10206 SE 244th St. 3B: 10316 SE 244th St.	3. 10220 SE 228th Street (sample station) 3A: 10304 SE 228th Street 3B: 10214 SE 228th Street
4. 10220 SE 228th Street (sample station) 4A: 10304 SE 228th Street 4B: 10214 SE 228th Street	4. 7500 S. 259th St. (sample station) 4A: 8407 259th Street 4B: 8501 259th Street
5. 10817 SE 232nd St. (sample station) 5A: 10811 SE 232nd St. 5B: 10825 SE 232nd St.	5. 930 E. James Street (Church - sample station) 5A: 603 Alvord Avenue N. 5B: 615 Hazel Avenue N.
6. 405 Novak Ln. (sample station) 6A: 415 Novak Ln. 6B: 301 Novak Ln.	6. 435 E. Titus St. (sample station) 6A: 700 E. Guiberson Street 6B: 422 E. Titus St.
7. 8200 S. 216th Street (sample station) 7A: 21417 84th Avenue S. 7B: 21237 84th Avenue S.	7. 950 E. Walnut Street (sample station) 7A: 1010 E. Walnut Street 7B: 942 E. Walnut Street
8 7620 S. 190th St. (sample station) 8A: 7620 S. 192nd Street 8B: 7622 S. 188th Street	8. 8426 S. 259th Street (sample station) 8A: 8407 S. 259th Street 8B: 8511 S. 259th Street
9. 5801 S. 212th Street (KOA-sample station) 9A: 6329 S. 212th Street 9B: 22230 Russell Road	9. 905 Lincoln Ave (sample station) 9A: 911 West James Street 9B: 203 Madison Avenue N
10. 6500 S. 231st Street (sample station) 10A: 6510 S. 231st Street 10B: 23000 64th Avenue S.	10. 8401 S. 184th St. (sample station) 10A: 18437 East Valley 10B: 8825 S. 184th Street

Table 8
Coliform Monitoring Sampling Locations and Schedule (Continued)

11. 506 W. Cloudy (sample station) 11A: 521 W. Cloudy 11B: 744 5th Avenue N.	11. 6230 S. 190th Street (sample station) 11A: 6020 S. 190th Street 11B: 6320 S. 190th Street
12. 5821 S. 240th Street (City Shops) 12A: 21861 Russell Road 12B: 21814 Russell Road	12. 21819 46th Pl. S. (sample station) 12A: 21813 46th Pl. S. 12B: 21911 46th Pl. S.
13. 25206 45th Ave S. (sample station) 13A: 25204 45th Ave S. 13B: 25208 45th Ave S.	13. 5821 S. 240th Street (City Shops) 13A: 21861 Russell Road 13B: 21814 Russell Road
14. 3915 S. 248th St. (sample station) 14A: 4221 S. 247th Street 14B: 24815 42nd Avenue S.	14. 26151 Lake Fenwick Rd. (sample station) 14A: 25805 Lake Fenwick Road 14B: 26415 Lake Fenwick Road
15. 3807 Reith Road (Church - sample station) 15A: 3720 S. 257th Street 15B: 26018 36th Pl. S.	15. 26434 Yale Ct. (sample station) 15A: 3606 Hampton Way 15B: 3628 Hampton Way
16. 4714 272nd Street S. (samples station) 16A: 27114 46th Avenue S. 16B: 27012 47th Pl. S.	16. 24410 36th Ave S (sample station - Armory) 16A: 24526 Military Road S. (West Hill Market) 16B: 24320 Military Road S.
17. 327 Alder Ln. (sample station) 17A: 305 Alder Ln. 17B: 1406 Maple Ln.	17. 20415 72nd Ave. S. (sample station) 17A: 20676 72nd Ave. S. (Fire Station #76) 17B: 20424 72nd Ave. S.
18. 27321 111th Pl. (sample station) 18A: 27320 111th Pl. 18B: 27319 111th Pl.	18. 24300 116th Ave. SE (sample station) 18A: 24217 116th Pl. SE 18B: 24523 116th Ave. SE (fire Station #74)
19. 26806 107th Ave SE (sample station) 19A: 26812 107th Ave SE 19B: 10628 SE 268th St.	19. 27804 108th Ave SE (sample station) 19A: 27830 108th Ave SE 19B: 10713 SE 277th St.
20. 25228 116th Ave SE (sample station) 20A: 11606 SE 252nd Pl. 20B: 11528 SE 253rd Pl.	20. 5314 S. 237th Pl. (sample station) 20A: 5310 S. 237th Pl. 20B: 5318 S. 237th Pl.

Table 8
Coliform Monitoring Sampling Locations and Schedule (Continued)

Sample Site and follow-up sample sites	Point of Collection	Pressure Zone	Reservoir Served	Potential Source Locations
1. 12126 SE 284th Street	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
12005 SE 284th Street				
12025 SE 284th Street				
2. 10618 Kent Kangley Road	Sample Station	590 Zone	Blue Boy & 640 Tank	S01, S02, S05, S07, S18, *S19
10432 Kent Kangley Road				
10248 S. 256th				
3. 10218 SE 244th Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10206 SE 244th Street				
10316 SE 244th Street				
4. 10220 SE 228th Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10304 SE 228th Street				
10214 SE 228th Street				
5. 10817 SE 232nd Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10811 SE 232nd Street				
10825 SE 232nd Street				
6. 405 Novak Ln.	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
301 Novak Ln.				
415 Novak Ln.				
7. 8200 S. 216th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
21417 84th Avenue S.				
21237 84th Avenue S.				
8. 7620 S. 190th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
7620 S. 192nd Street				
7622 S. 188th Street				
9. 5801 S. 212th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
6329 S. 212th Street				
22230 Russell Road				
10. 6500 S. 231st Street	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
6510 S. 231st Street				
23000 64th Avenue S.				
11. 506 W. Cloudy	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
521 W. Cloudy				
744 5th Avenue N.				
12. 5821 S. 240th Street (PW Shop Lab)	Sample Tap	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
21861 Russell Road				
21814 Russell Road				
13. 25206 45th Ave S.	Sample Station	354 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
25204 45th Ave S.				
25208 45th Ave S.				
14. 3915 S. 248th Street	Sample Station	587 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
4221 S. 247th Street				
24815 42nd Avenue S.				

Table 8
Coliform Monitoring Sampling Locations and Schedule (Continued)

15. 3807 Reith Road	Sample Station	529 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
3720 S. 257th Street				
26018 36th Pl. S.				
16. 4714 272nd Street S.	Sample Station	529 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
27114 46th Avenue S.				
27012 47th Pl. S.				
17. 327 Alder Lane	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
305 Alder Lane				
1406 Maple Lane				
18. 27321 111th Pl.	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
27320 111th Pl.				
27319 111th Pl.				
19. 930 E. James Street	Sample Station	485 Zone	6 MG #1 & 125K Tank	S01, S02, S07, S18, *S19
603 Alvord Avenue N.				
615 Hazel Avenue N.				
20. 435 E. Titus Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
700 E. Guiberson Street				
422 E. Titus Street				
21. 8426 S. 259th Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
8407 S. 259th Street				
8511 S. 259th Street				
22. 6230 S. 190th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
6020 S. 190th Street				
6320 S. 190th Street				
23. 26300 72nd Avenue S.	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
7226 S. 262nd Street				
27402 72nd Avenue S.				
24. 26434 Yale Court	Sample Station	565 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
3606 Hampton Way				
3628 Hampton Way				
25. 24410 36th Avenue S.	Sample Station	587 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
24526 Military Road S.				
24320 Military Road S.				
26. 950 E. Walnut Street	Sample Station	485 Zone	6 MG #1 & 125K Tank	S01, S02, S05, S07, S18, *S19
1010 E. Walnut Street				
942 E. Walnut Street				

Table 8
Coliform Monitoring Sampling Locations and Schedule (Continued)

27. 20415 72nd Avenue S.	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
20676 72nd Avenue S.				
20424 72nd Avenue S.				
28. 24300 116th Avenue SE.	Sample Station	590 Zone	6 MG #1 & Blue Boy Tank	S01, S02, S05, S07, S18, *S19
24217 116th Pl. SE.				
24523 116th Avenue SE.				
29. 27947 123rd Pl. SE	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
12132 SE 280th Street				
12301 SE 280th Street				
30. 7500 S. 259th Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
8407 259th Street				
8501 259th Street				
31. 905 Lincoln Avenue	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
911 West James Street				
203 Madison Avenue N.				
32. 8401 S. 184th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
18437 East Valley				
8825 S. 184th Street				
33. 21819 46th Pl. S.	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
21813 46th Pl. S.				
21911 46th Pl. S.				
34. 26151 Lake Fenwick Road	Sample Station	354 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
25805 Lake Fenwick Road				
26415 Lake Fenwick Road				
35. 26806 107th Ave SE	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
26812 107th Ave SE				
10628 SE 268th St.				
36. 27804 108th Ave SE	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
27830 108th Ave SE				
10713 SE 277th St.				
37. 25228 116th Ave SE	Sample Station	590 Zone	Blue Boy & 640 Tank	S01, S02, S05, S07, S18, *S19
11606 SE 252nd Pl.				
11528 SE 253rd Pl.				
38. 5314 S. 237th Pl.	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
5310 S. 237th Pl.				
5318 S. 237th Pl.				

Updated 4-2018

*S19 is a surface water source, supplied by Tacoma Water through the Regional Water Supply System (Pipeline #5), but has been added per DOH request. Tacoma's Triggered Source Monitoring Plan is on file with DOH. Under normal operations, Tacoma does not need to be notified in the event Kent has a positive coliform bacteria hit.

Coliform Bacteria Repeat Sampling – In the event that a sample tests positive for coliform, a repeat sample shall be taken at the same location as the suspect sample and two additional samples shall be taken within five service connections upstream and downstream of the suspect sample. The repeat upstream and downstream sample locations are listed in **Table 8**. Each repeat sample must also be tested for the presence of *E. Coli*. These repeat and source samples shall be taken by the end of the next business day after receiving the unsatisfactory results. The City must also conduct an assessment of its water system facilities and operations and fix any sanitary defects. 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 King 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.

Samples collected and submitted for coliform testing shall also be tested for disinfectant residual concentration to ensure the disinfectant residual meets the regulatory requirements and achieves the target levels planned by the City.

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 King 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). Initial monitoring, beginning July 1, 1993, required 20 samples for each 6-month monitoring period for the City's population. After two consecutive 6-month monitoring periods of meeting the lead and copper action levels, ten samples taken during June, July, August, or September were required once per year. After three consecutive years of monitoring and meeting the lead and copper action levels, ten samples taken during June, July, August, or September are required every 3 years. However, the City's population has increased such that the sampling requirement is now 30 samples every 3 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) every 3 months. Based on the City’s water service population, four TTHM and four 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

The City’s responses in the event that *E. coli* is present in the source water or distribution system is included in their Coliform Monitoring Plan, included in **Appendix I**.

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Water Quality Monitoring Schedule

System: KENT WATER DEPARTMENT
Contact: Sean M Bauer

PWS ID: 38150 1
Group: A - Comm

Region: NORTHWEST
County: KING

NOTE: To receive credit for compliance samples, you must fill out laboratory and sample paperwork completely, send your samples to a laboratory accredited by Washington State to conduct the analyses, AND ensure the results are submitted to DOH Office of Drinking Water. There is often a lag time between when you collect your sample, when we credit your system with meeting the monitoring requirement, and when we generate the new monitoring requirement.

Coliform Monitoring Requirements

	Jun 2017	Jul 2017	Aug 2017	Sep 2017	Oct 2017	Nov 2017	Dec 2017	Jan 2018	Feb 2018	Mar 2018	Apr 2018	May 2018
Coliform Monitoring Population	67380	67380	67380	67380	67380	67380	67380	67380	67380	67380	67380	67380
Number of Routine Samples Required	70	70	70	70	70	70	70	70	70	70	70	70

- Collect samples from representative points throughout the distribution system.
- Collect required repeat samples following an unsatisfactory sample. In addition, collect a sample from each operating groundwater source.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring



Water Quality Monitoring Schedule

<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Lead and Copper	30	Jan 2016 - Dec 2018	standard - 3 year	09/16/2015	Sep 2018
Asbestos	0	Jan 2011 - Dec 2019	waiver - 9 year	12/10/1998	
Total Trihalomethane (THM)	4	Jan 2017 - Mar 2017	quarterly	03/07/2017	
Total Trihalomethane (THM)	4	Apr 2017 - Jun 2017	quarterly	03/07/2017	Jun 2017
Total Trihalomethane (THM)	4	Jul 2017 - Sep 2017	quarterly	03/07/2017	Sep 2017
Total Trihalomethane (THM)	4	Oct 2017 - Dec 2017	quarterly	03/07/2017	Dec 2017
Halo-Acetic Acids (HAA5)	4	Jan 2017 - Mar 2017	quarterly	03/07/2017	
Halo-Acetic Acids (HAA5)	4	Apr 2017 - Jun 2017	quarterly	03/07/2017	Jun 2017
Halo-Acetic Acids (HAA5)	4	Jul 2017 - Sep 2017	quarterly	03/07/2017	Sep 2017
Halo-Acetic Acids (HAA5)	4	Oct 2017 - Dec 2017	quarterly	03/07/2017	Dec 2017

Notes on Distribution System Chemical Monitoring

- For *Lead and Copper*:
- Collect samples from the COLD WATER side of a KITCHEN or BATHROOM faucet that is used daily.
 - Before sampling, make sure the water has sat unused in the pipes for at least 6 hours, but no more than 12 hours (e.g. overnight).
 - If you are sampling from a faucet that has hot water, make sure cold water is the last water to run through the faucet before it sits overnight.
 - If your sampling frequency is annual or every 3 years, collect samples between June 1 and September 30.

For *Asbestos*: Collect the sample from one of your routine coliform sampling sites in an area of your distribution system that has asbestos concrete pipe.

For *Disinfection Byproducts (HAA5 and THM)*: Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/11/2016	Jul 2017

Source S01 Kent Springs 1,2,3 Ranney Infiltration Gallery Use - Permanent Susceptibility - Moderate



Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

<i>Source S01</i>	<i>Kent Springs 1,2,3</i>	<i>Raney Infiltration Gallery</i>	<i>Use - Permanent</i>	<i>Susceptibility - Moderate</i>
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<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/11/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	07/11/2016	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015	

<i>Source S02</i>	<i>Clark Springs 1,2,3</i>	<i>Raney Infiltration Gallery</i>	<i>Use - Permanent</i>	<i>Susceptibility - High</i>
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<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/11/2016	Jul 2017
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/11/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/01/2015	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2017 - Dec 2019	standard - 3 year	05/12/2015	May 2018
Radium 228	1	Jan 2017 - Dec 2019	standard - 3 year	05/12/2015	May 2018

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S05	East Hill Well 1	Well	Use - Permanent	Susceptibility - Low
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<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/11/2016	Jul 2017
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/11/2016	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/20/2013	Aug 2019
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/11/2016	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/11/2016	

Source S07	Seven Oaks Well	Well	Use - Seasonal	Susceptibility - Low
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<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/11/2016	Jul 2017
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/06/2015	
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	07/06/2015	Jul 2019
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	08/20/2013	Jul 2019
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004	
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year		
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/11/2016	
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/11/2016	

Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S10	N Kent Wellfield (212th & 208th)	Well Field	Use - Seasonal	Susceptibility - High		
<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>	
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/18/2016	Jul 2017	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/21/2015		
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	07/21/2015	Aug 2019	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	07/27/2009	Jul 2019	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021	
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004		
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year			
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015		
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015		

Source S12	OBrien Well	Well	Use - Seasonal	Susceptibility - Low		
<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>	
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/12/2016	Jul 2017	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/07/2009	Jul 2019	
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	07/12/2016	Sep 2019	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	07/07/2009	Jul 2019	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021	
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	07/14/2004		
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year			
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	04/13/2015		
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	04/13/2015		



Water Quality Monitoring Schedule

Source Monitoring

- Collect 'source' chemical monitoring samples from a tap after all treatment (if any), but before entering the distribution system.
- Washington State grants monitoring waivers for various test panels /analytes. Please note that we may require some monitoring as a condition of some waivers. We have granted complete waivers for dioxin, endothal, glyphosate, diquat, and insecticides.
- Nitrate, arsenic, iron, and other individual inorganics are included as part of a Complete Inorganic (IOC) analysis when it is collected.

Source S16	Garrison Well 2	Well	Use - Seasonal	Susceptibility - Low		
<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>	
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/05/2016	Jul 2017	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/05/2016		
Manganese	1	Jan 2017 - Dec 2019	standard - 3 year	07/05/2016	Jun 2019	
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/23/2009	Jul 2019	
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	07/10/2012	Jul 2021	
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	01/16/2004		
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year			
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	11/09/2015		
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	11/09/2015		

Source S18	Armstrong Wells 1 & 2	Well Field	Use - Permanent	Susceptibility - Moderate		
<u>Test Panel/Analyte</u>	<u># Samples Required</u>	<u>Compliance Period</u>	<u>Frequency</u>	<u>Last Sample Date</u>	<u>Next Sample Due</u>	
Nitrate	1	Jan 2017 - Dec 2017	standard - 1 year	07/11/2016	Jul 2017	
Complete Inorganic (IOC)	1	Jan 2011 - Dec 2019	waiver - 9 year	07/06/2015		
Volatile Organics (VOC)	1	Jan 2014 - Dec 2019	waiver - 6 year	06/01/2015		
Herbicides	1	Jan 2014 - Dec 2022	waiver - 9 year	04/14/2009	Apr 2018	
Pesticides	0	Jan 2017 - Dec 2019	waiver - 3 year	04/14/2009		
Soil Fumigants	0	Jan 2017 - Dec 2019	waiver - 3 year			
Gross Alpha	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015		
Radium 228	1	Jan 2014 - Dec 2019	standard - 6 year	07/06/2015		



Water Quality Monitoring Schedule

Other Information

Other Reporting Schedules	Due Date
Measure chlorine residuals and submit monthly reports if your system uses continuous chlorination:	monthly
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2017
Submit CCR certification form to ODW (Community systems only):	10/01/2017
Submit Water Use Efficiency report online to ODW and to customers (Community and other municipal water systems only):	07/01/2017
Send notices of lead and copper sample results to the customers sampled:	30 days after you receive the laboratory results
Submit Certification of customer notification of lead and copper results to ODW:	90 days after you notify customers

Special Notes

None

Northwest Regional Water Quality Monitoring Contacts

For questions regarding chemical monitoring:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding DBPs:	Steve Hulsman: (253) 395-6777 or Steve.Hulsman@doh.wa.gov
For questions regarding coliform bacteria and microbial issues:	Carol Stuckey or Ingrid Salmon: (253) 395-6775: or carol.stuckey@doh.wa.gov or ingrid.salmon@doh.wa.gov

Additional Notes

The information on this monitoring schedule is valid as of the date in the upper left corner on the first page. However, the information may change with subsequent updates in our water quality monitoring database as we receive new data or revise monitoring schedules. There is often a lag time between when you collect your sample and when we credit your system with meeting the monitoring requirement.

We have not designed this monitoring schedule to display all compliance requirements. The purpose of this schedule is to assist water systems with planning for most water quality monitoring, and to allow systems to compare their records with DOH ODW records. Please be aware that this monitoring schedule does not include constituents that require a special monitoring frequency, such as monitoring affiliated with treatment.

Any inaccuracies on this schedule will not relieve the water system owner and operator of the requirement to comply with applicable regulations.

If you have any questions about your monitoring requirements, please contact the regional office staff listed above.

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City of Kent Revised Coliform Monitoring Plan

SYSTEM INFORMATION

PWSID# 381501

SOURCES:	<u>DOH source #</u>	<u>Source Name</u>
	S01	Kent Springs #1, #2, #3, and infiltration gallery
	S02	Clark Springs #1, #2, #3 and infiltration gallery
	S05	East Hill Well
	S07	Seven Oaks Well
	S10	North Kent Wellfield (212 th & 208 th)
	S12	O'Brien Well
	S16	Garrison Well #2
	S18	Armstrong Springs Well #1 & #2
	S19	Tacoma Water (Second Supply) (Surface Water)

STORAGE: 9 Storage tanks – 23,200,000 gallons

TREATMENT: S01, S02, S05, S07, & S18 utilize gas chlorine for disinfection, sodium fluoride for prevention of dental carries, and sodium hydroxide for corrosion control. S10, S12 & S16 utilize sodium hypochlorite (12.5%) for disinfection. S10 has a greensand treatment facility for the removal of iron and manganese.

PRESSURE ZONES: The City water system is presently divided into five primary pressure zones based on property elevation and Hydraulic Grade Line (HGL). Some of those primary zones have been divided into smaller sub-areas with the use of pressure reducing and boosting facilities to provide better management of the pressure in the zones.

PUMPING STATIONS: Seven pumping stations. Two (PS#6 & PS#7) are booster stations, three (PS#3, PS#4 & PS#5) are pump stations, and two (Highline PS#8 & Renton) are an emergency intertie pump station. Other emergency interties include; Auburn, Tukwila, Soos Creek & KCWD #111.

CONNECTIONS BY PRESSURE ZONE:

529 Pressure Zone (West Hill)	1,865
354 Pressure Zone (Lower West Hill)	291
240 Pressure Zone (Valley Floor)	4,305
485 Pressure Zone (Lower East Hill)	1,604
590 Pressure Zone (East Hill)	<u>6,661</u>
Total Connections:	15,115

POPULATION SERVED: Approximately 71,728

SAMPLING INFORMATION

ROUTINE SAMPLING REQUIRED BY REGULATION: 80 samples per month

To adequately cover each pressure zone, reservoir, and source distribution, 80 routine samples are collected each month. Currently, samples are collected and analyzed by AmTest, Inc. Laboratories, Kirkland, Washington. Bacteriological samples are collected the first four Tuesdays of every month.

ROUTINE & REPEAT SAMPLE SITE ADDRESSES: *See attached spreadsheet & map*

- Repeat sample sites are available upstream & downstream of all routine sample sites.
- All water storage tanks can be sampled as necessary.
- All sources can be sampled directly as necessary.

UNSATISFACTORY SAMPLE INVESTIGATION

Because the City collects two or more routine samples per month, follow-up sampling requirements are THREE REPEAT samples in the event of an unsatisfactory sample. Samples are required from the following location:

1. The same tap as the original unsatisfactory routine sample
2. An active service within five active connections upstream from where the original Unsatisfactory sample was taken.
3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

In addition, the City will collect a sample from the reservoir, booster station or intertie that influences the area of the original unsatisfactory sample. In conjunction with the City's Ground Water Rule Plan, source water samples will be collected at all on-line sources that influence the area of the unsatisfactory sample, and will be sampled for E. coli.

WATER SYSTEM ASSESSMENTS

LEVEL 1 ASSESSMENT

A level 1 Assessment will be conducted by a qualified knowledgeable person if a level 1 treatment technique trigger occurs. The RTCR requires a Level 1 assessment when one of these treatment technique triggers occurs:

- The City water system has coliform-positive results in more than 5 percent of the routine and repeat samples that were collected during the month.
- The City water system fails to collect three repeat samples for every total coliform-positive routine sample.

LEVEL 2 ASSESSMENT

A Level 2 assessment is a more complex assessment that only a person with state-required qualifications, such as an engineer, certified operator (WDM2 or higher), or state or local health staff can do. While state and local health staff are qualified to do Level 2 assessments, their availability may be limited to *E. coli* events. RTCR requires a Level 2 assessment when one of these treatment technique triggers occurs:

- A water system has a second Level 1 treatment technique trigger within a rolling 12-month period.
- The City water system has an *E. coli* MCL violation. There are four ways a water system can have an *E. coli* MCL:

1. A total coliform-positive repeat sample follows an *E. coli* positive routine sample.

2. An *E. coli* positive repeat sample follows a total coliform-positive routine sample.

3. The lab fails to test a total coliform-positive repeat sample for *E. coli*.

4. The City water system fails to take three repeat samples following an *E. coli* positive routine sample.

If the City water system has an *E. coli* MCL, the water users must be notified within 24 hours.

PLAN PREPARATION INFORMATION

Prepared by **Tom Cunningham, Water Quality Technician, (253)856-5616**

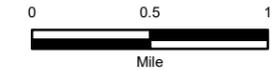
Prepared on: March 31st, 2016, reviewed annually, updated as necessary

Latest revision: April 10th, 2018

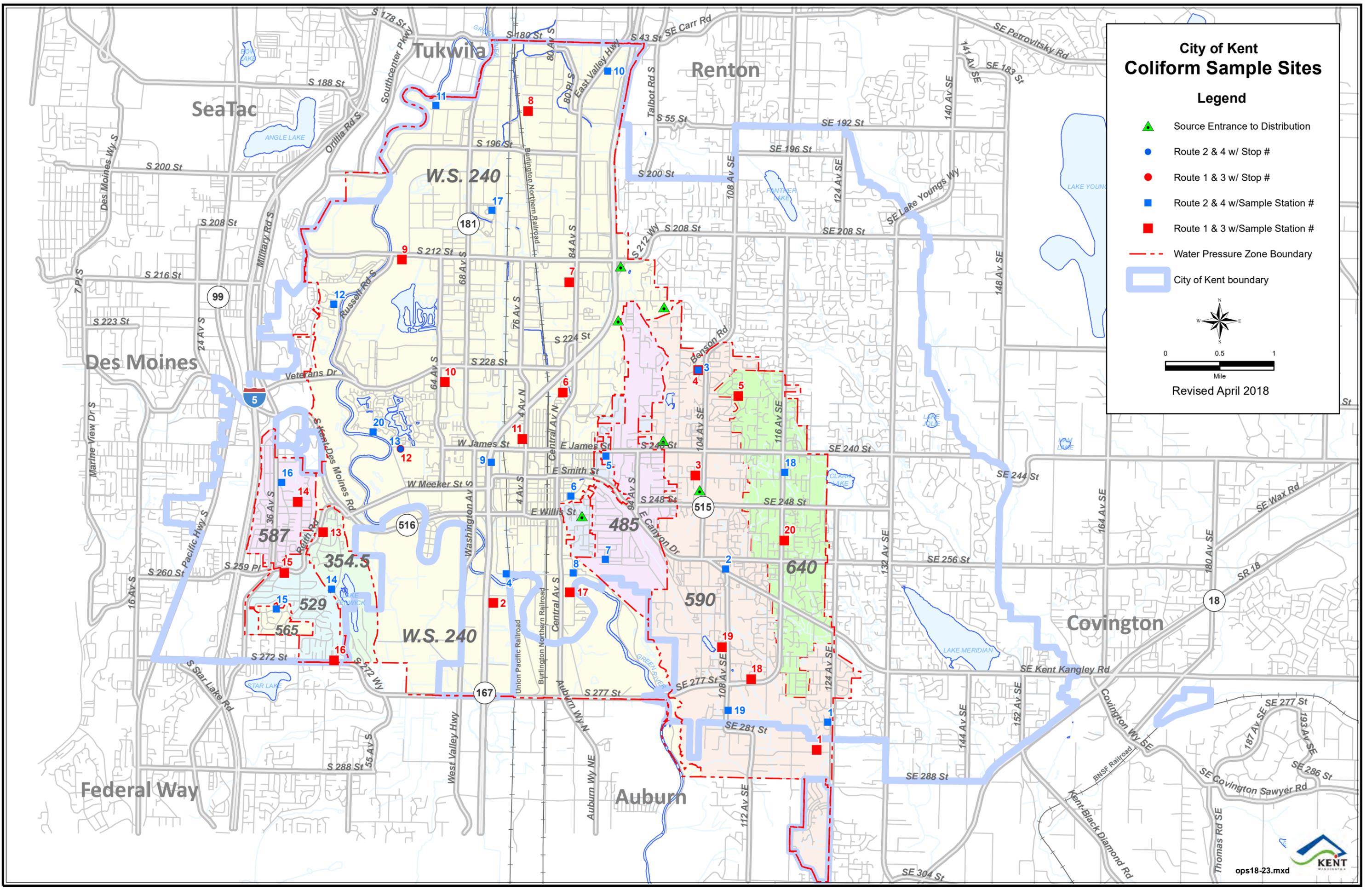
City of Kent Coliform Sample Sites

Legend

-  Source Entrance to Distribution
-  Route 2 & 4 w/ Stop #
-  Route 1 & 3 w/ Stop #
-  Route 2 & 4 w/Sample Station #
-  Route 1 & 3 w/Sample Station #
-  Water Pressure Zone Boundary
-  City of Kent boundary



Revised April 2018



CITY OF KENT

Coliform Monitoring Plan

Includes Provisions of GWR and RTCR

October 16, 2009

Revised: October 20th 2016



Prepared by Tom Cunningham, Water Quality Technician

City of Kent Revised Coliform Monitoring Plan

SYSTEM INFORMATION

PWSID# 381501

SOURCES:	<u>DOH source #</u>	<u>Source Name</u>
	S01	Kent Springs #1, #2, #3, and infiltration gallery
	S02	Clark Springs #1, #2, #3 and infiltration gallery
	S05	East Hill Well
	S07	Seven Oaks Well
	S10	North Kent Wellfield (212 th & 208 th)
	S12	O'Brien Well
	S16	Garrison Well #2
	S18	Armstrong Springs Well #1 & #2
	S19	Tacoma Water (Second Supply)(Surface Water)

STORAGE: 9 Storage tanks – 23,200,000 gallons

TREATMENT: S01, S02, S05, S07, & S18 utilize gas chlorine for disinfection, sodium fluoride for prevention of dental carries, and sodium hydroxide for corrosion control. S10, S12 & S16 utilize sodium hypochlorite (12.5%) for disinfection. S10 has a greensand treatment facility for the removal of iron and manganese.

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CONNECTIONS BY PRESSURE ZONE:

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354 Pressure Zone (Lower West Hill)	291
240 Pressure Zone (Valley Floor)	4,305
485 Pressure Zone (Lower East Hill)	1,604
590 Pressure Zone (East Hill)	<u>6,661</u>
Total Connections:	14,726

POPULATION SERVED: Approximately 67,151

SAMPLING INFORMATION

ROUTINE SAMPLING REQUIRED BY REGULATION: 70 samples per month

To adequately cover each pressure zone, reservoir, and source distribution, 72 routine samples are collected each month. Currently, samples are collected and analyzed by AmTest, Inc. Laboratories, Kirkland, Washington. Bacteriological samples are collected the first four Tuesdays of every month.

ROUTINE & REPEAT SAMPLE SITE ADDRESSES: *See attached spreadsheet & map*

- Repeat sample sites are available upstream & downstream of all routine sample sites.
- All water storage tanks can be sampled as necessary.
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UNSATISFACTORY SAMPLE INVESTIGATION

Because the City collects two or more routine samples per month, follow-up sampling requirements are THREE REPEAT samples in the event of an unsatisfactory sample. Samples are required from the following location:

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3. An active service within five active connections downstream from where the original unsatisfactory sample was taken.

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- The City water system has coliform-positive results in more than 5 percent of the routine and repeat samples that were collected during the month.
- The City water system fails to collect three repeat samples for every total coliform-positive routine sample.

LEVEL 2 ASSESSMENT

A Level 2 assessment is a more complex assessment that only a person with state-required qualifications, such as an engineer, certified operator (WDM2 or higher), or state or local health staff can do. While state and local health staff are qualified to do Level 2 assessments, their availability may be limited to *E. coli* events. RTCR requires a Level 2 assessment when one of these treatment technique triggers occurs:

- A water system has a second Level 1 treatment technique trigger within a rolling 12-month period.
- The City water system has an *E. coli* MCL violation. There are four ways a water system can have an *E. coli* MCL:

1. A total coliform-positive repeat sample follows an *E. coli* positive routine sample.

2. An *E. coli* positive repeat sample follows a total coliform-positive routine sample.

3. The lab fails to test a total coliform-positive repeat sample for *E. coli*.

4. The City water system fails to take three repeat samples following an *E. coli* positive routine sample.

If the City water system has an *E. coli* MCL, the water users must be notified within 24 hours.

PLAN PREPARATION INFORMATION

Prepared by **Tom Cunningham, Water Quality Technician, (253)856-5616**

Prepared on: March 31st, 2016, reviewed annually, updated as necessary

Latest revision: October 12th, 2016

Coliform Sample Site Location & GWR Representative Triggered Monitoring Plan

Sample Site and follow-up sample sites	Point of Collection	Pressure Zone	Reservoir Served	Potential Source
1. 12126 SE 284th Street	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
12005 SE 284th Street				
12025 SE 284th Street				
2. 10618 Kent Kangley Road	Sample Station	590 Zone	Blue Boy & 640 Tank	S01, S02, S05, S07, S18, *S19
10432 Kent Kangley Road				
10248 S. 256th				
3. 10218 SE 244th Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10206 SE 244th Street				
10316 SE 244th Street				
4. 10220 SE 228th Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10304 SE 228th Street				
10214 SE 228th Street				
5. 10817 SE 232nd Street	Sample Station	590 Zone	Blue Boy Tank & 6 MG #1	S01, S02, S05, S07, S18, *S19
10811 SE 232nd Street				
10825 SE 232nd Street				
6. 405 Novak Ln.	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
301 Novak Ln.				
415 Novak Ln.				
7. 8200 S. 216th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
21417 84th Avenue S.				
21237 84th Avenue S.				
8. 7620 S. 190th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
7620 S. 192nd Street				
7622 S. 188th Street				
9. 5801 S. 212th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
6329 S. 212th Street				
22230 Russell Road				
10. 6500 S. 231st Street	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
6510 S. 231st Street				
23000 64th Avenue S.				
11. 506 W. Cloudy	Sample Station	240 Zone	Guiberson Reservoir & 6 MG #2	S01, S02, S07, S10, S12, S16, S18, *S19
521 W. Cloudy				
744 5th Avenue N.				
12. 5821 S. 240th Street (PW Shop Lab)	Sample Tap	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
21861 Russell Road				
21814 Russell Road				
13. 25206 45th Ave S.	Sample Station	354 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
25204 45th Ave S.				
25208 45th Ave S.				
14. 3915 S. 248th Street	Sample Station	587 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
4221 S. 247th Street				
24815 42nd Avenue S.				

15. 3807 Reith Road	Sample Station	529 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
3720 S. 257th Street				
26018 36th Pl. S.				
16. 4714 272nd Street S.	Sample Station	529 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
27114 46th Avenue S.				
27012 47th Pl. S.				
17. 327 Alder Lane	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
305 Alder Lane				
1406 Maple Lane				
18. 27321 111th Pl.	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
27320 111th Pl.				
27319 111th Pl.				
19. 930 E. James Street	Sample Station	485 Zone	6 MG #1 & 125K Tank	S01, S02, S07, S18, *S19
603 Alvord Avenue N.				
615 Hazel Avenue N.				
20. 435 E. Titus Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
700 E. Guiberson Street				
422 E. Titus Street				
21. 8426 S. 259th Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
8407 S. 259th Street				
8511 S. 259th Street				
22. 6230 S. 190th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
6020 S. 190th Street				
6320 S. 190th Street				
23. 26300 72nd Avenue S.	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
7226 S. 262nd Street				
27402 72nd Avenue S.				
24. 26434 Yale Court	Sample Station	565 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
3606 Hampton Way				
3628 Hampton Way				
25. 24410 36th Avenue S.	Sample Station	587 Zone	Cambridge Tank	S01, S02, S07, S18, *S19
24526 Military Road S.				
24320 Military Road S.				
26. 950 E. Walnut Street	Sample Station	485 Zone	6 MG #1 & 125K Tank	S01, S02, S05, S07, S18, *S19
1010 E. Walnut Street				
942 E. Walnut Street				
27. 20415 72nd Avenue S.	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
20676 72nd Avenue S.				
20424 72nd Avenue S.				
28. 24300 116th Avenue SE.	Sample Station	590 Zone	6 MG #1 & Blue Boy Tank	S01, S02, S05, S07, S18, *S19
24217 116th Pl. SE.				
24523 116th Avenue SE.				
29. 27947 123rd Pl. SE	Sample Station	590 Zone	3.5 MG Tank & 640 Tank	S01, S02, S05, S07, S18, *S19
12132 SE 280th Street				
12301 SE 280th Street				

30. 7500 S. 259th Street	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
8407 259th Street				
8501 259th Street				
31. 905 Lincoln Avenue	Sample Station	240 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
911 West James Street				
203 Madison Avenue N.				
32. 8401 S. 184th Street	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
18437 East Valley				
8825 S. 184th Street				
33. 21819 46th Pl. S.	Sample Station	240 Zone	6 MG #2 Reservoir	S01, S02, S07, S10, S12, S16, S18, *S19
21813 46th Pl. S.				
21911 46th Pl. S.				
34. 26151 Lake Fenwick Road	Sample Station	354 Zone	Guiberson Reservoir	S01, S02, S07, S18, *S19
25805 Lake Fenwick Road				
26415 Lake Fenwick Road				
35. Intentionally Left Blank				
36. Intentionally Left Blank				

Updated 1-2014

*S19 is a surface water source, supplied by Tacoma Water through the Regional Water Supply System (Pipeline #5), but has been added per DOH request. Tacoma's Triggered Source Monitoring Plan is on file with DOH. Under normal operations, Tacoma does not need to be notified in the event Kent has a positive coliform bacteria hit.

