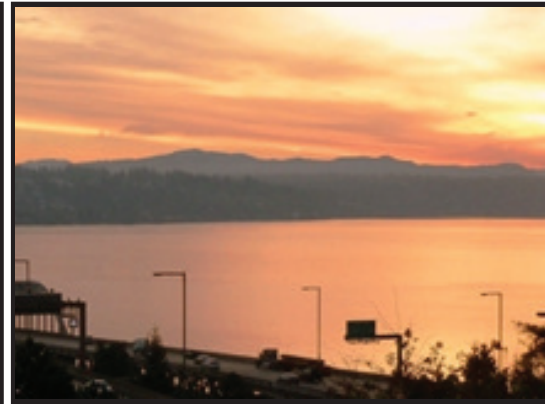


City of Mercer Island



2015 Water System Plan



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CITY OF MERCER ISLAND

2015 WATER SYSTEM PLAN

City Consulting Engineer



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CERTIFICATION

This 2015 Water System Plan for the City of Mercer Island was prepared by HDR Engineering, Inc., and City of Mercer Island staff, under the direction of the following Registered Professional Engineers:



Jeffrey Hansen, PE
HDR Engineering, Inc.

APPROVAL

Reviewed by Washington State Department of Health in accordance with the provisions of WAC 246-290-100 and approved on 7/12/2016.

Approved by the City of Mercer Island by Resolution _____ dated _____.

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DEFINITION OF TERMS

Capital Facilities Charge

A one-time fee is paid by a property owner when connecting to the City's water system. This fee pays for the 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

Water consumption is defined to be the quantity of water purchased by Mercer Island residents.

Cross-Connection

A physical arrangement that connects a public water system, directly or indirectly, with anything other than another potable water system and, therefore, presents the potential for contaminating the public water system.

Demand

The quantity of water required from a water supply source over a period of time necessary to meet the needs of domestic, commercial, industrial, and public uses, and to provide enough water to supply fire fighting, 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:

- **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 single day of a given year.
- **Peak Hour Demand (PHD):** The maximum amount of water delivered to the system, excluding fire flow, during a one-hour time period of a given year. A system's peak hour demand usually occurs during the same day as the peak day demand.



Equivalent Residential Units (ERU)

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 fire fighting, which is usually expressed in terms of gallons per minute (gpm).

Head

A measure of pressure or force 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.

Potable

Water suitable for human consumption.

Pressure Zone

A water system subsection operating from sources at a common hydraulic elevation.



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, 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 four components which are defined and discussed in more detail in Chapter 4.

- Operational
- Equalizing
- Standby
- Fire Flow

Unaccounted for Water

Water that is measured as going into the distribution system but not metered as going out of the system. Unaccounted for water is calculated to be the difference between the volume of water purchased by the City from SPU and the volume of water sold to customers.

EXECUTIVE SUMMARY

The City of Mercer Island has prepared this Water System Plan to outline the City's planning strategy for the next 20 years. The Plan has been prepared in accordance with the Washington Administrative Code 246-290-100, requiring water purveyors to update their water system plan every six years, and supersedes the 2008 Water System Comprehensive Plan.

This Plan analyzes the City's existing water system and its operation, provides guidance to evaluate the impacts of future growth and recommends necessary improvements to the water system to ensure the City remains on the forefront in providing high-quality water service to its current and future customers. The plan was prepared in 2014, and the Plan date (2015) reflects the issuance year.

The City's goals as set forth in the 2015 Water System Plan are to:

1. Preserve public health and safety.
2. Maintain adequate water volume for fire fighting.
3. Maintain adequate water volume for basic sanitation.
4. Maintain consumptive value and water quality.

The 2015 Water System Plan carries forward the policies and intent of the 2008 Plan and provides updated documentation and direction for implementing the key functions of the City water system.

BACKGROUND

The City of Mercer Island owns and operates the municipal water system under the regulatory provisions of the Washington Department of Health. In 1960, the City became a municipal corporation. Prior to its incorporation, water service on the Island was provided by several purveyors including the Seattle Water Department and various King County Water Districts. In the years between 1966 and 1972, the City expanded its service area with the addition of King County Water District 93's water system; the area served by King County Water District No. 91; and in 1996, the Mercer Crest water system.

Mercer Island is a kidney-shaped island situated in Lake Washington with a land area of 4,000 acres. It is connected to the cities of Seattle and Bellevue by the I-90 freeway across the north end of the island. Currently, Mercer Island remains mostly single-family residences with a moderately developing business district at the Town Center on the northern part of the Island, and one small business district at the south side. At this time, the water system serves the entire island except for the Shorewood Apartments, located in a relatively small area south of I-90, which is served by Seattle Public Utilities (SPU). The City has no immediate plans to become the water supplier to the Shorewood Water System.

The City provides water to 7,376 retail customers through 7,477 connections, as of the end of 2013. Single-family residences account for approximately 95% of system connections and 77% of water use. All of the City's water is purchased from and supplied by SPU through a distribution system comprising 121 miles of pipeline, two 4 million-gallon storage tanks and two pump stations. A majority of the water originates in the Cedar River Watershed, with occasional supplementation from the Tolt River supply system.



PLANNING AND FORECASTING

The City of Mercer Island strives for consistency with all current and projected land use, zoning, population, and water use regulations in the maintenance, operation and expansion of its water system. The City's water planning area is consistent with the King County Coordinated Water System Plan. Land use and zoning within the service area are designated by the City of Mercer Island.

The City has a long-term source of supply under a contract with the City of Seattle that remains in effect until January 1, 2062. The contract will supply the City with water at the minimum hydraulic gradient up to a maximum flow rate that totals 3,205 gallons per minute (GPM) for the three delivery points to the City.

In compliance with the Water Use Efficiency (WUE) Rule, distribution leakage averaged less than 10% of the City's supply over the past two years (9%). It is not possible to estimate the three-year average due to SPU supply metering issues from 2009 to 2011. The 2014 City planning value for water use of 202-gallons per day per ERU represents a reduction from the 2008 planning value of 247 gallons per day per ERU.

Using planning information from the Puget Sound Regional Council, the City projected population growth, user accounts, and future water demand through the year 2034. Analysis of the account projections indicates that the commercial sector will experience the most significant growth, due largely to redevelopment in the City's Town Center. A summary of the planning data is shown in **Table E-1**. The total number of accounts is projected to grow from 7,552 in 2015 to 7,874 in 2034.

Table E-1. Projected Accounts

Classification	2015	2020	2025	2034	Average Annual Growth
Single-Family	7,198	7,366	7,442	7,485	0.21%
Multifamily	104	105	105	106	0.07%
Commercial	181	197	200	212	0.92%
Government	69	71	71	71	0.21%
Total	7,552	7,738	7,818	7,874	

Projecting future water demand is one of the key elements of the water system planning process. Identification of system improvements such as supply, pumping, storage and piping requirements are all related to demand projections. Future water system demands are based on projected ERUs, which in turn are based on the projected water consumption by customer classification and the projected number of accounts. **Figure E-1** shows the projected annual water usage through the 20-year planning period.

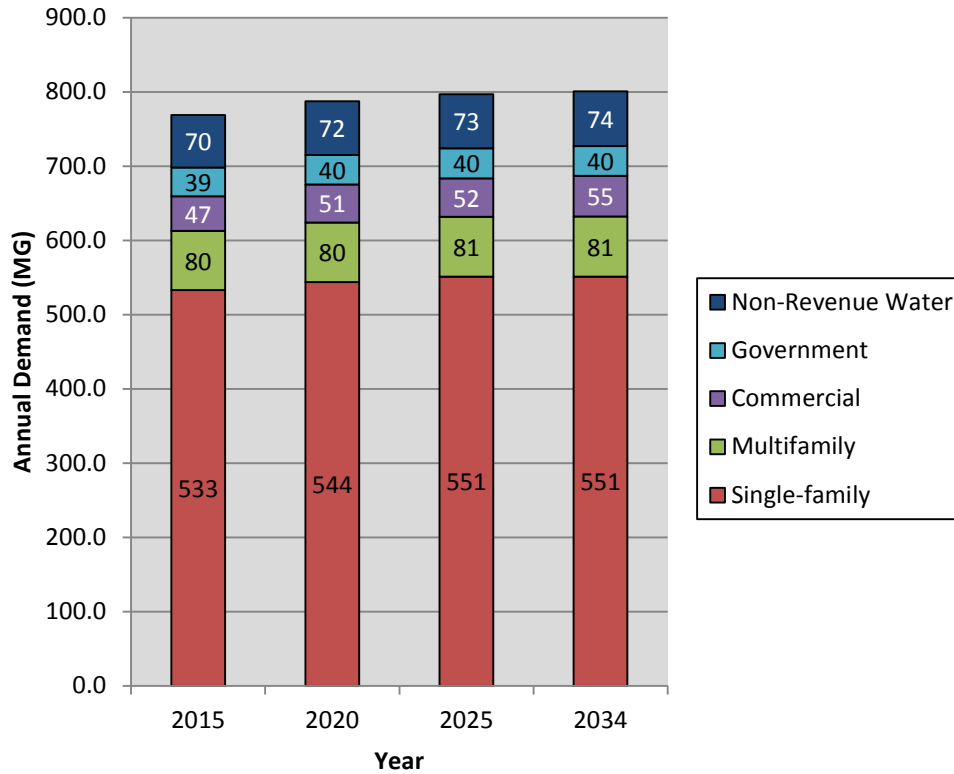


Figure E-1. Projected Annual Demand, without WUE

POLICIES AND CRITERIA

The City manages and operates its water system in accordance with all applicable Federal, State and local regulations. The City has discretion in setting the performance, design criteria, and standards for its water system; however, these must meet or exceed the minimum standards for public water supplies set by the Washington State Department of Health through Washington Administrative Code 246-290.

Policies established by the City provide a framework for planning, design, operation and management of its system. The City’s criteria provide the requirements necessary to implement and enforce the established policies. The criteria focus on planning and design parameters developed to establish consistency and to ensure adequate levels of service throughout the system, including interlocal agreements with neighboring jurisdictions to ensure regional water supply coordination.

Other publications, such as the Mercer Island Comprehensive Plan (July 2005), SPU’s 2013 Water System Plan (April 2013), East King County Coordinated Water System Plan (CWSP, 1990) Addendum (1993) and Update (1996), and the City’s Emergency Response Plan document the design standards and procedures for development of the water system.

SYSTEM ANALYSIS

The City’s water system is classified as a Group A system and, as such, the City is responsible for monitoring and complying with all applicable Safe Drinking Water Act and Washington Administrative Code regulations pertaining to source water and distribution system water quality.



EXECUTIVE SUMMARY

The City's monitoring program requires collection of water samples at identified locations on a regular basis to verify compliance with the Washington State Department of Health drinking water standards.

The City of Mercer Island's water system comprises two supply lines, two steel storage reservoirs totaling 8 million gallons, two independent routes to fill the reservoirs, two booster pump stations, 121 miles of distribution watermain and 85 pressure-reducing stations. Water purchased from SPU is treated differently at each source. The Cedar system has intake screening, ultraviolet disinfection, ozonation, chlorination, fluoridation, and corrosion control. The Tolt system has intake screening, filtration (direct) ozonation, chlorination, fluoridation and corrosion control.

A hydraulic analysis of the City's water system facilities was performed to evaluate the ability of the storage facilities, transmission and distribution piping, and other system components to safely meet the needs of its customers.

Results of the hydraulic analysis identified areas exhibiting less than the minimum system pressure (30 psi) and other areas exhibiting higher than recommended pressure. These extremes are caused primarily by high and low points in the topography, not hydraulic factors. Areas of low pressure are near facilities like pump stations and reservoirs without any customer connections. The City manages high pressures in the system by installing pressure reducing valves and pressure relief valves where applicable. Fire flow analysis results for maximum day demand conditions identified deficiencies in available fire flow. Improvement projects proposed in the Capital Improvement Program are recommended to remedy these deficiencies, improve available fire flow and simplify system operation.

Storage analysis for 2020 and 2034 indicates that Mercer Island's system will have adequate storage for the next 20 years, based on current growth projections.

WATER USE EFFICIENCY

The City is committed to efficient use of the water supply. The City historically participated in the regional Water Use Efficiency program in conjunction with Seattle Public Utilities, and has produced quantifiable water savings through operations and maintenance, plumbing retrofit programs, water rates, metering improvements, technical assistance and public information programs to educate customers about conservation. Total water use reduction is estimated to be 564 million gallons between 2008 and 2013.

The City continues to participate in SPU's regional conservation program titled "Saving Water Partnership." The City adopted the 6-year regional conservation goal on February 24, 2014 through Resolution No. 1478. The regional goal is to reduce per capita water use from current levels so that the total average annual retail water use of the Saving Water Partnership is less than 105 MGD from 2013 through 2018 despite forecasted population growth.

The City implements 16 Water Use Efficiency program measures which exceeds the minimum requirement of 6. The measures include conservation rate structure, customer leak notification and assistance, public education, landscape management, and low flow faucet and showerhead distribution. Water conservation measures are consistent with, and strive to exceed, all local, state, and federal laws and regulations.

It is essential for the City to continue its Water Use Efficiency Program and implement enhanced measures to achieve its water use efficiency target. Given the City's existing program and proposed measures, it is expected that this goal will be met.



OPERATIONS AND MAINTENANCE

The City is committed to ensuring that its water system is well managed and maintained to continue to supply quality water to its customers. To accomplish this, the City performs regular maintenance of all facilities and equipment, which are monitored in accordance with manufacturers' recommendations. The City's water system, operated under the Water Utility of the City's Maintenance Department, is managed by the Utilities Operations Manager and a staff of 14 employees, who are certified by the State to work on the water distribution system.

The City's Emergency Response Plan defines the organization, responsibilities and procedures for response to emergency situations. The Plan includes elements for direction and control, situation analysis, public information, support functions and response procedures. In 2010, the City completed construction of an Emergency Well. The Well is designed to temporarily provide the Island with water in the event water supply from SPU is disrupted during a disaster. The Well is not connected to the distribution system, yet is designed to be readily operated by volunteers. In the event of a disaster, an Incident Command Strategy has been established to aid decision making and maximize resource use.

The City performs in-house improvements to the water system outside of the Capital Improvement program, including water service replacement and upgrades, fire hydrant replacement, and improvements to other water system components. Water system employees receive ongoing training and operational education to further enhance the operation and reliability of the system.

IMPROVEMENTS

The City has identified \$15.6 million in capital projects to be constructed between 2015 and 2020. These costs are based on 2014 dollars and reflect actual project costs from the previous three years. Project costs will be reevaluated and adjusted to account for inflation and changing market conditions at the time of construction.

The overall and long-term system improvements identified within this section focus on bringing the existing water system as close as possible to meeting the City's water system policies and goals. All identified projects belong to one of the four categories: Distribution System, Pump Station, Others, and SPU Pipeline between East Channel and the reservoir.

- **Distribution System:** Sub-standard watermain replacement and new watermain installation.
- **Pump Stations:** Back-up generator for Reservoir Pump Station and the Emergency Well at Rotary Park.
- **Other:** Water system component (PRV, valves, etc) replacement, water system plan update, water model update, and meter replacement program.
- **SPU Supply System:** Repairs and improvements to the SPU supply system.

These projects are designed to help fulfill the City's mission to provide adequate water supply and improved water quality to the water service area now and in the future.

FINANCIAL INFORMATION

The City of Mercer Island water system's primary function is to provide potable water, fire suppression, and irrigation services to its customers at the lowest reasonable price, assuring



EXECUTIVE SUMMARY

reliability of source, water quality, storage and distribution. Costs are met through a combination of rate charges to existing customers and capital facilities charges collected from new customers.

The City of Mercer Island has prudently issued little debt over the years, maintaining a sizable debt capacity. The City has consistently followed a conservative fiscal management policy, which is reflected by the high Aa1 rating from Moody's Investors Service.

The City has a long-range financial plan which enables it to: 1) meet projected capital and operational requirements outlined in their Plan; and 2) minimize or forestall future rate increases. The financial plan includes a capital funding strategy which relies on cash resources including reserves, policy-based funding, grant proceeds and revenue bond proceeds. The financial projection for the utility indicates that to fully fund the operating and maintenance expenses, capital costs and to maintain reserve balances, an average annual rate adjustment of 8% is necessary through 2020.

CHAPTER 1

INTRODUCTION

The objective of this plan is to evaluate the existing water system and its operation to meet current and future demands and regulatory requirements.

The Water System Plan update complies with the Washington State Department of Health regulations (WAC 246-290). The regulations require that the City update its Water System Plan every six years.

The Water System Plan update includes an assessment of the capability of the existing water system and identification of future infrastructure improvements.

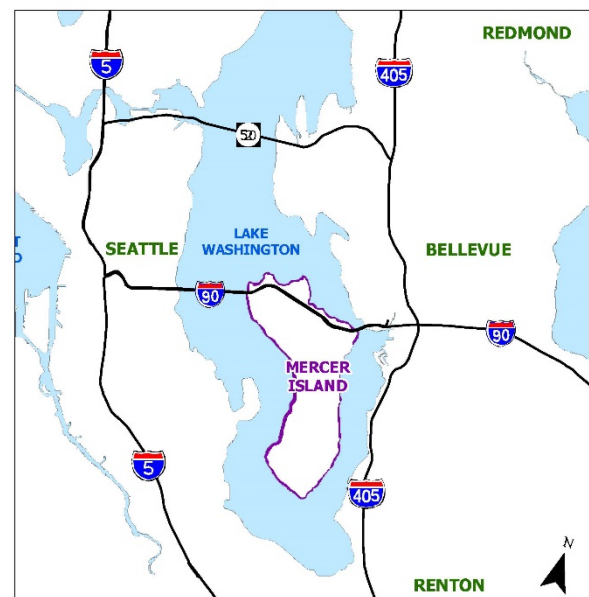
OWNERSHIP AND MANAGEMENT

The City of Mercer Island Water System is a municipal water system and is owned and operated by the City of Mercer Island (hereinafter the “City”) under Washington Department of Health (hereinafter DOH) Water System ID Number 536405. The Utilities Operations Manager is responsible for day-to-day system operations. The management structure and decision making process are included in Chapter 6, Operation and Maintenance Program. A current copy of the Water Facilities Inventory (WFI) is included in **Appendix D**.

SYSTEM BACKGROUND

The City became a municipal corporation in 1960. Prior to incorporation, water service on the Island was provided by several purveyors. The majority of the Island was served by Seattle Water Department (now Seattle Public Utilities (SPU)) through several purveyors; King County Water District No. 91, King County Water District No. 93, and the Mercer Crest Water System. In 1966, the City took over King County Water District 93’s water system. The area served by King County Water District No. 91 was added to the City’s water system service area in July 1972. Mercer Crest Water System was added to the City Service area in 1996.

Currently, Mercer Island remains mostly single-family residences with a moderately developing business district at the Town Center on the northern part of the Island, and one small business district at the south side. At this time, Mercer Island’s water system serves the entire Island except for the Shorewood Apartments, located in a relatively small area south of I-90, which are direct customers of SPU.



Vicinity Map

CHAPTER 1 – INTRODUCTION

Mercer Island is a kidney-shaped island that rises out of Lake Washington with its long axis bearing in the north-south direction (see the Vicinity Map on previous page).

The Island has steep slopes and ravines around most of its perimeter. Elevations on the Island range from approximately 15 feet along the shoreline to 385 feet along the crest near the center of the Island (NGVD 29 datum). A narrow plateau above the 300-foot contour extends along much of the length of the Island. This plateau widens at the south end of the Island. The northwest corner of the Island, known as First Hill, is a 300-foot crest separated from the main north-south ridge by a valley that falls below the 100-foot contour. The topography of the Island affects both the physical characteristics and the operational procedures for the water system.

Because of the approximate 370-foot elevation differential on the Island, pressure-reducing valves are necessary to create pressure zones to provide adequate water pressures throughout the Island. The steep slopes and ravines make looping of distribution mains difficult or impractical in many areas. The physical characteristics of the water system are discussed in Chapter 4.

The I-90 freeway infrastructure is a 300 to 400-foot-wide concrete corridor across the north end of the Island. The corridor is 40 feet below the adjacent ground surface in some places. As a result, the northern portion of the water system is connected to the remainder of the system by five freeway pipeline crossings and one land line connection.

There is one independent water system located within the service area boundary of the City. See Shorewood Location Map (on this page) for the location of the Shorewood Water System within the service area boundary of City of Mercer Island’s water system. The City does not intend to become the water supplier to the Shorewood Water System; however, this situation may change in the future as the operation and maintenance requirements for water and other utilities become more complicated.

The Shorewood Apartment Water System serves 645 apartments in its 40 buildings. The system is supplied from SPU’s supply line, as a direct customer, through master meter No. 71 located at SE 40th Street and Greenbrier Lane. The system is privately owned and consists of approximately 800 feet of 12-inch, 1,600 feet of 10-inch, and 3,199 feet of 6-inch mains, consisting of cast iron, ductile iron and asbestos cement (AC) pipes.

Chapters 15.12 through 15.18 of the Mercer Island Municipal Code address the City’s water system. The topics covered include fees associated with connecting to the water system, unlawful cross connections, fluoridation, and water use restrictions. The relevant City ordinances are presented in **Appendix N**. Additional policies and criteria governing the water system are located in Chapter 3.



Shorewood Location Map

INVENTORY OF EXISTING SYSTEMS

The City obtains all of its water supply from SPU. The City purchases and distributes all of the water consumed on the Island under a long-term contract that guarantees an adequate supply through the year 2062 (**Appendix E**).



The majority of the water supplied by SPU to the City originates in the Cedar River Watershed, although occasionally the City is supplied from the Tolt River supply system. The water is delivered through the Cedar East Side Supply Line (CESSL) to the 30-inch Mercer Island supply line at Factoria.

The 30-inch supply line along I-90 reduces to a 20-inch line at the Bellevue side of the Lake Washington East Channel and then crosses beneath the Lake to the island. A second 16-inch supply line parallels the 20-inch line and is attached to the I-90 Freeway East Channel Bridge structure. See **Figure 1-3**, Mercer Island Supply System Map located at the end of this chapter. The SPU supply lines feed directly into the reservoirs with no service connections along the way.

The existing system is shown in **Figure 1-1**, and is comprised of the following elements:

- Two 4 million-gallon storage tanks for a total of 8 million gallons of water storage
- Two independent transmission line routes to fill the reservoirs
- Two pump stations
- 115 miles of watermains, ranging in size from 2-inch to 30-inch
- 85 pressure reducing valves

Figure 1-1 also identifies the City’s major pressure zones and 30 smaller low pressure zones. Pressure zones are named by the dominant street or plat located within the pressure zone.

In 2010, the City completed construction of an Emergency Well. The Well is designed to temporarily provide the Island with water in the event water supply from SPU is disrupted during a disaster.

The two pump stations are located at the Reservoir site and at the First Hill Pump Station site.

Reservoir Pump Station: There are five pumps each with 100 Horsepower (HP) capacities. They serve the Reservoir 398 Pressure Zone, surrounded by the Freeway 282 Pressure Zone, in the northwest side of the Island.

First Hill Pump Station: There are six pumps, two each with 40 HP and four each with 1.5 HP capacities. They serve the First Hill 456 Pressure Zone, surrounded by the Reservoir 398 Pressure Zone, in the First Hill neighborhood.

The existing interties are listed in **Table 1-1** below:

Table 1-1. Interties with Seattle Public Utilities (SPU)

Intertie No.	Location	Connection
67	SE 43rd Street/89th Avenue SE	24-inch main
68	SE 40th Street/97th Avenue SE	Zone Backup
N/A	Boat Launch	16-inch main



CHAPTER 1 – INTRODUCTION

The City currently provides water service to 7,376 account customers through 7,477 connections. Water is distributed through 115 miles of distribution mains (4 to 8-inch) and transmission lines (10 to 30-inch) constructed, operated and maintained by the City. The lengths and sizes of the system pipes are summarized in **Table 1-2** below.

Approximately 63% of the water mains are of cast iron material while 30% are of ductile iron material. The remainder of the water mains are of either asbestos concrete, copper, galvanized iron, poly vinyl chloride, steel, or unknown materials.

Table 1-3 provides a summary of pipe materials

Table 1-2. System-wide Pipe Length Breakdown

Diameter	Linear Feet	Miles
30"	3,579	0.68
24"	11,211	2.12
20"	475	0.09
18"	59	0.01
16"	29,447	5.58
14"	16,100	3.05
12"	63,280	11.98
10"	23,128	4.38
8"	193,294	36.61
6"	217,539	41.20
4"	45,214	8.56
3"	171	0.03
2"	1,290	0.24
Unknown	49	0.01
Total	604,837	114.55

Table 1-3. Water Main Material Summary

Pipe Material	Linear Feet	Percentage of System (%)
Asbestos Concrete	34,753	5.75%
Cast Iron	381,963	63.15%
Copper	81	0.01%
Ductile Iron	182,986	30.25%
Galvanized Iron	152	0.03%
Poly Vinyl Chloride	215	0.04%
Steel	4,493	0.74%
Unknown	193	0.03%

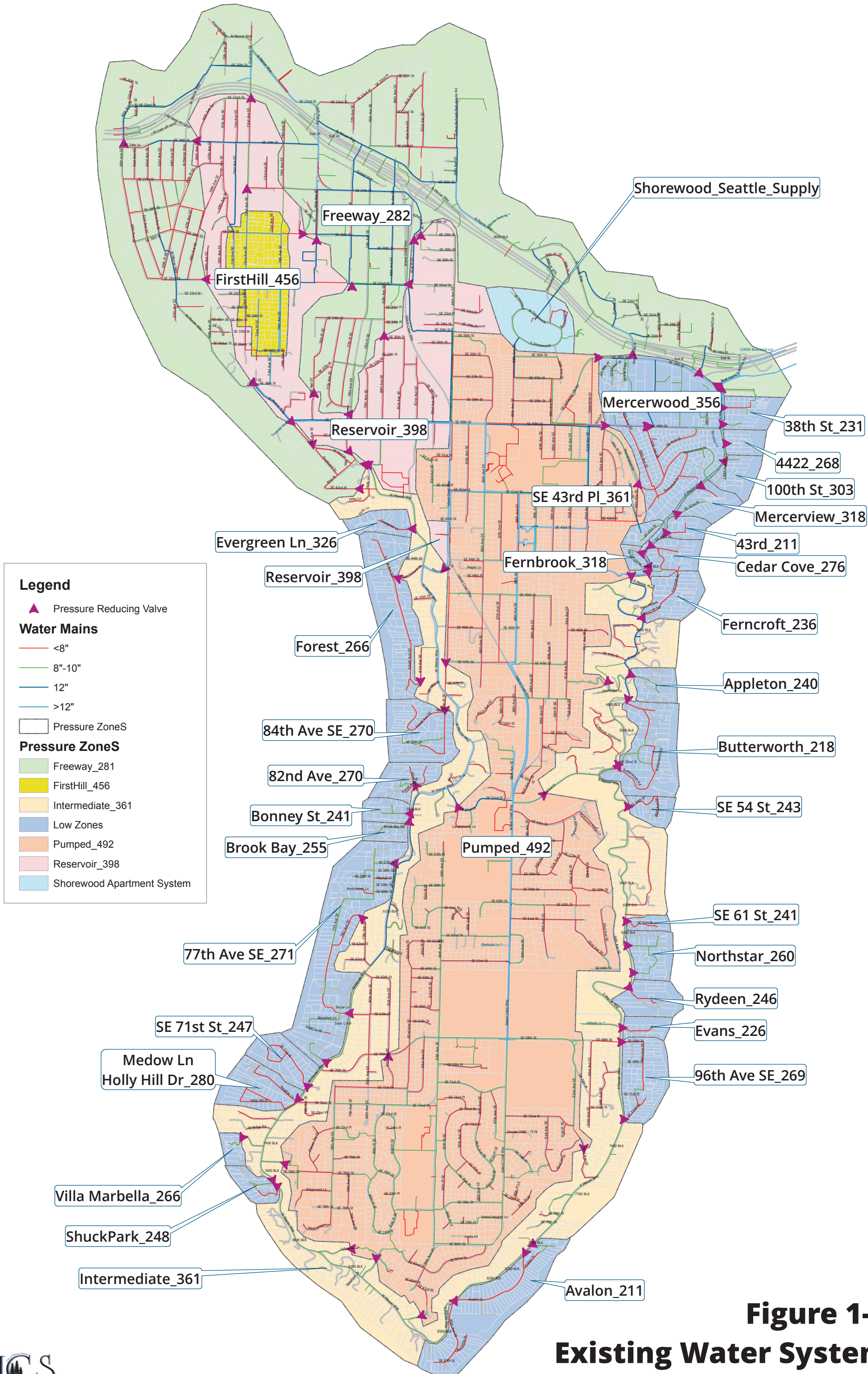


Figure 1-1
Existing Water System

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RELATED PLANS

This Water System Plan was developed to be consistent with the following related plans and documents:

- Comprehensive Plan, City of Mercer Island, 2005
- SPU'S 2013 Water System Plan, 2013
- East King County Coordinated Water System Plan (CWSP), 1990
- Addendum to the East King County Coordinated Water System Plan, 1993
- 1996 East King County CWSP Update, 1996

RETAIL AREA CHARACTERISTICS

The City limits are the same as the retail water service area and are shown in **Figure 1-1**. The City is predominately a single-family residential community. Land use and zoning ordinances have been adopted by the City to protect this characteristic. **Figure 1-2** shows the zoning boundaries adopted by the City. Current land use on the Island is in agreement with the zoning ordinance. Zoning categories used include the following:

- Business (B)
- Commercial Offices (C-O)
- Planned Business (PBZ)
- Single Family with minimum 8,400 square-foot (sf) lots (R-8.4)
- Single Family with minimum 9,600 sf lots (R-9.6)
- Single Family with minimum 12,000 sf lots (R-12)
- Single Family with minimum 15,000 sf lots (R-15)
- Multi-Family with maximum allowed density of 38 units per acre (MF-2)
- Multi-Family Limited with maximum allowed density of 26 units per acre (MF-2L)
- Multi-Family with maximum allowed density of 26 units per acre (MF-3)
- Town Center (TC)
- Public Institution (P)

With the exception of the Shorewood Apartments and adjacent property to the east, Covenant Shores, the Mercer Isle Condominiums, and the parcels immediately north of North Mercer Way in the vicinity of 77th Avenue SE, multifamily uses are located to serve as a buffer between single-family residences and the Town Center. Commercial establishments are generally of the service or sales type to meet the needs of the local community. Industrial-type land use is not allowed on the Island by ordinance.

The total land area of Mercer Island is approximately 4,100 acres. As of 2005, 90% of the Island was composed of single-family residences, 2.4% multifamily and 7.2% commercial. Most of the remainder of the Island's development will be single-family residences with commercial growth limited to the Town Center. The underlying factor that drives these numbers is zoning and land use. In 2002 and 2004 the City undertook major planning efforts to expand commercial and



CHAPTER 1 – INTRODUCTION

multi-family development throughout the City. Since 2005, the multifamily and commercial sectors have continued to grow as a result of these planning efforts.

Business and commercial establishments are located in three specific areas of the Island. The Town Center is the largest of these areas. The Town Center is located immediately south of I-90 between 74th Avenue SE and Island Crest Way. A small shopping center is located near the south end the Island, and an area comprising office buildings is located immediately south of I-90 at the east side of the Island, near City Hall. Future office buildings are currently limited by ordinances to two stories unless underground parking is provided, in which case up to five stories are allowed. Public facilities such as schools, churches and parks are located throughout the community.

SERVICE AREA AGREEMENTS

The City does not have a service agreement with Shorewood Apartments as they are the direct customers of SPU. No other special emerging agreements exist at the time of this Comprehensive Plan update.

SPU and the City of Mercer Island have a 60-year contract agreement effective until the year 2062, a copy of which is included in **Appendix E**. SPU will sell and distribute water to the City of Mercer Island under conditions and terms specified in the Full Requirements Contract agreed upon by both parties. The Island's perimeter, surrounded by Lake Washington, is the boundary of the service area, with the exception of the Shorewood Apartments located between I-90 and SE 37th Street, and between 86th Avenue SE and the Gallagher Hill Open Space, shown as green parkland adjacent to the east side of the Shorewood Apartments on the Shorewood Location Map on page 1-2.

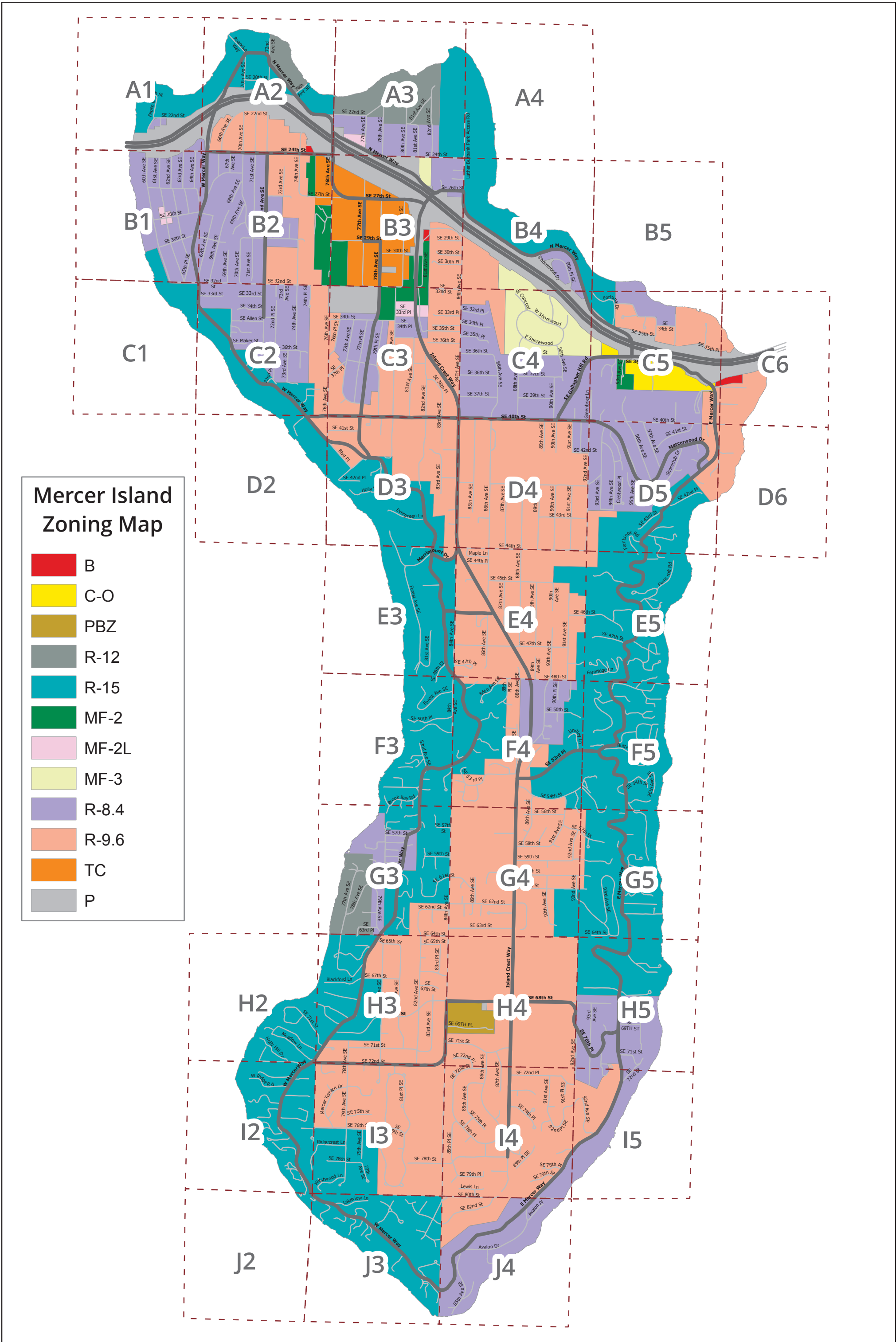


Figure 1-2 Mercer Island Zoning Map



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CHAPTER 2

PLANNING

INTRODUCTION

This chapter presents an analysis of historical water use from 2008 to 2013; existing and future zoning and land use; and population projections in order to predict future needs for the City’s water system. Historical consumption and supply data was used to develop the value of an Equivalent Residential Unit (ERU) and the maximum day peaking factor. This data was then used to convert the population projections into projected average and maximum day future demands for the planning period. These future water demands are used to establish criteria for the analysis of the water system and for development of the recommended Capital Improvement Program.

SOURCE

The City of Mercer Island purchases water from Seattle Public Utilities (SPU) and is billed for its water consumption on a monthly basis. The monthly and annual quantity of water purchased from SPU is summarized in **Table 2-1**. The water usage is measured and recorded at the source meter daily. **Figure 2-1** provides a graphical monthly comparison for 2008 to 2013.

Table 2-1. Monthly Water Purchased from SPU (MG)

	2008	2009	2010	2011	2012	2013
January	56	44	41	49	47	53
February	43	45	41	36	42	43
March	55	40	40	40	39	39
April	58	48	48	46	42	48
May	50	43	44	40	51	58
June	62	102	60	58	64	76
July	113	107	70	72	80	108
August	99	114	110	98	108	110
September	81	87	70	109	99	83
October	58	48	40	52	70	46
November	48	46	38	43	47	44
December	54	49	40	49	41	43
Total	778	773	641	691	730	751

MG = million gallons

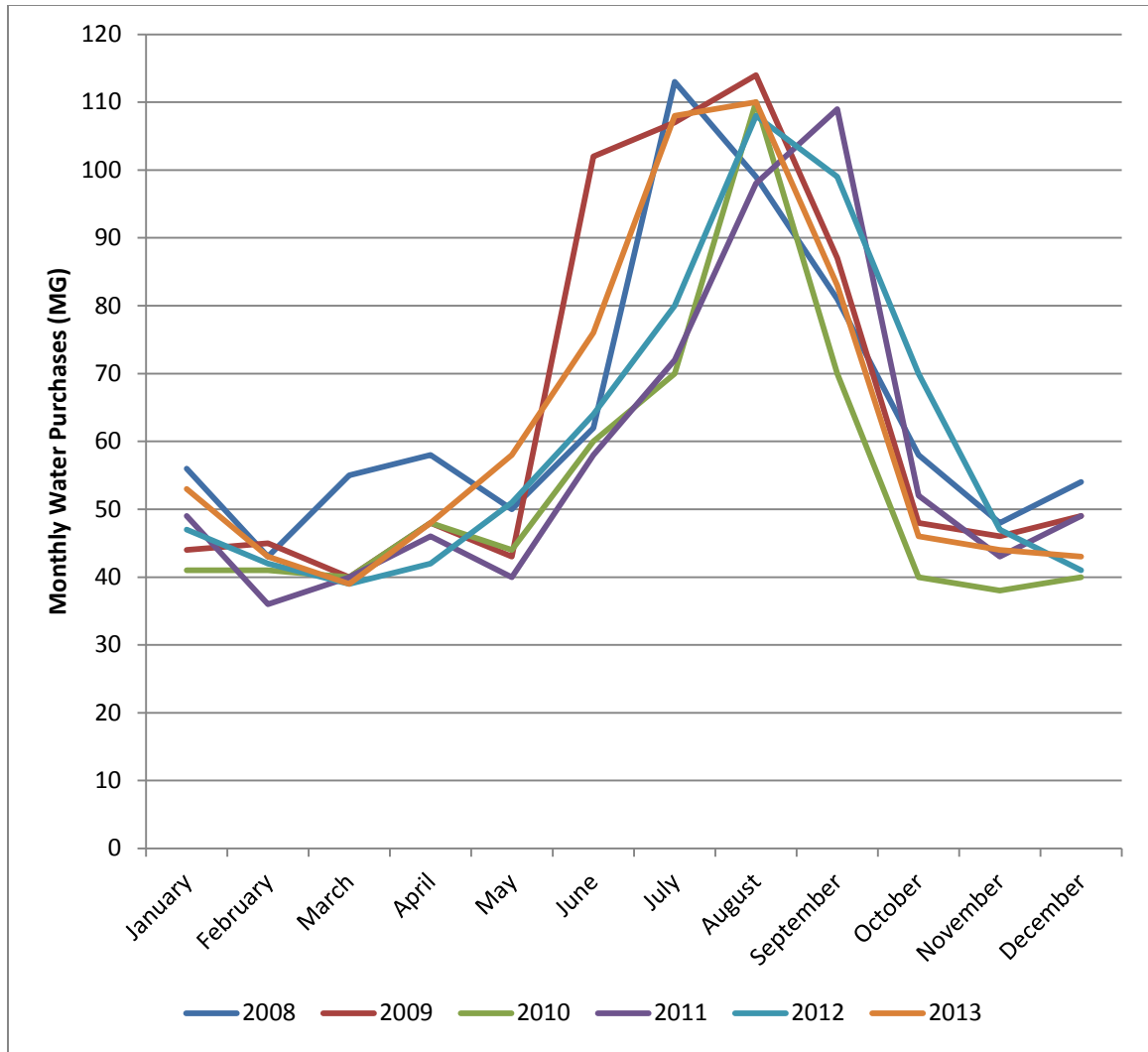


Figure 2-1. Monthly Water Production (2008-2013)

The majority of the water supplied by SPU to the City originates in the Cedar River Watershed, although the City is occasionally supplied from the Tolt River supply system. The water is delivered through the Cedar East Side Supply Line (CESSL) to the 30-inch Mercer Island supply line at Factoria.

There are three meters on the mains serving the City. Use of these meters is further described in **Chapter 4**, System Analysis. Water Rights Self Assessment forms detailing the supply are included in Appendix D.



HISTORICAL WATER USE AND CONNECTIONS

The City provides water to 7,376 retail customers through 7,477 connections as of the end of 2013. Customer meters are read on a bi-monthly basis. Over the last six years, the number of connections has increased by less than 0.5%.

Retail Customer Classes

Single-family residences account for approximately 95% of system connections and 76.9% of water use. This has been relatively consistent over the history of the system. There have been nine new single family connections since 2008.

The multifamily customer class is the second largest in terms of total water used. There are 104 accounts using 11.2% of the total water. There have been five new accounts since 2008.

There are 174 commercial accounts that make up over 2% of the system connections, and use 6.3% of the total water. There have been six new commercial connections since 2008.

The Government customer class is the smallest in terms of number of connections. There are 68 government accounts using 5.5% of the total water. There has been one new account since 2008.

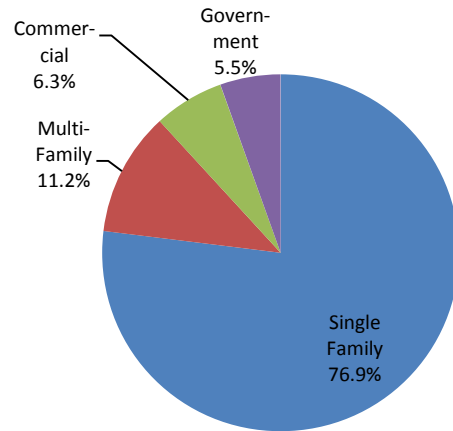


Figure 2-2. Average Annual Water Use by Customer Class (2008-2013)

Figure 2-2 shows the average annual water use, between 2008 and 2013, for each customer class as a percentage of the total water purchased. As noted earlier, water use is predominately single-family residential customers.

Since the 2008 Water System Plan (WSP), the City has decommissioned a number of large unused government account meters as well as consolidated a portion of multifamily connections into larger meters. Additionally, the Utility’s Billing Department has implemented new software which better tracks water use data and accounts. It should also be noted, that the 2008 WSP factored in fire meters thereby doubling the number of connections for many accounts. Fire meters have not been included in the connections data used for this demand forecast. These changes are evident when comparing the number of multifamily and government connections reported in the 2008 WSP to those presented in this plan.

The historical number of customer connections, by customer class, is shown in **Figure 2-3**, and a table detailing the number of connections each year is included in **Appendix F**.

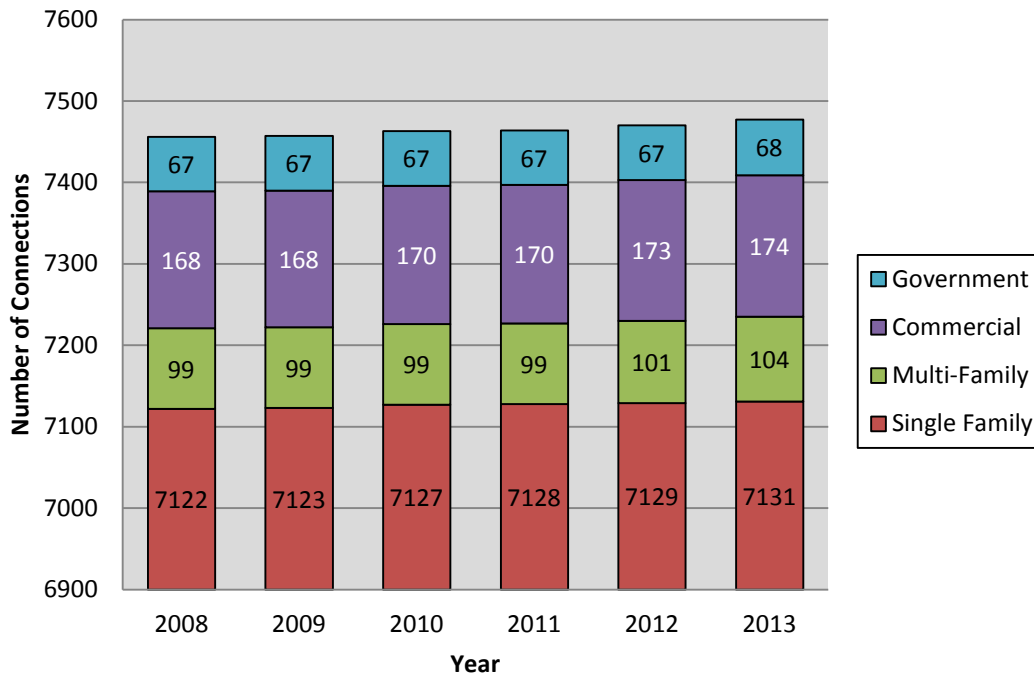
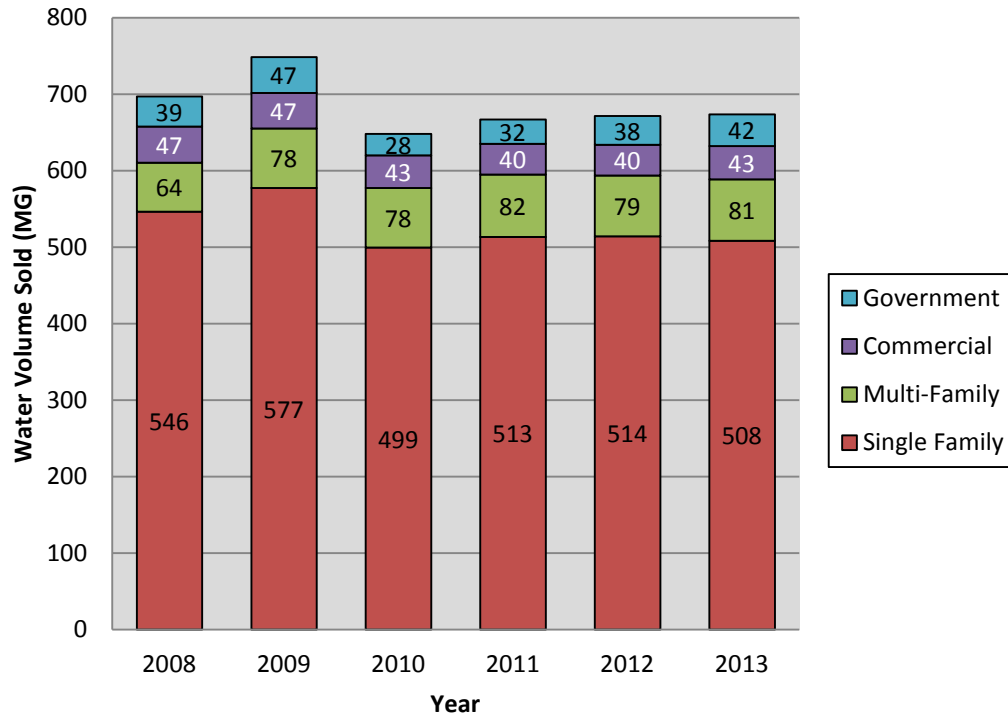


Figure 2-3. Historical Number of Connections by Customer Class

The last six years of water usage by customer class is summarized in **Figure 2-4**. Variations between years typically reflect changes in customer demands based on a variety of factors such as seasonal weather patterns, growth within the service area, and City policies. Over this period, the City has had moderate variation of approximately 16% in water use. A table detailing water consumption by customer class is included in **Appendix F**.

There are seasonal variations in water usage for each customer class. Residential and Multi-Family water consumption increase in the summer months due to irrigation use. Commercial water usage is pretty constant throughout the year. Governmental usage also increases during summer months because of irrigation usage.



Note: Water purchases data for the years 2009-2011 is affected by Mercer Island reservoir meter and SPU supply master metering issues.

Figure 2-4. Historical Water Use by Customer Class

WATER BALANCE AND DISTRIBUTION SYSTEM LEAKAGE

A water balance is an accounting of all water that is produced. The City’s 2013 water balance is shown in **Table 2-2**. The table is a slightly modified version of the format recommended for use by the American Water Works Association (AWWA).

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

Level 1 allocates the water to either Revenue Water or Non-Revenue Water. As implied by the names, Revenue Water generates income while Non-Revenue Water does not. This is helpful in understanding the percent of water purchased from SPU that generates income for the City. The City’s 2013 water production is divided into 89.7% Revenue Water and 10.3% Non-Revenue Water.



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Table 2-2. Water Balance (2013)

	Level 1	Level 2	Level 3	Volume (MG)	% of Produced and Purchased Water
Water Produced and/or Purchased	Revenue Water	Billed Authorized Consumption	1. Billed Water Exported	0.0 ³	0.0%
			2. Billed Metered Consumption	673.7 ²	89.7%
			3. Billed Unmetered Consumption	0.0 ³	0.0%
	Non-Revenue Water	Unbilled Authorized Consumption	4. Unbilled Metered Consumption	2.5 ²	0.3%
			5. Unbilled Unmetered Consumption	0.0 ¹	0.0%
		Apparent Losses	6. Unauthorized Consumption	0.0 ¹	0.0%
			7. Customer Metering Inaccuracies	0.0 ¹	0.0%
		Real Losses	8. Known Leakage	0.0 ¹	0.0%
			9. Assumed Leakage	74.8 ^{2,4}	10.0%
TOTAL				751.0	100.0%

1. City staff does not track this number; therefore zero was used in the water balance.
2. Data Source: City of Mercer Island billing records and authorized non-revenue data for 2013 was provided by City staff.
3. This category does not apply to Mercer Island.
4. Calculation: Water purchased from SPU minus authorized consumption.

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

- **Unbilled Authorized Consumption:** Includes uses such as water system flushing, firefighting, and unbilled contractor use. Typically, it is standard practice not to charge for uses falling into this sub-category. However, it is always a prudent idea to review these uses to ensure that a legitimate revenue opportunity is not missed. Water used by City staff for flushing is metered. Water used for Fire Department testing, fire protection, or water lost in leaks is not tracked or metered.
- **Apparent Losses:** Includes unauthorized uses and customer meter inaccuracies, both of which are lost revenue opportunities.
- **Real Losses:** Includes various types of system leaks. A certain level of leakage is unavoidable; however, leakage beyond that level should be repaired to avoid unduly burdening both the natural resource and the physical infrastructure. Any amount that cannot be assigned to another category is considered a real loss under the AWWA protocol, as well as per the formula for calculating distribution system leakage under Washington State’s Water Use Efficiency (WUE) Rule.



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

Water purchased, authorized consumption, total non-revenue water, and distribution system leakage over the past six years are shown in **Table 2-3**.

It should be noted, that between 2009 and 2011 the City experienced issues with their reservoir meter and SPU’s supply master meter. As such, water purchases data collected during those years is potentially underreported. This issue is evident in the year 2010 when authorized water consumption would appear to exceed water purchases. Non-revenue water and distribution system leakage is potentially greater than what is shown for years 2009 through 2011.

Table 2-3. Historical Non-Revenue Water and Distribution System Leakage

Year	Water Produced and Purchased (MG) ⁽¹⁾	Authorized Consumption (MG)	Non-Revenue Water		Distribution System Leakage	
			Qty (MG)	Percent of Consumption	Qty (MG)	Percent of Production & Purchases
2008	778	697	81	11.6%	81	10.4%
2009	773	750	25	3.3%	23	3.0%
2010	641	648	-7	-1.1%	-8	-1.2%
2011	691	667	24	3.6%	24	3.5%
2012	730	673	59	8.8%	58	7.9%
2013	751	676	77	11.4%	75	10.0%
2012 – 2013 Average	741	674	68	10.1%	67	9.0%

1. Water purchases data for the years 2009-2011 is affected by Mercer Island reservoir meter and SPU supply master metering issues. The water supplied to the reservoirs is potentially underreported so the Non-Revenue water and distribution system leakage may be greater than what is shown for 2009 through 2011.

Data Source: For the years 2008-2012 City of Mercer Island Water Use Efficiency Report. 2013 data was provided by Mercer Island staff.

The WUE Rule requires that the three-year average of distribution leakage be maintained at less than 10% of the supply. Over the past two years, distribution system leakage has been an average of 9.0% of the supply. It is not possible to estimate the system leakage between 2009 and 2011 due to reservoir and SPU supply master meter issues where the water purchases were potentially underreported.

Non-Revenue water is assumed to be 10.1% of the total forecasted consumption.

EQUIVALENT RESIDENTIAL UNITS

The demand of each customer class can be expressed in terms of equivalent residential units (ERU) for demand forecasting and planning purposes. One ERU is defined as the quantity of water used by one typical, full-time, single-family residence. The quantity of water used by other connections, and by the whole system, can be expressed in terms of ERUs. **Table 2-4** shows the historical annual average water consumption by customer classification as well as non-revenue consumption. This data is used to project the ERU planning value.



CHAPTER 2 – PLANNING

Based on the last six years, an ERU equals 202 gallons per connection per day (gpcd). This was calculated based on the total residential volume sold divided by total residential accounts. This represents a reduction of 22.3% from the ERU value of 247 gpcd reported in the 2008 Comprehensive Water System Plan.

Table 2-4 also shows the water used by the average connection from each customer class, expressed in in ERU values. This output is based on the 202-gallon per day per ERU. The number of ERUs per account in each account class is:

- Multifamily 10.4
- Commercial 3.5
- Government 7.6

Distribution system leakage and other non-revenue water use not specifically associated with any customer classification is not included in the ERU but is instead allocated as a percent of the total water used.

Table 2-4. Historical Average Day Demand by Customer Class

Classification	Daily Consumption	2008	2009	2010	2011	2012	2013	Avg.	2015 WSP Plan ⁽¹⁾	Num. of ERUs Per Account
Single-family Residential	Gallons per account	210	222	192	197	198	195	202	202	1.0
Multifamily Residential	Gallons per account	1773	2147	2154	2261	2146	2122	2100	2100	10.4
Commercial/ Other	Gallons per account	771	760	690	649	637	682	698	698	3.5
Government	Gallons per account	1614	1915	1141	1298	1536	1680	1531	1531	7.6
Distribution Leakage	% of total supply	10.4 %	3.0%	-1.2%	3.5%	7.9%	10.0 %	5.6%	9.0%	-

1. The 2015 WSP values for Multifamily, Commercial, and Government Classifications were calculated by applying the same relative increase as the Single-Family value.



MAXIMUM DAY DEMAND AND PEAKING FACTORS

Historical water use can also be described in terms of average day demand (ADD) and maximum day demand (MDD). **Figure 2-5** illustrates ADD and MDD from 2008 to 2013. MDD is used for the storage and fire flow analysis. It is particularly dependent on peak temperatures in the summer, and therefore varies as a result.

The system demand ratios, or peaking factors, shown in **Table 2-5**, illustrate the relative magnitude of peak-day demands compared to average system demands. Determination of MDD is critical because it is the benchmark utilized by a number of the water system criteria discussed in Chapter 3. Supply capability, pump station discharge rates, reservoir capacity and pump sizes are all derived from MDD data collected by the City’s Data Management System (DMS). The peaking factor derived from the average ratio of MDD to the average historical ADD is 2.11. This is comparable to the average peaking factor of 2.14 from 2001 to 2006 identified in the 2008 Water System Plan. Therefore, the projected MDD/ADD peaking factor is estimated to be 2.11.

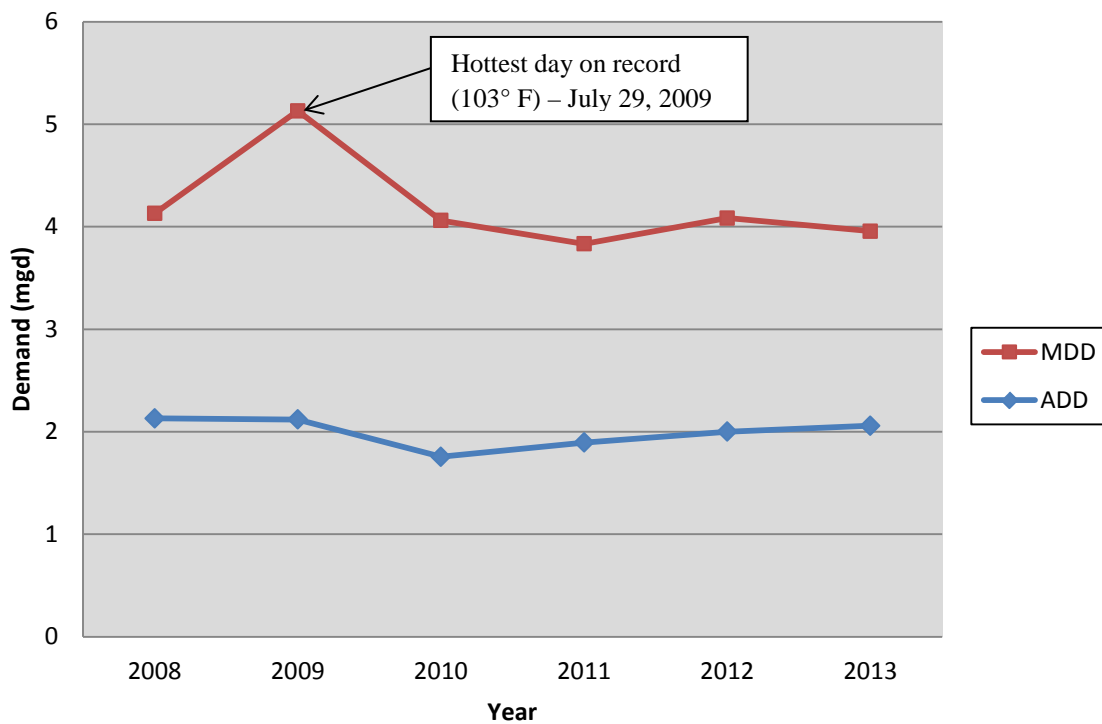


Figure 2-5. Historical ADD and MDD



Table 2-5. Historical MDD, ADD, and Peaking Factors

	2008	2009	2010	2011	2012	2013	Avg.
Water Purchased (MG) ⁽¹⁾	778	773	641	691	730	751	727
Average Annual Day Demand (ADD) (mgd)	2.13	2.12	1.75	1.89	2.00	2.06	1.99
Maximum Day Demand (MDD) (mgd) ⁽²⁾	4.13	5.13	4.06	3.83	4.08	3.96	4.20
	15-Aug	29-Jul ⁽³⁾	16-Aug	5-Sep	17-Aug	24-Jul	-
Maximum Day/Average Day (MDD/ADD)	1.94	2.42	2.31	2.02	2.04	1.92	2.11

1. Data Source: For the years 2008-2012 City of Mercer Island Water Use Efficiency Report. 2013 data was provided by Mercer Island staff.
2. Data provided by City of Mercer Island staff.
Note: Water purchases data for the years 2009-2011 is potentially underreported due to Mercer Island reservoir meter and SPU supply master metering issues.
3. July 29, 2009 was the hottest day on record 103° F.