ROUTINE COLIFORM MONITORING ROUTES

Route T-1&3	Route T-2&4
1. 12126 SE 284th Street (sample station) 1A: 12005 SE 284th Street 1B: 12025 SE 284th Street	1. 27947 123rd Pl. SE (sample station) 1A: 12132 SE 280th Street 1B: 12301 SE 280th Street
2. 26300 72nd Ave S. (sample station) 2A: 7226 S. 262nd Street 2B: 27402 72nd Avenue S.	2. 10618 Kent Kangley Road (sample station) 2A: 10432 Kent Kangley Road 2B: 10248 S. 256th
3. 10218 SE 244th St. (sample station) 3A: 10206 SE 244th St. 3B: 10316 SE 244th St.	3. 10220 SE 228th Street (sample station) 3A: 10304 SE 228th Street 3B: 10214 SE 228th Street
4. 10220 SE 228th Street (sample station) 4A: 10304 SE 228th Street 4B: 10214 SE 228th Street	4. 7500 S. 259th St. (sample station) 4A: 8407 259th Street 4B: 8501 259th Street
5. 10817 SE 232nd St. (sample station) 5A: 10811 SE 232nd St. 5B: 10825 SE 232nd St.	5. 930 E. James Street (Church - sample station) 5A: 603 Alvord Avenue N. 5B: 615 Hazel Avenue N.
6. 405 Novak Ln. (sample station) 6A: 415 Novak Ln. 6B: 301 Novak Ln.	6. 435 E. Titus St. (sample station) 6A: 700 E. Guiberson Street 6B: 422 E. Titus St.
7. 8200 S. 216th Street (sample station) 7A: 21417 84th Avenue S. 7B: 21237 84th Avenue S.	7. 950 E. Walnut Street (sample station) 7A: 1010 E. Walnut Street 7B: 942 E. Walnut Street
8. 7620 S. 190th St. (sample station) 8A: 7620 S. 192nd Street 8B: 7622 S. 188th Street	8. 8426 S. 259th Street (sample station) 8A: 8407 S. 259th Street 8B: 8511 S. 259th Street
9. 5801 S. 212th Street (KOA-sample station) 9A: 6329 S. 212th Street 9B: 22230 Russell Road	9. 905 Lincoln Ave (sample station) 9A: 911 West James Street 9B: 203 Madison Avenue N
10. 6500 S. 231st Street (sample station) 10A: 6510 S. 231st Street 10B: 23000 64th Avenue S.	10. 8401 S. 184th St. (sample station) 10A: 18437 East Valley 10B: 8825 S. 184th Street
11. 506 W. Cloudy (sample station) 11A: 521 W. Cloudy 11B: 744 5th Avenue N.	11. 6230 S. 190th Street (sample station) 11A: 6020 S. 190th Street 11B: 6320 S. 190th Street
12. 5821 S. 240th Street (City Shops) 12A: 21861 Russell Road 12B: 21814 Russell Road	12. 21819 46th Pl. S. (sample station) 12A: 21813 46th Pl. S. 12B: 21911 46th Pl. S.
13. 25206 45th Ave S. (sample station) 13A: 25204 45th Ave S. 13B: 25208 45th Ave S.	13. 5821 S. 240th Street (City Shops) 13A: 21861 Russell Road 13B: 21814 Russell Road
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15. 3807 Reith Road (Church - sample station) 15A: 3720 S. 257th Street 15B: 26018 36th Pl. S.	15. 26434 Yale Ct. (sample station) 15A: 3606 Hampton Way 15B: 3628 Hampton Way
16. 4714 272nd Street S. (samples station) 16A: 27114 46th Avenue S. 16B: 27012 47th Pl. S.	16. 24410 36th Ave S (sample station - Armory) 16A: 24526 Military Road S. (West Hill Market) 16B: 24320 Military Road S.
17. 327 Alder Ln. (sample station) 17A: 305 Alder Ln. 17B: 1406 Maple Ln.	17. 20415 72nd Ave. S. (sample station) 17A: 20676 72nd Ave. S. (Fire Station #76) 17B: 20424 72nd Ave. S.
18. 27321 111th Pl. (sample station) 18A: 27320 111th Pl. 18B: 27319 111th Pl.	18. 24300 116th Ave. SE (sample station) 18A: 24217 116th Pl. SE 18B: 24523 116th Ave. SE (fire Station #74)

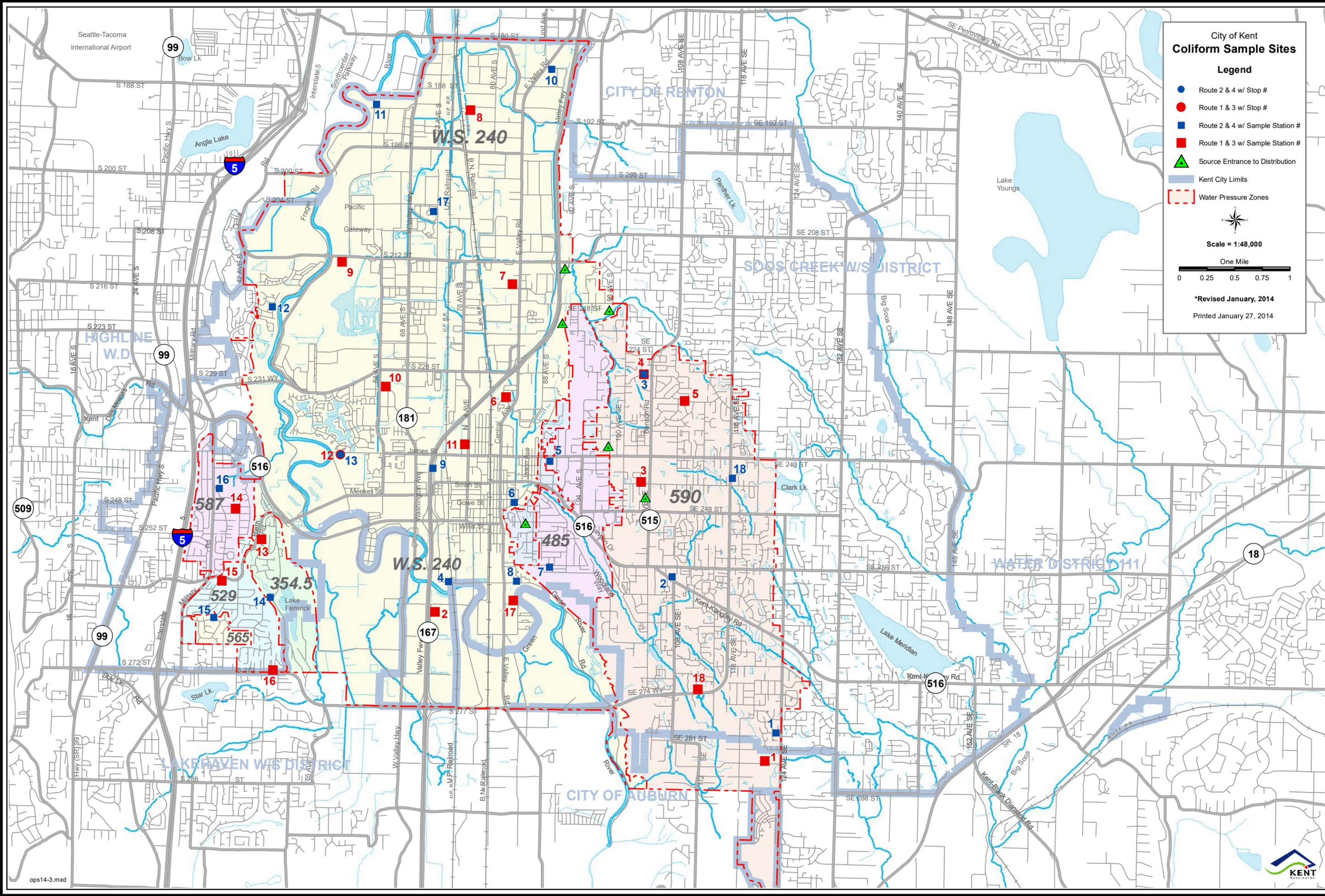
**City of Kent
Coliform Sample Sites**

Legend

- Route 2 & 4 w/ Stop #
- Route 1 & 3 w/ Stop #
- Route 2 & 4 w/ Sample Station #
- Route 1 & 3 w/ Sample Station #
- ▲ Source Entrance to Distribution
- Kent City Limits
- Water Pressure Zones


 Scale = 1:48,000
 One Mile
 0 0.25 0.5 0.75 1

*Revised January, 2014
 Printed January 27, 2014



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City of Kent Water Department Contact Information

*Sean Bauer Water System Manager	Desk# Cell# Home#	(253) 856-5610 (253) 740-7089 (253) 347-8143	*First contact attempt should be made to Sean Bauer
Kevin Swinford Source and Supply Supervisor	Desk# Cell# Home#	(253) 856-5613 (253) 740-6590 (253) 740-6590	
Tom Cunningham Water Quality Technician	Desk# Cell# Home#	(253) 856-5616 (253) 740-8090 (253) 273-7339	
Randy Pulkrabek Water Quality	Desk# Cell# Home#	(253) 856-5623 (253) 266-6179 (253) 862-6558	
Brandon Wallace Water Quality	Desk# Cell# Home#	(253) 856-5623 (253) 740-0980 (253) 820-7091	
Dave Brock Operations Manager Deputy Director	Desk# Cell# Home#	(253) 856-5658 (253) 740-3855 (253) 631-4205	
Paul Johnson Water Dist. Supervisor	Desk# Cell# Home#	(253) 856-5615 (253) 740-2003 (253) 863-3423	
Steve Reynolds Water Dist. Supervisor	Desk# Cell# Home#	(253) 856-5618 (253) 740-7106 (360) 897-9369	

Am Test Laboratory Aaron Young, Lab Manager	Main# Cell# Home#	(425) 885-1664 (425) 358-7995 (206) 387-8722
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13600 NE 126th Pl., Suite C
Kirkland, WA 98034



[Home](#) > [Community and Environment](#) > [Drinking Water](#) > [Offices and Staff](#) > [Northwest Regional Office Staff](#)

Northwest Regional Office Staff

Physical Address:

Northwest Drinking Water Operations
20425 72nd Ave. South, Building 2, Suite 310
Kent, WA 98032-2358

[Map with driving directions](#)

Main Phone: 253-395-6750
FAX: 253-395-6760
TDD Relay Service: 1-800-833-6388

Information and Technical Assistance

Our office is open Monday through Friday from 8 a.m. to 5 p.m. Please direct all general inquiries to our main line at 253-395-6750. Staff are available to assist with most questions immediately. As necessary, other questions will be referred to the appropriate staff for response.

The Northwest Regional Office regulates and provides technical assistance to over 2156 Group A public water systems serving approximately 4,458,373 people in the following counties:

- Island
- San Juan
- Whatcom
- King
- Skagit
- Pierce
- Snohomish



Robert James, Regional Manager, 253-395-6768

Supervises the Northwest Regional Office. Supervises the Program Staff.

Vacant, Assistant Regional Manager, 253-395-6763

Manages Planning and Engineering Staff, Ground Water Under the Influence.

Cynthia Blackwell, Office Manager, 253-395-6753

Supervises the Regional Administrative Staff . Manages office records and public disclosure.

Engineers:

Regional Engineers are responsible for the implementation of the state's drinking water program in assigned counties. They conduct sanitary surveys and special purpose investigations of public water systems and promote needed water facility improvements. They are the lead reviewer of specifications for system improvements and provide technical assistance to purveyors and local health departments upon request.

<u>Laura McLaughlin</u>	Whatcom County	253-395-6761
<u>Steve Deem, P.E.</u>	Seattle Public Utilities	253-395-6767
<u>Brietta Carter, P.E.</u>	King County (except Seattle Public Utilities)	253-395-6770
<u>Jolyn Leslie, P.E.</u>	San Juan County Specialty: Disinfection – Surface Water, Disinfection, and Disinfection By Product	253-395-6762
<u>Erika Lindsey, P.E.</u>	Snohomish, Skagit Counties	253-395-6766
<u>John Ryding, P.E.</u>	Pierce County	253-395-6757
<u>Denis Mehinagic</u>	Island County Specialty: State Revolving Loan Fund Assistance (SRF)	253-395-6764

Planners:

Regional Planners are responsible for the implementation of the state's drinking water planning program in assigned counties. They are the lead reviewer of Water System Plans, Small Water System Management Program Plans, Water System Consolidations, Water Use Efficiency, Funding, and they provide technical assistance to purveyors and local health departments upon request.

<u>Richard Rodriguez</u>	King, San Juan, Snohomish, and Whatcom Counties	253-395-6771
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<u>Jennifer Kropack</u>	Island, Pierce and Skagit Counties	253-395-6769
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Program staff:

Provide the day-to-day contact for the implementation of the state's drinking water program requirements and compliance, and provide technical assistance to purveyors and local health departments upon request.

<u>Carol Stuckey</u> <u>Ingrid Salmon</u>	Coliform Water Quality Monitoring Program <ul style="list-style-type: none"> • Coliform sampling results, requirements, and compliance • Coliform and E.coli technical assistance • Boil water/health advisories • Total coliform rule 	253-395-6775
<u>Steve Hulsman</u>	Chemical Water Quality Monitoring Program <ul style="list-style-type: none"> • Nitrate, arsenic, inorganic chemicals, volatile organic chemicals, synthetic organic chemicals and radionuclides, asbestos, and lead & copper • Susceptibility assessment, pesticide vulnerability determinations, and waivers for organic and inorganic chemical monitoring • Water Quality Monitoring Schedules • Consumer Confidence Reports • Groundwater under the influence 	253-395-6777

<u>Aniela Sidorska</u>	Compliance Program <ul style="list-style-type: none"> • Compliance strategies & enforcement • Operating permits 	253-395-6751
<u>Brian Boye</u>	Sanitary Survey Program <ul style="list-style-type: none"> • Well-site inspections • Technical investigations • Complaint tracking and follow-up 	253-395-6778
<u>Krista Chavez</u>	Water Treatment Program <ul style="list-style-type: none"> • Treatment reports • Source assessment monitoring • Small system Cross-Connection Control 	253-395-6772

Administrative staff:

<u>Mary Rucksdashel</u>	<ul style="list-style-type: none"> • Customer assistance • Public disclosure • Invoices: project review/approval, surveys • Complaints • Consumer Confidence Report • Publication requests • Monthly treatment reports 	253-395-6756
<u>Sonia Raines</u>		253-395-6752

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RTCR Level 1 Assessment Guidance Template

331-569, March 2016

Send your
assessment to:

Eastern Region	16201 East Indiana Avenue, Suite 1500 Spokane Valley, WA 99216	Phone: 509.329.2100 Fax: 509.329.2104 Email: mark.steward@doh.wa.gov
Northwest Region	20425 72nd Ave. South, Suite 310 Kent, WA 98032-2358	Phone: 253.395.6750 Fax: 253.395.6760 Email: dw.nwro@doh.wa.gov
Southwest Region	PO Box 47823 Olympia, WA 98504-7823	Phone: 360-236-3030 Fax: 360-664-8058 Email: swro.coli@doh.wa.gov

Water System Name:	County:	Water System ID #:
Operator in Responsible Charge (ORC):	ORC Phone:	Water System Mailing Address:
ORC Address, City, State:		
Assessor Name:		
Assessor Address, City, State, Zip:		
Date(s) Assessment Completed:		

Your water system exceeded a treatment technique trigger for the Revised Total Coliform Rule. Assess the water system's condition and operation using this *Level 1 Assessment Template* as a guide.

Part A: Respond to each item below. Identify corrective actions taken to address the issue(s) found.

Part B: Summarize your findings and include an action plan with timetable for corrective actions not yet taken.

For parts A and B, include additional information (photos or other documentation) as needed to depict assessment findings and corrective actions that have been completed. All assessment elements listed in this template must be addressed in your assessment. Systems with multiple facilities such as wells or storage tanks may need to provide additional pages.

Within 30 days of learning of the treatment technique trigger, submit completed assessment documentation to [your regional office](#) and keep a copy in your water system files.

Part A: Assessment		Corrective action needed?	Corrective action(s) taken & date taken
1. Site and Sampling Protocol			
1a. Do you have a written coliform monitoring plan & sampling procedure that ensures samples are representative of the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1b. Have there been any changes in sampling conditions or procedures that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1c. Inspect the sampling sites:			
- Are the sampling locations free of potential sources of contamination?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- Are the sampling taps in good condition?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
- Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken	
2. Distribution 2a. Do you have procedures in place to ensure proper maintenance of the distribution system, including: <ul style="list-style-type: none"> - Appropriate pipe replacement and repair procedures - Replacement and repair of other distribution system components - Regular flushing program - Routine vault inspections - Fully implemented cross connection control program - Maintain positive pressure in all parts of the distribution system 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
2b. Has there been any recently reported low pressure (<20 PSI) or complete loss of pressure in the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2c. Have there been any changes in distribution conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2d. Inspect the distribution system: <ul style="list-style-type: none"> - Are there any visible line breaks or leaks? - Are there any observed unprotected cross connections? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Storage Facilities 3a. Does your water system have a water storage tank? <i>If no, skip to Section 4.</i>	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3b. Do you have procedures in place for periodic inspection and maintenance of the exterior and interior of each storage facility?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3c. Have there been any changes in storage conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3d. Inspect the storage facilities: <ul style="list-style-type: none"> - Does the tank have any cracks or other openings? - Is the reservoir roof free of any unprotected openings? - Is the access hatch constructed and sealed to keep contaminants out? - If there is an air vent on the storage tank, is it constructed to prevent the entry of contaminants? - Is the overflow line constructed to prevent contaminants from entering the tank? - If the overflow line discharges into a storm drain, to surface water, or directly into a sanitary sewer, is it protected by a proper air gap? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken	
4. Source--Groundwater 4a. Does your water system have a well or spring? If no, skip to Section 6.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4b. Do you comply with Sanitary Control Area requirements (WAC 246-290-135(2))?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4c. Have there been any changes in source conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4d. Inspect the source facilities: - Is the sanitary control area free of all potential sources of contamination? - Is the wellhead or spring box above grade with no potential for flooding? - Is the pressure tank water logged? - Is the well cap sealed and watertight, and the well casing free of unprotected openings? - (For springs) Is the spring box (structure, hatch, and overflow) free of any unprotected openings? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Treatment--Groundwater 5a. Is any source continuously treated with a disinfectant ? If no, skip to Section 6.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5b. Do you have procedures in place for proper operation and maintenance of disinfection treatment facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5c. Have there been any changes in treatment equipment or process that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5d. Inspect the treatment facilities: - Is the treatment system operating properly? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
6. Source—Surface Water Supply (watershed) 6a. Does your water system have a surface water supply? If no, skip to Section 8.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
6b. Do you comply with Watershed Control Program requirements (WAC 246-290-135(4))?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6c. Have there been any changes within the watershed or in raw water conditions that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment		Corrective action needed?	Corrective action(s) taken & date taken
6d. Inspect the surface water intake/headworks: <ul style="list-style-type: none"> - Is there evidence of problems at the intake? - Is there evidence of vandalism or other security breaches at the intake? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
7. Treatment—Surface Water			
7a. Do you have procedures in place for proper operation and maintenance of surface water treatment facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7b. Have there been any changes in treatment equipment or process that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
7c. Inspect the treatment facilities: <ul style="list-style-type: none"> - Is the treatment system operating properly? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
8. Other assessment activities (describe):			

Part B. Assessment Summary and Action Plan with Timetable for corrective actions not yet taken

ASSESSOR: CHECK HERE if you did not identify any issues that may have directly or indirectly caused or contributed to entry of coliform bacteria into the system.

Corrective Actions Completed: ASSESSOR: Summarize the issues found and the corrective actions that have been completed and date completed

Describe issue found	Describe corrective action taken and date completed

Corrective Actions Not Completed: ASSESSOR: Describe the issues for which corrective actions have not yet been completed. **Provide an action plan with timetable for completion.**

Describe issue found	Describe planned corrective action and timetable for completion.

Print Name of Assessor: _____ Signature of Assessor: _____ Date: _____

OFFICE OF DRINKING WATER USE ONLY

Regional Office Reviewer: _____ Date of Review: _____

Assessment sufficient? Yes No

Likely cause determined? Yes No

Sanitary defect(s) identified? Yes No

Corrective actions completed? Yes No

Corrective action plan included? Yes No

Corrective action plan approved? Yes No

Comments:



RTCR Level 2 Assessment Guidance Template

331-570, March 2016

Send your
assessment to:

Eastern Region	16201 East Indiana Avenue, Suite 1500 Spokane Valley, WA 99216	Phone: 509.329.2100 Fax: 509.329.2104 Email: mark.steward@doh.wa.gov
Northwest Region	20425 72nd Ave. South, Suite 310 Kent, WA 98032-2358	Phone: 253.395.6750 Fax: 253.395.6760 Email: dw.nwro@doh.wa.gov
Southwest Region	PO Box 47823 Olympia, WA 98504-7823	Phone: 360-236-3030 Fax: 360-664-8058 Email: swro.coli@doh.wa.gov

Water System Name:	County:	Water System ID #:
Operator in Responsible Charge (ORC):	ORC Phone:	Water System Mailing Address:
ORC Address, City, State:		
Assessor Name:	Assessor is: <input type="checkbox"/> WDM-2, 3, or 4 <input type="checkbox"/> Engineer <input type="checkbox"/> LHJ	
Assessor Address, City, State, Zip:		
Date(s) Assessment Completed:		

Your water system exceeded a treatment technique trigger for the Revised Total Coliform Rule. Assess the water system's condition and operation using this *Level 2 Assessment Template* as a guide.

Part A: Respond to each item below. Identify corrective actions taken to address the issue(s) found.

Part B: Summarize your findings and include an action plan with timetable for corrective actions not yet taken.

For parts A and B, include additional information (photos or other documentation) as needed to depict assessment findings and corrective actions that have been completed. All assessment elements listed in this template must be addressed in your assessment. Systems with multiple facilities such as wells or storage tanks may need to provide additional pages.

Within 30 days of learning of the treatment technique trigger, submit completed assessment documentation to [your regional office](#) and keep a copy in your water system files.

Part A: Assessment		Corrective action needed?	Corrective action(s) taken & date taken
1. Site and Sampling Protocol			
1a. Do you have a written coliform monitoring plan & sampling procedure that ensures samples are representative of the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1b. Do you have a program in place that ensures that all sample collectors are trained before being allowed to collect compliance samples?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1c. Do you regularly monitor the condition of each routine and repeat sample site to ensure that no site will contaminate the sample?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1d. Was the sample collected by a trained, qualified person?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1e. Did the sampler follow your monitoring plan and sampling procedure?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken	
1f. Was the sample collected representative of the water in the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1g. Have there been any changes in sampling conditions or procedures that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
1h. Inspect the sampling sites: - Are the sampling locations free of potential sources of contamination? - Are the sampling taps in good condition? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
2. Distribution 2a. Do you have procedures in place to ensure proper maintenance of the distribution system, including: - Appropriate pipe replacement and repair procedures - Replacement and repair of other distribution system components - Regular flushing program - Routine vault inspections - Fully implemented cross connection control program - Maintain positive pressure in all parts of the distribution system	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
2b. Following work done on the water system and following any pressure loss event, do you collect investigative coliform samples?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2b. Has there been any recently reported low pressure (<20 PSI) or complete loss of pressure in the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2c. Have there been any recent repairs or new construction in the distribution system?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2d. Are there any known pipe leaks that have not yet been repaired?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2e. Has there been any recent use of fire hydrants such as hydrant maintenance or utility/FD flushing?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2f. If there are there any air-vacuum relief valve vaults in the distribution system, are any flooded?	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2g. Has there been any recent report of a cross connection incident?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2h. Have there been any off-normal events, such as discolored water, odd taste, or smell?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
2i. Have there been any other changes in distribution conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken	
2j. Inspect the distribution system: <ul style="list-style-type: none"> - Are there any visible line breaks or leaks? - Are there any observed unprotected cross connections? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Storage Facilities 3a. Does your water system have a water storage tank? If no, skip to Section 4.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
3b. Do you have procedures in place for periodic inspection and cleaning of the interior of each storage facility including vent, roof hatch, and overflow?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3c. Has there been any recent work done on a storage facility?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3d. Are all storage facilities secured from unauthorized entry and vandalism?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3e. Have there been any other changes in storage conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
3f. Inspect the storage facilities: <ul style="list-style-type: none"> - Does the tank have any cracks or other openings? - Is the reservoir roof free of any unprotected openings? - Is the access hatch constructed and sealed to keep contaminants out? - If there is an air vent on the storage tank, is it constructed to prevent the entry of contaminants? - Is the overflow line constructed to prevent contaminants from entering the tank? - If the overflow line discharges into a storm drain, to surface water, or directly into a sanitary sewer, is it protected by a proper air gap? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
4. Source--Groundwater 4a. Does your water system have a well or spring? If no, skip to Section 6.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
4b. Do you comply with Sanitary Control Area requirements (WAC 246-290-135(2))?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4c. Are all sources protected from fecal contamination by appropriate placement and construction?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4d. Have any unapproved sources recently been used?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken	
4e. Have there been any recent land use changes observed within a source sanitary control area, such as construction, farming, or dumping in the last month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4f. Has there been any standing water, heavy precipitation, or flooding around a source in the last month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4g. Has there been any recent work done on a well or spring box?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4h. Has there been any recent failure of a source pump?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4i. Has there been any recent maintenance performed on a source pump or other source component?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4j. Are the source facilities secured from unauthorized entry and vandalism?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
4k. Have there been any other changes in source conditions or operations that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
<p>4l. Inspect the source facilities:</p> <ul style="list-style-type: none"> - Is the sanitary control area free of all potential sources of contamination? - Is the wellhead or spring box above grade with no potential for flooding? - Is the pressure tank water logged? - Is the well cap sealed and watertight, and the well casing free of unprotected openings? - (For springs) Is the spring box (structure, hatch, and overflow) free of any unprotected openings? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____ 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
5. Treatment--Groundwater			
5a. Is any source continuously treated with a disinfectant ? If no, skip to Section 6.	<input type="checkbox"/> Yes <input type="checkbox"/> No		
5b. Do you have procedures in place for proper operation and maintenance of disinfection treatment facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5c. If a disinfection residual should be continuously maintained throughout the distribution system, was the measured free chlorine residual at the time of coliform sample collection below 0.2 mg/L?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5d. Have there been any recent interruptions in any treatment process?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	
5e. Has there been any recent maintenance performed on any treatment component?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No	

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken
5f. Have there been any other changes in treatment equipment or process that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
5g. Inspect the treatment facilities: - Is the treatment system operating properly? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
6. Source—Surface Water Supply (watershed) 6a. Does your water system have a surface water supply? If no, skip to Section 8.	<input type="checkbox"/> Yes <input type="checkbox"/> No	
6b. Do you comply with Watershed Control Program requirements (WAC 246-290-135(4))?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6c. Has there been any recent spikes in raw water turbidity?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6d. Have there been any land use changes within the watershed, such as logging, construction, or different farming practices in the past month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6e. Have there been any other changes within the watershed or in raw water conditions that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
6f. Inspect the surface water intake/headworks: - Is there evidence of problems at the intake? - Is there evidence of vandalism or other security breaches at the intake? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
7. Treatment—Surface Water 7a. Do you have procedures in place for proper operation and maintenance of surface water treatment facilities?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7b. Have there been any recent interruptions in any part of the filtration or disinfection treatment process?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7c. Are filtration and disinfection treatment facilities properly operated and maintained?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7d. Has there been any maintenance performed on any treatment component in the past month?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7e. Have there been any problems with a treatment process in the past month, such as high finished water turbidity, disinfection inactivation ratio <1, or changes in coagulation practices or filtration rate?	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No

Part A: Assessment	Corrective action needed?	Corrective action(s) taken & date taken
7f. Have there been any other changes in treatment equipment or process that may have contributed to the treatment technique trigger? Describe:	<input type="checkbox"/> Yes <input type="checkbox"/> No	<input type="checkbox"/> Yes <input type="checkbox"/> No
7g. Inspect the treatment facilities: - Is the treatment system operating properly? - Is there any evidence of vandalism or other security breaches? - Other: (describe) _____	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> N/A	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No
8. Other assessment activities (describe):		

Part B. Assessment Summary and Action Plan with Timetable for corrective actions not yet taken

ASSESSOR: CHECK HERE if you did not identify any issues that may have directly or indirectly caused or contributed to entry of coliform bacteria into the system.

Corrective Actions Completed: ASSESSOR: Summarize the issues found and the corrective actions that have been completed and date completed

Describe issue found	Describe corrective action taken and date completed

Corrective Actions Not Completed: ASSESSOR: Describe the issues for which corrective actions have not yet been completed. **Provide an action plan with timetable for completion.**

Describe issue found	Describe planned corrective action and timetable for completion.

Print Name of Assessor: _____ Signature of Assessor: _____ Date: _____

OFFICE OF DRINKING WATER USE ONLY

Regional Office Reviewer: _____ Date of Review: _____

Assessment sufficient? Yes No

Likely cause determined? Yes No

Sanitary defect(s) identified? Yes No

Corrective actions completed? Yes No

Corrective action plan included? Yes No

Corrective action plan approved? Yes No

Comments:

PUBLIC WORKS OPERATIONS

STANDARD OPERATING PROCEDURES

16.0 WATER QUALITY

16.4 Sample Collection Procedures

PUPOSE: To establish guidelines and procedures to follow for proper collection of water quality samples for laboratory analysis.

16.4.1 Definitions

- **DOH: Washington State Department of Health Office of Drinking Water**
- **EPA: United States Environmental Protection Agency**

16.4.2 Bacteriological Samples

- A) Remove any aerators or other devices attached to the tap outlet.
- B) Disinfect by thoroughly spraying the sample tap with a bleach and fluoride solution.
- C) Slowly open the cold water tap until it has a good but not heavy flow.
- D) Leave water running for 5 min.
- E) Test for chlorine residual and write the result on laboratory slip.
- F) Reduce the flow to approximately the width of a pencil while avoiding splashing off of any surface.
- G) Remove cap off the sample bottle and hold without touching the inside of the cap or bottle.
- H) Take care to not allow anything to enter or splash into the bottle.
- I) Slowly fill the bottle with the sample water up to the neck of the bottle and immediately put the cap back on the bottle.
- J) Fill out the required information on the laboratory slip and attach it to the bottle with a rubber band.
- K) Place sample into a cooler with an ice pack.
- L) Sample must be analyzed within 24 hours of collection.

16.4.3 DOH and EPA scheduled sample collection

- A) Do not disinfect the sample tap for any samples other than bacteriological.
- B) Slowly open the tap until it has a good but not heavy flow.
- C) Leave water running for 5 min.
- D) Reduce the flow to approximately the width of a pencil while avoiding splashing off of any surface.
- E) There are different sampling procedures for each sample kit. Follow the procedure for each kit.
- F) Fill out the required laboratory paper work
- G) Make sure the sample is delivered to the laboratory within the required time for analysis.

CITY OF KENT

Stage 2 D/DBP Monitoring Plan

April 18, 2012

(Revised)



Prepared by Sean Bauer, Water Quality Supervisor

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

I. GENERAL INFORMATION

A. PWS Information

B. Date Submitted 04/18/2012

PWSID: 381501

PWS Name: City of Kent

PWS Address: 220 4th Avenue S.

City: Kent State: WA Zip: 98032

Population Served: 66,006

System Type:	Source Water Type:	Buying / Selling Relationships:
<input checked="" type="checkbox"/> CWS	<input type="checkbox"/> Subpart H	<input checked="" type="checkbox"/> Consecutive System
<input type="checkbox"/> NTNCWS	<input checked="" type="checkbox"/> Ground	<input type="checkbox"/> Wholesale System
		<input type="checkbox"/> Neither

C. PWS Operations

Residual Disinfectant Type: Chlorine Chloramines Other: _____

Number of Disinfected Sources: ___ Surface ___ GWUDI 8 Ground 1 Purchased

D. Contact Person

Name: Sean M. Bauer

Title: Water Quality Supervisor

Phone #: (253) 856-5616 Fax #: (253) 856-6600

E-mail: sbauer@kentwa.gov

II. STAGE 2 DBPR REQUIREMENTS – Ground Water Sources

A. Number of Compliance Monitoring Sites	B. Schedule	C. Compliance Monitoring Frequency
Highest TTHM: <u>2</u>	<input type="checkbox"/> Schedule 1	<input type="checkbox"/> During peak historical month (1 monitoring period)
Highest HAA5: <u>1</u>	<input checked="" type="checkbox"/> Schedule 2	<input checked="" type="checkbox"/> Every 90 days (4 monitoring periods)
Existing Stage 1: <u>1</u>	<input type="checkbox"/> Schedule 3	
Total: <u>4</u>	<input type="checkbox"/> Schedule 4	

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS

A. Did you deviate in any way from your approved standard monitoring plan? Yes No

If YES, explain:

The City of Kent received 40/30 certification based on historical water quality data, and was not required to conduct a standard monitoring plan.

B. Where were your TTHM and HAA5 samples analyzed?

In-House

 Is your in-house laboratory certified? Yes No

Certified Laboratory

 Name of certified laboratory: Edge Analytical - Burlington, WA

C. What method(s) was used to analyze your TTHM and HAA5 samples?

TTHM	HAA5
<input type="checkbox"/> EPA 502.2	<input type="checkbox"/> EPA 552.1
<input checked="" type="checkbox"/> EPA 524.2	<input type="checkbox"/> EPA 552.2
<input type="checkbox"/> EPA 551.1	<input checked="" type="checkbox"/> EPA 552.3
	<input type="checkbox"/> SM 6251 B

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

D. Monitoring Results - TTHM

Site ID	Data Type	TTHM (mg/L)						LRAA
		3/4/09	6/4/09	9/2/09	12/7/09			
SS#1	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	17.0	14.7	21.0	19.8			18.1
SS#2	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	6.4	5.9	24.8	3.7			10.2
SS#3	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	3.3	2.2	24.1	2.7			8.1
SS#4	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	ND	ND	ND	1.1			0.3
SS#5	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	3.2	3.1	2.2	5.0			3.4
SS#6	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	1.6	1.4	1.3	1.3			1.4
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

E. Monitoring Results - HAA5

Site ID	Data Type	HAA5 (mg/L)						LRAA
		3/4/09	6/4/09	9/2/09	12/7/09			
SS#1	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	8.4	4.0	24.6	5.8			10.7
SS#2	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	1.7	1.3	19.3	ND			5.6
SS#3	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	1.0	ND	24.7	ND			6.4
SS#4	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	ND	ND	ND	ND			ND
SS#5	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	1.9	ND	ND	ND			0.5
SS#6	Sample Date	3/4/09	6/4/09	9/2/09	12/7/09			
	Sample Result	ND	ND	ND	ND			ND
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

F. Stage 1 DBPR Compliance Monitoring Results - TTHM

Site ID	Data Type	TTHM (mg/L)			LRAA
East Hill (590)	Sample Date	8/10/09			
	Sample Result	10.2			10.2
West Hill (587)	Sample Date	8/10/09			
	Sample Result	21.5			21.5
West Hill (529)	Sample Date	8/10/09			
	Sample Result	20.6			20.6
North Valley (240)	Sample Date	8/10/09			
	Sample Result	4.1			4.1
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

G. Stage 1 DBPR Compliance Monitoring Results - HAA5

Site ID	Data Type	HAA5 (mg/L)			LRAA
East Hill (590)	Sample Date	8/10/09			
	Sample Result	12.1			12.1
West Hill (587)	Sample Date	8/10/09			
	Sample Result	19.5			19.5
West Hill (529)	Sample Date	8/10/09			
	Sample Result	17.3			17.3
North Valley (240)	Sample Date	8/10/09			
	Sample Result	1.0			1.0
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

IV. JUSTIFICATION OF STAGE 2 DBPR COMPLIANCE MONITORING SITES – Ground Water

Stage 2 Compliance Monitoring Site ID	Site Type	Justification
SS#2	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high TTHM
SS#3	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high HAA5
SS#1	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	2 nd highest TTHM not already used
West Hill (587)	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input checked="" type="checkbox"/> Stage 1 DBPR	2 nd highest HAA5 not already used
	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	
	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	
	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	
	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

V. PEAK HISTORICAL MONTH AND PROPOSED STAGE 2 DBPR COMPLIANCE MONITORING SCHEDULE

A. Peak Historical Month September

B. Is Your Peak Historical Month the Same as in Your IDSE Standard Monitoring Plan?

Yes No

If no, explain how you selected your new peak historical month (*attach additional sheets if needed*)

The City of Kent was granted 40/30 certification based on historical water quality data, and was not required to perform an IDSE. Historical month was selected based on historical water quality data.

C. Proposed Stage 2 DBPR Compliance Monitoring Schedule – Ground Water

Stage 2 Compliance Monitoring Site ID	Projected Sampling Date			
	period 1	period 2	period 3	period 4
SS#1	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS#2	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS#3	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
West Hill (587)	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)

The City of Kent is required to monitor quarterly. Each quarter we will calculate a locational running annual average (LRAA) for TTHM and HAA5 at each monitoring location. Compliance will be achieved if the TTHM and the HAA5 LRAA at each location for the four most recent quarters is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/L for HAA5.

VI. DISTRIBUTION SYSTEM SCHEMATIC

ATTACH a schematic of your distribution system if it has changed since you submitted your Standard Monitoring Plan (Form 6).

VII. ATTACHMENTS

- Additional sheets for explaining how and why you deviated from your standard monitoring plan (Section III).
- Additional sheets for Standard Monitoring Results (Section III). **REQUIRED** if you are a subpart H system serving **more than 49,999 people** or a ground water system serving **more than 499,999 people**.
- Additional sheets for Stage 2 DBPR Compliance Monitoring Sites (Section IV). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- Additional sheets for explaining how you selected the peak historical month (Section V).
- Additional sheets for proposed Stage 2 DBPR peak historical month and compliance monitoring schedule (Section V). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- Distribution system schematic* (Section VI). **REQUIRED if it has changed from your approved IDSE standard monitoring plan.**
- Compliance calculation procedures (for Stage 2 Compliance Monitoring Plan).

Total Number of Pages in Your Report: 10

City of Kent
**STAGE II
D/DBP MONITORING
GROUND WATER**

Legend

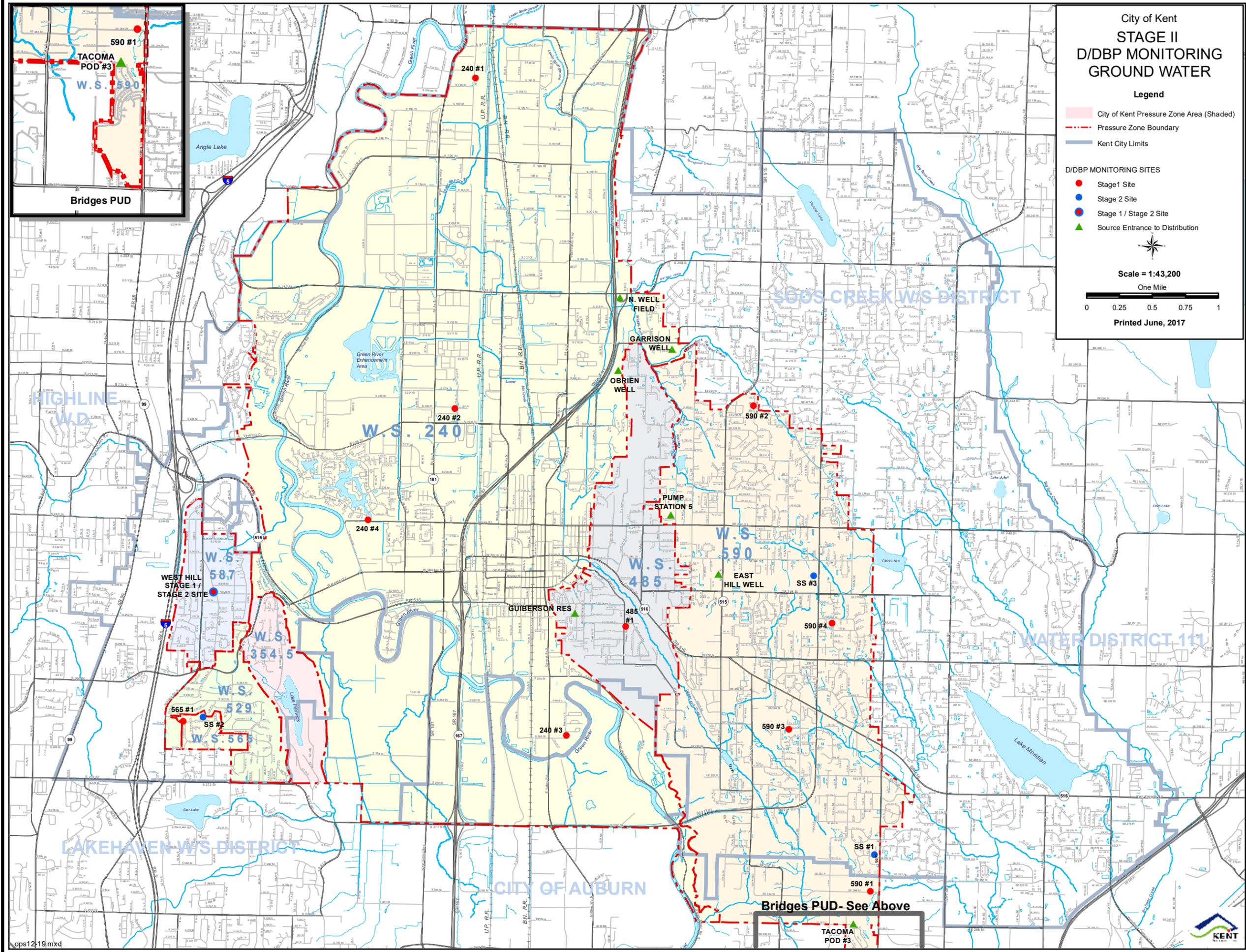
- City of Kent Pressure Zone Area (Shaded)
- Pressure Zone Boundary
- Kent City Limits

D/DBP MONITORING SITES

- Stage 1 Site
- Stage 2 Site
- Stage 1 / Stage 2 Site
- ▲ Source Entrance to Distribution

Scale = 1:43,200
 One Mile

 0 0.25 0.5 0.75 1
Printed June, 2017



City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

I. GENERAL INFORMATION

A. PWS Information

B. Date Submitted 04/18/2012

PWSID: 381501

PWS Name: City of Kent

PWS Address: 220 4th Avenue S.

City: Kent State: WA Zip: 98032

Population Served: 66,006

System Type:	Source Water Type:	Buying / Selling Relationships:
<input checked="" type="checkbox"/> CWS <input type="checkbox"/> NTNCWS	<input checked="" type="checkbox"/> Subpart H <input type="checkbox"/> Ground	<input checked="" type="checkbox"/> Consecutive System <input type="checkbox"/> Wholesale System <input type="checkbox"/> Neither

C. PWS Operations

Residual Disinfectant Type: Chlorine Chloramines Other: _____

Number of Disinfected Sources: ___ Surface ___ GWUDI 8 Ground 1 Purchased

D. Contact Person

Name: Sean M. Bauer

Title: Water Quality Supervisor

Phone #: (253) 856-5616 Fax #: (253) 856-6600

E-mail: sbauer@kentwa.gov

II. STAGE 2 DBPR REQUIREMENTS

A. Number of Compliance Monitoring Sites	B. Schedule	C. Compliance Monitoring Frequency
Highest TTHM: <u>4</u>	<input type="checkbox"/> Schedule 1	<input type="checkbox"/> During peak historical month (1 monitoring period)
Highest HAA5: <u>3</u>	<input checked="" type="checkbox"/> Schedule 2	<input checked="" type="checkbox"/> Every 90 days (4 monitoring periods)
Existing Stage 1: <u>1</u>	<input type="checkbox"/> Schedule 3	
Total: <u>8</u>	<input type="checkbox"/> Schedule 4	

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS

A. Did you deviate in any way from your approved standard monitoring plan? Yes No

If YES, explain (attach additional pages if necessary):

The City of Kent received 40/30 certification based on historical water quality data, and was not required to conduct a standard monitoring plan.

B. Where were your TTHM and HAA5 samples analyzed?

In-House

 Is your in-house laboratory certified? Yes No

Certified Laboratory

 Name of certified laboratory: Edge Analytical - Burlington, WA

C. What method(s) was used to analyze your TTHM and HAA5 samples?

TTHM	HAA5
<input type="checkbox"/> EPA 502.2	<input type="checkbox"/> EPA 552.1
<input checked="" type="checkbox"/> EPA 524.2	<input type="checkbox"/> EPA 552.2
<input type="checkbox"/> EPA 551.1	<input checked="" type="checkbox"/> EPA 552.3
	<input type="checkbox"/> SM 6251 B

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

MONITORING RESULTS – Surface Water

D. Monitoring Results - TTHM

Site ID	Data Type	TTHM (mg/L)						LRAA
SS#7	Sample Date	7/9/2009						
	Sample Result	22.0						22.0
SS#8	Sample Date	7/9/2009						
	Sample Result	18.5						18.5
SS#9	Sample Date	7/9/2009						
	Sample Result	16.6						16.6
SS#10	Sample Date	7/9/2009						
	Sample Result	29.1						29.1
SS#11	Sample Date	7/9/2009						
	Sample Result	10.1						10.1
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							
	Sample Date							
	Sample Result							

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

MONITORING RESULTS – Surface Water

E. Monitoring Results - HAA5

Site ID	Data Type	HAA5 (mg/L)					LRAA
SS#7	Sample Date	7/9/2009					
	Sample Result	17.3					17.3
SS#8	Sample Date	7/9/2009					
	Sample Result	15.0					15.0
SS#9	Sample Date	7/9/2009					
	Sample Result	14.1					14.1
SS#10	Sample Date	7/9/2009					
	Sample Result	19.8					19.8
SS#11	Sample Date	7/9/2009					
	Sample Result	10.1					10.1
	Sample Date						
	Sample Result						
	Sample Date						
	Sample Result						
	Sample Date						
	Sample Result						

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

F. Stage 1 DBPR Compliance Monitoring Results - TTHM

Site ID ¹	Data Type	TTHM (mg/L)			LRAA
East Hill (590)	Sample Date	8/10/09			
	Sample Result	10.2			10.2
West Hill (587)	Sample Date	8/10/09			
	Sample Result	21.5			21.5
West Hill (529)	Sample Date	8/10/09			
	Sample Result	20.6			20.6
North Valley (240)	Sample Date	8/10/09			
	Sample Result	4.1			4.1
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

III. MONITORING RESULTS (Continued)

G. Stage 1 DBPR Compliance Monitoring Results - HAA5

Site ID	Data Type	HAA5 (mg/L)			LRAA
East Hill (590)	Sample Date	8/10/09			
	Sample Result	12.1			12.1
West Hill (587)	Sample Date	8/10/09			
	Sample Result	19.5			19.5
West Hill (529)	Sample Date	8/10/09			
	Sample Result	17.3			17.3
North Valley (240)	Sample Date	8/10/09			
	Sample Result	1.0			1.0
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				
	Sample Date				
	Sample Result				

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

JUSTIFICATION OF STAGE 2 DBPR COMPLIANCE MONITORING SITES – Surface Water

Stage 2 Compliance Monitoring Site ID	Site Type	Justification
SS#2	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high TTHM
SS#3	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high HAA5
SS#1	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	2 nd highest TTHM not already used
West Hill (587)	<input type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input checked="" type="checkbox"/> Stage 1 DBPR	2 nd highest HAA5 not already used
SS# 10	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high TTHM – surface water source
SS# 7	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	1 st high HAA5 – surface water source
SS# 8	<input checked="" type="checkbox"/> Highest TTHM <input type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	2 nd highest TTHM not already used – surface water
SS# 9	<input type="checkbox"/> Highest TTHM <input checked="" type="checkbox"/> Highest HAA5 <input type="checkbox"/> Stage 1 DBPR	2 nd highest HAA5 not already used – surface water

City of Kent Stage 2 Disinfectants/Disinfection Byproducts Monitoring Plan

V. PEAK HISTORICAL MONTH AND PROPOSED STAGE 2 DBPR COMPLIANCE MONITORING SCHEDULE

A. Peak Historical Month September

B. Is Your Peak Historical Month the Same as in Your IDSE Standard Monitoring Plan?

Yes No

If no, explain how you selected your new peak historical month (*attach additional sheets if needed*)

The City of Kent was granted 40/30 certification based on historical water quality data, and was not required to perform an IDSE. Historical month was selected based on historical water quality data.

C. Proposed Stage 2 DBPR Compliance Monitoring Schedule – Surface Water Influence

Stage 2 Compliance Monitoring Site ID	Projected Sampling Date			
	period 1	period 2	period 3	period 4
SS#1	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS#2	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS#3	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
West Hill (587)	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS# 10	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS# 7	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS# 8	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)
SS# 9	Mar (week1)	June (week1)	Sept (week1)	Dec (week1)

The City of Kent is required to monitor quarterly. Each quarter we will calculate a locational running annual average (LRAA) for TTHM and HAA5 at each monitoring location. Compliance will be achieved if the TTHM and the HAA5 LRAA at each location for the four most recent quarters is less than or equal to 0.080 mg/L for TTHM and less than or equal to 0.060 mg/L for HAA5.

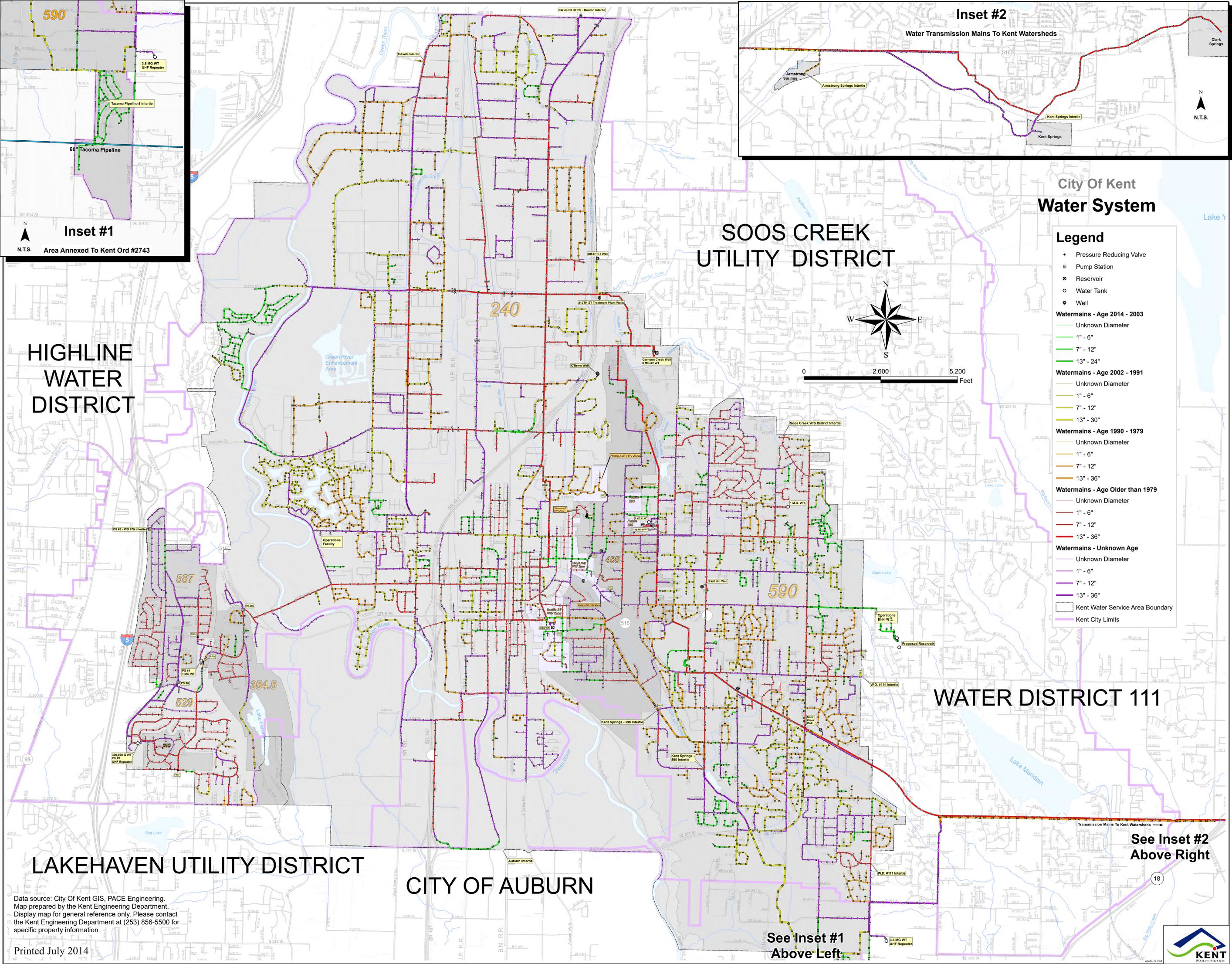
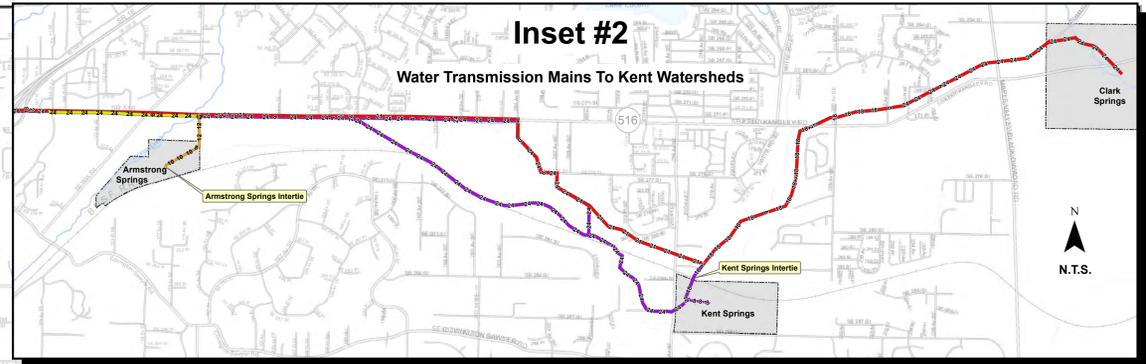
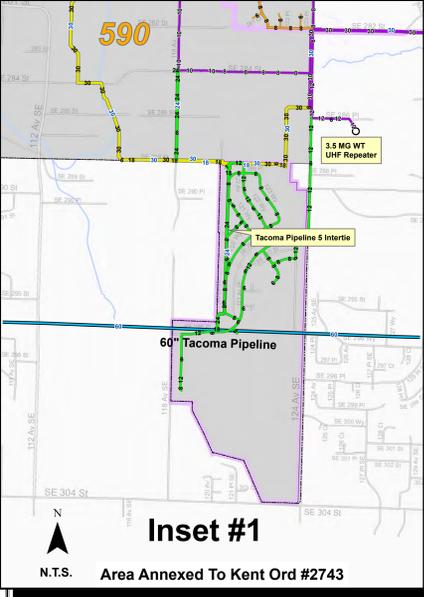
VI. DISTRIBUTION SYSTEM SCHEMATIC

ATTACH a schematic of your distribution system if it has changed since you submitted your Standard Monitoring Plan (Form 6).

VII. ATTACHMENTS

- Additional sheets for explaining how and why you deviated from your standard monitoring plan (Section III).
- Additional sheets for Standard Monitoring Results (Section III). **REQUIRED** if you are a subpart H system serving **more than 49,999 people** or a ground water system serving **more than 499,999 people**.
- Additional sheets for Stage 2 DBPR Compliance Monitoring Sites (Section IV). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- Additional sheets for explaining how you selected the peak historical month (Section V).
- Additional sheets for proposed Stage 2 DBPR peak historical month and compliance monitoring schedule (Section V). **REQUIRED** if you are a subpart H system serving **more than 249,999 people**.
- Distribution system schematic* (Section VI). **REQUIRED if it has changed from your approved IDSE standard monitoring plan.**
- Compliance calculation procedures (for Stage 2 Compliance Monitoring Plan).

Total Number of Pages in Your Report: 10



Legend

- Pressure Reducing Valve
- Pump Station
- ▣ Reservoir
- Water Tank
- Well

Watermains - Age 2014 - 2003

- Unknown Diameter
- 1" - 6"
- 7" - 12"
- 13" - 24"

Watermains - Age 2002 - 1991

- Unknown Diameter
- 1" - 6"
- 7" - 12"
- 13" - 30"

Watermains - Age 1990 - 1979

- Unknown Diameter
- 1" - 6"
- 7" - 12"
- 13" - 36"

Watermains - Age Older than 1979

- Unknown Diameter
- 1" - 6"
- 7" - 12"
- 13" - 36"

Watermains - Unknown Age

- Unknown Diameter
- 1" - 6"
- 7" - 12"
- 13" - 36"

□ Kent Water Service Area Boundary
 □ Kent City Limits

Data source: City Of Kent GIS, PACE Engineering.
 Map prepared by the Kent Engineering Department.
 Display map for general reference only. Please contact the Kent Engineering Department at (253) 856-5500 for specific property information.

Printed July 2014



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 operational changes or emergency procedures to reduce the effect of *E. coli* bacteria on water system customers.

Distribution System <i>E. coli</i> Response Checklist				
Background Information	Yes	No	N/A	To Do List
We inform staff members about activities within the distribution system that could affect water quality.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We document all water main breaks, construction & repair activities, and low pressure and outage incidents.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can easily access and review documentation on water main breaks, construction & repair activities, low pressure and outage incidents.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our Cross-Connection Control Program is up-to-date.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We test all backflow devices annually as required, with easy access to the proper documentation.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We routinely inspect all treatment facilities for proper operation	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have procedures in place for disinfecting and flushing the water system if it becomes necessary.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can activate an emergency intertie with an adjacent water system in an emergency.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a map of our service area boundaries.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have consumers who may not have access to bottled or boiled water.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
There is a sufficient supply of bottled water immediately available to our customers who are unable to boil their water.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

We have messages prepared and translated into different languages to ensure our consumers will understand them.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
We have the capacity to print and distribute the required number of notices in a short time period.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Distribution System <i>E. coli</i> Response Checklist				
Policy Direction	Yes	No	N/A	To Do List
We have discussed the issue of <i>E. coli</i> -present sample results with our policy makers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
If we find <i>E. coli</i> in a routine distribution sample, the policy makers want to wait until repeat test results are available before issuing advice to water system customers.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
Potential Public Notice Delivery Methods	Yes	No	N/A	To Do List
It is feasible to deliver a notice going door-to-door.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of all our customers' addresses.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customer telephone numbers or access to a Reverse 9-1-1 system.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a list of customer email addresses.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We encourage our customers to remain in contact with us using social media.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an active website we can quickly update to include important messages.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Our customers drive by a single location where we could post an advisory and expect everyone to see it.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We need a news release to supplement our public notification process.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
<u>All Sources</u>				
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We address any significant deficiencies identified during a sanitary survey.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input type="checkbox"/> <input type="checkbox"/>	<input checked="" type="checkbox"/> <input type="checkbox"/>	<input type="checkbox"/> <input checked="" type="checkbox"/>	<input type="checkbox"/> <input type="checkbox"/>
We routinely inspect our well site(s).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have a good raw water sample tap installed at each source.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
After we complete work on a source, we disinfect the source, flush, and collect an investigative sample.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Public Notice	Yes	No	N/A	To Do List
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our water system's governing body (board of directors or commissioners) and received direction from them on our response plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>
We discussed the requirement for immediate public notice of an <i>E. coli</i> -present source sample result with our wholesale customers and encouraged them to develop a response plan.	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>
We have prepared templates and a communications plan that will help us quickly distribute our messages.	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input checked="" type="checkbox"/>

E. coli-Present Triggered Source Response Checklist

Source S01 Kent Springs 1, 2, 3 Ranney Infiltration Gallery

Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of our distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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 to achieve 4-log virus treatment with chlorine.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
<u>Source S02 Clark Springs 1, 2, 3 Ranney Infiltration Gallery</u>				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of our distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
Source S05 East Hill Well 1				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

E. coli-Present Triggered Source Response Checklist				
Source S07 Seven Oaks Well				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
Source S10 N Kent Wellfield (212th & 208th)				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
Source S12 OBrien Well				
Alternate Sources	Yes	No	N/A	To Do List
We can stop using this source and still provide reliable water service to our customers.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

***E. coli*-Present Triggered Source Response Checklist**

Source S16 Garrison Well 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

<i>E. coli</i>-Present Triggered Source Response Checklist				
Source S18 Armstrong 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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We have an emergency intertie with a neighboring water system that we can use until corrective action is complete (perhaps for several months).	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can provide bottled water to all or part of my distribution system for an indefinite period.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can quickly replace our existing source of supply with a more protected new source of supply.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
We can reduce the production capacity of our pumps or alter the configuration of our storage quantities (Operational Storage) to increase the length of time water stays in the system before the first customer to achieve CT = 6.	<input type="checkbox"/>	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
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.	<input checked="" type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Distribution System *E. coli* Response Plan

If we have *E. coli* in our distribution system we will immediately:

1. Call DOH.
2. Collect repeat and triggered source samples. Collect additional investigative samples as necessary.
3. Inspect our water system facilities, including treatment plant and sources for proper operation.
4. Interview staff to determine whether anything unusual was happening in the water system service area, especially since the previous month's sample(s).
5. Review new construction activities, water main breaks, and pressure outages that may have occurred during the previous month.
6. Review Cross-Connection Control Program status.
7. Discuss with DOH whether to issue a Health Advisory based on the findings of steps 3-6. If necessary, issue the HA.
8. Notify King County Public Health Center. City will compile an emergency response call-list.
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 10 to 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 Response Plan*Source S01 Kent Springs 1, 2, 3 Ranney Infiltration Gallery**

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S01.
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 investigative sampling at Ranney Wells.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S02 Clark Springs 1, 2, 3 Ranney Infiltration Gallery

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source 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 investigative sampling at Ranney Wells.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S05 East Hill Well 1

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S05.
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 investigative sampling at S05 wellhead.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S07 Seven Oaks Well

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S07.
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 investigative sampling at S07 wellhead.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan*Source S10 N Kent Wellfield (212th & 208th)**

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S10.
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 investigative sampling at S10 wellheads.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S12 OBrien Well

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S12.
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 investigative sampling at S12 wellhead.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S16 Garrison Well 2

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S16.
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 investigative sampling at S16 wellhead.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. 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 Response Plan**

Source S18 Armstrong Wells 1 & 2

If we have *E. coli* in our source water we will immediately:

1. Call DOH.
2. Shut down source S18.
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 investigative sampling at S18 wellhead.
7. Ask DOH to review our Contact Time analysis and acknowledge that we provide 4-log virus treatment before the first customer.
8. Respond appropriately to repeat results:
 - a. If repeats are all satisfactory, lift HA if one was issued.
 - b. If any repeat is unsatisfactory, issue HA if not already issued. Host DOH for an inspection and respond accordingly to inspection findings.

APPENDIX J

Wellhead Protection Program

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CHAPTER 8

WELLHEAD PROTECTION PROGRAM

The City of Kent's (City) wellhead protection program is designed to protect groundwater resources supplying its water sources used for drinking water. Development of the wellhead protection program is mandated by the 1986 Amendments to the Safe Drinking Water Act and the Washington State Drinking Water Regulations (WAC 246-290-135). The wellhead protection program builds on the South King County Groundwater Management planning process and is an important local tool for protecting groundwater quality. Delineation of wellhead protection areas helps to identify the most important areas of focus for protecting water supplies and the most appropriate areas to focus limited funding resources.

The City's wellhead protection program began in 1991, when the City applied to the Washington State Department of Ecology (Ecology) for a Centennial Fund grant to help fund the program development. Ecology awarded a grant in 1992. At that time, the City conducted program development efforts with the Covington Water District and Water District No. 111, who were simultaneously developing their wellhead protection programs. Coordination efforts occurred through a Project Review Committee set up for review and input to the process, which included representatives from the three purveyors as well as the Seattle/King County Health Department, the State Department of Health (DOH), and Ecology's Water Quality Program.

The City's first WHPP was completed in 1996. Since then, rapid development has been occurring within portions of the wellhead protection areas, which can pose gradually increasing risk to the City's groundwater supply sources, particularly its Clark, Kent, and Armstrong Springs sources which produce from a shallow aquifer system that is susceptible to contamination. However, in this same time period, the City has been implementing the WHPP and has successfully maintained safe and reliable sources of drinking water.

Wellhead protection techniques that have been completed include adoption of the WHPP, established relationships with local jurisdictions to provide comments on proposed land use developments, WHPA roadside signage, notifications to owners/operators of identified potential contaminant sources, and increased educational awareness including a Water Festival and public presentations on the WHPP. Extensive monitoring of the groundwater system has also been implemented.

In 2008, the City updated its WHPP to address the current land uses and incorporate the wellhead protection information and experience that the City has gained over the previous twelve years. The WHPP is divided into two documents: one for the Clark, Kent, and Armstrong Springs supply sources (referred to collectively as the Phase 1 supply sources); and one for the City's deep wells within the City limits, namely the 208th Street, 212th Street, Garrison, O'Brien, East Hill, and Seven Oaks wells (referred to collectively as the

Phase 2 supply sources). Each WHPP document includes the elements required under Washington State DOH wellhead protection planning guidance.

8.1 HYDROGEOLOGY & WELLHEAD PROTECTION AREA DELINEATION

The City's Phase 1 (Springs) and Phase 2 (deep wells) supply sources withdraw groundwater from distinctly different aquifer systems within the regionally extensive Covington Upland. This necessitates developing a thorough understanding (conceptual model) of hydrogeologic conditions controlling groundwater flow for each set of sources. From that conceptual understanding, a three-dimensional numerical groundwater flow model was developed to represent and simulate the groundwater flow system and its response to operation of the supply sources. The numerical groundwater flow model is the tool used to rigorously delineate the wellhead protection area for each water supply source. In accordance with state DOH wellhead protection guidance, the wellhead protection area for each water supply source is divided into Zones 1, 2, and 3, corresponding to the 1-, 5-, and 10-year times of groundwater travel to the source, respectively. A 6-month time of travel zone is also delineated as a subdivision of Zone 1, and is incorporated into the priority ranking of potential contaminant sources within the WHPA. The hydrogeology and wellhead protection area delineation for the Phase 1 and Phase 2 supply sources are outlined below.

8.1.1 Phase 1 Supply Sources

The City's Clark, Kent, and Armstrong Springs sources derive water from shallow glacial outwash (sand and gravel) aquifers without significant protective confining layers between ground surface and the depth of groundwater withdrawal. Infiltration of precipitation is the principal source of recharge to the local groundwater system. Infiltration is high in the permeable outwash sediments that comprise much of the area, particularly in the foothills east of Clark Springs, where the highest annual precipitation falls. The surrounding uplands are generally capped by low permeability glacial till, but provide recharge through overland runoff to the surrounding, highly permeable glacial outwash deposits. Surface water features, such as Lake Sawyer, Ravensdale Lake, and Retreat Lake, appear to provide some additional recharge to the groundwater system.

Groundwater flow in the area is predominantly east to west, from the high recharge area of the eastern foothills, through two principal aquifers: the Vashon Recessional Outwash (Qvr) and the deeper, older Qc(2) glacial deposits. In the western area, low permeability till lies between the recessional outwash and the deeper Qc(2) aquifer in some locations; however, at the City's Kent Springs and Armstrong Springs properties, the till seems to be absent, and these two aquifers are connected. In these areas, the shallow aquifer is more highly susceptible to contamination.

Because of the east to west flow pattern, groundwater withdrawal from the City's Springs sources creates capture zones that extend eastward from the wellheads. The capture zone represents that portion of the aquifer providing flow to the source(s).

The capture zones were delineated through development of a regional groundwater flow model that encompassed the three Springs sources and surrounding area. The groundwater flow model was used to estimate 1-, 5-, and 10-year time-of-travel capture zones, in accordance with the state DOH wellhead protection guidance.

An assessment of uncertainties in delineating the wellhead capture zones, and coordination of management efforts with the neighboring water districts, resulted in development of a composite Kent/Covington wellhead protection area (WHPA). The composite WHPA includes a buffer beyond the modeled aquifer capture zones that encompasses the surrounding surface water basin. Expanding the WHPA out to the local surface water divides provides a measure of conservatism, in recognition that surface water runoff from till-capped and bedrock uplands can infiltrate into the adjacent glacial outwash aquifer tapped by the Springs sources.

8.1.2 Phase 2 Supply Sources

The City's deep well sources (208th Street, 212th Street, Garrison, O'Brien, East Hill, and Seven Oaks wells) derive water from a series of confined aquifer units that occur deeper than the shallow aquifer system tapped by the Springs sources. The East Hill well is completed in the Intermediate Aquifer. The Seven Oaks well is completed in the next underlying aquifer, termed the Sea Level Aquifer. The 208th Street, 212th Street, Garrison Creek, and O'Brien wells are completed in the deepest identified aquifer system, termed the Deep Aquifer. Low permeability confining layers (aquitards) exist above and below each of these aquifer units. Because they withdraw from relatively deep confined aquifers, the Phase 2 supply sources have low susceptibility to surface contamination.

The majority of recharge to the layered aquifer system is derived from infiltration of precipitation; however, additional recharge is derived regionally from Cedar River water imported into the basin. This occurs via leakage from the City of Seattle's Lake Youngs reservoir, as well as return flow (e.g., septic system discharge) from use of the water.

Within the area of the City's Phase 2 supply sources, groundwater flow in each of the aquifers is generally from east to west. Groundwater flow occurs predominantly horizontally within the permeable aquifer units; however, vertical leakage through the intervening confining layers also occurs, allowing groundwater to move slowly downward from shallower to deeper aquifers. Although the rate of downward leakage is small, it can occur over many square miles and therefore represent large volumes of recharge to the deeper aquifer systems.

In the area of the Phase 2 supply sources, groundwater discharges naturally from the deeper aquifers where they intersect the Green River valley on the west edge of the upland. This groundwater discharge can occur as leakage into the valley-fill sediments, springs on the valley walls, or as evapotranspiration. Additional discharge

from these aquifers can also occur as vertical leakage between units, well production, springs becoming stream baseflow, and/or evapotranspiration.

Groundwater withdrawal from the City's Phase 2 wells creates capture zones that extend generally eastward from the wellheads. As conducted for the Phase 1 supply sources, a numerical groundwater flow model was used to estimate 6-month, 1-year, 5-year, and 10-year time-of-travel capture zones for the Phase 2 wells. The WHPA for each well was then established to include a buffer around the modeled 10-year capture zone, to address uncertainties in the capture zone modeling. Because of the proximity of the City's four Deep Aquifer wells, a composite WHPA was established.

8.2 POTENTIAL CONTAMINANT SOURCES

Within the defined WHPAs for the Phase 1 and Phase 2 supply sources, the potential groundwater contaminant sources were identified and ranked according to their estimated potential risk to groundwater quality. Potential contaminant sources were identified based on review of land uses within the WHPA, review of regulatory agency database lists and files, and a windshield survey to reconnaissance for other potential land use activities of interest and confirm the regulatory database information.

The priority ranking of potential contaminant sources was performed in accordance with applicable EPA and state DOH guidance. The inventory and ranking methodology was reviewed by the Project Review Committee during preparation of the 1996 WHPP, and the same basic methodology has been retained for the 2008 WHPP. Proximity to the wellhead (which WHPA zone) was the criterion given the highest prioritization. Within a WHPA zone, potential contaminant sources were then further prioritized based on the type of contamination and the severity of the contamination. The identified potential contaminant sources for the Phase 1 and Phase 2 supply sources are summarized below.

8.2.1 Phase 1 Supply Sources

Numerous potential contaminant sources are identified within the Armstrong Springs WHPA. The primary risks occur within the surrounding, relatively high density urban development that occurs within the Zone 1 WHPA. This includes potential for contaminant releases from commercial facilities (e.g., leaking underground storage tanks and other chemicals), as well as residential land use (e.g., infiltration of stormwater potentially containing fertilizers, pesticides, petroleum, and/or metals, on-site septic tanks, and/or home heating oil tanks). Other identified potential contaminant sources within Zone 1 include sites with discharges permitted under the National Pollution Discharge Elimination System (NPDES), transportation corridors (pesticide applications and potential for spills), and sites where hazardous wastes are handled. Similar types of sites occur within Zones 2 and 3, but they are ranked as lower risks due to distance from the supply source. Within Zone 2, Kent Junior High School is the highest ranked potential risk, because it had a leaky underground fuel storage tank and, based on the available data, has petroleum-impacted groundwater.

The highest ranked potential risk within Zone 3 is the current King County regional maintenance facility, where hazardous materials are handled and petroleum cleanup has been conducted. This facility is proposed to be re-located to the east, within the Clark Springs WHPA.

Within the Kent Springs WHPA, the highest ranking potential risks, located in Zone 1, include residential land use (south and west of the supply source), a site that has generated hazardous waste, and transportation corridors. There are no known contaminated sites identified within Zone 1. There are two cleanup sites identified within Zone 2 that warrant tracking of the cleanup process - the Plum Creek/Ravensdale Property and Reserve Silica Corporation sites. Forestry and mining land uses occurring within Zone 2 are ranked 6 and 9, respectively. Also identified within Zone 2 are a RCRA handler of hazardous waste (Kanaskat Drums) and the Lake Retreat Camp and Conference Center with an operational UST (not identified as leaking).

Within the more rural Clark Springs WHPA, the three identified highest-priority risks are contaminated sites in Zone 1, with the Landsburg Mine site ranking as the highest risk to the Clark Springs source. The Safford property and Bremmeyer Logging Company sites rank as 2 and 3, respectively. Residential land use and transportation corridors in Zone 1 rank 4 and 5. Forestry and mining land uses, in Zone 2 and Zone 3, respectively, rank lower. In addition, King County has plans to move its regional maintenance facility, now in Armstrong Springs Zone 3 (described above), to a parcel near the northern edge of the Clark Springs Zone 2 WHPA. Because the facility does not exist, nor is its precise future location known, it represents a potential future risk to keep track of, but is not included in the ranking of current potential risks.

8.2.2 Phase 2 Supply Sources

Potential contaminant sources were also identified and ranked for Phase 2 supply sources; however, because the Phase 2 wells withdraw groundwater from low susceptibility (deeper confined) aquifers, the identified potential contaminant sources represent lower risk than those identified for the Phase 1 Springs sources. In other words, a top-ranked contaminant source for one of the Phase 2 wells is of less concern than a top-ranked contaminant source for one of the Springs sources.

The risk ranking identified 30 potential contaminant sources within the Deep Aquifer wells WHPA. Five of the potential sources are located within Zone 1, and 24 are located in the buffer zone that was added to the WHPA for conservatism. Within Zone 1, the highest risk identified for the Deep Aquifer wells is potential (hazardous) waste handling practices at commercial facilities, and the immediately adjacent transportation corridors and residential land use. Pilchuck Contractors is the only identified contaminated site (petroleum cleanup) in Zone 1, and is ranked number 1

for risk to the wellhead based on its proximity to the 212th Street wellhead. Stormwater discharge from construction activities was identified as the only potential source of contamination in Zone 2. No potential contaminant sources were identified in Zone 3. The remaining 24 potential contaminant sources identified in the Deep Aquifer wells WHPA are located within the buffer zone. Five of them are listed as contaminated sites (including a LUST). One of the contaminated sites is a dry cleaner, which had chlorinated solvent contamination. Chlorinated solvents, because of their transport behavior (heavier than water so they sink) and toxicity, are contaminants of high concern for protection of the deep wells. Other ranked potential sources in the buffer zone include twelve hazardous waste generators, three UST sites, one metals recycler or solid waste facility, and stormwater runoff.

The largest number of potential contaminant sources (52) are identified within the East Hill WHPA, which is the largest of the Phase 2 well WHPAs. Residential land use (sewered), transportation corridors, a hazardous waste generator (American Power Systems), and a (permitted) construction stormwater discharge are ranked as the top four risks, respectively, within Zone 1. There are no known contaminated sites within Zone 1. Identified potential contaminant sources within the Zone 2 WHPA include six petroleum-contaminated sites, seven generators of hazardous waste (including probable chlorinated solvents), two UST sites, and three potential stormwater runoff sources. Eight sites/land uses were identified within the East Hill Zone 3 WHPA: four petroleum-contaminated sites, residential land use (on septic), a hazardous waste generator, and a UST site. The remaining twenty-two potential sources identified are located within the buffer zone. This includes six petroleum contaminated sites, eleven hazardous waste generators, four UST sites, and one permitted construction stormwater discharge.

The risk ranking identified eleven sites/land uses within the Seven Oaks well WHPA. No contaminated sites are identified in Zones 1 through 3. Residential land use (sewered), a UST site, transportation corridors and a hazardous waste generator are ranked as the next top four risks, respectively, in Zone 1. The hazardous waste generator may use chlorinated solvents as a degreaser or parts cleaner. Stormwater pollution from construction activities was identified as the only potential source of contamination in Zone 2. No potential contaminant sources are identified within Zone 3. Six potential contaminant sources are listed within the buffer zone of the Seven Oaks well WHPA: one petroleum-contaminated site, two UST sites, and three permitted construction stormwater discharges.

8.3 MANAGEMENT STRATEGIES

During preparation of the 1996 WHPP, wellhead protection management tasks were developed based on tasks included in the South King County GWMP, adapted to the specifics of the WHPA for the City's Springs sources. Forty-eight tasks were initially developed in coordination with the Wellhead Protection Project Review Committee. These tasks were

created to help mitigate the identified high priority risks to groundwater quality. Management strategies were then developed, based on the concept of managing the tasks in certain ways to implement the program.

Since that time, the City has been implementing its WHPP, and adapting the wellhead protection management strategies to reflect changes in land use and political jurisdictions within the WHPA. Based on that, the management strategies carried forward for application in the City's WHPA are as follows:

8.3.1 Management and Cooperation Strategies

- Maintain a central point of contact for the City's wellhead protection program.
- Provide current WHPA maps to controlling jurisdictions.
- Send notification letters to owners/operators of identified potential contaminant sources.
- Stay involved with South King County Groundwater Management Committee.
- Encourage best management practices (BMPs) in land management activities.

8.3.2 Land Use Strategies

- Review pending land use permits.
- Develop an automated notification process for pending land use permits.

8.3.3 Regulatory Strategies

- Track state cleanup sites.
- Participate in future updates to critical aquifer recharge area regulations.

8.3.4 Planning Strategies

- Promote protective stormwater management.
- Obtain notifications of hazardous materials spills.
- Map petroleum pipelines and develop emergency response.
- Encourage use of sewers and develop emergency response measures.
- Encourage farm planning.

8.3.5 Data Management Strategies

- Monitor groundwater.
- Inventory underground storage tanks (within Zone 1 of the WHPA).
- Track the state's inventory of dry wells.

- Track pesticide use.
- Inventory abandoned wells.

8.3.6 Education Strategies

- Target public education programs in the WHPA.

8.4 OTHER WHPP ELEMENTS

The WHPPs also include a Monitoring Plan, Spill Response Plan, and a Water Supply Contingency Plan, as required by the state DOH wellhead protection guidance. These plans are described below.

8.4.1 Monitoring Plan

The Monitoring Plan defines a baseline program for continued water level and water quality monitoring to measure potential water quality degradation, and provide an early warning of changes to groundwater quality or quantity within the WHPA. The monitoring program will be adjusted based on concerns with specific land use or other changes in the WHPA, and/or observed changes in groundwater quality, over time. Because of the unique conditions of the Phase 1 Springs sources relative to the Phase 2 deep well sources, including hydrogeologic conditions and identified potential contaminant sources, the WHPP for each provides a Monitoring Plan tailored to the supply sources and their relative susceptibility.

The Monitoring Plan for the Phase 1 supply sources includes monthly water level and field parameter measurements, and quarterly water quality monitoring for nitrate, at the locations currently being monitored. Nitrate is an important water quality indicator for the urbanizing land uses that are occurring within the WHPA. If nitrate concentrations are observed to increase over time at a location, chloride analysis would be added at that location to help determine the cause of the increasing nitrate (e.g., help differentiate septic from fertilizer influences). Once per year during the dry season, each groundwater location would also be sampled for volatile organic compounds (VOCs), which include a wide range of the generally more mobile contaminants associated with common contaminant releases (e.g., fuels and solvents). In addition, the quarterly groundwater samples from wells located near the Landsburg Mine site will be analyzed for VOCs and petroleum hydrocarbons to monitor for presence of the more mobile contaminants associated with that high priority site.