CURRENT AND HISTORIC POPULATION

The United States Census Bureau completes a census every 10 years, with the most recent census completed in 2010. The published population of Mercer Island is 22,699 people as of 2010, which agrees with City data. The historic population is illustrated in **Figure 2-6**. The population has increased slightly between 1970 and 2010. Minor growth has been experienced since 2010, and is expected to continue.

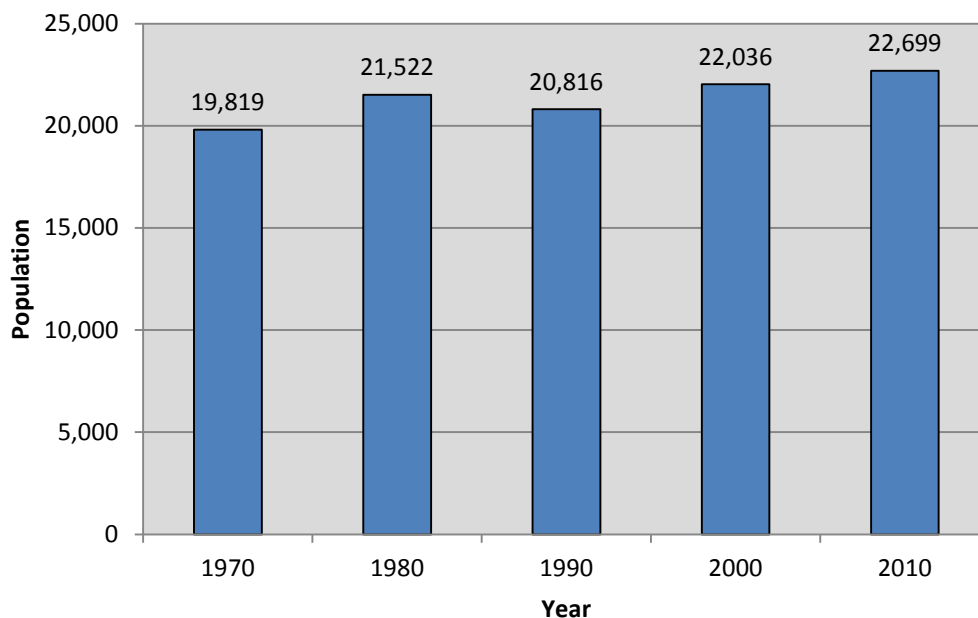


Figure 2-6. Historical Population



CURRENT AND FUTURE LAND USE

The current zoning map for the City of Mercer Island is shown in **Figure 1-2**. The City is not planning any zoning changes. The City is almost fully developed, the City limits are not expected to change, and it is principally a single-family residential community. The residential zones will continue to have small growth due to redevelopment of existing lots and the addition of accessory dwelling units (ADU).

Growth is anticipated downtown in the Town Center. Zoning codes were updated in the 1990s to attract multi-use development in the downtown core. The downtown core is approximately 76 acres in the northern midsection of the Island adjacent to I-90. See **Figure 1-2**, in Chapter 1. The goal of the mixed-use development codes is to attract development of up to five-story-high developments in the downtown core with retail business on the street level, and office space and residential units above. This growth is consistent with the Growth Management Act (GMA) and the City of Mercer Island Comprehensive Plan, 1994, most recently amended in 2005.

POPULATION FORECAST

Many factors influence population growth. The state of the economy, interest rates, and zoning changes all influence new development and population growth. Growth management policies, along with coordination between local governments and the Puget Sound Regional Council (PSRC), align to make development more predictable and growth projections more accurate than they have been historically. However, significant changes to the regional economy will continue to affect growth timing and patterns. Additionally, the land use and development policies of adjoining jurisdictions may also affect growth patterns, especially in light of threatened species listings and increased efforts to retain rural open space.

It is not uncommon for actual growth rates within the City to vary from those predicted. Growth projections from the PSRC were for the entire City, and were not subdivided. Therefore, growth rates will vary between different parts of the City based on the availability of services and the costs to develop the land for the zoned use. As required by the Municipal Water Law under Chapter 90.03.386(2), certification of the consistency statements will be requested from the City of Mercer Island's Development Services Department, during the agency-review process.

The population forecast comes from the PSRC forecast that is based on the 2010 Census. The boundary of Forecast Analysis Zone (FAZ) 4400 is the same as the City limits. Population, households, and employment forecasts were obtained from the PSRC for the years 2010, 2020, 2030, and 2040. Population projections for interim years (2015, 2025, and 2034) were computed by interpolation based on the projections provided by the PSRC.

The resulting government, employment, and household growth rates for the entire service area can be seen in **Table 2-6**. The growth rates are the total growth over the time period shown, except where indicated. The growth rates for the single-family and multifamily classes are based on the projected growth for single-family and multifamily households respectively. The growth rates for the commercial class were based on the projected employment growth, and the growth rates for the government class were based on the projected total population growth. The total City population is expected to grow relatively quickly until approximately 2020, and then growth is expected to slow. The average population growth per year, between 2015 and 2034, is 0.21%. The fastest growing sector is commercial, at an average of 0.92% per year between 2015 and 2034. The slowest growing sector is projected to be multifamily residential, at an average annual growth rate of 0.07%. Commercial growth is largely due to the rezoning and redevelopment of the Town Center.



Table 2-6. Projected Growth

Classification	2015-2020	2020-2025	2025-2034	2015-2034	Average Annual Growth
Single-family	2.33%	1.03%	0.59%	3.99%	0.21%
Multifamily	0.47%	0.20%	0.64%	1.31%	0.07%
Commercial	9.11%	1.55%	5.99%	17.44%	0.92%
Government	2.90%	0.63%	0.36%	3.91%	0.21%

PROJECTED ACCOUNTS

The number of projected accounts is determined by applying the above growth rates to the number of existing connections. Projected accounts are shown in **Table 2-7**. From 2015 to 2034, there are expected to be 287 new single-family connections, two new multifamily connection, 31 new commercial connections, and two new government connections. This is a total of 322 new connections.

Table 2-7. Projected Accounts

Classification	2015	2020	2025	2034
Single-Family	7,198	7,366	7,442	7,485
Multifamily	104	105	105	106
Commercial	181	197	200	212
Government	69	71	71	71
Total	7,552	7,738	7,818	7,874

PROJECTED DEMAND

Projecting future water demand is one of the key elements of the water system planning process. Identification of system improvements such as supply, pumping, storage and piping requirements are all related to demand projections.

Future water system demands are based on projected ERUs, which in turn are based on the projected water consumption by customer classification and the projected number of accounts discussed at the beginning of this chapter. **Table 2-8** shows the projected ERUs for the planning period. The planning value for non-revenue water is 10.1% of the total consumption, shown in ERUs.

Table 2-8. Projected ERUs

Classification	2015	2020	2025	2034
Single-family Residential	7,198	7,366	7,442	7,485
Multifamily Residential	1,084	1,089	1,091	1,098
Commercial	632	690	700	742
Government	523	538	541	543
Non-Revenue Water	953	978	987	997
Total (w/ Leakage)	10,390	10,660	10,761	10,866
Total (w/o Leakage)	9,437	9,682	9,774	9,869



The ADD for the entire City was based on multiplying the projected ERUs by the planning value of 202 gpd per ERU. The projected MDD is simply the projected ADD multiplied by the MDD/ADD factor of 2.11, as discussed previously. The existing and projected average and maximum daily demands for the City, without WUE reductions, are shown in **Table 2-9**. The existing and projected annual demands, without WUE reductions, are shown in **Figure 2-7**. As such, the values presented in **Table 2-9** and **Figure 2-7** below represent conservative estimates for ADD, MDD, and annual demand.

The deficiencies identified in the system analysis serve as the basis for the Capital Improvement Plan in Chapter 7. The ADD and MDD projections (without WUE reductions) are utilized in Chapter 4, System Analysis. The City participates in regional conservation efforts. Because conservation is measured regionally, it is difficult to quantify the water savings attributed to each wholesale customer. As such, WUE reductions specific to Mercer Island are not included in this Water System Plan.

Table 2-9. Projected ADD and MDD, without WUE

Classification	2015		2020		2025		2034	
	Avg. Day (gpd)	Max. Day (gpd)	Avg. Day (gpd)	Max. Day (gpd)	Avg. Day (gpd)	Max. Day (gpd)	Avg. Day (gpd)	Max. Day (gpd)
Single-family	1,460,000	3,080,000	1,490,000	3,140,000	1,510,000	3,190,000	1,510,000	3,190,000
Multifamily	219,000	462,000	220,000	464,000	221,000	466,000	222,000	468,000
Commercial	128,000	270,000	140,000	295,000	142,000	300,000	150,000	317,000
Government	106,000	224,000	109,000	230,000	110,000	232,000	110,000	232,000
Non-Revenue Water	193,000	407,000	198,000	418,000	200,000	422,000	202,000	426,000
Total	2,110,000	4,440,000	2,160,000	4,550,000	2,180,000	4,610,000	2,190,000	4,630,000

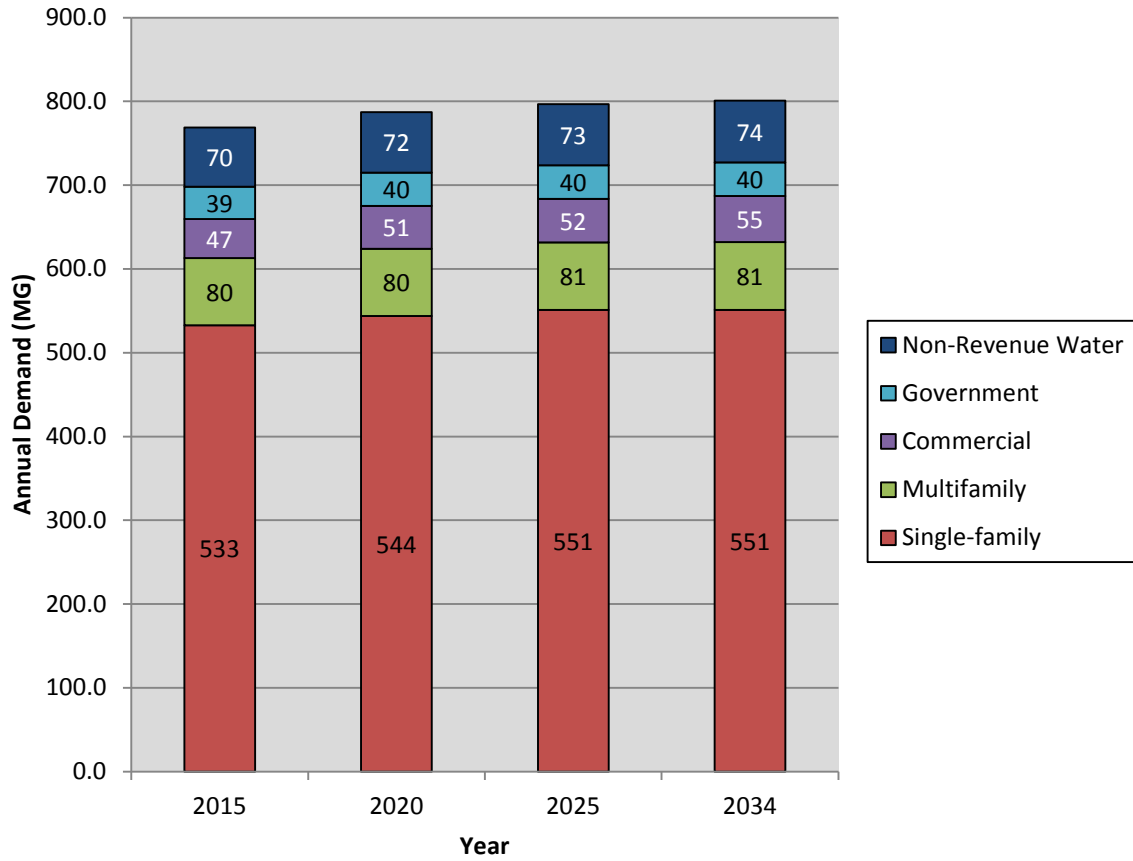


Figure 2-7. Projected Annual Demand, without WUE

CHAPTER 3

POLICIES

INTRODUCTION

The City plans and operates water service for Mercer Island customers according to federal, state, and local design criteria, laws and policies, including:

- US Environmental Protection Agency (EPA)
- Washington State Department of Health (DOH)
- Washington State Department of Ecology (ECY)
- King County Coordinated Water System Plan (CWSP)
- City of Mercer Island policies and ordinances
- American Water Works Association (AWWA) guidance materials

These agencies help to guide the City's operation and maintenance of the water system on a daily basis, as well as its planning for future improvements.

It is important that the policies and criteria are reviewed and reaffirmed or modified at regular intervals to ensure they continue to represent the City's needs. The City of Mercer Island may adopt policies and criteria that meet or exceed requirements identified by the above entities.

The City policies take the form of ordinances, memoranda, written standards and operational procedures.

The operational mission objectives for the water system are:

- Priority 1:** Preserve public safety.
- Priority 2:** Maintain adequate water volume for fire fighting.
- Priority 3:** Maintain adequate water volume for basic sanitation.
- Priority 4:** Maintain consumptive value and water quality.

The City's policies are grouped by major categories. These categories are:

- Service Area, Extension and Service Ownership
- System Reliability and Emergency Management Plan
- Fire Protection
- Coordination and Cooperation with Other Agencies
- Water System Planning, Design, and Construction
- Environmental Stewardship
- Water Use Efficiency
- Operational



- Financial

SERVICE AREA, EXTENSION, AND SERVICE OWNERSHIP

Urban Growth Areas

The City is currently in an Urban Growth Area and is required to comply with the Growth Management Act.

Service Area

The City will serve within its retail services area (RSA) as defined herein and shown in Figure 1-1. The City does not anticipate any additional growth to the RSA.

Duty to Serve/Timely and Reasonable Service

The City will plan to provide water service to all customers within the City's RSA in a timely and reasonable manner. The City does not anticipate any changes to its defined RSA. Revisions to the City's RSA shall only be made in accordance with local and state regulations.

Wholesaling Water

The City does not wholesale and has no current intention of wholesaling water.

Wheeling Water

Wheeling of water is allowing water to pass through the City's mains to another system. The City has no current intention to wheel water.

Annexation

The City limits of Mercer Island are bounded by the physical limits of the Island. Mercer Island has no intention of annexing any property outside the current city limits.

Connections

New water service connections within the retail service area boundary must connect to the Mercer Island Water System. All proposed water services for new structures within the City limits, excluding the Shorewood Apartments, will have a water meter installed per City standards. The property owner will be required to obtain a permit and to pay all the costs associated with the new service connection and installation.

Reconnections

A permit is required for a service reconnection, upsizing, or relocation. The owner of the premises desiring the service is required to pay all the costs associated with the project.

Abandonment of Connection

Any connection remaining unused for a period of five years or more is declared abandoned. A new connection fee shall be applied if a renewal of service is requested.

Service area and extension policies define the Water Service Area and conditions for service extension within those boundaries. The service policies define the level of service provided to water system customers, as well as public and private **service ownership** and responsibility for water system components.



Emergency Service

Compliance with standards and policies may be deferred for an emergency water service. This will be reviewed on a case-by-case basis.

Satellite System

It is the City’s policy to provide direct service to its customers. At the City’s discretion, if the City deems no other options feasible, the City may enter into a written satellite system agreement with a satellite water system owner.

SYSTEM RELIABILITY AND EMERGENCY MANAGEMENT PLANNING

Supply

The City has a long-term source of supply. The City plans to continue purchasing its water supply from Seattle Public Utilities. The City signed the City of Seattle’s Full Requirements Contract for the Supply of Water that remains in effect until January 1, 2062. The Contract will supply the City water at the minimum hydraulic gradient up to a maximum flow rate that totals to 3,205 gallons per minute (gpm) for the three services to the City. A copy of the Contract is included in **Appendix E**.

*Service reliability policies and criteria define the City’s standards to construct and maintain reliable water system infrastructure and equipment. The **Emergency Operations Plan** states the City’s responsibility to maintain an updated Emergency Response Plan and to take reasonable action in case of emergencies.*

Water Quality

Water quality regulations are established by WAC 246-290-310 and are used as the City’s criteria for water quality. The City will pursue steps to comply with all water quality laws and standards and will take all reasonable measures to protect its system.

Reliability

WAC 248-54-201 requires that public water systems provide an adequate quantity of water in a reliable manner at all times. To meet this requirement, the City constructed an emergency source well in 2010 on the north end of the Island. The North Emergency Well is capable of supplying up to 5 gallons per day (GPD) per person of potable water to residents during emergency events. The City also has plans to construct a second emergency source well by 2022 on the south end of the Island.

Backup Power Requirements

To increase emergency reliability, the City has backup generators at both pump stations. The emergency well at Rotary Park is also supported by the backup generator at the Reservoir site.

Routine Operation and Preventive Maintenance

Unless specifically directed otherwise by the City, all facilities and equipment shall be maintained in accordance with the manufacturer’s specifications. The City has developed, and shall adhere to, maintenance and replacement schedules for all facilities and equipment.

- Facility and equipment breakdown is given highest maintenance priority. Emergency repairs will be made even if overtime labor is involved. Customers will be without water for the shortest amount of time possible.



CHAPTER 3 – POLICIES

- The Maintenance Department will repair, replace or rebuild parts before they represent a high failure probability. Spare parts will be stocked for all equipment items whose failure will impact the ability to meet other policy standards. Equipment that is out of service will be returned to service as soon as possible.
- A preventative maintenance program schedule is established for all facilities and equipment.
- Written records and reports will be maintained on each facility and component of the water system and will be kept in the Maintenance Department. The information will also be linked to the City's Geographical Information System (GIS).

Emergency Operations Plan

The City has prepared an Emergency Operations Plan which defines emergency management organization, responsibilities, and procedures for all City functions in the event of an emergency or disaster. This plan describes how the City Maintenance Utilities team should react to an emergency, including functions and responsibilities of personnel, procedures to be followed, maps of the area, means of establishing communications between various organizations, and lists of people to contact during an emergency. This plan will be updated as required by regulations.

Water Shortage Contingency Plan

The City, under its Contract with Seattle, recognizes that emergency water use curtailment measures may be implemented by SPU on a regional basis in order to meet emergency conditions or a regional water shortage. The procedures to be used in the event of a weather-related regional water shortage, or shortages caused by other factors, shall be as described in Seattle's Water Shortage Contingency Plan.

The City has prepared an Emergency Operations Plan which defines the emergency management organization, responsibilities, and procedures for all City functions in the event of an emergency or disaster. This plan describes how the City Utilities Team should react to an emergency, including functions and responsibilities of personnel, procedures to be followed, maps of the area, and means of establishing communications between various organizations, and lists of people to contact during an emergency.

The City has established an emergency well supply to assist during emergency situations should SPU not be able to provide reliable water (described further in the following section).

Emergency Supply Source

On September 16, 2009, the Department of Ecology (Ecology) issued a Report of Examination (ROE) approving the City's emergency source well application that was submitted on April 18, 2006. The purpose of the application was to enable the City to develop and operate two emergency, stand-alone, water supply sources (i.e. North and South Wells) for use in the event of seismic emergency or other catastrophic event that temporarily disrupts water service. To this end, North Well and South Well sites were identified for potential well source development.

Following expiration of the statutory 30 day ROE appeal period, the City was issued a permit on December 2, 2009. The permit authorizes two wells for Standby-Reserve use only which may on a combined basis, beneficially use an instantaneous quantity (Qi) of 400 gpm, and an annual quantity (Qa) of 66.3 acre feet per year (afy) to meet resident emergency water supply needs. The permit also entails a series of conditions which include requiring construction of the two wells by July 1, 2015, periodic testing, duration of use, reporting requirements, and use consistent with state or local emergency declarations



On March 4, 2010, the City completed construction of its first emergency source well – the North Well located within Rotary Park, and made it operational. As required by the emergency source permit, the North Well is unconnected to the City’s water distribution and designed to operate on a complete stand-alone basis. Based on well testing and pump data, the North Well appears to be highly productive and should enable the City to meet its (north end) operational goal of providing residents up to 5 GPD per person of well water for a period of time extending up to 90 days.

Subsequent to the completion of the North Well, it was the City’s plan to test and construct the second emergency source well (i.e., South Well) by 2015 in the vicinity of Island Crest Park. However, as discussed later in Chapter 6, due to economic, financial, and property acquisition challenges, the City has determined that it will not be able to meet this projected development schedule. On March 12, 2015, Department of Ecology granted its approval to the City to extend the timeline for construction of the South Well to July 1, 2022.

A more specific description of the emergency supply source wells, and related permit and operational conditions may be found in Chapter 6 and related attachments.

Cross-Connection Control Program

The City has a responsibility to protect the public water system from contamination due to cross connections. The City will actively pursue elimination of cross connections.

The City Manager or his/her designee may require the installation of backflow prevention assemblies on any premises receiving water under the provisions outlined in the City Municipal Code, Chapter 15.14, or as required by the adopted Unified Development Code. The owner of the property will pay the total cost of the installation, maintenance, and testing of all private backflow assemblies.



FIRE PROTECTION

Fire Flow Requirements

A water system must have a supply, storage, and distribution system of sufficient capacity to supply fire fighting while maintaining a minimum 20 psi residual pressure through the distribution system (WAC 246-290-221(5)).

The fire protection policies outline the City's fire flow requirements and the City's commitment to system improvements.

The City of Mercer Island has adopted the 2012 International Fire Code (IFC) for site specific fire protection requirements. The fire flow required for each site is based on many factors including the size and type of construction and emergency vehicle access; however, the fire flow requirements for a particular site may be modified if certain conditions are met, such as providing approved fire sprinklers, or other factors determined by the Fire Marshal.

The City's water system has fire flow standards based on zoning. The fire flows presented are the desired minimum flows for the water system. There are areas of the distribution system that do not meet the minimum fire flow requirements because they were developed prior to the adoption of these standards. The improvement program is prioritized for these areas that do not meet the minimum fire flow. The minimums have been agreed to by Fire Department and the City's Utility Board and they are summarized as follows:

Minimum Fire Flow

<u>Zoning</u>	<u>Flow</u>	<u>Duration</u>
Residential	1,000 gpm	2 hours
Multifamily	4,000 gpm	4 hours
Commercial	5,000 gpm	4 hours

COORDINATION AND COOPERATION WITH OTHER AGENCIES

Regional Water Supply Participation

The City is committed to participating in regional planning and water supply development. The City will actively engage local and state governments, regulatory agencies and other water systems with the goal of improving the water supply industry and to protect the interests of all public water system customers.

*These policies summarize the City's willingness to **coordinate and cooperate with other agencies**, as well as to enter interlocal agreements with neighboring jurisdictions.*

Mutual Aid

The City will participate in Mutual Aid Agreements with adjacent jurisdictions, King County and the State of Washington.

Emergency Interties

The City supports emergency interties with adjacent water systems where this is a benefit to the water systems. Interties increase reliability of water systems during emergencies and other unusual operational circumstances.



WATER SYSTEM PLANNING, DESIGN AND CONSTRUCTION

Planning Objectives

The City will plan and design water system facilities that can deliver continuous, safe water supply to meet customer demand and remain consistent with all applicable federal, state and local regulations. This can be accomplished through the development and review of the City's Water System Plan that will be updated every six years per state regulations.

Water system planning policies define the methods and procedures the City uses to determine what facilities are needed to meet anticipated growth within the City's retail service area. These also provide guidance for design and construction of facilities.

The City will plan the construction of its infrastructure to accommodate growth while maintaining stable rates and charges.

Design and Performance Standards

All new connections are required to meet the minimum design and performance standards. New standards may be adopted from time to time upon the recommendation of the City Engineer. The most recent standards in effect at the time this plan was prepared is included in Appendix G.

New facilities, extensions, and improvements required for development may be financed by the applicant or by the formation of a Local Improvement District. In either case, water system extensions, improvements or new facilities must be constructed in accordance with the City's policies, technical standards and specifications.

Supply Facilities

Supply facilities should be designed to meet the Maximum Day Demand (MDD). Sizing to meet peak-hour demands would be very costly. It is more economical to use storage to meet demands that exceed the MDD than to oversize supply facilities. The City has a long-term source of supply under a contract with the City of Seattle that remains in effect until January 1, 2062. The contract will supply the City with water at the minimum hydraulic gradient up to a maximum flow rate that totals to 3,205 gallons per minute (GPM) for the three services to the City.

Pressure Zones

Pressure zone boundaries are identified by elevation and topography (ground contours). The lower boundary is the lowest ground contour where static pressure will not exceed 110 psi. The upper boundary of the zone is the highest ground contour where static pressure will not fall below 40 psi.

One must take existing streets and pressure reducing valves into consideration when recommending changes to the existing pressure zones. Exceptions to the static pressure standards are sometimes necessary because streets and mains do not conveniently follow the ideal ground contours. When pressure to some customers exceeds 80 psi, a pressure-reducing valve must be installed by the customer on their system to comply with the Uniform Plumbing Code regulations.

The fewest possible pressure zones should be created. Wherever pressure zones are created, the system becomes fragmented and the water conveyance capacity is severely limited by pressure reducing valves (PRV). Also, it is desirable to limit the number of PRVs in the system because they are mechanical devices that have high maintenance costs and are subject to failure.



CHAPTER 3 – POLICIES

The number of PRVs serving any given zone should be sufficient to meet fire fighting requirements if one of the PRVs is out of service. Therefore, at least two, and ideally three, PRVs should serve each zone.

Storage Standards

System storage volume requirements consist of four separate components: operational storage, equalizing storage, fire suppression storage and standby storage volumes. Storage facilities may also contain a “dead storage” component of volume that is unused primarily due to the facility configuration. The City nests the system storage volumes of fire suppression and standby storage. Therefore, only the larger of the two volumes shall be provided.

Operational Storage

Operational storage is the volume within the tanks devoted to supplying the water system while the sources are not activated during normal operating conditions. The City’s operational storage does not need to be significantly large, as water level sensors control inflow from the flow control valves to maintain a high hydraulic grade line per the City’s policy. Therefore, the operational storage volume does not fluctuate significantly during normal operating conditions.

Equalizing Storage

Equalizing storage is the total volume required to satisfy peak system demands that exceed the capacity of the supply and pumping facilities. Equalizing storage requirements are greatest on the day of maximum demand and are typically equal to 20-30 percent of the maximum day demand (MDD). The City will plan to provide equalizing storage in the amount needed to offset the difference between the peak hour demand (PHD) and sum of all the SPU supply capacities for a duration of 2½ hours, in accordance with the Washington State DOH guidelines for equalizing storage. The City will also provide a minimum of 30 psi at all service connections with equalizing storage expended at peak day.

Fire Suppression Storage

Design criteria established by WAC 246-290-230 and DOH require that new or expanding water systems have the capacity to provide design fire flows during MDD conditions. Fire protection volume requirements are computed based on the size and duration of the largest required fire flow within the service area of the storage facility. The City plans to provide fire flows as described in the Fire Protection Section of this Chapter. The largest fire flow volume within the City’s water system is required for the Town Center (TC), which requires 5,000 gpm for 4 hours, or 1.2 million gallons.

Standby Storage

Emergency and reserve volume (standby storage) is required to supply reasonable system demands during an unforeseeable system emergency or outage, such as major pipeline failure, power outage, valve failure or another system outage. Emergency and reserve volume requirements are dependent upon average system demands and source of supply redundancy. The City has established a minimum standby volume criterion to provide sufficient standby storage to maintain service for two days of average day demand (ADD), with all sources of supply off-line. The City’s standby criterion is more conservative than the Washington State DOH recommendation of two days of standby storage, to provide additional emergency water supply if the SPU supply is interrupted.



Standby storage and fire suppression storage are “nested” in the City’s water system, such that only the larger of the two volumes is provided.

Pump Stations

All pump stations require a minimum of two pumps for flexible operation. The total capacity of the pumps in a pump station should generally be 25-50% greater than the calculated required capacity of the pump station.

Minimum and Maximum System Pressure

Minimum pressure criteria are 30 pounds per square inch (psi) under peak day conditions and 20 psi maximum day and fire flow requirements.

Pressures within the distribution mains are generally limited to a maximum 100 psi. Services with static pressures above 80 psi are required to have a homeowner provided PRV as per plumbing code requirements.

Velocity

The maximum water velocity in the pipe shall not exceed 8 feet per second during maximum day demand except for fire flow conditions. The maximum velocity requirement is in place to limit velocity forces and reduce the likelihood of a water hammer effect in the distribution system.

Watermains and Service Lines

All watermains will comply with the generally recognized design criteria from the AWWA and Washington State DOH. Requirements are as follows:

- All new construction of watermains will be in accordance with the City’s most current Standard Water Details Drawings and Specifications.
- All new mains will be sized by a hydraulic analysis to provide the required fire flow at a minimum residual pressure of 20 psi and maximum pipeline velocity of 8 feet per second during maximum daily demand conditions.
- The minimum diameter of all watermains shall be 6 inches, unless justified by a hydraulic analysis (WAC 246-290-230(2)). Any watermain designed to provide fire flow must be at least 6 inches in diameter.
- The City Engineer has the authority to require a larger pipe size, if deemed warranted, to provide increased fire flow protection to areas other than that being immediately served by the upgrade.
- For residential connections, adequately sized service lines will be used. The size is based on fixture counts, as determined by the Development Services Department, and all new residential service lines will be no less than 1-inch copper in the right-of-way. Service lines between the meter and the house must be the same size as the service or larger.
- If a fire sprinkler system is required, a minimum 1½-inch meter will be installed. The connection charge will be based on the size of the meter required for fixture counts in the house.

Looping

Whenever practical, water mains will be looped. The City also recognizes that topography and lack of right of way or easements may make looping of some mains impractical.



CHAPTER 3 – POLICIES

Sub-Standard Watermain Improvement Program

The City will evaluate undersized water main projects by using the following criteria:

- All 4-inch and smaller watermains shall be upgraded to the size determined by the hydraulic analysis and at least 6 inches in diameter.
- Aging 6-inch and 8-inch water mains shall be evaluated and ranked for system improvements if needed.

Watermain upgrades will be prioritized using a weighted ranking evaluation based on the following criteria:

- Breakage and maintenance problems
- Fire protection issues
- Water quality concerns
- Material type
- Age of pipe
- Streets prioritized for construction by the Six Year Transportation Improvement Plan
- Water mains on private streets will be upgraded based on breakage and maintenance problems, lack of fire protection, or a street surfacing overlay initiated by the residents

Hydrants

The spacing for fire hydrants is to be no more than 300 feet between hydrants unless on-site hydrants are provided for any facility or building. For one and two-family dwellings and Group R-3 and Group U occupancies, the distance requirement shall be 300 feet. For buildings with one- and two-family dwellings and Group R and Group U occupancies equipped throughout with approved automatic sprinkler systems, the distance shall be 600 feet.

New hydrants will conform to Mercer Island's Water System Standard Specifications.

Valves

Valve installations will satisfy the following criteria:

- Valves are to be located at main intersections, a minimum of three valves will be provided per cross, two valves per tee and one valve per dead-end line
- Air/vacuum release valves will be placed at all high points or "crowns" in pipelines

Blowoffs

For water quality, dead-end mains should have either hydrants or blowoffs. Blowoffs shall be installed where a hydrant is not practical.

Demand Metering

Under the new Seattle Contract, the Demand Metering Program is established to set performance standards, and to monitor the wholesale customer's compliance. Seattle may choose to apply demand metering selectively to certain parts of the transmission network that are designated as critical from the standpoint of hydraulic capacity or other operational considerations. Seattle may choose to apply demand metering intermittently in various parts of the transmission network for



the purpose of monitoring for compliance by individual wholesale customers or groups of wholesale customers on a given line segment.

Meter Reading and Billing

All water customers must be metered. Meters are read and bills sent bi-monthly. Meter reading shall occur, if possible, on the same cycle date. The City may estimate meter readings for billing purposes when its meter reader is unable to gain access to the premises on the regularly scheduled meter reading trip, when the meter has been tampered with, is not functioning properly, or when circumstances beyond the control of the City make reading of meters impractical or impossible.

Connection between Meter and Point of Access

It is the customer’s responsibility to maintain the connection between the meter and any point of access on the customer’s property. It is also the customer’s responsibility to inspect and test annually any backflow prevention assemblies required by the City, or as required by the International Building Code, at the time of construction in accordance with Section 15.14 of the Municipal Code.

Meter Requirements

All service connections to the City Water System shall be metered. Water meters shall be sized to provide adequate domestic water service and/or provide fire protection, whichever demands the larger meter.

All water service connections serving multi-family dwellings shall be sized by an engineer and approved by the City Engineer.

Material Requirements for Water System Components

The City is in compliance with the new “The Reduction of Lead in Drinking Water Act” which took effect on January 4, 2014. The law requires that all water systems that provide water for human consumption must use materials, devices, and components that meet the new “lead-free” requirement. It also changes the definition of “lead-free” from a weighted lead content of 8 percent or less to a weighted average of less than or equal to 0.25 percent for surfaces in contact with potable water. Any materials used for installation or repair must be lead-free, including pipes, pipe fittings, plumbing fittings, and plumbing fixtures.

ENVIRONMENTAL STEWARDSHIP

Sustainable Community

In 2006, a Comprehensive Plan Amendment added the following text to the City’s Vision Statement:

“Sustainable Community - Mercer Island strives to be a sustainable community: Meeting the needs of the present while preserving the ability of future generations to meet their own needs. We consider the relationship between the decisions we make as a community and their long-term impacts before committing to them. We understand that our strength is dependent on an open decision-making process that takes into account the economic, environmental and social well-being of our community.”

The environmental stewardship policies outline the City’s dedication to develop and implement facilities and programs that will protect the environment.



CHAPTER 3 – POLICIES

The City Council then adopted Resolution 1389 (in May 2007) committing to a sustainability work program and a goal of reducing greenhouse gas emissions by 80% from 2007 levels by 2050, which was consistent with the goals stated in King County’s Comprehensive Plan.

Since that time the City has achieved a number of notable milestones as its sustainability program evolves. In 2012 a citizen-staffed Sustainability Policy Task Force provided valuable guidance to the Council on feasible near-term actions to care for the environment while making best use of limited tax revenues. Building on that momentum, the City has hired its first dedicated staff position to focus on the issue; sustainability collaborations with other like-minded municipalities continue to grow; the City won a high-profile national award from the federal EPA in 2013; recycling rates are the highest in the region; and the Mayor has joined forces with other regional elected officials to help influence critical State-level climate policy decisions.

In the water system arena, sustainability considerations led a recent 2011 booster pump station improvement project to select modern variable-frequency drive (VFD) pumps to replace much less efficient equipment, thereby saving the City energy and money.

WATER USE EFFICIENCY

Regional Water Use Efficiency Program

The City participates in the regional conservation plan and goes beyond the regional requirements by promoting special programs, tailored for City residences, targeting peak day use. The special programs are funded by the water utility surcharge for high users.

The water use efficiency policies summarize the City’s responsibility to continue promoting programs that address water efficiency and implement the use of the best available technology.

The City is a member of the Saving Water Partnership, which includes SPU and 18 other water utilities.

City Water Use Efficiency Target

In 2014, the City of Mercer Island adopted a six-year regional water conservation goal of reducing per capita water use from current levels so that the total average annual retail water use of the members of the Saving Water Partnership is less than 105 million gallons per day (MGD) from 2013 through 2018 despite forecasted population growth.

Unaccounted for Water

The City will strive to maintain levels of unaccounted for water at less than 10 percent.

OPERATIONAL

Administration

The Utilities Operations Manager and personnel assigned to maintain the water system will be certified as required by state law. The Maintenance Department promotes staff training. All maintenance personnel will be trained to efficiently perform their job descriptions.

The operational policies summarize the City’s commitment to resolving customer complaints, and providing a safe work environment, training, and certification opportunities for its employees.

Water System Management and Personnel

The City provides cross training for all utility employees.



Operator Certification

The City requires employee training and recognizes certification as a measure of skill in providing excellent water quality and reliability of service.

Telemetry Systems

The telemetry data will be available at the reservoir site and the Maintenance Department.

Complaints

The City receives complaints about the water system from time to time. All complaints are investigated and documented by maintenance staff. The results of the investigation determine the course of action required. Reports are periodically generated to show the location and nature of the complaints to see if a pattern is developing.

FINANCIAL

Fiscal Stewardship and Self-Sufficient Funding

The City shall manage its income and expenses in a self-supporting manner in compliance with applicable laws, regulations and its own financial policies.

The financial policies summarize the City's general financial policies and criteria, including water rate structure, development charges, and capital improvements financing.

Rates

The City will review or establish rates, charges and fees to maintain sufficient funds to operate, maintain and upgrade its water system as necessary to provide safe and reliable water service to its customers. This will ensure that forecasted expenses and impacts for regulations are reflected in the rate structure.

Connection Fees

Extension of the water system to serve additional customers, properties, tracts, or subdivisions, or to increase the size of the connection, will be paid for by the individuals that are benefiting from the extension. The applicant (hereinafter "Applicant" or "Developer") for a water system extension is responsible for financing the entire cost of the extension. Costs the applicant must pay for include, but are not limited to, the following:

- New system components.
- The replacement of existing system components when necessary to meet City standard requirements.
- Connection charges and permits as required by the City.

All persons connecting to the City's Water System shall pay a hook-up and water meter service charge, in advance to connect to the water system, in accordance with the fee schedule adopted by City Council in Section 15.12.040 of the Municipal Code.

Capital Facilities Planning

Due to the impact of capital costs on rates and charges, and the variation in funding levels needed over time, the water utility will establish and maintain a capital projects schedule of at least six years in duration. This schedule will be consistent with the Utility's Comprehensive Plan and will include project description, scheduled year of construction and total estimated cost.



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CHAPTER 4

SYSTEM ANALYSIS

INTRODUCTION

This Chapter presents a description and the results of the evaluation and analysis of the water system's components. The components of the analysis include:

- Water Source
- Storage Facilities
- Pump Stations
- Distribution System

The hydraulic analysis evaluates the capacity and operational characteristics of the City's water distribution system. The analysis also includes the storage facilities to ensure adequate sizing for future growth based on both the City's design criteria and DOH's regulations.

OVERVIEW OF THE EXISTING SYSTEM

The City of Mercer Island's water system comprises two supply lines, two reservoirs totaling 8 million gallons, two independent routes to fill the reservoirs, two booster pump stations, 121 miles of distribution mains, and 85 pressure-reducing stations. Chapter 1 provides a detailed system description and maps.

SOURCE

Description

The City has a long-term source of supply based on purchase of water from Seattle Public Utilities. The City signed the City of Seattle's Full Requirements Contract for the Supply of Water that remains in effect until January 1, 2062. The contract will supply the City with water at the minimum hydraulic gradient up to a maximum flow rate that totals to 3,205 gallons per minute (GPM) for water supplied through the three service meters to the City. A copy of the Contract is included in **Appendix E**.

The majority of the water supplied by SPU to the City originates in the Cedar River Watershed. Occasionally the supply comes from the Tolt River supply system. **Figure 1-3** in Chapter 1 shows the components of the Supply System. The water is delivered through the Cedar East Side Supply Line (CESSL) to the 30-inch Mercer Island supply line north of the Factoria Shopping Center.

The Mercer Island supply line reduces to a 20-inch line at the Bellevue side of the Lake Washington East Channel and then crosses beneath the East Channel. The pipeline increases to 24 inches at the east shore of Mercer Island. The primary supply line on Mercer Island consists of a 24-inch concrete cylinder pipe, which runs from East Mercer Way (EMW) to SE 40th, to 92nd Avenue, to 43rd Street to the Mercer Island reservoirs. A second 16-inch supply line parallels the 20-inch main along the I-90 Freeway Corridor. It is attached to the East Channel Bridge structure.

This second supply line consists of 16-inch ductile iron pipe that runs along EMW from the East Channel Bridge to SE 44th Street and reduces to a 12-inch main along SE 44th Street from EMW



CHAPTER 4 – SYSTEM ANALYSIS

to the water reservoir site. Connection of the 16-inch supply line to the 16-inch supply line on the east shore of Mercer Island was completed in 2001.

There are three metered connections to SPU’s supply line on the island. Meter 67 and Meter 68, a zone backup, are located on the 24-inch main. Meter 171 is a secondary meter located on the 16-inch main at the boat launch. A list of the supply meters is included in **Table 4-1**.

Table 4-1. Water System Master Meters

Station Number ⁽¹⁾	Locations	Seattle Demand Metering	Mercer Island Flow Control	Meter Size	Minimum Hydraulic Gradient for Planning Purposes at Station Upstream of Meter (ft NAVD-88)	Maximum Flow Rate up to Which the Minimum Hydraulic Gradient Applies (gpm) ⁽²⁾
67	SE 43rd & 89th Ave	Yes	Yes	12”	405	2,685
68	SE 40th & 97th Ave	Yes	No	6”	405	Back-up service
171	Boat Launch	Yes	Yes	10”	405	520
					Total	3,205

1. Station and Pipeline Segment Numbers pertain to demand metering program
2. City of Seattle’s estimate of Water Utility’s average daily demand for 2020 with a peaking factor of 2.0 for peak day.

The City’s primary meter, No. 67, is located on the 24-inch supply main adjacent to the Mercer Island water reservoirs at SE 43rd Street and 89th Avenue SE. The supply rate through meter No. 67 at the reservoir site is regulated by a flow control valve at the City’s reservoir site. This valve is an altitude valve operated remotely from the City’s maintenance facility and is adjusted on a daily basis during June, July, and August.

Meter No. 68 serves as a zone backup for the City’s Pumped Zone. It does not have a flow control valve to regulate the supply flow rate and is controlled by pressure reducing valves. It is normally closed because the Pumped Zone operates at a higher HGL than the supply line.

Meter No. 171 is the City’s secondary meter and was installed in 2001. It meters the 16-inch supply line near the east shore of the Island. This meter and Meter No. 68 operate alternately for water quality purpose.

Demand Metering

Under the Seattle Contract, the Demand Metering Program is established to set performance standards, and to monitor the wholesale customer’s compliance. Seattle may choose to apply demand metering selectively to certain parts of the transmission network that are designated as critical from the standpoint of hydraulic capacity or other operational considerations. Seattle may choose to apply demand metering intermittently in various parts of the transmission network for the purpose of monitoring for compliance by individual wholesale customers or groups of wholesale customers on a given line segment.

Reliability

WAC 248-54-201 requires that public water systems provide an adequate quantity of water in a reliable manner at all times. To meet this requirement, provisions must be made to furnish water to customers during periods when the primary supply system is out of service for any reason. Mercer Island has developed an emergency well system described in the **Chapter 6** to further strengthen the system reliability.



Source Water Quality

Water purchased from SPU is treated differently at each source. The Cedar system has intake screening, ultraviolet disinfection, ozonation, chlorination, fluoridation, and corrosion control. The Tolt system has intake screening, filtration, (direct) ozonation, chlorination, fluoridation and corrosion control.

Water Supply Evaluation

An evaluation of the City’s water supply from interties with SPU was performed to determine the sufficiency of the water supply to meet both existing and future water demands. **Appendix D** provides the detailed water rights self-assessment forms for the City’s intertie limits, as required by the Department of Ecology. **Table 4-2** provides a summary of that information, comparing the City’s existing intertie limits with current, 6-year, and 20-year demands.

As shown in this table, the City has sufficient water supply (both instantaneous and annual amounts) to meet its existing and projected 6-year demands. However, according to the maximum flow rate up to which the minimum hydraulic gradient applies, the City is projected to face a slight deficiency in maximum instantaneous flow by the end of the 20-year planning horizon. The City will monitor its water demand and work with SPU to update the supply contract if needed to meet future demands.

Table 4-2. Water Supply Capacity Summary

	Current (2015)		6-Yr (2020)		20-Yr (2034)	
	Maximum Instantaneous Flow, Qi	Maximum Annual Volume, Qa	Maximum Instantaneous Flow, Qi	Maximum Annual Volume, Qa	Maximum Instantaneous Flow, Qi	Maximum Annual Volume, Qa
	(gpm) (mgd)	(afy) (mg)	(gpm) (mgd)	(afy) (mg)	(gpm) (mgd)	(afy) (mg)
Existing Interties	3,205 ⁽¹⁾	5,170 ⁽²⁾	3,205	5,170	3,205	5,170
	4.62	4.62	4.62	4.62	4.62	4.62
Water Demand	3,083	2,364	3,160	2,420	3,215	2,453
	4.44	3.40	4.55	3.48	4.63	3.53
Surplus/(Deficiency)	122	2,806	45	2,750	(10)	2,717
	0.18	1.21	0.07	1.13	(0.01)	1.08

1. Based on the water supply contract maximum flow rate, 3,205 gpm, up to which the minimum hydraulic gradient applies.
2. The City does not have an annual limitation on water supply and Qa is calculated as 3,205 gpm for the entire year.



STORAGE

Description

The City maintains two 4-million-gallon welded steel storage tanks for a total of 8 million gallons of water storage. The two reservoirs serve the entire service area and are located in the Pumped 492 Zone. The north tank was constructed in 1962 and the south tank in 1975. The reservoirs and adjacent booster pump station underwent a seismic retrofit in 1999. This work also included application of an epoxy coating on the interiors of both tanks and paint of the exteriors. The reservoirs are regularly inspected and reported to be in very good condition, and are consequently not expected to require replacement within the next 20 years.

Storage Capacity Analysis

The City must ensure that adequate water is secured for existing and future needs. If a storage deficiency is identified for any of the projected years, then alternative plans to provide additional storage will be evaluated.

The City decided to modify the operating criteria by nesting the Standby Storage and the Fire Suppression Storage. The main consideration for this modification is that the City installed an emergency water well in 2010. Even though the well water will not be accounted for as an additional source in the storage analysis, the assumption is that the City will have the well water as a backup source during emergency situations that remove the Seattle supply from use. It should be noted that the emergency well water is not potable and additional treatment is required for consumption.

The storage calculation is shown in **Table 4-3**, indicating adequate storage through the planning period. The reservoirs have a storage surplus of 2.8 million gallons for the 20 year projected demand. The reservoirs have capacity to provide storage for 16,757 ERUs.

Water Turnover in Reservoirs

The reservoir levels are changed slightly throughout the year with a goal of maintaining water quality and volume. During winter months, the City lowers the operational start/stop band as low as 17.5 feet. During summer months, the operational band is increased to 29.5 feet. Typical turnover time during low demand season is about four days. During high demand season this turnover is reduced to about two days.



Table 4-3. Storage Analysis

	Year			
	2015	2020	2034	Max ⁽¹⁰⁾
Projected ERUs and Demand⁽¹⁾				
Equivalent Residential Units (ERU's)	10,446	10,693	10,842	16,757
Average Day Demand (mgd)	2.11	2.16	2.19	3.38
Maximum Day Demand (mgd)	4.44	4.55	4.63	7.14
Available Source (mpd)⁽²⁾				
SPU Master Meter (3,205 gpm)	4.62	4.62	4.62	4.62
Total Available Source (mpd)	4.62	4.62	4.62	4.62
Required Storage Calculations				
Operational Storage (MG) ⁽³⁾	0.51	0.51	0.51	0.51
Equalizing Storage (MG) ⁽⁴⁾	0.27	0.29	0.30	0.72
Standby Storage (MG) ⁽⁵⁾	4.22	4.32	4.38	6.77
Fire Flow Storage (MG) ⁽⁶⁾	1.20	1.20	1.20	1.20
Required Storage				
Greater than 30 psi at highest meter (MG) ⁽⁷⁾	0.78	0.80	0.81	1.23
Greater than 20 psi at highest meter (MG) ⁽⁸⁾	5.00	5.12	5.19	8.00
Existing Storage Greater Than 30 psi (MG)⁽⁹⁾				
North Tank	4.00	4.00	4.00	4.00
South Tank	4.00	4.00	4.00	4.00
Total Existing Storage at 30 psi (MG)	8.00	8.00	8.00	8.00
Storage Surplus/(Deficiency) at 30 psi (MG)	7.22	7.20	7.19	6.77
Existing Storage Greater Than 20 psi (MG)⁽⁹⁾				
North Tank	4.00	4.00	4.00	4.00
South Tank	4.00	4.00	4.00	4.00
Total Existing Storage at 20 psi (MG)	8.00	8.00	8.00	8.00
Storage Surplus/(Deficiency) at 20 psi (MG)	3.00	2.88	2.81	0

Notes:

- (1) Projected demands taken from Chapter 2. ERUs calculated as Average Day Demand / ERU water use factor (202 gpd/ERU).
- (2) Available source assumes source pumps are on for 24 hours in a day, at the maximum production rate.
- (3) Required operational storage is based on summer operational setting with the start level at 29.5 feet.
- (4) Required Equalizing Storage is equal to [(PHD - Total Available Source) x 150 minutes] .
 $PHD : (Maximum\ Day\ Demand\ per\ ERU / 1440) * [(C) * (N) + F] + 18$
 (C & F values obtained from Table 5-1 in DOH Dec 2009 WSDM)
- (5) Required Standby Storage is the greater of (2*ADD less multi-source credit) or (200 gallons per ERU).
- (6) Required Fire Flow Storage = 5000 gpm x 4 hours.
- (7) Total required storage greater than 30 psi is equal to the total of operational and equalizing storage.
- (8) Total required storage greater than 20 psi is equal to the total of operational, equalizing, and the greater of standby or fire flow storage.
- (9) The storage volume available in existing reservoirs at 30 and 20 psi is based on the elevation of the highest customer.
- (10) Maximum ERUs served by Available Storage.



PUMP STATIONS

The Mercer Island water system has two pump stations. The main pump station is located at the reservoir site and supplies the City's Pumped Zone. A booster pump station is located on First Hill and supplies the domestic and fire flow water needs to the First Hill Zone. **Table 4-4** summarizes the characteristics of the pump stations.

Table 4-4. Pump Stations

	Main Pump Station	First Hill Booster
Location	4350 SE 88 th Ave SE	SE 32 nd & 74 th SE
Supply Zone	Reservoir	Reservoir
Zone Served	High	First Hill
Number of Pumps	5	6
Operating Head (ft.)	98	135
Discharge Elevation (ft.)	366	318
Discharge Pressure (psi)	45	53
Station Capacity (gpm)	9,000	1,150
Control	Variable Speed	Variable Speed

Main Pump Station

The main pump station contains five variable speed pumps. Each pump has a rated capacity of 2,250 gpm at 115-foot discharge head. Four pumps are in operation at a time and the fifth is for standby. The pumps are operated as one lead pump, a primary lag pump, and two secondary lag pumps. The pump designations are rotated daily. The lead pump operates continuously and the primary lag pump cycles on to meet demands over 1,800 gpm. The first secondary lag pump cycles on for demand in excess of 2,600 gpm and the second secondary lag pump cycles on for demands in excess of 3,200 gpm.

The pumps are supplied water from the reservoirs. The pumps maintain a discharge pressure of 45 psi by variable speed drives. The overall system efficiency of the pump, motor, and variable speed drive varies between 50 and 65%, depending on system demand. An auxiliary power generator provides power to the station during power outages.

It should be noted that the above pumps supply water only about one-third of the time. There is a High Zone By-pass Valve on site which operates in lieu of the pumps approximately 8 months in a year.

First Hill Pump Station

In 2011, the City completed the system upgrades at the First Hill booster pump station. The project was to increase the station's pumping capacity in order to provide higher water flow for fire protection in First Hill neighborhood. The upgrades include the replacement of pumps, associated piping and valve upgrades, electrical system, SCADA control system, and minor structural modifications.

The upgraded First Hill booster pump station contains six high efficiency pumps with variable-speed drive (VFD) which provide both domestic and fire suppression water supply. Four 1.5 HP pumps operate to provide discharged pressure at 53 psi to the First Hill Zone. Two 40 HP pumps are provided for high season demand and fire flow needs.



LIMITING FACTORS AND CARRYING CAPACITIES

A key element of this WSP is the evaluation of the capacities of various water system elements and their abilities to support current and projected future water supply needs. These evaluations identify “carrying capacities,” or the maximum number of equivalent residential units (ERUs) that existing facilities can support. Such analyses aid in identifying capacity deficiencies and provide the foundation for some capital improvement projects.

Table 4-5 summarizes the carrying capacities associated with the City’s primary water system components. This summary is formatted consistent with “Worksheet 6-1” of the DOH Water System Design Manual (December 2009). Details regarding source and storage capacity analyses are provided earlier in this chapter of the WSP.

As noted in the table, the source (i.e., SPU’s maximum flow rate up to which a minimum hydraulic gradient applies specified in the contract) is the limiting water system component, with a current ERU capacity of 10,807.

Carrying capacity analyses have not been conducted for the City’s distribution facilities, for the following reasons. It is difficult to characterize ERU carrying capacities in terms of piping, etc. Water mains are typically designed to convey fire flows, which in the case of the City, means that they are more than adequate to support the average and maximum day demands from customers. Some deficiencies have been identified throughout the system regarding the capability of certain sections of distribution piping to convey required fire flows at minimum pressures. Such deficiencies, however, are not a function of the amount of current or proposed ERUs, and therefore do not factor into a carrying capacity analysis. The City has scheduled improvements to address noted distribution system deficiencies, as described in **Chapter 7**.



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Table 4-5. Water System Physical Capacity Documentation based on MDD

Note: Capacity determinations are *only for existing facilities* that are operational for the water system.

Specific Single-Family Residential Connection Criteria:

Average Day Demand (ADD): 202⁽¹⁾ gpd/ERU

Maximum Day Demand (MDD) 427⁽²⁾ gpd/ERU

Water System Service Connections correlated to ERUs			
Service Classification	Total MDD for the classification, gpd ⁽³⁾	Total # Connections in the classification ⁽⁴⁾	ERUs ⁽⁵⁾
Single-Family	3,080,000	7,198	7,198
Multi-Family	462,000	104	1,084
Commercial	270,000	181	632
Governmental	224,000	69	523
Non- Revenue	407,000 ⁽⁶⁾	N/A	953
Other (identify)			
Total existing ERUs (Single-Family + Multi-Family + Commercial + Governmental + Non-revenue) = 10,390			
Physical Capacity as ERUs			
Water System Component (Facility)	Calculated Capacity in ERUs for each component		
Source(s)	10,807 ⁽⁷⁾		
Treatment	NA ⁽⁸⁾		
Equalizing Storage	25,239 ⁽⁹⁾		
Standby Storage	13,926 (at 20 psi) ⁽¹⁰⁾		
Distribution	NA ⁽⁸⁾		
Transmission	10,807 ⁽¹¹⁾		
Other			
Water System Physical Capacity (ERUs) = 10,807 (based on the limiting water system component shown above)			

Notes:

(1) See Table 2-5

(2) See Table 2-6

(3) Based on Table 2-10, for Year 2015.

(3) Based on Figure 2-8, for Year 2015.

(5) Calculated using MDD ERU factor.

(6) See Table 2-10, for Year 2015.

(7) See Table 4-2. Based on the SPU contract maximum flow, 3,205 gpm, up to which a minimum hydraulic gradient applies.

(8) Not calculated for reasons specified in the text.

(9) See Table 4-3. Assumes only equalizing and operational storage are provided for the ERUs.

(10) See Table 4-3. Assumes standby, fire flow, equalizing, and operational storage are provided for the ERUs. Standby and fire flow storage is nested.

(11) Transmission is the same as the source capacity.



DISTRIBUTION SYSTEM

Pipelines

The majority of the distribution system was constructed between 1956 and 1960 by utility local improvement districts (ULID). There were major improvements made at the north end of the system around 1984 in conjunction with the I-90 freeway construction.

The majority of the distribution system consists of 6- and 8-inch mains, which account for about 67% of the total pipe linear-footage in the system, however many 4-inch mains still remain. Larger diameter pipes ranging in size from 10 to 30 inches serve as major feed lines or transmission mains to various parts of the system. The 4- and 6-inch pipes in the system are scheduled to be replaced with the undersized main improvement program. **Table 1-2** in Chapter 1 summarizes the footage of the total system by main size.

Service Pressure Zones

The City of Mercer Island includes five large service zones, 30 smaller low pressure zones serving small neighborhoods along the island waterfront, and the Shorewood Apartments Zone which is supplied directly from SPU. The main service pressure zones are listed in **Table 4-6** along with their relative size, operating hydraulic grade line (HGL), and service pressures.

Table 4-6. Service Pressure Zones

Zone	Percent of Total Demand	Operating HGL (ft.)	Service Pressures (psi)
Pumped	37.5%	492	46-100
Intermediate	14.3%	361	38-120
Freeway	19.6%	281	25-110
Reservoir	9.6%	401	28-100
First Hill	2.2%	456	55-80
Low	16.8%	Varies	70-125

Pumped Zone

The Pumped Zone is the largest pressure zone. The customers in this zone are predominately single-family residences. The south-end shopping center, schools, churches, and the public library are also within this long, narrow zone which runs along the central ridge of the Island. The main pump station operates at a hydraulic elevation of 492 feet supplying this zone from the reservoir zone. During winter months, the high zone valve bypasses the main pump station and serves this zone directly from the SPU transmission lines when there is sufficient pressure in the transmission system.

The pumped zone interfaces with the intermediate zone at 10 PRV locations. The highest ground elevations in the zone are located near the main pump station at elevation 385 feet and on the south end near intersection of 86th Avenue SE and SE 76th Place at elevation 368 feet. The lowest ground elevation within the zone is approximately 151 feet.

The major distribution pipelines within the zone are parallel 24- and 14-inch mains that convey water southward along Island Crest Way from the main pump station. The 14-inch main increases to 16-inches and is reduced back to 14 and 12 inches as it continues south from the main pump station. The parallel major distribution mains end at SE 68th Street and Island Crest Way, where three 8-inch mains distribute water to the southernmost portions of the zone.



Intermediate Zone

The Intermediate Zone is horseshoe shaped around the southern half of the island and below the Pumped Zone lower boundary and is the second largest zone in the system. Customers are predominately single-family residences. The low-lying pressure zones in the waterfront neighborhoods are generally supplied using PRVs from the intermediate zone. See **Figure 4-1**.

The Intermediate Zone is also supplied from the Pumped Zone by three primary PRVs. The Intermediate Zone is supplied from the Reservoir Zone and Seattle supply line by secondary PRVs. Seven secondary PRVs supply the Intermediate Zone from the Pumped Zone during emergencies. The secondary PRVs are generally set about 10 psi lower than primary PRVs.

The high ground elevations within the zone are between 275 and 250 feet with static pressures of 38 to 49 psi. The lowest part of this zone is a minor 4-inch loop main located at the 5900 block of East Mercer Way. The elevation at this location is 55 feet with a static pressure of 134 psi. A long segment of the major distribution main along East Mercer Way is between elevations of 100 and 75 feet with static pressures between 114 to 125 psi. Many system PRVs are in place to protect blocks of homes served by the water mains in these areas. In addition, the City requires the installation of an individual PRV on the customer side of the water service meter where distribution pressures exceed 80 psi.

The major distribution pipeline in the Intermediate Zone is a single trunk line extending southward along West Mercer Way from the PRV on Merrimount Drive to the southern tip of the island, then continues northward along East Mercer Way to the PRV at the 4400 block.

The intermediate trunk line supplies many water mains through a PRV which extends toward the lake front. The steep terrain results in many dead end water mains, creating isolated or fragmented pressure zones. There are 19 low zones that have one PRV providing supply for the zone and 11 low zones that are supplied by two or more PRVs.