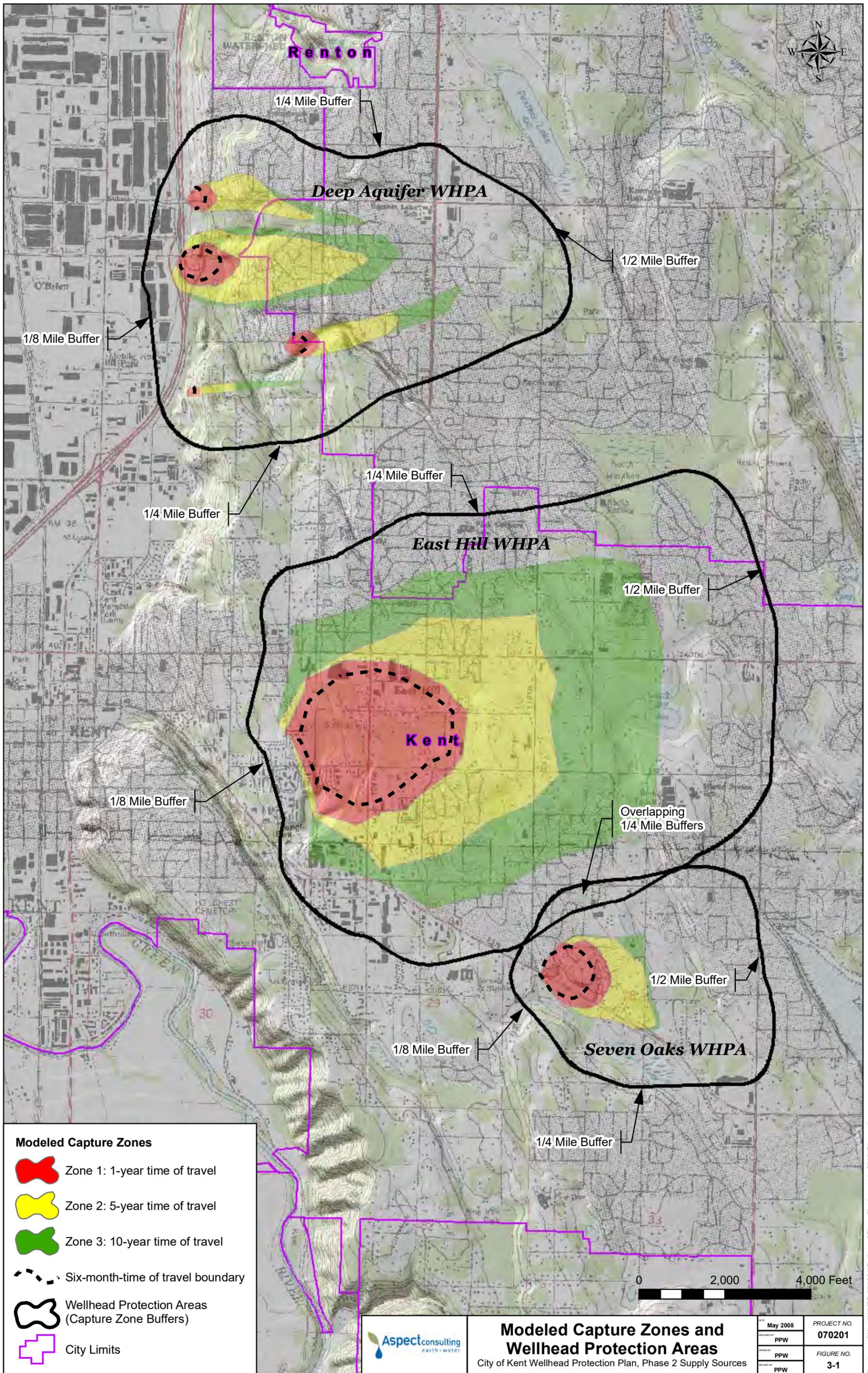
The Monitoring Plan for the Phase 2 supply sources follows the same water level and water quality monitoring schedule described above for the Phase 1 Springs sources. The Phase 2 monitoring program includes monitoring of existing deep water wells for which well owner permission is obtained.

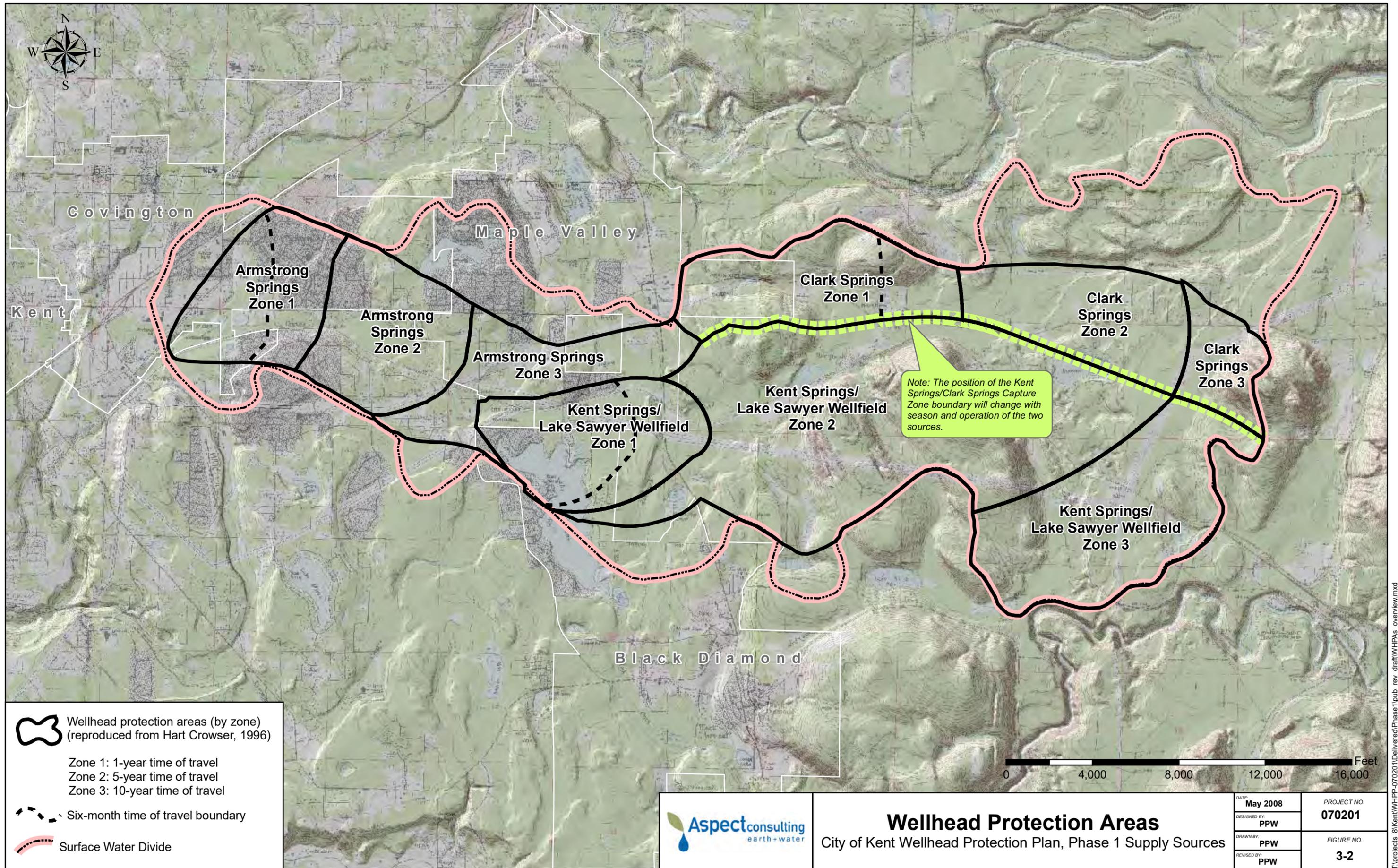
8.4.2 Spill Response Plan

Spill response planning exists through integrated national, state, and local agencies. However, because most spills are small and require local response, the Spill Response Plan focuses on local response capabilities and needs associated with these local response systems. Depending on the nature and location of the spill incident, the local Fire Department and the State Patrol are normally the first responders for highway-related incidents, and Ecology is the regulatory lead for environmental cleanup following a spill. Locally, the City of Kent is responsible for assisting the local fire districts with Hazardous Material Response within the WHPA. The City has a hazardous material emergency response plan which identifies the personnel and procedures that are used in response to a hazardous materials incident within the WHPA. The Spill Response Plan is the same for the Phase 1 and Phase 2 supply sources.

8.4.3 Water Supply Contingency Plan

The Water Supply Contingency Plan identifies possible steps that could be taken to seek alternate supplies of water if one of the City's key water supply sources becomes contaminated or otherwise unusable. The Contingency Plan for the Phase 1 supply sources assumes loss of Clark Springs. The Contingency Plan for the Phase 2 supply sources assumes loss of the East Hill wellfield. Depending on how long a source is not available, the options include purchasing water via existing interties, treating contaminated groundwater at the source, or exploring for new sources of groundwater.





Wellhead Protection Areas

City of Kent Wellhead Protection Plan, Phase 1 Supply Sources

DATE	May 2008	PROJECT NO.	070201
DESIGNED BY	PPW	FIGURE NO.	3-2
DRAWN BY	PPW		
REVISED BY	PPW		



PUBLIC WORKS ENVIRONMENTAL ENGINEERING

Michael Mactutis, P.E.
Environmental Engineering Manager
400 West Gowe
Kent, WA 98032
Fax: 253-856-6500

PHONE: 253-856-5500

February 22, 2019

Gina Estep
Community Development Director
City of Covington SEPA Official
16720 SE 271st Street, Suite 100
Covington, WA 98042

**RE: Alpine Glen Subdivision Project
File No. LU18-0020/0040 & LU18-0022/0040**

Dear Ms. Estep:

Thank you for the opportunity to provide comments on the Alpine Glen Subdivision Project. The city of Kent (Kent) is concerned about the protection of water quality as this project is located within Kent's wellhead protection area (WHPA).

The proposed project is located within Kent's WHPA for Armstrong Springs, a municipal water source for Kent. Armstrong Springs is located approximately 1.4 miles west of the proposed project. Armstrong Springs has a high susceptibility to groundwater contamination due to soil permeability, geologic materials, depth to water, and topography. Protecting the quality and quantity of municipal groundwater sources are critical to ensure public health and safety as well as economic develop is not impacted.

Potential contaminant sources include spills (during construction and after installation) and stormwater runoff. Appropriate measures should be implemented during design and construction of the proposed project to ensure groundwater is protected. Please take into consideration the following comments during the project:

- 1) The proposed project is located in the Zone 2 (five-year time of travel zone) wellhead protection area (WHPA) for Kent's Armstrong Springs municipal water source. The project should be designed, constructed and maintained to protect groundwater resources. Please identify the WHPA on all project plans for this area and include a note on the face of the plans. Map below for reference.
- 2) During construction, stormwater should be adequately treated prior to discharging from the site.
- 3) All equipment should be in good operating condition at all times. No equipment with leaks should be permitted on the construction site.

- 4) A refueling plan should be developed for this project including a specific location to refuel equipment that includes secondary containment in the event of a spill including spill kits and equipment to clean up any spills. Fuel should not be permitted to be stored on-site. The refueling location should be located well outside the WHPA.
- 5) Please notify Kent in the event of any spills. Any spills, regardless of size, within 1 mile of the WHPA should be reported to the Kent, in addition to the Department of Ecology as required. In the event notification to Kent is required, please state that the spill is located in a wellhead protection area. Please place the following note on all sheets on the construction plans: ,

"All spills must be reported to the city of Kent water department at (253) 856-5600 and the Washington State Department of Ecology at (425) 649-7000."



Map Source: <https://fortress.wa.gov/doh/swap/index.html>

Thank you again for the opportunity to comment on the Alpine Glen Subdivision Project. Please feel free to contact me at (253)856-5527.

Sincerely,

Evan Swanson
Water Quality Coordinator

c: Mr. Michael Mactutis, Environmental Engineering Manager
Mr. Shawn Gilbertson, Environmental Engineering Supervisor
Mr. Sean Bauer, Water Superintendent

APPENDIX K

Consumer Confidence Report

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CITY OF KENT

2018 Water Quality Report

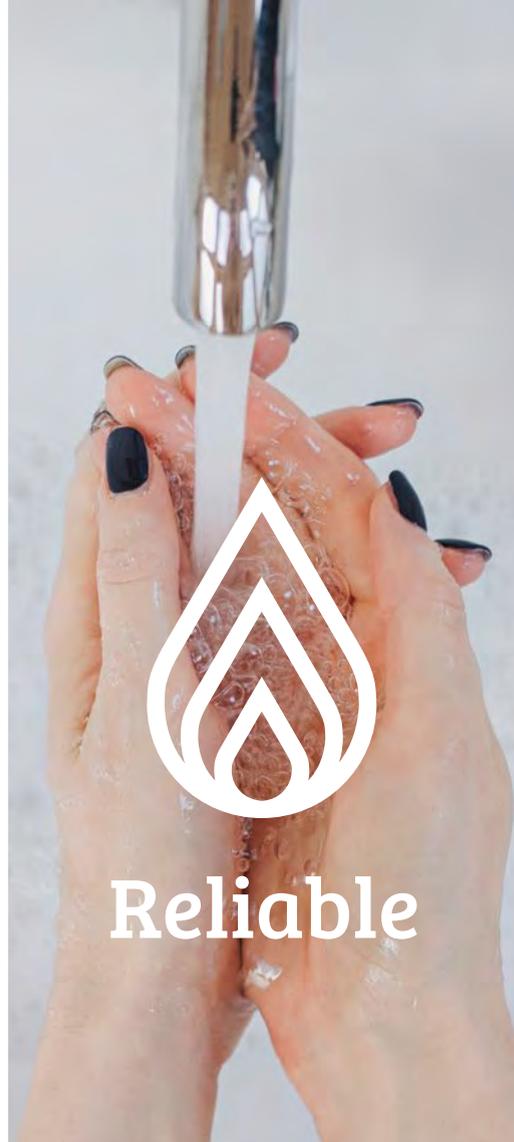


This report contains important information about your drinking water.

PWS ID 381501



Essential



Reliable



Invaluable

Imagine a day without water.

Committed to delivering the highest quality water

The City of Kent again provides our annual Water Quality Report to all our customers, in compliance with federal and state drinking water regulations. We are required to provide this report by July 1 of each year. This edition summarizes the water quality testing completed from January through December 2018.

The purpose of this report is to share a summary of where your water comes from and how your water was treated and tested during 2018. We continue our commitment to delivering high quality drinking water.

We remain diligent in meeting the challenges of water source protection, conservation and community education while continuing to serve the needs of all water users in a fiscally responsible manner.

For questions related to drinking water, call **253-856-5600**. You may also contact the Washington State Department of Health, Office of Drinking Water at **253-395-6750**.



Kent water facts

Sources

16 wells

2 springs

1 surface
(Tacoma Water)

2.770 billion gallons
of water produced

11,157 routine
water quality tests
performed

Storage

9 water reservoirs

23.2 million
gallons of storage
for peak demand &
fire flow

6 pump stations

7 primary pressure
zones

Distribution

69,841 water
customers served

15,256 water
service connections

287 miles of
water main

8,841 water
valves

2,954 fire hydrants



Multiple water sources

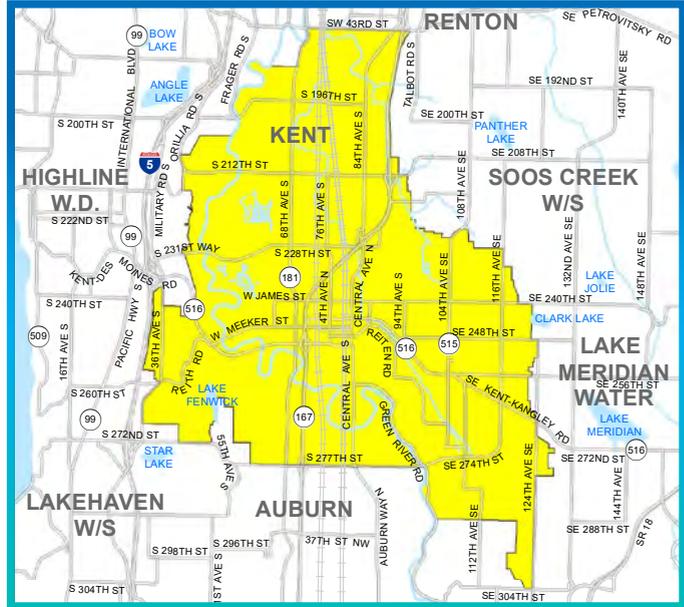
The City's primary water supplies come from either a spring or well drilled into an underground aquifer (a natural underground water reservoir).

To provide for future growth and water system demands, the City has partnerships with Tacoma Water, Covington Water District and Lakehaven Utility District to obtain surface water from the Green River through the Regional Water Supply System.

Kent also has a number of interties linking our water system with all our neighboring water providers to provide emergency service among water providers. Water providers include the cities of Auburn, Renton, Tacoma and Tukwila as well as Lake Meridian Water, Highline Water District and Soos Creek Water & Sewer District.

Customers may notice slight taste differences due to the operation of these various sources and interties, but these water providers must meet the same rigorous standards as the City of Kent.

City of Kent water service area



Water is essential.

Without clean water, our kids' clothes would never make it through the entire school year.





Howard Hanson Dam



How is my water treated and purified?

The primary treatment methods for water supplied to Kent customers are chlorination, fluoridation and pH adjustment.

- **Chlorine** is used for disinfection of the water supply. Chlorine kills germs and microorganisms that may be in the water supply and acts as a protective barrier from any recontamination while water is in the distribution system. The average chlorine residual in your drinking water is 0.81 parts per million (ppm).
- **Sodium Fluoride** is added to the water supply to aid in the prevention of tooth decay. Fluoride levels are maintained at an average of 0.70 ppm.
- **Sodium Hydroxide** is added to the water supply to raise pH levels. pH levels (a measurement of acidity) are adjusted to make the water less corrosive on plumbing and reduce the amount of lead and copper that can dissolve into drinking water.

The City of Kent also obtains water from the City of Tacoma. Tacoma's water supply is surface water coming from the Green River in southeast King County. It is also disinfected with chlorine, fluoridated and pH-adjusted with sodium hydroxide. In addition, Tacoma uses ozone to control taste and odor. This report includes Tacoma's water quality in our system.



For more information on Tacoma Water, visit:
mytpu.org/tacomawater/water-quality

Unwanted medicine return program

Pharmaceuticals and personal care products, abbreviated as PPCPs, are a group of compounds consisting of human and veterinary drugs (prescription or over-the-counter) and consumer products such as perfumes, lotions, sunscreens, housecleaning products and others. These compounds have been detected in trace amounts in surface water, drinking water and wastewater in the United States and Europe.

Pharmaceuticals can enter the water when they are flushed down toilets, put into sinks, thrown into the garbage or when humans or animals pass drugs through their bodies. Excretion of medicines that pass through our bodies is the largest source of the pollution and is more difficult to prevent from entering sewage or septic tanks.

To date, scientists have found no evidence of adverse human health effects from PPCPs in the environment. However, the EPA is committed to investigating PPCPs and developing strategies to make sure the health of the environment and the public is protected.

Kaiser Permanente is participating in King County's medication disposal program to encourage responsible disposal of unwanted medicines. Disposal kiosks are open to anyone in the community. Kent Medical Center Pharmacy has a disposal kiosk available.

For more information on their program and other locations, visit wa.kaiserpermanente.org/html/public/pharmacy/drug-disposal

For other locations in King County and answers to questions about disposing of unwanted medicines, visit KingCountySecureMedicineReturn.org

Protecting our groundwater

Several aquifers supplying Kent's water are shallow and receive most of their water through infiltration (rainfall trickling through the ground into the aquifer). Because of this, the aquifers are susceptible to contamination from above-ground activities that have the potential to introduce contaminants through the ground to the aquifer.

To ensure Kent's groundwater is protected, a **Wellhead Protection Program** was implemented in 1996 and updated in 2008. This program ensures our groundwater sources are regularly monitored to provide a high quality water supply. By monitoring how water flows underground and where potential sources of contaminants are located, we can be better prepared to respond in the event of an emergency or contamination.

Growth has the potential to impact groundwater resources by creating impervious surfaces which concentrate pollutants and decrease aquifer recharge rates. Growth also leads to additional pesticide and fertilizer use that could impact water quality and quantity. The City continues to review land use applications to ensure development will not have a negative impact on groundwater resources. New developments are being encouraged to maintain a no-net-loss in aquifer recharge.



For more information on the Wellhead Protection Program, call **253-856-5527**.

To report spills, water pollution, or contamination, call **253-856-5600**.

Integrated Pest Management (IPM) provides alternatives for farmers, golf course managers, parks departments, school districts, public works crews and homeowners to control nuisance plants and insects. Alternatives in IPM are provided to decrease environmental impacts and to help protect groundwater. For example, instead of spraying an entire playfield for weeds, spot spraying may be used to save money and reduce the amount of herbicide used.



Water system protection: cross connection control

The City of Kent implements an extensive cross connection control program to help ensure safe drinking water for its customers.

What is a cross connection?

A cross connection is a permanent or temporary piping arrangement that can allow the City's drinking water to be contaminated by a non-potable (not safe to drink) source if a backflow condition occurs.

What is backflow?

Backflow is water flowing in the opposite direction of its intended path. Backflow can allow contaminants to enter the drinking water system through cross connections.

Through an active cross-connection control program, the City of Kent isolates and eliminates hazards by requiring installation and testing of backflow prevention assemblies. A properly-installed and maintained backflow prevention assembly protects the water supply and the health and wellbeing of those who drink the water. Periodic testing ensures the assembly is working properly.

The following are examples of water uses for which the City of Kent requires backflow prevention:

- Wash basins and service sinks
- Hose bibs (garden hose faucets)
- Chemical sprayers attached to hoses
- Lawn irrigation systems
- Ornamental landscape ponds and fountains
- Auxiliary water supplies
- Laboratory and aspirator equipment
- Processing tanks
- Boilers
- Water recirculation systems
- Swimming pools
- Solar heat systems
- Fire sprinkler systems
- Hazardous chemicals or biological processes
- RV wastewater (blackwater) dumping stations

To learn more about cross connection control, backflow prevention or backflow assembly testing, call 253-856-5500 or visit KentWA.gov/city-hall/public-works/water-master-plan/cross-connection-control-program

Annual backflow assembly test reports can be submitted directly to us at backflow@KentWA.gov

For a list of Washington State Department of Health approved backflow assembly testers, visit GRCC.greenriver.edu/wacertservices/bat/bat_publiclist.asp



Water use efficiency goals

State law requires municipal water suppliers to use water more efficiently in exchange for water right certainty and flexibility to help meet future demand. The Legislature directed the Department of Health to adopt an enforceable Water Use Efficiency (WUE) program, which became effective on January 22, 2007.

Kent's Water Use Efficiency Program strives to reduce water used by public agencies (e.g., city facilities, schools, etc.) between June and August by 0.5 percent each year, with a total reduction goal of 3 percent over a six-year period. The program also aims to keep water loss at less than 6 percent per year (Municipal Water Law standard is 10 percent). Water loss (unaccounted-for water) is an inherent element of water system management which can never be eliminated entirely due to meter inaccuracies, water theft and undetected system leakage.

Results:

Water use for the period of June through August 2018 decreased 0.2 percent compared to the same period in 2017. Our emphasis was on outdoor water use which saw an increase of 6.8 percent over last year. 2018 was the driest June through August period in the last five years, with a total of only 1.7 inches of rain over the three-month period. Since the inception of this goal in 2007, overall water use for the period of June through August has decreased by 2.4 percent even as the number of services has increased by 2.2 percent. Dedicated irrigation accounts for government agencies have risen by 43.3 percent over this same time period. We will reevaluate this goal, as well as other potential water use efficiencies that can be incorporated, as part of our water system plan renewal that is currently underway.

The City met its goal of maintaining 6 percent or less lost water for the year, with a 5.8 percent distribution system leakage reported. The average lost water rate is 4.3 percent since 2007.

To view the entire 2018 Water Use Efficiency Report, visit our water utility page at **KentWA.gov**.



Water conservation

Water conservation measures are another tool in protecting our water supply. Not only do they conserve water, but they can also save money by reducing your water bill.

For tips on conserving water and protecting water quality please visit **KentWA.gov/EnvironmentalStewardship**.

Buying a new toilet? Make it a Water Sense model, and you may qualify for a \$50 rebate. Water Sense toilets use 20 percent less water than the current federal standard, while still providing equal or superior performance. To participate, you must be a City of Kent water customer and replacing a high-volume toilet that was installed before 1993. To find out more about this program, visit **KentWA.gov/EnvironmentalStewardship**. For a list of EPA Water Sense-certified toilets, visit **EPA.gov/watersense/residential-toilets**.

Save water and energy with a new, high-efficiency, Energy Star washer, and you may qualify for a \$75 rebate. To find out more about the program and if you qualify visit **KentWA.gov/EnvironmentalStewardship**. For a list of eligible washing machines, visit **Energystar.gov**.

Water conservation tips

To conserve water inside your home:

- Fix leaking faucets, pipes and toilets or replace them with water-saving devices.
- Wash only full loads of dishes or laundry.
- Do not use the toilet for food disposal.
- Take shorter showers.
- Don't let the water run while shaving or brushing teeth.

To conserve water outside your home:

- Install rain sensor on sprinkler control system.
- Water the lawn and garden in the morning or evening to avoid evaporation in hot weather. One inch of water a week is sufficient.
- Use mulch around plants and shrubs.
- Repair leaks in faucets and hoses, and use water-saving nozzles.
- Wash your car using water from a bucket, and save the hose for rinsing.

For more information call **258-856-5589**, or visit **WaterUseItWisely.com** or **EPA.gov/Watersense**



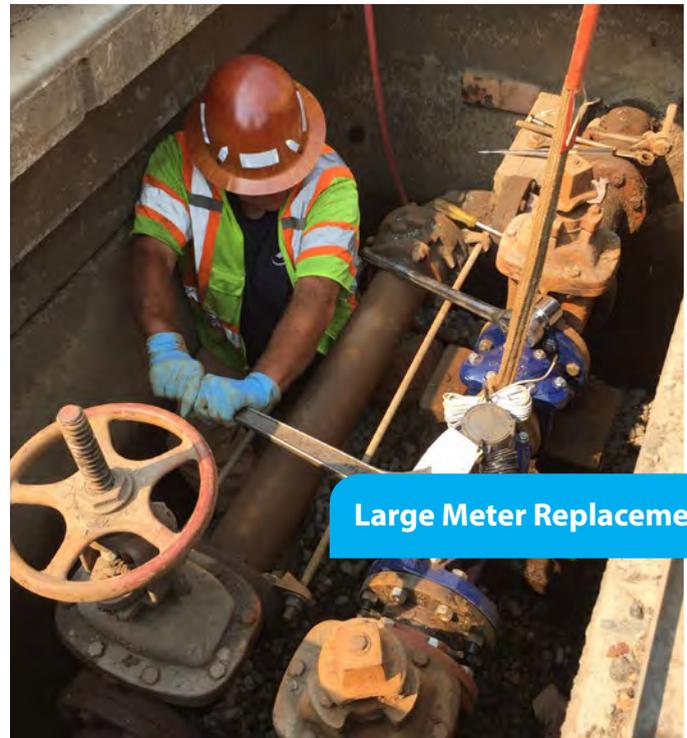
Building for today

Key accomplishments in 2018:

- Construction began on a back-up power generator system at our Kent Springs source and electrical improvements at a pump station on the West Hill of our service area. Construction will be complete in the spring of 2019.
- We are working with our consultant on renewing our water system plan for the next 10-year planning period. The plan should be finalized and adopted by the end of 2019.
- Construction began on a coating, structural and safety improvement project at our Cambridge Reservoir on the West Hill of our service area. Construction will be completed in summer 2019.
- We revised our Eastern Wellhead Protection Monitoring Plan to incorporate additional monitoring wells.
- We completed installation of 485 pressure-reducing valves needed on customers' water services located within a new pressure zone on the East Hill area of our water system.
- We completed design of a new pump station that will supply water to customers within a new pressure zone on the East Hill of our water system. Construction of the pump station began in February of 2019

- We updated the City's Cross Connection Control Code (Chapter 7.02). The new code reflects changes in state law, improvements in technology, and provides for a more well-defined and consistent enforcement mechanism.
- We cleaned and inspected two water reservoirs
- We installed 1,500 feet of eight-inch water main at various locations as part of our Shops Inc. program.
- We upgraded 14 fire hydrants in the water distribution system.

The Water Section continues implementation of a system-wide water main cleaning, unidirectional flushing, valve exercise and water service line/water main replacement program, as well as other related maintenance to improve water quality and system reliability.



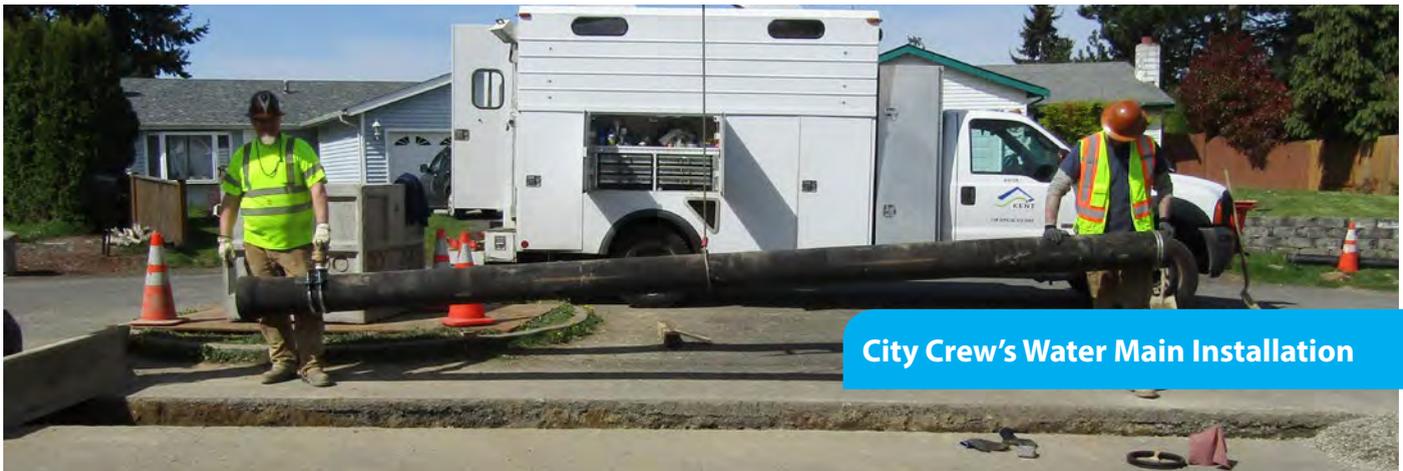
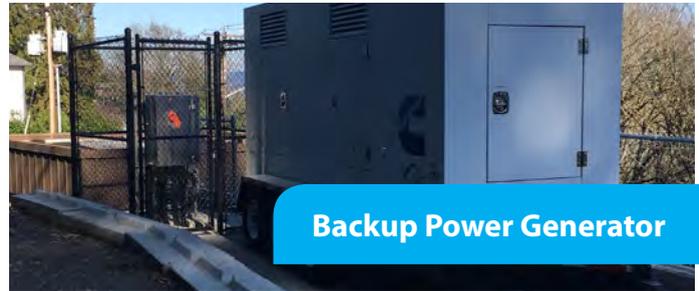
Large Meter Replacement



Planning for tomorrow

The next few years will bring many new system improvement projects:

- Continued work with our consultant on our water system plan renewal for the next 10-year planning period
- Coating and structural improvements for a water storage tank on the Kent East Hill
- Permitting and construction of an additional water storage tank on the West Hill of Kent
- An electrical system upgrade and automated back-up power transfer switch at a booster station providing water to the West Hill of our water system
- Continued pumping and piping improvements to increase water pressure in our upper 590 Pressure Zone on the East Hill for a new pressure zone
- Water main and fire hydrant replacements
- Interior cleaning and inspection of water storage reservoirs and coating improvements
- Design/installation of backup emergency power supply for our water sources
- Design/implementation of Habitat Conservation Measures for our Clark Springs source





Monitoring Results

Thousands of water samples were taken in 2018 to determine the presence of any radioactive, biological, inorganic, volatile organic or synthetic organic contaminants. The table below shows those contaminants that were detected in the water. Because the concentrations of certain substances do not change frequently, the state requires us to monitor for these substances less often than once per year. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

SUBSTANCE	MCL (Maximum amount allowed)	MCLG (ideal amount or less)	Maximum Result	Sample Range	MCL Violation	Major Sources
REGULATED AT THE SOURCE						
Nitrate	10 ppm	10 ppm	1.6 ppm	0.55-1.6 ppm	No	Runoff from fertilizer use, leaching from septic tanks & sewage, erosion of natural deposits
Radium 228	5 pCi/L	0	0.484 pCi/L	0-0.484 pCi/L	No	Erosion of natural deposits
Gross Alpha Particles	15 pCi/L	0	<0.426 pCi/L	<0.426 pCi/L	No	Decay of natural and man-made deposits
Arsenic	10 ppb	0	1.3 ppb	0-1.3 ppb	No	Erosion of natural deposits
UNREGULATED AT THE SOURCE						
Sodium	Not regulated	Not regulated	21 ppm	8-21 ppm	Not regulated	Erosion of natural deposits
Calcium	Not regulated	Not regulated	25 ppm	5.4-25 ppm	Not regulated	Erosion of natural deposits
Magnesium	Not regulated	Not regulated	15 ppm	0.88-15 ppm	Not regulated	Erosion of natural deposits
TOC (Total Organic Carbon)	Not regulated	Not regulated	2.5 ppm**	<0.2-2.5 ppm	Not regulated	Organic compounds in surface water
Hardness	Not regulated	Not regulated	136 ppm	10-136 ppm	Not regulated	Erosion of natural deposits
REGULATED IN THE DISTRIBUTION SYSTEM						
Haloacetic Acids (HAAs)	60 ppb	na	6.5 ppb	<1.0-6.5 ppb	No	By-product of drinking water disinfection
TTHMs (Total Trihalomethanes)	80 ppb	na	16.7 ppb	2.6-16.7 ppb	No	By-product of drinking water disinfection
Chlorine	MRDLG=4	na	1.42 ppm	0.35-1.42 ppm	No	Water additive used as an industry-wide treatment method to control microbes.
REGULATED (Secondary) AT THE SOURCE Substances not considered a risk to human health but can affect aesthetics, such as taste, color, and odor. Results above the SMCL are not considered to be a violation.						
Iron	SMCL=0.300 ppm	na	0.006 ppm	0-0.006 ppm	No	Erosion of natural deposits
Manganese	SMCL=0.050 ppm	na	0.069 ppm	0-0.069 ppm	No	Erosion of natural deposits
DOH (State) REGULATED						
Fluoride	4.00 ppm	2.00 ppm	0.88 ppm	0.55-0.88 ppm	No	Erosion of natural deposits, water additive which promotes strong teeth
Turbidity	Not regulated	Not regulated	0.80 NTU	0.03-0.80 NTU	No	Soil runoff/pipe sediments & minerals
MICROBIAL STANDARDS IN DISTRIBUTION SYSTEM						
Total Coliform	<5% positive	0	0	0 of 934 samples	No	Sampling technique, coliforms are naturally present in the environment

**Tacoma Supply

Table Definitions:

MCL (Maximum Contaminant Level): Highest level of a substance that's allowed in drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a substance in drinking water below which there is no known or expected risk to health.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water.

NA: Not applicable.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water.

pCi/L (Picocuries per Liter): Unit of measurement used for radiological contaminants.

ppb (parts per billion): One part substance per billion parts water (or micrograms per liter).

ppm (parts per million): One part substance per million parts water (or milligrams per liter).

SMCL (Secondary Maximum Contaminant Level): The level above which a substance may affect taste, color and odor but is not considered a risk to human health. Results above this level are not considered a regulatory violation.



Unregulated Contaminant Monitoring Regulation Fourth Cycle (UCMR4)

Unregulated contaminants are those that do not yet have a drinking water standard set by the EPA. The purpose of monitoring for these contaminants is to help the EPA decide whether the contaminants should have a standard. In 2018, the City of Kent sampled for 30 different contaminants as required by the EPA and found low levels of four compounds present in our drinking water. The contaminants and their concentration are listed below. For more information, contact the EPA's Safe Drinking Water Hotline at **1-800-426-4791**.

Substance	Unit	Year Sampled	MCL	MCLG	Maximum Result	Sample Range	Compliance
Manganese	ppm	2018	0.05 ppm	na	0.044 ppm	0.0004 to 0.044 ppm	Yes
	Major Sources: Erosion of natural deposits						
Haloacetic Acids							
HAA5	ppb	2018	60 ppb	na	15 ppb	2.1 to 15 ppb	Yes
	Major Sources: By-product of drinking water disinfection						
HAA9	ppb	2018	Not regulated	na	17 ppb	3.1 to 17 ppb	na
	Major Sources: By-product of drinking water disinfection						
HAA6Br	ppb	2018	Not regulated	na	3.6 ppb	0.46 to 3.6 ppb	na
	Major Sources: By-product of drinking water disinfection						

Table Definitions:

MCL (Maximum Contaminant Level): The highest level of a substance that is allowed in drinking water.

MCLG (Maximum Contaminant Level Goal): The level of a substance in drinking water below which there is no known or expected risk to health.

ppm (parts per million): One-part substance per million parts water (or milligrams per liter).

ppb (parts per billion): One-part substance per billion parts water (micrograms per liter).

na: Not applicable.



Lead and copper monitoring

To reduce the risk of lead and copper exposure, the City water system utilizes a corrosion control program that adjusts pH levels to reduce the corrosiveness of the drinking water. The drinking water system is monitored continuously through water quality analyzers and tested daily to maintain a non-corrosive pH level. In September 2018, the City sampled the lead and copper levels in 45 homes throughout our water system. The results of this sampling showed our corrosion control efforts are working. All sample results showed lead and copper levels were well below the EPA regulatory action levels.

These samples are collected every three years as required by the Department of Health. Another round of sampling will occur in 2021.

Substance	Unit	Year Sampled	AL	MCLG	Amount Detected (90%)	Number of Homes Above AL	Compliance
Copper	ppm	2018	1.3 ppm	1.3 ppm	0.12 ppm	0	Yes
	Major Sources: Corrosion of household plumbing systems, erosion of natural deposits						
Lead	ppm	2018	0.015 ppm	0	<0.001 ppm	0	Yes
	Major Sources: Corrosion of household plumbing systems, erosion of natural deposits						

Table Definitions:

AL (Action Level): The concentration of a substance which triggers treatment or other requirements which a water system must follow

MCLG (Maximum Contaminant Level Goal): The level of a substance in drinking water below which there is no known or expected risk to health

ppm (parts per million): One-part substance per million parts water (or milligrams per liter)

Lead: In Washington State, lead in drinking water comes primarily from materials and components used in household plumbing. Your water may contain more dissolved metals, such as lead, the longer the water remains in your homes plumbing. Elevated levels of lead can cause serious health problems, especially in pregnant women and young children.

Reduce potential exposure to lead: For water taps that have not been used for six hours or more, flush water through the tap until the water is noticeably colder before using for drinking or cooking. Use the flushed water for watering plants, washing dishes or general cleaning. Only use water from the cold-water tap for drinking, cooking and making baby formula. Hot water is likely to contain higher levels of lead. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water is available from the **EPA's Safe Drinking Water Hotline at 1-800-426-4791** or online at **EPA.gov/safewater/lead**.



Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. People with compromised immune systems such as people with cancer, patients undergoing chemotherapy, organ transplant recipients, people with HIV/AIDS or other immune system disorders, and some elderly and infants can be particularly at-risk for infections. These people should seek advice about drinking water from their health care providers.

EPA/CDC guidelines on appropriate means to lessen the risk of infection by cryptosporidium and other microbial contaminants are available by calling the EPS's Safe Drinking Water Hotline at 1-800-426-4791.

Substances that may be present in drinking water include:

- Microbial contaminants, such as viruses and bacteria, from septic systems, agricultural livestock operations and wildlife.

- Inorganic contaminants, such as salts and metals, which can be naturally occurring or result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining or farming.
- Pesticides and herbicides, from agriculture, urban stormwater runoff and residential uses.
- Organic chemical contaminants, including synthetic and volatile organic chemicals, which are by-products of industrial processes and petroleum production. They can also come from gas stations, urban stormwater runoff and septic systems.
- Radioactive contaminants, which can be naturally occurring or be the result of oil and gas production and mining activities. Radon is a radioactive gas that you cannot see, taste or smell. It is found throughout the U.S. Radon can move up through the ground and into a home through cracks and holes in the foundation.