Freeway Zone

The Freeway Zone includes the island's commercial and multi-family customers and some single-family residences. The I-90 corridor divides the zone, with the area north of the corridor connected to the remainder of the zone by seven water mains that cross the I-90 corridor.

The water for the Freeway Zone is fed by multiple pressure zones. The zone can also be fed directly from Seattle supply through the 16-inch supply line as well as from the Reservoir Zone through six primary PRVs. Seven secondary PRVs also serve the Low Zone from the Reservoir Zone. Three secondary PRVs connect the Freeway Zone to the Mercerwood Zone at the northeast end of the island.

The zone operates at a HGL of 282 feet. The high ground surface within the zone is at elevation 190 feet with resulting static pressure of 32 psi. The lowest ground surface is 15 feet in elevation with a static pressure of 108 psi.

Reservoir Zone

The Reservoir Zone is directly served by the storage reservoirs. Demand comprises about 10% of the total system demand. The customers are predominately single-family residences. The reservoirs are the sole source of supply for this zone. This zone in turn serves as the primary supply source for the Low Zone.

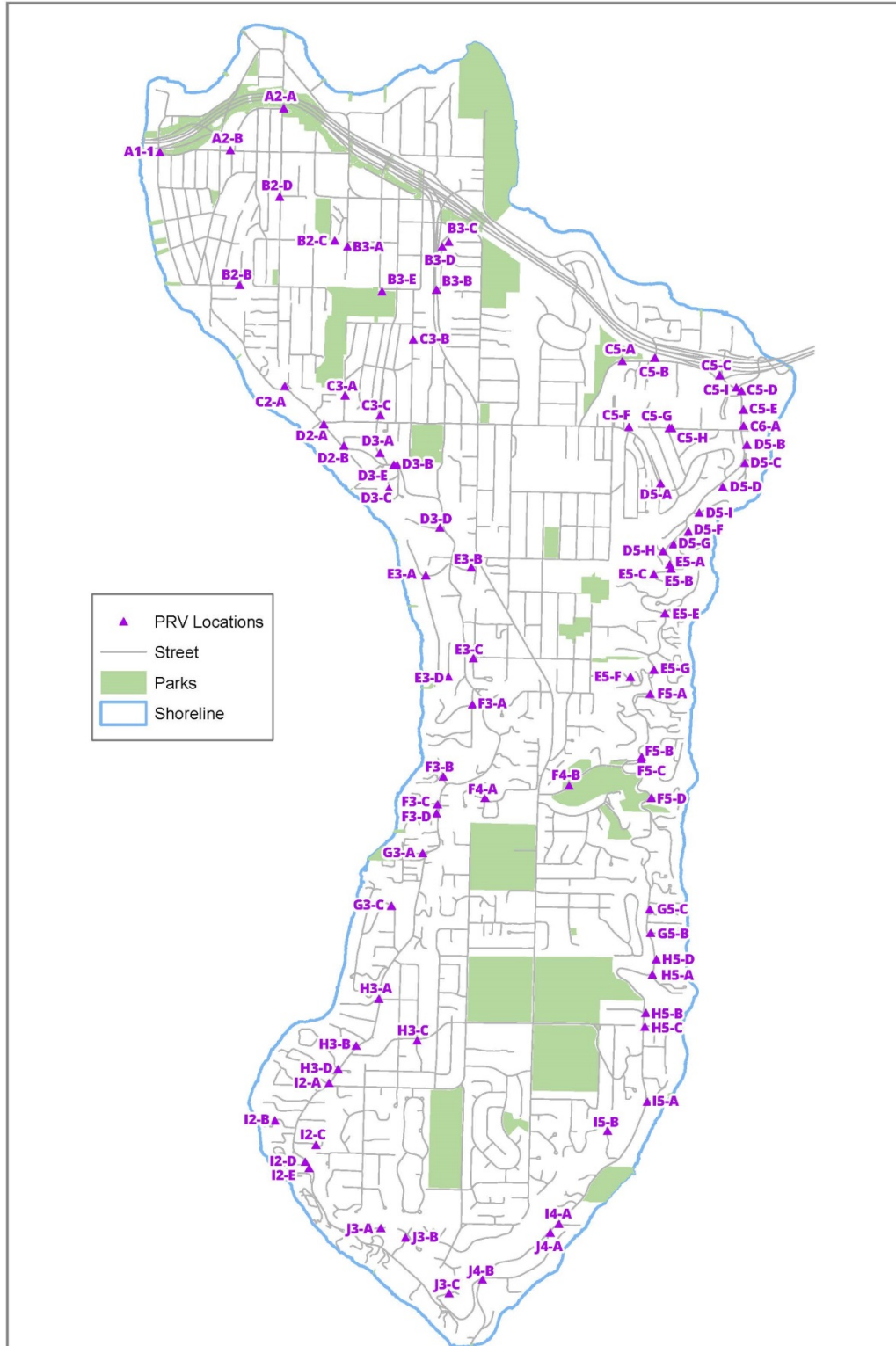


FIGURE 4-1 PRV LOCATION MAP

City of Mercer Island GIS
Date: 4/28/2014
Document Name: PRVMap2014

Figure 4-1. PRV Location Map



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The reservoir level varies, but usually operates between Hydraulic Grade Line (HGL) of 398 and 385 feet. The high ground elevation within the zone, 320 feet, is located at SE 32nd St and 74th Avenue SE near the First Hill booster pump station. Although customers in this area are supplied from the First Hill booster pump station, the static pressure in the Reservoir Zone distribution mains can be as low as 28 psi. The Reservoir Zone serves customers up to ground elevation 305 feet with a 35 psi static pressure at low reservoir water levels. The low ground elevation is 140 feet with a static pressure of 111 psi, located at SE 40th street and West Mercer Way.

The zone’s major distribution pipelines consist of a 30-inch gravity line and a 14-inch pumped line both originated from the reservoir.

First Hill Zone

The low pressures on First Hill are booster-pumped from the Reservoir Zone to the First Hill Zone. This zone supplies 0.7% of the total system demand, primarily single family residences.

The First Hill Zone’s purpose is to increase customer service pressure to an acceptable level. The zone is supplied at a HGL of 456 feet, and static pressures vary between 60 and 80 psi from the high ground elevation of 320 feet to the low elevation of 270 feet. Fire Protection is primarily provided through the First Hill booster pump station.

It should be noted that during the 2012 First Hill Water System Improvements construction project, the majority of the fire hydrants were upgraded and connected to pipelines in the First Hill Zone. A couple of fire hydrants, however, remained connected to the lower pressure zone. The reason for this decision was to provide redundancy for fire protection in this neighborhood.

Low Zones

There are 30 smaller low pressure zones and they are named by the dominant street or plat followed by the HGL of the pressure zone. **Figure 1-1** in **Chapter 1** shows all the zones.

Closed Service Zone Valves

Service zone valves are provided within the Mercer Island water system to isolate adjoining pressure zones. These valves are normally closed and should not be opened. Opening the valves could potentially cause damage from high pressures without careful system-wide planning. **Table 4-7** lists the service zone valves along with the upstream and downstream service zones.

Table 4-7. Service Zone Valves

Location of Normally Closed Valves	Upstream Service Zone	Downstream Service Zone
SE 24 th Street & 66 th Avenue SE	Reservoir	Low
SE 24 th Street & 74 th Avenue SE	Reservoir	Low
SE 27 th Street & 74 th Avenue SE	Reservoir	Low
SE 29 th Street & 74 th Avenue SE	First Hill	Reservoir
WMW & 80 th Avenue SE	Reservoir	Intermediate
SE 40 th Street & 84 th Avenue SE	Reservoir	Intermediate
SE 43 rd Street & 88 th Avenue SE	Pumped	Reservoir
SE 40 th Street & 86 th Avenue SE	Pumped	Reservoir
4400 Block of EMW	Seattle Supply	Intermediate



Pressure Reducing Valves

The topography of the Mercer Island water system requires extensive use of PRV stations. Currently, the system has a total of 85 PRV stations. A PRV station is a hydraulically actuated valve that lowers the pressure downstream from the valve to a desired set point.

Appendix L lists the PRV stations in the system. The table indicates the location and maintenance history of each valve.

Pressure Relief

The City has a pressure relief valve at the south edge of the Town Center area where 8 pressure reducing valves (PRVs) are serving the business concentrated zone. In the event of a malfunction of the PRVs, the pressure relief device would cycle quickly and relieve the pressure before the water system is damaged due to excessive pressure.

Hydraulic Capacity Analysis

DOH requires that a water distribution system is analyzed for the following two conditions:

- **First**, the water system **must** be able to deliver the peak hourly demand at a required minimum pressure of 30 psi at every existing and proposed service connection.
- **Second**, if the water system provides fire flow, the distribution pipelines **must** be able to deliver the maximum day demand (MDD) rate, in addition to the fire flow, at a required minimum pressure of 20 psi throughout the distribution system.

To satisfy that requirement, the City is using a distribution system hydraulic analysis completed in 2013 for the purpose of this plan. The City contracted with CH2M Hill to update their hydraulic model and conduct a distribution system analysis of peak hour pressure and fire flow. Model analysis was completed with the current system configuration and operation to evaluate the system performance. The model scenarios include the following per the DOH requirement:

1. Peak Hour Demand (PHD) at minimum pressure of 30 psi
2. Maximum Day Demand (MDD) plus fire flow at a minimum pressure of 20 psi at all points throughout the Island

Portions of the Hydraulic Model Update and Verification Technical Memo prepared by CH2MHill are included in this chapter. The full text of this memo is included in **Appendix Q**.

The hydraulic analysis study simulated only current day demand conditions. This is sufficient to satisfy the purpose of the distribution system analysis of the Water System Plan for the following reason. The demand in the City is projected to only increase by a total of approximately 4% after 20 years. Demand growth is flat and the future demand conditions are not expected to affect peak hour pressure or fire flow supply.

Model Development

The hydraulic model was developed from the ArcInfo Graphical Information System (GIS) maintained by the City. GIS is a comprehensive database including every pipe and facility, including valves, hydrants and meters within the system. Basic information taken from the GIS and converted into the model included, pipe diameter and length. Elevations for the model were derived from aerial photography with an accuracy of +/- 2 feet. A triangulated irregular network (TIN) was created from the contour information, which the pipe system was then dropped on. The elevations were then transferred from the TIN to the model nodes. Friction factors used in the model were based on Hazen Williams C values. Initial C values were developed based on pipe



CHAPTER 4 – SYSTEM ANALYSIS

material and age, varying between 100 for older steel pipe to 150 for PVC. The C values required little modification due to the high correlation between modeling runs and field verified pressures.

For the City's model, the first import of the pipe information from the City's geodatabase showed that there were some areas where the connectivity needed to be investigated. The City updated these areas, and a new import of data was performed. The pressure reducing valves (PRV) were also imported into the model from the geodatabase, and pump station and tank information was manually input. Elevations were applied to system nodes and PRVs by using the contour information provided by the City.

The demand was allocated using the InfoWater™ Demand Allocator tools which uses the spatial information from the meter record data to spatially link the meters to nearby model junctions, and PRV settings were input based upon the most recent survey of the PRVs in the City system.

Model Verification

The City conducted an update to the hydraulic model in 2010 and 2012. The model was calibrated with hydrant flow tests during the update in 2010. No hydrant flow tests were conducted as part of the update in 2012 though the model was verified with hydrant pressure readings. For the purpose of the water system plan update, the modeling analysis conducted in 2012 was used. The City is in the process of updating their model in 2015 and will conduct additional flow testing to calibrate the model.

The model verification process entailed running ADD, MDD, and PHD scenarios and comparing the model predicted pressure to the historical pressure information collected at the hydrants in the City's system. Due to the fact that the actual demand of the system is unknown in relation to the hydrant test data collected, the comparison is made among the results to the average day demand condition. The model predicted data is expected to be within 5 to 7 psi of the field pressures. Where the pressure difference was greater than 7 psi, the elevation of the nodes was checked, and then PRV settings were investigated.

Hydraulic Analysis

The system analysis consisted of running the PHD, and MDD plus fire flow scenarios and reporting on those results. The results of these analyses are shown in **Figure 5** through **Figure 7** in **Appendix Q**. The City has essentially been built-out since 1980 and limited growth is projected to occur in the City, therefore, the ADD, MDD, and PHD scenarios are not expected to change with projected demand.

Peak Hour Demand Analysis

Analysis was conducted to model the PHD scenario with all equalizing storage depleted. **Figure 5** in **Appendix Q** shows areas of high (>80 psi) and low (<30 psi) pressure within the system under PHD conditions. These pressure extremes are caused primarily by high and low points in the topography, not hydraulic factors. Most of the areas of pressure less than 30 psi are surrounding tank, PRV, pump station, and transmission facilities where no services are present. There are two services in the distribution system with low pressure. The City has communicated the condition with each home owner and there is no current plan to boost pressure to either connection.

Fire Flow

Analysis was conducted for the MDD plus fire flow at a minimum pressure of 20 psi at all points throughout the Island. Required available fire flow is determined based on land use and is listed



in **Table 4-8**. Scenarios were run with reservoir tanks levels set at 22 feet with fire suppression, operational, and equalizing storage depleted.

Table 4-8. Required Fire Flow by Land Use

Land Use Category	Fire Flow Requirement (gpm)
Commercial	5,000
Multifamily	4,000
Single-family Residential	1,000

Figure 6 in **Appendix Q** shows the available fire flow under MDD conditions, with no velocity requirement, and **Figure 7** shows the available fire flow under MDD conditions with a 10 ft/sec velocity requirement. **Figure 6** and **Figure 7** show that at least 1,000 gpm is available at most locations in the City’s system. For those areas where 1,000 gpm is not available, it is usually due to dead end 4-inch or 6-inch pipelines.

When comparing **Figure 6** and **Figure 7**, there are some additional areas that show that less than 1,000 gpm is available in **Figure 7**. This is also due to the small diameter, dead end pipelines since the maximum flow in a 4-inch pipe at 10 ft/sec is 391 gpm, and the maximum flow in a 6-inch pipe at 10 ft/sec is 880 gpm. With the 10 ft/sec criteria, neither a single 4-inch nor 6-inch pipeline will ever meet the fire flow requirement.

In commercial areas, the storage required for fire flow protection is 5,000 gpm for four hours resulting in a total of 1.2 million gallons of storage required for fire flow. The City has verified the available fire flow in commercial areas by reviewing a spreadsheet of the available fire flow reported by the model. For a majority of hydrants in the commercial areas, there are multiple hydrants available to satisfy the fire flow requirement. Hydrants that are not able to supply the required fire are included in the City’s improvement prioritization process.

System Improvements

The modeling analysis indicates the City’s system is performing well, except for some localized limitations in fire flow. The City has been undertaking projects to replace smaller diameter pipe and improve fire flow, and these improvements are incorporated into a program for efficient management.

A small diameter replacement program is described in more detail in **Chapter 7**. A list of piping improvements is prioritized based on various criteria that include fire flow and distribution system performance as key considerations. The recommended capital improvements will be implemented over the next 20 years to improve domestic flows for existing and future conditions.



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CHAPTER 5

WATER USE EFFICIENCY

INTRODUCTION

The City of Mercer Island values water as an essential commodity that is to be used wisely. This conservation program uses Seattle Public Utility's (SPU) 2013 – 2018 Saving Water Partnership regional conservation program as a foundation to build a program that is specifically tailored for the community of Mercer Island.

History

Since the 1980's Mercer Island and many other communities in the Puget Sound region have recognized that water resources must be managed carefully for long term sustainability of our drinking water supplies and the natural environment.

In 1985, East King County, in which the City is located, was declared a Critical Water Supply Service Area (CWSSA).

In 1989, the East King County Regional Water Association (EKC RWA) formed to develop a Coordinated Water System Plan (CWSP). The CWSP included a water conservation element outlining regional and local conservation objectives, including a target reduction of 6.5% by the year 2000 for purveyors, such as the City, serving 500 or more customers.

In 1994, the State Departments of Ecology and Health published Conservation Planning Requirements for water systems. These were updated after the Washington State Legislature passed the Municipal Water Supply – Efficiency Requirements Act of 2003, better known as the Municipal Water Law. The law gives municipal water suppliers certain benefits and obligations. One of their obligations is to comply with the Water Use Efficiency rules.

In 2007, the City adopted a six-year regional water conservation goal comprised of the remainder of the 11 mgd savings goal of the 1% Water Conservation Program through 2010; and a portion of the 15 mgd regional goal thereby adopted from 2011 through 2030.

The 2013 – 2018 Regional Water Conservation Strategies and Actions of the Saving Water Partnership outlined a new goal to reduce regional per capita water use from current levels so that total average annual retail water use of members of the Saving Water Partnership is less than 105 million gallons per day from 2013 through 2018 despite forecasted growth.

The City continues to participate in the regional conservation program sponsored by the Saving Water Partnership and shall be consistent with, and strive to exceed, all local, state, and federal laws and regulations. The Mercer Island City Council adopted the regional goal on February 24, 2014 at a regularly scheduled public meeting. A copy of the adopting legislation, Resolution 1478, is included in **Appendix H**.

The City, in partnership with other local water providers, continues to assist customers to reduce water usage. The partnership offers educational programs, financial incentives, and special promotions to help inform customers of conservation opportunities.



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Regulatory Requirements

The City of Mercer Island is considered a municipal water supplier (MWS) and therefore regulated by the State’s Water Use Efficiency (WUE) requirements. The WUE requirements are found in the WAC 246-290-810. Additional information about requirements and assistance can be found in the WUE Guidebook provided by the Department of Health. Under these requirements the City must:

- Adopt water use efficiency goals;
- Evaluate or implement at least six water conservation measures (the standard for systems serving from 2,500 to 9,999 customer connections);
- Describe measures to be implemented over the next six year including a schedule and budget;
- Describe how customers will be educated on water use efficiency practices; and
- Evaluate water distribution system leakage.

Additionally, the 60-year Water Supply Contract with Seattle Public Utilities requires the City to adopt and agree to Seattle Public Utilities’ Regional Water Conservation Program.

Table 5-1 lists the current state conservation guidelines for public water systems of Mercer Island’s size (i.e., municipal water suppliers with 1,000 or more connections) and shows that the City is in full compliance.



Table 5-1. Compliance with Water Use Efficiency Rule Requirements

Category	WAC ¹ Section	Compliance Date	Requirement	Mercer Island in Compliance?
1. Meters	246-290-496	Fully metered by January 22, 2017. Submit metering plan by July 1, 2008.	1. Meter all sources.	Yes.
			2. Meter all service connections.	Yes.
			3. For systems not fully metered: Create meter installation plan, perform activities to minimize leakage until fully metered, and report annually on installation and leak minimization actions.	N/A
2. Data Collection	246-290-100	WSPs submitted after January 22, 2008.	1. Provide monthly and annual production/purchase numbers for each source.	Yes. See Table 2-1
			2. Provide annual consumption by customer class.	Yes. See Figure 2-4
			3. Provide "seasonal variations" consumption by customer class.	Yes. See Section 3.2
			4. Evaluate reclaimed water opportunities.	Yes. Included in this WSP Chapter.
			5. Provide annual quantity supplied to other public water systems.	N/A. Mercer Island does not provide water to another water system
			6. Consider water use efficiency rate structure.	Yes. The City has conservation based rates.
3. Distribution System Leakage	246-290-820	First report completed by July 1, 2008. First compliance determination made by July 1, 2010.	1. Calculate annual volume and percent using formula defined in the Rule.	Yes. The City has calculated water loss from 2008 - 2012 for performance reports submitted to DOH.
			2. Report annually: annual leakage volume, annual leakage percent, and, for systems not fully metered, meter installation progress and leak minimization activities.	Yes. The City submitted annual reports to DOH for calendar years 2008 - 2012. See Appendix F for 2012 report.
			3. Develop water loss control action plan (if leakage is over 10% for 3 year average).	N/A. The City is averaging less than 10% DSL over the last three years.
4. Goals	246-290-830	Goals established by January 22, 2008.	1. Establish measurable (in terms of water production or usage) conservation goals and re-establish every 6 yrs. Provide schedule for achieving goals.	Yes. Goals were adopted in Dec 2007. New goals were adopted on Feb 24, 2014. Progress is reported annually on the Water Use Efficiency Reports submitted from 2008 – 2012.
			2. Use a public process to establish the goals.	
			3. Report annually on progress.	



CHAPTER 5 – WATER USE EFFICIENCY

Category	WAC ¹ Section	Compliance Date	Requirement	Mercer Island in Compliance?
5. Efficiency Program	246-290-810	WSPs submitted after January 22, 2008.	1. Describe existing conservation program.	Yes. Included in this WSP chapter.
			2. Estimate water saved over last 6 years due to conservation program.	
			3. Describe conservation goals.	
			4. Describe how customers will be educated on efficiency practices.	
			5. Describe conservation programs for next 6 years including schedule, budget, and funding mechanism.	
			6. Describe how efficiency program will be evaluated for effectiveness.	
			7. Implement or evaluate 1-12 measures, depending on size. (6 measures for systems like Mercer Island having 2,500 to 9,999 connections.)	Yes. The City has implemented and evaluated more than 6 measures.
			8. Estimate projected water savings from selected measures.	N/A. The City relies on SPU to monitor the transmission lines supplying Mercer Island.
			9. Estimate leakage from transmission lines (if not included in DSL).	
6. Demand Forecast	246-290-100	WSPs submitted after January 22, 2008.	1. Provide demand forecast reflecting no additional conservation.	Yes. See Section 3.5 for water demand forecast. The City has not estimated conservation savings to the demand forecast as it participates in a regional program. Demand savings are estimated at the regional level.
			2. Provide demand forecast reflecting savings from efficiency program.	
			3. Provide demand forecast reflecting all "cost effective" evaluated measures.	
7. Performance Reports	246-290-840	First report completed by July 1, 2008.	1. Develop annual report including: goals and progress towards meeting them, total annual production, annual leakage volume and percent, and, for systems not fully metered, status of meter installation and actions taken to minimize leakage.	Yes. The City submitted annual reports for calendar years 2008 through 2012 as required.
			2. Submit annually by July 1 to DOH and customers and make available to the public.	

¹ WAC = Washington Administrative Code



HISTORICAL WATER USE EFFICIENCY PROGRAM

Table 5-2 represents the previous conservation program for Mercer Island.

Table 5-2. Water Conservation Program Summary (2000 – 2008)

PUBLIC EDUCATION
The City, in partnership with 18 other local water providers, worked to help all customers conserve water. The partnership offered educational programs, financial incentives and special promotions to inform customers of conservation opportunities.
<i>School Outreach</i>
The City made available conservation materials provided by Seattle Public Utilities to local schools.
<i>Program Promotion</i>
The City, in coordination with Seattle Public Utilities, distributed literature to its customers on water conservation practices, efficiency standards for plumbing fixtures, water efficient landscaping, and more.
The City participated in the regional mass communication and marketing program (TV, radio, community events) to promote water conservation.
The City periodically provides conservation information as utility bill stuffers.
The City, as required, provided an annual Consumer Confidence Report (CCR) which outlined the water source, contaminant levels, violation of contaminates, etc. Conservation information was included as part of the CCR.
Conservation information was listed on the City's website and updated as needed. Additionally, a link to Seattle Public Utilities' conservation website was listed.
TECHNICAL ASSISTANCE
<i>Purveyor Assistance</i>
Not applicable.
<i>Customer Service</i>
The City routinely monitored water usage for all residential and commercial accounts. If a significant deviation from past usage is noticed, the customer would be notified immediately.
The City provided free landscape assessments provided by a landscape professional to Island residents each summer. These comprehensive assessments focused on the efficient use of irrigation systems, plant location, and soil care.
The City provided assistance to prospective new customers regarding water conservation practices.
<i>Bill Showing Consumption History</i>
Customers' water bills included water use over the same period from the prior year as well as the average water use for their customer classification.
SYSTEM MEASURES
<i>Source Meters</i>
The City is metered at all source connections. These meters assist in system management, water accounting, and billing from Seattle Public Utilities. Meters are maintained and tested on a regular basis by Seattle Public Utilities.
<i>Service Meters</i>
The City required all water to be metered at the point of use.



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The City required any person who desires to use City water from an unmetered source to rent a meter and pay the City for water used.
<i>Unaccounted Water/Leak Detection</i>
The City systematically cleaned all watermains as part of a flushing program. The water is accounted for by the use of a flow meter.
The City required developers and contractors to use a hydrant meters during the construction of projects.
When anomalies appear on customer’s bills, the City investigated for the source of the problem.
INCENTIVES/OTHER MEASURES
<i>Single-Family/Multifamily Kits</i>
The City encouraged and periodically provided water conservation items to single-family homes and the owners and managers of multifamily buildings. Conservation items available free of charge included adjustable low-flow showerheads, bathroom and kitchen faucet aerators, toilet leak detection tablets, shower timers, and toilet displacement devices.
<i>Nurseries/Agriculture</i>
Through partnerships with local businesses, the City supported the Water Smart Technology (WST) program which offered technical and financial assistance for the installation of water conservation technologies for businesses.
The City provided informational pieces on watering practices and the use of native vegetation.
<i>Landscape Management/Playfields</i>
The City supported the Water Efficient Irrigation Program (WEIP) that offered irrigation system assessments and audits as well as detailed evaluations of irrigation efficiency to qualifying customers.
The City encouraged and distributed brochures and informational pieces on water practices and the use of native plants.
The City supported, in cooperation with participating local nurseries, the soaker hose rebate program to promote Natural Lawn and Garden practices.
<i>Conservation Pricing</i>
The City passed seasonal rate charges from Seattle Public Utilities on to its customers.
The City maintained a conservation pricing structure with increasing block rates to provide economic conservation incentive.
<i>Utility Financed Retrofit</i>
The City, in cooperation with Seattle Public Utilities, participated in the Toilet Rebate Program for single-family, multifamily and commercial customers.
The City promoted high-efficiency washing machines to its customers as part of the regional “WashWise Program”. The City offered information on these machines and offers a customer rebate.
<i>Other Measures</i>
The City supported wastewater reuse and rainwater reclamation projects and programs, and participated when they serve as cost-effective and environmentally beneficial sources of water.
The City monitored non-revenue water by testing the accuracy of meters and changes any malfunctioning meter upon detection. Additionally, the City metered all flushing of its water system.

Historical Water Savings

The conservation savings the City has achieved the past six years is estimated by comparing the decrease in per customer consumption with estimated consumption as if no decrease occurred.



Estimated consumption for each year from 2008 to 2013 is calculated by multiplying the 2001 – 2006 average water use per customer by the number of connections for each year shown in **Figure 2-3**. **Table 5-3** shows the change in average water use per connection from 2001 to 2006 and from 2008 to 2013.

Water use per connection increased only for the Multifamily customer class. This is due to an increase in the development of multifamily buildings with higher density apartments. Since 2002, the water usage per connection has steadily increased reflecting the shift towards higher density multifamily properties. The City does not collect data on water usage for individual multifamily dwelling units so it is not possible to determine if the water usage is increasing or decrease per each multifamily dwelling unit.

Table 5-3. Historic Conservation Based on ADD per Account

Customer Class	Water Use per Connection (gpd/connection)	
	2001 - 2006 Average	2008 - 2013 Average
Single-family	247	202
Multifamily	1145	2100
Commercial	821	698
Government	1745	1531

The estimated consumption between 2008 and 2013 using the 2001 – 2006 average water use per connection and the number of connections shown in **Figure 2-3** is 4,669 MG. The actual consumption during that period is 4,105 MG as reported in **Figure 2-4**. The estimated reduction in water usage is 564 MG with an average annual reduction of 94 MG.

Not all of the reduction in water use can be attributed to conservation savings. Other factors such as cooler summers, changes in cultural attitudes towards water, installation of more efficient household appliances, and reduction in per household population may attribute to a reduction in usage as well.



2013-2018 WATER USE EFFICIENCY PROGRAM

The City's Water Use Efficiency Program discussed in the following sections includes on-going measures, which the City intends to continue implementing as well as recommended enhanced measures. The City will implement the enhancements to its existing conservation program in order to achieve its goals.

The WUE public review requirement for the City was completed at a City Council meeting on February 24, 2014 where the proposed regional conservation goal was presented. The City adopted the six-year regional water conservation goal of reducing per capita water use from current levels so that the total average annual retail water use of the Saving Water Partnership is less than 105 mgd from 2013 through 2018 despite forecasted population growth. A copy of the adopting legislation, Resolution 1478, is included in **Appendix H**.

The City Council may consider adopting additional City specific conservation goals to support the City's sustainability initiatives. Additional goals are not identified in this plan but may be evaluated in the future.

According to the WUE program requirements, there are several measures that must be implemented. Because these measures are mandatory, they do not count towards the minimum measures required to implement in the WUE program. They include:

- Install production (source) meters
- Install consumption (service) meters
- Perform meter calibration
- Implement a water loss control action plan to control leakage
- Educate customers about water use efficiency practices

The City is implementing all of these measures.

In addition, the City is required to evaluate or implement at least six additional WUE measures. If a specific WUE measure is being implemented for different customer classes, it counts as multiple WUE measures. Excluding the measures listed above, the proposed program contains 16 measures, ten more than required, which includes counting some items multiple times as they apply across customer classes.

The City budgets \$30,000 annually to fund the conservation program measures implemented directly by the City. This amount is in addition to funding for the regional conservation program provided to SPU through rates and facility charges. Measures are implemented each year as funding allows.

As the City participates in a regional conservation program, the City has not estimated the projected conservation savings on the demand forecast. Since the goal is regional, conservation savings are estimated at the regional level. Also, the City's contribution to the overall regional water use is minimal and the projected water use is essentially flat as little growth is anticipated.

Regional Program Measures

Because the City purchases all of its water supply from SPU under a 60-year long-term contract it is required to participate in the regional efforts for saving water. The Program is sponsored by the Saving Water Partnership and includes the City of Seattle and its retail service area along with 18 utilities, including Mercer Island. SPU administers the Regional Program in collaboration with



CHAPTER 5 – WATER USE EFFICIENCY

participating wholesale utility customers, under the terms of the long-term water supply contracts. SPU's regional water use specific measures are displayed in **Table 5-4**.

While SPU encourages users within its boundaries to use their suggested measures and strategies for water use efficiency, some of these are done region-wide. The City will, in addition to the Regional Program, implement measures specific to its utility. These measures are discussed below in the section following the regional measures in **Table 5-4**.



Table 5-4. Summary of Saving Water Partnership 2013-2018 Water Use Efficiency Program

General Activities	Specific Measures
CUSTOMER BEHAVIOR CHANGE	
Community events, schools support, customer education	<ul style="list-style-type: none"> • Schools outreach • Festivals, shows and fairs • Customer technical assistance • Regional phone hotline: 684-SAVE • Online repository of articles for utility newsletters • Media promotion and advertising • Customer mailings • Regional web site: www.savingwater.org • Partnerships with vendors, trade groups, agencies and energy utilities • Awards and recognition • Equitable customer access to conservation messages and services • Fix-A-Leak-Week 2013, 2014
Leaks and indoor water use education	<ul style="list-style-type: none"> • Find and fix leaks instructional videos and information on web and in print
Landscape water use education	<ul style="list-style-type: none"> • Landscape classes for residential gardeners • Irrigation scheduling and maintenance • Expert one-on-one advice through the Garden Hotline • Natural Lawn & Garden Guides (how-to materials) and other brochures • Online weather data, watering index, water budgeting and irrigation scheduling tools • Irrigation training in multiple languages for professionals • Smart Water Application Technologies testing
Benchmarking customer behavior	<ul style="list-style-type: none"> • Customer research including identification of traditionally underserved populations and program design options to meet their needs • Technical studies and end-use metering • Conservation measure evaluation
WATER EFFICIENT EQUIPMENT UPGRADES	
Residential indoor water use	<ul style="list-style-type: none"> • Single-family toilet rebates • Multi-family toilet rebates
Commercial irrigation systems	<ul style="list-style-type: none"> • Weather-based irrigation controllers



General Activities	Specific Measures
	<ul style="list-style-type: none"> • Pressure regulating and efficient spray heads • Drip irrigation and micro sprays • Seasonal adjust (percentage) controllers • Irrigation system leak monitoring alarms
Businesses and institutions	<ul style="list-style-type: none"> • Technical assessments and outreach • End use metering and monitoring • Plumbing fixture rebates for toilets, urinals, showerheads, aerators, etc. • Cooling and process water rebates • Food service equipment rebates • Medical and lab equipment rebates • Laundry equipment rebates • Steam condensate equipment rebates • Partnerships with energy utilities • Evaluation of reclaimed water opportunities

City Specific Measures

While the City participates in the SPU Regional Program measures included above in **Table 5-4**, it can also implement measures that are specific to the City. These measures make it possible for the City to meet its water use efficiency goals stated earlier in the Chapter. The following are description of each measure the City is implementing in its conservation program.

Conservation Rate Structures

This measure is for rate structures that encourage customers to use less water. The City maintains an inclining block pricing structure for single family residential customers and seasonal pricing structures for commercial and irrigation customers. The 2014 Water Utility Rates are listed in **Table 8-2** and **Table 8-3**.

Customer Leak Notification

This measure is to educate customers about fixing leaks within their homes. The City provides technical assistance to its retail customers about detecting and fixing leaks within their homes on an ongoing basis.

The City employs an additional measure that notifies customers of unusually high water bills. The City has a program to report anomalies that appear on customer’s bills and investigates for the source of the problem to encourage leaks to be fixed.

Public Education

This measure is to educate customers about the importance of using water efficiently. The City provides technical information and customer service for all the various programs and measures that are implemented. The City periodically provides efficiency information as utility bill stuffers. It also includes conservation information as part of the annual Consumer Confidence Report.



CHAPTER 5 – WATER USE EFFICIENCY

School Outreach

This measure provides schools with conservation materials. The City makes available conservation materials provided by Seattle Public Utilities to local schools.

Targeted Marketing

This measure applies to the commercial sector. The City targets promotion through businesses, vendors, trade groups, and agencies. Restaurants are targeted to use new efficient food streamer rebates. The City also provides messaging services when customers consume an excessive amount of water. Other methods of behavioral modifying methods are used to promote less flushing, faucet use, shower time, and full loads.

Landscape Management

This measure promotes low water demand landscaping. The City distributes brochures and informational pieces on water practices, the use of native plants, etc. They also participate in financial incentive programs, workshops, retail partnerships, and by establishing vendor and contractor relationships as part of the regional program.

The City requires enhanced practices that affect watering, irrigation system performance standards, and upgrades to irrigation equipment, and improvement in scheduling and maintenance for residential customers.

Showerheads

This measure applies to the single family and multi-family sectors, both existing and future customers. The City distributes adjustable low flow showerheads and shower timers free of charge.

Faucet Aerators

This measure applies to the single family and multi-family sectors, both existing and future customers. The City distributes bathroom and kitchen faucet aerators free of charge.

Toilet Leak Detection

This measure applies to the single family and multi-family sectors, both existing and future customers. The City distributes toilet leak detection tablets and toilet displacement devices free of charge.

Bills Showing Consumption History

This measure applies to single family, multi-family, and commercial sectors. The City redesigned their utility bills so all residents can track their own water usage over time.

Staff Time

While not a specific measure, the City will continue to have individual personnel responsible for the water use efficiency program management and implementation.

As part of its commitment to the Regional Program the City will also continue to participate in the Conservation Technical Forum with other SPU water purveyors.



It was determined that the new WUE program will produce adequate yearly savings through 2013 to meet efficiency targets by comparing the estimated program saving to the target, enabling the City to meet the program goals.

Monitoring Water Use Efficiency Measures

Monitoring and evaluating the individual WUE measures during and after implementation of the WUE Program are essential to determine the effectiveness of the program. It is important to develop reliable data to use in analyzing the actual water use to identify whether goals and objectives are being met. The City will perform an annual year-end evaluation of the WUE measures.

At a minimum, factors such as growth rate, water usage and conservation budget expenditures should be taken into account. Looking at changes in population and growth rates will help to determine the effects the changes have on the demand of water.

Applicable monitoring data will be kept for each WUE measure including:

- The type of enhanced measure implemented, level of implementation, duration and date when implemented.
- The number of customers affected by the measure in each category, i.e., the number of customers who receive conservation literature.
- The number of conservation kits, rebates and devices distributed.
- The expected amount of savings from each of the distributed conservation devices.
- The average water used in a specific activity, by category, before and after implementation of conservation measures.
- As part of the new WUE requirements, the City reports annually on how it is working towards achieving its goal of water reduction.

Reclaimed Water Analysis

The City may develop projects or consider participation as appropriate in the water reuse projects and programs developed by King County and others, including demonstration or pilot projects that may be developed in accordance with applicable federal, state, and local laws and regulations.

City staff may investigate and recommend proposed changes to the City's development and service policies and regulations that may be desirable in order to encourage the promotion of these programs and technologies.

King County currently has no plans to provide reclaimed water within the City's water service area. However, Attachment 9 of the Municipal Water Law has been completed for any potential reclaimed water users and can be found in **Appendix H**.

In accordance with the City's commitment, it may continue to work with King County to identify opportunities and explore ownership and management options to produce and deliver reclaimed water within the City's service area.



CHAPTER 5 – WATER USE EFFICIENCY

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CHAPTER 6

OPERATIONS AND MAINTENANCE

WATER SYSTEM MANAGEMENT AND PERSONNEL

The Water Utility field crew consists of six full-time personnel in addition to the Utility Operations Manager. The City cross-trains its ten utility team employees which all but one are certified with the Washington State Department of Health to work on the water distribution system. The tasks performed by the Water Utility are testing, installation and repair of system facilities, water quality, routine operation and preventative maintenance, record keeping, administrative tasks, general clerical work, corrective or breakdown maintenance required in response to emergencies and customer response.

Engineering, water meter reading, cross-connection control, utility inspection, customer service, record keeping and billing, and utility inspection are performed by numerous responsible staff from within other City Departments.

Personnel Responsibilities

The key responsibilities of the water division staff are summarized below.

Director of Maintenance – Directs the activities of all divisions within the maintenance department.

City Engineer – Oversees all development project reviews, water system applications and major capital construction projects.

Utilities Operations Manager – Plans and directs the daily operations of the water and sewer teams. Maintains budgets, attends regional water meetings, responsible for system reporting to DOH and DOE, provides plan review, maintains the SCADA (Supervisory Control and Data Acquisition) and WIN911 Data Reports and assures water quality monitoring and reporting is maintained.

Assistant City Engineer – Manages field engineering, customer response team and Capital Improvement Program implementation.

Water Generalist (Lead) – Coordinates and schedules daily field activities of crews performing maintenance, operation, and construction of water facilities. Also provides emergency response.

Utility Engineer – Provides co-ordination with contractors and private engineering firms on capital improvement projects.

Senior Development Engineer – Provides development project review to the Utility team.

Administrative Assistant – Provides administrative support services to the Utility team. Dispatches responders to customer complaints, maintains the maintenance management system.

Customer Service Team Member – Responds to customer service needs, provides Utility locates to the Utilities Underground Location Center, and provides support to the Water Team.

Team Member – Performs manual labor and operates equipment for maintenance and construction of water facilities. Also provides emergency response.



CHAPTER 6 – OPERATIONS AND MAINTENANCE

Utility Site Inspector – Inspects public and private projects that are being performed within the City.

Utility Billing Supervisor – Manages all aspects of Utility billing, meter reading, cross connection reporting and water meter maintenance requests.

Meter Reader/Cross Connection Control – Provides meter reading, cross connection inspection and initial testing of backflow devices two inches and smaller.

OPERATOR CERTIFICATION

According to state law, WAC 246-292-050 requires all public water systems with more than 250 connections to have at least one certified operator in charge of the daily operational activities of their water system. This WAC goes on to state that all Group A community water systems, which includes Mercer Island, must have a Water Distribution Manager for the responsible operation of its water system. WAC-246-292-040 further states that water systems serving populations from 15,001 to 50,000 require the operator to maintain a Water Distribution Manager III certificate. According to WAC 246-292-020, when a certified operator is required, the operator is in responsible charge of the daily operational activities of the public water system and/or distribution system that will directly impact water quality and/or quantity of drinking water as required under WAC 246-292-050. The designated certified operator shall be in responsible charge and available for each operating shift.

WAC 246-290-490 states that all community water systems comply with the cross-connection control requirements specified within this section including that a cross connection control specialist (CCS) be responsible for the systems cross-connection control program.

Per WAC 246-294, the City of Mercer Island maintains a Permit Category of Green with the Washington State Department of Health and the Office of Drinking Water. This category assures the water users on Mercer Island that the system is substantially in compliance with all applicable drinking water requirements.

The City of Mercer Island encourages employee training and recognizes certification as a measure of knowledge and ability in providing safe and excellent water quality. The City allocates a portion of the annual budget to continuing education training so its employees will be able to maintain their Washington State Department of Health Water Certifications. Mercer Island also supports membership to professional organizations such as the American Water Works Association (AWWA) which enables personnel to keep abreast of the latest advances in maintenance and operations of water utilities. The administration of the City believes that the time and money invested in training and certification, and professional organizations are repaid many times in improved pride, safety, skill and confidence.

Certifications

Table 6-1 lists the employees and their certifications.

Table 6-1. Employee Certifications

	Type	Number
Tom Babcock - Sewer Generalist	WDS	7993
Dennis Baker - Sewer Team	WDS	10203
Curtis Clifton - Water Team	WDM1	13220
John Druschba - Water Generalist	WDS	5936



	Type	Number
Jim Felix - Water Generalist	WDS	7557
Mike Gaviglio - Water Team	WDS	10359
Chris Kelley - Customer Response Team	WDS	13240
Casey Leyde - Sewer Team	CCS	013943
Eric Moltz - Water Team	WDS	10607
Brian McDaniel - Manager	BTO, CCS, WDM4, WDS, WTPO IT	007135
Rudy Walker Jr - Sewer Team	WDM1	12342
Bob Willing - Water Team	WDS/WTPO IT	7538

The certified operator shall operate the public water system with due care and diligence consistent with their experience and training appropriate to his/her level of certification, for protecting public health, and shall abide by applicable state and federal drinking water laws and regulations.

SYSTEM OPERATION AND CONTROL

Major System Components

Chapter 4 of the plan discusses major water system components. The major components of the City’s system are summarized below.

- Three Seattle Public Utility master meters maintained by SPU
- Two 4 million gallon reservoirs
- Two altitude valves and one flow control valve
- 85 pressure reducing stations with one or more devices installed
- 115 miles of water distribution system
- Two independent reservoir supply lines which can provide redundant system supply
- 1071 fire hydrants
- 7640 water meters
- Five vertical turbine booster pumps that are located at the reservoir site, which boosts water storage pressure to two-thirds of the water distribution system (Pumped Zone).
- Pumped Zone bypass valve which allows the City to supply gravity water, supplied by Seattle Public Utilities head pressure, to the Pumped Zone approximately eight months per year.
- Telemetry controls, motor controls, back up generators, Supervisory Control and Data Acquisition (SCADA), WIN911 Data Reports located at the main reservoir, First Hill Booster Station and the City Maintenance facility.
- Six variable speed motors and controls located on First Hill which boost both domestic and fire suppression water to this zone.



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Routine System Operation

Routine operations require the development and analysis of procedures to ensure that water system facilities are operated properly and function efficiently. When local water service is interrupted for any reason it is the City's policy to work continuously until service is restored. The Utility Operations Manager is responsible for administering the water utility operations.

Reservoir Inspection

The reservoir is inspected daily, except weekends and holidays, for the proper operation of its pumps, pressure settings, inlet valve operation, and the comparative readings from Mercer Island's wholesaler water provider. During the inspection visual checks are made to the perimeter grounds and throughout the station site to inspect for leaks, security breaches, and mechanical noise and temperature abnormalities. Additionally during each visit, the cumulative hours that each pump has operated, current pump controller speed, amperage, and power frequency data are gathered. Additionally, this station is monitored by SCADA for its operation, intrusion alarms for its building, tank access ladders and hatch security. A video surveillance system also monitors the site through a contracted security company.

Both reservoirs have seismic valves located on both the inlet and outlet lines of each tank. These valves are checked and exercised quarterly by City staff.

The reservoirs are also equipped with cathodic protection systems that protect the internal submerged surfaces of the water storage tanks from corrosion. Monthly readings of the rectifiers are made by City staff to ensure the systems are functioning properly. Annually the complete system is inspected, and calibrated as needed, by a Certified Technical contractor.

The reservoir site has an emergency generator which is manually exercised "under load" once per month. The 1,000 gallon capacity diesel fuel storage is also checked at this time.

The variable speed pumps and the inlet valves are rotated in cycle to maintain optimum and reliable performance. The two supply lines to the reservoirs are alternated, utilizing maximum velocity, to keep the water supply fresh in both mains.

On a two to three-year rotating cycle the reservoirs are taken out of service for cleaning and inspection. The south reservoir was last drained and cleaned in February 2013. The north reservoir was last cleaned in March of 2014. Ongoing inspection results of both tanks indicate a slight deposit of seasonal SPU algae bloom, on the bottom of each tank.

First Hill Booster Station

This facility is physically inspected approximately once each week. It is also monitored daily by the City's SCADA system located at the maintenance shop. Pump run hours, system boosted pressure, check valve operation and generator fuel storage are checked during each site inspection. The emergency generator is programmed to exercise once per week to assure reliable operation. This station is also equipped with an intrusion alarm, smoke and operator in trouble alarms.

Emergency Well Facility

In 2004, City staff assessed the Island's water system and concluded that Mercer Island's water supply from Seattle Public Utilities (SPU) would likely be disrupted in a disaster such as a major earthquake. Therefore, City officials decided to develop an emergency well that could be activated if the Island lost its supply from SPU.



CHAPTER 6 – OPERATIONS AND MAINTENANCE

In August 2008, Mercer Island’s City Council approved the design for an above-ground permanent well facility. Construction was completed in spring, 2010.

The Emergency well was not designed to supply the Island’s water through its distribution system. State permits do not allow it to be connected to the system. Users are made aware that prior to consumption disinfection techniques of the water must be administered.

- The well is operated under an Incident Command Strategy (ICS), which is designed to establish a consistent chain of command and clear roles that allow for solid decision-making, and maximize use of available resources.
- Every detail of the well has been designed so that volunteers can activate and operate the well facility. Members of the Well Operations Team (comprised of more than 50 Island resident volunteers) have been trained to distribute water from the well and from trucks, dispatched to neighborhoods.
- The well was designed for use with a back-up generator, since an emergency that disrupts the water supply could also cause power outages.
- Monthly City staff monitors static and drawdown levels of the well, amperage readings, run time and gallons flowed. This facility is connected to intrusion alarm monitoring.

Meters

There are ten meter routes consisting of residential, multifamily and commercial meters. These meters are read every other month. Meters in City parks are read each month.

Fire Hydrants

The City hires seasonal help each year to clean, inspect for proper operation, grease port caps, and paint and clear any obstruction that encroaches upon the three-foot operating perimeter for fire hydrants. Every other year City staff performs a full operational inspection and pressure check of each City owned fire hydrant.

Asbestos Cement Pipe Operations

Less than 2% of the water distribution piping within the City of Mercer Island’s water system is asbestos cement. All City water system personnel have attended AC pipe refresher training. The Puget Sound Clean Air Agency (PSCAA) has the authority to regulate work with asbestos cement pipe within the City’s water system. The requirements are defined by Regulation III, Article 4, Asbestos Control Standards. The following steps will be taken while working with asbestos cement pipe.

- The agency states in section 4.03 (a) (2) that notification is not required for asbestos projects involving less than 10 linear feet of AC Pipe.
- Work must be performed by a trained asbestos worker.
- All asbestos containing pipe shall be kept adequately wet while being cut and removed.
- Per PSCAA Section 4.07, asbestos cement pipe used in public right-of-ways, public easements, or other places receiving the prior written approval of the Control Officer may be buried in place if the pipe is covered with at least 3 feet or more of non-asbestos fill material. All asbestos cement pipe fragments that are 1 linear foot or less, and other waste material, shall be disposed of at a waste disposal site authorized to accept such waste.



CHAPTER 6 – OPERATIONS AND MAINTENANCE

Preventative Maintenance Program

Preventative maintenance is essential to ensure the proper and efficient operation of the water system. Preventive maintenance consists of regularly monitoring and servicing of pumps and motors, exercising valves, inspecting and repairing fire hydrants and air-vacs, cleaning reservoirs flushing water mains, and cleaning/adjusting and repairing PRVs.

The distribution and transmission system pipe sizes vary from 2 inches to 30 inches in diameter. The distribution system is comprised of pipes made of cast iron, ductile iron, and some asbestos cement pipe. The City is prepared to repair leaks as they occur as well as remove and replace lengths of pipe as needed. Major water main replacements are accomplished through the capital improvement program (CIP) which is managed by the City Utility Engineer. The preventative maintenance schedule is shown in **Table 6-2**.

Table 6-2. Preventative Maintenance Schedule

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sept	Oct	Nov	Dec
System Monitoring using SCADA & WIN 911 Data Reports	x	x	x	x	x	x	x	x	x	x	x	x
Valve Exercising and Inspection	x				x	x	x	x	x		x	x
Distribution Main Flushing	x	x									x	x
Dead End Main Flushing	x	x	x									
PRV Maintenance				x	x	x	x	x	x	x		
Fire Hydrant Inspection	x				x	x	x	x	x		x	x
Air & Vac Maintenance		x		x		x		x		x		x
Galvanized Service Replacement	o	o	o	o	o	o	o	o	o	o	o	o
Sample Stand Cleaning		y			y			y			y	
Water Meter Replacement	o	o	o	o	o	o	o	o	o	o	o	o
Water Meter Reading	x	x	x	x	x	x	x	x	x	x	x	x
Emergency Well Inspection and Operation	y	y	y	y	y	y	y	y	y	y	y	y
Cross Connection Control	x	x	x	x	x	x	x	x	x	x	x	x
Utility Locates and Inspections	x	x	x	x	x	x	x	x	x	x	x	x
Water Distribution System Sampling	o	o	o	o	o	o	o	o	o	o	o	o

Key to above: x(daily) o(as needed) y(one day)

Equipment, Supplies and Chemical Listing

The City of Mercer Island purchases, stores and distributes, without treating, its entire water supply from their regional water wholesaler, Seattle Public Utilities. The source of water provided to Mercer Island is primarily from the Cedar River Watershed with the Tolt River's South Fork providing an alternate supply. At the Cedar facility, the water is screened for twigs and leaves and goes through ozonation and ultraviolet light (UV) disinfection, which kills disease causing Giardia and Cryptosporidium. In addition, the water is fluoridated, controlled for corrosion and chlorinated.

The City maintains a variety of equipment and supplies for water system operation and maintenance, including pumps, generators, valves, hydrants, meters, fittings, de-chlorination tablets, and liquid bleach for sanitization.



Major service representatives include:

- Telemetry and Pump motor control: S & B, Inc.
- Emergency generator: Cummins Northwest
- Pumps and motors at the Reservoir and First Hill Booster: Pumptech Inc.

The City provides staff members with safety gear such as hard hats, safety vest, steel toe boots, gloves, respirators, gas detectors, ear & eye protection, raingear, shoring equipment, atmosphere monitoring equipment, tripod, harness, goggles, and other items as needed. A confined space entry program is also in place for applicable situations. Shoring and Trench safety training and procedures are also followed. The City also provides first aid kits throughout City's facilities and in all City vehicles.

The City's Fire Department owns and operates Automatic External Defibrillator (AED) equipment. Each building is provided with one AED unit.

SUMMARY OF REGULATORY STATUS AND MONITORING REQUIREMENTS

Statutory Authority

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. The Department of Health has published drinking water regulations, which are contained in WAC Chapter 246-290.

A review of the City's monitoring and compliance procedures and water quality monitoring results indicates that Mercer Island was in full compliance with State and federal regulations during the review period.

Comprehensive Monitoring (Regulatory Compliance) Plan

"SPU conducts water quality monitoring per the City's wholesale water contract. The City is responsible for total coliform repeat sampling, and also periodic lead and copper sampling. During the transitional monitoring plan, the City is collecting samples which include some faucet tap samples. The City is in the process of installing additional sampling sites in the distribution system after which SPU will conduct all future monitoring in the distribution system."

Water quality test results from 2001 forward are available at the City of Mercer Maintenance Department for review by interested persons.

Reduced Stage 2 DBP Rule IDSE Sampling

On June 17, 2013 DOH approved Mercer Island's request for reduced monitoring. This was based on the previous TTHM and HAA LRAAs monitoring performed in previous sampling periods. The following tables (**Tables 6-3, 6-4, and 6-5**) provide information for the City's sampling standards.



Table 6-3. Sampling Periods 2014

1st Quarter	2 nd week January
2nd Quarter	2 nd week April
3rd Quarter	2 nd week July
4th Quarter	2 nd week October

Table 6-4. Testing Distribution

A. Number of Sites	B. Schedule	C. Standard Monitoring Frequency
Total: 2 Near Entry Point: 0 Average residence time: 0 High TTHM: 2 High HAA5: 0	X Schedule 1 <input type="checkbox"/> Schedule 2 <input type="checkbox"/> Schedule 3 <input type="checkbox"/> Schedule 4	<input type="checkbox"/> During peak historical month (1 monitoring period) x Every 90 days (4 monitoring periods) <input type="checkbox"/> Every 60 days (6 monitoring periods)

Table 6-5. Sampling Locations

Site ID (Show on Map)	Approximate Location	Pressure Zone	Type of Site
T-1	Along 85 th Avenue SE	Avalon 211	High TTHM
T-2	Along loop on SE 71 st Street	SE 71 st St 247	High TTHM

IDSE site selection was made using primarily system information, such as system map and hydraulic profile, and staff expertise. The following information and data were used:

- Mercer Island staff operating knowledge and experience
- Average annual flows through entry points (2003 – 2005)
- System map showing important elements such as pressure zones, entry points, reservoirs, and sample stands
- Distribution system temperature (2001 – 2006 Total Coliform Rule (TCR) monitoring at four locations)
- Source water temperature (1993 – 2005)
- Microbial data (past five years of coliform sampling)

As a system that purchases an already disinfected drinking water supply, the City of Mercer Island was not required to collect samples for Stage 1 DBP compliance. The City of Mercer Island collected TTHM data on a quarterly basis for compliance with the TTHM Rule. Results for the Stage 2 DBP sampling are summarized in the Annual Water Quality Report available on the City’s website <http://www.mercergov.org/>.

Beginning in 2004 Seattle Public Utilities began ozonation and UV disinfection of the Cedar River supply. It is unknown how these treatment changes affected DBP levels throughout Mercer Island’s distribution system

Lead and Copper Sampling

Seattle Public Utility wholesale customers, that receive their water supply from the Cedar River Watershed, which Mercer Island does, performed Lead and Copper sampling during the summers



of 2009 and 2012. The City is collecting lead and copper samples for 2015. Previous water sampling has concluded that this source of supply is far below the Action Levels. Results for the Lead and Copper sampling are summarized in the Annual Water Quality Report available on the City's website <http://www.mercergov.org/>.

Total Coliform and Chlorine Monitoring

Seattle Public Utilities conducts the Coliform Monitoring Plan sampling for the City included in **Appendix J** and as described below. The City is responsible for total coliform repeat sampling.

On April 17, 2008 a Rosemount Analytical water monitor was installed at the reservoir site. This monitor provides recorded hourly chlorine readings for both of the Seattle Public Utilities reservoir inlets, in addition to both of the reservoir outlets. In April of 2012, in conjunction with the construction of the new First Hill Booster Station, another Rosemount Analyzer was installed. The City has a Coliform Monitoring Plan included in **Appendix J**.

In response to positive E. Coli samples collected in the fall of 2014, the City instituted a transitional monitoring plan and chlorine residual boosting. The "transition" period ended when the City located and installed nine additional TCR sample stands at sites approved by DOH in spring 2015, and SPU took over monitoring under the regional TCR Program in September, 2015. The City's current TCR Plan requires that 25 monthly samples are collected from 14 sites in the distribution system. In addition, the baseline water quality is measured in the system with the following routine activities:

- Daily monitoring of chlorine residual at the entry point to the City's system, the two reservoirs, and First Booster Pump Station through telemetry.
- Quarterly disinfection byproducts (DBP), lead, and copper samples at 4 sites. Increased from 2 sites in 2014 after the E Coli positive samples.
- Chlorine residual profiling sampling on a quarterly basis in addition to the monthly chlorine residual samples collected with total coliform samples.

Unregulated Contaminant Monitoring Regulations (UCMR3)

Any water system serving a retail population of > 10,000 must monitor for List 1 (Assessment Monitoring). This list includes 21 compounds listed in six individual EPA methods. Monitoring must commence on or after January 1, 2013 and conclude by December 31, 2015. Mercer Island chose to do their testing at the onset of the program in 2013. Testing was performed during the months of March, June, September and December. Two locations in the distribution system are required; the Entry Point (EPTDS) and the Maximum Residence Time (DSMRT). The DSMRT location typically is the farthest point relative to the EPTDS, which is usually the highest Stage 2 TTHM sample location. The City's 2013 Water Quality Annual Report summarizes UCMR3 monitoring data. A copy is provided in Appendix J. There were several detections of UCMR3 compounds, but none exceed the maximum contaminant level.

EMERGENCY RESPONSE PROGRAM

The City's Emergency Response Plan (ERP) outlines the use and operation of the emergency well, including regulatory constraints and guidelines.

Emergency Procedures

The City has prepared an Emergency Operations Plan which defines the emergency management organization, responsibilities, and procedures for all City functions in the event of an emergency



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or disaster. This plan describes how the City Utilities Team should react to an emergency, including functions and responsibilities of personnel, procedures to be followed, maps of the area, and means of establishing communications between various organizations, and lists of people to contact during an emergency.

Under most operational scenarios, the loss of a single reservoir, more than one pump at the reservoir or booster station, or a transmission line, could be accommodated through redundancy inherent in the City's system. Loss of supply through SPU supply lines would have the greatest impact on the City's ability to maintain normal service throughout the service area.

Emergency Call-Out List

Mercer Island Maintenance Team employees volunteer to be on an Emergency Call Out list that is administered by the Utilities Manager. Emergency calls are received and dispatched through the NORCOM 911 Center. When a call is received by the center, two calls are made to the employee that is on call for any particular week. If the Dispatch Center is unsuccessful in reaching the on-call employee the Utilities Manager is then contacted in order to make contact with another available maintenance employee. All water calls that involve the City's water distribution or storage system, that will potentially or directly impact water quality or quantity, will have a minimum of one Washington State Department of Health Certified Employee on site.

Notification Procedures

Per WAC 246-290-71001, Public Notification, the purveyor shall notify the water system users when the system violates a National Primary Drinking Water Regulation and when any of the situations listed in Table 1 of 40 CFR 141.201 occur, except for (3)(b). Public notifications for violations and other situations are categorized into Tiers in accordance with the following:

- (a) Tier 1 as described in Table 1 of 40 CFR 141.202(a);
- (b) Tier 2 as described in Table 1 of 40 CFR 141.203(a); or
- (c) Tier 3 as described in Table 1 of 40 CFR 141.204(a).

Additionally, the purveyor shall notify the water system users when the system:

- (a) Is issued a departmental order;
- (b) Fails to comply with a departmental order; or
- (c) Is issued a category red operating permit.

Purveyor will seek immediate input from and work with state and local health agencies to accurately communicate and properly mitigate potential health effects resulting from any public health impact.

The City has many forms of communication available to notify its customers in the event of a public health risk. Methods of communication include:

- City Communication Manager
- City of Mercer Island Web Site, Facebook, Twitter, Reverse 911
- Where customers cannot be contacted immediately, purveyor will place a written notice on the front door handle, and a follow-up visit will be made to confirm that the customers received notice.
- Local media and newspapers



- Posting signs

Vulnerability Analysis

The City of Mercer Island completed a vulnerability analysis of the water supply system, the results of which are broadly summarized below.

System Components Assessed

Reservoir Site

- South tank: Tank shell and roof, piping, anchors, and foundation.
- North tank: Piping, emergency water hookup assembly, and motor operated valve on inlet pipe.
- Reservoir Pump Station: Motor control center, turbine pumps, telemetry system, electrical control center, and Emergency generator.
- First Hill Booster Pump Station: Pumps, emergency generator, and telemetry system.

SPU Supply Lines at Lake Washington Channel Crossing

- Primary pipeline, a 20-inch diameter pipe, is laid on the lake floor across the east channel.
- Secondary pipeline, 16-inch diameter pipe, is supported on the eastbound I-90 bridge.

SPU Supply Lines at Mercer Slough Crossing

- Primary pipeline is a 30-inch diameter steel pipeline with coal tar enamel coating. The majority of the pipe is elevated except at the Mercer Slough crossing where the pipe is submerged for about 400 feet. The elevated portion is supported on concrete saddles which are spaced at 30 to 45-foot intervals.
- Secondary pipeline, 16-inch diameter pipe, is supported on the eastbound I-90 bridge (not assessed).

Types of Emergency Events Considered

- Natural disaster including earthquake, flooding, fire, storm, water quality events, and etc.
- Human/Technological events including vandalism, computer disruption, chemical release, mechanical failure, fire, and accidental damages.
- Transportation Accidents including airplane collision, airplane fuel dump, and truck/car collision.
- Lifeline Service Loss including regional electricity outage, wireless communication outage, wire communications outage, liquid fuel service loss, and treatment chemical supply and delivery disruption.

Baseline System Performance Goals

The City will operate and maintain the water system in the most reliable condition. The City's goal is to provide sufficient water, with adequate water quality and pressure, to its customers. This includes the domestic needs for residential usage and commercial and municipal needs for business operations.



POTENTIAL IMPROVEMENTS OR MITIGATING ACTIONS TO LESSEN THE IMPACT OF EMERGENCY EVENTS

The City has an Emergency Response Plan (ERP) in place that provides as a guideline for employees to take appropriate actions in handling various types of emergencies. The ERP allows the employees to take proper steps to respond to different situations, such as assess the damage, determine the level of event severity, and implement appropriate level of response.

The City has taken actions in implementing one major improvement recommended by the Vulnerability Assessment Study and will continue carrying out some of the recommendations in future years. The major improvement the City has implemented is the North Emergency Well installed on the north end of the Island in 2010.

Other possible improvements that will be implemented pending on funding availability are adding isolation valves to the distribution system, and procurement of about 5,000 feet of flexible hose.

Contingency Operational Plan

Depending on the occurrence, many combinations of alternative methods may be implemented to continue water supply to the Mercer Island distribution system.

- The reservoirs can be isolated allowing them to function independently of each other.
- Seismic Valves have been installed on each reservoir which will isolate both incoming and outgoing water upon an event.
- Mercer Island has a secondary supply line to the reservoir that will maintain supply and storage depending upon;
 - Where a major SPU transmission break occurs
 - The supplied head that SPU provided at the time
 - Peak demand periods. During the three month summer season, there would be a loss of pressure and flow but the City would still be able to supply distribution system function.
- Except during the summer high demand period, the Pumped Zone bypass valve can provide distribution supply if electrical power isn't available, if the auxiliary generator fails or the fuel supply isn't available.
- Both reservoir altitude inlet valves and the Pumped Zone bypass valve are plumbed with pilot systems that allow operation of these valves if power is lost to the solenoids. The altitude valves operate independently so if one fails, the second valve is totally operational.
- There are inline gate valves around the reservoir that can be opened to supply the distribution grid providing SPU provides Mercer Island adequate system head.
- The Generator at the reservoir and the Emergency Well building along with First Hill Booster Station provide auxiliary power to the booster pumps, motor controls, well head pump and telemetry operation.
- One generator at the maintenance building provides auxiliary power to the Head-works of the City telemetry system.
- The City has drilled an emergency water supply well for use in specifically defined emergencies where off-island water is not available. A possible second such well has



been discussed, in accordance with permission granted by the Washington Department of Ecology.

During a catastrophic event, the City's water system will most likely be severely damaged and the water supply delivery to the customers will be disrupted. It's reasonable to assume that people will conserve water usage at the time of water outage. The City is also continuing public education to emphasize the importance of water conservation during normal and unusual situations.

With the establishment of an emergency water supply well, the City has prepared to supply limited well water when a catastrophic event takes place. The quantity estimated for this emergency supply is limited to 5 gallons per person per day. The City has developed a plan to operate the emergency water well facility with trained resident volunteers. These volunteers will assist in the water dispensing in an orderly fashion under emergency situations.

SAFETY PROCEDURES

City employees are provided with appropriate safety and personal protective equipment for the tasks and work environments they encounter as part of their jobs. Staff is provided with necessary training to ensure that they understand and practice all applicable safety regulations including confined space entry, shoring/trench safety, asbestos cement pipe handling and traffic control/flagging. The Maintenance staff has mandatory monthly safety meetings to stay current on work safety issues.

The City maintains a varied stock of hearing and eye protection, various lengths of speed shoring, three sizes of approved sheeting, an approved shoring box, atmospheric monitors, fresh air blowers, and tri-pods and harnesses.

Water system personnel attend periodic refresher training for Asbestos Cement Pipe Work Practice Procedures. This training provides approved training for compliance with the most recent Department of Labor and Industries regulations. City personnel are refreshed on safe, field-proven procedures to protect them from cancer-causing asbestos fibers. They learn how to recognize asbestos health hazards, prevent exposure to deadly asbestos fibers, and how to choose and use protective equipment. They also perform approved AC pipe work practices.

Asbestos Cement Pipe Operations

Less than 2% of the City Water System is asbestos cement pipe. The Washington Department of Health (DOH) does not require any water supplier to report on systems with less than 10% total asbestos-cement piping. The City's waiver simply acknowledges that a very small amount of asbestos-cement pipe exists in the system. Puget Sound Clean Air Agency has the authority to regulate work with asbestos cement pipe within the City's water system. The requirements are contained within Regulation III, Article 4, Asbestos Control Standards. The following steps will be taken in the removal of asbestos cement pipe.

- The Agency states in section 4.03 (a) (2) that notification is not required for asbestos projects involving less than 10 linear feet of A/C Pipe.
- Work must be performed by a trained asbestos worker.
- All asbestos containing pipe shall be kept adequately wet while being cut and removed.
- Asbestos cement pipe debris will be buried in place, with three feet or more of non-asbestos fill material, in accordance with Section 4.07 (d) when the pipe is over one linear-foot in length.



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- When the pipe is less than one linear foot Section 4.07 (d) states that the asbestos-containing waste material shall be disposed of at a waste disposal site authorized to accept such waste.

CROSS-CONNECTION CONTROL PROGRAM

The City has an established cross-connection control program (**Appendix I**) to provide for the proper review and engineering of proposed connections to the City water system and the installation and testing of backflow prevention devices which protect the public water system from contamination due to cross connections.

The City's responsibility for cross connection control begins at the water supply source, includes all public water storage and distribution facilities, and ends 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 in the public right-of-way or utility-held easement.

The City, in accordance with City of Mercer Island Municipal Code Title 15 (**Appendix N**) and WAC 246-290-490, must ensure that a cross connection control specialist (CCS) is responsible for:

- The system's cross connection control program
- Initial inspection of premises served by the system, for cross connections
- Periodic re-inspection of premises served by the system, for cross connections
- Owners must ensure that a backflow assembly tester (BAT) is responsible for inspecting, testing, and monitoring backflow prevention assemblies in accordance with WAC 246-290-490.
- A WDM must be certified at a level equal to or higher than the water system's classification rating assigned by the department in accordance with WAC 246-292-040.
- The certified operator in responsible charge of each operating shift must be certified at a minimum of one level lower than the classification of the purification plant or distribution system.

CUSTOMER COMPLAINT AND RESPONSE PROGRAM

Customer complaint response is prioritized on a 1-5 scale with 1 being immediate response due to any type of public safety or health risk. Any call received that has a reference to water quality is handled with immediate response by the Customer Response or Utility Team. Contact is made with the caller to determine the type of concern and any specific information regarding the event. Assurance is given to the caller that the incident will receive top level priority and a follow up call will be provided upon any findings at the resolution of the occurrence.

Other immediate responses include watermain breaks, customers out of water, fire hydrants that are out of service, reduced pressure calls and property damage resulting from a water leak.

Upon the occurrence of a public health risk, the City implements the procedure described above under Emergency Response Plan Public Notification Procedures.

Following are the customers' complaint calls received by the City between 2009 and 2013. Also listed are the resolution and notifications for each of the calls.

Complaint

- dirty water calls - 9



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- cloudy water calls – 1
- low-pressure calls – 0
- air in lines and milky water calls – 1
- smell and odor calls – 0

Resolution

- dirty water calls – customer advised to flush water in residence until clear and to call back if City needs to flush water mains or nearby hydrants
- cloudy water calls – customer advised to flush water in residence until clear and to call back if City needs to flush water mains or nearby hydrants
- low-pressure calls – flow test at meter & hose bid & neighboring properties
- air in lines and milky water calls – customer advised to flush water in residence until clear and to call back if City needs to flush water mains or nearby hydrants
- smell and odor calls – site visit to assess

Notification

- dirty water calls – customer advised to flush water in residence until clear and to call back if water doesn't clear
- cloudy water calls – customer advised to run water in residence until clear and to call back if water doesn't clear
- low-pressure calls – customer advised City would perform flow test at meter & hose bib and customer advised of findings
- air in lines and milky water calls – customer advised to run water in residence until clear and to call back if water doesn't clear
- smell and odor calls – site visit to assess

RECORDKEEPING AND REPORTING

The City of Mercer Island complies with WAC 246-290-480 recordkeeping and reporting. Source water and water sampling is reported to DOH through the City's wholesale water supplier (SPU).

- The City's Maintenance Department utilizes a Maintenance Management System (MMS) that has logged all customer calls, including water quality, since 1995.
- The Finance Department maintains all water consumption records.
- Reporting of all required records to the DOH is done by the Utilities Operations Manager.
- Bacteriological analysis results are kept for a minimum of five years.
- Records of source meter readings are kept for a minimum of ten years.
- Total Coliform Rule Monthly reports are on file since March 2001.



OPERATION AND MAINTENANCE IMPROVEMENTS

Outside of any work that is outlined in the City’s Capital Improvement program, the Utility Team performs daily improvements to the water system. This work involves the replacement of galvanized water services, air-vac assemblies and 5 to 10 fire hydrants annually. In addition, work has been completed to improve the Water System Telemetry and Emergency Dialer functions, and the ability for water system personnel to remotely monitor and control the water system’s storage and pressure levels. Replacement of inlet meters on the supply side of the City reservoirs and downstream mainline metering replacement have also been accomplished. A five point chlorine & pH analyzer monitors all water entering and leaving the storage site.

The construction of the First Hill Booster Pump Station Improvement project increased the station’s pumping capacity and improved the fire flow for the First Hill area. In addition to the new booster pumps, other improvements to the station include electrical system upgrades, structural modifications for a new hatch door, replacement of the motor control system, and associated piping and valve upgrades and a chlorine and pH monitor.

A new feature added to the Station is the installation of new high efficiency pumps equipped with variable-frequency drive (VFD). The VFD allows the motor to operate at slower speeds which reduce energy and equipment maintenance costs. Since the installation of the new pumps in September 2011, the cost savings for electricity at the First Hill Booster Pump Station averaged approximately 35% compared to the same time period a year ago.

A water meter replacement program on services two inches and larger began in 2007. Previous compound water meters that were installed in prior decades became obsolete and manufacturers since discontinued parts. It has been determined that other forms of metering can be accomplished which provide for a higher level of metering accuracy in conjunction with minimal maintenance. This program also places the City in greater compliance with the Water Use Efficiency Rule with regard to unaccounted for water.

Ongoing training and operational education is provided to water system employees involving the operation of the reservoir, reservoir bypass valve, the second reservoir supply line and how these components effect water quality and reliability of the water distribution system. This has resulted in operational savings and electrical efficiency. Additionally, more employees have been trained to understand the system’s numerous pressure zones and the maintenance and repair of 85 pressure reducing stations within the system.

Beginning in September of 2005, the City activated the long anticipated energy saving bypass valve that was installed years prior at the water reservoir site. Placing this valve in operation during the lower seasonal demand periods has realized savings upwards of \$1,000 a month during eight months of the year.

In 2005, City crews began installing a style of water meter for 1½-inch and larger services which provides a far greater level of accuracy during low flow conditions. Since the City installs upwards of 50 water meters annually for the joint function of metering domestic and potential fire flows, it became apparent that the City was losing low flow registration on its water meters. Advanced metering technology has greatly factored in as customers become more efficient with their use of water.

EMERGENCY SUPPLY SOURCE

On April 18, 2006, the City filed a water right application with the Washington State Department of Ecology (Ecology) to permit and develop two stand-alone emergency source supply wells; one located in the north, and one located in the south of the Island (City) that would be installed on a



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phased basis. The City’s decision to pursue the emergency supply wells was based on its assessment that the City’s water system, as well as its water supply from SPU, was at significant risk of damage and disruption in the event of a major seismic event.

The City proposed that the emergency supply wells be accessible on a temporary, walk-up basis by residents and requested a combined instantaneous quantity (Qi) of 400 gpm and annual quantity (Qa) of 66.3 aft. The purpose in requesting the (above) amounts was to ensure an emergency supply capable of providing up to 5 gallons per day (gpd) for City residents and visitors over a period of 7 to 90 days.

A permit to install and operate the two emergency wells for “Standby-Reserve use only” was issued by Ecology on December 9, 2009. The permit authorized the requested quantities and set forth a well development (construction) schedule that expires on July 1, 2015. Subsequently on March 12, 2015, Department of Ecology granted its approval to the City to extend the timeline for the construction of the second well to July 1, 2022.

The permit also placed multiple operational conditions on use the emergency source wells which include the following:

- Use of the wells may occur pursuant to a declaration of emergency issued by the Governor of the State of Washington or a determination of a local (government) Incident Response Commander or other authorized local official(s) that emergency conditions have so damaged or compromised existing water supplies, as well as access to and use of emergency interties (if existing), that public health and safety are at risk, and thereby warrant the use of emergency water source(s).
- Incident Response Commanders or other appropriate officials responsible for emergency source use shall notify the Department of Ecology NWRO and Washington State Department of Health NWRO prior to authorizing use of emergency source(s), or if that is not feasible, as soon as possible thereafter.
- Use of the wells may only occur pursuant to catastrophic events that disrupt, compromise, damage, or otherwise affect existing public water supplies and related transmission, distribution, storage, fire flow, and treatment facilities in a manner that risks the public health and safety of local and transient communities.
- The well or wells shall not be connected to the City of Mercer Island drinking water distribution system and shall serve only as a point of distribution. However, on-site storage of water from the emergency source is authorized.
- In the event a water supply emergency extends beyond 90 days, the City of Mercer Island must provide the Department of Ecology with a written explanation of the reasons for continued use of the wells and steps being taken to remedy the situation.
- The authorized instantaneous and annual quantities may be exceeded if an emergency causes a supply disruption that exceeds 90 days.
- When the water supply emergency no longer exists, use of emergency water sources should be immediately terminated and the Department of Ecology and Washington State Department of Health so notified

The City should prepare a report consistent with Washington State Department of Health guidelines documenting the volume of water used and/or consumed, and the reliability of the emergency sources in meeting emergency needs. This report should be submitted to Ecology and DOH within 3 months after formal determination of the emergency.



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CHAPTER 7

CIP IMPROVEMENTS

CAPITAL IMPROVEMENT PROGRAM DESCRIPTION

This chapter describes the water system improvements necessary to meet Mercer Island's current and future water system needs. The improvements described in this chapter are prioritized based upon evaluation of the existing system inventory, water modeling, reporting from the operations staff, and the system analysis completed for this plan. Projects were then placed in a reasonable schedule for implementation over the 6- and 20-year improvement program periods.

The specific needs of the water utility are evaluated biennially using contemporary asset management principles. Significant thought goes into the analysis of improvements in order to select the most cost-effective plan to meet the City's current and future needs. However, as the water system infrastructure ages or budgetary issues arise, the size and timing of projects may differ from the recommendations in this plan.

CAPITAL IMPROVEMENT PROJECTS

The City completed all projects scheduled in the 2008 WSP for implementation from 2007 through 2014 except two that were delayed due to council decision for funding purposes. The Island Crest Way project was delayed until 2015 and three new PRV stations on East Mercer Way were combined with another water main project and delayed until 2016 and 2017.

The capital improvement program identified within this section focuses on bringing the existing water system as close as possible to meeting the City's water system policies and goals. All identified projects belong to one of the five categories: Storage, Distribution System, Pump Station, Others, and SPU Supply System. The following are description of improvements assigned to each category.

Storage

Reservoir Storage Upsize

Though the storage analysis result does not indicate any storage deficiencies over the 20-year planning horizon, it is possible that additional storage capacity may be needed if changes are made in the current service area boundary of the SPU wholesale customers on the Island.

Reservoir Master Meter Replacement

Five master meters at the reservoir site were replaced in 2011 and would be replaced again and within the 20-year CIP.

Distribution System

Sub-Standard Watermain Replacement

Approximately 200 segments of watermain are currently listed on the City's Sub-Standard Watermain Replacement list. These are pipes that are 8 inches and under in diameter. A majority



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on the list are aging 4 inches or 6 inches watermains with deteriorating conditions. Refer to **Table 7-4** located at the end of this chapter.

New Watermains

Installation of approximately half a dozen new watermains in neighborhoods that currently have no watermains and lack adequate fire protection. Refer to **Table 7-4**.

Pump Stations

Reservoir Pump Station

Two of the five pumps at the Reservoir Pump Station were replaced within the past 10 years. The emergency generator, which serves as backup power for both the Reservoir Pump Station and the Emergency Well at Rotary Park, is up for replacement in 2016.

First Hill Booster Pump Station

The First Hill Booster Pump Station upgrade was completed in 2011. All interior components of the Station, except for the emergency generator, were replaced.

Others

Emergency Water Supply

The construction of the Emergency Well Facility at the Rotary Park was completed in 2010. A second well site at the south side of the Island will be explored in the 20-year planning period.

Emergency Preparedness

Implementation of the recommendations from the *2004 Seismic Vulnerability Assessment Study*, including: isolation valves, structural stabilization of the reservoir tank anchors, non-structural stabilization of building and components, flexible hoses, and continued public education. Grants and other public funding sources will be pursued to supplement funding this program.

Hydrants and Other Water System Components

Replacement of aging or undersized fire hydrants, air-vacuum assemblies, blow-offs, in-line valves, and PRVs.

Meter Replacement Program

Replacement of outdated and malfunctioning meters that contribute to high unaccountable water losses, including possible upgrade to radio-read meter capability.

Street Related CIP Improvements

Installation or replacement of water system components coordinated with street related improvements.

Telemetry Upgrades

Upgrade or replace the telemetry system.



Water System Plan Update

Update of the City’s Water System Plan every six years as required by DOH.

Water Model Updates/Fire Flow Analysis

Update the City’s hydraulic model every two years and conduct fire flow analysis of the distribution system.

SPU Supply System

SPU and the City are tracking movement of the ground surrounding the supply line area. An option to install two sleeves was selected to provide stabilization to the pipeline. This work was prompted by a major break in the line in early 2007. Due to contractual obligations the majority of cost of any project would be the City’s responsibility paid for through its wholesale water rates.

COST ESTIMATE METHODOLOGY

The planning-level cost estimates prepared as part of the Capital Improvement Program are provided for guidance in project evaluation, funding and implementation from the best available data at this time. The project cost estimates are presented in 2014 dollars and based on actual costs of similar projects from the previous three years.

The estimates are approximately average costs for similar types of projects but do not take into account individual variables related to particular projects that can significantly affect costs. For example, a project in an arterial street compared to a project in a private neighborhood may have higher average costs. For this reason, it is recommended that ‘project-specific’ estimates of probable costs be prepared prior to initiating any specific projects in order to include these unaccounted variables. Additionally, capital costs estimated for the various projects listed should be adjusted to account for inflation rates applicable to the proposed design and construction schedules. As a result, final project costs will vary from the costs projected herein.

FUTURE DEVELOPMENT

The Island is nearly built out at this time. There is more re-development than new development throughout the Island. The business district in the Town Center is currently experiencing re-development growth. These projects are mostly mixed use developments with ground floor retail and residential units above. It is anticipated that the CIP improvements associated with the future developments will be funded by the developers.

SUMMARY

The City of Mercer Island does biennial budget planning. The 2013-2014 Water CIP, included in the City’s Biennial Budget, was adopted in December 2012. **Table 7-1** provides the CIP projects planned for these two years.

Table 7-1. Current Biennium Capital Improvements Projects

Year	Project Name and Description	Finance Source	Budget
2013	88th & 86th Ave SE Water System Improv. - Design	Revenue	\$131,000
	Sandy Cove Water System Improv. - Design & Construction	Revenue	\$374,000
	Mercerwood Dr. Water System Improv. - Design & Construction	Revenue	\$442,000



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Year	Project Name and Description	Finance Source	Budget
	Hydrants Replacement	Revenue	\$60,000
	Water System Components Replacement	Revenue	\$20,000
	Water System Plan Update	Revenue	\$70,000
	76th Avenue SE Water System Improvement	Revenue	\$180,000
<u>2014</u>	88th & 86th Ave SE Water System Improv. - Construction	Revenue	\$619,000
	93rd Ave/SE 72nd, 89th, 90th Ave and SE 41st Water System Improv	Revenue	\$166,000
	83rd Ave SE at SE 40th St Water System Improv	Revenue	\$230,000
	Street Related Water CIP Improvements	Revenue	\$200,000
	Water System Components Replacement	Revenue	\$30,000
	Water System Plan Update	Revenue	\$60,000
	Water Model Updates/Fire Flow Analysis	Revenue	\$25,000
	Meter Replacement Program	Revenue	\$45,000

The next 6-year Capital Improvement Program, as described in Table 7-2, translates into approximately \$15.6 million in capital expenditures. The long-term (20-year) projects listed in Table 7-3 are estimated to be a total of \$85.2 million.

Table 7-2. Six-year Capital Improvements Projects

Year	Project Name & Description	Finance Source	Total Probable Project Cost *
<u>2015</u>	93rd Ave/SE 72nd, 89th, 90th Ave and SE 41st Water System Improv. - Construction	Revenue	\$971,000
	ICW & 85th Ave SE Water System Improv. - Construction	Revenue	\$1,747,000
	9700 Blk SE 41st St Water System Improv. - Design	Revenue	\$80,000
	Madrona Crest West Water System Improv. - Design	Revenue	\$280,000
	Street Related Water CIP Improv.	Revenue	\$150,000
	Water System Components Replacement	Revenue	\$35,000
	Meter Replacement Program	Revenue	\$100,000
<u>2016</u>	9700 Blk SE 41st St Water System Improv. - Construction	Revenue	\$461,000
	3838 WMW neighborhood Water System Improv. - Design	Revenue	\$65,000
	5400 to 6000 block EMW Watermain & 3 new PRV - Design	Revenue	\$219,000
	Madrona Crest West Water System Improv. - Construction	Revenue	\$1,622,000
	Hydrants Replacement	Revenue	\$300,000
	Street Related Water CIP Improv.	Revenue	\$200,000
	Water System Components Replacement	Revenue	\$35,000
	Meter Replacement Program	Revenue	\$100,000
	Water Model Updates/Fire Flow Analysis	Revenue	\$25,000
	Reservoir Generator Replacement	Revenue	\$100,000
<u>2017</u>	3838 WMW neighborhood Water System Improv. - Construction	Revenue	\$377,000
-	82nd Ave and Forest Ave Water System Improv. - Design	Revenue	\$120,000
-	5400 to 6000 block EMW Watermain & 3 new PRV - Construction	Revenue	\$1,276,000
-	Street Related Water CIP Improv.	Revenue	\$200,000
-	Water System Components Replacement	Revenue	\$35,000



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Year	Project Name & Description	Finance Source	Total Probable Project Cost *
-	Meter Replacement Program	Revenue	\$100,000
<u>2018</u>	82nd Ave and Forest Ave Water System Improv. - Construction	Revenue	\$695,000
-	SE 22nd St - SE 22nd Pl Water System Improv. - Design	Revenue	\$142,000
-	76th Ave, btw SE 27th & SE 29th St Water Sys Improv. - Design	Revenue	\$68,000
-	SE 29th St, btw 74th & 76th Ave Water Sys Improv. - Design	Revenue	\$54,000
-	Hydrants Replacement	Revenue	\$300,000
-	Street Related Water CIP Improv.	Revenue	\$200,000
-	Water System Components Replacement	Revenue	\$35,000
-	Meter Replacement Program	Revenue	\$100,000
-	Water Model Updates/Fire Flow Analysis	Revenue	\$25,000
<u>2019</u>	SE 22nd St - SE 22nd Pl Water System Improv. - Construction	Revenue	\$823,000
-	76th Ave, btw SE 27th & SE 29th St Water Sys Improv. - Construction	Revenue	\$394,000
-	SE 29th St, btw 74th & 76th Ave Water Sys Improv. - Construction	Revenue	\$314,000
-	Madrona Crest East Water System Improv. - Design	Revenue	\$285,000
-	New PRV Stations - Design	Revenue	\$50,000
-	Street Related Water CIP Improv.	Revenue	\$200,000
-	Water System Components Replacement	Revenue	\$35,000
-	Meter Replacement Program	Revenue	\$100,000
<u>2020</u>	Madrona Crest East Water System Improv. - Construction	Revenue	\$2,092,000
-	New PRV Stations - Construction	Revenue	\$400,000
-	Hydrants Replacement	Revenue	\$300,000
-	Water System Plan Updates	Revenue	\$60,000
-	Street Related Water CIP Improv.	Revenue	\$200,000
-	Water System Components Replacement	Revenue	\$35,000
-	Meter Replacement Program	Revenue	\$100,000
-	Water Model Updates/Fire Flow Analysis	Revenue	\$25,000
Total Cost for the 6-year CIP plan:			\$15,630,000

* Total Probable Cost in 2014 Dollars includes construction contingency, design, project management & inspection.

Future water system improvements are shown in **Figure 7-1**. Hydrants and Other Water System Components Projects and the Meter Replacement Program are not shown on this map because the project locations will be determined during design. The map, however, shows all the undersized fire hydrants throughout the Island.



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Table 7-3. 20-Year CIP Water Projects

Project	Descriptions	Finance Source	2015	2016	2017	2018	2019	2020	2021	2022-2035
Storage Facility										
Reservoir Master Meter Replacement	Five (5) water flow meters at reservoir and one (1) at the Boat Launch were replaced in 2011. Next upgrade in 2025-2030.	Revenue								\$70,000
Reservoir PRV Replacement.	The high zone PRV replacement is needed in about 6 to 8 years.	Revenue								\$90,000
Both tanks internal coating and external painting	The internal coating schedule should be staggered about 3 months apart. Same timeframe for exterior painting.	Revenue								\$1,552,000
Reservoir Storage Upsize	Increase in tank capacity may be needed in future years (if City take over the last retail customers from SPU).	Revenue								\$2,000,000
Distribution System										
I. Sub-Standard Water Main Replacement Program										
	Ongoing replacement of sub-standard water mains (≤8").								\$1,853,250	\$38,140,000
93rd Ave @SE 72nd St and 89th/90th Ave SE @ SE 40th St	Replacement of 4" CI and 4" AC water mains.	Revenue	\$971,000							
ICW and 85th Ave SE, btw SE 40th and SE 44th St Water System Improvements	Replacement of 6" AC and 4" CI water mains.	Revenue	\$1,747,000							
9700 Block SE 41st St Water System Improvements- Design in 2015. Construction in 2016.	Replacement of 4" AC water main on SE 41st St and abandonment of 6" AC water main on SE 40th St.	Revenue	\$80,000	\$461,000						
3838 WMW	Replacement of 4" CI water main.	Revenue		\$65,000	\$377,000					
82nd Ave and Forest Ave, W of WMW Water System Improv.	Replacement of 6" and 4" CI water mains.	Revenue			\$120,000	\$695,000				
Madrona Crest West Addition Water Sys Improv - Design & Construction	Replacement of 6" AC and 4" CI water mains.	Revenue	\$280,000	\$1,622,000						
SE 22nd St - 22nd Pl Water System Improv.	Replacement of 6" CI and 1.5" Galv. water mains.	Revenue				\$142,000	\$823,000			
76th Ave SE, btw SE 27th St and SE 29th St Water System Improv.	Replacement of 6" CI water mains.	Revenue				\$68,000	\$394,000			
SE 29th St, btw 74th Ave and 76th Ave Water System Improv.	Replacement of 6" CI water mains.	Revenue				\$54,000	\$314,000			
Madrona Crest East Addition Water Sys Improv - Design & Construction	Replacement of 6" and 4" CI water mains.	Revenue					\$285,000	\$2,092,000		
Place Holder - Projects to be scoped and defined (see page 7-2 under "Others" for project descriptions).										
II. Water System Improvements										
	Projects with multiple purposes or locations and/or Island-wide system improvements								\$864,500	\$17,800,000
EMW 5400 to 6000 block Watermain & 3 PRV Stations	Replacement of 1990 LF of 4" and 6" CI water mains, and installation of 3 new PRV stations	Revenue		\$219,000	\$1,276,000					
New PRV stations	Installation of new pressure reducing valve (PRV) stations in areas with excessive high water pressure	Revenue					\$50,000	\$400,000		
Street Related Water System Improvements	Coordinate with street paving projects to complete water system improvements in paving affected areas.	Revenue	\$150,000	\$200,000	\$200,000	\$200,000	\$200,000	\$200,000		
Hydrant Replacements	Replacement of aging or undersized fire hydrants.	Revenue		\$300,000		\$300,000		\$300,000		
System Components Replacement	Replacement of aging air vac, blow-offs, and PRV valves or parts.		\$35,000	\$35,000	\$35,000	\$35,000	\$35,000	\$35,000		
Meter Replacement Program	Ongoing replacement of outdated and malfunctioning meters.	Revenue	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000	\$100,000		



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III. New Water Mains Installation Program	Seven (7) segments of new water main at identified locations should be installed when funding is available.	Revenue								\$3,000,000
Pump Station										
Reservoir Booster Pump Station Upgrades	Future replacement of five (5) pumps and other components, likely near year 2025.									\$250,000
Reservoir Generator Replacement	Generator serving both reservoir and emergency well is in need of replacement	Revenue		\$100,000						
First Hill Booster Pump Station Upgrades	Booster pump station at First Hill was updated in 2010. Next upgrade near year 2024.	Revenue								\$40,000
Others										
Water Model updates/Fire flow Analysis	Hydraulic model should be updated every other year to incorporate system changes.	Revenue		\$25,000		\$25,000		\$25,000		\$210,000
Water System Plan Update	Updating the Water System Plan every six years is required by the Dept of Health.	Revenue						\$60,000	\$70,000	\$302,000
Telemetry Upgrades at both Maintenance Shop and Reservoir	Future replacement of telemetry system.	Revenue								\$100,000
Emergency Preparedness/Public Education/Wellhead Protection Plan	Implementation of recommended/required actions for emergency preparedness.	Revenue								\$20,000
Emergency Water Supply - Well 2 (south well) Pre-design	South Well - facility pre-design is planned for 2021	Revenue							\$100,000	
Emergency Water Supply - Well 2 (south well) Design &Construction	South Well - facility Construction is planned for future years	Other								\$2,000,000
Follow-up CIP projects to address 2014 Boil Water Advisory Events	Upgrade of air vacuum release valve assemblies	Revenue	\$550,000	\$577,500						
Seattle Public Utilities (SPU) Supply System										
Place Holder - Projects to be defined (see page 7-3 under "SPU Supply System" for project descriptions.										
SUB-TOTAL (2022 through 2035)										\$65,574,000
SUB-TOTAL PER YEAR AND TOTAL OF 7 YEARS (2015-2021)			\$3,913,000	\$3,704,500	\$2,108,000	\$1,619,000	\$2,201,000	\$3,212,000	\$2,887,750	\$19,645,250
TOTAL ESTIMATED COSTS (Note 1)										\$85,219,250

Note 1: Total estimated costs listed in this table do not include CIP project management overhead and interfund transfer.



SUB-STANDARD WATERMAIN REPLACEMENT

As stated in Chapter 4, the sub-standard watermain replacement will be a significant component of the CIP water system improvements projects for many years to come. During every biennial budget planning process, these projects and other watermain projects are re-evaluated. Projects with higher priorities will be selected for implementation if they fit into the financial structure for the biennium.

The City has developed a project scoring matrix that uses points, criteria, and weight factors to evaluate each watermain replacement project. The following lists each criterion used in the matrix. Each factor is assigned a weight factor indicating a higher priority for improvement. In general, points are assigned on a scale of 0 to 3 for each criterion.

- Model evaluated fire flow deficiency (Weight Factor 2)
- Pipe diameter (Weight Factor 2)
- Size of area benefitted (Weight Factor 2)
- Maintenance/break history (Weight Factor 4)
- Pipe material (Weight Factor 3)
- Age of pipe (Weight Factor 1)
- Coordination with other projects (Weight Factor 2)

During the next biennial budget planning process, the City will include an additional scoring criterion for water quality.

Table 7-4 lists all the watermain projects currently on the watermain replacement list. The improvements are ranked according to their total score indicating a higher priority for replacement.

Table 7-4. Watermain Replacement/Installation Lists

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
J4	8345 Avalon Dr	Tee W of 8370	NE to Tee @8005 EMW	1968	\$853,364	6"	CI	33
G5	5462 EMW	10" CI ~ 57' from EMW	E, S to Hyd #G5-09	1500	\$650,430	4"	CI	30
D5	9702 SE 41st St	97th AVE SE	SE 40th St	1025	\$444,461	4"	AC	29
E3	Forest Ave SE	Merrimont Dr	E3-24, E, N on 81st Ave	2990	\$1,296,524	6"	CI	28
B2	2800 75th Pl SE	75th PL SE	End of St (2800)	250	\$108,405	4"	CI	27
B2	2805 75th Pl SE	SE 29th St	End of St (2805)	140	\$60,707	4"	CI	27
B2	SE 29th St	74th Ave SE	76th Ave SE	695	\$301,366	6"	CI	27
B2	76th Ave SE	SE 27th ST	SE 29th St	870	\$377,249	6"	CI	27
C2	3838 & WMW	WMW	3876	900	\$390,258	4"	CI	26
I5	7205 93rd Ave SE	SE 72nd St	S to 7234	385	\$166,944	4"	CI	26
J4	8410 Benotho Pl	85th Ave SE	NE to Hyd #J4-12	450	\$195,129	4"	CI	26
A3	SE 22nd St - 22nd Pl	76th Ave SE	78th Ave SE	1060	\$459,637	6"	CI	25



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GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
B3	2970 76th Ave SE	76th Ave SE	77th Ave SE	660	\$286,189	4"	CI	25
C2	72nd Ave SE	SE 32nd St	SE 36rd St	1345	\$583,219	6"	CI	25
D5	4044 94th Ave SE	93rd Ave SE	SE 43rd St	1510	\$654,766	4"	AC	25
B2	SE 32nd St	68th Ave SE	DI 6" near 71st Ave	850	\$368,577	6"	CI	24
B3	SE 30th St	80th Ave SE	ICW	280	\$121,414	6"	CI	24
B3	77th Ave SE	SE 27th St	SE 29th St	870	\$377,249	6"	CI	23
A1	6204 SE 22nd St	SE 22nd	6210	185	\$80,220	4"	CI	22
A2	7414 NMW	7290	7414	635	\$275,349	4"	CI	22
B2	74th Ave SE	Hyd B2-05	SE 27th St	830	\$359,905	6"	CI	22
D3	SE 42nd Pl & WMW	4155 Blvd Pl	WMW	1015	\$440,124	4"	CI	22
D3	4311 Forest Ave SE	4311	Hyd #E3-01	475	\$205,970	4"	CI	22
D4	SE 41st St	89th Ave SE	91st Ave SE	580	\$251,500	4"	AC	22
D5	4215 93rd Ave SE	4134	SE 43rd St	768	\$333,020	4"	AC	22
D5	SE 43rd St	93rd Ave SE	94th Ave SE	270	\$117,077	4"	AC	22
D5	Crestwood Pl & SE 43rd St	94th Ave SE	4200	545	\$236,323	6"	AC	22
E4	8405 & SE 47th Pl	84th Ave SE	Hyd #E4-31	310	\$134,422	4"	CI	22
F3	5220 82nd Ave SE	PRV-F3-B	N to valve	295	\$127,918	4"	CI	22
F3	5249 Forest Ave SE	PRV-F3-B	SW to deadend	240	\$104,069	4"	CI	22
H3	7620 SE 72nd St	WMW	E to 7636	520	\$225,482	4"	CI	22
I2	7637 WMW	meter tap for 7641 EMW	2nd bend E of hydrant I2-08	210	\$91,060	4"	CI	22
J3	8049 WMW	"Y" N of 8049 WMW	SE to Hyd #J3-07	2835	\$1,229,313	8"	CI	22
A2	1600 72nd Ave SE	1600	NMW	290	\$125,750	4"	CI	21
B1	60th Ave SE	SE 27th SE	SE 32nd - 65th PL	2290	\$992,990	6"	CI	21
B2	70th Ave SE	SE 32nd St	SE 29th -71st Ave	1170	\$507,335	6"	CI	21
B3	78th Ave SE	SE 27th St	SE 29th St	865	\$375,081	8"	CI	21
B3	ICW	SE 30th St	SE 32nd St	700	\$303,534	8"	CI	21
B3	SE 32nd St	78th Ave SE	84th Ave SE	1670	\$724,145	8"	CI	21
C3	8000 SE 34th Pl	80th Ave	8027	245	\$106,237	4"	CI	21
C3	3236 78th Ave SE	SE 32nd St	SE 34th St	670	\$290,525	8"	CI	21
D3	SE 40th Street & 83rd Ave SE	SE 40th	4041	470	\$203,801	4"	CI	21
E4	4820 WMW	WMW	4820	280	\$121,414	4"	CI	21
G4	8804 SE 61st St	ICW	E thru 92nd to G5-11	1415	\$613,572	6"	CI	21
G5	SE 57th St + 93rd Pl SE	G5-03	N, E to G5-04	523	\$226,783	4"	CI	21
A1	Faben Dr	SE 22nd	5908 SE 20th	570	\$247,163	6"	CI	20
B1	62nd Ave SE	SE 24th St	SE 27th St	660	\$286,189	6"	CI	20
C4	SE 37th St	84th Ave SE	86th Ave SE	780	\$338,224	4"	CI	20



CHAPTER 7 – CIP IMPROVEMENTS

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
C4	SE 39th St	84th Ave SE	86th Ave SE	790	\$342,560	4"	CI	20
C4	SE 39th St	88th Ave SE	90th Ave SE	730	\$316,543	4"	CI	20
F3	84th Ave SE	WMW	Hyd #F4-13	1154	\$500,397	6"	CI	20
F3	5214 Forest Ave SE	82nd Ave SE	Hyd #F3-18	530	\$229,819	6"	CI	20
J4	8035 Avalon Pl	Avalon Dr	NE to 90' S of 8005	425	\$184,289	4"	CI	20
B3	76th Ave SE & SE 27th St	2411	7620	610	\$264,508	6"	CI	19
B3	81st Ave SE	SE 24th St	Hyd #B3-50	370	\$160,439	6"	CI	19
B3	8205 SE 24th St	SE 24th St	2424	210	\$91,060	6"	CI	19
C3	80th Ave SE	SE 32nd St	SE 40th St	2650	\$1,149,093	6"	CI	19
C4	SE 37th St	88th Ave SE	3642 - N-deadend	1370	\$594,059	4"	CI	19
C4	86th Ave SE	SE 36th St	SE 40th St	1325	\$574,547	6"	AC	19
D5	4340 92nd Ave SE	92nd Ave SE	Hyd #D5-33	165	\$71,547	6"	AC	19
G4	8421 SE 62nd St	84th Ave SE	ICW	1327	\$575,414	8"	CI	19
I5	7447 EMW	Tee NE of 7631 EMW	NE to Tee E of 7219	1850	\$802,197	8"	CI	19
J4	8565 EMW	Hyd #J3-07	NE to Tee W of PRV-I4-A	3060	\$1,326,877	8"	CI	19
B1	63rd Ave SE	SE 27th St	SE 28th St	520	\$225,482	6"	CI	18
C3	8280 SE 36th St	84th	8200	570	\$247,163	4"	CI	18
C5	3350 97th Ave SE	Tee	Hyd #C5-04	235	\$101,901	4"	CI	18
D4	86th Ave SE & SE 44th St	86th Ave SE	8424	375	\$162,608	4"	CI	18
D4	90th Ave SE	SE 40th St	SE 41st	645	\$279,685	4"	AC	18
D5	96th Ave SE	SE 40th St	Shoreclub Dr	1470	\$637,421	6"	AC	18
E4	4450 & 84th Ave	4400	S to Tee @SE 45th St	320	\$138,758	4"	CI	18
E4	SE 47th St & 86th Ave SE	SE 47th	4728	345	\$149,599	4"	CI	18
E4	4728 86th Ave SE	4728	S to Hyd #E4-32	146	\$63,309	4"	CI	18
F4	5212 WMW	WMW	5206	280	\$121,414	4"	CI	18
F4	90th Ave SE	S of 5070	S, W to 14" CI on ICW	835	\$362,073	6"	CI	18
F5	9166 Parkwood Ridge Rd	6" CI S of 9140	SE to Hyd #F5-16	495	\$214,642	4"	CI	18
F5	4804 EMW	6" CI N of 4830	E to Hyd # F5-02	235	\$101,901	4"	CI	18
G3	Northbrook Ln	80 Ave SE	hydrant G3-07	370	\$160,439	4"	CI	18
G3	83rd Pl SE @ SE 62nd St	SE 62nd St	S. to Hyd G3-28	300	\$130,086	4"	CI	18
H2	45 Holly Hill Dr	7179	N to Hyd #H2-06	340	\$147,431	4"	CI	18
H2	7266 Holly Hill Dr	4" CI 4" Tee	E to 6" CI on Holly Hill	555	\$240,659	4"	CI	18
H5	6630 EMW	EMW	E to 6646	690	\$299,198	4"	CI	18
I2	7243 W Ridge Road	WMW	W to 7230	510	\$221,146	4"	CI	18
I3	7620 SE 72nd Pl	Tee S of 7610	S, E to Hyd # I3-01	520	\$225,482	4"	CI	18



CHAPTER 7 – CIP IMPROVEMENTS

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
A3	82nd Ave SE	1985	SE 24th St	1430	\$620,077	6"	CI	17
B1	61st Ave SE	SE 24th St	SE 27th St	610	\$264,508	6"	CI	17
B2	73rd Ave SE @ SE 27th	SE 27th	End of st.(2414)	610	\$264,508	4"	CI	17
B2	SE 27th St	74th Ave SE	76th Ave SE	640	\$277,517	8"	CI	17
B3	SE 28th St	78th Ave SE	80th Ave SE	450	\$195,129	8"	CI	17
C3	77th Ave SE	SE 34th St	SE 39th/78th Ave SE	2050	\$888,921	6"	CI	17
C3	77th Pl SE	SE 34th St	SE 39th St	1705	\$739,322	6"	CI	17
C3	7930 SE 34th St	78th Ave SE	80th Ave SE	375	\$162,608	8"	CI	17
C3	79th Pl SE and SE 37th St	3788 79th PL SE	SE 37th - 80th Ave	1385	\$600,564	6"	CI	17
C3	3248 80th Ave SE	SE 33rd PL	SE 32nd St	495	\$214,642	8"	DI	17
C6	3816 E Mercer Way	3838	3810	185	\$80,220	4"	AC	17
D5	4240 Shoreclub Dr	Shoreclub Dr	4245 Mercerwood Dr	370	\$160,439	6"	STL	17
E4	84th Ave SE	SE 45th St	WMW 14" CI	1945	\$843,391	6"	CI	17
E4	89th Ave SE	SE 45th St	SE 48th St	1990	\$862,904	6"	CI	17
F4	9028 SE 50th St	90th Pl SE	E to Hyd # F4-17	545	\$236,323	4"	CI	17
F4	5300 Landsdown Ln	SE 53rd Pl	Tee S of 5340	595	\$258,004	6"	CI	17
H3	84th Ave SE	SE 64th St	S to SE 72nd St	2650	\$1,149,093	8"	CI	17
H4	SE 68th St	84th Ave SE	92nd Pl SE	2585	\$1,120,908	8"	CI	17
H4	SE 71st St	84th Ave SE	ICW	1370	\$594,059	8"	CI	17
H4	ICW	SE 68th St	S to Tee @ SE 72nd Pl	1478	\$640,890	8"	CI	17
H5	6901 94th AVE SE	SE 70th Pl	N to 6901	250	\$108,405	4"	CI	17
I3	8" main thru playfield (E-W)	Ctr W edge of playfield	E to Tee on 84th Ave	677	\$293,561	8"	CI	17
I3	8215 SE 78th St	Tee for 8215 meter	E to 84th Ave SE	652	\$282,720	8"	CI	17
I3	84th Ave SE	SE 72nd St	S to SE 80th St	2662	\$1,154,296	8"	CI	17
I4	8549 SE 76th Pl	SE 76th PL	SW to 8549	190	\$82,388	4"	CI	17
A2	74th Ave SE	7276	7290	330	\$143,095	6"	CI	16
B3	78th Ave SE	SE 30th St	SE 32nd St	675	\$292,694	8"	CI	16
B3	3077 SE 32nd St	77th Ave SE	78th Ave SE	368	\$159,572	8"	CI	16
B4	NMW	8450 NMW	9095 (Hyd C4-28)	2680	\$1,162,102	8"	CI	16
C1	6105 SE 32nd St	SE 32nd	6105	100	\$43,362	1"	GI	16
C3	7603 SE 37th Pl	76th	77th	435	\$188,625	4"	CI	16
C3	3775 77th Ave SE	77th	3775	140	\$60,707	4"	CI	16
C4	90th Ave SE	SE 37th St	SE 40th St	880	\$381,586	4"	CI	16
C4	84th Ave SE	N of SE 36th St	SE 37th St	460	\$199,465	6"	AC	16
C4	88th Ave SE	SE 36th St	S of SE 40th St	1410	\$611,404	6"	CI	16
C5	96th Ave-SE 34th-3434 97th Ave	Hyd #C5-08	SE 34th to 97th Ave	1060	\$459,637	6"	CI	16



CHAPTER 7 – CIP IMPROVEMENTS

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
D3	7650 SE 41st St	78th Ave SE	PRV-D2-B	842	\$365,108	4"	CI	16
D4	87th Ave SE	SE 42nd St	SE 44th St	1297	\$562,405	8"	CI	16
D4	4220 88th Ave SE	SE 42nd St	6" main NW of reservoir	705	\$305,702	6"	CI	16
D4	4350 88th Ave SE	S of 4254	SE 44th St	650	\$281,853	6"	CI	16
G5	9170 SE 64th St	Tee @ 6189	S, W, to deadend	545	\$236,323	8"	CI	16
H3	SE 67th+80th Ave+SE 70th	10"CI WMW/SE 67th	E, S,W back to WMW	2185	\$947,460	6"	AC	16
H4	8473 SE 68th St	SE 68th St	S to tee W of H4-15	512	\$222,013	8"	CI	16
H4	8421 SE 68th St (SE 69th Pl)	84th Ave SE	Tee W of H4-15	680	\$294,862	8"	CI	16
H5	93rd Ave+SE 68th+96th Ave	7081 93rd Ave SE	N,E,S to valve@6902	2709	\$1,174,677	6"	CI	16
I2	7625 WMW	WMW	S, W to bend S of hyd	443	\$192,094	6"	CI	16
I3	7333 Mercer Terrace Dr	Mercer Terrace	NW to 7333	180	\$78,052	4"	CI	16
I4	7254 91st Ave SE	91st Ave SE	E to 7254	140	\$60,707	4"	CI	16
J4	8555 85th Ave SE	Hyd #J4-16	NE to Tee, N to 8"CI-8395	1188	\$515,141	6"	CI	16
A2	NMW	7406	7414	290	\$125,750	6"	AC	15
B2	69th Ave SE	SE 32nd St	3005	655	\$284,021	6"	CI	15
C1	3265 & 67th Ave	3265	WMW	330	\$143,095	4"	CI	15
C2	WMW	SE 34th St	PRV-C2-A	2230	\$966,973	8"	CI	15
C3	SE 34th St	84th Ave SE	W to 8220	570	\$247,163	6"	CI	15
C4	SE Gallagher Hill	3726	3921	350	\$151,767	6"	AC	15
D3	4310 Island Crest Way	4300	4340	300	\$130,086	2"	CI	15
D3	WMW	SE 42nd Pl	Merrimount Dr	2105	\$912,770	8"	CI	15
D4	91st Ave SE	SE 42nd St	SE 44th St, E to 92nd Ave	1585	\$687,288	6"	AC	15
E5	SE 47th St	12" CI on EMW	9350 SE 47th St	675	\$292,694	6"	CI	15
G3	5625 84th Ave SE	SE 57th	N to 5605	256	\$111,007	4"	CI	15
G3	80th Ave SE	G3-01	S,W,S to G3-16	2480	\$1,075,378	8"	CI	15
G3	78th Ave SE+79th Ave SE	G3-16	78th, 79th S to WMW	1960	\$849,895	6"	CI	15
G5	9220 SE 59th St	Tee E of G4-12	E to 9253	758	\$328,684	6"	CI	15
H2	SE 71st St	WMW	NW Loop back @ 7510	1940	\$841,223	6"	CI	15
H3	6520 82nd Ave SE	82nd Ave	E to 6520	105	\$45,530	4"	CI	15
H3	7005 80th Ave SE	SE 70th St	7021	389	\$168,678	6"	AC	15
H3	SE 72nd St	78th Ave SE	E to tee for Hyd #I3-45	1840	\$797,861	8"	CI	15
I2	7217 WMW	WMW	W to 7231	805	\$349,064	6"	CI	15
I4	SE 80th St + ICW	Tee @84th/SE 80th	E,N on ICW to SE 72nd	3700	\$1,604,394	8"	CI	15



CHAPTER 7 – CIP IMPROVEMENTS

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
A2	66th Ave SE	6518	2203	830	\$359,905	6"	CI	14
A3	8004 SE 20th St	80th Ave	8030	160	\$69,379	1 1/2"	GAL	14
A3	SE 22nd Pl	78th Ave SE	80th Ave SE	600	\$260,172	6"	CI	14
A3	8000 to 81st Ave SE	2208 80th Ave	SE 24th St	880	\$381,586	6"	CI	14
B2	WMW	SE 24th St	SE 27th - 65th PL	880	\$381,586	6"	CI	14
B2	71st Ave SE	SE 29th St	SE 32nd St	970	\$420,611	6"	CI	14
C6	3712 EMW	8" AC Main	S to deadend	72	\$31,221	2"	Copper	14
C6	3826 EMW	PRV-C5-E	3820	455	\$197,297	6"	AC	14
D3	4215 ICW	SE 42nd St	S to deadend	165	\$71,547	3"	Steel	14
D3	4215 Island Crest Way	6" AC	Dead end @ south	160	\$69,379	3"	STL	14
D4	89th Ave SE	SE 40th St	SE 41st	655	\$284,021	4"	AC	14
E4	SE 47th St	86th Ave SE	88th Ave SE	660	\$286,189	6"	CI	14
F4	90th Ave SE	SE 48th St	5070	1314	\$569,777	6"	CI	14
G3	SE 62nd St @ 79th Ave	79th Ave SE	7840	235	\$101,901	4"	CI	14
G4	6015 & 90th Ave SE	SE 60th St	SE 61st St	280	\$121,414	4"	AC	14
G4	5608 89th Ave SE	SE 56th St	SE 58th St	697	\$302,233	6"	CI	14
G4	8806 SE 59th St	ICW	E, S to SE 60th St	1525	\$661,271	6"	CI	14
H2	Holly Hill Rd	PRV-I2-A	SW, N, W to H2-07	1295	\$561,538	6"	CI	14
H3	8000 SE 70th Pl	80th Ave	E to 8010	146	\$63,309	4"	CI	14
H5	SE 72nd Pl + SE 72nd Ave	H5-22@ 9621	SW to Tee on EMW	642	\$278,384	6"	CI	14
I2	WMW- stretch 3 grids	WMW/SE 72nd	S, J2, valve @ Y in J3	3685	\$1,597,890	8"	CI	14
I3	7627 79th Ave SE	Hyd #I3-14	S to Hyd #I3-17	514	\$222,881	4"	CI	14
I4	SE 73rd St+85th Ave+SE 75th	86th Ave SE	W,S,SE to I4-17	1415	\$613,572	6"	CI	14
I4	SE 79th Pl+Island Heights Ln	SE 78th St	S, E to ICW	1410	\$611,404	8"	CI	14
I4	8874 SE 72nd Pl	ICW	E to 92nd Pl SE	1396	\$605,334	6"	CI	14
J4	8416 SE 87th ST	W of 8439 meter tap	E to bend S of 8427meter	216	\$93,662	4"	CI	14
A1	SE 20th St N of Faben Drive	Faben Dr.	W end of 20th	146	\$63,309	4"	CI	13
B2	70th Ave SE	SE 24th St	2754 70th Ave SE	1640	\$711,137	6"	CI	13
C3	SE 36th St and 81st Ave SE	8001	8040 to- SE 40th St	2000	\$867,240	6"	CI	13
C4	8416 SE 33rd Pl	SE 33rd Pl	8449	320	\$138,758	4"	CI	13
C4	SE 40th St	86th Ave SE	90th Ave SE	1230	\$533,353	6"	AC	13
D3	WMW	Bldv Pl	4170 Blvd Pl	760	\$329,551	6"	CI	13
D3	4004 ICW	SE 40th St	4060 ICW	800	\$346,896	6"	AC	13
D3	ICW/SE 41st St	SE 41st St	6" AC @ 8321	100	\$43,362	6"	AC	13
D3	4105 ICW	4060 ICW	SE 42nd St	630	\$273,181	6"	AC	13



CHAPTER 7 – CIP IMPROVEMENTS

GRID	ADDRESS	Range From	Range To	Length of Pipe (ft)	Estimated Total Project Budget	PIPE DIA.	PIPE	TOTAL SCORE
D4	9100 SE 42nd St	92nd Ave SE	W to deadend	92	\$39,893	6"	AC	13
D4	90th Ave SE	SE 42nd St	SE 44th St	1300	\$563,706	6"	CI	13
D4	92nd Ave SE	S of Hyd D5-34	SE 44th St	1565	\$678,615	6"	AC	13
D5	4292 Shoreclub Dr	4290	4283	160	\$69,379	2"	CI	13
D5	SE 42nd St & 93rd Ave SE	92nd Ave SE	93rd Ave, N to SE 40th	1425	\$617,909	6"	AC	13
D5	SE 43rd St & 95th Ave SE	4250 92nd Ave SE	95th, N to Mercerwood	1685	\$730,650	6"	AC	13
D5	97th Ave SE	SE 40th St	Mercerwood Dr	1020	\$442,292	6"	AC	13
D5	Mercerwood Dr	95th Ave SE	9802	1336	\$579,316	6"	AC	13
D5	Shoreclub Dr	4283	Mercerwood Dr	1215	\$526,848	6"	AC	13
E4	87th Ave SE	SE 45th St	SE 47th St	1320	\$572,378	6"	CI	13
E4	90th Ave SE	4630 89th Ave SE	SE 48th St	1010	\$437,956	6"	CI	13
E4	91st Ave SE	4518 91st Ave SE	SE 48th St	1740	\$754,499	6"	CI	13
E5	Ferncroft Rd	4422	EMW @PRV-E5-E	1180	\$511,672	6"	CI	13
F4	SE 54th Pl	ICW	9140	1420	\$615,740	6"	CI	13
F5	5360 EMW	EMW	E curve, N to Hyd F5-12	1710	\$741,490	6"	CI	13
G3	83rd Ave SE @ SE 59th	SE 59th	S. to 5915	260	\$112,741	4"	CI	13
G4	8412 SE 63rd St	84th Ave SE	ICW	1328	\$575,847	6"	CI	13
G4	5709 92nd Ave SE	SE 57th St	Tee @ SE 59th St	618	\$267,977	6"	CI	13
H3	83rd Ave SE	SE 68th St	S, W to 82nd Ave SE	1316	\$570,644	6"	CI	13
H4	8415 SE 68th St	SE 68th St	S, E to 8" CI at tee	512	\$222,013	8"	DI	13
H4	SE 69th Pl	W of valve @ 8401	E to Tee @ 8470	746	\$323,481	6"	DI	13
I3	7804 79th Ave SE	SE 78th Ave SE	S to 7820	405	\$175,616	6"	CI	13
I3	8220 SE 78th St	SE 78th St	N to Hyd #I3-36	268	\$116,210	8"	DI	13
I4	7702 88th Pl SE	SE 78th St	N to 7702	204	\$88,458	4"	CI	13
I4	7716 89th Pl SE	7806	NE to 7706	632	\$274,048	4"	CI	13
I4	7353 85th Pl SE	Bend W of 8515	S to Tee W of 7388	495	\$214,642	6"	CI	13
I4	91st Ave SE & 92nd Pl SE	SE 72nd Pl	S, NW to Tee @ 92nd Av	2036	\$882,850	6"	CI	13
J3	84th Ave SE+SE 83rd St	S of meter tap 8401	S, SE, to 8" DI S of 8465	705	\$305,702	6"	CI	13



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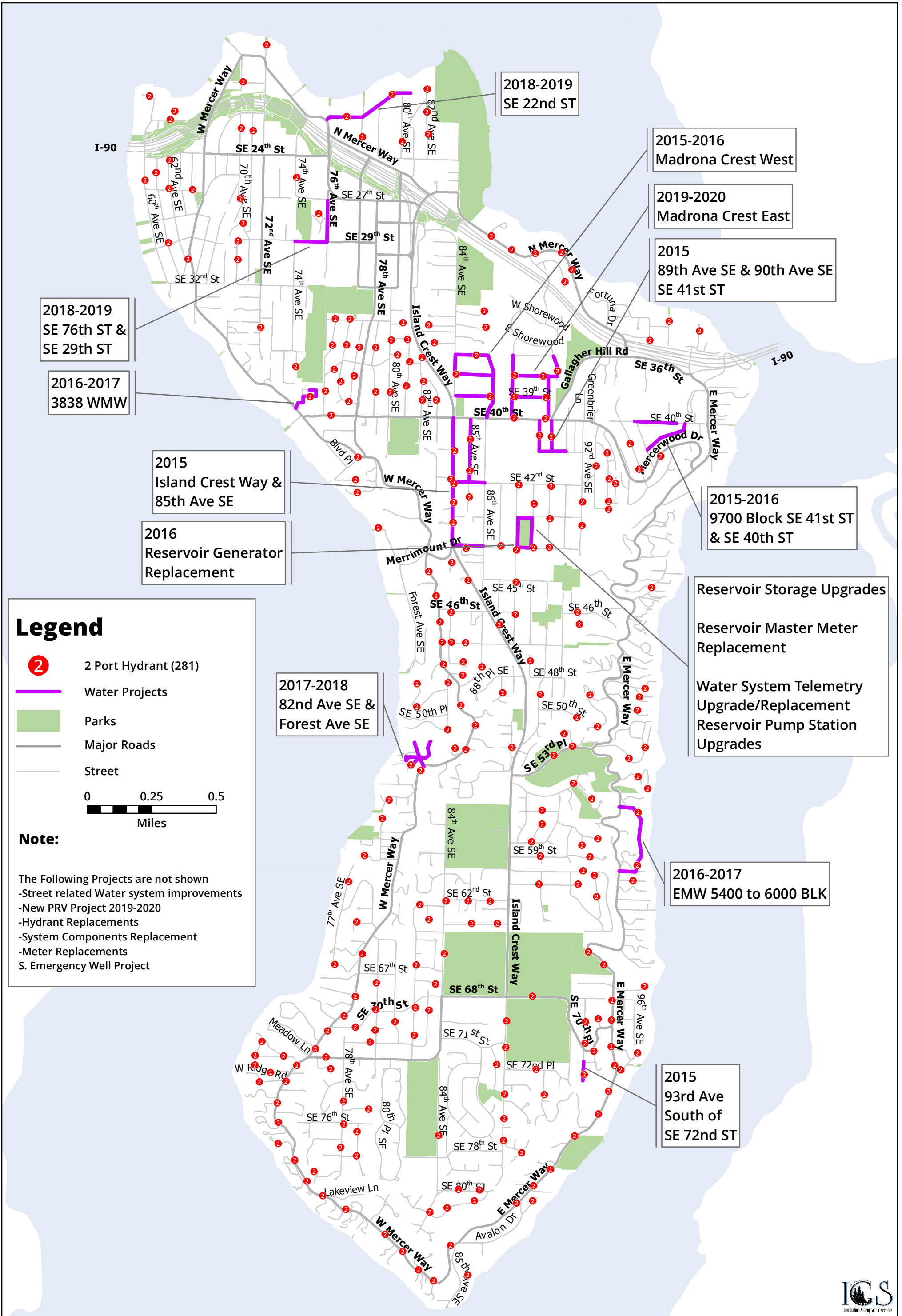


Figure 7-1: CIP Improvements



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CHAPTER 8

FINANCIAL INFORMATION

This chapter summarizes the current and forecasted financial strength of Mercer Island's Water Utility and its funding strategy for recommended capital improvements identified in Chapter 7. Beginning with a review of the past seven years financial history, this chapter evaluates the City's current financial condition as well as the revenue sources available to pay for the Water Fund's capital needs.