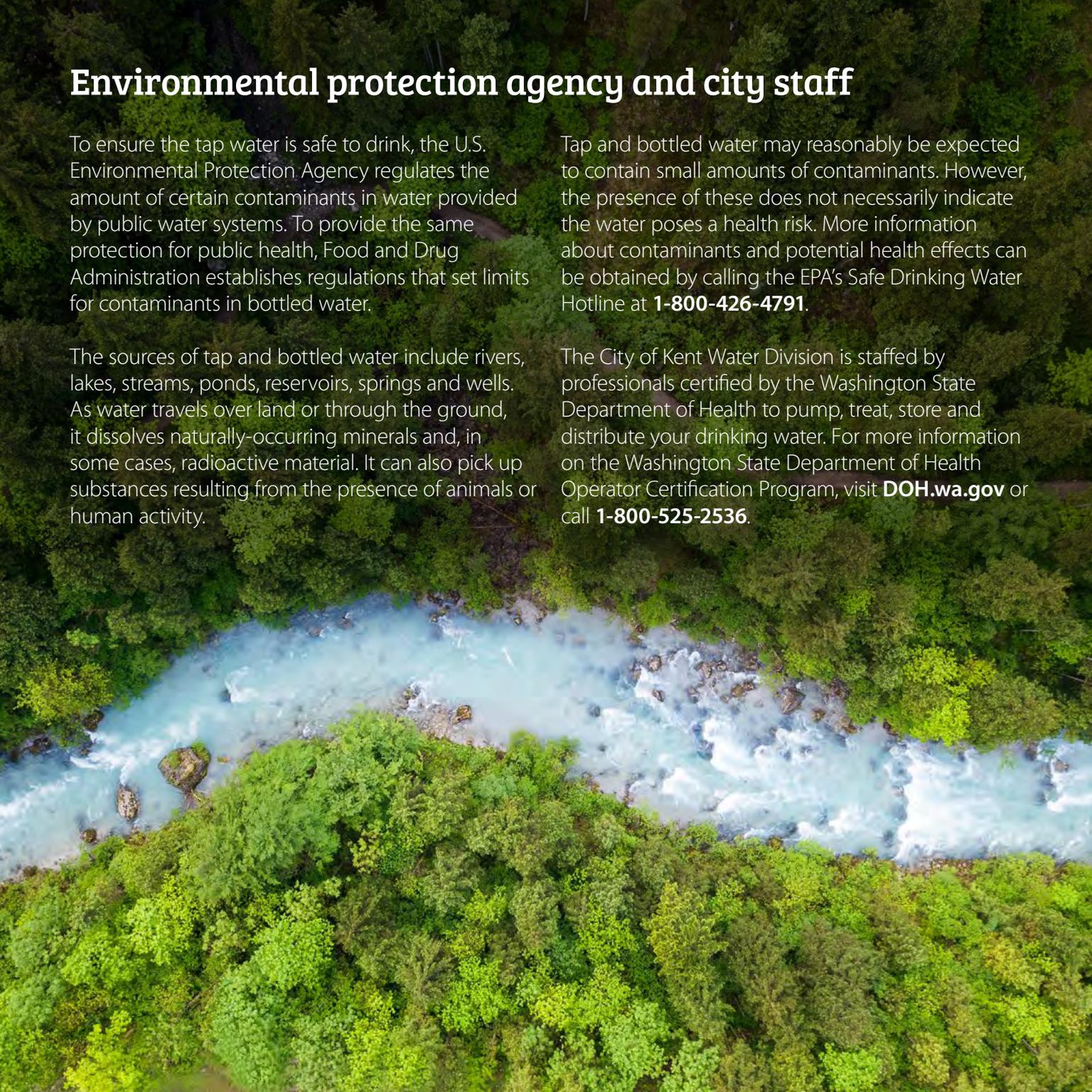
Environmental protection agency and city staff

To ensure the tap water is safe to drink, the U.S. Environmental Protection Agency regulates the amount of certain contaminants in water provided by public water systems. To provide the same protection for public health, Food and Drug Administration establishes regulations that set limits for contaminants in bottled water.

The sources of tap and bottled water include rivers, lakes, streams, ponds, reservoirs, springs and wells. As water travels over land or through the ground, it dissolves naturally-occurring minerals and, in some cases, radioactive material. It can also pick up substances resulting from the presence of animals or human activity.

Tap and bottled water may reasonably be expected to contain small amounts of contaminants. However, the presence of these does not necessarily indicate the water poses a health risk. More information about contaminants and potential health effects can be obtained by calling the EPA's Safe Drinking Water Hotline at **1-800-426-4791**.

The City of Kent Water Division is staffed by professionals certified by the Washington State Department of Health to pump, treat, store and distribute your drinking water. For more information on the Washington State Department of Health Operator Certification Program, visit **DOH.wa.gov** or call **1-800-525-2536**.





City Administration

City Council 253-856-5712
 Mayor's Office 253-856-5700

Utility Billing

Questions, shutoffs 253-856-5200

Permit Center

Plumbing/Permits 253-856-5300
 Water Meter Permits 253-856-5300
 Planning Services 253-856-5454

Spill Hotlines

City of Kent,
 Public Works Operations 253-856-5600

EPA Hotlines

Safe Drinking Water 1-800-426-4791
 Radon 1-800-SOS-RADON
 EPA.gov/safewater or Waterwiser.org

WA State Dept. of Health, Division of Drinking Water

NW Operations 253-395-6750
 Doh.wa.gov/ehp/dw

Kent City Council Meetings 253-856-5712

The Council typically meets on the first and third Tuesdays of each month at 7 p.m. Meetings are held in the Council Chambers of Kent City Hall, 220 Fourth Avenue South, Kent, WA 98032. Please feel free to participate—your input is always welcome!

Public Works Committee 253-856-5500

City Council Public Works Committee meetings are held on the first and third Mondays of every month at 4 p.m.

Kent's Lifeline Program 253-856-5200

Seniors, low income or disabled residents may qualify for Kent's Lifeline Program. The City of Kent offers reduced utility rates for those in need.



For more information

Public Works Water Utility

253-856-5600 • 7:30 a.m. – 4 p.m. weekdays

(For emergencies or general water questions including quality, leaks or pressure)

During non-working hours, emergency calls are answered by staff who will contact a water utility employee.

For non-emergencies that can wait until the next business day, visit **KentWA.gov** and make a "request for service". A water utility employee will contact you the next business day.



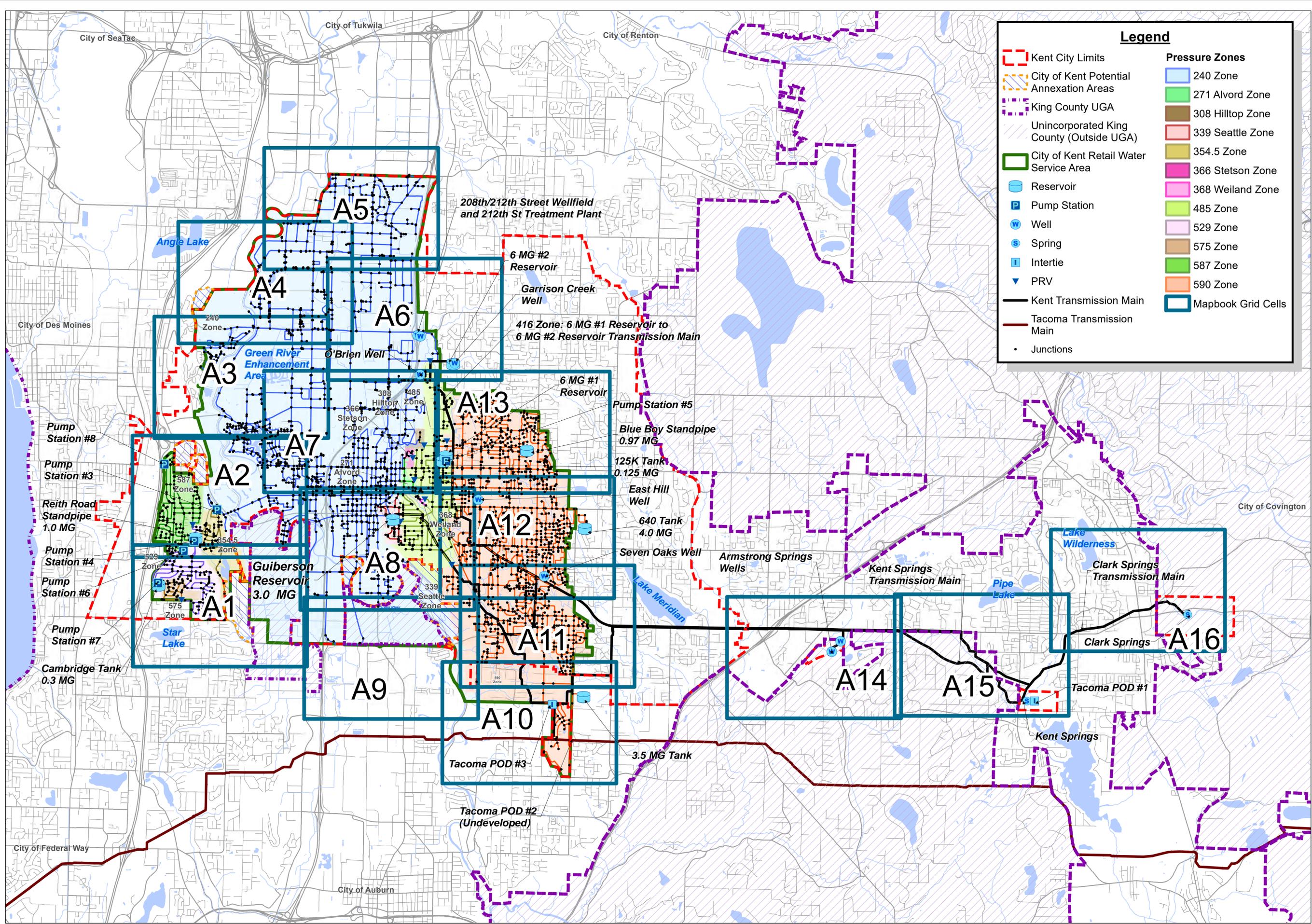
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KentWA.gov

APPENDIX L

Hydraulic Model Node Diagram

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Legend

Kent City Limits	240 Zone
City of Kent Potential Annexation Areas	271 Alford Zone
King County UGA	308 Hilltop Zone
Unincorporated King County (Outside UGA)	339 Seattle Zone
City of Kent Retail Water Service Area	354.5 Zone
Reservoir	366 Stetson Zone
Pump Station	368 Weiland Zone
Well	485 Zone
Spring	529 Zone
Intertie	575 Zone
PRV	587 Zone
Kent Transmission Main	590 Zone
Tacoma Transmission Main	Mapbook Grid Cells
Junctions	

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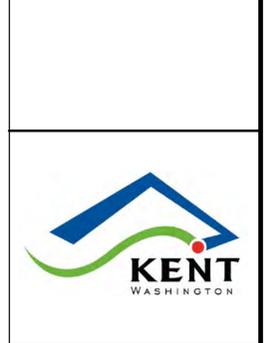
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Existing Node Diagram Overview Map

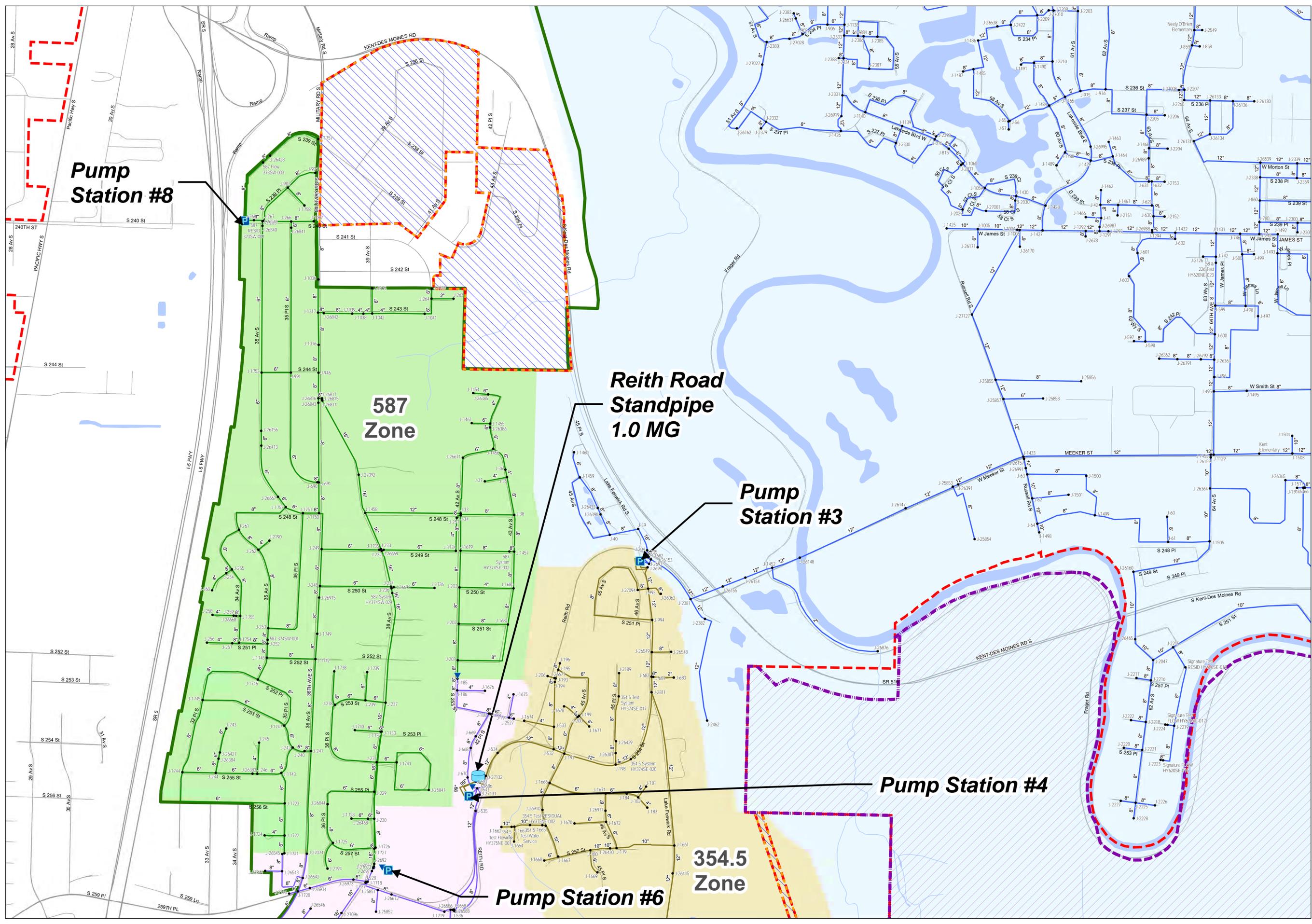
City of Kent 2019 Water System Plan



1 inch = 3,000 feet

DRAWING IS FULL SCALE WHEN BAR MEASURES 2"

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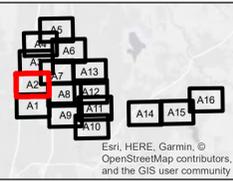


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Vicinity Map



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Existing Node Diagram Mapbook
Grid Cell: A2 **Page 2 of 16**
City of Kent
2019 Water System Plan

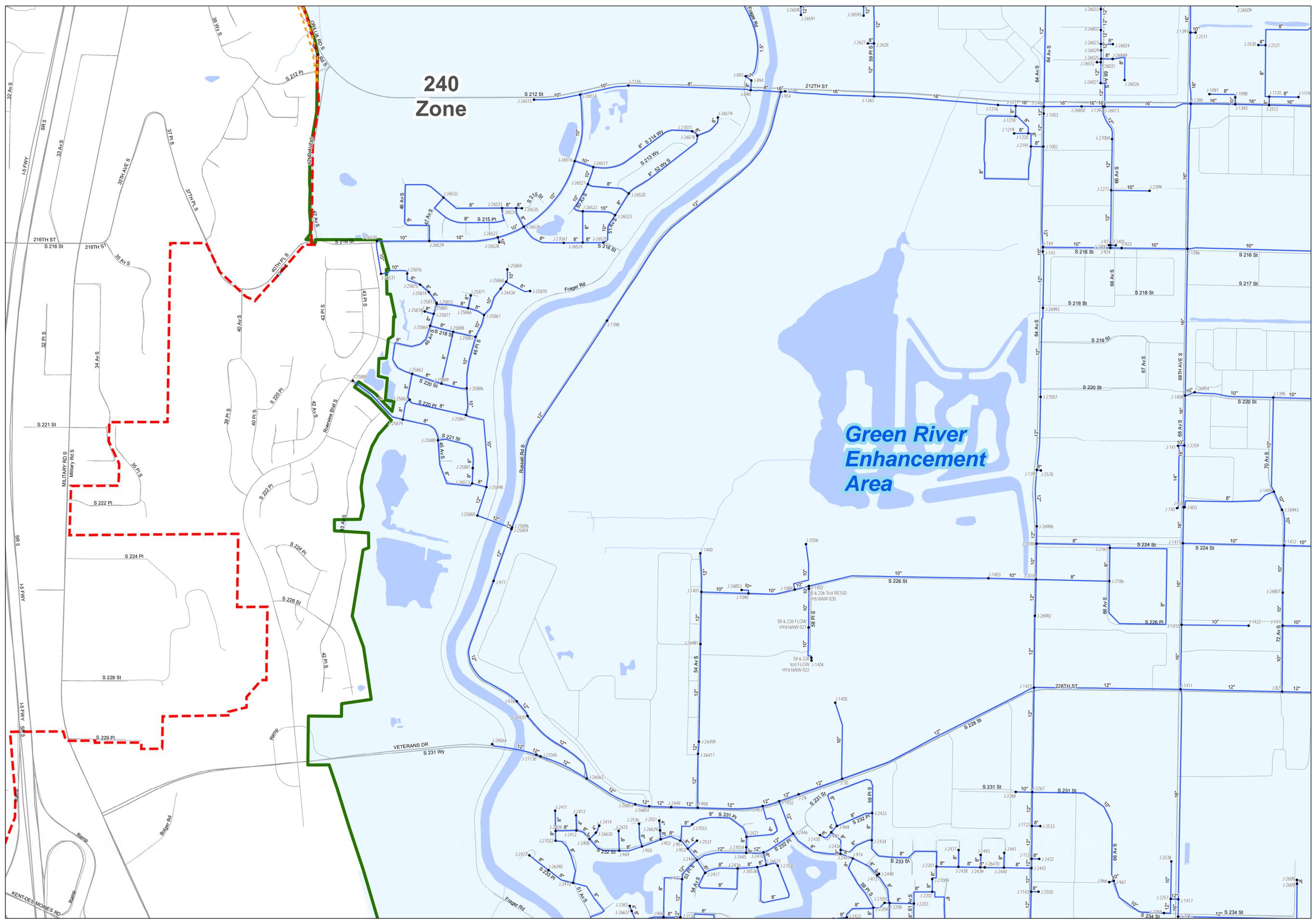


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**240
Zone**

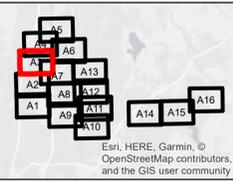
**Green River
Enhancement
Area**

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City of Kent
2019 Water System Plan

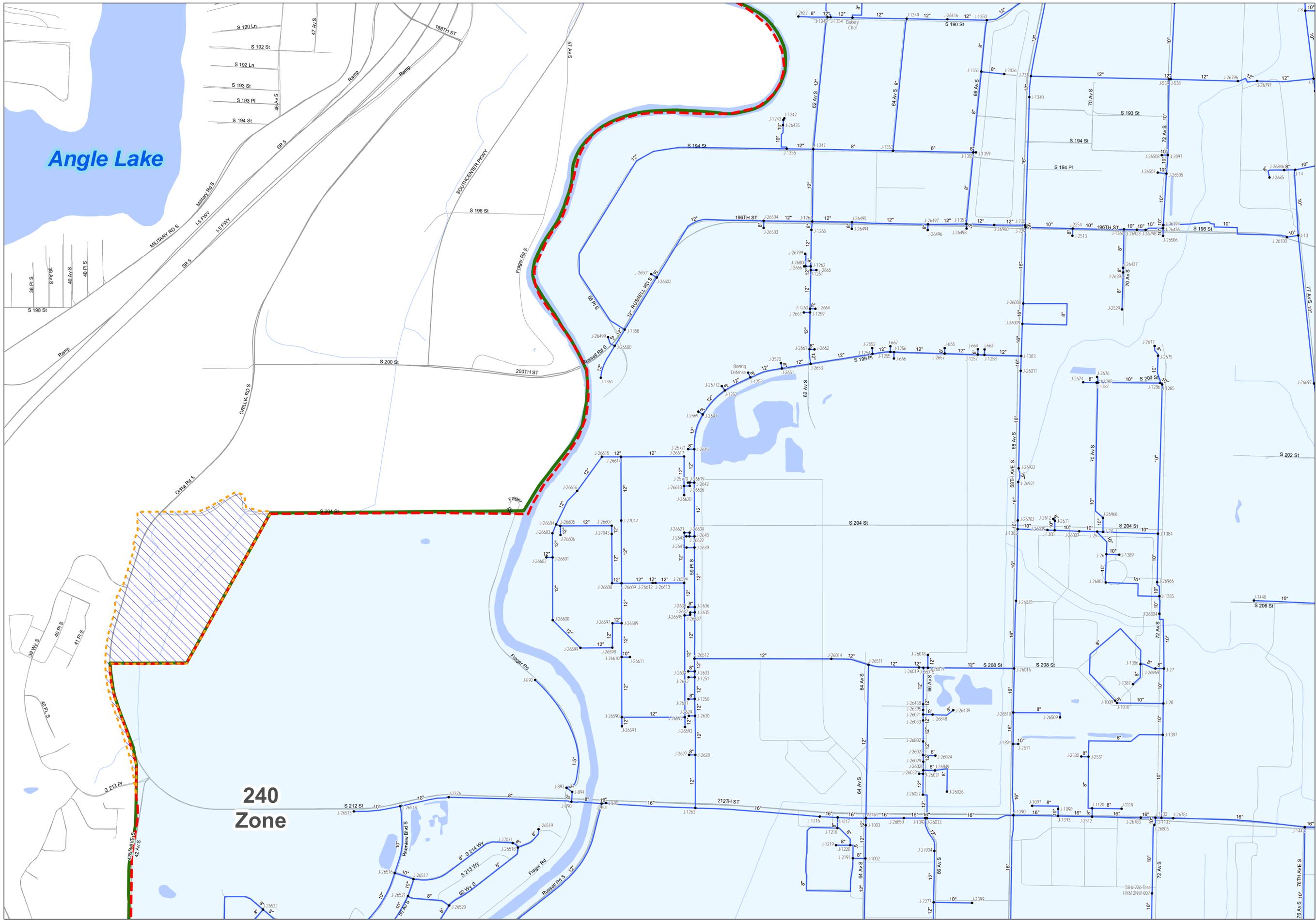


1 inch = 400 feet
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DRAWING IS FULL SCALE
 WHEN BAR MEASURES 2"



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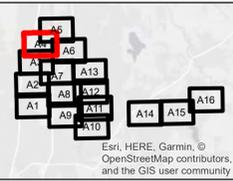
**240
Zone**

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2019 Water System Plan

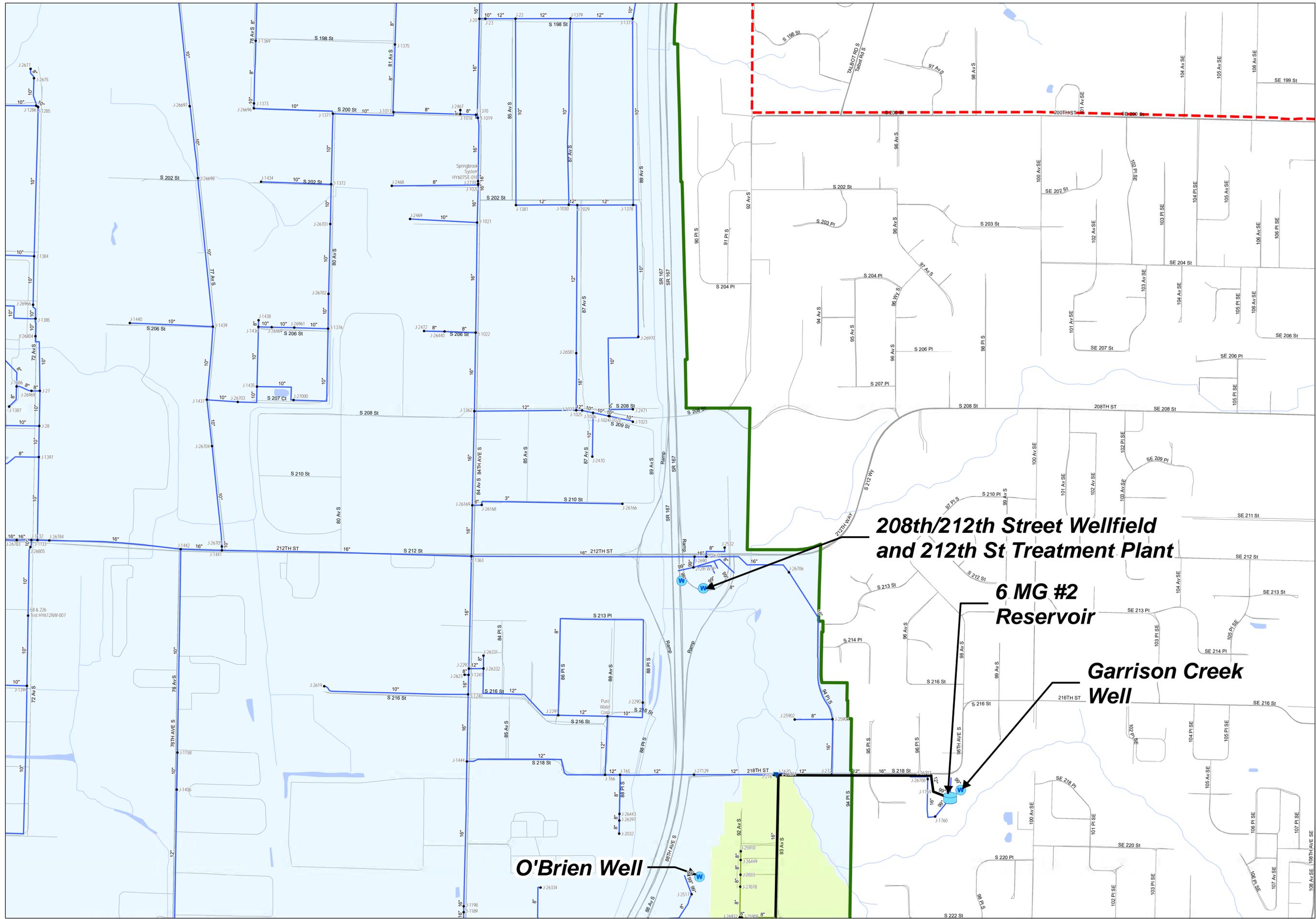


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DRAWING IS FULL SCALE WHEN BAR MEASURES 2"



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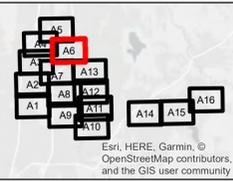


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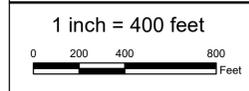
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Vicinity Map



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Page 6 of 16
City of Kent
2019 Water System Plan



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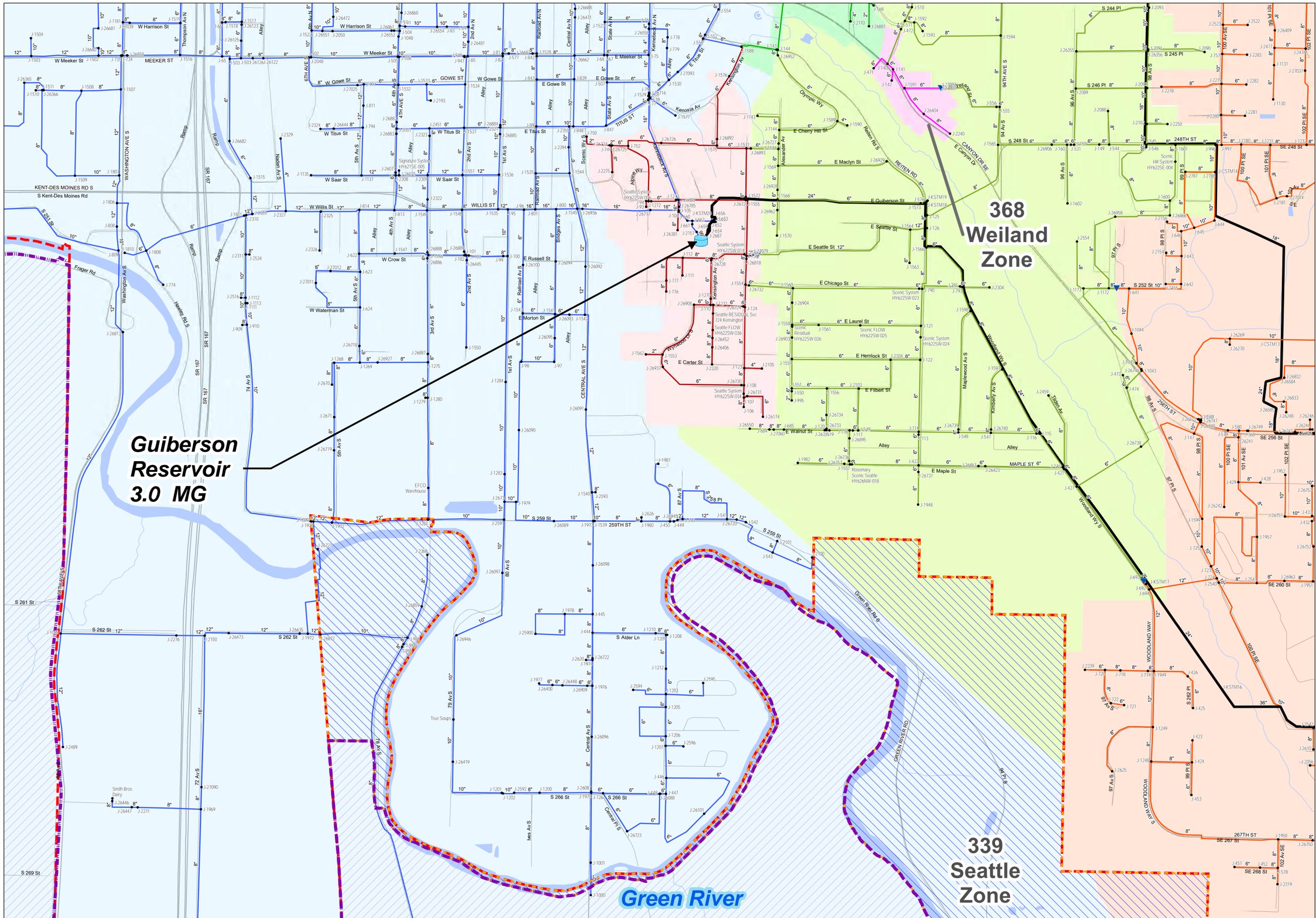
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208th/212th Street Wellfield and 212th St Treatment Plant

6 MG #2 Reservoir

Garrison Creek Well

O'Brien Well

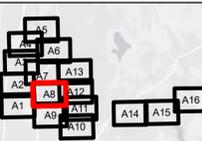


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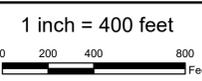
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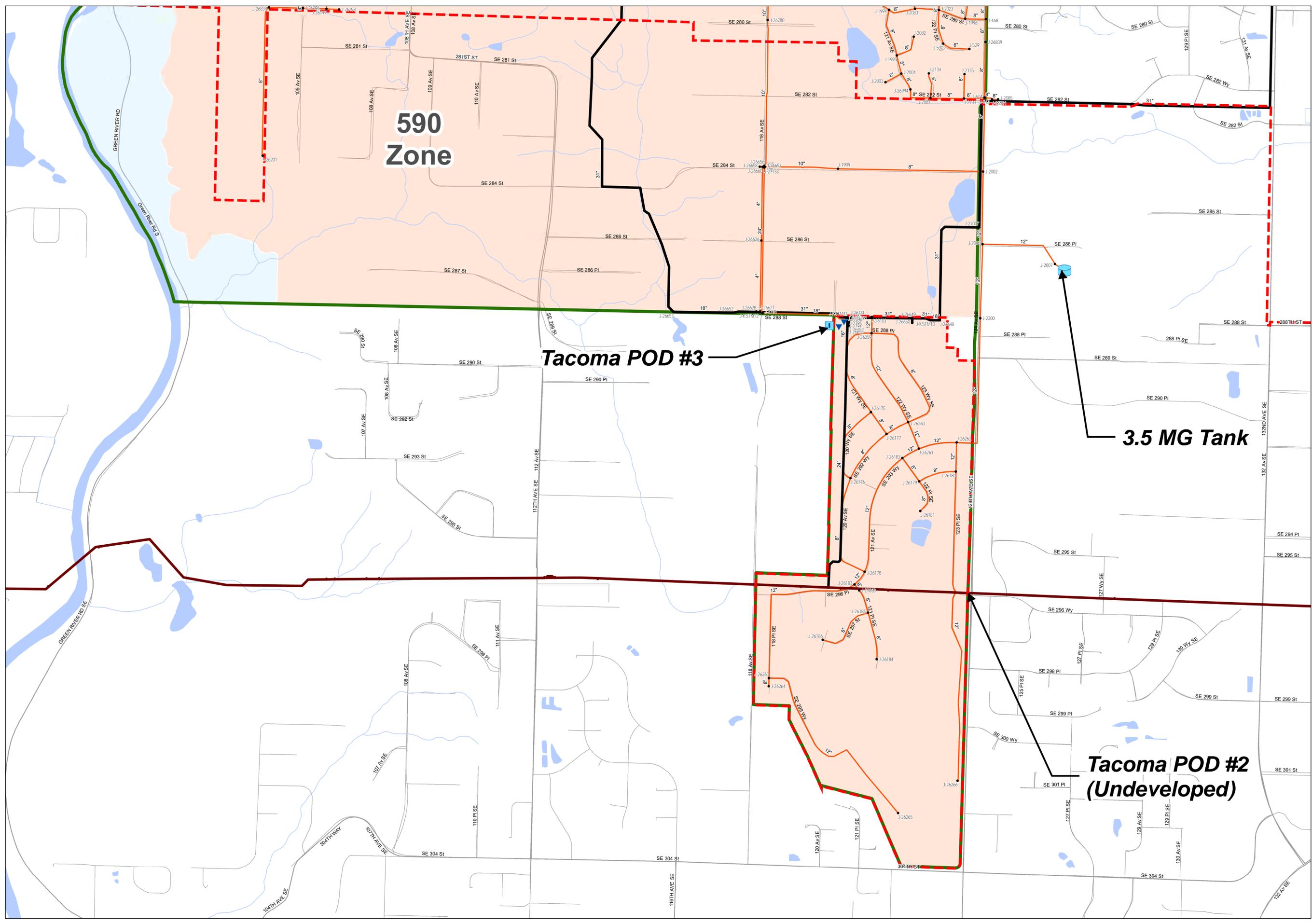
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 City of Kent
 2019 Water System Plan



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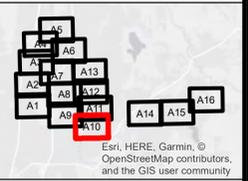


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City of Kent
2019 Water System Plan

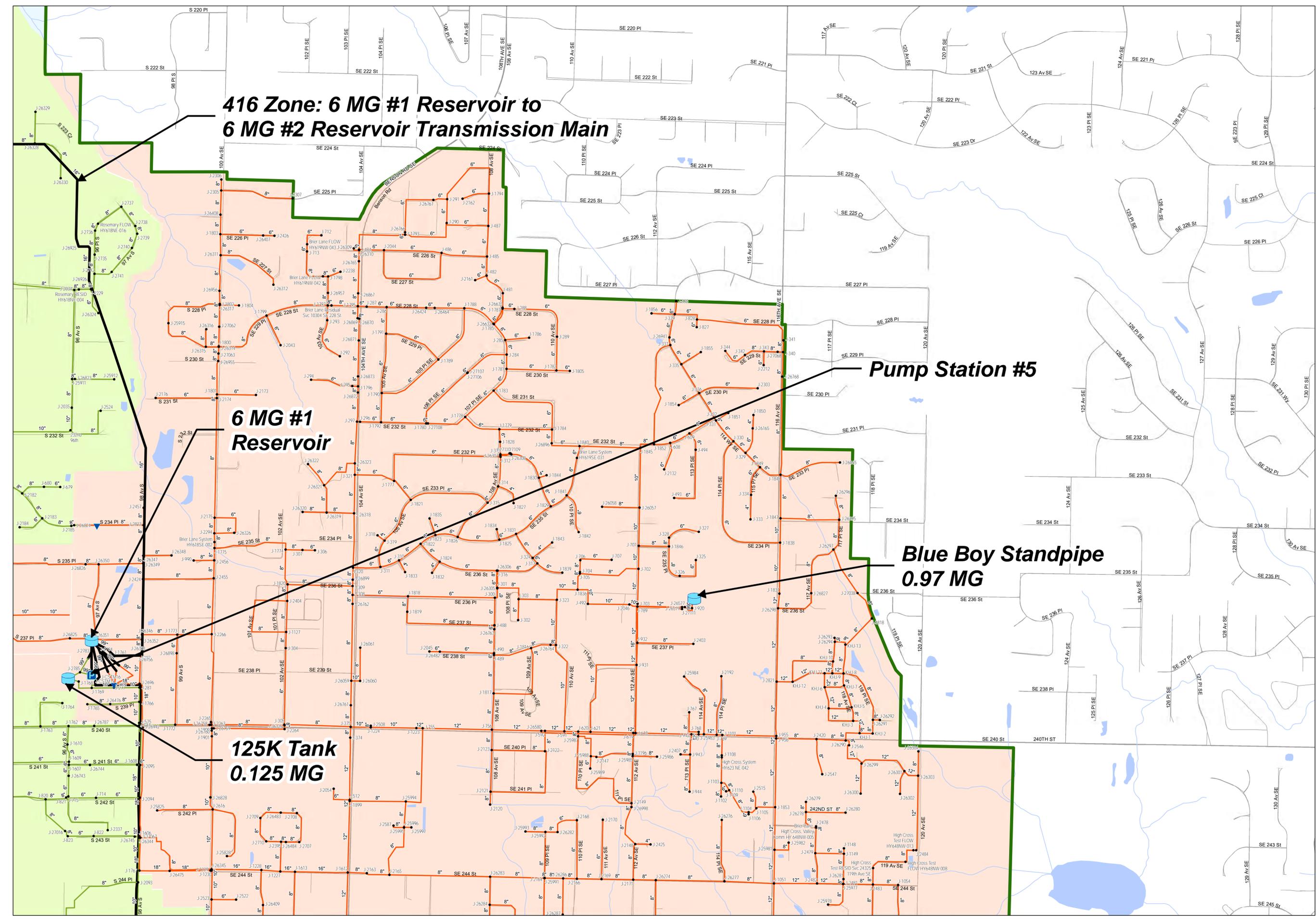


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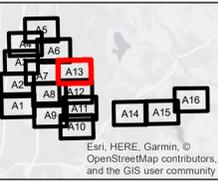


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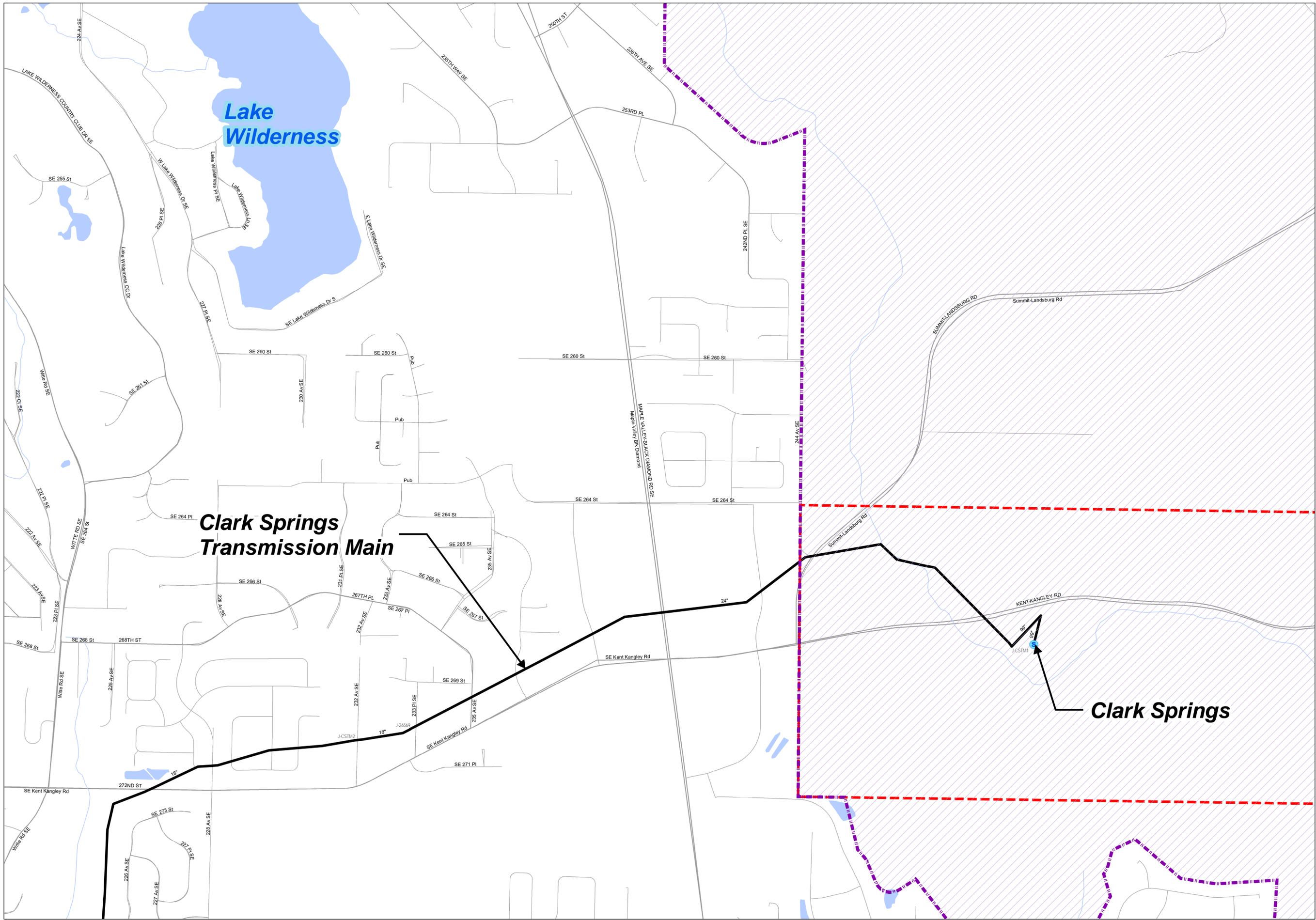


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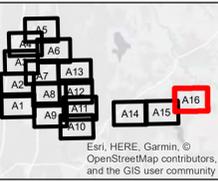


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APPENDIX M

Water Ordinances

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ORDINANCE NO. 2394

AN ORDINANCE of the City of Kent, Washington, relating to water services; amending Chapter 7.06 Kent City Code by adding new sections 7.06.180 - 7.06.185 adopting Rules and Regulations of the State Board of Health relating to and regulating cross-connections in public water systems.