FINANCIAL POLICIES

Starting in the Spring of 1992, the Finance Department worked closely with the Utility Board to establish financial policies to guide future rate and budget decisions made for the Utilities. The financial policy analysis consisted of identifying, describing, and to the extent possible, evaluating impacts of various elements of the policies. Elements discussed included types and levels of utility reserves, methods of capital improvement funding, methods of capital replacement funding, rate structure and equity, and related objectives such as water conservation.

In 2006, the Utility Board reviewed and updated the fiscal policies for the Water Fund. The Board recommended: (1) Increasing the operating reserve from 75 days to 90 days, (2) Creating a capital contingency reserve of 1% of original asset value, and (3) Increasing the rate funding for capital reinvestment from \$700,000 to \$1,050,000 over a four-year period. These reserve policy changes were adopted as part of the 2006 water rate study. The Financial Policies are detailed in the City of Mercer Island's biennial budget.

WATER FUND HISTORICAL FINANCIAL PERFORMANCE

The City operates the water system as a self-supporting utility. The Water Utility is designed to operate like a business, charging rates for the purpose of providing water to City residents. All expenses are supported through rates charged to City residents and businesses. The City also has a financial policy of funding capital projects on a pay-as-you-go basis, thus the City has very little outstanding debt. The City will occasionally finance major capital projects with debt.

Table 8-1 (see the next page) presents a financial summary of the water utility's operating revenues and expenses from 2007 through 2013. During this period rate increases averaged 8.61%, contributing to the increasing fund balance in the Water Fund. Total revenues (excluding debt proceeds and the sale of fixed assets) increased from \$3.8 million in 2007 to \$5.8 million in 2013. Water revenue is impacted by the level of water consumption, which can vary greatly depending on how wet or dry the summer season is in any given year. The majority of revenues come from payments for regular water service. Other sources of revenue include meter installations, connection charges, lease payments for cell towers located on water owned property, transfers from other City funds, and interest on investments.

Total expenses, which include personnel, materials, supplies, water purchases from Seattle Public Utility and rate funded capital outlays, have ranged from a low of about \$3.8 million in 2008 to a high of about \$5.6 million in 2013 (excluding the debt repayment of \$975,000 which was made from the sale of property). The largest annual operating expense to the City is the purchase of water from Seattle Public Utilities.



CHAPTER 8 – FINANCIAL INFORMATION

TABLE 8-1
Water System Revenue and Expense Summary, 2007-2013

Year Ending	2013	2012	2011	2010	2009	2008	2007
Beginning Working Capital	\$ 4,213,457	\$ 4,502,341	\$ 2,497,156	\$ 2,149,407	\$ 1,579,289	\$ 1,568,226	\$ 1,721,298
Revenue							
Water Service	\$ 5,141,605	\$ 4,875,525	\$ 4,194,453	\$ 3,804,482	\$ 4,042,783	\$ 3,350,141	\$ 3,213,125
Conservation Surcharge	28,156	25,576	24,428	23,397	45,387	34,720	37,219
Special Service Fees	42,085	38,513	39,545	35,675	33,230	28,500	31,020
Meter Installations	180,507	126,203	110,215	115,891	62,517	136,744	180,400
Connection Fees	274,330	93,094	238,116	105,180	181,148	202,847	250,431
Interest on Investments	7,039	4,479	10,705	8,721	16,691	36,451	72,780
Leases of Public Cell Towers	27,320	27,256	24,233	24,233	26,198	-	-
Sale of Fixed Assets	1,900,004	-	10,917	-	-	-	-
Debt Proceeds	-	-	1,519,771	-	1,015,000	-	-
Transfer from Other Funds	86,226	82,530	471,264	64,862	-	-	1,667
Other Revenues	5,811	(34,625)	8,914	1,040	(21)	(261)	-
Total Revenue	\$ 7,693,081	\$ 5,238,551	\$ 6,652,561	\$ 4,183,482	\$ 5,422,933	\$ 3,789,141	\$ 3,786,642
Expenses							
Operating Expense	\$ 2,222,392	\$ 2,056,162	\$ 1,819,982	\$ 1,896,517	\$ 1,895,461	\$ 1,789,701	\$ 1,733,303
Water Purchases	2,077,763	2,010,974	1,418,172	1,323,119	1,617,528	1,462,388	1,522,431
Water Purchases-Settlement	316,929	-	-	-	-	-	-
Water Conservation	871	1,000	1,864	19,672	21,774	1,943	9,145
Debt Service	1,094,617	136,677	102,197	71,468	10,359	13,869	14,006
Rate Funded Capital Outlays	890,669	1,322,621	1,305,161	524,955	1,307,693	510,177	660,829
Total Expenses	\$ 6,603,240	\$ 5,527,435	\$ 4,647,376	\$ 3,835,732	\$ 4,852,816	\$ 3,778,077	\$ 3,939,714
Net Increase (Decrease) in Working Capital	\$ 1,089,841	\$ (288,884)	\$ 2,005,185	\$ 347,750	\$ 570,117	\$ 11,064	\$ (153,072)
Ending Working Capital	\$ 5,303,298	\$ 4,213,457	\$ 4,502,341	\$ 2,497,156	\$ 2,149,407	\$ 1,579,289	\$ 1,568,226
Overall Rate Increase:	4.30%	12.35%	9.50%	8.15%	10.50%	8.80%	6.65%

During this period debt proceeds were received to fund two capital projects. The first was \$1,015,000 received in 2009. This was a short-term loan to fund the construction of an Emergency Water Well. A surplus property owned by the Water Utility was sold in 2013 to pay off this loan. In addition, in 2011, debt proceeds of \$1,519,771 were received to fund the construction of Water System Improvements on First Hill. This debt is in the form of limited tax general obligation bonds which will be paid off in 2030.

EXISTING RATE STRUCTURE

Table 8-2 (Residential Bimonthly Water Rates) and **Table 8-3** (Non- Residential Bimonthly Water Rates) present the adopted water rates for 2014 for the City. In 2014, rates will increase an average of 8.0% over 2013. **Table 8-4** (Meter Equivalents and Fixed Charges) provides further detail on the fixed charges portion of the rates shown in Tables 8-2 and 8-3.



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**TABLE 8-2
Residential Bimonthly Water Rates**

Class	Fixed Charge	Volume Charge			
	Per Meter Equivalent*	Block 1 (0-10 ccf)	Block 2 (11-20 ccf)	Block 3 (21-30 ccf)	Block 4 (31+ ccf)
Single Family Residential	\$23.40	\$2.78	\$4.70	\$5.65	\$7.59
Low-Income Residential	\$23.40	\$0.70	\$1.18	\$1.41	\$1.90
Conservation Surcharge**				\$0.10	\$0.30

Class	Fixed Charge	Volume Charge
	Per Meter Equivalent*	All Use (0-99+ ccf)
Multi-Family Residential	\$23.40	\$4.11

* Meter Equivalents are summarized in a following table. The total meter equivalent charge is based on the meter size and is calculated by multiplying the meter equivalents by the per meter equivalent rate.

** A surcharge of \$0.10 per ccf for single family residential bimonthly usage between and including 21 and 30 ccf, and \$0.30 per ccf for bimonthly usage in excess of 30 ccf will be included in the rates, as an incentive to conserve and may be used to fund conservation education. This rate will apply on consumption of water from June 1 through September 30.

**TABLE 8-3
Non-Residential Bimonthly Water Rates**

Class	Fixed Charge	Volume Charge	
	Per Meter Equivalent*	Winter** (All Usage)	Summer** (All Usage)
Commercial/Public	\$23.40	\$2.55	\$6.36
Irrigation	\$23.40	\$3.82	\$8.04

* Meter Equivalents are summarized in a following table. The total meter equivalent charge is based on the meter size and is calculated by multiplying the meter equivalents by the per meter equivalent rate.

** Seasons: Summer is June 1 through September 30; rest of year is winter.

**TABLE 8-4
Meter Equivalents and Fixed Charges**

Meter Size	Meter Equivalent	Fixed Charge
3/4 Inch or Smaller	1.0	\$23.40
1 Inch	2.5	\$58.50
1-1/2 Inch	5.0	\$117.00
2 Inch	8.0	\$187.20
3 Inch	16.0	\$374.40
4 Inch	25.0	\$585.00
6 Inch	50.0	\$1,170.00



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The Utility Board annually reviews utility rate analysis prepared by City staff and recommends rate changes to the City Council. The 2014 recommended rate increases are primarily driven by two things: (1) the cost of capital reinvestment in the water system, and (2) the cost of water purchased from Seattle Public Utilities. Full details of the water rates for 2014 are detailed in Resolution 1470 and a copy is in **Appendix P**.

CURRENT BIENNIAL BUDGET FOR WATER FUND

Table 8-5 presents the forecasted annual water revenues, expenses and fund balances, based on the adopted 2013-2014 biennial budget, water consumption to date, and forecasted changes to the budget.

TABLE 8-5 Water System Revenue and Expense Summary, 2013-2014		
Year Ending	2013 Actual	2014 Fore cast
Beginning Working Capital	\$ 4,213,457	\$ 5,303,300
Revenue		
Water Service	\$ 5,141,605	\$ 5,161,038
Conservation Surcharge	28,156	20,000
Special Service Fees	42,085	32,000
Meter Installations	180,507	100,000
Connection Fees	274,330	112,986
Interest on Investments	7,039	22,298
Sale of Fixed Assets (Property)	1,900,004	-
Transfer from Other Funds	86,226	89,614
Other Revenues	33,131	-
Total Revenue	\$ 7,693,083	\$ 5,537,936
Expenses		
Operating Expense	\$ 2,223,262	\$ 2,240,665
Water Purchases	2,394,692	1,867,561
Debt Service	1,094,617	108,263
Rate Funded Capital Outlays	890,669	1,753,163
Total Expenses	\$ 6,603,240	\$ 5,969,652
Net Increase (Decrease) in Working Capital	\$ 1,089,843	\$ (431,716)
Ending Working Capital	\$ 5,303,300	\$ 4,871,584

FINANCIAL OUTLOOK – UPCOMING SIX-YEAR PERIOD

Table 8-6 presents a projection of the annual utility revenues, expenses, and fund balances for the next six years, based on the 2013-2014 adopted biennial budget and changes expected to occur in the various categories over the subsequent six-year period as a result of new customers, general inflation, and other related factors. This type of forecast is routinely used by Finance staff to develop rate adjustment proposals and to assess the impact of changing budget assumptions on future rate requirements.

Some key assumptions used to forecast future annual revenues and expenses that appear in **Table 8-6** are outlined below:

1. Water consumption is expected to decline approximately 1% per year for the period 2015-2020. This is based on historical declines of 1-2% per year in the last few years.



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2. Wholesale water costs for 2015 through 2020 are expected to increase 5% per year. Overall, the cost of purchased water is expected to increase about 24% over the six-year period.
3. Personnel labor costs are expected to increase annually by 5.5% while benefit costs are anticipated to increase about 7.5% per year for the 6 year period of 2015-2020. Overall, personnel costs are expected to increase about 42% over the six-year period.
4. Other maintenance and operations expenses will increase annually by 3.0%, based on historical trends and projected increases in the Seattle Consumer Price Index (CPI-U). An increase of 19% is expected over the 6 year period.
5. The average annual water consumption is 990,000 ccf based on water purchases from Seattle Public Utilities between 2012 and 2013. With water losses of close to 10%, water sales to Mercer Island customers are estimated at an average of 901,000 ccf.
6. Rate funding for capital reinvestment is based on the capital reinvestment project plan for 2015-2020. Details of the capital funding needs for anticipated system improvements are detailed in Chapter 7.

TABLE 8-6
Water System Revenue and Expense Summary, 2015-2020

Year Ending	2015	2016	2017	2018	2019	2020
Beginning Working Capital	\$ 4,871,584	\$ 3,089,792	\$ 2,013,802	\$ 1,420,507	\$ 2,071,992	\$ 2,458,397
Revenue						
Water Service	\$ 5,522,508	\$ 5,909,122	\$ 6,322,624	\$ 6,764,877	\$ 7,312,279	\$ 7,903,659
Conservation Surcharge	20,000	20,000	20,000	20,000	20,000	20,000
Special Service Fees	32,000	32,000	32,000	32,000	32,000	32,000
Meter Installations	99,000	98,010	97,030	96,060	96,060	96,060
IFT - General Fund	95,815	102,446	109,535	117,115	126,484	136,603
Connection Fees	128,013	143,840	160,501	178,033	183,374	188,875
Interest on Investments	32,347	24,822	27,191	26,872	27,254	36,052
Total Revenue	\$ 5,929,683	\$ 6,330,240	\$ 6,768,881	\$ 7,234,957	\$ 7,797,450	\$ 8,413,249
Expenses						
Operating Expense	\$ 2,245,692	\$ 2,336,855	\$ 2,447,982	\$ 2,534,357	\$ 2,643,447	\$ 2,758,378
Water Purchases	1,941,330	2,018,013	2,097,724	2,180,584	2,289,613	2,404,094
Debt Service	106,763	110,263	108,475	111,525	109,425	107,150
Rate Funded Capital Outlays	3,417,691	2,941,100	2,707,995	1,757,005	2,368,560	3,358,930
Total Expenses	\$ 7,711,475	\$ 7,406,230	\$ 7,362,176	\$ 6,583,471	\$ 7,411,045	\$ 8,628,552
Net Increase (Decrease) in Working Capital						
Ending Working Capital	\$ 3,089,792	\$ 2,013,802	\$ 1,420,507	\$ 2,071,992	\$ 2,458,397	\$ 2,243,094
<i>Target - 75 days Operating Res</i>	<i>1,032,416</i>	<i>1,070,869</i>	<i>1,120,859</i>	<i>1,162,588</i>	<i>1,216,371</i>	<i>1,269,460</i>
<i>Target - 1% Asset Value Capiti</i>	<i>373,023</i>	<i>397,824</i>	<i>423,704</i>	<i>647,526</i>	<i>437,210</i>	<i>449,879</i>
Available Working Capital	\$ 1,684,352	\$ 545,109	\$ (124,056)	\$ 261,878	\$ 804,816	\$ 523,755
Forecasted Rate Increase:	8.00%	8.00%	8.00%	8.00%	8.00%	8.00%

CURRENT DEBT STATUS AND CREDIT WORTHINESS

The City of Mercer Island has prudently issued little debt over the years, maintaining a sizable debt capacity. The City has consistently followed a conservative fiscal management policy, which is reflected by the high Aa1 rating from Moody's Investors Service. Mercer Island is the only city in the State with an Aa1 rating – only Bellevue and Seattle have a higher rating.



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The City has no immediate plans to issue additional debt. However, if this action becomes necessary, the Utility can expect a proposed bond issue to receive a similarly favorable credit rating and, therefore, to sell at lower interest rates than would otherwise be possible.

SUMMARY

The City applies prudent financial practices to management of the utility, as evidenced by the high rating from Moody's Investors Service. While the financial projection for the utility indicates that an average annual rate adjustment of 8% is projected through 2020, rate increases are subject to City Council approval and are evaluated each year during the budget planning process. The City will consider the financial impact on customers while balancing the necessary rate increases to fully fund the operating and maintenance expenses, capital costs and to maintain reserve balances.

Appendix A

State Environmental Policy Act (SEPA) Checklist and Determination

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CITY OF MERCER ISLAND, DEVELOPMENT SERVICES GROUP
 9611 S.E. 36 ST., MERCER ISLAND, WA 98040
 (206) 275-7605 FAX: (206) 275-7726
 WWW.MERCERGOV.ORG

ENVIRONMENTAL CHECKLIST

(WAC 197-11-960)

Date Received _____
 File No. _____
 Fee _____
 See Development Application for fees

Purpose of Checklist:

The State Environmental Policy Act (SEPA), chapter 43.21C RCW, requires all governmental agencies to consider the environmental impacts of a proposal before making decisions. An environmental impact statement (EIS) must be prepared for all proposals with probable significant adverse impacts on the quality of the environment. The purpose of this checklist is to provide information to help you and the agency identify impacts from your proposal (and to avoid impacts from the proposal, if it can be done) and to help the agency decide whether an EIS is required.

Instructions for Applicants:

This environmental checklist asks you to describe some basic information about your proposal. Governmental agencies use this checklist to determine whether the environmental impacts of your proposal are significant, requiring preparation of an EIS. Answer the questions briefly, with the most precise information known, or give the best description you can.

You must answer each question accurately and carefully, to the best of your knowledge. In most cases, you should be able to answer the questions from your own observations or project plans without the need to hire experts. If you really do not know the answer, or if a question does not apply to your proposal, write "do not know" or "does not apply." Complete answers to the questions now may avoid unnecessary delays later.

Some questions ask about governmental regulations, such as zoning, shoreline, and landmark designations. Answer these questions if you can. If you have problems, the governmental agencies can assist you.

The checklist questions apply to all parts of your proposal, even if you plan to do them over a period of time or on different parcels of land. Attach any additional information that will help describe your proposal or its environmental effects. The agency to which you submit this checklist may ask you to explain your answers or provide additional information reasonably related to determining if there may be significant adverse impact.

Use of checklist for nonproject proposals:

Complete this checklist for nonproject proposals, even though questions may be answered "does not apply." IN ADDITION, complete the SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS (part D).

For nonproject actions, the references in the checklist to the words "project", "applicant," and "property or site" should be read as "proposal," proposer", and "affected geographic area," respectively.

A. BACKGROUND

1. Name of proposed project, if applicable:
 City of Mercer Island Comprehensive Water System Plan

2. Name of applicant: City of Mercer Island

3. Address and phone number of applicant and contact person:

Rona Lin
 Utilities Engineer
 City of Mercer Island
 9611 SE 36th Street



4. Date checklist prepared: January 9, 2015

5. Agency requesting checklist:

City of Mercer Island, Development Services Group

6. Proposed timing or schedule (including phasing, if applicable):

The comprehensive water system plan addresses the policies, design criteria, and outlines recommendations for system improvements. The plan will be supplemented and updated on a regular basis, at least every six years

7. Do you have any plans for future additions, expansions, or further activity related to or connected with this proposal? If yes, explain.

Yes, the City plans to update or supplement this plan on a regular basis. Any desired changes to these recommendations will require a comprehensive plan amendment. It is recommended that this plan be updated in the year 2021.

8. List any environmental information you know about that has been prepared, or will be prepared, directly related to this proposal.

The majority of the projects listed in the capital improvement program are subject to SEPA regulations. While some projects may be categorically exempt, most will require a Determination of Non-Significance (DNS).

9. Do you know whether applications are pending for governmental approvals of other proposals directly affecting the property covered by your proposal? If yes, explain.

No

10. List any government approvals or permits that will be needed for your proposal, if known.

The approval from the Washington Department of Health and the City Council of Mercer Island will be required.

11. Give brief, complete description of your proposal, including the proposed uses and the size of the project and site. There are several questions later in this checklist that ask you to describe certain aspects of your proposal. You do not need to repeat those answers on this page. (Lead agencies may modify this form to include additional specific information on project description.)

The Comprehensive Water System Plan serves all of Mercer Island which covers approximately 6.2 square miles of area. A component of this plan is a list of water system projects to be constructed over the next six years and beyond. The comprehensive plan lists projects to be constructed in a 6-year and 20-year program, however, this checklist does not address any specific projects or site or specific conditions. The projects proposed in the plan will be reviewed as the engineering studies or scopes of work are developed and discussed in the SEPA reviews of the individual projects.

12. Location of the proposal. Give sufficient information for a person to understand the precise location of your proposed project, including a street address, if any, and section, township, and range, if known. If a proposal would occur over a range of area, provide the range or boundaries of the site(s). Provide a legal description, site plan, vicinity map, and topographic map, if reasonably available. While you should submit any plans required by the agency, you are not required to duplicate maps or detailed plans submitted with any permit applications related to this checklist.

The area covered by this Comprehensive Water System Plan is the City of Mercer Island located in Lake Washington between the Cities of Seattle and Bellevue.

B. ENVIRONMENTAL ELEMENTS

1. Earth

a. General description of the site (check one): Flat, rolling, hilly, steep slopes, mountainous, other...
 Flat rolling hilly steep slopes mountainous other...

b. What is the steepest slope on the site (approximate percent slope)?
 45%

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.

The main soil types for Mercer Island are Clay and Sand

d. Are there surface indications or history of unstable soils in the immediate vicinity?
 If so, describe.

Some landslide hazards exist on the island. A soil survey will be completed if a project exists in a location of a known landslide area.

e. Describe the purpose, type, and approximate quantities of any filling or grading proposed. Indicate source of fill.

There are no known needs for grading or filling for any of the projects identified in the comprehensive plan. During the construction of a water main, any back fill material will be imported unless the native material is suitable for backfill.

f. Could erosion occur as a result of clearing, construction, or use? If so, generally describe.

There is the potential for erosion to occur during construction of water projects. Standard BMP's will be installed as necessary for each project.

g. About what percent of the site will be covered with impervious surfaces after project construction (for example, asphalt or buildings)?

Water projects on the island rarely create new impervious surfaces. For the most part, water mains are constructed in existing roadway or easements where structures are prohibited.

h. Proposed measures to reduce or control erosion, or other impacts to the earth, if any:

All construction projects identified in this plan will provide erosion control measures, which shall meet all erosion control requirements as required by BMP, County, and City requirements or as required by SEPA finding.

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.

Potential vehicular and equipment emissions may affect the ambient air quality for a short period of time during the construction of water system project



b. Are there any off-site sources of emissions or odor that may affect your proposal? If so, generally describe.

Potential vehicular and equipment emissions may affect the ambient air quality for a short period of time during the construction of water system project



c. Proposed measures to reduce or control emissions or other impacts to air, if any:

The construction projects will meet all City codes including state emission control.

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, saltwater, lakes, ponds, wetlands)? If yes, describe type and provide names. If appropriate, state what stream or river it flows into.

Many streams and seasonal creeks are located within the city limits of Mercer Island. Mercer Island is also surrounded by Lake Washington.

- 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.

Any projects identified within this document that area within 200 feet of described water will address the issue in the SEPA or Shoreline permit review of the individual project. The projects will meet all City Codes, as well as any outside agency requirements.

- 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.

There are no project identified that will remove dredge material or fill from a surface water or wetland area.

- 4) Will the proposal require surface water withdrawals or diversions? Give general description, purpose, and approximate quantities if known.

No

- 5) Does the proposal lie within a 100-year floodplain? If so, note location on the site plan.

No

- 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.

No discharge of waste materials to surface waters is anticipated for any of the proposed projects.

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.

Ground water withdrawal from the Emergency Well, built in 2010, will take place only under emergency situations. Estimated the maximum annual quantity to be withdrawn form the emergency water well is 66.3 acre-feet per year (AFT). According to the preliminary permit issued by the Department of Ecology, the maximum days per occurrence for the groundwater withdrawal from this emergency water well is 90 days.

- 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.

No

c. Water runoff (including stormwater):

- 1) Describe the source of runoff (including stormwater) 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.

There will be no runoff from the adoption of this plan. Any runoff that may occur during the construction will be mitigated as required by City codes and County requirements.

- 2) Could waste materials enter ground or surface waters? If so, generally describe.

Not Applicable

d. Proposed measures to reduce or control surface, ground, and runoff water impacts, if any:

Any Runoff that may occur during the construction will be mitigated as required by City Codes and County requirements.

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, other
- water plants: water lily, eelgrass, milfoil, other
- other types of vegetation

b. What kind and amount of vegetation will be removed or altered?

Most of the project identified will not have vegetation removed because most water system projects will occur in asphalt roadway or roadway shoulder. If any vegetation is to be removed for a specific project, then it would be addressed during the SEPA review for the specific project.

c. List threatened or endangered species known to be on or near the site.

N/A

d. Proposed landscaping, use of native plants, or other measures to preserve or enhance vegetation on the site, if any:

Not applicable. Most of the projects are located within asphalt roadways.

5. Animals

a. State 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.

N/A

c. Is the site part of a migration route? (If so, explain.)

No

d. Proposed measure to preserve or enhance wildlife, if any:

Not Applicable. The construction projects will not have any measurable effects to wildlife.

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.

Not Applicable

TO BE COMPLETED BY APPLICANT

EVALUATION FOR
AGENCY USE ONLY

- b. Would your project affect the potential use of solar energy by adjacent properties? If so, generally describe.
Not applicable
- c. What kinds of energy conservation features are included in the plans of this proposal? List other proposed measures to reduce or control energy impacts, if any:
Not Applicable

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.

Not Applicable

- 2) Proposed measures to reduce or control environmental health hazards, if any:

Not Applicable

b. Noise

- 1) What types of noise exist in the area which may affect your project (for example: traffic, equipment, operation, other)?

Existing noise could not affect construction or operation of project proposed in this plan.

- 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.

There will not be any noise involved with the adoption of this plan. The projects identified in this plan will have short term noise impacts associated with their construction.

- 3) Proposed measures to reduce or control noise impacts, if any:

The proposed projects of this plan will meet all City codes including the noise ordinance. Construction hours will be limited to 7am to 5pm.

8. Land and shoreline use

- a. What is the current use of the site and adjacent properties?

Current land use within the planning area is mostly residential with some commercial and multi-family use.

- b. Has the site been used for agriculture? If so, describe.

No

- c. Describe any structures on the site.

Structures vary through the planning areas from residential housing to commercial buildings.

- d. Will any structures be demolished? If so, what?

Not Applicable

- e. What is the current zoning classification of the site?
There are multiple zoning codes for the City.
- f. What is the current comprehensive plan designation of the site?
Varies
- g. If applicable, what is the current shoreline master program designation of the site?
Not Applicable
- h. Has any part of the site been classified as an "environmentally sensitive" area? If so, specify.
The areas specified for construction are mostly roadway and roadway shoulders. These areas are not classified as environmentally sensitive.
- i. Approximately how many people would reside or work in the completed project?
The population for the City of Mercer Island is approximately 23,370 persons
- j. Approximately how many people would the completed project displace?
Not Applicable
- k. Proposed measures to avoid or reduce displacement impacts, if any:
Not Applicable
- l. Proposed measures to ensure the proposal is compatible with existing and projected land uses and plans, if any:
Not Applicable

9. Housing

- a. Approximately how many units would be provided, if any? Indicate whether high, middle, or low income housing.
Not Applicable
- b. Approximately how many units, if any, would be eliminated? Indicate whether high, middle, or low income housing.
Not Applicable
- c. Proposed measures to reduce or control housing impacts, if any:
Not Applicable

10. Aesthetics

- a. What is the tallest height of any proposed structure(s), not including antennas? What is the principal exterior material(s) proposed?
The proposed projects are mostly underground utilities. No buildings and/or structures construction are expected in the planning years of this Water System Plan.
- b. What views in the immediate vicinity would be altered or obstructed?
None
- c. Proposed measures to reduce or control aesthetics impacts, if any:
None

11. Light and glare

- a. What type of light or glare will the proposal produce? What time of day would it mainly occur?
Not Applicable

- b. Could light or glare from the finished project be a safety hazard or interfere with views?
Not Applicable

- c. What existing off-site sources of light or glare may affect your proposal?
Not Applicable

- d. Proposed measures to reduce or control light and glare impacts, if any:
Not Applicable

12. Recreation

- a. What designated and informal recreational opportunities are in the immediate vicinity?
Parks and Lake recreational opportunities.

- b. Would the proposed project displace any existing recreational uses? If so, describe.
Not Applicable

- c. Proposed measures to reduce or control impacts on recreation, including recreation opportunities to be provided by the project or applicant, if any:
Not Applicable

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.
Not Applicable

- c. Proposed measures to reduce or control impacts, if any:
Not Applicable

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.

The transportation system within the water service area consist of arterial, city streets, and local access roads. The City's water system is planned and constructed to mostly utilize public streets and public right of ways.

- b. Is site currently served by public transit? If not, what is the approximate distance to the nearest transit stop?
Yes

- c. How many parking spaces would the completed project have? How many would the project eliminate?
Not Applicable

- d. Will the proposal require any new roads or streets, or improvements to exiting roads or streets, not including driveways? If so, generally describe (indicate whether public or private).

Many of the proposed projects will require improvements to the roadway after the installation of the water mains. Both public and private streets are affected by the proposed projects.

- 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.

Not Applicable

- g. Proposed measures to reduce or control transportation impacts, if any:

There will be a temporary increase in vehicular trips during the construction of the projects identified in this plan. Each construction project will have a traffic control plan to minimized construction impacts.

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.

Not Applicable

- b. Proposed measures to reduce or control direct impacts on public services, if any.

Not Applicable

16. Utilities

- a. Circle utilities currently available at the site: electricity, natural gas, water, refuse service, telephone, sanitary sewer, septic system, other.

In addition to all listed, add "stormwater system"

- b. Describe the utilities that are proposed for the project, the utility providing the service, and the general construction activities on the site or in the immediate vicinity which might be needed.

The construction projects proposed in the plan involve the replacement of water mains, hydrants, and other water system components, installation of new water mains, and the replacement of the emergency generator at the Reservoir booster pump station.

C. SIGNATURE

I certify (or declare) under penalty of perjury under the laws of the State of Washington that the answers to the attached SEPA Checklist 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 Submitted: 2/2/2015

SEPA RULES

D. SUPPLEMENTAL SHEET FOR NONPROJECT ACTIONS

(do not use this sheet for project actions)

Because these questions are very general, it may be helpful to read them in conjunction with the list of the elements of the environment.

When answering these questions, be aware of the extent the proposal, or the types of activities likely to result from the proposal, would affect the item at a greater intensity or at a faster rate than if the proposal were not implemented. Respond briefly and in general terms.

1. How would the proposal be likely to increase discharge to water; emissions to air; productions, storage, or release of toxic or hazardous substances; or production of noise?

There will be a temporary increase in noise level from the equipment and construction activities during the construction.

Proposed measures to avoid or reduce increases are:

Not Applicable.

2. How would the proposal be likely to affect plants, animals, fish, or marine life?

Not Applicable.

Proposed measures to protect or conserve plants, animals, fish, or marine life are:

Not Applicable.

3. How would the proposal be likely to deplete energy or natural resources?

Not Applicable.

Proposed measures to protect or conserve energy and natural resources are:

Not Applicable.

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?

Majority of the proposed projects will not affect any of the areas listed above.

Proposed measures to protect such resources or to avoid or reduce impacts are:

Not Applicable.

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?

Not Applicable.

Proposed measures to avoid or reduce shoreline and land use impacts are:

Not Applicable.

6. How would the proposal be likely to increase demands on transportation or public services and utilities?

The proposed projects in the Comprehensive Water System Plan will have temporary increase demands on transportation during the construction of the project. The projects are designed to replace and upgrade the water system.

Proposed measures to reduce or respond to such demand(s) are:

Not Applicable.

7. Identify, if possible, whether the proposal may conflict with local, state, or federal laws or requirements for the protection of the environment.

Not Applicable.



STATE ENVIRONMENTAL POLICY ACT (SEPA) DETERMINATION OF NON-SIGNIFICANCE (DNS)

June 1, 2015

Application Nos.: **SEP15-003**

Description of proposal: **An update to the City of Mercer Island's Water System Comprehensive Plan. The comprehensive plan lists projects to be constructed in a 6-year and 20-year program. The projects proposed in the plan will be reviewed as the engineering studies or scopes of work are developed and discussed in the SEPA reviews of the individual projects.**

Proponent: **Rona Lin, Project Engineer, for the City of Mercer Island**

Location of proposal: **The area covered by the Comprehensive Water System Plan serves all of Mercer Island, which covers approximately 6.2 square miles of area, located in Lake Washington, between the cities of Seattle and Bellevue.**

Lead agency: **City of Mercer Island**

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.

✓ _____ This DNS is issued after using the optional DNS process in WAC 197-11-355. There is no further comment period on the DNS.

_____ This DNS is issued under WAC 197-11-340(2); the lead agency will not act on this proposal for 14 days from the date below. Comments must be submitted by **N/A**.

Responsible Official: **Scott Greenberg, Development Services Director
City of Mercer Island
9611 SE 36th Street
Mercer Island, WA 98040
Phone: (206) 275-7706
Email: scott.greenberg@mercergov.org**

Date: **June 1, 2015**

Signature _____

APPEAL INFORMATION

This decision to issue a Determination of Non-significance (DNS) rather than to require an EIS may be appealed pursuant to Section 19.07 of the Mercer Island Unified land Development Code, Environmental procedures.

✓ _____ Any party of record may appeal this determination to the City Clerk at 9611 SE 36th Street Mercer Island, WA 98040 no later than **5:00 PM on Monday, June 15, 2015** by filing a timely and complete appeal application and paying the appeal fee. You should be prepared to make specific factual objections. Contact the City Clerk to read or ask about the procedures for SEPA appeals. To reverse, modify or remand this decision, the appeal hearing body must find that there has been substantial error, the proceedings were materially affected by irregularities in procedure, the decision was unsupported by material and substantial evidence in view of the entire record, or the decision is in conflict with the city's applicable decision criteria.

_____ There is no agency appeal.

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Appendix B

Approvals

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STATE OF WASHINGTON
DEPARTMENT OF HEALTH
NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

July 12, 2016

TERRY SMITH, UTILITIES OPERATIONS
MERCER ISLAND, CITY OF
9601 SE 36th STREET
MERCER ISLAND WA 98040

Subject: Mercer Island, City of – Water System ID# 53640
King County
2014 WSP- Approval
Submittal #14-0804

Dear Mr. Smith:

The City of Mercer Island (the City) water system plan (WSP) received in this office on August 5, 2014, with a subsequent submittal on June 30, 2016 have been reviewed and in accordance with the provisions of WAC 246-290-100, is hereby APPROVED.

Approval of this WSP is valid as it relates to current standards outlined in Washington Administrative Code (WAC) 246-290 revised April 2016, WAC 246-293 revised September 1997, RCW 70.116, and is subject to the qualifications herein. Future revisions in the rules and statutes may be more stringent and require facility modification or corrective action. An approved update of this WSP is required on or before **July 12, 2022** unless ODW requests an update or plan amendment pursuant to WAC 246-290-100(9).

APPROVED NUMBER OF CONNECTIONS

The analysis provided in this WSP shows the water system has sufficient capacity to meet the growth projections during this planning period. The City of Mercer Island water system can support an “**unspecified**” designation for its approved number of connections. A specific number of approved connections will not be applied at this time. Development may occur in compliance with the schedule and information provided in this WSP. This designation may be rescinded (and replaced with a specified number of approved connections) if ODW determines that the WSP is no longer representative of system activities.

LOCAL GOVERNMENT CONSISTENCY

This document meets local government consistency requirements for WSP approval pursuant to RCW 90.03.386 and RCW 43.20.



SERVICE AREA AND DUTY TO SERVE

Pursuant to RCW 90.03.386(2), the service area identified in this WSP service area map may now represent an expanded "place of use" for this system's water rights. Changes in service area should be made through a WSP amendment.

The City has a duty to provide new water service within its retail service area. This WSP includes service policies to describe how your system plans to provide new service within your retail service area.

CONSTRUCTION WAIVERS

Standard Construction Specifications for distribution main extensions in this WSP are approved. Consistent with WAC 246-290-125(2), this system may proceed with the installation of distribution main extensions provided this system completes and keeps on file the enclosed construction completion report form in accordance with WAC 246-290-125(2) and WAC 246-290-120(5) and makes it available for review upon request by ODW.

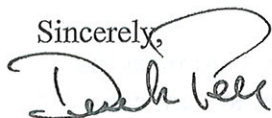
WATER RESOURCES

Below is the general regulatory language that applies to all water system plan approvals:

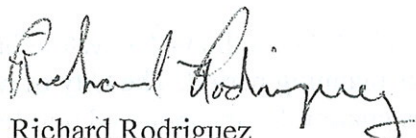
The department's approval of your water system plan does not confer or guarantee any right to a specific quantity of water. The approved number of service connections is based on your representation of available water quantity. If the Washington Department of Ecology, a local planning agency, or other authority responsible for determining water rights and water system adequacy determines that you have use of less water than you represented, the number of approved connections may be reduced commensurate with the actual amount of water and your legal right to use it.

Thank you for your cooperation. King County is being notified of the terms and requirements of this approval and the determination of the approved number of connections. If you have any questions or wish to check our records, you may contact either of us at the numbers listed below.

Sincerely,



Derek Pell, P.E.
Regional Office Manager
(253) 395-6763



Richard Rodriguez
Regional Planner
(253) 395-6771

Encl: Construction Completion Report

cc: Steve Hirschey, King County UTRC
Seattle/King County Health
Eric Habermeyer, PE, HDR

CONSTRUCTION COMPLETION REPORT FOR DISTRIBUTION MAIN PROJECTS

In accordance with WAC 246-290-120(5), a *Construction Completion Report* is required for all construction projects. Under the submittal exception process for distribution main projects, designed by a professional engineer but not submitted to DOH for approval, the report does not need to be submitted. **However, the purveyor must keep the Construction Completion Report on file and make it available for review upon request by DOH in accordance with WAC 246-290-125 (2)(b).** Furthermore:

- (1) The report form **must** bear the seal, date and signature of a professional engineer (PE) licensed in the state of Washington; and
- (2) Per WAC 246-290-120(5)(c), the amount of change in the physical capacity of a system must be documented, if the project results in a change in physical capacity.

MERCER ISLAND, CITY OF	DOH System ID No.: 53640
Name of Water System	
BRIAN MCDANIEL	Date Water System Plan that includes
Name of Purveyor (Owner or System Contact)	Standard Construction Specifications
9611 SE 36TH ST	Date Standard Specifications
Mailing Address	Approved by DOH: _____
MERCER ISLAND, WA 98040	
City	State
	Zip

PROJECT NAME AND DESCRIPTIVE TITLE:

(Include the name of any development project and number of services.) _____ Date Project or Portions Thereof Completed _____

PROFESSIONAL ENGINEER'S ACKNOWLEDGMENT

The undersigned professional engineer (PE), or his/her authorized agent, has inspected the above-described project that, as to layout, size and type of pipe, valves and materials, and other designed physical facilities, has been constructed and is substantially completed in accordance with construction documents reviewed by the purveyor's engineer. In the opinion of the undersigned engineer, the installation, physical testing procedures, water quality tests, and disinfection practices were carried out in accordance with state regulations and principles of standard engineering practice.

I have reviewed the disinfection procedures, pressure test results, and results of the bacteriological test(s) for this project and certify that they comply with the requirements of the construction standards/specifications approved by DOH.



Date Signed

Name of Engineering Firm

Name of PE Acknowledging Construction

Mailing Address

City

State

Zip

Engineer's Signature

State/Federal Funding Type (if any) _____

Please keep a completed, signed, and stamped copy on file.

<input checked="" type="checkbox"/> NWRO Drinking Water Department of Health 20425 72 nd Ave, S, Ste 310 Kent, WA 98032-2358 (253) 395-6750	<input type="checkbox"/> SWRO Drinking Water Department of Health PO Box 47823 Olympia, WA 98504-7823 (360) 236-3030	<input type="checkbox"/> ERO Drinking Water Department of Health 16201 E Indiana Ave, Suite 1500 Spokane Valley, WA 99216 (509) 329-2100
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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).

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**BUSINESS OF THE CITY COUNCIL
CITY OF MERCER ISLAND, WA**

**AB 5204
October 4, 2016
Regular Business**

2015 WATER SYSTEM PLAN	Proposed Council Action: Adopt the 2015 Water System Plan.
-------------------------------	--

DEPARTMENT OF	Public Works (Rona Lin and Anne Tonella-Howe)
COUNCIL LIAISON	n/a
EXHIBITS	<ol style="list-style-type: none"> 1. Resolution No. 1517 2. AB 4977 (7/7/2014) 3. Water System Plan Booster Chlorination Station Letter from Department of Health 4. Water System Plan Approval Letter from Department of Health
APPROVED BY CITY MANAGER	<i>Ram Bisimetta</i>

AMOUNT OF EXPENDITURE	\$	n/a
AMOUNT BUDGETED	\$	n/a
APPROPRIATION REQUIRED	\$	n/a

SUMMARY

At the meeting on Monday night, staff will present the completed 2015 Water System Plan for Council's adoption. Per the City's standard procedures for Plan adoptions, Resolution No. 1517 (Exhibit 1) is prepared for Council's approval.

Public water systems are established to provide adequate quantity and quality of water to their customers with reliable operations. A water system plan, approved by the Washington Department of Health (DOH), serves as a standard guideline for system owners to ensure that the water utility infrastructure and performance are safe and reliable.

In accordance with chapter 246-290 WAC, the City is required to update its Water System Plan (Plan) every six years. The current Plan was previously adopted in 2008 and updated in 2014. This updated Plan (2015 Plan) was discussed with the Council during the July 7, 2014 Study Session (AB 4977 is attached as Exhibit 2). At the Study Session, the Council concurred with the schedule to adopt the final 2015 Plan later that year after comments from the City Council and other agencies had been incorporated into the document.

The 2015 Plan was scheduled to return to the Council in October 2014 for adoption. Unfortunately, in late September 2014, the Water Advisory Event (Event) occurred which delayed adoption of the Plan. Following the Event, the City was required by DOH to complete the Coliform Response Action Plan (including the design of the Booster Chlorination Station) and update two key elements of the drafted 2015 WSP Plan:

- 1) the Cross-Connection Control Plan (CCCP), and
- 2) the Coliform Monitoring Plan (CMP). All other elements of the drafted 2015 Plan, with some minor edits, were approved by DOH.

At the October 4 Council meeting staff will provide an overview of the two key elements required for the Plan adoption.

Booster Chlorination Station Project

Following the discussion and direction of the Council at the July 19 Council meeting, staff is moving forward with the design of a Booster Chlorination Station. The design is expected to be completed in 2017. As part of the proposed 2017-2022 Capital Improvement Program, staff has recommended funding construction of this Station in the 2017-2018 biennium. The purpose of the booster chlorination station is to, when necessary, augment the chlorine residual levels in the drinking water supplied by Seattle Public Utilities to maintain a higher concentration of secondary disinfectant in the City's distribution system and prevent coliform growth. The project is scheduled to return to the Council in November as part of the 2017-2018 Capital Improvement Program Preliminary Budget Review.

Based on input received from DOH in a letter dated September 1, 2016 (Exhibit 3) the Booster Chlorination Station will be included as an amendment to the Plan once the project is completed and operational procedures have been developed. The Booster Chlorination Station Project including operations, will be included in the 2021 update of the Water System Plan.

Cross-Connection Control Plan

The CCCP objective is to ensure that all potential pathways for contamination are safeguarded with certified devices and routine inspection. These key elements have been included in the CCCP and meet the requirements set forth by DOH:

- Adoption of a written legal instrument authorizing the establishment and implementation of a Cross-Connection Control (CCC) program;
- Development and implementation of procedures and schedules for evaluating new and existing service connections to assess the degree of hazard;
- Development and implementation of procedures and schedules for elimination and/or control of cross-connections;
- Provision of qualified personnel, including at least one person certified as a Cross-Connection Specialist (CCS), to develop and implement the CCC program;
- Development and implementation of procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable);
- Development and implementation of a backflow prevention assembly testing and quality control program;
- Development and implementation (when appropriate) of procedures for responding to backflow incidents;
- Development and implementation of a cross-connection control public education program;
- Development and maintenance of cross-connection control records; and
- Additional cross-connection control requirements for reclaimed water.

On June 15, 2015, the City Council adopted Ordinance No. 15C-09, amending chapter 15.4 MICC, Unlawful Cross Connections. The ordinance was needed to provide staff with enforcement tools to help ensure that all back flow prevention assemblies be installed and annually tested wherever a cross-connection to the water system exists. In March 2016, with the approval of the City Council, a Water Quality Technician who is also a certified cross-connection control specialist (CCS) was hired to oversee the CCCP, including the development and implementation of the program, as well as public education, outreach and quality control for backflow assembly testing. Currently the City is working with residents, starting with the areas of the highest risks, to identify potential cross-connection points and to implement the control measures outlined in the updated CCCP.

Coliform Monitoring Plan

The CMP has been updated to meet the requirements set forth by DOH and ensure that the water quality within the City's water system is closely monitored and tested. Key elements of the CMP include:

- Agency notification requirements;
- Collection of repeat samples and locations or alternate locations;
- Inspection of potential pathways;
- Review of the repeat samples; and
- Standard operating procedures and assessments.

Agency Reviews

The draft 2015 Plan was originally submitted to both Seattle Public Utilities (SPU) and DOH in July 2014. Following the 2014 Water Advisory event, the agencies required updates of the CCCP and CMP and had several review comments and questions of the 2015 Plan. The comments and questions ranged from water service connections, water standard details, water modeling, and the regional conservation goal. In response to each of these comments and questions, the City provided clarifications, updates, and new information to the agencies.

On June 30, 2016, all revisions, including the submittal of the updated CCCP and CMP elements, were submitted to DOH and SPU for review. The Plan was preliminarily accepted one week later. A copy of the WSP approval letter from DOH is attached as Exhibit 4. The draft 2015 Plan, including comments from DOH and SPU in Appendix C, can be found at: www.mercergov.org/files/2015WaterSystemPlan.pdf.

Final Plan Adoption

The 2015 Water System Plan is now ready for Council's adoption. All revisions have been incorporated. Following the council's adoption, the 2015 Plan along with the Resolutions will be submitted to DOH for final approval. To adopt the 2015 Water System Plan, the Council is hereby requested by staff to approve Resolution No. 1517 (Exhibit 1).

RECOMMENDATION

Water Utilities Engineer and Assistant City Engineer

MOVE TO: Approve Resolution No. 1517, adopting the 2015 City of Mercer Island Water System Plan.

**CITY OF MERCER ISLAND
RESOLUTION NO. 1517**

**A RESOLUTION OF THE CITY OF MERCER ISLAND, WASHINGTON
ADOPTING THE CITY OF MERCER ISLAND 2015 WATER SYSTEM PLAN**

WHEREAS, the City of Mercer Island's comprehensive Water System Plan describes the existing water system and service area, forecasts future demands, identifies policies and design criteria for water system operation and improvements, describes the operations and maintenance program, and identifies a schedule of improvements; and

WHEREAS, the City of Mercer Island's previous Water System Plan revisions were approved by the Washington State Department of Health, Office of Drinking Water in 2008; and

WHEREAS, the Washington State Department of Health administers the Safe Drinking Water Act, RCW 43.21A.445; and

WHEREAS, the Washington State Department of Health Public Water Supplies Rules, WAC 246-290-200, require that the City update its comprehensive Water System Plan every 6 years; and

WHEREAS, the City of Mercer Island Public Works Department has reviewed the City of Mercer Island Water System Plan, the existing water system, and its operation; and

WHEREAS, the City of Mercer Island Public Works Department has studied the current and projected conditions by computer modeling and developed a comprehensive plan to meet the City's water system needs to the year 2035 and beyond; and

WHEREAS, the City of Mercer Island Public Works Department, on the basis of said review, has created the 2015 Water System Plan, dated July 2016, to update the existing Water System Plan to address the needs of the City of Mercer Island; and

WHEREAS, the City of Mercer Island Public Works Department has submitted the 2015 Water System Plan to the Washington State Department of Health and obtained preliminary approval of that plan.

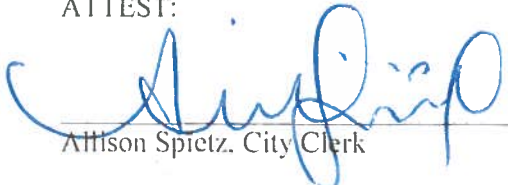
NOW, THEREFORE, IT IS HEREBY RESOLVED by the City Council of Mercer Island that the 2015 Water System Plan, dated July 2016, is hereby adopted as the official Water System Plan for the City of Mercer Island.

ADOPTED BY THE CITY COUNCIL OF THE CITY OF MERCER ISLAND, WASHINGTON AT ITS REGULAR MEETING ON THE 4TH DAY OF OCTOBER, 2016.



Bruce Bassett, Mayor

ATTEST:



Allison Spietz, City Clerk



CITY OF MERCER ISLAND CITY COUNCIL MEETING AGENDA

Tuesday
October 4, 2016
6:00 PM

Mayor Bruce Bassett
Deputy Mayor Debbie Bertlin
Councilmembers Dan Grausz, Jeff Sanderson,
Wendy Weiker, David Wisenteiner
and Benson Wong
Contact: 206.275.7793, council@mercergov.org
www.mercergov.org/council

All meetings are held in the City Hall Council Chambers at
9611 SE 36th Street, Mercer Island, WA unless otherwise noticed

"Appearances" is the time set aside for members of the public to speak to the City Council about any issues of concern. If you wish to speak, please consider the following points:
(1) speak audibly into the podium microphone, (2) state your name and address for the record, and (3) limit your comments to three minutes.
Please note: the Council does not usually respond to comments during the meeting.

REGULAR MEETING

CALL TO ORDER & ROLL CALL, 6:00 PM

AGENDA APPROVAL

STUDY SESSION

- (1) [AB 5201 Fire Sprinkler Requirements for New Residential Construction](#)

APPEARANCES, 7:00 PM

CONSENT CALENDAR

- (2) [Payables: \\$348,925.53 \(09/15/16\) & \\$617,366.04 \(09/22/16\)](#)
[Payroll: \\$757,009.49 \(09/16/16\)](#)
[Minutes: September 19, 2016 Regular Meeting Minutes, September 23, 2016 Special Meeting Minutes, & September 27, 2016 Special Meeting Minutes](#)
[AB 5212 2015 Water System Improvements Project Close Out](#)

REGULAR BUSINESS

- (3) [AB 5221 2017-2018 Preliminary Budget Presentation & Distribution](#)
(4) [AB 5220 Crown Castle Small Cell Franchise Follow-Up](#)
(5) [AB 5204 2015 Water System Plan Adoption](#)
(6) [AB 5222 I-90 Loss of Mobility Negotiations Status Report](#)

OTHER BUSINESS

Councilmember Absences

[Planning Schedule](#)

Board Appointments



CITY COUNCIL MINUTES REGULAR MEETING OCTOBER 4, 2016

CALL TO ORDER & ROLL CALL

Mayor Bruce Bassett called the meeting to order at 6:00 pm in the Council Chambers of City Hall, 9611 SE 36th Street, Mercer Island, Washington.

Mayor Bruce Bassett, Deputy Mayor Debbie Bertlin, and Councilmembers Dan Grausz, Jeff Sanderson, Wendy Weiker, David Wisenteiner, and Benson Wong were present.

AGENDA APPROVAL

It was moved by Bertlin; seconded by Wong to:

Approve the agenda as presented.

Passed 7-0

FOR: 7 (Bassett, Bertlin, Grausz, Sanderson, Weiker, Wisenteiner, Wong)

STUDY SESSION

AB 5201 Fire Sprinkler Requirements for New Residential Construction

Fire Chief Steve Heitman presented the Fire Sprinkler Requirements for New Residential Construction. He spoke about the current code, MICC Chapter 17.16, and the code alternate process. He noted that the Mercer Island Fire Department is proposing mandatory residential fire sprinklers in all new types of construction projects and substantial alterations in order to increase the safety of Mercer Island citizens.

Fire Marshall Herschel Rostov presented a video regarding the effectiveness of residential fire sprinklers. He spoke about how sprinklers work, why we need sprinklers, and noted that newer building materials actually cause fires to burn hotter and much more aggressively. He also spoke about the City's current requirements, what are considered substantial alterations, the impacts of sprinkler installation, smoke alarms versus sprinklers, and the focus group.

Council directed staff to proceed with drafting code amendments to require the installation of automatic fire-sprinkler systems in all new residential construction, but asked staff to come back with data and options regarding substantial remodels.

APPEARANCES

There were no appearances.

CONSENT CALENDAR

Payables: \$348,925.53 (09/15/16) & \$617,366.04 (09/22/16)

Recommendation: Certify that the materials or services hereinbefore specified have been received and that all warrant numbers listed are approved for payment.

Payroll: \$757,009.49 (09/16/16)

Recommendation: Certify that the materials or services specified have been received and that all fund warrants are approved for payment.

Minutes: September 19, 2016 Regular Meeting Minutes, September 23, 2016 Special Meeting Minutes, & September 27, 2016 Special Meeting Minutes

Recommendation: Adopt the September 19, 2016 Regular Meeting Meetings, the September 23, 2016 Special Meeting Minutes, and the September 27, 2016 Special Meeting Minutes as written.

AB 5212 2015 Water System Improvements Project Close Out

Recommendation: Accept the completed 2015 Water System Improvements project and authorize staff to close out the contract.

It was moved by Bertlin; seconded by Wong to:

Approve the Consent Calendar and the recommendations contained therein.

Passed 7-0

FOR: 7 (Bassett, Bertlin, Grausz, Sanderson, Weiker, Wisenteiner, Wong)

REGULAR BUSINESS

AB 5221 2017-2018 Preliminary Budget Presentation & Distribution

Finance Director Chip Corder presented the 2017-2018 Preliminary Budget. He reviewed the budget message and spoke about General Fund deficits, YFS Fund deficits, other operating funding challenges, operating and capital funding options, and the recommended path forward.

AB 5220 Crown Castle Small Cell Franchise Follow-Up

Assistant City Attorney Christina Schuck presented the Crown Castle Small Cell Franchise follow-up. She reviewed the framework for the franchise agreement and asked for policy direction on design and location standards and the approval process for additional small cells.

Representatives from Crown Castle spoke about design solutions including locating antennas on the top of poles or within the communications space, and whether or not a pole should have just one tenant or multiple tenants. They discussed the reasons for pole replacement, reviewed the plan for Mercer Island and showed a map of both the northern and southern sites.

Council provided policy direction to staff regarding the small cell franchise agreement as follows:

- finding sites that do not require any tree trimming
- including stealthing requirements such as painting to match the pole and flush mounting
- specifying the use of smaller two foot antennas
- limiting mounting of equipment to the communications space
- limiting placement to poles on the collector arterial streets
- locating additional sites and related equipment on the next feasible pole/proliferation
- adding a timeframe in which the applicant is required to conduct an audit with City staff on equipment to ensure it is the smallest size that is commercially available
- requiring that every installation will have the maximum amount of stealthing

Council also directed staff to draft the agreement to only approve the 39 sites and that any additional sites require a franchise amendment.

AB 5204 2015 Water System Plan Adoption

Utilities Engineer Rona Lin presented the 2015 Water System Plan for adoption by the Council. She spoke about the purpose of water system planning, the system overview, the original project schedule and the change of schedule, and the key updates.

It was moved by Wong; seconded by Weiker to:

Approve Resolution No. 1517, adopting the 2015 City of Mercer Island Water System Plan.

Passed 7-0

FOR: 7 (Bassett, Bertlin, Grausz, Sanderson, Weiker, Wisenteiner, Wong)

AB 5222 I-90 Loss of Mobility Negotiations Status Report

Assistant City Manager Kirsten Taylor presented the I-90 Loss of Mobility Negotiations Status Report. She spoke about Mercer Island's goals and negotiating principles, public outreach, and the progress on negotiations. She also spoke about the I-90 Access Alternatives Study and the traffic engineering study.

OTHER BUSINESS

Councilmember Absences

There were no absences.

Planning Schedule

Interim City Manager Pam Bissonnette noted that the Crown Castle franchise agreement is scheduled for first reading on November 21 and spoke about the agenda for the October 13 joint meeting with the Mercer Island School Board.

Board Appointments

There were no appointments.

Councilmember Reports

Councilmember Wisenteiner spoke about the PTSA and expressed their concerns about the large amount of no parking signage around Northwood Elementary and about teacher retention in regards to I-90 negotiations.

Deputy Mayor Bertlin spoke about attending the Growth Management Planning Council meeting and their discussion around the administrative process behind growth management and growth allocations.

Councilmember Sanderson spoke about the ribbon cutting ceremony of the tile mosaics at Luther Burbank Park.

Councilmember Weiker spoke about the IMS ribbon cutting ceremony.

Councilmember Wong spoke about attending the YFS Community Advisory Board and their planning of the next community forum and attending the ARCH workshop on the decreasing numbers of affordable housing and how to increase dedicated funding. He also noted that he will be attending the PIC Committee meeting on October 12 and received support from the Council on expanding the low income housing tax credit, favoring greater flexibility in the property tax cap, additional funding for public health, and additional funding for affordable housing.

Mayor Bassett spoke about attending the IMS and tile mosaic ribbon cutting ceremonies.

ADJOURNMENT

The regular meeting adjourned at 9:52 pm.

Bruce Bassett, Mayor

Attest:

Karin Roberts, Deputy City Clerk

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Habermeyer, Eric

From: Hirschey, Steve <Steve.Hirschey@kingcounty.gov>
Sent: Tuesday, August 12, 2014 11:15 AM
To: Rona Lin; Habermeyer, Eric
Cc: Richard.Rodriguez@DOH.WA.GOV
Subject: Mercer Island Water System Plan and local government consistency review

Hi Rona and Eric – this email addresses the local government consistency review for water system plans required by the Washington Administrative Code (WAC) and summarizes/finalizes the work the City of Mercer Island (the City) has done with King County regarding the City's 2014 water system plan update.

In 2013 we exchanged emails when the City was doing a preplanning meeting with the Washington State Department of Health (DOH). Within the email exchange, the City verified that the City does not obtain or distribute water in unincorporated King County. Given that, there is no requirement/need for the King County Council to approve the City's plan. The Council's approval of a water plan is usually the way that King County affirms the consistency of a water plan with the County's code and policy framework for water supply and water to meet growth needs. We do use the Department of Health's form entitled, Local Government Consistency Review Checklist, as the way to affirm consistency.

With that said, the County still has an interest in the City's water plan. For example, we have a strong interest that all water system plans are consistent with the Countywide Planning Policies. The Countywide Planning Policies or **CPPs** are a series of policies that address growth management issues in King County. We think that the CPPs are relevant adopted planning elements related to water supply planning.

The County is supportive of the City providing DOH a self- completed consistency review as described in WAC 246-290-108(1) in light of the fact the County is not approving the plan. Within that review, we request that you affirm the City has a plan to provide the water to accommodate the twenty-year housing and employment targets adopted by the City. We would also look for the City to demonstrate and affirm its plan is consistent with the water supply policies of the CPP, especially, PF-4 through PF-10.

The WAC has other self-certification requirements that the City must document. Please do let DOH know that the amount of time and effort at coordination provided to King County for the review was very reasonable. Please send me a copy of the self-certification. Thanks again for the copy of the plan you sent and we appreciate the communication and coordination from the City. If you have any questions, or concerns on this issue, please do not hesitate to call upon me at 206.477.5387. Steve

Steve Hirschey
206.205.0817
King County UTRC Chair

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Local Government Consistency Review Checklist

Water System Name: City of Mercer Island PWS ID: 536405

Planning/Engineering Document Title: 2015 Water System Plan Plan Date: July 2015

Local Government with Jurisdiction: City of Mercer Island Development Services Department

WAC 246-290-108 Consistency with local plans and regulations:

Consistency with local plans and regulations applies to planning and engineering documents under WAC 246-290-106, 246-290-107, and 246-290-110(4)(b) (ii).

1) Municipal water suppliers must include a consistency review and supporting documentation in its planning or engineering document describing how it has addressed consistency with **local plans and regulations**. This review must include specific elements of local plans and regulations, as they reasonably relate to water service as determined by Department of Health (DOH). Complete the table below and see instructions on back.

Local Government Consistency Statement	Section(s) in Planning Document	Yes - No - Not Applicable
a) The water system service area is consistent with the adopted <u>land use and zoning</u> within the applicable service area.	Pg 1-7, 1-8, & Figure 1-2	Y
b) The <u>six-year growth projection</u> used to forecast water demand is consistent with the adopted city/county's population growth projections. If a different growth projection is used, provide an explanation of the alternative growth projection and methodology.	Pg 2-11, 2-12, & Table 2-6	SEE ATTACHED PP 8-11 from COMP PLAN LAND USE ELEMENT
c) Applies to <u>cities and towns that provide water service</u> : All water service area policies of the city or town are consistent with the <u>utility service extension ordinances</u> of the city or town.	Chapter 3, Appendix O	Y
d) <u>Service area policies</u> for new service connections are consistent with the adopted local plans and adopted development regulations of all jurisdictions with authority over the service area [City(ies), County(ies)].	Chapter 3, Appendix O	Y
e) <u>Other relevant elements</u> related to water supply are addressed in the water system plan, if applicable; Coordinated Water System plans, Regional Wastewater plans, Reclaimed Water plans, Groundwater Area Management plans, and Capital Facilities Element of Comprehensive plans.	Pg 1-7 & Appendix I	Y

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

4/20/15

Date

SCOTT GREENBERG, DEVELOPMENT SERVICES Director, CITY OF MERCER ISLAND

Printed Name, Title, & Jurisdiction

III. GROWTH FORECAST

Residential and Employment 20-year Growth Targets

The King County Countywide Planning Policies (CPPs) establish growth targets for all of the jurisdictions within King County. The CPPs were initially adopted in 1992, and have been amended several times since then. Elected officials from King County, the Cities of Seattle and Bellevue, and the Suburban Cities Association meet as the Growth Management Planning Council (GMPC). This Council makes recommendations to the County Council, which has the authority to adopt and amend the CPPs. During 2003, the GMPC worked with an inter-jurisdictional team of King County planning directors to determine an equitable distribution of the growth targets throughout the county. It was agreed that the City of Mercer Island would plan to accommodate 1,437 new housing units and 800 new jobs over the 2001 -2022 planning period. (See Table 3)

Table 3 - Growth Targets

2022 GMPC Targets	
Housing Target	1,437 additional housing units
Job Target	800 additional jobs

Employment and Commercial Capacity

According to the 2002 Eastside Economic Forum Report, there are approximately 7,883 total jobs on Mercer Island (Hebert

Research, Inc.). Based on estimates done by the Suburban Cities Association and the City of Mercer Island, there are approximately 4,292 jobs in the Town Center alone. According to the 2002 King County Buildable Lands Report, Mercer Island has the capacity for a total of 1,248 new jobs, with an additional 228 jobs from planned developments. Approximately 25,000 sq. ft. of new commercial space was completed in 2002-2005. In addition, approximately 59,000 SF of new commercial space was under construction, with an additional 28,000 sq. ft. of commercial development currently in the entitlement process.

Residential Growth

The Comprehensive Plan contains three types of housing figures: a capacity estimate, a growth target, and a housing and population forecast. Each of these housing numbers serves a different purpose.

Housing Capacity

As required in a 1997 amendment to the Growth Management Act (RCW 36.70A.215), recent growth and land capacity in King County and associated cities have been reported in the 2002 King County Buildable Lands Report.

The capacity estimate identifies the number of new units that could be accommodated on vacant and redevelopable land under current zoning. The capacity estimate is not a prediction of what will happen, merely an estimate of how many new units the Island could accommodate based on our

current zoning code, the number and size of vacant properties, and some standard assumptions about the redevelopment potential of other properties that could accommodate additional development.

According to the 2002 Buildable Lands Report, the City of Mercer Island has the capacity for 2,271 additional housing units on properties designated for residential uses through new development on vacant lands and/or through redevelopment of underutilized lands. Based on zoning and redevelopment assumptions done in 2002 for the Buildable Lands Report, about 1,279 new housing units could be accommodated in single family zones, 41 new housing units could be accommodated in multifamily zones and 641 units could be accommodated in mixed use zones.

The housing capacity numbers, particularly in the mixed use zones (Town Center), are currently under review. Based on recently permitted projects and closer observation of redevelopment factors, the City is analyzing the current Town Center capacity estimates and believes capacity in the Town Center may be more than originally thought.

Based on a preliminary analysis of those parcels which currently have an improvement to land value ratio of .5 or less and are not in public or utility ownership, the City believes that there may be capacity in the Town Center for as many as 1300 additional multifamily units. Future assumed densities for this preliminary figure were based on the density of recently permitted projects (2/3 mixed-use, 1/3 commercial only). This capacity is in addition to those projects which are currently under construction.

The City is revising the capacity estimates based on recent construction and development trends in the Town Center and concerns about critical area limitations in single family zones. The City will provide new official capacity estimates for all portions of the Island in the next Buildable Lands Report in 2007.

Housing Targets

As mentioned above, the City has a King County Growth Management Planning Council (GMPC) 2022 housing target of 1,437 new units. The housing target represents the number of units that the City is required to plan for under the Growth Management Act. The housing target is not necessarily the number of units that will be built on Mercer Island over the next two decades. Market forces, including regional job growth, interest rates, land costs, and other factors will have a major influence on the number of actual units created.

Housing and Population Forecast

The third type of housing figure contained in the Comprehensive Plan is a local housing forecast. Table 3 contains a housing unit and population forecast for 2010 and 2020 conducted by City planning staff. The City conducted this preliminary forecast in response to new construction and development interest that is higher than was anticipated when the GMPC growth targets were established in 2002.

The City anticipates an increase in housing units at an average annual growth rate of approximately 1.0% between 2000 and 2020, for a total housing unit increase of approximately 21% over this 20-year period. This represents an increase of approximately 1,856 housing units and 4,193 people over 20 years. The City

forecasts 10,662 total housing units and a total population of 26,229 by 2020. The rate of population growth is expected to be slightly less than housing growth over the same period due to the expected continued decrease in household size.

The Housing Unit and Population forecasts are informed estimates based on several factors, such as growth trends for new single family and accessory dwelling units over the last several years, Puget Sound Regional Council forecasts of future household size, Town Center development under construction and in the development pipeline, and a closer examination of redevelopment potential on the Island based on local knowledge and property data analysis. In particular, the City looked closely at improvement to land value ratios and sites known to be under consideration by development interests.

Given the uncertainty of future market forces, periodic reviews of housing and population forecasts should be made to evaluate the future growth assumptions. Adjustments to this forecast will also be necessary if the projections on household size and population growth vary significantly from those forecasted. However, based on all available information, the City will likely meet our established 20-year growth target, perhaps as early as 2016 if this forecast is accurate. The City will continue to monitor housing unit, population growth and market trends, and adjust land use, transportation, and capital facilities planning as necessary prior to the next major Comprehensive Plan update in 2011.

Housing Density

The average allowed density in the City of Mercer Island is more than 6.2 dwelling units per acre. This figure is based on the proportional acreage of each land use designation (or zones) that allows residential development, the densities permitted under the regulations in place today for that zone, and an assumption that the average practical allowed density for the Town Center is 81 units per acre. Since there is no maximum density in the Town Center and density is controlled instead by height limits and other requirements, the figure of 81 units per acre represents the average density of the last four recently approved mixed-use projects in the Town Center. Even if the land area and density of the Town Center is not included, the average Island-wide allowed density would still be approximately 4.8 dwelling units per acre.

Table 4 – 2010/2020 Housing Unit and Population Forecast

Year	Overall Household Size (1)	SFR Units (2)	Multi-family Units (3)	Legal ADUs (4)	Total Increase in units per decade	Total Housing Units	Population
1990 (Census)	2.59	6,702	1,619	0	N/A	8,321	20,816
2000 (Census)	2.58	6,840	1,813	153	485	8,806	22,036
2010 (Forecast)	2.51	7,002	2,523	240	959	9,765	24,510
2020 (Forecast)	2.46	7,164	3,172	326	897	10,662	26,229

Notes:

1. Forecasts of average household size were obtained from Puget Sound Regional Council (2003).
2. Forecasts of Single Family Residential (SFR) Units are based on the trend of net new single family home (new construction minus demolitions) building permits for the last six years. Actual SFR construction may be higher if select known large acreage sites are put on the market during the planning period or due to other change in market factors.
3. Forecasts of Multifamily Units are based on a conservative set of factors and assumptions. These include projects currently under construction, in the development pipeline, and parcels with a high likelihood of redevelopment based on known developer interest and very low improvement to land value ratios. Assumed densities were determined from a sample of six recently completed or permitted projects (4 mixed-use and 2 commercial). Please contact Development Services Group for more information.
4. Forecasts of Accessory Dwelling Units (ADUs) are based on a trend line projection of ADU permits issued since 1995.

Appendix C

Agency Comments

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STATE OF WASHINGTON
DEPARTMENT OF HEALTH

NORTHWEST DRINKING WATER REGIONAL OPERATIONS
20425 72nd Avenue South, Suite 310, Kent Washington 98032-2388

November 13, 2014

TERRY SMITH, UTILITIES OPERATIONS
MERCER ISLAND, CITY OF
9601 SE 36th STREET
MERCER ISLAND WA 98040

Subject: Mercer Island, City of – Water System ID# 536405
King County
2014 Water System Plan – Review Comments
Submittal #14-0804

Dear Mr. Smith:

Thank you for submitting the Water System Plan (WSP) for the City of Mercer Island (the City) received in this office on August 05, 2014. We have reviewed the plan and offer the following comments. These comments must be adequately addressed prior to approval of the WSP.

General System Information

1. Do you have pipe material information in GIS? Please include a table showing a breakdown of miles of pipe material in the WSP.

Basic Planning Data

2. In Table 5-3, the multifamily water use per connection increased from 1145 to 2100. Describe the reasons for this increase in the text. Is this usage per building? Are you able to break it down per apartment or connection?

Water Quality

3. Please provide a Coliform Monitoring Plan for your system; nothing was included in Appendix K. Include a water system facility map showing pressure zones and sampling locations. Refer to guidance on our website (<http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-036.pdf>). I understand you are updating this as a result of the *E.coli* incident in September/October 2014.



4. Please include a description of the baseline water quality of your system including typical chlorine residuals in the text. What information is collected to characterize baseline water quality? Will standard procedures change as a result of the recent water quality events?

System Analysis

5. Table 4-2 indicates the existing Seattle Public Utilities (SPU) contract is not adequate to provide supply at the 20-year planning horizon. Please monitor demands and be proactive about updating your SPU supply contract if needed to meet future demands.
6. A discussion about adding pressure relief valves or rupture disks at particular locations within the system is presented on page 4-13. I do not see this project in the CIP included in Chapter 7. What is the City's plan for this project?
7. Please describe why the model was not calibrated for this WSP update. A full calibration should be conducted periodically to ensure the model is simulating the system as close as possible. Model calibration should be planned for the next WSP update.
8. Explain in more detail how modeling results show areas of low pressure (less than 30 psi at PHD) but no improvements are included in the CIP to improve system pressure.
9. For the fire flow analysis, describe what is meant by 'tanks were set to maximum operating level'. Per the WAC, for fire flow analyses, the water system should be evaluated under conditions where the fire suppression and equalizing volumes are depleted. Confirm that water levels in the reservoirs were set appropriately for fire flow and peak hour demand analyses.
10. Did the modeling analyses show that a fire flow of 5,000 gpm for 4 hours is available for the commercial district? If not, what projects are planned to improve available fire flow for this area?
11. On page 4-12, the text indicates that the First Hill zone does not have hydrants or major distribution mains. Do the modeling results show that adequate fire flow protection is available for services in this pressure zone under MDD conditions?

CIP

12. Describe what CIP projects from 2008 WSP were implemented. If projects were removed or are no longer valid, describe why.
13. How were the projects in Table 7-4 developed? Describe how the substandard main replacement projects are selected for each year. What criteria are used? Do you include water quality and material in these decisions? How will priorities change with the recent *E.coli* event?

Distribution Facilities Design and Construction Standards

14. Recommend you remove the 2 inch drain pipe from air vacuum valve assembly standard details W25 and W25A.
15. Please ensure your design and construction standards include the following:
 - a. Include requirements around reduced lead content (0.25 percent) in materials that come in contact with drinking water
 - b. Requirements for required vertical and horizontal separation between water lines and non-potable water lines
 - c. Standards outlining disinfection, hydrostatic testing and bacteriological testing for new construction and repairs

Operations and Maintenance

16. Update Emergency Response Plan with lessons learned from *E.coli* event of September/October 2014.
17. Update Cross Connection Control Program per recommendations from the Department and your engineer from Phase 2 of the Action Plan, which include the changes/improvements required as the result of the *E.coli* incident of September/October 2014.
18. Update information about the emergency well on page 6-11; it has already been constructed.

Miscellaneous

19. Nothing was included in Appendix G. What is planned for this part of the Appendix?
20. The final WSP submittal must be stamped and signed by your engineer.
21. Provide a determination of local government consistency from the City's Planning and Land Use Department.
22. Provide signed SEPA Checklist and a SEPA Threshold Determination with the final WSP submittal.
23. 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.
24. Prior to DOH approval, the City's governing body must approve and adopt the WSP. This is a requirement resulting from the Municipal Water Legislation.
25. Please provide copies of any comments made by purveyors (SPU), along with your response to those comments.

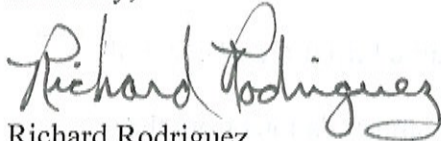
We hope that you have found these comments to be clear, constructive and helpful in the development of your final draft WSP. We ask that you submit the revised WSP on or before **February 12, 2015**. In order to expedite the review of your revised submittal, please include a cover letter summarizing how each of the above comments was addressed in the revised WSP and where each response is located (i.e., page numbers, Appendices, etc.)

Mercer Island, City of
November 13, 2014
Page 4

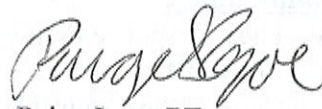
Regulations establishing a schedule for fees for review of planning, engineering and construction documents have been adopted (WAC 246-290-990). Please note that we have included an invoice in the amount of \$3705.00 for the review of the Water System Plan. This fee covers our cost for review of the initial submittal, plus the review of one revised document. Please remit your complete payment in the form of a check or money order within thirty days of the date of this letter to: **DOH, Revenue Section, and P.O. Box 1099, Olympia, WA 98507-1099.**

Thank you again for submitting your revised Water System Plan for our review. If you have any comments or questions concerning our review, please contact either of us.

Sincerely,



Richard Rodriguez
Regional Planner
(253) 395-6771



Paige Igoe, PE
Regional Engineer
(253) 395-6764

Enclosure (invoice)

Cc: Public Health – Seattle & King County
Steve Hirschey, King County UTRC
Jerry Liszak – WSDOE, NWRO
Eric Habermeyer, PE, HDR
Joan Kersnar, PE, Seattle Public Utilities

**City of Mercer Island
2015 Water System Plan**

Response to DOH Comments (Submitted to City via Letter Dated November 13, 2014)

Comment Number	DOH Comment	City Response
General System Information		
1	Do you have pipe material information in GIS? Please include a table showing a breakdown of miles of pipe material in the WSP.	A table summarizing pipe material has been added as Table 1-3.
Basic Planning Data		
2	In Table 5-3, the multifamily water use per connection increased from 1145 to 2100. Describe the reasons for this increase in the text. Is this usage per building? Are you able to break it down per apartment or Connection?	Added a paragraph " <i>Water use per connection increased only for the Multifamily customer class. This is due to an increase in the development of multifamily buildings with higher density apartments. Since 2002, the water usage per connection has steadily increased reflecting the shift towards higher density multifamily properties. The City does not collect data on water usage for individual multifamily dwelling units so it is not possible to determine if the water usage is increasing or decrease per each multifamily dwelling unit.</i> "
Water Quality		
3	Please provide a Coliform Monitoring Plan for your system; nothing was included in Appendix K. Include a water system facility map showing pressure zones and sampling locations. Refer to guidance on our website (http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-036.pdf). I understand you are updating this as a result of the <i>E. Coli</i> incident in September/October 2014.	The City has updated the coliform monitoring plan. The updated plan was reviewed and approved by DOH in July 2016. The updated plan is included in Appendix J of this Water System Plan. The Coliform Monitoring is included in Appendix J.

Comment Number	DOH Comment	City Response
4	Please include a description of the baseline water quality of your system including typical chlorine residuals in the text. What information is collected to characterize baseline water quality? Will standard procedures change as a result of the recent water quality events?	<p>Added the follow to “Total Coliform and Chlorine Monitoring” section in the “Summary of Regulatory Status and Requirements” section of Chapter 6 to describe baseline water quality.</p> <p>The standard procedures are documented in the updated Cross Connection Control Plan (Appendix I) and Coliform Monitoring Plan (Appendix J).</p> <p><i>“In response to positive E. Coli samples collected in the fall of 2014, the City instituted a transitional monitoring plan and chlorine residual boosting. The “transition” period ended when the City located and installed nine additional TCR sample stands at sites approved by DOH in spring 2015, and SPU took over monitoring under the regional TCR Program in September, 2015. The City’s current TCR Plan requires that 25 monthly samples are collected from 14 sites in the distribution system. In addition, the baseline water quality is measured in the system with the following routine activities:</i></p> <ul style="list-style-type: none"> • <i>Daily monitoring of chlorine residual at the entry point to the City’s system, the two reservoirs, and First Booster Pump Station through telemetry.</i> • <i>Quarterly disinfection byproducts (DBP), lead, and copper samples at 4 sites. Increased from 2 sites in 2014 after the E Coli positive samples.</i> • <i>Chlorine residual profiling sampling on a quarterly basis in addition to the monthly chlorine residual samples collected with total coliform samples.</i>
System Analysis		
5	Table 4-2 indicates the existing Seattle Public Utilities (SPU) contract is not adequate to provide supply at the 20-year planning horizon. Please monitor demands and be proactive about updating your SPU supply contract if needed to meet future demands.	Agreed. A statement is included prior to the table that says <i>“The City will monitor its demands and work with SPU to update supply contract if needed to meet future demands.”</i>

Comment Number	DOH Comment	City Response
6	A discussion about adding pressure relief valves or rupture disks at particular locations within the system is presented on page 4-13. I do not see this project in the CIP included in Chapter 7. What is the City's plan for this project?	One pressure relief valve was added in the Town Center, but there are no additional plans to install any additional pressure relief valves in the near future. Rupture discs are placed as part of the operations and maintenance budget and is not included in the CIP.
7	Please describe why the model was not calibrated for this WSP update. A full calibration should be conducted periodically to ensure the model is simulating the system as close as possible. Model calibration should be planned for the next WSP update.	A statement has been added to page 4-15. <i>"The City conducted an update to the hydraulic model in 2010 and 2012. The model was calibrated with hydrant flow tests during the update in 2010. No hydrant flow tests were conducted as part of the update in 2012 though the model was verified with hydrant pressure readings. For the purpose of the water system plan update, the modeling analysis conducted in 2012 was used. The City is in the process of updating their model in 2015 and will conduct additional flow testing to calibrate the model. "</i>

Comment Number	DOH Comment	City Response
8	<p>Explain in more detail how modeling results show areas of low pressure (less than 30 psi at PHD) but no improvements are included in the CIP to improve system pressure.</p>	<p>There are two services in the system with low pressure. The City monitors each location and has communicated with the homeowners. Due to unique site restrictions (for example: dead end main on high elevation), it's extremely challenging to implement system improvements in order to increase water pressure at these locations. The City will continue researching options and seeking solutions for these two locations. A draft of the modeling report was completed in June 2015; however, the City does not intend to include the revised modeling report into the WSP because the results have not yet been integrated into the City's distribution main improvement prioritization process. The process was last conducted in 2014 for the WSP and it is based on the 2012 modeling report. It would more appropriate to maintain that as a reference in the WSP. The City will be working on incorporating the results from the 2015 modeling report and other GIS data to update the prioritization on an ongoing basis.</p> <p>The following has been added to the chapter. <i>“Most of the areas of pressure less than 30 psi are surrounding tank, PRV, pump station, and transmission facilities where no services are present. There are two services in the distribution system with low pressure. The City has communicated the condition with each home owner and there is no current plan to boost pressure to either connection.”</i></p>
9	<p>For the fire flow analysis, describe what is meant by 'tanks were set to maximum operating level'. Per the WAC, for fire flow analyses, the water system should be evaluated under conditions where the fire suppression and equalizing volumes are depleted. Confirm that water levels in the reservoirs were set appropriately for fire flow and peak hour demand analyses.</p>	<p>Agreed. The modeling analysis conducted in 2012 assumed tank levels that are consistent with the storage analysis of the system. (i.e. modeling analysis assumed tank levels of 22 feet. The tank level based on the storage analysis in Table 4-3 is 23.7 feet with FSS, operational, and equalizing storage depleted.)</p> <p>The statement is revised to state <i>“tank levels were set with fire suppression, operational, and equalizing storage depleted.”</i></p>

Comment Number	DOH Comment	City Response
10	Did the modeling analyses show that a fire flow of 5,000 gpm for 4 hours is available for the commercial district? If not, what projects are planned to improve available fire flow for this area?	<p>Available fire flow from the model is reported up to 3,500 gpm and greater. A draft of the modeling report was completed in June 2015. This evaluated fire flow availability with the specific analysis of 5,000 gpm fire flow requirements. However, the City does not intend to include the revised modeling report into the WSP because the results have not yet been integrated into the City's distribution main improvement prioritization process. The City maintains an active list of all distribution improvements and will update it as necessary based on information provided in subsequent modeling analyses.</p> <p>A sentence is added to page 4-16 <i>"The City has verified the available fire flow in commercial areas by reviewing a spreadsheet of the available fire flow reported by the model. For a majority of hydrants in the commercial areas, there are multiple hydrants available to satisfy the fire flow requirement. Hydrants that are not able to supply the required fire are included in the City's improvement prioritization process."</i></p>
11	On page 4-12, the text indicates that the First Hill zone does not have hydrants or major distribution mains. Do the modeling results show that adequate fire flow protection is available for services in this pressure zone under MDD conditions?	This text has been revised. <i>"Fire Protection is provided through the First Hill booster pump station." The City installed the fire flow booster pump station to increase fire flow to hydrants in the zone. Fire flow is supplied through hydrants in the zone, not from the Reservoir Zone.</i>
CIP		
12	Describe what CIP projects from 2008 WSP were implemented. If projects were removed or are no longer valid, describe why.	Added a paragraph to page 7-1. <i>"The City completed all projects scheduled in the 2008 WSP for implementation from 2007 through 2014 except two that were delayed due to council decision for funding purposes. The projects Island Crest Way project was delayed until 2015 and three new PRV stations on East Mercer Way were combined with another water main project and delayed until 2016 and 2017."</i>

Comment Number	DOH Comment	City Response
13	How were the projects in Table 7-4 developed? Describe how the substandard main replacement projects are selected for each year. What criteria are used? Do you include water quality and material in these decisions? How will priorities change with the recent <i>E. Coli</i> event?	The projects were developed from a scoring matrix. A description of the matrix and scoring process has been added to page 7-9. The City intends to add water quality as a criterion during the next biennial budget planning process when the improvements will be re-evaluated.
Distribution System Design and Construction Standards		
14	Recommend you remove the 2 inch drain pipe from air vacuum valve assembly standard details W25 and W25A.	Details W25 and W25A have been updated.
15	Please ensure your design and construction standards include the following: a. Include requirements around reduced lead content (0.25 percent) in materials that come in contact with drinking water b. Requirements for required vertical and horizontal separation between water lines and non-potable water lines c. Standards outlining disinfection, hydrostatic testing and bacteriological testing for new construction and repairs	a. The City's specifications outline that all fittings, valves, couplings, and service connections shall be lead free in accordance with the Federal Reduction of Lead in Drinking Water Act. b. The required vertical and horizontal separation is shown in a sewer standard detail. It is also included as a standard on bid documents. c. Standards outlining disinfection, hydrostatic testing, and bacteriological testing are outlined in the City's Specifications 7-01.2(7) and 7-01.2(8).
Operations and Maintenance		
16	Update Emergency Response Plan with lessons learned from the <i>E. Coli</i> event of September/October 2014.	As of September 2016, the City is updating the CIP as part of the biannual budgeting process. The updated CIP is still considered preliminary at this time, since it has not been approved by Mercer Island's City Council. As such, the recent edits to the CIP were not included in the final version of the 2015 WSP approved by DOH in July, 2016. However, in response to this comment, the 2016 CIP includes updating the Water System Emergency Response Plan and construction of a booster chlorination facility to improve disinfection capabilities, both would reflect the lessons learned from the 2014 <i>E. Coli</i> event. The operation of this facility would be included as a component of the Emergency Response Plan.

Comment Number	DOH Comment	City Response
17	Update Cross Connection Control Program per recommendations from the Department and your engineer from Phase 2 of the Action Plan, which include the changes/improvements required as the result of the <i>E. Coli</i> incident of September/October 2014.	The City has updated the Cross Connection Control Plan. DOH reviewed and approved the updated Cross Connection Control Plan in July 2016. The updated Cross Connection Control Plan is included in Appendix I.
18	Update information about the emergency well on page 6-11; it has already been constructed.	Text has been updated to state that it has been constructed.
Miscellaneous		
19	Nothing was included in Appendix G. What is planned for this part of the Appendix?	Appendix G has been eliminated in this submittal. The information contained within this Appendix in the 2008 WSP is included in Table 7-4. The Appendices are re-sequenced.
20	The final WSP submittal must be stamped and signed by your engineer.	The engineering certification page is signed for the final submittal.
21	Provide a determination of local government consistency from the City's Planning and Land Use Department.	Included in Appendix B
22	Provide signed SEPA Checklist and a SEPA Threshold Determination with the final WSP submittal.	Included in Appendix A
23	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.	A consumer input meeting was held during a special session of the City Council on July 7 th , 2014. The meeting was advertised with a copy of the Water System Plan available to the public. The meeting agenda and minutes are included in Appendix B.
24	Prior to DOH approval, the City's governing body must approve and adopt the WSP. This is a requirement resulting from the Municipal Water Legislation.	Included in Appendix B
25	Please provide copies of any comments made by purveyors (SPU), along with your response to those comments.	Comments and responses were received from SPU and DOH. Documentation of their resolution is included in Appendix C.
<p>Note: The City of Mercer Island submitted the original version of this document to DOH on April 22, 2015. Subsequent changes were made to items 3, 4, 8, 10, 16, and 17 of this document between June 11, 2015 and September 26, 2016 based on communications with DOH staff and completion of pending action items.</p>		

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City of Seattle
Seattle Public Utilities

October 27, 2014

Ms. Rona Lin
City of Mercer Island
9611 S.E. 36th Street
Mercer Island, WA 98040-3732

Subject: Comments to Draft 2015 Water System Plan for the City of Mercer Island

Dear Ms. Lin:

Thank you for the opportunity to review and comment on the draft 2015 Water System Plan (WSP) for the City of Mercer Island. Our comments below include general comments and more specific comments on data gaps and corrections to the information presented in the WSP, particularly as related to Seattle Public Utilities (SPU) and its services to Mercer Island.

1. The section on water rights evaluation on page 4-3 should be corrected to indicate that this evaluation is of water supply availability from interties with SPU and not of water rights held by the City of Mercer Island. Some suggestions are to describe this as "having sufficient supplies from interties" (not "sufficient water rights"), to replace in Table 4-2 "Existing Water Rights" with "Existing Interties," and to rename the table to "Water Supply Capacity Summary."
2. While we applaud Mercer Island in taking additional steps beyond the regional program, referred to as "enhanced measures" throughout the WSP, participation in the regional conservation program is all that the City needs to do to meet its adopted WUE goal. Perhaps clarify why the City believes it needs to implement enhanced measures to meet its target, or explain other reasons for taking these additional steps.
3. On page 5-1, the description of the goal set in the 2008 WSP is incomplete in that it does not describe the component after 2010. We suggest using language from that WSP or from the adopting resolution (Resolution 1394, passed Dec. 3, 2007).
4. There are several issues regarding Table 5-2 that could be clarified in the text introducing the table or within the table:
 - a) We suggest adding a date to the title of the table to clarify that these are measures that were offered from very early-on in the program - 2000-2008.
 - b) The current number of partners has changes from 25 to 18, with the formation/exit of Cascade Water Alliance and addition of the City of Renton.

Ray Hoffman, Director
Seattle Public Utilities
700 5th Avenue, Suite 4900
PO Box 34018
Seattle, WA 98124-4018

Tel (206) 684-5851
Fax (206) 684-4631
TDD (206) 233-7241
ray.hoffman@seattle.gov

<http://www.seattle.gov/util>

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- c) References to the SWP 2006 Annual Report stand out as they are for a single year and there is no explanation for why that year is used.
5. The statements on page 5-8 that read, "The City budgets \$30,000 annually to fund the conservation program measures. Measures are implemented each year as funding allows." should be clarified as to whether the \$30,000 is the City's estimate of the amount paid to SPU for the regional conservation program through rates and facility charges per the wholesale contract or a separate budget.
6. Table 5-4 should be updated and corrected as follows:
 - a) Delete "Tips on Tap" and add "Online repository of" before "articles for utility newsletters"
 - b) Add for schools, "Fix-A-Leak-Week 2013, 2014"
 - c) Delete "Education on water pricing and conservation rates"
 - d) Delete "Leak detection dye strips distributed via direct mailings"
 - e) Move "scheduling tools" to end of previous bullet
 - f) Move "populations and program design options to meet their needs" to end of previous bullet
 - g) Remove "Residential and" for irrigation systems (now only Commercial)
7. Although page 6-7 states, "Seattle Public Utilities conducts the Coliform Monitoring Plan sampling for the City included in Appendix K and as described below," Appendix K does not include a coliform monitoring plan, and there is no discussion of monitoring responsibilities (SPU versus Mercer Island).
8. In the section on *Reduced Stage 2 DBP Rule IDSE Sampling* starting on page 6-7, there is no discussion of IDSE data, which have been available since 2008, or of Stage 2 data, which have been collected since early 2012. A statement on page 6-8 implies that no HAA data are available, while HAA data dating back to 2007 are available. There is also no overview of the DBP results.
9. On page 6-9, the lead and copper limits are referred to as "maximum reporting levels", instead of the correct term of "action levels."
10. Also on page 6-9, there is no review of Mercer Island's lead and copper data, coliform or chlorine data, and the results from their UCMR3 samples (all sampling rounds are completed).
11. For Figure 1-3, we suggest making the following changes:
 - a) Show SPU-owned pipelines in one color, and Mercer Island-owned pipelines in another.
 - b) SPU's 24-inch pipeline on Mercer Island ends at the intersection of SE 43rd St and 89th Ave SE; it does not extend up to Mercer Island's tanks.
 - c) Delete the distinction of "primary" and "secondary" for SPU-owned pipelines as SPU does not use this terminology.
 - d) Delete the "proposed secondary pipeline" as shown; SPU has no plans to add onto the Mercer Island Pipeline systems.
 - e) Show the service to Shorewood Apartments on the map at SE 40th & 82nd Ave SE.
 - f) Delete reference to Mercer Crest; that purveyor no longer exists.
 - g) Identify "Reach 4, Mercer Island (100%)" from the Shorewood Apartments service to the end of the 24-inch pipeline.

12. Page 1-3, the 16-inch line on the East Channel Bridge is referred to as "emergency supply line" when it is a second pipeline along this stretch.
13. On Page 3-8, the discussion on Operational Storage refers to water level sensors being used to control pumps, and both altitude valves and flow control valves are later mentioned. It would be helpful to describe clearly how tank inflows are controlled.
14. On Page 7-3, it states, "Should the City someday agree to take over supply to Shorewood from SPU, other potential projects would be the replacement/relocation of the existing supply meters and the repair/replacement of the transmission line across the East Channel from Bellevue." SPU is not aware of any issues with the original pipeline segment across the East Channel or on Enatai. However, the 30-inch segment of the original pipeline east of Enatai to Lake Washington Blvd, across the Mercer Slough, is in poor condition and is expected to be decommissioned in 2015.

If you have any questions on our comments, please contact me at 206-684-0839, or joan.kersnar@seattle.gov.

Sincerely,



Joan M. Kersnar, P.E.
Drinking Water Planning Manager

cc: Terri Gregg, Wholesale Contracts Manager, Seattle Public Utilities
Eric Habermeyer, HDR Engineering

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City of Mercer Island

2015 Water System Plan

Response to Seattle Public Utility's Comments (Submitted to City via Letter Dated October 27, 2014)

Comment Number	SPU Comment	Draft Response
1	The section on water rights evaluation on page 4-3 should be corrected to indicate that this evaluation is of water supply availability from interties with SPU and not of water rights held by the City of Mercer Island. Some suggestions are to describe this as "having sufficient supplies from interties" (not "sufficient water rights"), to replace in Table 4-2 "Existing Water Rights" with "Existing Interties," and to rename the table to "Water Supply Capacity Summary."	The section has been revised as suggested. The only mention of water rights that remains is the reference to "Water Rights Self-Assessment Forms" in Appendix D. This was not changed because it is the specific name of the form provided by DOH.
2	While we applaud Mercer Island in taking additional steps beyond the regional program, referred to as "enhanced measures" throughout the WSP, participation in the regional conservation program is all that the City needs to do to meet its adopted WUE goal. Perhaps clarify why the City believes it needs to implement enhanced measures to meet its target, or explain other reasons for taking these additional steps.	The City desires to be a good steward of its water resources and voluntarily implements additional measures.
3	On page 5-1, the description of the goal set in the 2008 WSP is incomplete in that it does not describe the component after 2010. We suggest using language from that WSP or from the adopting resolution (Resolution 1394, passed Dec. 3, 2007).	A statement describing the portion of the 15 mgd goal adopted from 2011 through 2030 has been included. The language is copied from Resolution 1394.

Comment Number	SPU Comment	Draft Response
4	<p>There are several issues regarding Table 5-2 that could be clarified in the text introducing the table or within the table:</p> <p>a) We suggest adding a date to the title of the table to clarify that these are measures that were offered from very early-on in the program - 2000-2008.</p> <p>b) The current number of partners has changes from 25 to 18, with the formation/exit of Cascade Water Alliance and addition of the City of Renton.</p> <p>c) References to the SWP 2006 Annual Report stand out as they are for a single year and there is no explanation for why that year is used.</p>	<p>Agreed.</p> <p>Agreed</p> <p>References to the 2006 SWP have been removed in Table 5-2. The 2013 annual report does not include Mercer Island specific information to update the numbers in the table. The conservation program is intended to be described qualitatively in this table.</p>
5	<p>The statements on page 5-8 that read, 'The City budgets \$30,000 annually to fund the conservation program measures. Measures are implemented each year as funding allows.' should be clarified as to whether the \$30,000 is the City's estimate of the amount paid to SPU for the regional conservation program through rates and facility charges per the wholesale contract or a separate budget.</p>	<p>\$30,000 is the amount the Mercer Island spends for conservation measures implemented directly by the City. Further description is added to clarify the statement in the WSP.</p>
6	<p>Table 5-4 should be updated and corrected as follows:</p> <p>a) Delete "Tips on Tap" and add "Online repository of" before "articles for utility newsletters"</p> <p>b) Add for schools, "Fix-A-Leak-Week 2013, 2014"</p> <p>c) Delete "Education on water pricing and conservation rates"</p> <p>d) Delete "Leak detection dye strips distributed via direct mailings"</p> <p>e) Move "scheduling tools" to end of previous bullet</p> <p>f) Move "populations and program design options to meet their needs" to end of previous bullet</p> <p>g) Remove "Residential and" for irrigation systems (now only Commercial)</p>	<p>Agreed to all changes.</p>

Comment Number	SPU Comment	Draft Response
7	Although page 6-7 states, "Seattle Public Utilities conducts the Coliform Monitoring Plan sampling for the City included in Appendix K and as described below," Appendix K does not include a coliform monitoring plan, and there is no discussion of monitoring responsibilities (SPU versus Mercer Island).	<p>Mercer Island has updated the coliform monitoring plan. The updated plan was reviewed and approved by SPU in July 2016. The updated plan will be included in Appendix J of this Water System Plan.</p> <p>The monitoring responsibilities are described in the wholesale water contract. SPU is responsible for monitoring per the contract. The City is responsible for TCR repeat sampling and is in the process of collecting lead and copper samples in 2015. During the transitional monitoring plan, the City is collecting samples which include some faucet tap samples. The City is in the process of installing additional sampling sites in the distribution system after which SPU will conduct all future monitoring in the distribution system.</p>
8	In the section on <i>Reduced Stage 2 DBP Rule IDSE Sampling</i> starting on page 6-7, there is no discussion of IDSE data, which have been available since 2008, or of Stage 2 data, which have been collected since early 2012. A statement on page 6-8 implies that no HAA data are available, while HAA data dating back to 2007 are available. There is also no overview of the DBP results.	The text to this section has been revised to remove the mention that no HAA data is available. IDSE, Stage 2, HAA, and DBP data is summarized and available on the City's website in its annual water quality report. A link to the location is provided in the text.
9	On page 6-9, the lead and copper limits are referred to as "maximum reporting levels", instead of the correct term of "action levels."	"Maximum Reporting Levels" has been changed to "Action Levels"
10	Also on page 6-9, there is no review of Mercer Island's lead and copper data, coliform or chlorine data, and the results from their UCMR3 samples (all sampling rounds are completed).	Lead and copper, UCMR3, and chlorine samples are summarized in their Annual Water Quality report located on line. A copy of the 2013 report is provided in Appendix J. A description of the report has been included in the text with a link to the City's website where it is available.

Comment Number	SPU Comment	Draft Response
11	<p>For Figure 1-3, we suggest making the following changes:</p> <p>a) Show SPU-owned pipelines in one color, and Mercer Island-owned pipelines in another.</p> <p>b) SPU's 24-inch pipeline on Mercer Island ends at the intersection of SE 43rd Stand 89th Ave SE; it does not extend up to Mercer Island's tanks.</p> <p>c) Delete the distinction of "primary" and "secondary" for SPU-owned pipelines as SPU does not use this terminology.</p> <p>d) Delete the "proposed secondary pipeline" as shown; SPU has no plans to add onto the Mercer Island Pipeline systems.</p> <p>e) Show the service to Shorewood Apartments on the map at SE 40th & 82nd Ave SE.</p> <p>f) Delete reference to Mercer Crest; that purveyor no longer exists.</p> <p>g) Identify "Reach 4, Mercer Island (100%)" from the Shorewood Apartments service to the end of the 24-inch pipeline.</p>	The figure has been updated with the suggested changes
12	Page 1-3, the 16-inch line on the East Channel Bridge is referred to as "emergency supply line" when it is a second pipeline along this stretch.	Supply line is referred to as "second" and not "emergency"
13	On Page 3-8, the discussion on Operational Storage refers to water level sensors being used to control pumps, and both altitude valves and flow control valves are later mentioned. It would be helpful to describe clearly how tank inflows are controlled.	The flow control valves controlling inflow to the reservoirs are controlled by the water level sensors. The text has been revised to clarify this.

Comment Number	SPU Comment	Draft Response
14	<p>On Page 7-3, it states, "Should the City someday agree to take over supply to Shorewood from SPU, other potential projects would be the replacement relocation of the existing supply meters and the repair/replacement of the transmission line across the East Channel from Bellevue." SPU is not aware of any issues with the original pipeline segment across the East Channel or on Enatai. However, the 30-inch segment of the original pipeline east of Enatai to Lake Washington Blvd, across the Mercer Slough, is in poor condition and is expected to be decommissioned in 2015.</p>	<p>This text has been removed. It is a carry over from the prior 2008 WSP.</p>

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Appendix D

Water Facilities Inventory Form and Water Rights Self Assessment

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WATER FACILITIES INVENTORY (WFI) FORM - Continued

1. SYSTEM ID 53640 5	2. SYSTEM NAME MERCER ISLAND, CITY OF	3. COUNTY KING	4. GROUP A	5. TYPE Comm
--------------------------------	---	--------------------------	----------------------	------------------------

	ACTIVE SERVICE CONNECTIONS	DOH USE ONLY! CALCULATED ACTIVE CONNECTIONS	DOH USE ONLY! APPROVED CONNECTIONS
25. SINGLE FAMILY RESIDENCES (How many of the following do you have?)	0	9213	Unspecified
A. Full Time Single Family Residences (Occupied 180 days or more per year)	7085		
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	75		
B. Full Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied more than 180 days/year	2128		
C. Part Time Residential Units in the Apartments, Condos, Duplexes, Dorms that are occupied less than 180 days/year	0		
27. NON-RESIDENTIAL CONNECTIONS (How many of the following do you have?)			
A. Recreational Services and/or Transient Accommodations (Campsites, RV sites, hotel/motel/overnight units)	0	0	
B. Institutional, Commercial/Business, School, Day Care, Industrial Services, etc.	175	175	
28. TOTAL SERVICE CONNECTIONS		9388	

29. FULL-TIME RESIDENTIAL POPULATION
A. How many residents are served by this system 180 or more days per _____ 22720

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

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

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?												
B. How many days per month are they present?												

33. ROUTINE COLIFORM SCHEDULE	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
	25	18*	18*	18*	18*	18*	18*	18*	18*	18*	18*	18*

35. Reason for Submitting WFI:

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

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

SIGNATURE: _____

DATE: _____

PRINT NAME: _____

TITLE: _____

<u>WS ID</u>	<u>WS Name</u>
53640	MERCER ISLAND, CITY OF

Total WFI Printed: 1

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Project Report Form Water Rights Self Assessment (2015)

Permit Certificate or Claim #	Name of rightholder or claimant	Priority Date	Source Name/Number	Primary or supplemental	Existing System Capacity - based on water right limits		Projects Production/withdrawal with New Project On-line		Projected System Capacity Status (excess or deficiency of water rights)	
					Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qi)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 1.										
Claims 1.										
2.										
3.										
4.										
Total	*****	*****	*****	*****						

Intertie Name/Identifier	Name of Purveyor Providing Water	Existing Limits on Intertie Water Use		Projected Production/Withdrawal with New Project On-line		Current Intertie Supply Status (Excess/Deficiency)	
		Maximum Instantaneous Flow rate (Qi) (cfs)	Maximum Annual Volume (Qa) (AFY)	Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (qi)	Maximum Annual Volume (Qa)
1. #67 at SE 43 rd Street and 89 th Ave.	Seattle Public Utilities (SPU)	3.87	4,331				
2. #68 at SE 40 th Street and 97 th Ave.	SPU	Backup	Backup				
3. Boat Launch	SPU	0.75	839				
4.							
TOTAL	*****	4.62	5,170	4.44	2,364	0.18	2,806

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Project Report Form Water Rights Self Assessment (2020)

Permit Certificate or Claim #	Name of rightholder or claimant	Priority Date	Source Name/Number	Primary or supplemental	Existing System Capacity - based on water right limits		Projects Production/withdrawal with New Project On-line		Projected System Capacity Status (excess or deficiency of water rights)	
					Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qi)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 2.										
Claims 1.										
2.										
3.										
4.										
Total	*****	*****	*****	*****						
Intertie Name/Identifier		Name of Purveyor Providing Water			Existing Limits on Intertie Water Use		Projected Production/Withdrawal with New Project On-line		Current Intertie Supply Status (Excess/Deficiency)	
					Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (qi)	Maximum Annual Volume (Qa)
1. #67 at SE 43 rd Street and 89 th Ave.		Seattle Public Utilities (SPU)			3.87	4,331				
2. #68 at SE 40 th Street and 97 th Ave.		SPU			Backup	Backup				
3. Boat Launch		SPU			0.75	839				
4.										
TOTAL					4.62	5,170	4.55	2,420	0.07	2,750
*****		*****	*****	*****						

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Project Report Form Water Rights Self Assessment (2034)

Permit Certificate or Claim #	Name of rightholder or claimant	Priority Date	Source Name/Number	Primary or supplemental	Existing System Capacity - based on water right limits		Projects Production/withdrawal with New Project On-line		Projected System Capacity Status (excess or deficiency of water rights)	
					Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qi)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (Qi)	Maximum Annual Volume (Qa)
Permits/ Certificates 3.										
Claims 1.										
2.										
3.										
4.										
Total	*****	*****	*****	*****						
Intertie Name/Identifier		Name of Purveyor Providing Water			Existing Limits on Intertie Water Use		Projected Production/Withdrawal with New Project On-line		Current Intertie Supply Status (Excess/Deficiency)	
					Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow rate (Qi)	Maximum Annual Volume (Qa)	Maximum Instantaneous Flow Rate (qi)	Maximum Annual Volume (Qa)
1. #67 at SE 43 rd Street and 89 th Ave.		Seattle Public Utilities (SPU)			3.87	4,331				
2. #68 at SE 40 th Street and 97 th Ave.		SPU			Backup	Backup				
3. Boat Launch		SPU			0.75	839				
4.										
TOTAL					4.62	5,170	4.63	2,453	(0.01)	2,717

If you need this publication in an alternate format, call (800) 525-0127. For TTY/TDD call (800) 833-6388.

Please return completed form to the Office of Drinking Water regional office checked below.

Northwest Drinking Water
Department of Health
20425 72nd Ave S, Suite 310
Kent, WA 98032-2358
Phone: (253) 395-6750
Fax: (253) 395-6760

Southwest Drinking Water
Department of Health
PO Box 47823
Olympia, WA 98504-7823
Phone: (360) 236-3030
Fax: (360) 664-8058

Eastern Drinking Water
Department of Health
16201 E Indiana Ave, Suite 1500
Spokane Valley, WA 99216
Phone: (509) 329-2100
Fax: (509) 329-2104

Appendix E

Existing Service Agreements

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CITY OF SEATTLE
FULL REQUIREMENTS CONTRACT
FOR THE
SUPPLY OF WATER
TO
CITY OF MERCER ISLAND

06-11-03

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FULL REQUIREMENTS CONTRACT

**BETWEEN
THE CITY OF SEATTLE
AND
CITY OF MERCER ISLAND**

FOR THE SUPPLY OF WATER

THIS CONTRACT is entered into between the CITY OF SEATTLE (“Seattle”), a municipal corporation of the State of Washington, and CITY OF MERCER ISLAND (“Water Utility”), a municipal corporation of the State of Washington.

RECITALS

1. Seattle owns and operates a system for the supply, transmission and distribution of potable water and is authorized to sell and distribute water to its residents and to other persons and customers located outside the corporate limits of Seattle.
2. Seattle's water system is integral to the health and welfare of the residents located within the water service area shown in Seattle's Water System Comprehensive Plan. Seattle intends to provide water from the system to meet the current and future needs of the residents of such water service area when such service is requested from Seattle.
3. In meeting this service commitment, Seattle must ensure that this role does not place financial burdens on its retail customers for which they do not receive a corresponding benefit.
4. This contract and contracts of a similar nature with other wholesale customers of Seattle located within Seattle's service area are intended to provide those customers with the security of a long term service commitment and to describe the terms and conditions associated with that commitment.
5. Under this contract, Seattle intends to provide wholesale water to Water Utility at an equivalent level of service and under the same pricing principles as it provides water to Seattle's own distribution system.
6. Given the extensive growth of Seattle and the surrounding areas and the impacts upon infrastructure and costs, this contract is intended to provide sufficient water for growth. As a general philosophy for cost sharing purposes, the parties desire to adopt the principle that “growth should pay for growth.”
7. Seattle and Water Utility, together with other wholesale customers of Seattle, have agreed to establish an Operating Board comprised of representatives pledged to represent the best

interests of the region in order to provide overall direction to the Administrator of the Seattle Water Supply System.

NOW, THEREFORE, in consideration of mutual covenants herein, it is agreed as follows:

SECTION I. DEFINITIONS

For the purposes of this contract, the following terms have been defined as:

"Full Water Requirements" - All of the water needed by Water Utility to meet the needs of its present and future water customers within its service area as shown in Water Utility's comprehensive water system plan.

"Block Purchase Contract" - A contract in which Seattle sells a fixed quantity of water to the Wholesale Customer on a take or pay basis.

"Full Requirements Contract" - A contract in which Seattle supplies a Wholesale Customer with its Full Water Requirements.

"Partial Requirements Contract" - A contract in which Seattle supplies a Wholesale Customer with that portion of its Full Water Requirements above that provided by the Wholesale Customer's own supply.

"Wholesale Customer" - Those customers who receive water from Seattle for the purposes of reselling to others.

"1982 Water Purveyor Contract" - That certain Water Purveyor Contract between Water Utility and Seattle having an effective date of September 8, 1982.

"Existing Supply Resources" - Current components of the Seattle Water Supply System which consist of the Cedar River storage, treatment and diversion facilities, the Tolt River storage, treatment and diversion facilities, and the Highline Well Field as set forth in Exhibit VII.

"FC" - Means Facility Charge.

"1% Water Conservation Program" - A program which has been implemented by Seattle with the agreement of Water Utility which contains a goal of 1% conservation per year for ten years.

"Seattle Water Supply System" - Seattle's water supply system consisting of dams, impounded water, supply and transmission mains, pumps, treatment facilities, and all other facilities utilized in conveying water to Seattle's retail service area, to Water Utility and other Wholesale Customers. This definition does not include Seattle's water distribution system, which is used to serve its Retail Customers.

"Seattle's Average Cost of Debt" - The weighted average interest rate on Seattle's water system debt outstanding calculated at the end of each calendar year during the term of this contract.

"Rate of Return on Investment" - Seattle's Average Cost of Debt, plus 1.5 percent.

"Service Connection" - The water meter and appurtenances through which water is delivered from the Seattle Water Supply System to a Wholesale Customer's water system.

“Seattle Transmission Facilities” – Those facilities serving Seattle’s regional transmission needs as set forth in Exhibit VIII.

“Stranded Costs” – Those water supply and related costs that Seattle and others have invested for the region which may not be recovered as a result of lost revenues.

“Seattle Water System Comprehensive Plan” - Seattle's Water System Comprehensive Plan dated April, 2001, and amendments thereto, prepared by Seattle to comply with the requirements of WAC 248-54-580, and successor regulations.

“Administrator” - The Director of Seattle Public Utilities or any other title given to that person who maintains the authority to operate and manage the Seattle Water Supply System.

“Operating Board” – A board of representatives having the powers and duties set forth in Section V hereof.

SECTION II. TERM OF CONTRACT AND GUARANTEES

II.A. Term of Contract

1. Term. This contract shall take effect upon the signature of both parties and shall remain in effect until 12:01 AM on January 1, 2062.
2. Subsequent Right Of First Refusal. At the end of the term of this contract, Water Utility shall have a right of first refusal to continue to purchase the amount of water then purchased from Seattle at the time of contract expiration.
3. Periodic Review and Right to Change Certain Terms and Conditions. The parties may review and change certain terms and conditions governing the sales of water hereunder on January 1, 2022 and January 1, 2042 as follows.
 - a. Consensual Process. On or before January 1, 2021, and then again on or before January 1, 2041, either party may provide the other with a written proposal to amend the contract terms. The parties shall then meet and consider the proposal. If the parties agree to the proposal prior to January 1, 2022 and January 1, 2042, respectively, a written amendment to this contract shall be approved and executed by both parties and this contract shall be amended accordingly.

- b. Seattle's Right to Amend. If the parties are unable to agree on a proposal by Seattle pursuant to subsection a. above within the respective one-year periods, Seattle may propose in writing its desired amendment to the Operating Board. Seattle and the Operating Board shall meet and consider the proposed amendment and use reasonable efforts to resolve any differences in the proposal. After 90 days from Seattle's written proposal to the Board, Seattle may propose its desired amendment to the Seattle City Council. If the Operating Board does not agree with such proposal, it may submit a revised proposal to the Seattle City Council within 90 days of Seattle's submission of its proposal to the Seattle City Council. After receiving the Operating Board's alternate proposal, or after the lapse of the 90 day period for the Operating Board to make an alternate proposal, the Seattle City Council may then deny both proposals or approve one of them and issue an amendment to this contract which shall be in effect for the remaining term of the contract from the date of issuance, unless later amended pursuant to subsection a. above, or by mutual agreement.

- c. Limitation on Seattle's Right to Amend. Notwithstanding subsection b. above, Seattle shall not have the right to: (i) reduce its obligation to provide the Full Water Requirements of Water Utility; (ii) cease to provide wholesale water to Water Utility at an equivalent level of service as it provides water to Seattle's own distribution system. (iii) charge a higher wholesale rate for water supply and transmission to Water Utility than that charged to Seattle for supply to its retail customers, (iv) reduce its water quality obligations hereunder, (v) change the methodology for calculating Rate of Return on Investment, (vi) restrict Water Utility's right to withdraw from this contract, and (vii) disband or significantly reduce the powers of the Operating Board.

II.B. Agreement to Supply and Purchase Water

1. Full Requirements Commitment. Seattle shall supply the Full Water Requirements of Water Utility for the term of this contract. Except as set forth in Exhibit I and section II.B.5 below, Water Utility shall purchase all of its wholesale water needs from Seattle.

2. Adjustments in Water Utility's Service Area. In the event Water Utility acquires additional service area that is: 1) located outside of the service area identified in its comprehensive water system plan and 2) which is not already served with Seattle water, then Seattle shall supply the water requirements of the additional service area subject to a) Seattle's ability to serve that area, and b) Water Utility's payment of FCs for that additional service area in accordance with section IV.E.

3. Assumption or Transfer of Responsibilities. In the event Water Utility's entire service area and service responsibilities are assumed by or are transferred to another utility, then this contract shall become null and void at the time of the assumption or transfer; provided, however, if the transferee of the service area is a Wholesale Customer, Seattle shall provide water to the transferee according to the terms of the transferee's water supply contract with Seattle. If the transferee is not a Wholesale Customer, then Seattle shall issue the transferee a water supply contract for such area subject to terms and conditions as Seattle shall determine.

4. Annexation by Seattle. If the entire water service area of Water Utility is annexed to Seattle, then this contract shall become null and void upon Seattle's assumption of Water Utility's water system.

5. Water Utility's Right to Terminate or Reduce Purchase Commitment. Water Utility's commitment to purchase water from Seattle under this contract may be terminated or reduced subject to the terms and conditions set forth below. Water Utility shall provide Seattle at least 5 years written notice thereof, provided, however, if Seattle unilaterally amends the terms and conditions of this contract pursuant to Section II.A.3 above, Water Utility may terminate this contract at any time within 1 year thereafter by giving Seattle 1 year written notice.
 - a. Automatically Permitted Reductions. Water Utility may, without restriction, upon five years written notice to Seattle, reduce its water purchases from Seattle by an amount not to exceed 10 million gallons per day of its average annual demand.

 - b. Reductions Requiring Permission. Water Utility may reduce quantities of water purchased from Seattle by more than the amount identified in the preceding section or by providing less than five years advance notice of such reduction if in the judgment of the Operating Board, using the criteria listed below, it determines that such reduction is in the best interest of the Seattle Water Supply System as a whole.

 - c. Criteria. The criteria to be used by the Operating Board in determining the best interest of the Seattle Water Supply System shall include but not be limited to the following:
 - i. The potential for Stranded Costs and impacts on rates;
 - ii. The cost of new resources;
 - iii. The feasibility and benefit of reallocating to Seattle or other customers the amount of water foregone by Water Utility; and
 - iv. Environmental aspects of the proposed change.

The Operating Board shall act promptly and reasonably in evaluating and deciding upon Water Utility's request. The Operating Board may approve, with or without reasonable conditions, or deny Water Utility's request based on the above criteria. Approval conditions may include a requirement that Water Utility waive its rights to be served its Full Water Requirements. If the approval conditions are unacceptable to Water Utility, it may elect in writing to withdraw its request and this contract shall continue in full force and effect.

II.C. Continuity of Service within the Term of the Contract

1. Parity of Service. Seattle shall provide wholesale water to Water Utility at an equivalent level of service that it provides to Seattle's own distribution system. In the event of a general emergency or weather-related water shortage affecting the entire Seattle Water Supply System, general restrictions placed upon water deliveries to Water Utility shall be determined by the Operating Board and applied equally to Seattle's distribution system and the Wholesale Customers. In the event of localized emergency problems, Water Utility acknowledges temporary, localized service interruptions may occur for the duration of the emergency.
2. Emergency Curtailment Measures. It is recognized by both parties that emergency water use curtailment measures may have to be implemented by Seattle on a regional basis in order to meet an emergency condition or a regional water shortage. The procedures to be used in the event of a weather-related regional water shortage, or shortages caused by other factors, shall be as described in Seattle's Water Shortage Contingency Plan in effect as of the effective date of this contract, or successor contingency plans. Successor contingency plans shall be developed and implemented by Seattle in consultation with the Operating Board. Water Utility shall assist with and support all emergency curtailment measures that are implemented.
3. Other Emergencies. Seattle may temporarily interrupt or reduce deliveries of water to Water Utility if Seattle determines that such interruption or reduction is necessary or reasonable in case of system emergencies or in order to install equipment, make repairs, replacements, investigations and inspections or perform other maintenance work on the Seattle Water Supply System. Except in cases of emergency, and in order that Water Utility's operations will not be unreasonably interrupted, Seattle shall give Water Utility and the Operating Board reasonable notice of any such interruption or reduction, the reasons for and the probable duration. Seattle shall use its best efforts to minimize service interruptions to Water Utility.
4. Waiver of Charges. If interruption or reduction in service to Water Utility requires that Water Utility draw water supply in a manner that subjects Water Utility to demand charges (as described in Exhibit III hereto), Seattle shall waive such charges during the period of such interruption or reduction.

II.D. Water Quality

1. Seattle Water Supply System. Seattle shall be responsible for water quality within the Seattle Water Supply System as set forth below. Seattle shall construct, operate and maintain water quality treatment facilities and use its best efforts to carry out its water quality responsibilities in the most cost-effective manner for the region.
2. Applicable Standards. Seattle shall at all times during the term hereof deliver water to Water Utility's system that meets or exceeds all applicable Federal, State and local regulations as the same may change from time to time.