THE CITY COUNCIL OF THE CITY OF KENT, WASHINGTON, DOES HEREBY ORDAIN AS FOLLOWS:

Section 1. Chapter 7.06 Kent City Code is amended to add the following sections 7.06.180, 7.06.181, 7.06.182, 7.06.183, 7.06.184, and 7.06.185:

7.06.180. Purpose. It is the purpose of KCC 7.06.180 - KCC 7.06.185 to protect the health of consumers receiving water from the City of Kent by protecting the public water system of the City of Kent from actual or potential contamination.

7.06.181. Definitions. The following are established as definitions for purposes of KCC 7.06.180 - 7.06.185 :

- A. "Cross connection" shall mean any physical arrangement whereby a public water supply is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or other device which contains or may contain contaminated water, sewer, or other waste or liquid of unknown or unsafe quality which may be capable of imparting contamination to the public water supply system of this district as a result of backflow.
- B. "Backflow" shall mean the flow, other than the intended direction of flow, of any foreign liquids, gases or substances into the City public water supply or distribution system.
- C. "Backflow prevention device" shall mean a device to counteract back pressure or to prevent back siphonage.
- D. "Director" shall mean the Director of Public Works of the City of Kent Department of Public Works.

E. Upon the filing of one copy with the City Clerk, all definitions contained in the State of Washington Administrative Code (WAC) 248-54-830, as now or hereafter amended, shall by this reference be considered definitions within this section.

7.06.182. Service Connection.

- A. No water service connection from the City of Kent's water system to any premise(s) shall be installed or maintained unless the City of Kent's water supply is protected by backflow prevention devices as required by the Director or her/his Designee and the rules and regulations of the State Board of Health and this Code. The installation or maintenance of a cross-connection which will endanger the water quality of the City of Kent's water supply is prohibited. Any such cross-connection now existing or hereafter installed is hereby declared a nuisance and shall be abated. The control and/or elimination of cross-connections within the City of Kent's systems shall be in accordance with WAC 248-54-820 to 248-54-850. as now or hereafter amended.
- B. Service to any property, landowner, or water user receiving its water supply from the City of Kent water supply system shall be contingent upon compliance with all requirements of the rules and regulations of the State Board of Health and of this Code pertaining to cross-connections. Service shall be discontinued to any premise(s), water user or property owner for failure to comply with such regulations of the State Board of Health and of this Code pertaining to cross-connections, and any discontinued service will not be re-established until the Department of Public Works of the City of Kent has approved compliance with such requirement of the rules and regulations of the State Board of Health and of this Code pertaining to cross-connection.

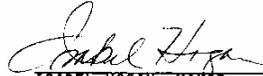
7.06.183. Public Works to Administer. The Department of Public Works of the City of Kent shall be responsible for administering this ordinance including the development of the necessary procedures and practices to accomplish same, consistent with the standards in this Code and Chapter 248-54 WAC.

7.06.184. Inspection - Right of Entry. The Director and other duly authorized employees of the Department of Public Works bearing proper credentials and identification shall be permitted to enter upon all properties receiving water service from the City of Kent water supply system for the purposes of inspection, observation and testing in accordance with the provisions of this Code.

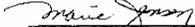
7.06.185. Administrative Code Adopted. The provisions of Sections 248-54-820 through 248-54-850, Washington Administrative Code, as now or hereafter amended relating to cross-connection control and elimination and the use of backflow prevention devices when such are considered to be advisable are upon the filing of one copy with the City Clerk, hereby adopted and made a part hereof, and all provisions of said Code may be executed and applied by the Department of Public Works in determining when cross-connection are prohibited and when backflow prevention devices shall be required.

Section 2. Severability. If any section, subsection, sentence, clause, phrase, part or portion of this Ordinance is for any reason held to be invalid or unconstitutional by any court of competent jurisdiction, such decision shall not affect the validity of the remaining portions of this Ordinance.

Section 3. Effective Date. This ordinance shall take effect and be in force five (5) days from and after its passage, approval and publication as provided by law.


ISABEL HOGAN, MAYOR

ATTEST:


MARIE JENSEN, CITY CLERK

APPROVED AS TO FORM:


P. STEPHEN DIJULIO, CITY ATTORNEY

PASSED the 7 day of March, 1983.

APPROVED the 8 day of March, 1983.

PUBLISHED the 11th day of March, 1983.

I hereby certify that this is a true copy of Ordinance
No. 2394, passed by the City Council of the City of Kent,
Washington, and approved by the Mayor of the City of Kent as hereon
indicated.


MARIE JENSEN, CITY CLERK (SEAL)

RESOLUTION NO. 1361

A RESOLUTION of the City Council of the City of Kent, Washington, adopting a Water Conservation Program as an additional element of the City's Water Comprehensive Plan.

WHEREAS, South King County, including the City of Kent, has been designated a critical water supply service area pursuant to Chapter 70.116 RCW, the Public Water System Coordination Act; and

WHEREAS, the King County Water Utility Coordinating Committee has developed a South King County Coordinated Water System Plan ("CWSP") that imposes certain obligations upon all public water system purveyors in South King County, including the City of Kent; and

WHEREAS, a water conservation program is an integral element of the South King County CWSP; and

WHEREAS, in accordance with King County Ordinance No. 9461, all purveyors subject to the South King County CWSP must adopt a water conservation program. NOW, THEREFORE,

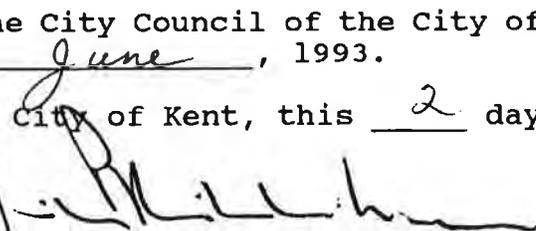
The City Council of the City of Kent, Washington, does hereby resolve as follows:

Section 1. The "City of Kent Water Conservation Plan" attached as Exhibit "A" and incorporated herein by this reference

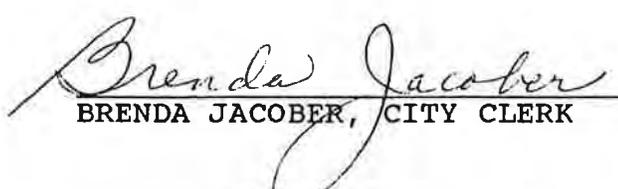
shall be incorporated as an additional element of the City's Water Comprehensive Plan in accordance with the South King County Coordinated Water System Plan and King County Ordinance No. 9461.

Passed at a regular meeting of the City Council of the City of Kent, Washington, this 1 day of June, 1993.

Concurred in by the Mayor of the City of Kent, this 2 day of June, 1993.


DAN KELLEHER, MAYOR

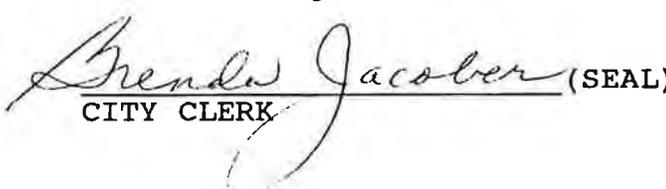
ATTEST:


BRENDA JACOBES, CITY CLERK

APPROVED AS TO FORM:


ROGER A. LUBOVICH, CITY ATTORNEY

I hereby certify that this is a true and correct copy of Resolution No. 1361, passed by the City Council of the City of Kent, Washington, on the 1 day of June, 1993.

 (SEAL)
CITY CLERK

WATRCONS.res

CITY OF KENT WATER CONSERVATION PLAN 1993

This document details the Water Conservation Plan for the City of Kent in keeping with the elements of the South King County Coordinated Water System Plan (SKC CWSP) and King County Ordinance #9461. The conservation plan is designed to improve the efficient delivery of water, reduce the amount of water wasted in the delivery process, and increase the available water supply. The City of Kent, in addition to other Puget Sound region communities, realize that water is a life-essential, limited resource that needs protection, preservation and conservation.

The City of Kent has been an active participant in the South King County Regional Water Association (SKC RWA) having implemented various water conservation programs identified in their Guidelines for Water Conservation Programs adopted May 21, 1991.

WATER USE DATA COLLECTION REQUIREMENTS

As identified in the Interim Guidelines prepared by the Department of Ecology, Department of Health, and Washington Water Utilities Council, minimum data collection is required to project public water system demands and to provide a basis for the evaluation of the effectiveness of conservation programs. The year 1991 has been selected as the baseline year for identifying per capita consumption. Data collection for a six year period between 1991 and 1996 is desired to determine and evaluate consumption trends and the effectiveness of conservation programs. The data collection schedule for Kent is shown below by data type and frequency.

- *source of supply meter - daily reading
- *service meter usage recorded
 - single family - every two months
 - multi-family - every two months
 - commercial/public/industrial - every month
 - irrigation/community system - semi-annual
- *unaccounted for water
- *annual total by source
- *peak day/peak month
- *population served
- *conservation data

EXHIBIT "A"

WATER DEMAND FORECAST

The Interim Guidelines identify appropriate demand forecasting methodology for public water systems to evaluate supply demands. Kent's water demand has been forecast through the Water System Plan for the City of Kent and includes total water demand forecasting as well as separate projections for residential and commercial/industrial consumption. The projections are in line with those projected under the SKC CWSP. Factors used in developing future demand forecasts will include water use, land use/zoning/capacity, water rates, and conservation savings as recommended in the Interim Guidelines.

WATER CONSERVATION PROGRAM ELEMENTS

Kent's water conservation program elements are detailed below. Program elements previously implemented as indicated in the SKC RWA **Recommended Water Conservation Program** (attachment A), include program promotion, single family/multi-family conservation kits, water leak detection, meters for all customers, and seasonal pricing.

In addition, the City has implemented several water conservation programs with the SKC RWA. Kent will continue to work with the SKC RWA to develop and implement programs at the regional level as well as the local level.

Kent recognizes the need for long range conservation planning to meet future water demands. In December, 1992, the City hired a Conservation Specialist to coordinate the water conservation program. In addition, as shown in the Water System Plan for the City of Kent, other than obtaining a portion of the supply from Tacoma's Green River Pipe Line #5, future source development involves constructing an Impoundment Reservoir. Said impoundment reservoir would store excess winter flows from existing sources (Clark Springs, Kent Springs and Pipe Line #5) for utilization during the peak summer demand period. This will result in conserving the regions ground water resources which would normally be tapped to meet the peak summer demands.

Details of Kent's Water Conservation Program, including program objectives, elements, level of participation, schedule for implementation and budget are detailed in this report.

PROGRAM OBJECTIVES

To meet the City's goals of attaining a 6.5% water reduction by 1995 and 8% reduction by the year 2000, the conservation program will achieve the following objectives:

- *improve efficient delivery of water
- *reduce the amount of water wasted in the delivery process
- *increase the available water supply
- *coordinate and support services and programs with adjacent water purveyors
- *reduce peak daily consumption
- *reduce peak monthly consumption
- *reduce total annual consumption
- *develop public awareness and education

ASSESSMENT OF CONSERVATION ACTIVITIES

The recommended conservation programs outlined in the **Interim Guidelines** are grouped into four categories: (1) public education, (2) technical assistance, (3) system measures, and (4) incentives/requirements. The **Interim Guidelines** require Kent to implement a moderate program as identified in attachment A. Kent's water conservation plan includes conservation elements above and beyond the minimum elements identified in the **Interim Guidelines**.

PUBLIC EDUCATION

The public education programs which the City is implementing are discussed below. These meet the requirements of the **Interim Guidelines** and include school outreach, speakers bureau, program promotion, and theme shows and fairs.

School Outreach Programs - Since 1991, the City of Kent has been involved in securing and scheduling the "Small Change Theatre" to perform plays at local elementary schools to teach children about the importance of water conservation. Additional programs and activities will be developed to include school presentations, tours of facilities, special projects involving students of all ages, and assisting with preparation of curriculum material.

With the development of a conservation material library, schools will have access to educational materials to assist with water conservation programs in their classrooms.

Speakers Bureau - The City of Kent will work cooperatively with the South King County RWA to develop a speakers bureau. City staff will be available to give presentations to groups, organizations, schools, businesses, and local residents, to encourage water conservation practices. Kent will prepare slide and video presentations with copies of video presentations on water conservation available for review at local libraries.

Program Promotion - In 1991 and 1992, Kent worked cooperatively with the SKC RWA to distribute lawn watering calendars to area residents and will incorporate the lawn watering schedule into a summer watering campaign. Kent also distributes water conservation information through it's utility bills and through articles in the local newspaper. Brochures produced by the Seattle Water Department, Department of Ecology, Department of Health, and other regional water agencies are also available at local libraries, City facilities and departments.

The City will be producing an "Environmental Awareness" brochure/newsletter for distribution which will include water conservation tips and information.

Special "How To" classes and workshops will be offered to citizens to show methods of installing home water conservation devices, to provide information on types of devices available, water conservation ideas and methods for the home and business, outdoor watering techniques, water conserving landscape ideas and alternatives, how to read a water meter, and water supply sources and issues.

A "Home Water Conservation Survey" was conducted in September 1991 in cooperation with the SKC RWA, the cities of Bellevue, Everett, Fife, Kent, Puyallup and Tacoma. Results of the survey will be incorporated into public education programs.

The development of a conservation library will include a wide range of multi-media materials. Brochures, pamphlets, books, portable displays, slide and video presentations relating to water conservation will be available to use at fairs, town meetings, community events, public meetings, schools and businesses.

Theme Shows and Fairs - The City of Kent provides staff, water conservation materials and displays to local and regional theme shows, fairs and the annual City of Kent Town Meeting. Exhibits are available to use at events throughout the area.

TECHNICAL ASSISTANCE

Kent currently offers assistance to customers within it's service area, in addition to working with the SKC RWA and other purveyors to provide technical assistance to customers as well as researching and conducting technical studies.

Purveyor Assistance - The City of Kent will continue to work with other purveyors to provide assistance in developing and implementing conservation plans. The City's participation in the **Water Conservation Coalition of Puget Sound** and regional coordination in developing and implementing programs for the Puget Sound area, can greatly increase the effectiveness of water conservation.

Customer Assistance - Through the development of educational programs and information, and the training of staff on water conservation methods and devices, the City will provide direct assistance to customers to facilitate water conservation.

Technical Studies - In 1991, the City of Kent, South King County RWA and other purveyors, hired Market Data Research to conduct a residential indoor water use survey. Survey results included customer's perceptions of available water supplies, customer behavior and attitudes, and current knowledge and use of conservation practices. Customers were also asked to respond to different conservation options available to assure future water supplies. Information collected from the survey will be used to develop appropriate conservation programs. The survey will be conducted in future years to audit changes in customers conservation practices, awareness and attitudes. Future plans will also include water audits of commercial and industrial customers.

The City will continue to work with the SKC RWA and other water purveyors to collect data and research new technology to develop new programs which will produce measurable water savings.

Bill Showing Consumption History - Kent will be implementing new programming on their customer water bill showing a graph depicting water consumption history, thus encouraging water conservation.

SYSTEM MEASURES

System measures include a 100 percent metered system, unaccounted water/leak detection, and high technology meters.

Metered Systems - The City of Kent requires metered systems for all domestic and /or industrial consumption of water. Additionally, all water service connections and plumbing must conform to relevant Washington State plumbing codes and City of Kent standards.

Unaccounted Water/Leak Detection - In 1991, the City conducted a leak survey of the oldest sections of town. A very minimum number of leaks were found and repaired. The City's inspection, repair, and replacement program is ongoing as a part of the preventive maintenance program.

High Technology Meters - In recent years, the City's water system was upgraded to include a state-of-the-art automated computerized control and telemetry system.

INCENTIVES/REQUIREMENTS

Incentives and requirements for the water conservation plan include single family/multi-family retrofit kits, new conservation practices for nurseries and agriculture, landscape management, conservation pricing, utility financed retrofit, mandatory seasonal water restrictions, potential recycle/reuse, and pressure reduction.

Single Family/Multi-Family Retrofit - The City distributes kits containing water saving devices at it's annual town meeting in addition to educational and informational materials. The City of Kent Home Repair Program is also available to low-income and elderly residents to assist in installing devices and making minor repairs. Kent will work with the SKC RWA, Tacoma Water Division, Seattle Water Department, City of Everett, the BPA, and other utilities, to distribute devices in a regional effort. Kent will also look at programs and methods to deliver water conservation kits and information to single family and multi-family customers.

Nurseries/Agriculture - The City will continue to encourage the application of new technology for irrigation systems that will achieve greater irrigation efficiency. A computerized irrigation system was installed during construction of the City's new golf course in 1991, to increase efficiency in irrigation. Water for the irrigation system is taken from on-site wells. City facilities and departments will continue working together to promote and publicly demonstrate water conservation practices.

Landscape Management/Playfields - Kent will continue to encourage the use of low water demand landscaping by commercial, industrial, public and private water customers throughout the area. Public education materials, workshops, demonstrations and use of the speakers bureau, will be utilized to promote new landscaping ideas and methods to achieve greater irrigation efficiency.

City Departments will work together to inventory properties, facilities, and develop plans for repairs and upgrades to irrigation systems. Results of Tacoma's landscape pilot study will be reviewed to help develop outdoor irrigation conservation measures and future landscape standards.

Conservation Pricing - In July, 1992, The City of Kent implemented seasonal water rates to encourage water conservation. Implementation of the water bill showing consumption history and providing customers with education and information relating to water conservation will encourage wise and efficient use of water.

Utility Financed Retrofit - The City and SKC RWA will review program options for utility financed retrofit. Potential programs range from rebates to providing fixtures at the system's cost or at no cost. Kent's local retrofit program as discussed earlier is financed through the City's water fund.

Mandatory Seasonal Restrictions - The City has adopted "Water Shortage Emergency Regulations" establishing methods and regulations for rationing water during a water shortage emergency. Future plans also include preparing a **waste water ordinance** focusing on wasteful uses of water such as gutter flooding, watering sidewalks and driveways, etc., and an **outdoor watering policy** such as watering schedules to reduce peak day impact on the system.

Recycling/Reuse - The City of Kent is attending meetings with METRO on possible water reuse. METRO is considering a regional study to look at potential recycling/reuse opportunities. Kent will continue to examine possibilities for water reuse and recycling as a method to reducing water demands. An example would be to encourage reuse of water through water rates which provide an incentive for major industrial water users to develop treatment/reuse/recycle systems.

Pressure Reduction - Pressure reduction is used throughout the City. Due to terrain, Kent's water system is comprised of five distinct pressure zones. Additionally, several of these zones are further subdivided into two or three subzones. While this provides a working pressure of 35-85 PSI throughout the system, it also makes the system very complicated and difficult to maintain. Any further breakdown of the service area will require weighing the operational integrity and reliability of the system against any conservation gain.

MONITORING REQUIREMENTS

Monitoring and evaluating the individual conservation measures during and after implementation of the conservation plan are essential to judging the effectiveness of the plan. It is important to develop reliable data to use in analyzing the actual water use after the conservation plan has been in place for a period of time, to identify whether goals and objectives are being met. This process can identify areas of the program that need to be changed. Periodic review and evaluation to "fine tune" the plan is important. Factors such as population, growth rate, and revenue will be taken into account when an evaluation is conducted. Looking at change in population and growth rate will help determine what effect the changes have on the demand for water.

Important monitoring data to keep for each conservation measure includes:

1. The number of customers affected by the measure in each category, i.e. the number of customers who received a bill insert, brochures, read newspaper articles, etc.
2. The amount of conservation literature and /or devices distributed for each measure.

3. The expected amount of savings from each of the distributed conservation devices.
4. The number of customers who actually received conservation devices or responded to offers of assistance.
5. The number of customers who actually installed the conservation devices.
6. The average water used in a specific activity by each category of customer before implementation of a conservation measure targeted for that activity and after implementation of the conservation measure.
7. Data on how changes in weather affect the demand for water in particular activities targeted for conservation measures.

SUMMARY

Implementation of the water conservation plan will have numerous benefits on our environment. Saving water today will improve wildlife and fisheries habitat, increase the aesthetic and recreation value of streams and rivers, and protect water sources for meeting future demands.

CITY OF KENT WATER CONSERVATION PLAN

PROGRAM ELEMENT	% REDUCTION IN WATER USE	
	1995 GOAL	2000 GOAL
A. PUBLIC EDUCATION	1	1.5
1. School Outreach		
Small Change Theatre		
Presentations		
Tours		
Special Projects		
2. Speakers Bureau		
3. Program Promotion		
Lawn Watering Calendars		
Brochures and Information		
Classes and Workshops		
B. TECHNICAL ASSISTANCE	2.5	3
1. Purveyor Assistance		
2. Customer Assistance		
3. Technical Studies		
Residential Indoor Water Survey		
Residential Water Audit		
Commercial/Industrial Water Audit		
4. Bill Showing Consumption History		
C. SYSTEM MEASURES	1	1
1. Metered System		
Source		
Service		
2. Unaccounted Water/Leak Detection		
3. High Technology Meters		
D. INCENTIVES/REQUIREMENT	2	2.5
1. Single Family/Multi-Family Retrofit Kits		
2. Nurseries/Agriculture		
3. Landscape Management/Playfields		
4. Conservation Pricing		
5. Utility Financed Retrofit		
6. Mandatory Seasonal Restrictions		
Water Shortage Emergency Regulations		
Draft Waste Water Ordinance		
Draft Outdoor Watering Policy		
7. Recycle/Reuse		
8. Pressure Reduction		

CITY OF KENT WATER CONSERVATION PLAN

PROGRAM ELEMENT	IMPLEMENTATION SCHEDULE						BUDGET	
	1991	1992	1993	1994	1995	1996		
A. PUBLIC EDUCATION								
1. School Outreach	-----	-----	-----	-----	-----	-----	\$1,950/year	
Small Change Theatre Presentations	-----	-----	-----	-----	-----	-----		
Tours	-----	-----	-----	-----	-----	-----		
Special Projects	-----	-----	-----	-----	-----	-----		
2. Speakers Bureau	-----	-----	-----	-----	-----	-----		
3. Program Promotion								
Lawn Watering Calendars	-----	-----	-----	-----	-----	-----	\$100/year	
Brochures and Information	-----	-----	-----	-----	-----	-----	\$8,000	
Classes and Workshops	-----	-----	-----	-----	-----	-----	\$1,000	
Conservation Library	-----	-----	-----	-----	-----	-----		
B. TECHNICAL ASSISTANCE								
1. Purveyor Assistance	-----	-----	-----	-----	-----	-----	\$5,000/survey	
2. Customer Assistance	-----	-----	-----	-----	-----	-----		
3. Technical Studies	-----	-----	-----	-----	-----	-----		
Residential Indoor Water Survey	-----	-----	-----	-----	-----	-----	\$80/sf \$50/mf	
Residential Water Audit	-----	-----	-----	-----	-----	-----	\$150/customer	
Commercial/Industrial Water Audit	-----	-----	-----	-----	-----	-----	\$8,000 first year	
4. Bill Showing Consumption History	-----	-----	-----	-----	-----	-----	\$5,000/year	
C. SYSTEM MEASURES								
1. Metered System								
Source	-----	-----	-----	-----	-----	-----	customer pays	
Service	-----	-----	-----	-----	-----	-----		
2. Unaccounted Water/Leak Detection	-----	-----	-----	-----	-----	-----	\$.035 l.f.	
3. High Technology Meters	-----	-----	-----	-----	-----	-----		
D. INCENTIVES/REQUIREMENT								
1. Single Family/Multi-Family Retrofit	-----	-----	-----	-----	-----	-----		
2. Nurseries/Agriculture	-----	-----	-----	-----	-----	-----		
3. Landscape Management/Playfields	-----	-----	-----	-----	-----	-----		
4. Conservation Pricing	-----	-----	-----	-----	-----	-----		
5. Utility Financed Retrofit	-----	-----	-----	-----	-----	-----		
6. Mandatory Seasonal Restrictions								
Water Shortage Regulations	-----	-----	-----	-----	-----	-----		
Draft Waste Water Ordinance	-----	-----	-----	-----	-----	-----		
Draft Outdoor Watering Policy	-----	-----	-----	-----	-----	-----		
7. Recycle/Reuse	-----	-----	-----	-----	-----	-----		
8. Pressure Reduction	-----	-----	-----	-----	-----	-----		

sf--single family, mf--multi-family
l.f.-linear foot

ALL PROGRAMS ARE FINANCED THROUGH THE CITY OF KENT WATER FUND/CONSERVATION PROGRAM UNLESS OTHERWISE NOTED. COSTS OTHER THAN OVERHEAD ARE SHOWN.

TABLE VII-7

SOUTH KING COUNTY CWSP
RECOMMENDED WATER CONSERVATION PROGRAM

Element (4)	Program Elements						Reduction In Water Use(8)		
	Comprehensive (1)		Moderate (2)		Base (3)		Comp.	Mod.	Base
	Utility	Region	Utility	Region	Utility	Region	%	%	%
A. Public Education							1	1 (9)	1 (9)
1. School Outreach		X			X				
2. Speakers Bureau	X	X (5)			X	X			
3. Program Promotion	X	X	⊗		X	X			
4. Theme Shows and Fairs	X	X			X	X			
B. Technical Assistance							4	3.5	2
1. Single-Family/Multi-Family Kits	X	X	⊗		X	X			
2. Purveyor Assistance/Customer Assistance	X	X	X		X	X			
3. Technical Studies	X	X			X				
4. Limit Unaccounted Water/Leak Detection	X	X	⊗						
5. Nurseries/Agriculture	X	X	X		X				
6. Bill Showing Consumption History	X		X			X			
7. High Technology Meters	X								
C. Policy							3	2	1
1. Require Meters (including all public use, customer meters, and/or master source meters)	X		⊗						
2. Plumbing Code		X (6)			X	X			
3. Landscape Management/Playfields	X	X	X		X				
4. Seasonal Pricing/Inverted Rates	X	X	⊗						
5. Irrigation/Private Wells	X	X			X	X			
6. Utility Financed Retrofit	X								
7. Master Source Meters						X			
D. Meriting Consideration (7)									
1. Mandatory Seasonal Restriction	X								
2. Recycling/Reuse	X								
3. No Water for Golf Courses/Major Use	X								
4. Conservation Program Performance Audit		X							
5. Reduce Pressure to 45 psi	X		X						

⊗ City Actively Pursuing

- (1) Cities with 10,000 or more water customers.
- (2) Cities with fewer than 10,000 customers and all other water utilities serving 500 or more customers.
- (3) Water utilities with less than 500 customers.
- (4) Implementation of program elements assumed to be initiated by the year 1990.
- (5) Where both a utility and regional program are indicated, it is intended that the utility program is lead and the regional program supportive.
- (6) Code to be established at state and/or county level.
- (7) Elements recommended for further consideration on an optional basis.
- (8) Percent reduction assumed to be achievable by the year 2000.
- (9) Regional public education program assumed to be equal to the combined utility/regional program under Comprehensive.



ECONOMIC AND ENGINEERING SERVICES, INC.

1/11 77

ATTACHMENT A

**CITY OF KENT
WATER CONSERVATION PLAN
BUDGET IMPACT**

<u>PROGRAM ELEMENT</u>	<u>FIRST YEAR</u>	<u>YEARLY</u>
Public Education		
Small Change Theatre	\$ 1,950	\$ 1,950
Program Promotion		
Lawn watering calendar	100	100
Conservation brochures	2,500	1,000
Quarterly newsletter	8,000	8,000
Library material - videos, books	1,000	300
Technical Studies		
Bill showing consumption history (based on 12,500 monthly statements, initial set up \$2,800, \$350 monthly)	8,000	5,000
TOTAL	\$21,550	\$16,350

ORDINANCE NO. 4288

AN ORDINANCE of the City Council of the City of Kent, Washington, repealing and readopting Chapter 7.02 of the Kent City Code entitled "Water," to reorganize the chapter and update the Cross-Connection Control sections to develop and implement procedures to ensure the elimination or control of cross-connections between a water consumer's system and the City's public water system and to create additional enforcement provisions allowing for more flexibility.

RECITALS

A. The city of Kent ("City") has codified its regulations concerning water service by its water utility within Chapter 7.02 of the Kent City Code. This chapter also contains provisions for the elimination and control of cross-connections between a water consumer's system and the City's public water system.

B. Washington Administrative Code 246-290-490 requires the City Council of the City of Kent to ensure the elimination or control of all cross-connections between a water consumer's system and the City's public water system.

C. The City is required to adopt an ordinance and develop and implement procedures to ensure approved backflow preventers commensurate with the degree of hazard are installed to prevent backflow into the City's public water system. Accordingly, this ordinance sets forth

what service connections require premises isolation and the requirements for commercial fire lines.

D. A city's ordinance must include corrective actions used to ensure water consumers comply with cross-connection control requirements. Currently, the only enforcement options available for a violation of cross-connection control requirements are criminal or civil code enforcement proceedings. This ordinance makes additional remedies available to the city of Kent, including imposing monetary penalties, water shutoff and the issuance of a civil infraction for violations of the cross-connection control requirements.

E. In addition, this ordinance reorganizes and restructures the chapter into two separate parts in order to clearly distinguish between the sections concerning water service—metering, rates, installation—and the sections concerning the elimination and control of cross-connections.

NOW, THEREFORE, THE CITY COUNCIL OF THE CITY OF KENT, WASHINGTON, DOES HEREBY ORDAIN AS FOLLOWS:

ORDINANCE

SECTION 1. - *Repealer - Chapter 7.02 KCC.* Chapter 7.02 of the Kent City Code, entitled "Water," is repealed in its entirety.

SECTION 2. - *Adoption - Chapter 7.02 KCC.* Title 7 of the Kent City Code, entitled "Utilities," is amended to adopt a new Chapter 7.02, entitled "Water," as follows:

PART ONE

Water Utility and Water Service Generally

Sec. 7.02.010. Water to be metered. All water of the water utility of the city shall be sold by use of a water meter that measures the amount of water used by a consumer.

Sec. 7.02.020. Rates for water connection. The city council shall fix rates to be paid by a consumer for water procured from the water utility of the city, and for the amount of cost to be charged to and paid by the applicant for a water connection to a water main including the water meters. Water connection shall be of various sizes as specified in this chapter. All water connections and water meters shall be installed by the water utility of the city or by a contractor approved by the director of public works. All connections shall be made under the supervision of the director of public works or his authorized representative and shall meet or exceed the standards and specifications approved by the director of public works.

Sec. 7.02.030. Using water in excess of meter capacity. The water utility will not install a water meter on a service which demands water in excess of the rated capacity of the meter. The water utility of the city shall have the right to discontinue water service to any consumer when the demand of the service exceeds the following meter capacities:

<i>Meter size (inches)</i>	<i>Gallons per minute</i>
5/8 x 3/4	20
3/4	30
1	50
1 1/2	100
2	160

<i>Meter size (inches)</i>	<i>Gallons per minute</i>
3	300
4	500

Sec. 7.02.040. Maintenance of water system. All tanks, reservoirs, water meters, water mains, pipes, couplings, shutoff valves, stop cocks, and every other kind of equipment or material in use or in place as a part of the water system of the city and located in any street, alley, city park, city property, or in any easement or franchise belonging to the city, or located upon private property from a water main of the water system to and including the water meter, are the property of the city and are subject to the exclusive control and regulations of the city. All pipes and connections from the water meter to the premises or building served by the city water are the property and the sole responsibility of the owner or lessee of the premises or building.

Sec. 7.02.050. Separate meters required – Exceptions. Except as provided in this chapter, each separate building occupied as a dwelling or as a place of business must have a separate water service and water meter. Where the applicant desires to have two (2) or more service pipes on the same premises, he shall state in his application for a water connection, and separate service pipes shall be run with individual stop cocks to each water meter. Each mobile home park and each condominium may be served by one (1) water meter. The city council may enter into agreements with commercial and industrial users to allow more than one (1) building to be served by a single meter.

Sec. 7.02.060. Existing service to more than one (1) building. At the time of the adoption of this chapter where more than one (1) building is served through one (1) meter, the consumption of water for

each billing period shall be divided by the number of buildings served and the charge will then be calculated as if each building were a separate account.

Sec. 7.02.070. Connection with other water supply.

A. No service connection shall be allowed from the city mains to any premises supplied by water from any other source, unless special permission is given by the director of public works, which special permission may be terminated at any time if in the judgment of the director of public works the public interest requires it.

B. No cross-connection shall be made or maintained between any city service connection and pipe supplying water from any other source unless the water supplied from the other source, by tests by the State Board of Health, is shown to conform with the United States bacteriological standard for drinking water. Such tests must be made by a professional tester and submitted to the city at least once each month.

Sec. 7.02.080. Connections outside of city limits.

A. Whenever any person outside the limits of the city, not already furnished with water by the city, shall desire the system to be extended, such person shall apply to the city council to have such water service extended. Such application shall designate the premises to be supplied and the number of services desired. If a permit is granted by the city council, the applicants shall, at their own expense, install all necessary mains or pipes in accordance with the requirements of the city engineer and the comprehensive water plan of the city which is on file in the office of the director of public works. All regulations concerning the size of service and meter shall apply.

B. Whenever any water district desires to purchase water from the city, it shall make application to the city council and if accepted, install all mains and services in accordance with the rules and regulations of the city. An individual contract will be negotiated for the purchase of water. Whenever any portion of a water district is annexed to the city, the ownership of the mains, meters, and services shall become the property of the city in accordance with RCW 35.13A.020.

Sec. 7.02.090. Installation and connection charges inside city limits, permits, and inspection fees.

A. *Tap charge – Connection by water utility.* Any property owner within the city limits applying for water service shall pay in full a tap charge and a permit review and inspection fee, plus a system development charge prior to issuance of the water service permit. The tap charge will include the cost of connection and laying the pipe from the city water main to the property line of the property to which service is desired, or at a distance of sixty (60) feet from the main toward such property line, whichever is shorter. The minimum tap charge so established for service installed by the water utility is as follows:

1. Two hundred seventy-five dollars (\$275) for each five-eighth (5/8) inch by three-quarter (3/4) inch connection.

2. Three hundred twenty-five dollars (\$325) for each three-quarter (3/4) inch connection.

3. Three hundred fifty dollars (\$350) for each one (1) inch connection.

4. Six hundred dollars (\$600) for each one and one-half (1-1/2) inch connection.

5. Eight hundred dollars (\$800) for each two (2) inch connection.

On any connection over two (2) inches, the minimum tap charge shall be the actual cost of the meter and installation, plus twenty-five (25) percent.

B. *Tap charge – Connection by licensed contractor.* If the workload of the water utility as determined by the director of public works is such that the installation of the water connection would interfere with the proper operation and maintenance of the water system, the director of public works may require that the property owner employ a licensed contractor to make the connection and install the necessary line and materials except the water meter. All such water services shall meet or exceed the standards and specifications approved by the director of public works. The minimum tap charge is as follows:

1. One hundred dollars (\$100) for each five-eighth (5/8) inch by three-quarter (3/4) inch connection.
2. One hundred twenty-five dollars (\$125) for each three-quarter (3/4) inch connection.
3. One hundred seventy-five dollars (\$175) for each one (1) inch connection.
4. Three hundred sixty dollars (\$360) for each one and one-half (1-1/2) inch connection.
5. Five hundred dollars (\$500) for each two (2) inch connection.

All such contractor-installed connections shall be guaranteed by the contractor for a period of one (1) year.

C. *System development charge.* The system development charge is as follows:

Meter Size (inches)	Charge Effective Through March 31, 2009	Charge Effective April 1, 2009
Less than 1	\$2,600	\$5,949

Meter Size (inches)	Charge Effective Through March 31, 2009	Charge Effective April 1, 2009
1	\$4,627	\$14,872
1-1/2	\$10,400	\$29,743
2	\$18,486	\$47,589
3	\$41,594	\$95,179
4	\$73,933	\$148,717
5	\$115,528	\$222,932
6	\$166,376	\$297,434
8	\$295,786	\$475,894
10	\$462,162	\$654,354

After April 1, 2009, this system development charge will increase annually, on the first day of each calendar year, by an amount equal to the percentage increase in the Construction Price Index for Seattle-Tacoma-Bremerton for the twelve (12) months, October 31st through September 30th, of the previous calendar year.

However, if (1) the city's fire marshal has required that, in conjunction with the city's issuance of a single-family residential building permit, the applicant must install a fire sprinkler system, and (2) the need for a meter size greater than three-quarters (3/4) of an inch is based solely on the fire marshal's requirement that the sprinkler system be installed, the single-family residential permit applicant shall pay only the system development charge listed above for a meter less than one (1) inch in diameter. It is not the city's intent to require an applicant to pay a higher system

development charge when the larger meter size is needed only in the unusual event of a fire demand rather than for normal daily user demand.

D. *Permit and inspection fee.* The city council shall, by resolution, establish the permit, inspection, and other related fees to be assessed to implement and operate the regulations adopted in this chapter. In the event of any conflict or ambiguity regarding any fees established by council resolution, the public works director is authorized to interpret the fee schedule(s) to resolve that conflict or ambiguity.

E. *Installation of undersized meter.* If an undersized meter is installed, a deduction will be allowed from the above charges, including system development charges, which will reflect the difference in cost between the undersized meter and the regular size meter. All service material (including water meter) will remain the property of the city.

F. *Tap change.* If the tap is changed to one of a larger size, the cost and expense of such charge must be paid before the larger size tap is installed.

G. *Paving replacement – Charge.* If it becomes necessary during the installation of such connection on a time and material basis to break and replace either concrete or blacktop paving, then in each instance an additional charge shall be made to cover the cost of such repair.

H. *Fee deferral.* Until December 31, 2013, at the time of issuance of any single-family residential building permit for a dwelling unit that is being constructed for initial sale, the owner of the subject real property may defer payment of the water system development charge in subsection (A) of this section, executing a first position lien in favor of the city in the amount of the water system development charge. The city shall record the lien against the real property and the lien amount shall be paid by the

seller to the city at the time of closing of the sale of the real property and single-family residence. An owner who chooses to defer the water system development charge must combine the lien with a lien deferring the transportation improvement fee in KCC 12.11.090 or Chapter 43.21C RCW, and drainage system development charge in KCC 7.05.165.

Sec. 7.02.100. Installation and connection charges outside city. Any property owner outside the city limits applying for water service shall pay in full the tap charge and a permit review and inspection fee, plus a system development charge prior to the issuance of a water service permit. The minimum charge established shall be the cost as established for inside the city limits plus fifty (50) percent, except the system development charge. The system development charge shall be the same as for inside city limits.

Sec. 7.02.110. Temporary water meters.¹

A. When water service is required for a specific short-term duration, upon approval of the director of public works, a temporary water meter may be obtained from the water utility.

B. Such meters shall only be used for a designated project and shall be promptly returned to the water utility upon completion of the project or at the end of 60 days, whichever comes first. The meters are to be returned in the same condition as when rented, and the user shall be held responsible for any damage thereto including paying all repair or replacement costs. While in the user's possession, the user shall be solely responsible for the meter and as such, should it be lost or stolen, the user shall pay the water utility the cost of its replacement.

C. The director of public works shall require that a cash bond be deposited with the city prior to receipt of a temporary meter. The amount of the bond shall equal the replacement cost of the respective meter. Upon

return of the meter, the payment of all outstanding charges including any meter repair or replacement costs, the cash bond shall be released back to the user.

D. Temporary meters may be moved from one hydrant to another within the same project; provided, the water utility is notified in advance of the proposed relocation and that hydrant wrenches are used to make all connections and disconnections.

E. For each 100 cubic feet of water used with a temporary water meter, the rate charged will be \$4.73 per 100 cubic feet of water used.

All rates are also subject to a one-time temporary meter charge as follows:

1. Up to one-and-one-half-inch meter, \$50;
2. Two-inch and larger meter, \$100.

Payment shall be made in full upon return of the meter. If a meter is lost or stolen, payment for water used shall be based on an estimate made by the director of public works.

Sec. 7.02.120. Stop cocks. All service pipes must come directly from the street main and shall be laid at such depth and at such point as the water utility shall designate. All stop cocks and connections thereto shall be maintained by and under the control of the water utility.

Sec. 7.02.130. Turn on and off service by water utility employees. No person except employees of the water utility or the finance department will be allowed to turn the water on or off at the city's stop cock after the plumbing has been completed and the water turned on by the water utility, except to repair the special stop and waste cock or the pipe between it and the city's stop cock.

Sec. 7.02.140. Special stop and waste cock. A special stop and waste cock with a key attached thereto shall be placed on the pipe leading

from the city's stop cock outside of the building or inside if basement is available. No branch pipe, bibb, or fixture of any kind shall be placed between this stop cock and the city's main. If this stop cock does not thoroughly drain all pipes throughout the premises, additional ones shall be placed in all sags, bends, and traps that cannot otherwise be drained. If the service is to a business building adjacent to a city sidewalk, a valve type stop and waste cock in a cast iron valve box, with traffic type lid shall be installed near the outside wall of the building.

Sec. 7.02.150. Replacement – Permit credit. If a property owner, lessee, or occupant requests a change in meter size and/or water line size, an application shall be made to the city engineer. The city engineer shall review the application for compliance with KCC 7.02.030. If the request results in an increase flow capability to the property, the charge for this service shall include the respective system development charge, otherwise, the charge shall be limited to a time and material basis. In all cases a credit on this charge will be made for the meter removed. This credit will be based on a depreciation schedule of twenty (20) percent per year for the number of years the meter has been in service, with a minimum credit of two dollars and fifty cents (\$2.50). No credit will be allowed for the valves, meter box, or pipe originally installed. Where a system development charge is included, a credit will also be given for that previously paid system development charge.

Sec. 7.02.160. Connections from stop cock at owner's expense and care. All pipes and connections from the city's adapter or coupling located on or near the property line or near the meter box shall be put in at the expense of the property owner, who shall be responsible for all damages resulting from leaks and breaks.

Sec. 7.02.170. Plumber's permit for turn on and off. No plumber or other person will be allowed to make connection with the city

mains or make alterations in conduit, pipe, or other fixture connecting therewith, or to connect pipes when they have been disconnected, or to turn water off or on, upon any premises at the city's stop cock without a permit from the director of public works.

Sec. 7.02.180. Water turned on by owner or tenant prohibited. If the water is turned on to the premises by anyone other than an employee of the water utility or the finance department after it has been turned off at the city stop cock, it will be turned off again at the city stop cock and locked, and will not be turned on again until the charges as prescribed in this chapter have been paid. These charges are based on the actual cost per hour, including overhead, of sending water utility employees to return service to the account, plus a turn on charge of thirty dollars (\$30). In no case will the charge be less than thirty dollars (\$30).

Sec. 7.02.190. Vacant premises – Water supply. If it is decided to discontinue the use of water supply to vacant premises for a period of thirty (30) days or more, notice in writing must be given to the finance department. The water will be turned off and will be turned on again upon written application at a charge of thirty dollars (\$30) for such turn on. No remission of charges will be made for a lesser period than thirty (30) days or without receipt of notice by the finance department.

Sec. 7.02.200. Size of water main. No water main shall be installed unless it is at least six (6) inches in diameter and is the size indicated in the comprehensive water plan.

Sec. 7.02.210. Turn off and turn on charges.

A. For the purpose of paying the expense to the water utility or finance department, a charge as set forth in this chapter is hereby fixed and made to turn off or turn on the water service to any building for the making

within the building of any inspection, repair, maintenance, enlargement, replacement, addition, or change in or to the water line or lines, or plumbing, or plumbing fixtures, or for the purpose of connecting any kind of machine, appliance, toilet, or bath facilities, or any kind of plumbing in or to the water system located within the building when the building does not have stop and waste cock as required in KCC 7.02.210.

B. The charge shall be forty-five dollars (\$45) if the turn off or turn on is done within a period of forty-eight (48) hours of the initial customer request, which charge shall be paid to the finance department before any water service is turned off or turned on for any of the purposes set forth in this section.

C. If the turn off and turn on is not done within a period of forty-eight (48) hours from the time of the initial consumer request, the charge is thirty dollars (\$30) to turn off the water service and thirty dollars (\$30) to turn on the service. The charge shall be paid to the finance department before any water service is turned off or turned on for any of the purposes set forth in this section.

D. If more than one turn off and turn on request occurs in any twelve (12) month period, a charge in the amount of forty-five dollars (\$45) shall be assessed against the account for each additional service turn off.

Sec. 7.02.220. Prohibited uses. No person shall:

A. Use water from the city water system for sprinkling or irrigating when requested by a police officer or firefighter of the city to cease such use during a fire which the fire department is seeking to control or when use of water for sprinkling or irrigation is forbidden by the city council;

B. Bathe in, fish in, or throw any substance into any reservoir or water tank or standpipe or into any pipe or connection to the city water system,

or upon the premises where any reservoir, water tank or standpipe is located;

C. Obstruct the access to any fire hydrant or place lumber, dirt, rubbish, or other material upon public right-of-way or city owned property within twenty (20) feet of a fire hydrant or to open or operate a fire hydrant except a member of a fire department or employee of the city in pursuance of his employment or duty;

D. Break or deface the seal of a water meter or tamper with, damage, obstruct, or alter a water meter in service;

E. Make any connection with a water main, water pipe, or fire hydrant for delivery of water from the city water system to a consumer without a permit from the water utility and a means of measuring the quantity of water taken prior to consumption;

F. Turn on or turn off a water service at the water box or any place between the water meter and the water main of the city water system other than by an employee of the water utility or finance department who is authorized to either turn on or turn off a water service;

G. Interfere with, obstruct, or prevent free or safe access to any water meter or water service for purpose of reading, inspection, repair, removal, or installation by any employee of the water utility or finance department in pursuit of his employment;

H. Tamper with, destroy, break, or interfere with any part of the water system; or

I. Make, construct, buy, sell, or in any way dispose of to any person any curb cock key or hydrant wrench that fits or may be used on any part

of the city water system without permission of the director of public works of the city.

Sec. 7.02.230. Water rates.²

A. *Water rates.* The following monthly rates apply to all water customers served by the city of Kent. The lower rate applies per 100 cubic feet of water used up to or equal to 800 cubic feet per month, and the higher rate applies per 100 cubic feet of any water used in excess of 800 cubic feet:

WATER	
USE/CONSUMPTION	
Winter/Summer	
≤ 800cf:	\$2.40
> 800cf:	\$4.73

All customers are also subject to a monthly demand charge for potable water service, dedicated fireline service, and water meters. For purposes of this chapter, a *dedicated fireline* constitutes the pipe(s) and appurtenances on private property that only supply water to the system riser for water-based fire protection systems, private hydrants, monitor nozzles, fire pump suction, and tanks. The dedicated fireline begins after the property isolation device, and it contains water that will be used only when needed for fire protection purposes and so will become stagnant and nonpotable. The fees for these monthly demand services are as follows:

Meter Size or, for Dedicated Fireline, Pipe Size (inches)	Residential Charge Effective January 1, 2017	Commercial Charge Effective January 1, 2017	Dedicated Fireline Charge Effective January 1, 2017
≤3/4	\$23.15	\$29.10	\$2.75
1	\$36.25	\$42.20	\$3.21

Meter Size or, for Dedicated Fireline, Pipe Size (inches)	Residential Charge Effective January 1, 2017	Commercial Charge Effective January 1, 2017	Dedicated Fireline Charge Effective January 1, 2017
1-1/4			\$4.81
1-1/2	\$69.00	\$74.95	\$6.42
2	\$108.30	\$114.25	\$10.27
3	\$173.80	\$179.75	\$25.67
4	\$265.50	\$271.45	\$51.33
6		\$402.45	\$102.67
8		\$533.45	\$173.25
10		\$664.45	\$256.67

Beginning January 1, 2018, and on the first day of each calendar year thereafter, the total water rate for consumption, meters, and dedicated fireline usage will adjust by the Consumer Price Index (CPI), specifically the CPI-W Seattle-Tacoma-Bremerton, measured from June 1st through June 1st of the previous calendar year, if the CPI-W reflects an upward adjustment from the previous annual June to June period. For the years 2018 through 2022 the adjustment will not exceed 2.4 percent of the total water rate, but after that, beginning January 1, 2023, any increase in the CPI will not be subject to this 2.4 percent limit. In order to simplify the rate-making structure, the finance director is authorized to amend the rate each year to reflect the CPI adjustment.

B. *Lifeline customers.* Through Chapter 7.01 KCC, the city council has established eligibility criteria for lifeline customers. For lifeline-qualified water service customers, the following fees apply for monthly demand services, and water consumption per 100 cubic feet:

<i>Effective Date</i>	<i>Demand Service Charge</i>	<i>Water Rate per 100 cf</i>
01/01/2017	\$13.10	\$0.61

Sec. 7.02.240. Water billing adjustments.

A. Subject to the right of access and inspection by a representative of the city, a property owner receiving water service from the city may apply for adjustment of a city water bill under the following circumstances:

1. A water leak has been discovered on the subject property; or
2. A water line failure has occurred on the subject property; or
3. An inadvertent error on the part of the occupant of the subject property caused excessive water usage; or
4. An unexplained, abnormal water meter reading has occurred on the subject property.

This adjustment shall not exceed 100 percent of the difference between the total amount charged by the city for the billing period for which adjustment has been requested, and the average water usage at the subject property. For purposes of this subsection, "inadvertent error" does not include actions constituting knowing or willful neglect. Furthermore, the average water usage shall be computed by determining the total volume of water consumed, under normal use conditions, during the preceding 12 months and dividing that total volume by the number of times the city reads the customer's water meter. If there is insufficient usage history by the owner at the subject property, the city may use additional consumption history before an adjustment can be made. This additional consumption history may include, but is not limited to: the owner's prior usage at another location receiving water service from the city; the previous owner's consumption history; and historical water consumption at comparable properties within the city.

B. This water bill adjustment can be applied to no more than two consecutive billing periods. Any bill submitted for adjustment must exceed two times the average usage in the preceding 12 months prior to the earliest billing period for which the adjustment is requested. The property owner must submit a signed application for adjustment, on a form prescribed by the finance director, within 90 days of the last day of the billing period for which an adjustment is requested, in order to be eligible for the adjustment.

C. Following receipt of an application for a water bill adjustment, the city's customer services manager, or the manager's designee, shall review the application and determine whether or not to adjust the water bill based on the criteria listed in this section. In order to make a proper and fair determination, city staff shall be entitled to enter upon and inspect the subject property, if necessary, and shall verify that the water meter serving the subject property does not indicate that excessive water usage is continuing. The customer services manager shall not approve an application for water bill adjustment if the city determines that the water meter shows the continued existence of abnormally high water usage.

D. If approved, the customer services manager shall adjust the water bill by issuing a credit to the water service billing account. In the alternative, if the owner no longer owns the subject property or is otherwise no longer legally responsible for the water bill, the city may, upon approval of the finance director, issue a check to the owner in an amount not to exceed what would have been credited to the water service billing account.

E. The owner may request reconsideration of the decision of the city's customer services manager by the city's finance director. This request must be in writing and delivered to the city no later than 30 days after the customer services manager's decision is delivered to the property owner.

For purposes of this subsection, delivery is deemed complete upon the third day following the day upon which the written determination or request for consideration is placed in the mail, unless the third day falls on a Saturday, Sunday, or legal holiday, in which event service shall be deemed complete on the first day other than a Saturday, Sunday, or legal holiday following the third day. This request for reconsideration must contain all relevant facts and circumstances pertaining to why the owner believes that the decision of the customer service manager was incorrect. The finance director shall issue a written decision to the requestor within 45 days of receipt of the request for reconsideration. The finance director's determination cannot be appealed to the hearing examiner or the city council, and any further appeals may only be made pursuant to applicable state law.

F. A property owner may submit an application for adjustment of a water bill only once every 12 months; provided, however, that this does not prohibit an owner from submitting an application for adjustment of two billing periods simultaneously, pursuant to subsection (B) of this section. If a property owner has previously submitted an application for adjustment of a water bill to the city for the same property, the customer services manager will reject any subsequent application that does not also include tangible proof that repair work to correct the leak has already been completed, such as original or certified copies of invoices for parts and/or labor. The city may also enter onto the subject property to confirm that necessary repairs have been made, prior to granting a subsequent request for a water bill adjustment.

G. Subsection (F) of this section notwithstanding, a property owner submitting an application pertaining to a property for which that owner has not previously submitted a request for a water bill reduction, or a new owner applying for a water bill reduction pertaining to a property for which

a water bill reduction was previously requested by a prior owner, shall be treated as a first-time applicant under this section. The finance director shall not consider an heir, devisee, person related by blood or marriage, an affiliated corporate entity or an entity under common control with a prior owner of the subject property to be treated as a "first-time applicant" for purposes of this subsection.

Sec. 7.02.250. Billing for service. All billing for water shall be made to the nearest five cents (\$0.05).

Sec. 7.02.260. Charges when meter is out of order. If a meter fails to register the amount of water used, the customer will be charged at the average rate of monthly consumption as shown by the meter when the meter was in working order.

Sec. 7.02.270. Request for meter check. A customer may request a meter check. If it is found that the meter is registering less than or more than the requirements of the state for meter accuracy, no charge will be made. If it is found that the meter is registering in accordance with state regulations, a charge which is on file in the city clerk's office will be made. This charge will be added to the next water billing.

Sec. 7.02.280. Fire protection service.

A. Pipes for fire protection purposes must be fitted with such fixtures as are needed for fire protection and such fixtures shall be sealed by the water utility. In no case shall such seal be broken, except in case of fire or by the fire chief for the purpose of testing the pipes, fixtures or hose.

B. When seals are broken in case of fire, it shall be the duty of the owner or tenant of the premises to notify the water utility within twenty-four (24) hours after its occurrence, and the seal will be replaced by the water utility.

Sec. 7.02.290. Emergency shutoff without notice.

A. The water may at any time be shut off from the mains without notice for repairs, extensions, or other necessary purposes and persons having boilers supplied by direct pressure from the mains are cautioned against danger of explosion or collapse. Where meters are in use, a safety valve shall be placed between the boiler on such service and the meter at the owner's expense, and the owner shall be held responsible to the city for any and all damages to meters caused by hot water.

B. The city will not be responsible for the safety of boilers or other fixtures on the premises of any water consumer.

Sec. 7.02.300. Penalty for violation.

A. Except as set forth in KCC 7.02.310 – 7.02.400, any violation of this chapter constitutes a civil violation under Chapter 1.04 KCC, for which a monetary penalty may be assessed and abatement may be required as provided therein.

B. In addition to, or as an alternative to, any other penalty provided in this chapter or by law, any person who violates this chapter shall be guilty of a misdemeanor and, upon conviction thereof, shall be subject to the penalties provided for in KCC 1.04.030.

PART TWO

Cross-Connection Restrictions

Sec. 7.02.310. Cross-connection restrictions – Purpose. The purpose of this section is to protect the city's public water system from contamination via cross-connections.

Sec. 7.02.320. Cross-connection restrictions – Definitions.

A. Definitions in WAC 246-290-010, as they presently exist and as they may be amended, are hereby adopted and incorporated herein by this reference as if set forth in full, including, but not limited to the following terms.

1. *Backflow* means the undesirable reversal of flow of water or other substances through a cross-connection into the public water system or consumer's potable water system.

2. *Consumer's water system* means any potable or industrial water system that begins at the point of delivery from the public water system and is located on the consumer's premises. The consumer's water system includes all auxiliary sources of supply, storage, treatment, and distribution facilities, piping, plumbing, and fixtures under the control of the consumer.

3. *Cross-connection* means any actual or potential physical connection between a public water system or the consumer's water system and any source of nonpotable liquid, solid, or gas that could contaminate the potable water supply by backflow.

4. *High health cross-connection hazard* means a cross-connection involving any substance that could impair the quality of potable water and create an actual public health hazard through injury, poisoning, or spread of disease.

5. *Premises isolation* means a method of protecting a public water system by installation of approved air gaps or approved backflow prevention assemblies at or near the service connection or alternative location acceptable to the purveyor to isolate the consumer's water system from the purveyor's distribution system.

6. *Uniform Plumbing Code (UPC)* means the code adopted under RCW 19.27.031 and implemented under chapter 51-56 WAC. This code

establishes statewide minimum plumbing standards applicable within the property lines of the consumer's premises.

B. In addition to those definitions contained within WAC 246-290-010, when used in this chapter, the following terms shall have the meanings ascribed to them in this section, unless the context indicates otherwise:

1. *Approved backflow preventer* means an approved air gap, an approved backflow prevention assembly, or an approved atmospheric vacuum breaker relied upon by the purveyor for the protection of the public water system. The requirements of this chapter do not apply to backflow preventers installed for other purposes.

2. *Approved backflow prevention assembly* means a reduced pressure backflow assembly, reduced pressure detector assembly, double check valve assembly, double check detector assembly, pressure vacuum breaker assembly, or spill resistant vacuum breaker assembly of make, model, and size that is approved by the Washington State Department of Health (Department of Health).

3. *Authority Having Jurisdiction* means the Building Services division of the City of Kent Economic and Community Development Department, which is authorized to administer and enforce the provisions of the UPC.

4. *Auxiliary Water Supply* means water supplied by wells or by cisterns or some other type of water not supplied by the city.

5. *Consumer* means the owner or operator of a water system connected to a public water system through a service connection.

6. *Director* means the director of the public works department or his/her designee.

7. *Public Water System* means all the public water treatment, storage, and distribution facilities, beginning at the water supply sources and ending at the point of delivery to the consumer's water system, which

begins at the downstream end of the service connection or water meter located on the public right of way or utility-held easement.

8. *Purveyor* means the city of Kent Public Works Department Water Utility, which operates the public water system.

9. *Substantial Alteration* means any upgrades, additions, repairs, or alterations to any site in exceedance of \$100,000.00.

Sec. 7.02.330. Adoption of state regulations. The provisions of WAC 246-290-490, as they presently exist and as they may be amended, are hereby adopted and incorporated herein by this reference as if set forth in full.

Sec. 7.02.340. Unprotected cross-connection declared unlawful. The installation or maintenance of an unprotected cross-connection is hereby declared to be unlawful. The control and elimination of cross-connections by the public works department shall be in accordance with the applicable sections of the Washington Administrative Code, the Kent City Code and the policies and procedures of the city's cross-connection control program.

Sec. 7.02.350. Cross-connection restrictions - Administration. The public works department shall be responsible for administering KCC 7.02.310 through 7.02.410, including the development of the necessary procedures and practices that are consistent with the standards in this code and chapter 246-290 WAC.

Sec. 7.02.360. Cross-connection restrictions - Service connection.

A. No water service connection from the public water system to any consumer shall be installed or maintained unless the public water system

is protected by an approved backflow preventer commensurate with the degree of hazard.

B. Water service may be discontinued to any consumer for failure to comply with this chapter. Service may not be re-established until the public works department has verified compliance with this chapter pertaining to cross-connections.

Sec. 7.02.370. Entry onto premises. With the consent of the consumer or owner/operator of any premises, through permissions granted in a water service agreement or pursuant to a lawfully issued warrant, public works department staff may enter any premises at any reasonable time to perform the duties imposed by this chapter. No consent, warrant, or permission is required to enter those areas open to the public generally or to which no reasonable expectation of privacy exists.

Sec. 7.02.380. Approved backflow preventers required.

A. Approved backflow preventers shall be installed at the city's water service connection commensurate with the assessed degree of hazard. The consumer shall install and maintain all approved backflow preventers deemed necessary by the standards established by the city.

B. Premises isolation is required for the following service connections:

1. Severe and high health cross-connection hazard premises listed in WAC 246-290-490(4)(b), Table 9;
2. New commercial multi-tenant facilities;
3. Single-family dwellings with access to an auxiliary water supply;
4. Commercial fire lines;
5. Commercial irrigation systems;
6. Residential irrigation systems (per the UPC);

7. Residential fire sprinkler systems, excluding the flow-through type (per the UPC).

C. Premises isolation may be required after an assessment by the public works department of the following service connections:

1. New commercial facilities;
2. Commercial facilities after a substantial alteration;
3. Facilities with complex plumbing arrangements that make it impracticable to assess whether cross-connection hazards exist;
4. Facilities with cross-connection hazards that are unavoidable or not correctable, such as, but not limited to, facilities which are more than two stories.

D. Commercial fire lines with single check valve backflow preventers are subject to the following requirements:

1. Where an existing fire line and/or private fire hydrant system is altered or extended, the existing fire line, fire hydrant(s) and/or yard hydrant and all related backflow protection assemblies shall be upgraded to comply with current City codes. The upgrade requires a backflow permit and all upgrades shall be completed prior to final inspection and permit approval.

2. When single check valve backflow preventers are discovered, the public works department will issue a notice requiring replacement with an approved backflow prevention assembly. The replacement shall be completed within one year of the notice or other timeframe acceptable to the public works department.

Sec. 7.02.390. Inspection and testing procedures of approved backflow preventers.

A. Approved backflow preventers shall be inspected and tested:

1. At the time of initial installation;

2. Annually after initial installation;
3. After the approved backflow preventer is repaired;
4. After the approved backflow preventer is moved, relocated, reinstalled or reinstated;
5. After the approved backflow preventer fails testing or inspection and the cause of the failure has been corrected;
6. After installation or replumbing of an air gap;
7. After a backflow incident;
8. More often if tests indicate repeated failures.

B. The consumer shall have all required inspections and tests performed by a backflow assembly tester certified by the Washington State Department of Health. The results shall be delivered to the city on a form acceptable to the city.

C. If any required inspection and/or test is not performed, or if the approved backflow preventer does not successfully pass the required tests, the city may initiate enforcement as set forth in KCC 7.02.410.

Sec. 7.02.400. Approved backflow preventers administrative fee and permit.

A. Administrative fee assessed. An administrative fee per approved backflow preventer has been established by council resolution, and is assessed annually. This fee is used to pay for costs incurred by the city to administer the cross-connection control program, including educational outreach, inspections, water-use surveys, and record-keeping mandated by the Washington State Department of Health and the UPC.

B. Backflow Prevention Permit. The installation of any approved backflow preventer requires a backflow prevention permit. An inspection fee for the backflow prevention permit shall be established by council

resolution and assessed at the time of permit issuance. The director is authorized to interpret the fee schedule(s) to resolve any conflict or ambiguity.

Sec. 7.02.410. Cross-connection restrictions – Enforcement.

A. Any violation of any provision of this chapter may be enforced as provided for in this section.

B. **Water Service Shutoff and Monetary Penalties.** If the public works department determines that an unlawful cross-connection exists and/or that the consumer has failed to meet the inspection and testing requirements for approved backflow preventers, the consumer may be subject to the following penalties:

1. Residential Consumers.

(a) **Warning.** Written notice will be sent to the consumer or, alternatively, a copy of such written notice will be posted on the premises involved. The notice shall provide that the unlawful cross-connection shall be corrected by testing or installation within 30 days of the date the notice is mailed or posted on the premises.

(b) **First Violation.** If the consumer does not correct the violation by testing or installation within 30 days of the first written notice, the consumer may receive a \$100 penalty and notice that water service to the premises may be shut off after 30 days. The notice shall include the actions necessary to avoid water service shutoff.

(c) **Second Violation.** If the consumer does not correct the violation by testing or installation within 30 days of the issuance of the first penalty, the consumer may receive an additional \$100 penalty and water service to the premises may be shut off immediately. Water service will not be restored until the consumer

corrects the violations and fully pays the penalty and water shutoff fee.

2. Commercial Consumers.

(a) Warning. Written notice will be sent to the consumer or, alternatively, a copy of such written notice will be posted on the premises involved. The notice shall provide that the unlawful cross-connection shall be corrected by testing or installation within 30 days of the date the notice is mailed or posted on the premises.

(b) First Violation. If the consumer does not correct the violation by testing or installation within 30 days of the first written notice, the consumer may receive a \$500 penalty and notice that water service to the premises may be shut off after 30 days. The notice shall include the actions necessary to avoid water service shutoff.

(c) Second Violation. If the consumer does not correct the violation by testing or installation within 30 days of the issuance of the first penalty, the consumer may receive an additional \$500 penalty and water service to the premises may be shut off immediately. Water service will not be restored until the consumer corrects the violations and fully pays the penalty and water shutoff fee.

3. Appeal of Water Service Shutoff and Monetary Penalties. A consumer may appeal the water service shutoff and/or the assessment of a monetary penalty to the director. An appeal must be made in writing and must set forth the reasons and include any evidence of why the consumer is not in violation of this chapter. The director will provide written notice of his or her decision on the appeal within 10 business days of the director's receipt of the appeal. That decision is final, and no additional appeal is available.

C. *Recovery of costs incurred by the city.* In addition to any penalty provided for in subsections (B) through (F) of this section, a consumer who violates any of the provisions of this chapter shall be liable for all costs incurred by the city as a result of the violation. The city will issue an invoice to the consumer for the violation advising of the amount of costs incurred by the city as a result of the violation. The consumer must respond within 14 days of service of notice by: (1) paying the invoice, (2) requesting a hearing before the city's hearing examiner to mitigate the amount of the invoice, or (3) requesting a hearing before the city's hearing examiner to contest the amount of the invoice. Failure to timely respond shall result in the invoice being deemed valid and the city may seek collection of the invoice through the process provided for in Chapter 3.10 KCC, including the use of a collection agency. Payment of any invoice issued shall not alleviate the consumer for the violation from complying with this chapter.

1. *Service of notice.* Service of an invoice issued under this subsection (C) shall occur and is deemed complete in the same manner and under the same provisions as provided for in KCC 1.04.060.

2. *Process to mitigate or contest invoice.* The process through which a consumer may request a hearing to contest or mitigate an invoice issued to him or her as a person responsible for the violation is the same as that provided for notices of violation under KCC 1.04.120 through 1.04.190. The hearing examiner's decision as to any invoice issued under this subsection (C) is final and may not be further appealed.

3. *Failure to pay – Civil infraction.* The failure to timely pay an invoice issued under this subsection (C), or any mitigated invoice amount set by the hearing examiner, is a separate violation that may be enforced through the issuance of a civil infraction pursuant to subsection (D) of this section.

D. *Civil infraction.* A person who violates any provision of this chapter may be issued a class 1 civil infraction as set forth in RCW 7.80.120, as currently enacted or hereafter amended. An infraction issued pursuant to this section shall be filed in the Kent Municipal Court and processed in the same manner as other infractions filed in the Kent Municipal Court. In addition, a civil code enforcement action may be instituted in accordance with subsection (E) of this section to effectuate any abatement or corrective action required by the person as a result of the violation.

E. *Civil code enforcement.* In addition to, or as an alternative to any other penalty provided for in this chapter or by law, a civil code enforcement action may be instituted under the provisions provided for in Chapter 1.04 KCC to effectuate any abatement or corrective action required as a result of a violation of this chapter, including the issuance of a stop use or stop work order under KCC 1.04.090 through 1.04.110. The process through which the person responsible for the violation may contest a stop use or stop work order is the same as that provided for notices of violation under KCC 1.04.120 through 1.04.190. Failure to timely abate the violation or take the required corrective action will result in the issuance of a fine in accordance with KCC 1.04.080 and 1.04.200, which fine will be separate and apart from any fine that may have been issued under subsection (B) of this section.

F. *Criminal offense.* Except as may otherwise be provided, a person who:

1. Negligently violates a provision of this chapter is guilty of a misdemeanor, punishable by up to the maximum penalty established in RCW 9A.20.021(3) as now enacted or hereafter amended; or who
2. Knowingly violates a provision of this chapter, or commits a repeated violation of this chapter, is guilty of a gross misdemeanor,

punishable by up to the maximum penalty established in RCW 9A.20.021(2), as now enacted or hereafter amended.

(a) For purposes of this section *repeated violation* means, as evidenced by either a prior committed finding by the Kent Municipal Court of an infraction issued under this chapter, or a committed finding by the hearing examiner of a notice of violation issued under Chapter 1.04 KCC, or a committed finding by operation of law under KCC 1.04.130, that a violation of this chapter has occurred on the same property or that a person responsible for the violation has committed a violation of this chapter elsewhere within the city of Kent. To constitute a "repeat violation," the violation need not be the same violation as the prior violation.

3. If a person is found guilty of a criminal offense as provided for in this subsection (F), or pleads guilty to another offense on recommendation of the prosecutor, the court shall order the defendant pay restitution to the city of Kent, or any other victim of the offense, for the total suffered loss or damage by reason of the commission of the crime.

SECTION 3. – *Savings.* The existing Chapter 7.02 of the Kent City Code, which is repealed and replaced by this ordinance, shall remain in full force and effect until the effective date of this ordinance.

SECTION 4. – *Corrections by City Clerk or Code Reviser.* Upon approval of the city attorney, the city clerk and the code reviser are authorized to make necessary corrections to this ordinance, including the correction of clerical errors; ordinance, section, or subsection numbering; or references to other local, state, or federal laws, codes, rules, or regulations.

SECTION 5. - Effective Date. This ordinance shall take effect and be in force 30 days from and after its passage, as provided by law.



DANA RALPH, MAYOR

November 20, 2018
Date Approved

ATTEST:



KIMBERLEY A. KOMOTO, CITY CLERK

November 20, 2018
Date Adopted

November 23, 2018
Date Published

APPROVED AS TO FORM:



ARTHUR "PAT" FITZPATRICK, CITY ATTORNEY

APPENDIX N

Agency Review Comments

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Stephanie Perkins

From: Michele Campbell
Sent: June 21, 2019 9:50 AM
To: Bauer, Sean; Swanson, Evan
Cc: Ryan Withers; Stephanie Perkins; Andy Dunn
Subject: FW: Review of Kent 2019 Water System Plan - DOH Submission #19-0502

Follow Up Flag: Follow up
Flag Status: Flagged

Good news from Ecology!

Have a great weekend,

Michele Campbell | RH2 Engineering, Inc.

O: 425.951.5394
C: 206.963.6553

From: Rodriguez, Richard (DOH) <Richard.Rodriguez@DOH.WA.GOV>
Sent: Thursday, June 20, 2019 2:01 PM
To: Michele Campbell <mcampbell@rh2.com>
Subject: FW: Review of Kent 2019 Water System Plan - DOH Submission #19-0502

Michele, see attached DOE e-mail response on review of Kent WSP.

Richard

From: Wood, Doug (ECY)
Sent: Wednesday, June 19, 2019 11:25 AM
To: Rodriguez, Richard (DOH) <Richard.Rodriguez@DOH.WA.GOV>
Subject: Review of Kent 2019 Water System Plan - DOH Submission #19-0502

Richard:

I have reviewed the submitted draft water system plan and do not have any comments.

I did not find a name or an email address for Kent in the letter, so if Kent needs a copy of this email please forward it to them.

Douglas H. Wood, LHG
Hydrogeologist/Permitting Specialist
Dept. of Ecology - Northwest Region

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King County

Utilities Technical Review Committee

Department of Natural Resources and Parks
King Street Center
201 South Jackson Street, Suite 512
Seattle, WA 98104-3855
www.kingcounty.gov

July 10, 2019

Sean Bauer, Water Systems Manager
City of Kent
220 Fourth Avenue S
Kent, WA 98032

Dear Mr. Bauer:

Thank you for submitting the City of Kent Water System Plan Agency Review Draft 2019 (Plan) for King County approval. The Plan was received from your consultant, Michele Campbell, on May 14, 2019. In accordance with the King County Code 13.24, the King County's Utilities Technical Review Committee (UTRC) has reviewed the Plan for consistency with the King County Comprehensive Plan and the King County Code. In reviewing the Plan, the UTRC noted the Plan is well written, easy to follow, and is largely consistent with the County's comprehensive plan and code. We have identified five points of clarification that are necessary before we can make a recommendation to the King County Council for approval of the City's final plan. We request you include the following information in your final plan:

1. Details regarding when the time-period starts for measuring timely and reasonable service for a request for service.
2. Details regarding what constitutes a reasonable response to a request for service.
3. Provide consistency statements by local jurisdictions, or documentation for self-certification of consistency, as described in WAC 246-290-108.
4. A State Environmental Policy Act decision or determination on the checklist.
5. Confirm the City will continue to issue or use certificates of water availability for service of water to parcels located in unincorporated King County.

Often, the construction and/or maintenance of utility lines require work within the road right of way (ROW) for roads in unincorporated King County. When a utility has a proposed project within unincorporated King County, please contact the King County Department of Local Services, Road Services Division, Engineering Services Section for coordination with the County's annual overlay program. Failure to do so may result in the denial of the permit to work within the ROW once an overlay of the road section has been completed. Although each utility has a set of construction standards and specifications for their projects, when construction and or maintenance of utilities requires work within the road ROW for roads in unincorporated King County, please be aware that the current edition of the King County Road Design and Construction standards apply to any installation or work in these ROWs. Not adhering to these standards could result in the installation of non-specified and approved methods and/or materials that are out of the specifications for King County and could potentially add additional costs to

RECEIVED BOTHELL
RH2 ENGINEERING INC.
JOB NO: _____

JUL 15 2019

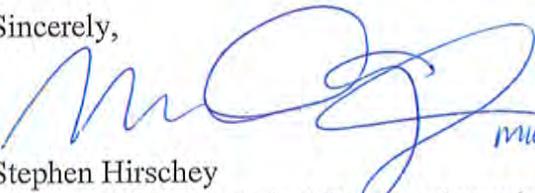
ROUTE TO: MC
FILE: _____

Sean Bauer
July 10, 2019
Page 2

the purveyor for future repairs or adversely affect acceptance of those repairs/installations. The 2016 King County Road Design and Construction Standards can be found on the World Wide Web at: <https://www.kingcounty.gov/depts/local-services/roads/road-standards.aspx>

We look forward to seeing the final Plan and working with you to secure the King County Council's approval. The Council's action will represent King County's final action on the Plan. If you have any questions or concerns about any of the information in this letter, please do not hesitate to call me at 206-477-5387, or email at Steve.Hirschey@kingcounty.gov.

Sincerely,



MICHAEL GALVAN

Stephen Hirschey
Chair, Utilities Technical Review Committee

cc: Richard Rodriguez, Regional Planner, Washington State Department of Health
Michael Kulish, Supervisor, Real Estate Services, Facilities Management Division, King County
Michele Campbell, P.E., Project Manager, RH2



September 27, 2019

Mr. Stephen Hirschey
King County UTRC Chair
201 South Jackson Street, Suite 512
KSC-NR-0512
Seattle, WA 98104-3855

Sent via: *Email and US Mail*

Subject: **City of Kent Water System Plan
Response to Review Comments**

Dear Mr. Hirschey

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting two copies of supplements and replacements for the City's Water System Plan (WSP). The WSP was originally submitted to the King County Utilities Technical Review Committee's (County) office on May 14, 2019, for review and comment. The review comments from the County's letter dated July 10, 2019, are addressed below. County comments are provided below in **bold** text, with RH2 responses in normal text.

1. Details regarding when the time-period starts for measuring timely and reasonable service for a request for service.

The Duty to Serve discussion on page 5-12 has been revised to describe that the time period starts when an application for water service is first received by the City.

2. Details regarding what constitutes a reasonable response to a request for service.

The Duty to Serve discussion on page 5-12 has been revised to describe what constitutes a reasonable response to a request for service.

3. Provide consistency statements by local jurisdictions, or documentation for self-certification of consistency, as described in WAC 246-290-108.

Consistency Statement Checklists have been requested from the City of Auburn and the County. These will be provided when available. The City of Kent's Consistency Statement Checklist is contained in Appendix C.





4. **A State Environmental Policy Act decision or determination on the checklist.**
A Determination of Non-Significance has been provided for inclusion in Appendix D.
5. **Confirm the City will continue to issue or use certificates of water availability for service of water to parcels located in unincorporated King County.**
Confirmed.

In addition to the documents previously mentioned, RH2 has enclosed two copies of the updated binder cover, spine, title page, and table of contents to be inserted in the WSPs that were previously submitted to your office.

If this submittal of information meets your needs for WSP approval, RH2 requests, on behalf of the City, that the WSP be approved and the attached Local Government Consistency Determination Form be returned.

If you have any questions, please call me at (425) 951-5394 or via email at mcampbell@rh2.com.

Sincerely,

A handwritten signature in blue ink that reads 'Michele Campbell'.

Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: Local Government Consistency Determination Form
Updated Cover, Spine, Title Page, and Table of Contents (2 copies)
Replacement and Supplemental Pages for WSP (2 copies)
2019 City of Kent Water System Plan (1 electronic copy)

cc: Mr. Sean Bauer, Water Systems Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent

Local Government Consistency Determination Form

Water System Name: City of Kent PWS ID: 381501

Planning/Engineering Document Title: Water System Plan Plan Date: May 2019

Local Government with Jurisdiction Conducting Review: King County

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Figs 2-3 & 3-1	
b) The <u>growth projection</u> 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.	Pages 3-6 to 3-10	
c) For <u>cities and towns that provide water service</u> ; All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Chapter 5, App. M	
d) <u>Service area policies</u> 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.	Chapter 5, App. M	
e) <u>Other relevant elements</u> 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 to 3-5	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature

Date

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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).



State of Washington

DEPARTMENT OF HEALTH

NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310 • Kent Washington 98032-2388

July 18, 2019

SEAN BAUER
KENT WATER DEPARTMENT
220 4TH AVE S
KENT WA 98032

RECEIVED BOTHELL
RH2 ENGINEERING INC.
JOB NO: _____

JUL 22 2019

SUBJECT: Kent Water Department, ID#38150
King County
Water System Plan 2019
Submittal #19-0502

ROUTE TO: MC
FILE: _____

Dear Mr. Bauer:

Thank you for submitting the draft Water System Plan (WSP) for the City of Kent (the City) received in this office on May 14, 2019. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

System Description

1. Provide a determinations of local government consistency from the Cities of Auburn and Tukwila.
2. Please respond to review comments from King County dated July 10, 2019. Adequate responses to their issues will be necessary in order to receive a WSP Adoption Ordinance from King County.
3. Page 2-11 refers the Tacoma Second Supply Pipeline (SSP) providing 12.64MGD or 8,778gpm. The water facilities inventory provided in Appendix A shows 13,500gpm. Should we update the water facilities inventory?
4. The water facilities inventory lists 2,300 non-residential connections and zero non-residential population. Please update the WFI with an estimate of non-residential users including employees, students, visitors, and the like who live outside of the City's service area yet have access to City water in work places, schools, entertainment venues, etc.
5. Page 2-26 refers to three 2-way emergency interties with Lake Meridian Water District. The water facilities inventory suggests there are four interties with Lake Meridian Water District. Please clarify. We recommend adding a footnote to Table 2-9 Adjacent System and any other



reference to King County Water District 111 to denote the current District name as Lake Meridian Water District.

6. Think about including the emergency interties on Figure 2-1 Existing Water System.
7. Does the City have a written agreement for the emergency intertie with Tukwila? Please include.
8. Page 2-27 refers to certified satellite management agencies (SMAs). Please note that the City does not have to be a Department approved SMA in order to provide SMA services within their service area.

Policies

9. What are Kent's' policies for providing service to existing group B or A public water systems in the Kent water service area?

Basic Planning Data

10. Page 3-7 reports an average annual growth rate of 0.4% between 2017 and 2038 for the City. The City average annual growth rate between 2014 and 2018 appears to be 1.5% (reference Table 3-2 and 2018 Population Trends published by Office of Financial Management). We understand that the water service area does not include the entire City of Kent. Please consider the possibility of the water system population projections shown in Chart 3-1 underestimating growth in the area.
11. It is our understanding that the City has access to 7/36 of the SSP supply. This could be more than 12.64MGD or less than 12.64MGD. How does the City manage uncertainty in timing of available supply? Has the City evaluated meeting future demand without SSP or with limited access to SSP?

System Analysis

12. Is it accurate to say the system analysis chapter presents the projected available capacity with capital improvement projects in place for the booster pump analysis and without the capital improvement projects in place for the storage analysis?
13. The water right capacity listed in Table 7-26 System Capacity Analysis does not correspond to the water right capacity listed in Tables 6-2 Existing Water Rights Evaluation, and Table 6-3 Future Water Rights Evaluation. For example, 31,946gpm (Qi from Table 6-2) does not equal 33,800,000gpd [i.e. 23,472gpm] (Qi from Table 7-26). Please explain.
14. Both the 2009 and Draft version of the Department Water System Design Manual discuss demonstrating that booster pump stations (open and closed systems) meet MDD while maintaining 30psi minimum.

Water Use Efficiency Program (WUE) and Water Rights Assessment

No comment

Source Protection

15. The Wellhead Protection Program provided in Appendix J does not include a publication date. Is the program from 2008 as the figures suggest? Has the City adopted the most recent version of the program? When was the last inventory of potential contaminants compiled (should be every two years)? The program does not specify the notification procedure. What is the frequency of notification? When were the most recent notification letters sent to facilities with potential contaminants?

Operations & Maintenance

16. Have you adopted the Water Main Break Protocol for Chlorinated Systems? (DOH Publication 331-583 – 1/1/2017)

17. Page 8-10 refers to maintenance for privately owned pressure reducing valves being the responsibility of the customer. In our experience, customers do not always understand this responsibility. The City has an excellent program related to privately owned pressure reducing valve customer education. Think about including a summary of the City's program in this chapter of the WSP.

18. Under Recordkeeping and Reporting, please add Construction Completion Reports for all distribution main replacements and extensions.

Water Quality

19. Page 6-36 of the Water Source and Quality chapter and page 18 of the Water Quality Monitoring Plan refer to disinfectant residual concentration monitoring. Please note that distribution system chlorine residual monitoring and reporting per the surface water treatment rule applies. The report should include distribution system disinfectant residuals for every calendar day and include the distribution residuals collected at the same time and place as the routine coliform samples. At least 95% of the monthly samples must have detectable levels.

20. Please note that the lead and copper rule also requires systems that serve more than 50,000 people to monitor and report water quality parameters to demonstrate effective corrosion control treatment.

21. It is excellent that the coliform monitoring plan (CMP) is reviewed annually and updated as needed.

22. If the City ever has an *E. coli* MCL violation DOH will do a special purpose investigation (SPI); an SPI is essentially an abbreviated sanitary survey, with the focus on trying to determine the cause of the *E. coli*. Information from the SPI may be used by the Level 2 assessor but the state's SPI will not satisfy the requirement for the City to do a Level 2.
23. The Northwest Regional Office Staff list included in the CMP is out of date. The most relevant needed update: Brietta Carter, 253-395-6770 is the current regional engineer for King county systems other than SPU.
24. A written standard operating procedure should be included in the CMP to describe the proper coliform sample collection technique for each type of routine and repeat sample site.
25. The City should develop an *E. coli* response plan in case the City ever has an *E. coli* MCL violation or identifies *E. coli* in a raw source water under the Groundwater Rule. Our Mercer Island experience indicated that consumers want this water quality information as soon as possible and an *E. coli* Response Plan best positions a community to be successful.

Standard Plans & Specifications

26. Page 3-25 refers to Section 7-17.3(2) of the WSDOT Standard Specifications which applies to sanitary sewers. Does the City intend to use Section 7-09.3(23) Hydrostatic Pressure Test for new water main? Please update.
27. Standard plan sheet 3-20, Combination Air/Vacuum Valve & Vault, shows a drain hole in the vent line. The Department considers this a potential cross-connection. Think about eliminating the drain hole from the air/vacuum valve design. Does this design accommodate regular testing of the combination air/vacuum valve to ensure it operates as designed?

Capital Improvement Program

28. Has the water system implemented an asset management program, which includes a remaining useful life assessment of major water system facilities, and estimated costs to replace those facilities?

Financial Program

No comment

Other Documentation

29. The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.

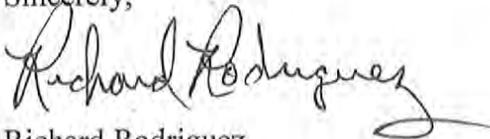
30. Prior to DOH approval, the City's elected officials must approve and adopt the WSP.
31. A signed SEPA checklist is a part of the WSP submittal. Provide a signed SEPA Threshold Determination.
32. Include any comments from adjacent purveyors and the City's response to those comments.
33. Is Kent a member of the Washington State Water/Wastewater Agency Response Network (WAWARN)? Federal Emergency Management Agency states prior to reimbursement, they will ask for mutual aid documentation. Becoming a member of WAWARN demonstrates both managerial and financial capacity.

We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before **November 30, 2018**. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Regulations establishing a schedule of fees for review of planning, engineering, and construction documents were adopted August 3, 2007 (WAC 246-290-990). The total cost is **\$5484.00**. An itemized invoice is enclosed. Please note that this fee covers our current review and one more submittal for this project. If additional submittals are required, then an invoice for additional fees will be included with our final approval letter. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **WSDOH, Revenue Section, PO Box 1099, Olympia WA 99507-1099**.

Thank you again for submitting your draft Water System Plan for our review. If you have any comments or questions concerning our review, please contact me.

Sincerely,



Richard Rodriguez
Regional Planner
Northwest Drinking Water Operations
(253) 395-6771

cc: Brietta Carter, DOH
Ria Berns, WSDOE – NWRO
Steve Hirschey, King County UTRC
Michele Campbell, RH2 Inc.

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September 27, 2019

Mr. Richard Rodriguez
Regional Planner
Department of Health
20425 72nd Avenue South, Suite 310
Kent, WA 98032

Sent via: *Email and US Mail*

Subject: **Kent Water Department, ID#38150**
King County
Water System Plan 2019
Submittal #19-0502

Dear Mr. Rodriguez:

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting three copies of supplements and replacements for the City's Water System Plan (WSP). The WSP was originally submitted to the Department of Health (DOH) office on May 14, 2019, for review and comment. The review comments from DOH's letter dated July 18, 2019, are addressed below. DOH comments are provided below in **bold** text, with RH2 responses in normal text.

System Description

1. Provide a determination of local government consistency from the Cities of Auburn and Tukwila.

A Consistency Statement Checklist has been requested from the City of Auburn. The City does not serve any customers in the City of Tukwila boundaries. Statement's regarding service within the City of Tukwila have been corrected on pages 2-2 and 3-4.

2. Please respond to review comments from King County dated July 10, 2019. Adequate responses to their issues will be necessary in order to receive a WSP Adoption Ordinance from King County.

RH2 has responded to comments received from King County. A copy of that letter is enclosed for inclusion in Appendix N of the WSP.





- 3. Page 2-11 refers the Tacoma Second Supply Pipeline (SSP) providing 12.64MGD or 8,778gpm. The water facilities inventory provided in Appendix A shows 13,500gpm. Should we update the water facilities inventory?**

Yes, 8,778 gpm is the correct flow from the Tacoma SSP. The water facilities inventory (WFI) has been updated and submitted to DOH. A copy of the revised WFI is enclosed.

- 4. The water facilities inventory lists 2,300 non-residential connections and zero non-residential population. Please update the WFI with an estimate of non-residential users including employees, students, visitors, and the like who live outside of the City's service area yet have access to City water in work places, schools, entertainment venues, etc.**

The WFI has been updated and submitted to DOH. A copy of the revised WFI is enclosed.

- 5. Page 2-26 refers to three 2-way emergency interties with Lake Meridian Water District. The water facilities inventory suggests there are four interties with Lake Meridian Water District. Please clarify. We recommend adding a footnote to Table 2-9 Adjacent System and any other reference to King County Water District 111 to denote the current District name as Lake Meridian Water District.**

There are two 2-way interties between the City and Lake Meridian Water District. Page 2-26 has been updated and Table 2-9 has been revised to denote the current name for Lake Meridian Water District. In addition, the WFI has been updated.

- 6. Think about including the emergency interties on Figure 2-1 Existing Water System.**

A new figure, Figure 2-4, has been created to show the City's emergency interties.

- 7. Does the City have a written agreement for the emergency intertie with Tukwila? Please include.**

The City's Emergency Intertie ILA with the City of Tukwila is enclosed for inclusion in Appendix B.

- 8. Page 2-27 refers to certified satellite management agencies (SMAs). Please note that the City does not have to be a Department approved SMA in order to provide SMA services within their service area.**

Noted.

Policies

- 9. What are Kent's policies for providing service to existing group B or A public water systems in the Kent water service area?**

Policies for providing water service to existing Group A or B public water systems are governed by Kent City Code including, but not limited to, sections 7.02.070 and 7.02.080.



Basic Planning Data

10. **Page 3-7 reports an average annual growth rate of 0.4% between 2017 and 2038 for the City. The City average annual growth rate between 2014 and 2018 appears to be 1.5% (reference Table 3-2 and 2018 Population Trends published by Office of Financial Management). We understand that the water service area does not include the entire City of Kent. Please consider the possibility of the water system population projections shown in Chart 3-1 underestimating growth in the area.**

For the purposes of maintaining Local Government Consistency, the growth rate stated in the Water System Plan is consistent with the City's *Comprehensive Plan*. If the City's *Comprehensive Plan* population projections underestimate growth, and the future water demands exceed projections in Chapter 4, the City has excess system capacity to support the additional growth as demonstrated in Table 7-26.

11. **It is our understanding that the City has access to 7/36 of the SSP supply. This could be more than 12.64MGD or less than 12.64MGD. How does the City manage uncertainty in timing of available supply? Has the City evaluated meeting future demand without SSP or with limited access to SSP?**

The SSP supply rate is guaranteed in the summer only, when demands are the highest. The SSP is a supplemental supply source that provides redundancy and reliability to the water system. As shown in Table 7-2, the City is able to meet the projected 20-year MDD without the SSP supply capacity. The City's future water supply planning will continue to consider the limitations in the SSP supply to maintain sufficient redundancy and reliability in the water system.

System Analysis

12. **Is it accurate to say the system analysis chapter presents the projected available capacity with capital improvement projects in place for the booster pump analysis and without the capital improvement projects in place for the storage analysis?**

No. Projected available capacities in Table 7-26 include both BPS and storage improvements in the future analyses as described on page 7-46.

13. **The water right capacity listed in Table 7-26 System Capacity Analysis does not correspond to the water right capacity listed in Tables 6-2 Existing Water Rights Evaluation, and Table 6-3 Future Water Rights Evaluation. For example, 31,946gpm (Qi from Table 6-2) does not equal 33,800,000gpd [i.e. 23,472gpm] (Qi from Table 7-26). Please explain.**

The water right capacities used in Table 7-26 were updated to match the correct quantities as stated in Chapter 6.

14. **Both the 2009 and Draft version of the Department Water System Design Manual discuss demonstrating that booster pump stations (open and closed systems) meet MDD while maintaining 30psi minimum.**

Analyses described in Chapter 7 assumed that the supply and BPS facilities were operating during peak hour demand (PHD) as denoted in Table 7-23. As shown in



Table 7-24, all PHD pressures are greater than 30 psi, including those nodes on the supplying pressure zone of each facility. System pressures during maximum day demand (MDD) will be the same or higher than system pressures during PHD; therefore, the system is capable of meeting MDD at 30 psi on both the suction and discharge side of the facilities.

Water Use Efficiency Program (WUE) and Water Rights Assessment

No comment.

Source Protection

- 15. The Wellhead Protection Program provided in Appendix J does not include a publication date. Is the program from 2008 as the figures suggest? Has the City adopted the most recent version of the program? When was the last inventory of potential contaminants compiled (should be every two years)? The program does not specify the notification procedure. What is the frequency of notification? When were the most recent notification letters sent to facilities with potential contaminants?**

The City of Kent Wellhead Protection Program was last updated and adopted in 2008. For security purposes, the complete draft was not included in the appendices. The City is currently working to update the inventory of potential contaminants. Once complete, the City will send notification letters every two years to all sites with contamination potential.

Notification letters are sent to proposed developments within the Wellhead Protection Area (WHPA). The most recent notification letter was sent on February 22, 2019, to a developer of a subdivision located within the Armstrong Springs WHPA. A sample notification letter is enclosed in Appendix J.

Operations & Maintenance

- 16. Have you adopted the Water Main Break Protocol for Chlorinated Systems (DOH Publication 331-583 – 1/1/2017)**

The City currently follows the Water Main Break Protocol for Chlorinated Systems and will continue to follow this protocol in the future.

- 17. Page 8-10 refers to maintenance for privately owned pressure reducing valves being the responsibility of the customer. In our experience, customers do not always understand this responsibility. The City has an excellent program related to privately owned pressure reducing valve customer education. Think about including a summary of the City's program in this chapter of the WSP.**

The City will consider including a summary of this program in future updates of the Operations and Maintenance Program.

- 18. Under Recordkeeping and Reporting, please add Construction Completion Reports for all distribution main replacements and extensions.**

Construction Completion Reports has been added to Table 8-7.



Water Quality

- 19. Page 6-36 of the Water Source and Quality chapter and page 18 of the Water Quality Monitoring Plan refer to disinfectant residual concentration monitoring. Please note that distribution system chlorine residual monitoring and reporting per the surface water treatment rule applies. The report should include distribution system disinfectant residuals for every calendar day and include the distribution residuals collected at the same time and place as the routine coliform samples. At least 95% of the monthly samples must have detectable levels.**

Noted. The City currently complies with these requirements and submits a monthly report to DOH.

- 20. Please note that the lead and copper rule also requires systems that serve more than 50,000 people to monitor and report water quality parameters to demonstrate effective corrosion control treatment.**

The City complies with current Lead and Copper Rule monitoring requirements. The City received a letter from DOH regarding additional monitoring requirements on July 16, 2019, and meets those recommendations as well. The data is included with the City's monthly reports to DOH.

- 21. It is excellent that the coliform monitoring plan (CMP) is reviewed annually and updated as needed.**

Noted.

- 22. If the City ever has an *E. coli* MCL violation, DOH will do a special purpose investigation (SPI); an SPI is essentially an abbreviated sanitary survey, with the focus on trying to determine the cause of the *E. coli*. Information from the SPI may be used by the Level 2 assessor but the state's SPI will not satisfy the requirement for the City to do a Level 2.**

Noted.

- 23. The Northwest Regional Office Staff list included in the CMP is out of date. The most relevant needed update: Brietta Carter, 253-3965-6770 is the current regional engineer for King county systems other than SPU.**

An updated Northwest Regional Office staff list has been enclosed for replacement in the CMP.

- 24. A written standard operating procedure should be included in the CMP to describe the proper coliform sample collection technique for each type of routine and repeat sample site.**

A standard operating procedure has been enclosed for addition to the CMP describing the City's water quality sample collection procedures.

- 25. The City should develop an *E. coli* response plan in case the City ever has an *E. coli* MCL violation or identifies *E. coli* in a raw water source under the Groundwater Rule. Our Mercer Island experience indicated that consumers want this water quality**



information as soon as possible and an *E. coli* Response Plan best positions a community to be successful.

An *E. coli* Response Plan has been included in Appendix I.

Standard Plans & Specifications

26. **Page 3-25 refers to Section 7-17.3(2) of the WSDOT Standard Specifications which applies to sanitary sewers. Does the City intend to use Section 7-09.3(23) Hydrostatic Pressure Test for new water main? Please update.**

Yes, the language within this document is currently in the process of being updated to be consistent with Section 7-09.3(23) of the WSDOT Standard Specifications. This will be submitted to DOH for approval.

27. **Standard plan sheet 3-20, Combination Air/Vacuum Valve & Vault, shows a drain hole in the vent line. The Department considers this a potential cross-connection. Think about eliminating the drain hole from the air/vacuum valve design. Does this design accommodate regular testing of the combination air/vacuum valve to ensure it operates as designed?**

The drain hole has been removed in the City's updated standard plan sheet, which has not been adopted yet. This will be submitted to DOH for approval.

Capital Improvement Program

28. **Has the water system implemented an asset management program, which includes a remaining useful life assessment of major water system facilities, and estimated costs to replace those facilities?**

The City has an asset management program in progress by Cityworks. The description of the program has been updated on page 8-3.

Financial Program

No comment.

Other Documentation

29. **The water system must meet the consumer input process outlined in WAC 246-290-100(8). Please include documentation of a consumer meeting discussing the WSP, prior to DOH approval of the WSP.**

The City's 2019 WSP will be presented to the City Council and Public Works Committee for adoption on October 22, 2019. Information will be provided to DOH once available.

30. **Prior to DOH approval, the City's elected officials must approve and adopt the WSP.**

The City's 2019 WSP will be presented to the City Council and Public Works Committee for adoption on October 22, 2019. Information will be provided to DOH once available.

31. **A signed SEPA checklist is a part of the WSP submittal. Provide a signed SEPA Threshold Determination.**

A Determination of Non-Significance has been provided for inclusion in Appendix D.



32. Include any comments from adjacent purveyors and the City's response to those comments.

Response comments from and responding to adjacent purveyors are enclosed for inclusion in Appendix N of the WSP.

33. Is Kent a member of the Washington State Water/Wastewater Agency Response Network (WAWARN)? Federal Emergency Management Agency states prior to reimbursement, they will ask for mutual aid documentation. Becoming a member of WAWARN demonstrates both managerial and financial capacity.

The City is a member of WAWARN and plans to execute a resource contract in the future.

In addition to the documents previously mentioned, RH2 has enclosed three copies of the updated binder cover, spine, title page, and table of contents to be inserted in the WSPs that were previously submitted to your office.

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 call me at (425) 951-5394 or via email at mcampbell@rh2.com.

Sincerely,

A handwritten signature in blue ink that reads 'Michele Campbell'.

Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: Updated Cover, Spine, Title Page, and Table of Contents (3 copies)
Replacement and Supplemental Pages for WSP (3 copies)

cc: Mr. Sean Bauer, Water System Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent

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31627 1st Avenue South • P.O. Box 4249 • Federal Way, WA 98063-4249
253-941-1516 Federal Way • 253-927-2922 Tacoma • www.lakehaven.org

RH2 Engineering
Michele Campbell, P.E.
22722 29th Drive SE, Suite 210
Bothell, WA 98021

RE: City of Kent Water System Plan

Ms. Campbell:

The District thanks you for the opportunity to review and comment on the DRAFT 2019 City of Kent Water System Plan.

Please find enclosed the following comments:

1. General comment: Any references to Lakehaven Utility District (LUD) should be retitled Lakehaven Water and Sewer District (LWSD).
2. Table 2-9: Number of District connections is 45,792 (2018). District source of supply is 25 groundwater wells and 3 interties SSP (aka RWSS).
3. Page 2-30: Retitled Lakehaven Utility District (LUD) to Lakehaven Water and Sewer District (LWSD). Number of District connections is 45,792 (2018).

Thank you again for providing us the opportunity to comment on the draft plan update.

Sincerely,

A handwritten signature in blue ink, appearing to read "Tim Osborne", is written over a horizontal line.

Tim Osborne, P.E.
Water Operations Manager

**RECEIVED BOTHELL
RH2 ENGINEERING INC.**
JOB NO: _____

JUL 22 2019

ROUTE TO: MC
FILE: _____

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September 27, 2019

Mr. Tim Osborne, PE
Water Operations Manager
Lakehaven Water & Sewer District
31627 1st Avenue South
PO Box 4249
Federal Way, WA 98063-4249

Sent via: Email and US Mail

**Subject: City of Kent Water System Plan
Response to Review Comments**

Dear Mr. Osborne:

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting one electronic copy of the City's Water System Plan (WSP). The WSP was originally submitted to Lakehaven Water & Sewer District (LWSD) on May 10, 2019, for review and comment. The review comments from LWSD's letter are addressed below. LWSD comments are provided below in **bold** text, with RH2 responses in normal text.

1. General comment: Any references to Lakehaven Utility District (LUD) should be retitled Lakehaven Water and Sewer District (LWSD).

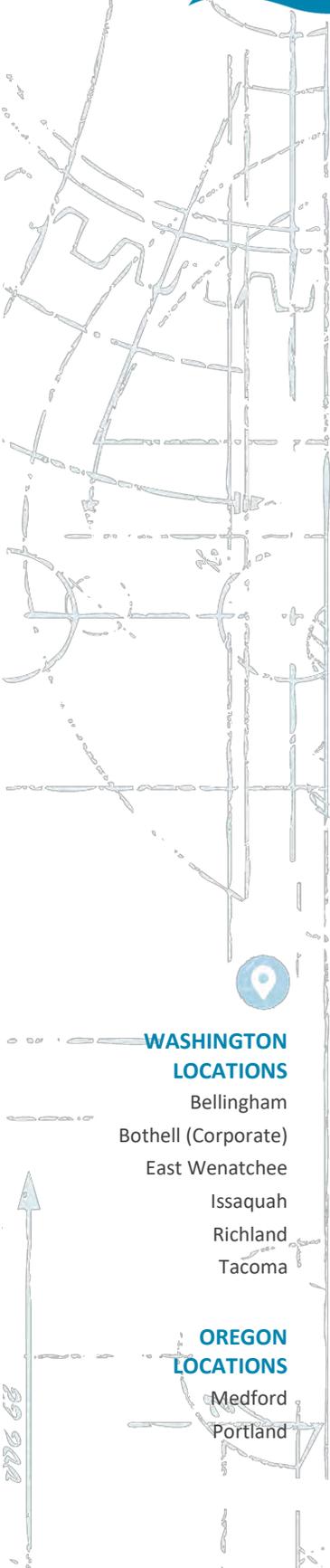
References to Lakehaven Utility District (LUD) have been retitled to Lakehaven Water and Sewer District (LWSD).

2. Table 2-9: Number of District connections is 45,792 (2018). District source of supply is 25 groundwater wells and 3 interties SSP (aka RWSS).

Table 2-9 has been updated.

3. Page 2-30: Retitled Lakehaven Utility District (LUD) to Lakehaven Water and Sewer District (LWSD). Number of District connections is 45,792 (2018).

Page 2-30 has been updated.





If you have any questions, please call me at (425) 951-5394 or via email at mcampbell@rh2.com.

Sincerely,

A handwritten signature in blue ink that reads 'Michele Campbell'.

Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: 2019 City of Kent Water System Plan (1 electronic copy)

cc: Mr. Sean Bauer, Water Systems Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent



Serving the Southwest Metropolitan Area since 1946

July 22, 2019

Michele Campbell, PE
RH2 Engineering
22722 29th Drive SW, Suite 201
Bothell, WA 98021

Re: City of Kent Water System Plan
Draft 2019 WSP Review

Dear Michele:

Highline Water District appreciates the opportunity to review and comment on the Draft City of Kent Water System Plan. In general, we find the plan consistent with established policies and mutual understandings between our agencies.

In December 2018, the City and District executed a long-term franchise agreement. The agreement identifies the Retail Water Service Area (RWSA) boundary between our water systems. We request the franchise agreement be referenced and included in an appropriate section of the Plan and RH2 confirm the boundary figures reflect the agreed upon RWSA.

The District has been working with the City to address domestic service and future fire flow in areas adjacent to the RWSA in the 587 Zone on the West Hill. We anticipate resolution to these issues in the next few months. We understand the City plans several piping improvement projects in the pressure zone over the next decade. Highline has several aging water mains in the same general area. The District has interest in replacing these mains and believes there may be mutual benefit to participate together in one construction project.

Again, thank you for the opportunity to comment. Please contact me at 206-592-8904 if you have any follow up questions.

Sincerely,

Jeremy S. DelMar, PE
Engineering and Operations Manager
Highline Water District

Cc: Sean Bauer, Water System Manager, City of Kent

Attachment

RECEIVED BOTHELL
RH2 ENGINEERING INC.
JOB NO: _____

JUL 25 2019

ROUTE TO: MC
FILE: _____

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September 27, 2019

Mr. Jeremy DelMar, PE
Engineering and Operations Manager
Highline Water District
23828 30th Avenue S
Kent, WA 98032

Sent via: *Email and US Mail*

**Subject: City of Kent Water System Plan
Response to Review Comments**

Dear Mr. DelMar:

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting one electronic copy of the City's Water System Plan (WSP). The WSP was originally submitted to Highline Water District (HWD) on May 10, 2019, for review and comment. The review comments from HWD's letter dated July 22, 2019, are addressed below. HWD's comments are provided below in **bold** text, with RH2 responses in normal text.

In December 2018, the City and District executed a long-term franchise agreement. The agreement identifies the Retail Water Service Area (RWSA) boundary between our water systems. We request the franchise agreement be referenced and included in an appropriate section of the Plan and RH2 confirm the boundary figures reflect the agreed upon RWSA.

A reference to the RWSA boundary has been added on page 2-25, and the franchise agreement has been added to Appendix B. RH2 and the City have confirmed that the boundary figures reflect the agreed upon RWSA.

If you have any questions, please call me at (425) 951-5394 or via email at mcampbell@rh2.com.

Sincerely,

Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: 2019 City of Kent Water System Plan (1 electronic copy)

cc: Mr. Sean Bauer, Water Systems Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent



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August 7, 2019

Ms. Michele Campbell, PE, Project Manager
RH2 Engineering
22722 29th Drive, Suite 210
Bothell, WA 98021

Subject: City of Kent 2019 Water System Plan

Dear Ms. Campbell:

Thank you for the opportunity to review the City of Kent 2019 Water System Plan. The City of Auburn has the following comments:

Chapter 2 – Water System Description, Water System Interties, Emergency Supply Interties, City of Auburn (page 2-25).

“...The intertie capacity is 0.3 MGD and connects to Auburn’s 250 pressure Zone with the City’s 240 Zone...” The 250 should be 242.

Please contact me at 253-804-5061, or sfenhaus@auburnwa.gov if you have any questions.

Sincerely,



Susan Fenhaus, P.E.
Water Utility Engineer
Public Works Department

JL/sf/mm

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September 27, 2019

Ms. Susan Fenhaus, PE
Water Utility Engineer
City of Auburn
25 West Main Street
Auburn, WA 98001-4998

Sent via: *Email and US Mail*

**Subject: City of Kent Water System Plan
Response to Review Comments**

Dear Ms. Fenhaus:

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting one electronic copy of the City's Water System Plan (WSP). The WSP was originally submitted to the City of Auburn (Auburn) on May 10, 2019, for review and comment. The review comments from Auburn's letter dated August 7, 2019, are addressed below. Auburn's comments are provided below in **bold** text, with RH2 responses in normal text.

Chapter 2 – Water System Description, Water System Interties, Emergency Supply Interties, City of Auburn (page 2-25).

"...The intertie capacity is 0.3 MGD and connects to Auburn's 250 pressure Zone with the City's 240 Zone..." The 250 should be 242.

The sentence has been corrected to read the 242 pressure zone.

If you find these revisions acceptable, please sign and return the attached Local Government Consistency Determination Form by October 31, 2019.

If you have any questions, please call me at (425) 951-5394 or via email at mcampbell@rh2.com.

Sincerely,

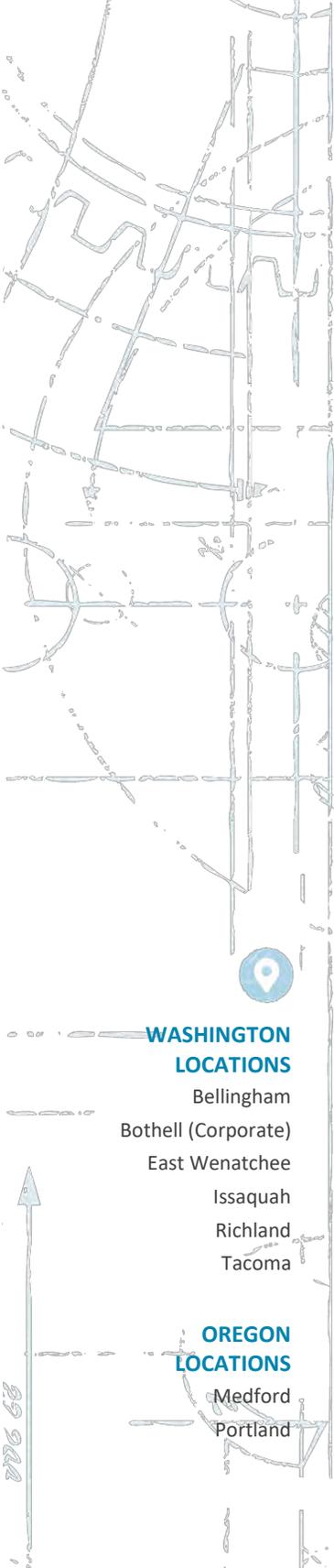
Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: Local Government Consistency Determination Form
2019 City of Kent Water System Plan (1 electronic copy)

cc: Mr. Sean Bauer, Water Systems Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent



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Local Government Consistency Determination Form

Water System Name: City of Kent PWS ID: 381501

Planning/Engineering Document Title: Water System Plan Plan Date: September 2019

Local Government with Jurisdiction Conducting Review: City of Auburn

Before the Department of Health (DOH) approves a planning or engineering submittal under Section 100 or Section 110, the local government must review the documentation the municipal water supplier provides to prove the submittal is consistent with **local comprehensive plans, land use plans and development regulations** (WAC 246-290-108). Submittals under Section 105 require a local consistency determination if the municipal water supplier requests a water right place-of-use expansion. The review must address the elements identified below as they relate to water service.

By signing this form, the local government reviewer confirms the document under review is consistent with applicable local plans and regulations. If the local government reviewer identifies an inconsistency, he or she should include the citation from the applicable comprehensive plan or development regulation and explain how to resolve the inconsistency, or confirm that the inconsistency is not applicable by marking N/A. See more instructions on reverse.

Local Government Consistency Statement	For use by water system	For use by local government
	Identify the page(s) in submittal	Yes or Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the service area.	Figs 2-3 & 3-1	
b) The <u>growth projection</u> 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.	Pages 3-6 to 3-10	
c) For <u>cities and towns that provide water service</u> : All water service area policies of the city or town described in the plan conform to all relevant <u>utility service extension ordinances</u> .	Chapter 5, App. M	
d) <u>Service area policies</u> 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.	Chapter 5, App. M	
e) <u>Other relevant elements</u> 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 to 3-5	

I certify that the above statements are true to the best of my knowledge and that these specific elements are consistent with adopted local plans and development regulations.

Signature

Date

Printed Name, Title, & Jurisdiction

Consistency Review Guidance

For Use by Local Governments and Municipal Water Suppliers

This checklist may be used to meet the requirements of WAC 246-290-108. When using an alternative format, it must describe all of the elements; 1a), b), c), d), and e), when they apply.

For **water system plans (WSP)**, a consistency review is required for the service area and any additional areas where a municipal water supplier wants to expand its water right's place of use.

For **small water system management programs**, a consistency review is only required for areas where a municipal water supplier wants to expand its water right's place-of-use. If no water right place-of-use expansion is requested, a consistency review is not required.

For **engineering documents**, a consistency review is required for areas where a municipal water supplier wants to expand its water right's place-of-use (water system plan amendment is required). For noncommunity water systems, a consistency review is required when requesting a place-of-use expansion. All engineering documents must be submitted with a service area map (WAC 246-290-110(4)(b)(ii)).

A) Documenting Consistency: The planning or engineering document must include the following when applicable.

- a) A copy of the adopted **land use/zoning** map corresponding to the service area. The uses provided in the WSP should be consistent with the adopted land use/zoning map. Include any other portions of comprehensive plans or development regulations that relate to water supply planning.
- b) A copy of the **growth projections** that correspond to the service area. If the local population growth projections are not used, explain in detail why the chosen projections more accurately describe the expected growth rate. Explain how it is consistent with the adopted land use.
- c) Include water service area policies and show that they are consistent with the **utility service extension ordinances** within the city or town boundaries. *This applies to cities and towns only.*
- d) All **service area policies** for how new water service will be provided to new customers.
- e) **Other relevant elements** the Department of Health determines are related to water supply planning. See Local Government Consistency – Other Relevant Elements, Policy B.07, September 2009.

B) Documenting an Inconsistency: Please document the inconsistency, include the citation from the comprehensive plan or development regulation, and explain how to resolve the inconsistency.

C) Documenting a Lack of Local Review for Consistency: Where the local government with jurisdiction did not provide a consistency review, document efforts made and the amount of time provided to the local government for review. Please include: name of contact, date, and efforts made (letters, phone calls, and emails). To self-certify, please contact the DOH Planner.

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).

COMMISSIONERS:

Alan Eades
Kevin Fuhrer
Brad Lake
David B. Roselle
Tal Weberg

GENERAL MANAGER:

Thomas Keown, P.E.



August 9, 2019

VIA REGULAR U.S. MAIL

Michele Campbell, P.E.
RH2 Engineering
22722 29th Drive SE, Suite 210
Bothell, WA 98021

Re: City of Kent Water System Plan Draft 2019 WSP for Review

Dear Ms. Campbell

Thank you for sending the Draft City of Kent WSP on behalf of the City of Kent to the Covington Water District. Attached are comments provided by the Covington Water District for inclusion into the Draft City of Kent WSP document.

Comments:

1. Table 2-9, page 2-29 – City of Renton is shown to have 32,627 service connections. Per Renton's current Water System Plan they have 17,400 service connections.
2. Page 2-30 – Under "CITY OF RENTON". See previous comment regarding number of service connections.
3. Table 2-9, page 2-29 – Covington Water District is shown to have 13 well sources of supply. CWD water system plan identifies 11 well sources, including Sugarloaf Well 3 but not Sugarloaf Well 4. If Sugarloaf Well 4 is included the District has 12 well sources. Rouse Well is not identified in the District's WSP as an approved source.
4. Table 2-9, page 2-29 – Covington Water District is shown to have 3 interties. Counting only interties that are non-emergency source of supply interties, the District has 8 interties which are CK, C3, C6, Lake Meridian Water District and 4 separate interties with Cedar River Water & Sewer.
5. Table 2-9, page 2-29 – Covington Water District has approximately 18,500 service connections. Please also review the number of service connections on page 2-30.

If you have additional questions, please contact Steve Lee directly at 253.867.0940 or email him at Steve.Lee@covingtonwater.com.

Sincerely,
COVINGTON WATER DISTRICT

A handwritten signature in blue ink, appearing to read 'T. Keown', is written over the printed name.

Thomas Keown, P.E.
General Manager

cc: Sean Bauer, Water Systems Manager, City of Kent



September 27, 2019

Mr. Thomas Keown, PE
General Manager
Covington Water District
18631 SE 300th Place
Covington, WA 98042

Sent via: *Email and US Mail*

Subject: **City of Kent Water System Plan
Response to Review Comments**

Dear Mr. Keown:

On behalf of the City of Kent (City), RH2 Engineering, Inc., (RH2) is submitting one electronic copy of the City's Water System Plan (WSP). The WSP was originally submitted to Covington Water District (CWD) on May 10, 2019, for review and comment. The review comments from CWD's letter dated August 9, 2019, are addressed below. CWD comments are provided below in **bold** text, with RH2 responses in normal text.

1. **Table 2-9, page 2-29 – City of Renton is shown to have 32,627 service connections. Per Renton's current Water System Plan they have 17,400 service connections.**

The City of Renton's service connections have been updated in Table 2-9.

2. **Page 2-30 – Under "CITY OF RENTON". See previous comment regarding number of service connections.**

The City of Renton's service connections have been updated on page 2-30.

3. **Table 2-9, page 2-29 – Covington Water District is shown to have 13 well sources of supply. CWD water system plan identifies 11 well sources, including Sugarloaf Well 3 but not Sugarloaf Well 4. If Sugarloaf Well 4 is included the District has 12 well sources. Rouse Well is not identified in the District's WSP as an approved source.**

CWD's well sources of supply have been updated in Table 2-9.

4. **Table 2-9, page 2-29 – Covington Water District is shown to have 3 interties. Counting only interties that are non-emergency source of supply interties, the District has 8 interties which are CK, C3, C6, Lake Meridian Water District and 4 separate interties with Cedar River Water & Sewer.**





CWD's interties have been updated in Table 2-9.

5. **Table 2-9, page 2-29 – Covington Water District has approximately 18,500 service connections. Please also review the number of service connections on page 2-30.**

CWD's service connections have been updated as requested in Table 2-9 and on page 2-30.

If you have any questions, please call me at (425) 951-5394 or via email at

mcampbell@rh2.com.

Sincerely,

A handwritten signature in blue ink that reads 'Michele Campbell'.

Michele Campbell, PE

Project Manager

MRC/sp

Enclosures: 2019 City of Kent Water System Plan (1 electronic copy)

cc: Mr. Sean Bauer, Water Systems Manager, City of Kent
Mr. Evan Swanson, Environmental Engineering, City of Kent