3. System-wide Water Quality Plan. Seattle, in consultation with the Operating Board, shall develop and maintain a system-wide regional water quality plan. The plan shall describe, at a minimum, goals, objectives, procedures and the means to satisfy legal requirements and industry standards for water quality, monitoring, information exchange, best management practices, adaptive management practices, public health protection, and cross connection control. The Operating Board may form a technical subcommittee to provide input and review of such plan. Seattle shall share available water quality data and technical expertise with all Wholesale Customers.
4. Distribution Systems. Water Utility shall be responsible for compliance with all applicable federal, State and local water quality laws and regulations applicable to water in its distribution system including any water from supply sources that it may own or operate.
5. Monitoring. Water quality monitoring shall be performed by Seattle in the Seattle Water Supply System and by Water Utility in its distribution system to comply with federal, State and local water quality regulations, to verify the condition of water that is passing from one entity to the other, to enhance system operation and to document the aesthetic qualities of the water. Notwithstanding the foregoing, Water Utility may contract with Seattle for water quality monitoring services as an elective service under section IV.F. hereof.
6. Water Quality Notifications to Customers (Consumer Confidence Reports). Each party shall prepare at its sole cost periodic water quality notifications to its respective retail customers and regulatory agencies as required by law. Seattle shall provide Water Utility all water quality data in a timely manner regarding the Seattle Water Supply System that Water Utility may be legally required to report in such notices.
7. Water Quality Best Management Practices and Adaptive Management Practices. The Operating Board shall develop best management practices ("BMPs") and adaptive management practices ("AMPs") as reasonably necessary to protect water quality within the Seattle Water Supply System. The BMPs and AMPs will include recommendations to prevent deterioration of water quality in transmission and distribution systems. The parties shall use reasonable efforts to comply with the BMPs and AMPs.
8. Flushing. Water Utility shall be solely responsible for flushing water mains within its system. Flushing allowances will be provided by Seattle only when the Operating Board determines that flushing is required to maintain or improve regional water quality.
9. New Water Sources. Prior to the introduction of any new water supply source by Water Utility which mixes with water in Seattle's Transmission Facilities, the proposed source must be evaluated using customary and reasonable water quality criteria developed in consultation with the Operating Board to ensure compatibility with Seattle water. The proposed Water Utility source must also meet all federal, state and Seattle water quality and treatment standards. Water Utility shall also provide Seattle with satisfactory results from a blending study to determine the compatibility of the source with existing sources already in the Transmission System, the appropriate method and level of treatment and the probable distribution of the new supply within the Transmission System. Water Utility shall also

complete a flavor rating analysis of no more than 3.0 as tested by Seattle's Flavor Profile Panel according to the methodology described by the American Water Works Association, or its successor. Water Utility shall obtain all necessary and appropriate regulatory permits, reviews and approvals for rights to and operational use of such water supply source. The introduction of any direct or indirect potable reuse water into Seattle's Transmission Facilities shall, in addition, require Seattle's prior written consent.

The Operating Board may form a technical subcommittee to develop water quality standards and review and advise on the water quality evaluation criteria for proposed new sources. Such criteria for new sources shall be the same for surface water and ground water.

10. Transfers Outside Seattle's Transmission System. If, with the consent of Seattle, water is transferred between Water Utility and another water utility in a manner that does not use the Seattle Water Supply System, Water Utility or the other water utility shall be responsible for meeting all applicable water quality standards related to the transfer of such water.

II.E. Conservation

The parties acknowledge that conservation prolongs the time before new supply resources are needed and thus constitutes an important ongoing tool in managing the water resources of the region. Accordingly, Water Utility hereby adopts and agrees to be bound by Seattle's 1% Water Conservation Program through the year 2010.

1. Performance Measurements. For the purposes of determining water conservation performance, Water Utility's water use shall be measured in conjunction with the use of all other participants in Seattle's 1% Water Conservation Program. The Operating Board may develop reasonable criteria to measure the participants' water conservation performance in accordance with such program.
2. Conservation Above the 1% Program. Water Utility acknowledges that water conservation beyond the 1% Water Conservation Program may be required as condition of State or federal regulations, court orders, settlements or agreements made to avoid litigation, fines or penalties, or as otherwise determined to be reasonably necessary by the Operating Board. The Operating Board may adopt reasonable additional conservation measures and targets for such purposes. Such conservation measures and targets shall apply in the same manner to all holders of Full and Partial Requirements contracts and to Seattle. Except as provided in the next subsection, Water Utility shall use reasonable efforts to abide by and perform such water conservation measures and to meet the adopted targets.

3. Water Utility's Option to be Conservation Service Provider. Water Utility may elect to provide its own water conservation program, beyond its commitment to the 1% Water Conservation Program to meet conservation targets adopted by the Operating Board or more stringent targets. Water Utility shall bear the costs thereof and shall be solely responsible for its implementation. Under this option, Water Utility shall be evaluated for meeting water conservation targets solely by its own performance.
4. Incentives and Penalties. The Operating Board may adopt penalties for shortfalls in water conservation and rewards for meeting or exceeding adopted targets. In the event Water Utility or Seattle fails to meet the adopted targets set by the Operating Board, the Operating Board may assess a penalty. Penalties may not exceed the cost of Seattle undertaking those conservation measures reasonably needed to achieve the adopted target.
5. Postponing The Need for New Water Supply Facilities. In order to avoid the necessity of developing new physical water supply facilities for as long as reasonably practicable, any water saved through conservation in either Seattle's or Water Utility's retail service areas shall be dedicated first to the municipal and industrial water supply requirements of the Seattle Water Supply System before any other use of such water may be undertaken.

SECTION III. CONDITIONS OF SERVICE

III.A. Minimum Hydraulic Gradient

1. Initial Minimum. Seattle shall maintain a minimum hydraulic gradient or head at a maximum flow rate in amounts and at locations described in Exhibit II attached hereto for each Service Connection from Seattle's Water Supply System to Water Utility's distribution system. Such gradients and locations shall be contained in Seattle's and Water Utility's future water system comprehensive plans. Seattle shall operate and maintain facilities necessary to carry out such obligation. If Seattle and the Operating Board find that a project resulting in the modification of such minimum gradient or head would benefit the Seattle Water Supply System as a whole, the minimum hydraulic gradient or head described in Exhibit II may be modified by Seattle if such modification is feasible from an economic, land use and engineering perspective taking into account the facilities required to carry out and for Water Utility to adapt to such modification. Seattle may make these modifications only once during any fifteen (15) year period provided that four (4) years advance written notice is given to Water Utility, unless a shorter notice is approved by the Operating Board.
2. Emergencies. If Seattle is prevented by emergency circumstances from providing such minimum hydraulic gradient, Seattle shall supply not less than the volume of water equivalent to the maximum 24-hour average flow rate required by Water Utility as shown on Exhibit II for each 24 hour period that the minimum hydraulic gradient is interrupted.

3. Additional Service Connections. Additional service connections between Water Utility's and Seattle's water systems or adjusted minimum gradients may be established from time to time by mutual agreement between Seattle and Water Utility subject to approval by the Operating Board. Exhibit II shall be appropriately amended to reflect such additions or adjustments.

III.B. Resale to Other Parties

Water Utility may sell water supplied by Seattle to water purveyors located outside of Water Utility's existing or future boundaries only upon the prior written consent of Seattle (or oral, in case of emergency). Agreements for resale of water by Water Utility listed in Exhibit I are hereby approved by Seattle subject to whatever written terms, conditions and limitations that Seattle has imposed on such resale.

III.C. Interconnection With Other Systems

1. Prohibition on Interconnection. Water Utility shall not interconnect any part of its system supplied with water from Seattle with other water systems without the prior written approval of the Operating Board, or, in case of emergency, upon oral approval by Seattle, which shall not be unreasonably withheld. Any such interconnection shall be subject to the approval of the Washington State Department of Health. Such other systems must be in compliance with all applicable local, State and federal laws and regulations including the requirement that they have a valid operating permit issued by the Washington State Department of Health.
2. Requests by Seattle to Interconnect. Seattle may request that Water Utility interconnect its water system to the water system of an adjacent Wholesale Customer. Water Utility shall comply with that request subject to the terms and conditions set forth below.
3. Requirement for Interconnection. If Water Utility does not consent to Seattle's request for interconnection, Seattle may propose the interconnection of Water Utility's water system to the adjacent Wholesale Customer to the Operating Board. Water Utility may present facts and arguments to the Operating Board in opposition to the interconnection and/or to document its costs in making the interconnection and conveying water to the adjacent Wholesale Customer. The Operating Board shall hear and consider the matter. Upon (a) a written finding by the Operating Board that the proposed interconnection with an adjacent Wholesale Customer is feasible taking into account Water Utility's capabilities, limitations and obligations, (b) a written finding by the Operating Board that such interconnection benefits the Seattle Water Supply System and (c) a written demand of the Operating Board that Water Utility carry out the interconnection, Water Utility shall be required to interconnect its facilities to the adjacent Wholesale Customer for the purpose of supplying water to that Wholesale Customer through the distribution system of Water Utility, provided that the interconnection shall be performed in a location and according to a schedule which does not unduly disrupt Water Utility's operations.

4. Payment and Indemnity. Water Utility shall be paid its actual costs of providing such interconnection and water transmission service to the adjacent Wholesale Customer, plus a reasonable amount for overhead, administration and rate of return (equal to Rate of Return on Investment) on such costs, and Water Utility shall be indemnified from any liability that may result from providing such interconnection. The Operating Board may adopt a standard methodology for calculating costs that ensures that Water Utility is fairly compensated for such service.

III.D. Development of Regional Supply and Transmission Infrastructure

Final decisions and authority to approve construction of capital infrastructure related to the Seattle Water Supply System shall rest with the Seattle City Council; provided, however, that any capital construction projects in Segments 3 or 4 of the Eastside Sub-regional Transmission Facilities described in Exhibit X shall be subject to mutual agreement between Seattle and the Water Utility; provided, further, however, if Seattle and the Water Utility do not agree on such capital construction projects, Water Utility will indemnify Seattle from any risk associated with not completing such capital projects. Seattle agrees to consult with Water Utility as to the necessity of any capital construction projects in Segments 1 or 2 of the Eastside Sub-regional Transmission Facilities described in Exhibit X prior to seeking Seattle City Council approval. Capital construction activities include all renewals, replacements, upgrades, expansion and any other capital construction activities.

III.E. Metering Equipment

Seattle shall own and maintain appropriate metering devices to measure the amount of water delivered to Water Utility pursuant to this contract. At Water Utility's request and expense, Seattle shall install and maintain equipment selected by Water Utility and approved by Seattle to transmit signals to Water Utility's recording equipment (at locations determined by Water Utility) of the amount of water delivered as measured by Seattle's meter(s).

Until such time as Seattle determines it to be economical to install metering devices to measure the amount of water delivered from the Seattle Water Supply System to Seattle's distribution system, the amount of water delivered to the Seattle distribution system shall be measured indirectly by subtracting the metered water delivered to all of Seattle's Wholesale Customers from 98% of the total amount of water exiting Seattle's sources of supply as measured by the supply meters.

SECTION IV. COST OF WATER & TRANSMISSION

Cost-based rates are a water industry accepted practice and the historical practice of Seattle and the Wholesale Customers. The rate-making principles, policies and methodologies set forth in this Section IV are intended to meet the objective of equitable and cost-based rates.

IV.A. Rate-making Principles

The following general principles and policies shall apply to the establishment of all rates and charges for water supply and related services hereunder beginning on January 1, 2002. Prior to that date, the pricing method of the 1982 Water Purveyor Contract shall be maintained.

1. No expenses attributable to electric power development may be allocated to the cost pools identified herein unless the pools are allocated a commensurate share of revenue derived from such development.
2. Seattle shall utilize generally accepted accounting principles consistently applied as a basis for developing the financial information upon which rates and charges are based.
3. Abrupt changes in financial policies should be avoided.
4. The rate structure should encourage the efficient use of water, conservation and the timely development of new environmentally responsible water sources and should incorporate seasonal rates and other pricing approaches to encourage efficient use.
5. The rate structure should be innovative, flexible and adaptive whenever it is cost effective and beneficial in furthering the rate-making policies.
6. The rate structure should be simple to administer and easily understandable.
7. The rate structure should be fair and equitable while balancing the needs of all parties.
8. Capital costs which benefit only a new Wholesale Customer shall be allocated to that customer and not to any cost pool described in this contract.
9. Seattle's distribution system which serves its retail customers shall be treated as the equivalent of a Wholesale Customer of the Seattle Water Supply System for the purpose of charging Seattle the same wholesale rates and charges as Water Utility for water supply and transmission. Costs calculated under the costs pools described below shall apply equally to Water Utility and to Seattle's distribution system which serves its retail customers.
10. The allocation of costs associated with capital construction activities within the Seattle Water Supply System shall be the responsibility of the Operating Board. The Operating Board shall use its best efforts to determine and approve a cost allocation method for infrastructure projects prior to the capital project obtaining construction approval from the Seattle City Council. Failure of the Operating Board to determine and approve a cost allocation method shall not hinder the Seattle City Council from approving capital infrastructure projects in order to assure Seattle's ability to fulfill the requirements of this contract.

11. The purveyor balance account as that term is defined in the 1982 Water Purveyor Contract between Seattle and Water Utility shall be credited to the Wholesale Customers in a ratable and equitable manner commencing with the application of rate making policies and framework.

IV.B. Rate-making Framework

Subject to the foregoing principles, wholesale rates and charges for the services described in this contract shall be developed by Seattle based on the following framework:

1. Water Supply and Transmission Service. The costs of water supply and transmission of water shall be accounted for separately in the water supply and transmission cost pools described below. The price for each service shall be recovered through separate rates for each service. All direct costs incurred in providing water supply and transmission services shall be allocated to the appropriate cost pool and recovered through the rates for each service. In addition, certain indirect costs consisting of a reasonable overhead and administration cost shall be allocated to the appropriate cost pool and recovered through rates for each service.
2. Water Supply - Basic and Elective Services. The costs of supplying water falls into two categories – basic and elective services. Basic service costs includes direct and indirect costs attributable to the delivery of water to the Wholesale Customers and to Seattle’s retail service area pursuant to the foregoing principles. Elective services are optional services, such as water quality laboratory services and specific engineering support that Seattle makes available.
3. Conservation. Costs incurred by Seattle for regional conservation shall be allocated to the Wholesale Customers through rates or FCs as determined by the Operating Board in the New Supply Cost Pool.

IV.C. Water Supply Pricing – Basic Services

1. Two Water Supply Cost Pools. For the purposes of determining costs of water supply, there shall be two cost pools: An existing supply cost pool ("Existing Supply Cost Pool") and a new supply cost pool ("New Supply Cost Pool").
 - a. Existing Supply Cost Pool. The Existing Supply Cost Pool shall be accounted for as follows:
 - i. A basic services rate for water supply shall be levied to recover the full costs of operating maintaining and replacing the Existing Supply Resources incurred by Seattle.
 - ii. All conservation programs undertaken by Seattle prior to the effective date of this contract with the exception of the costs of the 1% Program from January 1, 2002 through 2010, shall be considered an Existing Supply Resource cost.

- iii. Renewal and replacement of Existing Supply Resources will be an Existing Supply Resource cost.
- b. New Supply Cost Pool. The New Supply Cost Pool shall be accounted for as follows:
 - i. Water supply resources developed in the future ("New Supply Resources") that expand the capacity of the Seattle Water Supply System, including the costs of the 1% conservation program from January 1, 2002 through 2010 shall be included in the New Supply Cost Pool. If any portion of a New Supply Resource project enhances reliability of Existing Supply Resources, the costs thereof may be allocated to the Existing Supply Cost Pool if the Operating Board and Seattle both agree.
 - ii. The cost of New Supply Resources plus Rate of Return on Investment may be recovered through FCs charged annually to the holders of Full Requirements Contracts, Partial Requirements Contracts and to Seattle or through new supply rates based on the costs of such facilities. Such costs which are not recovered on an annual basis through FCs shall be recovered through new supply rates. The new supply rate shall be applied to all holders of Full Requirements Contracts and Partial Requirements Contracts and to Seattle.
 - iii. The Operating Board shall determine the portion of the New Supply Resource costs that shall be recovered through FCs or through new supply rates. The FCs and new supply rates may be scalable to create an incentive for developers to build housing or commercial units with efficient water usage levels. Water Utility, as well as each other Wholesale Customer and Seattle in setting rates for retail customers shall be free to choose the method of incorporating FCs or new supply rates into their own retail rates and charges.
 - iv. Holders of Full and Partial Requirements Contracts who have not purchased water from Seattle under the 1982 Water Purveyor Contract between Seattle and the Wholesale Customer shall be assessed the full marginal costs of the operation, including Rate of Return on Investment, of the New Supply Facilities. This assessment may be satisfied by either paying FCs and new supply rates or arranging a special water supply rate in lieu of paying FCs.
- c. Emergency Surcharge. In the event of a drought, catastrophe or other extraordinary condition that requires emergency expenditures to maintain a sufficient water supply, Seattle may impose an emergency surcharge on all holders of Full and Partial Requirements Contracts in order to pay for such expenditures and/or maintain financial stability of the Seattle Water Supply System. Any such emergency surcharge shall be presented to the Operating Board prior to adoption by Seattle. Seattle shall consider the comments of the Operating Board but shall nevertheless have the full authority to adopt the charge.

IV.D. Transmission Pricing - Basic Services

- 1. Transmission Costs Pools. For purposes of determining the cost of the transmission of water to the Wholesale Customers there shall be three transmission cost pools consisting of an

existing transmission cost pool ("Existing Transmission Cost Pool"), a new transmission cost pool ("New Transmission Cost Pool"), and an Eastside sub-regional cost pool ("Eastside Sub-regional Cost Pool").

- a. Existing Transmission Cost Pool. Costs to be allocated to the Existing Transmission Cost Pool shall consist of the following: operation, maintenance, repairs and replacements to the Seattle Transmission Facilities.
 - i. The Seattle Transmission Facilities are owned and operated as a regional network by Seattle to convey water to Wholesale Customers and to Seattle's distribution system. Therefore, the price of transmission for Seattle water transmitted within the Seattle Transmission Facilities shall be calculated on the same basis to holders of Full Requirements Contracts and Partial Requirements Contracts and to Seattle.
 - ii. Costs incurred for purposes of transmission reliability may be included in the Existing Transmission Cost Pool subject to the approval of the Operating Board and Seattle.
- b. New Transmission Cost Pool. The cost of new transmission facilities shall be included in the New Transmission Cost Pool. The renewal, replacement or modification of existing transmission facilities which create an expansion of transmission capacity may be allocated to the New Transmission Cost Pool. The Operating Board shall decide what portion of costs of renewal, replacement or modification of transmission facilities may be treated as new transmission costs and the portion of the cost of a transmission project that extends the geographic extent of the transmission system that shall be recovered through the New Transmission Cost Pool or from a new Wholesale Customer. Except for costs allocated specifically to a specific Wholesale Customer, New Transmission Cost Pool costs shall be recovered through new transmission rates or FCs. The new transmission rate shall be applied in a uniform manner to all holders of Full Requirements Contracts and Partial Requirements Contracts and to Seattle.
- c. Eastside Sub-regional Cost Pool. Water Utility is served, in part, by the water transmission facilities listed in Exhibit X. The actual costs of operating, maintaining, and repairing these facilities shall be included in the Eastside Sub-regional Cost Pool. The capital construction cost of replacing these facilities, if such capital construction projects have been approved consistent with Section III.D, shall be included in the Eastside Sub-regional Cost Pool, together with any other costs Water Utility and Seattle agree to include.

2. Demand Charge

- a. Seattle may adopt a demand charge in accordance with the methodology described in Exhibit III. The demand charge rate (i.e., dollars per 1000 gallons of deficient storage) shall be based on the equivalent cost of providing the deficient storage.
- b. The proceeds of the demand charge will be treated in rate setting as a credit to the New Transmission Cost Pool.
- c. Seattle shall suspend the demand charge rate in the event of emergencies and unforeseen conditions.

3. Cost of New or Changed Service Connection. If Seattle changes the location of the Service Connection to Water Utility for Seattle's benefit, then Seattle shall pay the cost and it shall be included in the appropriate transmission cost pool. If Water Utility requests the change in location, then Water Utility shall pay the cost of the new connection.

IV.E. Allocation of Costs and Revenues into Cost Pools

1. Accounting. Seattle shall maintain a cost accounting system consistent with the provisions of this contract and generally accepted accounting principles consistently applied in developing the financial information for determining the costs of construction, replacement, maintenance and operation of the facilities in each cost pool.

- a. Asset Accounts. An asset account shall be maintained for each facility and within that account Seattle shall record the original cost of that facility plus betterments and less retirements.
- b. Depreciation. Facilities shall be depreciated according to Standard Water System Asset Lives and a record of life-to-date depreciation shall be maintained for each facility. No depreciation shall be recorded in the first calendar year of operation of a facility. A full year's depreciation shall be recorded in every subsequent year.
- c. Net Book Value. The net book value of any facility shall be its original cost plus betterments and less retirements as recorded in its facility asset account, less life-to-date depreciation.

2. Infrastructure Costs. Each cost pool shall include the infrastructure costs for its respective facilities, calculated on a utility, cash or other basis depending upon the facility and the cost pool as set forth below.

- a. Utility Basis. The utility basis shall be used to calculate the infrastructure costs for all Existing Supply Facilities and Existing Transmission Facilities, as well as their replacements and betterments. The utility basis may also be used for new supply facilities and new transmission facilities in Seattle's discretion. Under the utility basis, the infrastructure cost for a facility in any year shall be the sum of (i) the annual

depreciation expense recorded for that facility and (ii) the product of the net book value of that facility and the Rate Of Return On Investment.

At Seattle's discretion, interest costs may be considered current infrastructure costs during the construction of a facility. However, any such interest costs must be considered contributions in aid of construction, and not included in the Net Book Value of the facility for purposes of calculating Utility Basis costs in future years.

- b. Cash Basis. The cash basis may be used in Seattle's discretion for new supply facilities and new transmission facilities, or a portion thereof. Under the cash basis, the infrastructure cost for a facility in any year shall be the actual cash expenditure made by Seattle in that year for either the payment of construction costs or actual principal and interest costs on debt issued to finance its construction. In the event that the depreciation lifetime of the facility is less than the term of the debt issued to finance all or a portion of the facility, debt maturities will be selected such that the construction cost of the facility will be fully amortized at the end of its depreciation lifetime.
 - c. Other Basis. Seattle, with the approval of the Operating Board may determine one or more other bases on which to calculate infrastructure costs and may apply these bases to facilities in the New Supply and New Transmission Cost Pools.
3. Operations Costs. The costs of operating the assets assigned to a cost pool shall be included in the cost pool. The annual operations costs of a cost pool shall be the labor, materials, equipment and other direct costs required for the operation and maintenance of the facilities in that cost pool, together with any net profit or expense from the disposition of facilities in that pool. Operations costs shall include the cost of general and administrative overhead applied in a manner consistent with its application to facilities construction projects.
- a. Existing Supply Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Supply Cost Pool shall be as follows: The Operations Cost base in the Existing Supply Cost Pool for the year 2001 shall be \$17,780,262.00. In each succeeding year, the amount from the previous year shall be adjusted by the percentage increase in cost in the supply cost centers identified in Exhibit IX, except that the increase in treatment operations costs caused by the first full year start-up of the Cedar Treatment Plant at Lake Youngs in or around 2005 shall not be included in the percentage adjustment. Any increase in Cedar Treatment operations costs for the first full year of operation of the plant shall instead be added directly to the Operations Cost total from the prior year as adjusted by the index. For each year after the first full year of operation, increases in Cedar Treatment operations costs shall be included in the adjustment index.

- b. Existing Transmission Operations Costs. The parties agree that an efficient way of handling operations costs for the Existing Transmission Cost Pool shall be as follows: the Operations Costs base in the Existing Transmission Cost Pool for the year 2001 shall be \$4,531,931.00. In each succeeding year, the amount of these costs from the previous year shall be adjusted by the percentage increase in cost in the transmission cost center identified in Exhibit IX.
 - c. New Supply Operations Costs. The operation costs of the 1% Program after January 1, 2002 together with the costs of operating facilities assigned to the New Supply Cost Pool and any other costs approved by the Operating Board, shall be assigned to the New Supply Cost Pool. The base for operations costs for 2001 for the 1% Program shall be \$1,326,712.00. This amount shall be adjusted in each succeeding year by the percentage increase in cost in the "1% Conservation" cost center as identified in Exhibit IX.
 - d. New Transmission Operations Costs. The actual costs of operating facilities assigned to the New Transmission Cost Pool and any other costs approved by the Operating Board, shall be assigned to the New Transmission Cost Pool.
 - e. Eastside Sub-regional Operations Costs. The actual costs of operating facilities assigned to the Eastside Sub-regional Cost Pool, together with any additional operations costs approved by Water Utility.
4. Disposition Costs. The costs of disposing of assets within a cost pool shall be included in the cost pool. Net disposition costs shall be calculated as follows:
- a. Disposition Under the Utility Basis. The net book value of the facility, less any sales, salvage, or other revenues derived from the disposition of that facility.
 - b. Disposition Under the Cash Basis. The value of principal of unpaid maturities of debt used to finance the construction cost of the facility, less any sales, salvage or other revenues derived from the disposition of that facility.
 - c. Disposition Under Other Basis. Disposition of any facilities whose infrastructure costs are calculated on another basis under section IVE.2.c. above shall be determined by the parties as part of the definition of such other basis.
5. Creation of Additional Cost Pools. Seattle, in its discretion, may create additional cost pools to provide equity and flexibility in payment arrangements and the allocation of costs as the Seattle Water Supply System expands to include new infrastructure and new customers. The costs in an additional cost pool, or a portion thereof, may be added to an existing cost pool subject to the consent of the Operating Board if the costs to be allocated satisfy the criteria for accounting in the existing cost pool.

6. Facilities Charge Revenues. Supply FC revenues shall offset infrastructure costs in the New Supply Cost Pool allocated to the Supply FC by the Operating Board. Surpluses and deficits in actual Supply FC revenues over cost allocated to the Supply FC shall be carried forward and earn simple interest at Seattle's Average Cost of Debt. Any current-year deficit (including any surplus balance available from previous years) shall be paid by rates for the New Supply Cost Pool. New Supply Cost Pool rates shall be discounted by surplus Supply FC revenues until any deficit Supply FC balance is repaid, except the amount of this discount shall not exceed, without the agreement of the Operating Board, twice the maximum annual deficit paid by the rate for the New Supply Cost Pool in any one year. In the event that Supply FC surplus balances exceed the Net Book Value of assets whose costs are allocated to the Supply FC, the difference between the Supply FC balance and the Net Book Value of these assets shall be used to discount the rate for the New Supply Cost Pool (and the Supply FC surplus balance shall be reduced by the amount of this discount). The use and accounting for transmission FCs shall be done in a like manner to supply FCs. Seattle and Water Utility agree that FC revenues are the sole property of Seattle.

7. Allocation of Cost Pools by Customer Class. The costs in cost pools shall be allocated within the pools as follows:
 - a. Allocation of Existing Supply Cost Pool. The total cost of the Existing Supply Cost Pool shall be allocated to two customer classes as follows:
 - i. Block Purchase Customer Class. The portion of costs in the Existing Supply Cost Pool allocated to holders of Block Purchase Contracts shall be determined pursuant to those contracts.
 - ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated the remaining costs in the Existing Supply Cost Pool.

 - b. Allocation of New Supply Cost Pool. The costs allocated to the New Supply Cost Pool shall be:
 - i. Block Purchase Customer Class. The holders of Block Purchase Contracts shall be allocated no costs from the New Supply Cost Pool.
 - ii. Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated all costs in the New Supply Cost Pool.

 - c. Allocation of Existing Transmission Cost Pool. The costs of the Existing Transmission Cost Pool shall be allocated as follows:
 - i. Block Purchase Customer Class. The proportion of costs in the Existing Transmission Cost Pool allocated to holders of Block Purchase Contracts shall be determined pursuant to those contracts.

- ii Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated the remaining costs in the Existing Transmission Cost Pool.
 - d. Allocation of New Transmission Cost Pool.
 - i. Block Purchase Customer Class. The holders of Block Purchase Contracts shall be allocated no costs from the New Transmission Cost Pool.
 - ii Full and Partial Requirements Customer Class. The holders of Full Requirements Contracts and Partial Requirements Contracts and Seattle shall be allocated all costs in the New Supply Cost Pool.
 - e. Allocation of Additional Cost Pools. The costs in any additional cost pool created by Seattle pursuant to the terms of this contract, or portion thereof, may be allocated to an existing cost pool identified above with the consent of the Operating Board.
 - f. Allocation of Eastside Sub-regional Cost Pool. The allocation of costs and rate setting for the Eastside Sub-regional Cost Pool shall be conducted according to Exhibit XI.
8. Facilities Charges. If Seattle establishes FCs as authorized herein, then such charges shall be calculated as follows:
- a. ERU Definition. Seattle shall develop a definition of an Equivalent Residential Unit (“ERU”) based on meter size as set forth in Exhibit VI, number of residential units, water use, or other basis which shall be consistent with accepted industry standards. The Operating Board shall have the right to review and comment on the definition and Seattle shall consider the Operating Board's comments.
 - b. Record-Keeping. Water Utility shall provide Seattle with an annual accounting of its water connections by January 31st of each year, which shall be accurate as of December 31st of the preceding year. Water Utility shall report the size of the meter and other pertinent data such as the number of residential units or square footage served or water use. Seattle shall provide Water Utility with an annual accounting of its retail service connections on the same basis. Upon reasonable notice, Water Utility shall make its billing and connection records available to Seattle for inspection and copying during normal business hours, and Seattle’s billing and connection records shall be made available to Water Utility on the same basis.
 - c. Annual Calculation of ERUs. Until such time as Seattle develops another basis, the calculation of ERUs in any year shall be the greater of:
 - i. Method One: The annual growth in the number of meters installed by Water Utility during the year taking into account the size of each meter, or

- ii Method Two: The annual growth in total water consumption of Water Utility divided by the annual average use of a single-family residential household of Seattle and all of its Wholesale Customers. The average annual growth shall be measured by a rolling three-year average of the most recent three years. Water use resulting from catastrophes, e.g. large fire, shall be excluded for purposes of this calculation.
 - d. Imposition of Facilities Charges. Seattle shall collect and Water Utility shall pay FCs based on the number of ERU's added during the previous month determined by the number of meters installed. Seattle shall pay FCs into the accounts of the Seattle Water Supply System on the same basis. Seattle shall prepare and distribute a report no later than March 31st of each year showing the ERU count of Seattle and each Wholesale Customer on such basis for the previous year and each year since the effective date of this contract.

Beginning in the June billing for each year, a truing charge for any underpayment of ERUs taking into account method two described above shall be added to Water Utility's bill in six equal installments.
 - e. Emergency Situations. Water Utility and Seattle agree that emergency situations may arise that require a Partial Requirements Customer to temporarily demand water in excess of its long-term annual demand. In the event of an emergency, Seattle may suspend the use of Method Two identified above in the calculation of the ERU count for any such Partial Requirements Customer for a period not longer than two consecutive years.
9. Rate Setting. The structure of FCs water rates for water charged to the holders of Full Requirements Contracts and Partial Requirements Contracts shall be determined by Seattle, in its sole discretion, except that the price may not, without the consent of Water Utility, be set to collect more than the costs forecast under Section IV hereof and Rate of Return on Investment. FCs shall be calculated as set forth on page 1 of Exhibit VI.
10. Cost Audit. At the end of each fiscal year, Seattle shall provide a statement of actual costs allocated to each cost pool and other costs and revenues received, which statement may be audited by an external auditor selected by the Operating Board. In addition, Water Utility may have the statement audited by an external auditor of its choice, solely at Water Utility's expense.
11. Transition. Notwithstanding the foregoing, Water Utility and Seattle agree that it is appropriate to adjust certain terms of this contract for the period commencing with the date of this contract to December 31, 2011 ("Transition Period").
- a. Waiver of Supply FCs. Seattle shall not levy Supply FCs on Water Utility as long as the amount of water it purchases from Seattle does not exceed its old water allowance under the 1982 Water Purveyor Contract. This waiver shall continue until the earlier of (i) January 1, 2012; or, (ii) the year in which the average annual water demand of Water Utility exceeds its old water allowance. This waiver, however, shall not relieve Water Utility from the record-keeping requirement of subsection 9 above.

- b. Transition Growth Surcharge. A transition growth surcharge of \$0.60 per CCF shall be applied to the rates of Water Utility for delivery of water in excess of the old water allowance of the 1982 Water Purveyor Contract for the Transition Period. The revenue from this surcharge shall be used to discount the base rates of the holders of Full and Partial Requirements Contracts by not more than \$0.16 per CCF. In the event that the revenues generated by the surcharge exceed those required to fund the discount, Seattle may keep the difference.

IV.F. Elective Services

1. Water Supply Services. Seattle may provide certain elective services (e.g. conservation, engineering) to Water Utility upon request by Water Utility. Such services shall be negotiated and contracted for separately between Water Utility and Seattle.
2. Transmission Wheeling. In consultation with the Operating Board, excess transmission capacity may be made available by Seattle for a fee for purposes of wheeling water between points within the Seattle Water Supply System to Water Utility or to others.
3. Water Quality. So long as Seattle owns and operates a water quality lab, Water Utility may use the services of that lab based on its published rates.

IV.G. Rate Adjustment

1. Rate Adjustment. Upon 120-days notice of its intent to do so, Seattle may adjust water service rates and FCs to Water Utility subject to the terms of this contract. Rate adjustments will be effected only within five years of the completion of a cost of service study to be conducted by Seattle which shall include an analysis of the allocation of operation, maintenance and capital costs between cost pools. Such study shall be prepared in accordance with accepted industry standards. In addition, Seattle shall review the Operating Board's comments and recommendations on the rate proposal and provide a written explanation of any recommendations that are not accepted.
2. Rate Consultant. An independent rate consultant shall be selected by Seattle in consultation with the Operating Board. Detailed information and progress reports from the consultant will be made to Water Utility during the course of the study upon drafting of each major study section directly affecting Water Utility and other Wholesale Customers. A final consultant report shall be made available to Water Utility not less than 30 days before Seattle formally transmits any resulting rate adjustment proposal to the Operating Board.

IV.H. Retail Rate-Setting

Each party to this contract shall have sole authority for establishing retail rates, connection charges and other fees and charges within its respective jurisdiction.

IV.I. Truing Actual Costs and Actual Revenues

A mechanism for reconciling revenue targets for the various cost pools and the actual revenues received during each year shall be implemented by Seattle as follows:

1. For each previously identified class of customers in each cost pool, Seattle shall maintain a running balance of the excess or deficit of actual rate revenues collected less actual expenses incurred. Each balance shall earn simple interest at the rate of Seattle's Average Cost of Debt. At the end of each year, each balance shall be adjusted to reflect the operating results of that year. The statement of these balances shall be reviewed and approved by an external auditor.
2. FC balances shall be carried forward as set forth in Section IV.E.7.
3. Each wholesale rate study shall adjust rates to eliminate the cost pool balances. ERU fees shall be based on the costs of increments in supply and transmission capacity, and shall not be adjusted to reflect surpluses or deficits in FC revenues.

SECTION V. OPERATING BOARD

1. Purpose. The purpose of the Operating Board is to provide certain limited authority to a board of representatives elected by the Wholesale Customers over policy and operational matters as they affect the Seattle Water Supply System.
2. Structure and Authority. The Operating Board shall have the powers and authority as set forth herein. Exhibits IV and V describe the structure and authority of the Operating Board. The matrix provided in Exhibit V is for illustrative purposes only. In the event of a conflict between provisions of this contract which grant specific powers to the Operating Board and Exhibits IV and V, such grants of specific powers shall control. The Operating Board shall not be formed until such time as there are six (6) signatories to Full or Partial Requirements contracts, or January 1, 2002, whichever comes first.
3. Review. The structure and authority of the Operating Board may be reviewed as of January 1, 2007 and every five years thereafter to determine its effectiveness in addressing regional and contractual issues. The review may address the composition of the Board and its powers and authority as set forth in Exhibits IV and V, provided that notwithstanding any other term or provision of this contract, Seattle shall not have the power to disband the Operating Board nor take away or diminish the powers vested in the Operating Board as set forth in Sections II, III and IV of this contract. Either party may initiate the review. The reviewing party shall provide the other with its comments and proposals. The parties agree to consider the other party's comments and proposals and to respond in writing stating its reasons for rejecting any proposals and the reasons for its own counter-proposal. After consideration of all comments and proposals at each five year interval, Seattle may make changes in the structure and authority of the Operating Board that are not inconsistent with the provisions of this subsection.

SECTION VI. PLANNING

VI.A. Reporting of Planning Data

1. By no later than April 1 of each year, Water Utility shall report to Seattle and the Operating Board as follows:
 - a. Its annual and peak day total system demand for each year, during the term of this contract, as of December 31st of the previous year.
 - b. Its forecast of Full Water Requirements for the year including estimates of annual water consumption and maximum 24-peak demand for the ensuing calendar year, and for the fifth, tenth, and fifteenth year in the future. Such forecasts shall reflect the best judgment of Water Utility.
2. Water Utility shall report other data relating to water supply and demand as may be reasonably requested by Seattle for water planning purposes.
3. Records relevant to water supply and consumption within the possession of Seattle or Water Utility shall be provided to the other upon reasonable request.

VI.B. Submittal of Water Utility Comprehensive Plans

Water Utility shall provide a copy of its water comprehensive plan, including any amendments, to Seattle for inclusion in Seattle's Water System Comprehensive Plan.

VI.C. Seattle as Water Planning Agency

Seattle shall be the lead agency and primary planning authority for the purposes of fulfilling its obligations to provide for the Full Water Requirements of Water Utility. Seattle, in consultation with the Operating Board, shall examine and investigate water supplies suitable and adequate to meet the present and reasonable future needs of Seattle and the Wholesale Customers. Seattle shall prepare and adopt a plan for acquiring such water supplies in a timely fashion. The plan shall provide for the lands, waters, water rights and easements necessary therefor, and facilities for retaining, storing and delivering such waters, including dams, reservoirs, aqueducts and pipelines to convey same throughout the Seattle Water Supply System. In preparing or adopting the plan, Seattle shall consider as possible alternatives or additional water supply sources the acquisition of water from sources controlled and/or developed by individual water utilities, legally constituted groups of water utilities and utilities which are not presently supplied by the Seattle Water Supply System. Seattle has final responsibility for the plan and for fulfilling the obligations of this contract. However, the Operating Board may participate in developing the plan by proposing goals and objectives for the Seattle Water Supply System, by making any additional suggestions and by acting in a review capacity.

VI.D. Comprehensive Capital Facilities Plan

Before ordering any major improvements to fulfill the requirements of this contract, Seattle shall adopt and maintain a comprehensive capital facilities plan for the Seattle Water Supply System,

which provide for such improvements. When such plan is updated or amended, it shall be reviewed by the Operating Board prior to submission to the Seattle City Council. The Operating Board shall respond within 60 days of receipt of the plan, or its approval shall be presumed to be given. The response submitted by the Operating Board regarding facilities substantially affecting Water Utility and other Wholesale Customers shall be seriously considered by Seattle. Seattle shall reply to the Operating Board within 90 days with its comments. The Operating Board and Seattle shall use their best efforts to arrive at a mutually acceptable plan.

VI.E. Emergency Planning

An emergency plan shall be prepared and maintained by Seattle as part of its Water System Comprehensive Plan to provide for water supply in the event of drought or disaster. Such plan shall be prepared pursuant to the procedure outlined in Section VI.D. Water Utility shall use reasonable efforts to comply with the provisions of such plan, or alternatively, Water Utility may adopt its own emergency plan if it believes it is prudent to do so.

SECTION VII. PAYMENT

VII.A. Collection of Money Due City

Seattle shall bill Water Utility on a monthly basis for all charges due under this contract. Water Utility shall pay such charges within 60 days of the billing date. Any amounts disputed by Water Utility shall be paid under protest within the 60-day time period.

VII.B. Penalties for Late Payment

All late payments, and any refund of an amount in dispute that was paid under protest, shall accrue interest at 1% per month.

VII.C. Disputes

Water Utility may dispute the accuracy of any portion of charges billed by Seattle by taking the following actions within the 60-day payment period by notifying Seattle in writing of the specific nature of the dispute and paying the undisputed portion of the charges.

Seattle shall consider and decide any billing dispute in a reasonable and timely manner. Any billing disputes that remain after such consideration shall be reconciled pursuant to the dispute resolution procedures of this contract.

SECTION VIII. CONTRACT AMENDMENTS

Seattle shall notify Water Utility and all other holders of Full Requirements Contracts of any amendments to such contracts within 30 days of the execution of such amendment. Water Utility shall then have 90 days to decide whether to include such amendment in this contract by giving written notice to Seattle of its election to do so. Upon the issuance of such notice, Seattle shall

issue the amendment to Water Utility and the amendment shall be final and binding upon both parties upon mutual execution.

SECTION IX. DISPUTE RESOLUTION

Dispute resolution shall proceed in four steps as follows:

IX.A. Operating Board Review

Any dispute regarding the terms of this contract shall first be referred to the Operating Board for consideration and recommendation. Each party shall submit a written statement regarding the dispute to the Operating Board.

1. If the dispute cannot be resolved in discussions with the Operating Board, then the Operating Board shall provide written recommendations to each parties within 60 days of the above submittal setting forth its interpretation of the applicable facts and law.
2. If either party rejects the written recommendation of the Operating Board, that party shall within 10 days, notify the other party in writing of its reasons.

IX.B. Seattle City Council Review

The written statements of the parties, the recommendations of the Operating Board and the written reasons for either party's rejection of those recommendations shall then be submitted to the Seattle City Council for review.

1. Within 60 days of the submittal of the written materials, the Seattle City Council shall provide written recommendations to resolve the dispute.
2. If either party rejects the written recommendation of the Seattle City Council, that party shall within 10 days notify the other party in writing its reasons..

IX.C. Non-binding Mediation

Within 10 days of receiving the written rejection of the Seattle City Council’s recommendations by one or both parties, each party shall designate in writing not more than 5 candidates it proposes to act as a non-binding mediator.

1. If the parties cannot agree on one of the mediators from the combined list within 5 days, the Operating Board shall within an additional 5 days select one of the mediators from either list to serve as mediator.
2. Upon selection of the mediator, the parties shall use reasonable efforts to resolve the dispute within 30 days with the assistance of the mediator.

IX.D. Resort to Litigation

If mediation fails to resolve the dispute within 30 days of selection of the mediator, the parties may thereafter seek redress in court subject to Section X.H. below.

SECTION X. MISCELLANEOUS

X.A. Notification

Whenever written notice is required by this contract, that notice shall be given to the following representatives by actual delivery or by the United States mail (registered or certified with return receipt requested,) addressed to the respective party at the following addresses or a different address hereafter designated in writing by the party):

<u>SEATTLE:</u> Director Seattle Public Utilities 700 Fifth Ave., Suite 4900 Seattle, WA 98104	<u>WATER UTILITY:</u> City Manager City of Mercer Island 9611 SE 36 th St. Mercer Island, WA 98040
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The date of giving such notice shall be deemed to be the postmarked date of mailing.

X.B. Severability

The purpose of this contract is to provide for long-term water supply planning and certainty for both Seattle and Water Utility through adoption of orderly plans calling for the expenditure of vast sums of money for regional water supply and transmission facilities. It is the intent of the parties that if any provision of this contract or its application is held by a court of competent jurisdiction to be illegal, invalid, or void, the validity of the remaining provisions of this contract or its application to other entities, or circumstances shall not be affected. The remaining provisions shall continue in full force and effect, and the rights and obligations of the parties

shall be construed and enforced as if the contract did not contain the particular invalid provision; provided, however, if the invalid provision or its application is found by a court of competent jurisdiction to be substantive and to render performance of the remaining provisions unworkable and non-feasible, is found to seriously affect the consideration and is inseparably connected to the remainder of the contract, the entire contract shall be null and void.

X.C. Consent

Whenever it is provided in this contract that the prior written consent or approval of either party is required as a condition precedent to any actions, in each such instance said consent or approval shall not be unreasonably withheld, and in each such instance where prior consent is sought, failure of the party to respond in writing within 90 days of the request shall be deemed as that party's consent or approval unless expressly stated herein. This provision does not apply to requests for amendments of this contract.

X.D. Emergency Situations

Nothing in this contract shall be deemed to preclude either party from taking necessary action to maintain or restore water supply in emergency situations and such action shall not be deemed a violation of this contract.

X.E. No Joint Venture - Individual Liability

This is not an agreement of joint venture or partnership, and no provision of this contract shall be construed so as to make Water Utility individually or collectively a partner or joint venturer with any other Wholesale Customer or with Seattle. Neither party is an agent of the other. Neither Seattle nor Water Utility shall be liable for the acts of the other in any representative capacity whatsoever.

X.F. Complete Agreement

This contract represents the entire agreement between the parties hereto concerning the subject matter hereof. This contract may not be amended except as provided herein.

X.G. Relinquishment of Prior Contract

Upon entering into this contract, Water Utility relinquishes its then existing 1982 Water Purveyor Contract with Seattle and the terms and conditions of that 1982 Water Purveyor Contract shall have no further force and effect.

X.H. Venue, Jurisdiction and Specific Performance

In the event of litigation between the parties, venue and jurisdiction shall lie with the King County Superior Court of the State of Washington. The parties shall be entitled to specific performance of the terms hereof.

X.I. Default

In the event of default of any provision of the contract, the non-defaulting party shall issue written notice to the other party setting forth the nature of the default. If the default is for a monetary payment due hereunder, the defaulting party shall have thirty (30) days to cure the default. In the event of other defaults, the non-defaulting party shall use its best efforts to cure the default within ninety (90) days. If such default cannot be reasonably cured within such ninety (90) day period, the non-defaulting party shall, upon written request prior to the expiration of the ninety (90) day period be granted an additional sixty (60) days to cure the default.

X.J. Force Majeur

The time periods for Seattle's performance under any provisions of this contract shall be extended for a reasonable period of time during which Seattle's performance is prevented, in good faith, due to fire, flood, earthquake, lockouts, strikes, embargoes, acts of God, war and civil disobedience. If this provision is invoked, Seattle agrees to immediately take all reasonable steps to alleviate, cure, minimize or avoid the cause preventing such performance, at its sole expense.

X.K. Successors

This contract shall inure to the benefit of and be binding upon the parties and their successors and assigns.

X.L. Exhibits

Exhibits I through XI are attached hereto and are hereby incorporated by reference as if set forth in full herein.

SIGNATURE PAGE

IN WITNESS WHEREOF, the parties hereby execute this contract.

WATER UTILITY

BY: _____

TITLE: _____

DATE _____

AUTHORIZING LEGISLATION: ORDINANCE/RESOLUTION _____

THE CITY OF SEATTLE

BY: _____

Director, Seattle Public Utilities

DATE: _____

AUTHORIZING LEGISLATION:

ORDINANCE No. 120362

LIST OF EXHIBITS

- I. Contracts, etc.
- II. Minimum Hydraulic Gradient of Water Supplied
- III. Demand Charge Methodology
- IV. Operating Board Structure
- V. Contract Authority Matrix
- VI. Calculation of ERUs as a Part of Facilities Charges
- VII. List of Supply Facilities
- VIII. List of Transmission Facilities
- IX. Cost Centers used for Operations Cost Indexes
- X. Eastside Sub-Regional Facilities List
- XI. Sub-Regional Facilities Cost Allocation and Rate Setting

EXHIBIT I

List of documents, commitments, adjustments, reductions, agreements, and/or written approvals by Seattle regarding the supply, purchase and/or resale of water according to Sections I.B. and II.B. of this Contract:

1. Intertie Agreements:

N/A

2. Independent Well Sources:

N/A

3. Water Supply Contracts To Other Water Utilities:

N/A

**CUSTOMARY POINTS OF DELIVERY, MINIMUM HYDRAULIC GRADIENTS,
AND MAXIMUM FLOW RATES OF WATER SUPPLIED**

METER SERVICE				MINIMUM HYDRAULIC GRADIENT FOR PLANNING PURPOSES AT STATION UPSTREAM OF METER (FEET NAVD-88 Datum)	MAXIMUM FLOW RATE UP TO WHICH THE MINIMUM HYDRAULIC GRADIENT APPLIES (gpm) ⁽²⁾
LOCATION	STATION NUMBER ⁽¹⁾	PIPELINE SEGMENT NUMBER ⁽¹⁾	SIZE OF METER (IN.)		
SE 43 rd Street & 89 th Ave SE	67	9	12	405	2,685
SE 40 th Street & 97 th Ave SE	68	9	6	405	Back-up service
E MERCER WY & Mercer Island Pipeline Right-Of-Way	171	9	10	405	520
				TOTAL:	3,205

Notes:

- (1) Station and Pipeline Segment Numbers pertain to the demand metering program.
- (2) City of Seattle's estimate of Water Utility's average daily demand for 2020 with a peaking factor of 2.0 for peak day.
- (3) All Points of Delivery provide a wholesale level of service. Seattle bears no responsibility for retail service level obligations, such as fire flow or emergency backup.

DEMAND CHARGE METHODOLOGY

The policy of Seattle Public Utilities is to supply water to its Wholesale Customers at, as near as is practical, the twenty-four hour average flow rate, during the peak demand season (June through August). To comply, the Wholesale Customers have to construct adequate storage volume within their individual systems, or sometimes collectively, so as to avoid excessive peak flow withdrawals from the Seattle transmission pipelines. The Demand Metering Program is established to set performance standards, and to monitor the Wholesale Customer's compliance with this policy. If an individual Water Utility exceeds the prescribed threshold, a "demand charge" is calculated.

Except where other agreements supersede the provisions of this contract, each Water Utility shall be subject to a demand charge based on effective deficient storage, as determined by the peak instantaneous flow rate, and the equivalent financing costs to provide storage. The demand charge rate (i.e., dollars per 1000 gallons of deficient storage) shall be based on the equivalent cost of providing the deficient storage. This rate will be determined as part of each rate study.

The Demand Metering Program is charged with implementation of the "demand charge" methodology. It shall be the responsibility of the Seattle, in consultation with the Operating Board, to determine the appropriate means to achieve the program's purpose. The options that may be considered range from temporary suspension on a year by year basis to full activation, as described below.

There shall be no requirement for Seattle to install demand-metering equipment at each Service Connection in order to assess a demand charge. Seattle may choose to apply "demand metering" selectively to certain parts of the transmission network that are designated as "critical" from the standpoint of hydraulic capacity or other operational considerations. Seattle may choose to apply "demand metering" intermittently in various parts of the transmission network for the purpose of monitoring for compliance by individual Wholesale Customers or groups of Wholesale Customers on a given line segment.

OPERATING BOARD STRUCTURE

1. **Structure.** The Operating Board (or “Board”) shall be structured as follows:
 - a. The Board shall consist of seven (7) members, composed of three members representing Seattle Public Utilities (SPU), three members representing Seattle’s Wholesale Customers selected as described below and one independent party selected as set forth below to be a tie-breaker as needed. Board members shall, to the best of their ability, act in the best interests of the Seattle Water Supply System as a whole and shall not represent the interest of a group of utilities or an individual utility.
 - b. The term of each Board position shall commence on January 1 and shall be for four (4) years. Terms of each Board position shall be staggered such that no more than two positions are renewed in any single year. Board members may serve not more than three successive terms.
 - c. Three Board members representing the Wholesale Customers will be selected from persons nominated by the holders of Full Requirements and Partial Requirements Contracts and sorted into three categories based on utility size, calculated by ERUs. The selected categories will be small, medium and large utilities, which will be made up from approximately equal numbers of contract holders. Each category of utility may elect, by majority vote (one vote per utility) its representative to the Operating Board.
 - d. The initial Operating Board will be created when there are at least six (6) signatories to the Full and Partial Requirements Contracts or January 1, 2002, whichever comes first. The initial Board will then be recomposed pursuant to the above subsection on January 1, 2004 and every 5 years thereafter.
 - e. The seventh member of the Board shall be a person having expertise in the operations of regional water supply systems. Such person shall be selected by majority vote of the other Board members. In the event of a deadlock in selecting the independent representative, the independent board member shall be selected by Judicial Arbitration and Mediation Services Inc., of Seattle, Washington or its successor. The seventh member shall not vote on issues coming before the Board unless there is a deadlock in the voting among the other six Board members. The seventh member may nevertheless express his or her opinions in Operating Board discussions. Such member shall have no employment, financial or contractual relationship with Seattle nor any Wholesale Customer and shall have no other actual or apparent conflict of interest in holding this position.
2. **Voting.** Except as otherwise provided above, each member of the Board shall have one vote on all matters coming before the Board. Each Board member may appoint an alternate to vote in his or her absence. A quorum of four (4) Board members present shall be required for any vote. Members of the Board may not grant proxies for any vote.

3. Chairperson. The Board shall have a Chairperson who will be selected and have duties as defined below:
 - a. The Chairperson shall be selected at the first regularly scheduled meeting of each new year.
 - b. For the initial year, a designated representative of SPU shall be the Chairperson of the Board. All Chairpersons thereafter shall be selected by the Board using a nomination and voting process.
 - c. Nominations for the position of Chairperson shall be taken from Board members. The Chairperson shall be selected based upon the simple majority vote of Board members. Should the Board fail to elect a Chairperson at the first regularly scheduled meeting of the new year, a designated representative from SPU shall be the acting Chairperson until such time as the Board elects a Chairperson.
 - d. The Chairperson shall have the responsibility to call meetings, determine the agenda and preside over meetings. In the absence of the Chairperson, for whatever reason, a designated representative from SPU shall be the Acting Chairperson for that meeting. The Chairperson shall also act as the spokesperson for the Board and liaison between the Administrator and the Seattle City Council's Committee on Water Resources and Public Health or successor committees.
4. Schedule / Procedures. The Board shall adopt a regular meeting schedule and notify all Wholesale Customers of the schedule. The Operating Board may adopt its own internal procedures. The latest edition of Roberts Rules of Order shall, in the absence of agreement by the Operating Board on procedural matters, govern all meetings and votes of the Operating Board.
5. Reporting. The Board will provide reports to the Wholesale Customers and to the Seattle City Council Committee on Water Resources, or successor City Council committee, on its decisions and recommendations in a timely manner.
6. Responsibilities and Authority of the Board. The Contract Authority Matrix, attached as Exhibit V, provides an outline of the responsibilities and authority of the Board for illustration purposes only. It also provides details of the relationship between the Operating Board, the Seattle City Council, and the Seattle Public Utilities. Where no clear responsibility or authority on an issue is established in this contract the responsibility and authority shall rest with the Seattle City Council.
7. Expenses. The Board shall be authorized to incur reasonable expenses which will be allocated by the Board to either or both of the New Transmission or Supply Cost Pools.

EXHIBIT V CONTRACT AUTHORITY MATRIX

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
CONTRACT Terms & conditions (amendments)	Implements	Recommends	Authorizes
OPERATING BOARD Structure & responsibilities	Recommends	Recommends	Authorizes
FINANCIAL Cost allocation structure	Recommends	Reviews & Recommends	Authorizes
Wholesale Rates	Develops & Implements	Review & Recommends	Authorizes
New Financial Policies	Develops & Implements	Reviews & Recommends	Authorizes
Purchase and disposal of regional property	Recommends	Recommends	Authorizes
Allocation of new regional projects costs	Recommends	Authorizes	Reviews
Issuance of Bonds	Implements	-	Authorizes
Regional Budget	Develops & Implements	Reviews & Recommends	Authorizes
Selection of vendors, consultants & contractors (for regional projects)	Authorizes	Recommends	-
Regional CIP	Develops & Implements	Recommends	Authorizes

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
SUPPLY Yield Analysis	Develops	Reviews	Reviews
Selections of new sources	Recommends	Recommends	Authorizes
New source criteria	Implements	Authorizes	Reviews
New supply cost allocation	Develops & Implements	Authorizes	Reviews
Allocation of supply to new customers	Recommends	Recommends	Authorizes
Reserves	Develops & Implements	Authorizes	Reviews
Allocation of block sales quantities	Implements	Recommends	Authorizes
Water Shortage Contingency Plan	Implements	Develops & Recommends	Authorizes
WATER CONSERVATION 1% Program	Develops & Implements	Reviews	Reviews and Approves
New Goals	Implements	Develops & Authorizes	Reviews
Incentive & disincentive programs	Implements	Develops & Authorizes	Reviews
Conservation Potential Assessment	Develops & Approves	Reviews	Reviews

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
WATER QUALITY			
Monitoring responsibility	Develops & Approves	Reviews	Reviews
Selection of new treatment techniques	Reviews & Implements	Recommends	Authorizes
New treatment cost allocation	Recommends & Implements	Authorizes	Reviews
New treatment regulations	Reviews & Implements	Reviews	Reviews
Flushing allowances	Reviews	Authorizes	Reviews
Solutions to identified regional water quality deficiencies	Recommends & Implements	Recommends	Authorizes
REGIONAL INFRASTRUCTURE			
Operation of System	Implements	Recommends	Authorizes
Access to transmission	Recommends	Recommends	Authorizes
Allocation of excess capacity	Recommends & Implements	Recommends	Authorizes
Transmission capacity cost allocation	Recommends & Implements	Authorizes	Reviews
New regional infrastructure	Recommends	Recommends	Authorizes
New regional project cost allocation	Recommends	Authorizes	Reviews
Wheeling	Recommends	Recommends	Authorizes
Wheeling cost	Develops & Implements	Reviews & Recommends	Authorizes
Regional CIP prioritization	Develops & Recommends	Reviews & Recommends	Authorizes

	SPU ADMINISTRATOR	OPERATING BOARD	COUNCIL
OPERATIONS & MAINTENANCE			
Best Management Practices	Recommends & Implements	Develops & Approves	Reviews
Demand Forecast	Develops & Approves	Reviews	Reviews
Reliability standard	Develops & Recommends	Reviews & Recommends	Authorizes
REGIONAL ISSUES			
CPS Water Suppliers Forum	Represents	-	Reviews
Tacoma Second Supply Project	Represents	Recommends	Represents
HCP's	Represents	Recommends	Authorizes
Regional conservation organizations	Represents	Recommends	Authorizes

EXHIBIT VI

Calculation of ERUs as a Part of Facilities Charges

The ERU Fee is:

- the flat debt service payment required to finance the facility providing the ERU over the lesser of (i) the facility life or (ii) the period over which new demand will fully utilize the facility's supply
- divided by -
- the number of new ERU's of demand expected in each year.

Seattle's Average Cost of Debt shall be used as the interest rate in this calculation. In the event that several new supply facilities are added simultaneously, the facilities may be considered together as providing a total new supply capacity for a total construction cost.

Example: A new facility costing \$100 million is built with a capacity of 100,000 ERUs. Growth of 5,000 ERU's per year is expected over the next 20 years, so the facility is projected to be supplying its full capacity in 20 years. Were this facility financed over 20 years at 6% interest, the flat annual debt service payment would be \$8.7 million. Each ERU would cost 0.02% of this annual amount, or about \$1,740.

At the time a new supply facility is added, the ERU price for this supply shall be calculated. This ERU price shall then be averaged with the then-current ERU Fee. This average shall be weighted by the number of un-purchased ERUs available at the then-current ERU fee and the number of new ERUs being added at the new ERU price. This weighted average shall be the new ERU Fee, and the number of ERUs available at the fee shall be the sum of the unsold ERUs at the previous fee and the ERU capacity of the new facility.

Example: 10 years ago, a \$100 million facility was constructed that can supply 100,000 ERU's. Growth and demand projections have proven accurate, and now 50,000 ERUs have been purchased, each for \$1,740. The facility also has an additional 50,000 ERU's still available at the same price. This year, we construct a facility worth \$70 million, with a capacity of 40,000 ERU's. Based on demand projections, this facility (on it's own) would be fully utilized in 10 years, and it's ERU price is therefore \$2,375. The average price of any of the 90,000 available ERU's is therefore \$2,022.

ERUs by Connection Size

<u>Connection Size</u>	<u>Number of ERUs</u>
$\frac{3}{4}$ " and smaller	1
1"	2
1 1/2"	5
2"	8
3"	22
4"	31
6"	66
8"	112
10"	169
12"	238

ERU Proving Methodology

The size of the water service connection used to serve an establishment depends upon both the total demand of that establishment and the instantaneous flow required by that establishment. For this reason, connection size is only a general indicator of the annual demand placed on water supplies by the establishment.

List of Seattle Supply System Facilities

1. Cedar Source

- All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the Cedar River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
- All facilities located within the Lake Youngs Reservation as defined by Seattle ownership of the land except for conveyance facilities used to transport finished water during non-emergency operation
- All facilities located within the Lake Youngs Aqueduct, the Landsburg Tunnel, and the Lake Youngs Supply Lines right-of-way, including the right-of-way itself
- Existing Morse Lake Floating Pump Stations

2. Tolt Source

- All roads, buildings, structures, water supply facilities, recreational and educational facilities, and fisheries enhancement and mitigation facilities located within or close to the South Fork Tolt River Hydrographic Watershed boundary as defined by Seattle land ownership, including the land itself, and any capitalized studies related to the above. Excepted are facilities solely owned by Seattle City Light for the purpose of power generation. Facilities shared by Seattle City Light and Seattle Public Utilities shall be part of the Seattle Supply System only to the extent of SPU share or responsibility.
- Tolt Treatment Facility

3. Highline Wellfield

- Riverton Wells, including all pumping and treatment equipment, original yard piping, to the connection to CRPL4, and the low flow piping to Riverton Reservoir
- Boulevard Well, including all pumping and treatment equipment, and all piping up to the connection to CRPL4

4. Other

- Water Reuse Program
- One Percent Conservation Program through December 31, 2001
- Commercial Incentive Program
- Commercial Toilet Retrofit Program
- Showerhead retrofit Program
- The Seattle Forecasting Model (SEAFM Model)
- GIS Projects related to facilities identified herein as part of the Seattle Supply System

List of Seattle Transmission Facilities

1. Pipelines

- Tolt Pipeline No. 1 from the Tolt Regulating Basin to Lake Forest Reservoir, including any transfer and ancillary small diameter parallel pipes
- Tolt Pipeline No. 2 (where constructed), including any transfer and ancillary small diameter parallel pipes
- Tolt Tieline
- Tolt Eastside Supply Line (from TESS Junction to the intersection of SE 16th ST and 145th Place SE)
- Tolt Eastside Line Extension (from the intersection of SE 16th ST and 145th Place SE to Eastside Reservoir)
- The 540 head Pipeline from Maple Leaf Reservoir to Lake Forest Reservoir
- Lake Youngs Bypass No. 4 from the outlet of each of the Cedar Treatment Facility clearwells to Control Works
- Lake Youngs Bypass No. 5 from the outlet of each of the Cedar Treatment Facility clearwells to the Lake Youngs Tunnel
- The Lake Youngs Tunnel (from the original lake outlet to Control Works)
- The Maple Leaf Pipeline (from the intersection of 18th Avenue E. and E. Prospect Street to Maple Leaf Reservoir)
- Cedar River Pipeline No. 1 from Control Works to Volunteer Reservoir
- Cedar River Pipeline No. 2 from Control Works to Lincoln Reservoir
- Cedar River Pipeline No. 3 from Control Works to the intersection of 18th Avenue E. and E. Prospect Street
- 30" intertie between Cedar River Pipelines 2 and 3 in east Olive Street
- Cedar River Pipeline No. 4 from Control Works to the West Seattle Pipeline
- Cedar Eastside Supply Line (from the Cedar Wye to the intersection of SE 16th St and 145th Place SE)
- West Seattle Pipeline from Augusta Gatehouse to Cedar River Pipeline 4
- The 8th Avenue S. Pipeline between S. 146th Street and S. 160th Street
- The Bow Lake Pipeline (between 8th Avenue S. and CRPL 4, and as relocated outside runways at Seatac Airport)
- The Burien Feeder (in S. 146th Street between 8th Avenue S. and CRPL 4)
- The Fairwood Line (between Fairwood Pump Station and Soos Reservoirs)
- The 24-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 12-inch discharge pipeline of Lake Youngs Pump Station up to Soos Reservoirs
- The 630 head pipeline between Lake Youngs Pump Station and the Cedar River WSD pump station at the eastern boundary of the Lake Youngs Reservation

2. Reservoirs, Tanks, and Standpipes, including overflow pipes, all valves, appurtenances, and disinfection facility located on the premises of each storage facility, unless otherwise noted

- Lake Forest Reservoir

- Eastside Reservoir
- Riverton Reservoir
- Maple Leaf Reservoir (excluding Roosevelt Way Pump Station and its suction and discharge piping, Maple Leaf Tank and 520 zone piping, except where solely serving the disinfection facility)
- Soos Reservoirs

3. Pump Stations, Major Valve Structures, and other Facilities

- Eastgate Pump Station
- TESS Junction Pump Station
- Lake Hills Pump Station
- Maplewood Pump Station
- Maple Leaf Pump Station
- Bothell Way Pump Station
- Fairwood Pump Station
- Lake Youngs Pump Station
- The Control Works
- Augusta Gatehouse

Purveyor tap and meter installations shall not be part of the Regional Transmission System. The cost of improvements to such installations shall be borne by the purveyor served by the installation regardless of the cause for the improvements provided that such cause is consistent with AWWA and safety standards and practices.

The facilities include the appurtenance of these transmission facilities including but not limited to rights of way, line valves, system meters and remote automation devices.

Cost Centers Used for Operations Cost Indices

The following costs centers or successor cost centers that capture the direct costs of operation of Existing Supply Facilities, Existing Transmission Facilities and the 1% Program shall be used as the indices for operations cost in the Existing Supply Cost Pool, Existing Transmission Cost Pool and for the 1% Program in the New Supply Cost Pool.

Supply

Program	Project	Project Name	Activity
Communications	N1203	Communications Activity Group	N120304 Purveyor Relations
Audit & Accounting	N3303	Customer Audit	N330303 Purveyor Audit
Watershed Management	N5401	Program Management	N540194 Department Support
Watershed Management	N5401	Program Management	N540195 General Expense
Watershed Management	N5401	Program Management	N540196 General Management
Watershed Management	N5401	Program Management	N540197 Training
Watershed Management	N5401	Program Management	N540198 Safety
Watershed Management	N5401	Program Management	N540199 Personnel
Watershed Management	N5401	Program Management	N540289 Capital Purchase
Watershed Management	N5403	Support Services	N540301 Modified Duty
Watershed Management	N5403	Support Services	N540302 Procuring/Paying/Receiving
Watershed Management	N5403	Support Services	N540303 Vehicle Equipment Downtime
Watershed Management	N5404	Watershed Protection	N540401 Hydrological Data Collection
Watershed Management	N5404	Watershed Protection	N540402 Fire Protection
Watershed Management	N5404	Watershed Protection	N540403 Inspection
Watershed Management	N5404	Watershed Protection	N540404 Boundaries
Watershed Management	N5405	Facility Management	N540501 WS Grounds
Watershed Management	N5405	Facility Management	N540502 WS Buildings
Watershed Management	N5405	Facility Management	N540503 WS Facilities & Roads
Watershed Management	N5406	Watershed Road Maintenance	N540601 Grade/Gravel/Ditching
Watershed Management	N5406	Watershed Road Maintenance	N540602 Bridges/Streams Culvert
Watershed Management	N5406	Watershed Road Maintenance	N540603 Roads/Row/Vegetation Cutting
Watershed Management	N5406	Watershed Road Maintenance	N540604 Tolt Roads & Streams
Watershed Management	N5407	Watershed Operations Support	N540701 Veh/Equipment Management
Watershed Management	N5407	Watershed Operations Support	N540702 Veh/Equip/Tool Repair
Watershed Management	N5408	Water Quality & Hydrology	N540801 Water Quality Monitoring
Watershed Management	N5408	Water Quality & Hydrology	N540802 Hydrological Monitoring
Watershed Management	N5409	Public/Cultural Programs	N540901 Recreation Planning
Watershed Management	N5409	Public/Cultural Programs	N540902 Management & Research
Watershed Management	N5409	Public/Cultural Programs	N540903 Watershed Education
Watershed Management	N5409	Public/Cultural Programs	N540904 Watershed Public Information
Watershed Management	N5410	Wildlife & Fisheries Programs	N541001 Program Planning & Evaluation
Watershed Management	N5410	Wildlife & Fisheries Programs	N541002 Interagency/Public Involvement
Watershed Management	N5410	Wildlife & Fisheries Programs	N541003 Ecological Monitoring & Research
Watershed Management	N5410	Wildlife & Fisheries Programs	N541004 Habitat & Species Inventory
Watershed Management	N5410	Wildlife & Fisheries Programs	N541005 Habitat Enhancement/Restoration
Watershed Management	N5411	Resource Information Mgmt	N541101 Program Plan/Evaluation
Watershed Management	N5411	Resource Information Mgmt	N541102 Information Maintenance
Watershed Management	N5411	Resource Information Mgmt	N541103 Information Services

Watershed Management	N5412	Special Projects	N541202 Silviculture
Watershed Management	N5412	Special Projects	N541205 Land Exchanges/Acquisitions
Watershed Management	N5415	Cedar HCP	N541501 ASSESS OF EXPAND FOREST STAND
Watershed Management	N5415	Cedar HCP	N541502 ASSESS EXPAND FOREST ATTRIBUTE
Watershed Management	N5415	Cedar HCP	N541503 AUGMENT FOREST HABITAT INV
Watershed Management	N5415	Cedar HCP	N541504 LONG-TERM FOREST HABITAT
Watershed Management	N5415	Cedar HCP	N541505 OLD-GROWTH CLASSIFICATION
Watershed Management	N5415	Cedar HCP	N541506 RIPARIAN RESTOR PROJECT MONIT
Watershed Management	N5415	Cedar HCP	N541507 UP0LAND FOREST RESTOR PROJ MONT
Watershed Management	N5415	Cedar HCP	N541515 GIS DATA COMPATIBILITY STUDY'
Watershed Management	N5415	Cedar HCP	N541516 FOREST HABITAT MODELING
Watershed Management	N5415	Cedar HCP	N541517 SPECIE HABITAT RELATION MODEL
Watershed Management	N5416	Cedar HCP	N541601 CRHCP GIS SUPPORT
Watershed Management	N5416	Cedar HCP	N541603 CRHCP TECHNICAL SUPPORT
Watershed Management	N5417	Cedar HCP	N541701 ROAD MAINTENANCE
Watershed Management	N5418	Cedar HCP	N541801 EXPERIMENTAL STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541802 LONG-TERM STREAM MONITORING
Watershed Management	N5418	Cedar HCP	N541803 AQUATIC RESTORATION MONITORING
Watershed Management	N5418	Cedar HCP	N541804 BULL TROUT SURVEYS (ADULT)
Watershed Management	N5418	Cedar HCP	N541805 BULL TROUT SPAWNING SURVEY
Watershed Management	N5418	Cedar HCP	N541806 BULL TROUT FRY/JUVENILE SURVEY
Watershed Management	N5418	Cedar HCP	Riparian Zone Studies
Watershed Management	N5418	Cedar HCP	N541809 BULL TROUT STREAM DISTRIBUTION
Watershed Management	N5418	Cedar HCP	N541810 BULL TROUT REDD INUNDATION STU
Watershed Management	N5418	Cedar HCP	N541811 COMMON LOON MONITORING
Water Quality & Supply	N5503	Water System Operations	N550301 Water Management
Water Quality & Supply	N5503	Water System Operations	N550302 Water System Control
Water Quality & Supply	N5503	Water System Operations	N550303 Anadromous Fishery Mgmt
Water Quality & Supply	N5503	Water System Operations	N550304 SCADA Management
Water Quality & Supply	N5503	Water System Operations	N550305 Highline Well Field
Water Quality & Supply	N5503	Water System Operations	N550306 Morse Lake PS
Water Quality & Supply	N5503	Water System Operations	N550307-SAFETY PROCESS MGMT COMPLIANCE
Water Quality & Supply	N5503	Water System Operations	N550308-EPA RISK MGMT COMPLIANCE
Water Quality & Supply	N5504	Water System Analysis	N550401 Eng Analysis/Modeling
Water Quality & Supply	N5504	Water System Analysis	N550402 Water Rights Mgmt
Water Quality & Supply	N5504	Water System Analysis	N550403 DEMAND METERING
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550501 Monitoring, Reporting & Admin
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550502 Cholrination Facilities O&M
Water Quality & Supply	N5505	Surface Water Trtmnt Rule	N550503 Watershed Management
Water Quality & Supply	N5506	Total Coliform Rule Compl.	N550601 Monitoring, Reporting & Admin
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550801 Monitoring, Reporting & Admin
Water Quality & Supply	N5508	Lead & Copper Rule Compl.	N550802 Corrosion Trtmnt Facil O&M
Water Quality & Supply	N5509	Fluoridation Program	N550901 Fluoridation Program O&M
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551001 Otr Reg/Operational Analysis
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551002 Disinfection By-Product Rule
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551003 Limnology
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551005 WQ Lab
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551006 DW Reg Dev & App Research
Water Quality & Supply	N5510	Other Reg Comp/Monitoring	N551007 Public Information/Notification
Water Quality & Supply	N5511	Special Projects	N551104 LIMS & QA/QC
Water Quality & Supply	N5512	Cedar HCP	N551201 INTERIM CHINOOK COHO

Water Quality & Supply	N5513	Cedar HCP	N551301 HCP STREAMFLOW GAUGING
Water Quality & Supply	N5513	Cedar HCP	N551302 SWITCHING CRITERIA STUDY
Water Quality & Supply	N5513	Cedar HCP	N551303 STEELHEAD REDD MONITORING
Water Quality & Supply	N5513	Cedar HCP	N551304 CHINOOK STUDIES
Water Quality & Supply	N5513	Cedar HCP	Salmonid Studies
Water Quality & Supply	N5514	WQ Monitoring	N551403 DRINKING WATER QUALITY MONITOR
Water Quality & Supply	N5515	HCP Fisheries	N551501 FRY CONDITION AT RELEASE
Water Quality & Supply	N5515	HCP Fisheries	N551502 FRY MARKING & EVALUATION
Water Quality & Supply	N5515	HCP Fisheries	N551503 FRY TRAPPING & COUNTING
Water Quality & Supply	N5515	HCP Fisheries	N551504 FISH HEALTH
Water Quality & Supply	N5515	HCP Fisheries	N551505 SHORT-TERM FRY REARING
Water Quality & Supply	N5515	HCP Fisheries	N551506 LAKE WASHINGTON PLANKTON STUDY
Water Quality & Supply	N5515	HCP Fisheries	N551508 ADULT SURVIVAL DISTRIBUTION
Water Quality & Supply	N5515	HCP Fisheries	N551509 PHENOTYPIC & GENETIC STUDY
Water Quality & Supply	N5516	Tolt DBO	N551601-CONTRACTOR PAYMENTS
Water Quality & Supply	N5516	Tolt DBO	N551603-MANAGEMENT COSTS
Resource Planning	N5609	Water Resource & Habitat Issues	N560903-ESA

Transmission

Program	Project	Project Name	Activity
Water Operation	N6540	WT – Headwork/Storage	N654001 Program Maintenance
Water Operation	N6540	WT – Headwork/Storage	N654002 Event Driven Repairs
Water Operation	N6541	WT – Transmission Pipeline Maint	N654101 Program Maintenance
Water Operation	N6541	WT – Transmission Pipeline Maint	N654102 Event Driven Repairs
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654201 Program Maintenance
Water Operation	N6542	WT - Value Op/Maint - Water Tran	N654202 Event Driven Repairs
Water Operation	N6543	WT - Grounds/Roads/ROW	N654301 Grade/gravel roads - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654302 Grade/gravel roads - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654303 Bridges/culverts - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654304 Bridges/culverts - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654305 Fences/gates - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654306 Fences/gates - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654307 Mow ROW - P
Water Operation	N6543	WT - Grounds/Roads/ROW	N654308 Mow ROW - E
Water Operation	N6543	WT - Grounds/Roads/ROW	N654309 Mow Other
Water Operation	N6544	WT - Facility Maintenance	N654401 Program Maintenance
Water Operation	N6544	WT - Facility Maintenance	N654402 Event Driven Repairs
Water Operation	N6545	WT – Castings	N654501 Casting Adjustments
Water Operation	N6546	WT - Customer Services	N654601 Communications/Dispatch
Water Operation	N6546	WT - Customer Services	N654602 Locating/Marking
Water Operation	N6547	WT - Damage by Others	N654701 P/L/ROW/Facility
Water Operation	N6548	WT – Transmission Shops	N654801 Shops/Fabrication
Water Operation	N6549	WT - General Expenses	N654905 Tools/small equipment
Water Operation	N6549	WT - General Expenses	N654906 Standy
Water Operation	N6549	WT - General Expenses	N654907 Truck Inventory
Water Operation	N6549	WT - General Expenses	N654908 Downtime - Job Related
Water Operation	N6549	WT - General Expenses	N654909-DISASTER-EMERG RESPONSE

1% Program

Program	Project	Project Name	Activity
Community Services	N5303	Resource Conservation	N530301 1% Conservation

List of Eastside Sub-regional Transmission Facilities

SEGMENT 1

(Bellevue, Coal Creek, Mercer Island, and Seattle)

1. The portion of the of the original Mercer Island Pipeline from the tee off the Cedar Eastside Supply Line in Factoria Boulevard SE to the west flange of the main line tee at the east end of the 16-inch Mercer Slough Bridge Pipeline (30-inch).

SEGMENT 2

(Bellevue, Mercer Island, and Seattle)

1. The portion of the of the original Mercer Island Pipeline from the west flange of the main line tee at the east end of the 16-inch Mercer Slough Bridge Pipeline to the west flange of the 20-inch valve west of the Enatai service to Bellevue (30-inch).
2. The entire 16-inch Mercer Slough Bridge Pipeline (16-inch).

SEGMENT 3

(Mercer Island and Seattle)

1. The portion of the original Mercer Island Pipeline from the west flange of the 20-inch valve west of the Enatai service to Bellevue to the west flange of the tee for the Shorewood Apartments service on Mercer Island (20-inch across the East Channel, 24-inch on Mercer Island).
2. The entire 16-inch East Channel Bridge Pipeline

SEGMENT 4

(Mercer Island only)

1. The portion of the original Mercer Island Pipeline from the west flange of the tee for the Shorewood Apartments service on Mercer Island to the west end of the original Mercer Island pipeline near SE 43rd Street & 89th Ave SE on Mercer Island (24-inch).

Wholesale customer tap and meter installations shall not be part of the Eastside Sub-regional Transmission Facilities. The cost of improvements to such installations shall be borne by the wholesale customer served by the installation regardless of the cause for the improvements provided that such cause is consistent with AWWA and safety standards and practices.

The facilities include the appurtenance of these transmission facilities including but not limited to rights of way, line valves, system meters and remote automation devices.

Seattle may from time to time eliminate facilities from this list without providing equivalent replacement facilities if it secures the written consent of Water Utility in the event that Water Utility is served by a tap or meter installation on the facility being eliminated. Seattle shall provide Water Utility with 120 days prior written notice of any change.

Allocating Costs and Setting Rates for Eastside Sub-region

In any year, Eastside Sub-regional Customer means a Wholesale Customer that is served in whole or in part by a tap or meter installation on the Eastside Sub-regional Transmission Facility listed in Exhibit X, or successor (replacement) facility.

In each year, the cost of each Eastside Sub-regional Transmission Facility shall be allocated by the segments identified in Exhibit X. Costs would be allocated based on Peak 7 Day flows through those facility segments. In the event that Peak 7 Day flow data is not available, Peak Month flows may be substituted.

A common rate will be established for each Eastside Sub-regional segment and billed to each utility identified with the specified segment. This rate shall apply to every unit of water delivered to an Eastside Sub-regional Customer by Seattle within the identified segment.

Actual costs and actual revenues for the Eastside Sub-region shall be trued up in a manner consistent with Section IV.I.

Appendix F

Historical Connections and Water Usage

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Historical Number of Connections by Customer Class (2008-2013)⁽¹⁾									
Customer Class	2008	2009	2010	2011	2012	2013	Total	Average Annual	%
Single Family	7122	7123	7127	7128	7129	7131	42,760	7,127	95%
Multi-Family	99	99	99	99	101	104	601	100	1%
Commercial	168	168	170	170	173	174	1,023	171	2%
Government	67	67	67	67	67	68	403	67	1%
Total Connections	7,456	7,457	7,463	7,464	7,470	7,477	44,787	7,465	

1. There is a discrepancy between the number of connections presented in the 2008 WSP and those presented here. The variation is due to the decommissioning and consolidation of a number of government and multifamily meters, respectively. Variations in the connections data is also attributed to changes in data collection and reporting since the 2008 WSP. The reasons for this discrepancy are discussed further in Chapter 2.

Historical Water Use by Customer Class (2008-2013) (MG)									
Customer Class	2008	2009	2010	2011	2012	2013	Total	Average Annual	%
Single Family	546	577	499	513	514	508	3,159	526	77%
Multi-Family	64	78	78	82	79	81	461	77	11%
Commercial	47	47	43	40	40	43	261	43	6%
Government	39	47	28	32	38	42	225	38	5%
Total Connections	697	748	648	667	671	674	4,105	684	

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Appendix G

Public Works Standards

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GENERAL TERMS AND CONDITIONS

**CITY OF MERCER ISLAND
GENERAL TERMS AND CONDITIONS
FEBRUARY 2013 EDITION
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ARTICLE 1: GENERAL PROVISIONS

1.0 DEFINITIONS

- A. **“Addendum”** or **“Addenda.”** Alteration or clarification of the plans or specifications provided to bidders by City prior to bid time, which becomes part of the Contract Documents when the Contract is executed.
- B. **“Claim.”** A written demand by the Contractor seeking (1) a change to Contract Price; (2) a change of Contract Time; (3) a payment of money or damages; and/or, (4) any other relief arising out of or relating to this Contract.
- C. **“Change Order.”** A written instrument designated to be a Change Order which alters the Contract, and identifies the following: (1) a change in the Work; (2) a change in Contract Price; and/or (3) a change in Contract Time.
- D. **“Change Proposal.”** A document prepared by the Contractor at the request of City, which proposes changes to the Work and/or changes to the Contract Price and/or Contract Time. City initiates all requests for Change Proposals.
- E. The **“Contract”** or **“Contract Documents.”** The entire integrated agreement between City and the Contractor for the performance of the Work in accordance with the Contract Documents. The Contract Documents include the following:
 - 1. The signed Agreement between City and Contractor (the “Public Works Contract”);
 - 2. The Contractor’s completed Bid Form;
 - 3. The City’s General Terms and Conditions (Feb 2013 ed.);
 - 4. Any Supplemental or Special Conditions.
 - 5. Technical Specifications;
 - 6. Drawings;
 - 7. Addenda; and
 - 8. Any Change Orders.
- F. **“Contract Execution.”** occurs when City Manager or his/her designee signs the Contract, which shall only occur after the Contractor signs the Contract.
- G. **“Contract Price”** means the total amount payable by City to the Contractor for performance of the Work in accordance with the Contract.
- H. **“Contract Time.”** The number of days or the specific date set forth in the Contract to achieve Substantial Completion of the Work.
- I. **“Contract Work”** or **“Work.”** The labor, supervision, materials, equipment, supplies, services, other items, and requirements of the Contract necessary for the execution, completion and performance of all requirements of the Contract by the Contractor to the satisfaction of City.
- J. **“Contractor.”** The individual, association, partnership, firm, company, corporation, or combination thereof, including joint ventures, contracting with City to do the Contract Work.

- K. **“Critical Path.”** The longest, continuous sequence of interrelated activities that begins at the start of the Project (Notice to Proceed) and extends to Substantial Completion of the Project. These activities are critical because delay to an activity on this path will extend Contract Time.
- L. **“Day.”** A calendar day, unless otherwise specified.
- M. **“Differing Site Conditions.”** (1) Subsurface or latent physical conditions at the site which differ materially from those indicated in the Contract Documents (Type I), or (2) Unknown physical conditions at the Site, of an unusual nature, which differ materially from those ordinarily encountered and generally recognized as inherent in the construction activities of the character provided for in the Contract (Type II).
- N. **“Engineer.”** The City representative who administers the Contract for the City.
- O. **“Final Acceptance.”** Written acceptance of the Project by City.
- P. **“Force Majeure.”** An event that is unforeseeable at the time of Contract Execution and that is beyond the reasonable control of the Contractor and City and includes:
1. Natural Disaster declared by Governor of Washington or President of the United States, including but not limited to earthquakes;
 2. Acts or omissions of any government entity acting within its governmental capacity;
 3. Fire and/or flood for which the Contractor or its Subcontractors is not responsible;
 4. Quarantine or epidemic;
 5. Strike or defensive lockout;
 6. Unusually Severe Weather Conditions; and
 7. Acts of terrorism.
- Q. **“Hazardous Material.”** Any pollutant, contaminant, toxic or hazardous waste, dangerous substance, potentially dangerous substance, noxious substance, toxic substance, flammable material, explosive material, radioactive material, urea formaldehyde foam insulation, asbestos, PCBs, or any other substances the removal of which is required, or the manufacture, preparation, production, generation, use, maintenance, treatment, storage, transfer, handling, or shipment of which is restricted, prohibited, regulated, or penalized by any and all federal, state, City, or municipal statutes or laws and regulations promulgated thereunder, now or at any time hereafter in effect, including, but not limited to, the Comprehensive Environmental Response, Compensation, and Liability Act (42 U. S. C. §§ 9601, *et seq.*), the Hazardous Materials Transportation Act (49 U. S. C. §§ 1801, *et seq.*), the Resource Conservation and Recovery Act (42 U. S. C. §§ 6901, *et seq.*), the Federal Water Pollution Control Act (33 U. S. C. §§ 1251, *et seq.*), the Clean Air Act (42 U. S. C. §§ 7401, *et seq.*), the Toxic Substances Control Act, as amended (15 U. S. C. §§ 2601, *et seq.*), the Occupational Safety and Health Act (29 U. S. C. §§ 651, *et seq.*, and the Model Toxics Control Act (RCW 70.105), or similar state or local statute or code), as the laws have been amended and supplemented.
- R. **“City”** or **“Owner”** may be used interchangeably and refer to the City of Mercer Island.

- S. **“Notice.”** A written document issued by the Engineer or Contractor’s Representative which is submitted to the other party and delivered by:
1. Depositing in the U. S. Mail (or other method of commercial express mail), which notice shall be effective on the date of receipt;
 2. Service on the Parties’ representative or at the Contractor’s home office or field office, which notice shall be effective on the date of service; or,
 3. Facsimile to the Parties’ representative or Contractor’s home office or field office, which notice shall be effective upon receipt.
- T. **“Notice To Proceed.”** A written directive issued by City authorizing the Contractor to perform some or all of the Work.
- U. **“Overhead.”** Charges that may be incurred or allocated in support of the Contract but are not part of the cost of directly performing the physical Contract construction activity. Overhead includes Site or Field Overhead and Home Office Overhead.
1. **Site or Field Office Overhead**
Site or Field Overhead costs are typically those costs that are related to, but are not limited to supervision, including general foremen and their supervisors, planners, schedulers, engineers, managers, etc. and the direct payroll costs of their project-related service, clerical salaries and their direct payroll costs, the costs of all vehicles, travel, meal and lodging costs associated with those personnel, Site or Field office and utility expense, expenses associated with all regulatory compliance, Hand and Other Small Tools provided by the Contractor for the use of its forces, all expendable supplies, and all other items incidental to or integral in supporting the physical completion of the Work.
 2. **Home Office Overhead**
Home office Overhead costs are typically those that include all general office expenses. Such costs include, but are not limited to those associated with officer and office salaries and related payroll taxes and benefits, costs of office occupancy and maintenance, all supporting services (such as utilities, office machines computers, and related items and support) related to the home office function, business taxes and licenses, and all such other costs necessary to operate the business entity. Home office overhead includes unabsorbed home office overhead.
 3. In addition to the above, whether treated as Site or Field Overhead or as Home Office Overhead, costs of any and all bonds, insurance(s), and taxes associated with this Contract are to be considered as Overhead. All items as those identified above are to be treated as Overhead for this purpose regardless of how the Contractor chooses to account for them in its books of account.
 4. Under no circumstances shall City pay the Contractor for direct or allocated costs or charges for officer bonus and profit sharing, project personnel bonuses, charitable contributions, income taxes, or any costs relating to illegal activity.
- V. **“Parties.”** The Contractor and City.
- W. **“Project.”** All activity relative to this Contract including activity of the Contractor, its Subcontractors, and City.

- X. **“Request for Change Order.”** A document, designated as a Request for a Change Order, prepared by the Contractor requesting either (1) a change in Contract Price; (2) a change in Contract Time; (3) a change in t Work; (4) a payment of money or damages; and/or, (5) any other relief arising out of or relating to this Contract.
- Y. **“Request for Information.”** A request from the Contractor to City seeking an interpretation or a clarification of some requirement of the Contract Documents.
- Z. **“Site” or “Project Site.”** The location, at which construction, equipment or services furnished by the Contractor under the Contract will be performed, completed and/or delivered.
- AA. **“Subcontractor.”** An individual, firm, partnership, or corporation having a contract, purchase order, or agreement with the Contractor, or with any Subcontractor of any tier for the performance of any part of the Contract. When City refers to Subcontractor(s) in this document, for purposes of this document and unless otherwise stated herein, the term Subcontractor(s) includes, at every level and/or tier, all subcontractors and subconsultants.
- BB. **“Supplier(s).”** Any person or firm who is not performing work or supplying labor on Site and is engaged in the business of supplying a manufactured product or resource to City, Contractor, or Subcontractors. The term Suppliers includes materialmen, manufacturers, and fabricators.
- CC. **“Substantial Completion.”** That stage in the progress of the Work where:
 1. City has full and unrestricted use and benefit of the Project for the purpose intended;
 2. All the systems and parts of the Contract Work are functional;
 3. Utilities are connected and operate normally;
 4. Only minor incidental work or correction or repair remains to complete all Contract requirements; and
 5. The City has received all certificates of occupancy and any other permits, approvals, licenses and other documents from any governmental authority with jurisdiction necessary for beneficial occupancy of the project.

1.1 INTENT AND INTERPRETATION OF THE DOCUMENTS

- A. The Contract Documents constitute the entire and integrated agreement between the parties hereto and supersede all prior negotiations, representations, or agreements, either written or oral.
- B. The Contract Documents shall not be construed to create a contractual relationship between any parties other than City and the Contractor. No contract between City and a third party shall be construed to create any duty on the part of City or such third party to the Contractor. The Contractor is not an intended or incidental beneficiary of any promises made in City’s contract with a third party, if any.
- C. The Contract Documents are intended to be complementary. What is required by one part of the Contract shall be as binding as if required by all. Should any conflict or inconsistency be found in the Contract Documents, the provision imposing the more expensive duty or obligation on the Contractor shall take precedence.

- D. The words “similar,” “typical” (or other equivalents) shall mean nearly corresponding or having a likeness. Such words shall not be construed to mean that all parts of the Work referred to are identical or substantially identical, or that such elements of the Work are connected identically or substantially identically to the rest of the Work. The Contractor has the responsibility to determine all details of the Work in relation to their location and connection to other parts of the Work. The singular includes the plural and vice versa. Male includes female and vice versa.
- E. The organization of the specifications into divisions, provisions and articles and the organization of the drawings shall not control the Contractor in dividing the Work among Subcontractors or in establishing the extent of Work to be performed by any trade.

1.2 CLARIFICATION OF DRAWINGS AND DETAIL DRAWINGS

- A. Where on any drawing a portion of the Work is drawn out and the remainder is indicated in outline, the drawn out parts shall apply also to other similar portions of the Work. Where ornament or other detail is indicated by starting only, such detail shall be continued throughout the courses or parts in which it occurs and shall apply to all other similar parts of the Work, unless otherwise indicated.
- B. With regard to drawings the following shall apply:
 - 1. Written dimensions shall be followed; drawings may not be to scale.
 - 2. Figure dimensions on drawings shall govern over scale dimensions; and detail drawings shall govern over general drawings.

ARTICLE 2: CITY

2.0 AUTHORITY

- A. Unless City, in writing, indicates otherwise, the authority to (1) commit to or bind City to any Change Orders or change in the Work, Contract Price and/or Contract Time; or (2) sign the Contract or Change Orders rests solely in the City Manager or his or her designee.
- B. The Engineer shall have the authority to administer the Contract. Administration of the Contract by the Engineer includes but is not limited to:
 - 1. Receiving all correspondence and information from the Contractor;
 - 2. Issuing request for Change Proposals;
 - 3. Responding to Requests For Information;
 - 4. Reviewing the schedule of values, project schedules, submittals, testing and inspection reports, substitution requests, and other documentation submitted by the Contractor;
 - 5. Negotiating Change Proposals and Change Orders;
 - 6. Recommending Change Orders for approval by the City Manager or its designee;
 - 7. Issuing decisions with respect to Requests for Change Orders and Claims;
 - 8. Processing payment requests submitted by the Contractor, and recommending payment;

9. Monitoring the quality of the Work, rejecting noncompliant Work, and recommending acceptance of the Work;
 10. Transmitting executed Change Orders, amendments, and other Contract correspondence to the Contractor; and
 11. Performing all other contract administrative functions.
- C. All correspondence, questions, and/or documentation shall be submitted to the Engineer.
- D. The Engineer may designate representatives to perform functions under the Contract, such as review and/or inspection and acceptance of supplies, services, including construction, and other functions of a technical or administrative nature.

2.1 INFORMATION SUPPLIED BY CITY

- A. Unless otherwise specifically provided in the Contract, surveys and site information provided by City are intended to describe the general physical characteristics of the Site. City does not represent that this information is complete or sufficient for the Contractor's performance of the Work.
- B. City shall furnish to the Contractor a copy of the Contract Documents. The Contractor shall pay City for any additional copies of Contract Documents.

2.2 WORK BY CITY OR SEPARATE CONTRACTORS

City reserves the right to perform work not included in the Contract or to let other contracts in connection with this Project. The Contractor shall coordinate its Work with City and other City contractors and, at City's request, participate in meetings for the purpose of coordinating the Contractor's construction schedule with those of other contractors at no additional cost to City.

ARTICLE 3: CONTRACTOR

3.0 CONTRACTOR REPRESENTATIONS

The Contractor makes the following representations to City:

- A. Before submission of its bid, the Contractor has:
1. Carefully reviewed the Contract Documents, and visited and examined the Site;
 2. Become familiar with the general and local conditions in which the Work is to be performed, and satisfied itself as to the nature, location, character, quality and quantity of Contract Work, the labor, materials, equipment, goods, supplies, work, services and other items to be furnished and all other requirements of the Contract Documents, as well as the surface and reasonably ascertainable subsurface conditions and other matters that may be encountered at the Site or affect performance of the Work or the cost or difficulty thereof;
 3. Become familiar with and satisfied itself as to the conditions bearing upon transportation, disposal, handling, and storage of materials; and
 4. Become familiar with and satisfied itself as to the availability of labor, water, electric power, and roads; and the uncertainties of access, traffic, parking and weather. Any failure of the Contractor to take the action described in this provision (3.0) or elsewhere in the Contract Documents will not relieve the Contractor from responsibility for estimating properly the difficulty and cost of

successfully performing the Work, or for proceeding to successfully perform the Work without additional expense to City.

- B. The Contract Price is reasonable compensation for the Work and the Contract Time is adequate for the performance of the Work as represented by the Contract, site visit, and the general conditions (including but not limited to weather, site, soil) known or reasonably anticipated for the Site.

3.1 GENERAL DUTIES

- A. The Contractor shall give sufficient supervision to the Work, using its best skill and attention. The Contractor is on notice that City will be relying on the accuracy, competence and completeness of the Work. The Contractor shall supervise and be solely responsible for the proper performance of the Work in accordance with the Contract, including the construction means, methods, techniques, sequences, procedures, and for coordination of all portions of the Work.
- B. Unless specified elsewhere in the Contract, the Contractor shall provide and pay for all labor, materials, equipment, tools, construction machinery, utilities, transportation, and other facilities and services (including federal and state tax, industrial insurance, social security liability and all other applicable taxes) necessary for the proper execution and completion of the Work.
- C. The Contractor shall also provide sufficient staffing and supervision to process Requests for Information, Change Proposals, Submittals, Change Orders, close out documentation, and to perform all other requirements of the Contract and all Work.
- D. The Contractor shall lay out its Work from baselines and benchmarks indicated in the Contract, if any, and shall be responsible for the accuracy of all field measurements and surveys used in the lay out.

3.2 DUTY TO INSPECT CONTRACT DOCUMENTS

- A. The Contractor shall carefully study and compare all Contract Documents and check the conditions, dimensions, and instructions as stated therein. Contractor will not be required to provide professional services which constitute the practice of architecture and engineering except to the extent provided for in the technical specifications and drawings.
- B. The Contractor shall immediately notify City in writing of any:
 - 1. Error, inconsistency, or omission in the Contract Documents that a reasonable contractor knew or through the exercise of reasonable diligence should have discovered under the same and similar circumstances;
 - 2. Requirement in the Contract Documents that conflict with any local, state, and federal laws, regulations and/or permits, licenses, and easement conditions that a reasonable contractor knew or through the exercise of reasonable diligence should have discovered under the same and similar circumstances.
- C. The Contractor should not proceed with the work in question until the Contractor receives written direction from the Engineer.
- D. If the Contractor proceeds with the work in question without written direction from the Engineer, the Contractor shall be responsible for any costs or damages associated with:

1. Fines or penalties;
2. Demolition, tear out, removal, cleanup, remediation, or fixing the work in question; and
3. Delay, disruption, and loss of productivity.

3.3 CONTRACTOR'S SUPERVISION AND EMPLOYEES

- A. Contractor shall provide qualified and competent people to administer the contract and perform all the Work.
- B. During performance of the Work the Contractor shall have supervisory personnel on-site and available to administer, manage and coordinate the Work. City shall not be responsible for the acts or omissions of the supervisory personnel or their assistants.
- C. The Contractor shall at all times enforce good order among all persons furnishing labor or materials on-site and shall only employ workers skilled in the work assigned. If requested by the Project Representative, Contractor shall provide the Project Representative with copies of licenses, registrations, and certifications.
 1. City shall have the right to require the Contractor to remove personnel from the Site that do not have the appropriate qualifications and experience to meet or uphold the requirements of the Contract. City shall also have the right to order the Contractor to replace personnel who demonstrate unprofessional behavior.
 2. Failure by City to require removal of any Contractor personnel shall not be deemed an admission that any such personnel are satisfactory, nor shall such failure relieve the Contractor from any contractual responsibility.

3.4 SUBCONTRACTORS AND SUPPLIERS

- A. This Contract is between City and the Contractor.
 1. The Contractor's subcontracting shall not create a contract between City and the Subcontractor and Suppliers. Subcontractors and Suppliers are not intended as incidental third party beneficiaries to the Contract. The Subcontractor and Suppliers shall have no rights against City by reason of their agreements with the Contractor.
 2. The Contractor is responsible for performing all work required by the Contract. The Contract has not been written with the intent of, and City shall not be a party to, defining the division of work between the Contractor and its Subcontractors and Suppliers.
- B. **Selection of Subcontractors and Suppliers**
 1. Subcontractors and Suppliers shall be properly licensed, registered or certified, as applicable, and capable to perform the assigned work.
 2. If requested by City, the Contractor shall provide documentation that the proposed Subcontractors and Suppliers have adequate experience and skill.
 3. The Contractor shall require each Subcontractor and Supplier to comply with all provisions of this Contract. At the request of Subcontractors or Suppliers, Contractor shall make available for copying all Contract Documents.

C. Responsibility for Work of Subcontractors and Suppliers

The Contractor shall be responsible for the acts and omissions of Subcontractors and Suppliers. The Contractor shall also be responsible for the suitability of any materials, components, equipment or supplies furnished by a Subcontractor and/or Supplier irrespective of whether such were designated or approved by City.

3.5 SCHEDULE OF WORKING HOURS

- A. As specified in the Contract, the Contractor shall submit a schedule of working hours, including overtime to City for acceptance. This schedule shall comply with all Contract requirements. Except as permitted elsewhere in the Contract Documents or in the case of an emergency, all Work at the Site shall be performed between the hours of 7am and 6 pm Monday through Friday.
- B. The schedule of working hours accepted by City shall be the only schedule used by the Contractor during performance of the Contract, unless amended to maintain Work progress.
- C. The Contractor shall provide 48 hours advance written Notice of any intent to work outside of approved working hours. Any work at the Site performed outside approved working hours shall be performed without additional expense to City, except as otherwise provided in the Contract Documents. Contractor shall comply with Mercer Island Code Section 8.24.020 (Q) which prohibits construction related noise outside designated hours except in cases of emergency or demonstrated necessity.

3.6 RECORD DOCUMENTS

- A. The Contractor shall maintain an accurate, readable, and orderly set of drawings and specifications, updated as the job progresses to show all approved changes, options, alternates, and all actual deviations from the original Contract Documents. This set of drawings and specifications shall be the Record Documents.
 - 1. The Record Documents shall be maintained in hard copy.
 - 2. In addition to all approved changes, options, alternates, and all actual deviations from the original Contract Documents, the Record Documents shall be marked as follows:
 - a. Record all materials used where options, alternates and/or change orders were indicated, specified and/or authorized;
 - b. Accurate measurements referenced as required by the technical specifications shall be recorded to show the exact location and changes in direction of all underground services and utilities, as well as their depth below finished grade; and
 - c. Record all other requirements as specified in the Technical Specifications.
- B. The Record Documents shall be kept up-to-date and be available for review by City at all times, including but not limited to at each job progress meeting. Failure to have the record set up-to-date shall be sufficient reason for City to withhold payment in accordance with paragraph 7.2, *Payments Withheld*, until all such information is recorded.

- C. Record Documents may be used to assist City to verify the appropriate progress payment.
- D. Neither Final Acceptance nor Final Payment will be issued until a complete set of Record Documents is submitted and the Engineer is satisfied as to its quality and accuracy.

3.7 COST RECORDS

- A. The Contractor, Subcontractors, and Suppliers shall maintain Project cost records by cost codes and shall segregate and separately record at the time incurred all costs (1) directly associated with each work activity and (2) directly or indirectly resulting from any event or condition for which the Contractor seeks an adjustment in the Contract Price, Contract Time, and/or damages.
 - 1. Any costs claimed to result from any such event or condition, including, but not limited to, delay and impact costs, acceleration costs, loss of productivity or efficiency, and increased or extended overhead shall be recorded at the time incurred and be fairly and reasonably allocated to each such event or condition and to other causes of such costs.
 - 2. City shall be provided with a detailed description of all such costs and the basis of allocation. The Contractor, Subcontractors, and Suppliers shall maintain a monthly summary of all costs and shall make all underlying cost records and monthly summary of costs available for review, inspection, and copying by City upon request.
 - 3. Any work performed for which the Contractor intends to seek an adjustment in Contract Price and/or Contract Time shall be recorded on the same day the work is performed and kept separate so as to distinguish it from Contract Work.
- B. In addition to the requirements set forth in Article 5, *Changes to the Contract*, and Article 6, *Time and Price Adjustments*, the Contractor shall be entitled to extra compensation for an event or condition and/or the recovery of damages only to the extent that the Project cost records are kept in full compliance with all Contract requirements and the cost allocations support entitlement to such compensation.

3.8 MAINTENANCE AND INSPECTION OF DOCUMENTS

- A. All Contractor's, Subcontractors', and Suppliers' documents and records relating to the Contract shall be open to inspection, audit, and/or copying by City or its designee:
 - 1. During the Contract Time; and
 - 2. For a period of not less than six years after the date of Final Acceptance of the Contract ("Preservation Period"); or if any Claim, audit or litigation arising out of, in connection with, or related to this Contract is initiated, all documents shall be retained until such Claim, audit or litigation involving the records is resolved or completed, whichever occurs later.
- B. The Contractor shall also guarantee that all Subcontractor and Supplier documents shall be retained and open to similar inspection, audit and/or copying during the Contract Time and also the Preservation Period. The Contractor, Subcontractor, and Supplier shall use its best efforts to cooperate with the inspection, auditing, and/or copying.

- C. Inspection, audit, and/or copying of all documents described herein, may be performed by City or its designee at any time with not less than seven (7) days' Notice. Provided however, if an audit or inspection is to be commenced more than sixty (60) days after the Final Acceptance date of the Contract, the Contractor will be given twenty (20) days' Notice of the date of the audit.
- D. The Contractor, Subcontractors, and Suppliers shall provide adequate facilities, acceptable to City, for inspection, auditing, and/or copying during normal business hours.
- E. If the Contractor is formally dissolved, assigns or otherwise divests itself of its legal capacity under this Contract, then it shall immediately notify City and preserve such records, at its expense, as directed by City.
- F. The Contractor, Subcontractor, and Supplier, shall be subject to audit at any time with respect to this Contract. Failure to maintain and retain sufficient records to allow City to verify all costs or damages or failure to permit City access to the books and records shall constitute a waiver of the rights of the Contractor Subcontractor and Supplier to Claim or be compensated for any damages, additional time or money under this Contract.
- G. At a minimum, the following documents, including the machine readable electronic versions, shall be available for inspection, audits, and/or copying:
 - 1. Daily time sheets and all daily reports, Supervisor's reports, and inspection reports;
 - 2. Collective bargaining agreements;
 - 3. Insurance, welfare, and benefits records;
 - 4. Payroll registers;
 - 5. Earnings records;
 - 6. All tax forms, including payroll taxes;
 - 7. Material invoices and requisitions;
 - 8. Material cost distribution worksheet;
 - 9. Equipment records (list of Contractor's, Subcontractors', and Suppliers' equipment, rates, etc.);
 - 10. Contracts, purchase orders and agreements between the Contractor and each Subcontractor and Supplier;
 - 11. Subcontractors' and Suppliers' payment certificates;
 - 12. Correspondence, including email, with Subcontractors and/or Suppliers;
 - 13. All meeting notes by and between Contractor, Subcontractors, Suppliers and/or any third parties related to the Project;
 - 14. Canceled checks (payroll and vendors);
 - 15. Job cost reports, including monthly totals;
 - 16. Job payroll ledger;
 - 17. Certified payrolls;

18. General ledger;
 19. Cash disbursements journal;
 20. Take off sheets, and calculations used to prepare the bid and/or quotes;
 21. Take off sheets, calculations, quotes, other financial data to support change proposals, request for change order and/or claims;
 22. Financial statements for all years during the Contract Time. In addition, City may require, if it deems appropriate, additional financial statements for 3 years preceding execution of the Contract and 6 years following Final Acceptance of the Contract;
 23. Depreciation records on all Contractor's, Subcontractor's, and Supplier's equipment, whether these records are maintained by the Contractor, Subcontractors, and Suppliers involved, its accountant, or others;
 24. If a source other than depreciation records is used to develop costs for the Contractor's internal purposes in establishing the actual cost of owning and operating equipment, all such other source documents;
 25. All documents which relate to each and every Claim together with all documents which support the amount of damages as to each Claim;
 26. Worksheets or software used to prepare the Claim establishing the cost components for items of the Claim including but not limited to labor, benefits and insurance, materials, equipment, Subcontractors, Suppliers, all documents which establish time periods, individuals involved, the hours for the individuals, and the rates for the individuals;
 27. Worksheets, software, and all other documents used (a) by the Contractor to prepare its bid and schedule(s) and/or (b) to prepare quotes and bids to the Contractor;
 28. All schedule documents, including electronic versions, planned resource codes, or schedules and summaries;
 29. All submittals; and
 30. All other documents, including email, related to the Project, Claims, or Change Orders.
- H. The Contractor shall mark any documentation it considers proprietary or confidential accordingly. Such information will be treated as such by City; however, City cannot ensure that this information will not be subject to release pursuant to a public records request. In the event City receives a request for such information, City will advise the Contractor and will not release the requested information for a period of not less than ten (10) days in order to give the Contractor an opportunity to obtain a court order prohibiting the release of the information in response to the public records request.

3.9 MAINTENANCE AND SITE CLEANUP

- A. The Contractor shall at all times keep the Site, access points, and public rights-of-way free from accumulation of dirt, mud, waste materials or rubbish caused by the Contractor or Subcontractors. At the completion of the Contract Work, the Contractor shall remove and lawfully dispose of all its dirt, mud, waste materials,

rubbish, tools, scaffolding and surplus or partly used materials from the Site and shall leave the Site broom clean unless some stricter standard is specified in the Contract.

- B. The Contractor shall obey all applicable laws and regulations relating to the storage, use, and disposal of Hazardous Materials. The Contractor shall promptly notify City of all Contractor or Subcontractor caused spills or releases of Hazardous Materials, and pay the cost to promptly clean up all such spills or releases and any associated fines or penalties. The Contractor shall maintain documentation of the clean up and disposal all Contractor or Subcontractor caused spills or releases of Hazardous Materials.
- C. If the Contractor fails to adequately maintain or cleanup the Site, City may, after written Notice to the Contractor, sweep surfaces or remove the dirt, mud, waste materials, rubbish, or hazardous materials and charge all reasonable costs of such work to the Contractor.

3.10 PROTECTION OF EXISTING STRUCTURES, EQUIPMENT, VEGETATION, UTILITIES, AND IMPROVEMENTS

- A. Contractor shall protect from damage all existing structures, curbs, gutters, sidewalks, equipment, improvements, utilities, trees, and vegetation not shown in the Contract Documents to be removed or modified at or near the Site. Contractor shall repair, at no cost to City, any such damage resulting from failure to comply with the requirements of the Contract or failure to exercise reasonable care in performing the Work. If Contractor fails or refuses to repair the damage promptly, City may have the necessary work performed and deduct or charge the cost to Contractor or exercise its rights under the Performance and Payment Bond. If there are insufficient funds remaining, excluding retention, the Contractor shall pay City for the costs associated with protection and repairing the damages.

3.11 PERMITS, LAWS, REGULATIONS AND TAXES

- A. Except those permits, easements, and variances specified in the Contract as having been previously obtained by City, all permits, licenses, easements and variances necessary for the execution of the Work shall be secured and paid for by the Contractor. The Contractor shall identify, apply for, and pay for such permits and licenses at the earliest possible time so as to avoid any delay to the Work arising from the permitting and/or licensing process. No actions taken by City to aid the Contractor in securing any permit or license shall relieve the Contractor of any obligations to secure any such permit or license.
- B. The Contractor shall maintain all stamped permit sets of documents at the Site during construction, in good condition and as required by local ordinances.
- C. The Contractor shall perform the Work in full compliance with local, state and federal laws, ordinances, resolutions and regulations, and with permit, license, easement, and variance conditions pertaining to the conduct of the Work. The Contractor shall defend, indemnify, and hold City, its elected officials, officers, agents and employees harmless from any assessment of fines, penalties, or damages arising from violations of the same by the Contractor or Subcontractors. The Contractor shall pay and provide proof of payment for any assessments of fines, penalties or damages. The Contractor shall cooperate with all governmental entities regarding inspection of the Work and compliance with such requirements.

- D. The bid form may include a line item for sales tax on the whole amount, or on items which are not exempt from tax under Washington State Department of Revenue rules, including WAC 458-20-170 and WAC 458-20-171. Unless there are separate line items in the bid form for Washington State sales tax, Contractor shall include all sales tax in its lump sum bid or unit prices. The Contractor should contact the Washington State Department of Revenue for answers to questions in this area. The City will not adjust its payment if the Contractor bases a bid on a misunderstood tax liability. Except as provided above, the Contractor is required to pay all applicable taxes. No adjustment will be made in the amount to be paid by City under the Contract because of any change in law or regulations covering any applicable taxes, or because of any misunderstanding by the Contractor as to its liability for or the amount of any taxes.

3.12 PATENTS AND ROYALTIES

- A. The Contractor shall assume all costs or fees relating to royalties or claims for any patented invention, article, process or method that may be used upon or in a manner connected with the Work under this Contract or with the use of completed Work by City.

3.13 CONTRACTOR'S CERTIFICATION

A. Conflict of Interest

The Contractor certifies (and shall require each Subcontractor to certify) that it has no direct or indirect pecuniary or proprietary interest, and that it shall not acquire any such interest, which conflicts in any manner or degree with the work, services or materials required to be performed and/or provided under this Contract and that it shall not employ any person or agent having any such interest. In the event that the Contractor or its agents, employees or representatives acquires such a conflict of interest, the Contractor shall immediately disclose such interest to City and take action immediately to eliminate the conflict or to withdraw from this Contract, as City may require.

B. Contingent Fees and Gratuities

The Contractor, by entering into this Contract with City to perform or provide work, services or materials, has thereby covenanted:

1. That no person or selling agency except bona fide employees or designated agents or representatives of the Contractor has been or will be employed or retained to solicit or secure this Contract with an agreement or understanding that a commission, percentage, brokerage, or contingent fee may be paid; and
2. That no gratuities, in the form of entertainment, gifts or otherwise, have been or will be offered or given by the Contractor or any of its agents, employees or representatives, to any official member or employee of City or other governmental agency with a view toward securing this Contract or securing favorable treatment with respect to the awarding or amending thereof, or the making of any determination with respect to the performance of this Contract. The Contractor certifies that it has not made any contributions to any person or entity as a condition of doing business with City and it has disclosed to City all attempts by any person to solicit such payments.

3.14 DEVIATION FROM CONTRACT

- A. The Contractor shall not make an alteration, variation, addition, deviation, or omission from the requirements of the Contract Documents without the prior written consent of the Engineer.
- B. Any alteration, variation, addition, deviation, or omission by the Contractor shall not result in any extra compensation or extension of time.

3.15 OPERATIONS, MATERIAL HANDLING, AND STORAGE AREAS

A. Temporary Buildings and Utilities

Temporary buildings (including storage sheds, shops, and offices) and utilities may be erected by Contractor on the Site only with the consent of City and without expense to City. The temporary buildings and utilities shall remain the property of Contractor and shall be removed by the Contractor at its expense upon completion of the Work.

B. Disposal/Removal of Materials

The Contractor shall be responsible for compliance with all laws governing the storage and ultimate disposal of all materials and components. The Contractor shall provide City with a copy of all manifests and receipts evidencing proper disposal when required by City or applicable law.

C. Protection and Care of Contractor's Materials and Equipment

The Contractor shall be responsible for the proper care and protection of its materials and equipment delivered to the Site. Materials and equipment may be stored on the Site at the Contractor's own risk and with prior written approval from City. When the Contractor uses any portion of the Site as a shop, the Contractor shall be responsible for any repairs, patching, or cleaning arising from such use and for obtaining any necessary permits to establish such shop or temporary storage facilities.

3.16 CONTRACTOR'S OVERALL RESPONSIBILITY FOR PROTECTION OF WORK, PROPERTY, AND PERSONS

- A. The Contractor shall be responsible for conditions of the Site, including safety of all persons and property, during performance of the Work. The Contractor shall maintain the Site and perform the Work in a manner which meets all statutory and common law requirements or other specific contractual requirements for the provision of a safe place to work and which adequately protects the safety of all persons and property on or near the Site. This obligation shall apply continuously and shall not be limited to normal working hours. City's inspection of the Work or presence at the Site does not and shall not be construed to include review of the adequacy of the Contractor's safety measures in, on or near the site of the Work.
- B. The Contractor shall be responsible for initiating, maintaining and supervising all safety precautions and programs, including adequate safety training, in connection with the Work. The Contractor shall comply with all applicable laws, ordinances, rules, regulations and lawful orders of any public authority bearing on the safety of persons or property or their protection from damage, injury or loss.
- C. The Contractor shall protect and be responsible for any damage or loss to the Work or to the materials and equipment associated with the Work until the date of

Substantial Completion. The Contractor remains responsible for any damage or loss caused directly or indirectly by the acts or omissions of the Contractor, Subcontractors, Suppliers, or third parties authorized or allowed on the Site by the Contractor until Final Acceptance.

- D. The Contractor shall also be solely and completely responsible for damages arising from the Work that affect property adjacent to the Site.
- E. The Contractor shall repair or replace without cost to City any damage or loss that may occur, except damages or loss caused by the acts or omissions of City.
- F. The Contractor shall erect and maintain adequate steel plates, signs, fencing, barricades, lights or security measures and persons to protect the Work until the Engineer authorizes in writing the removal of signs, fencing, barricades, lights or security measures.
- G. The Contractor shall conduct all operations with the least possible obstruction and inconvenience to the public. To disrupt public traffic as little as possible, the Contractor shall permit traffic to pass through the Project Site with the least possible inconvenience or delay. The Contractor shall maintain existing roads, streets, sidewalks and paths within the Project Site, keeping them open and in good, clean, safe condition at all times.

3.17 PROTECTION OF PERSONS

- A. The Contractor shall take all reasonable precautions for the safety of all employees working on this Contract and all other persons who may be affected by such Work. The Contractor shall designate a responsible member of its organization at the Site whose duty shall be to manage and coordinate the safety programs and to prevent accidents of the Contractor and Subcontractors.
- B. Except as otherwise stated in the Contract, if the Contractor encounters, on the Site, material reasonably believed to be Hazardous Material that Contractor shall immediately stop work in the area affected and give Notice of the condition to City. Work in the affected area shall not be resumed without written direction by City.
- C. To protect the lives and health of persons performing work under this Contract, the Contractor shall comply with the Federal Occupational Safety and Health Act of 1970 (OSHA), including all revisions, amendments and regulations issued thereunder, and the provisions of the Washington Industrial Safety Act of 1973 (WISHA), including all revisions, amendments and regulations issued thereunder by the Washington State Department of Labor and Industries including, without limitation, all excavation, tunneling, trenching and ditching operations. In case of conflict between any such requirements, the more stringent regulation or requirement shall apply. There is no acceptable deviation from these safety requirements, regardless of practice in the construction industry. Any violation of OSHA, WISHA or other safety requirements applicable to the Work may be considered a breach of this Contract.

3.18 SAFETY PROGRAM

The Contractor shall prepare and maintain a written site specific "Safety Program" demonstrating the methods by which all applicable safety requirements of this Contract will be met. The Contractor shall ensure its Subcontractors and Suppliers have a written "Safety Program" or formally adopt the Contractor's site specific "Safety Program." The

Contractor shall conduct a weekly safety meeting with all Subcontractors and others on the Site to discuss general and specific safety matters.

3.19 ARCHAEOLOGICAL AND HISTORICAL PRESERVATION

The Contractor shall comply fully with the requirements set forth in Chapter 27.53 RCW entitled Archaeological Sites and Resources. The Contractor shall immediately notify the City if any artifacts, skeletal remains or other archaeological resources (as defined under RCW 27.53.040 now and as hereinafter amended) are unearthed during excavation or otherwise discovered on the Site.

3.20 WATER POLLUTION CONTROL REQUIREMENTS

The Contractor shall comply with and be liable for all penalties, damages and violations under Chapter 90.48 RCW including any regulations issued pursuant thereto in the performance of the Work.

3.21 EASEMENTS

If the Contractor makes arrangements for use of additional public and/or private property, the Contractor, prior to using such property, shall provide the Engineer with written permission of the landowner, or duly authorized agent of such landowner, for such use.

ARTICLE 4: ADMINISTRATION OF THE CONTRACT

4.0 TIME OF ESSENCE

All time requirements set forth in the Contract Documents are of the essence.

4.1 WORK PROGRESS

- A. The Contractor shall be required to:
 - 1. Prosecute the Work diligently with adequate forces;
 - 2. Plan, coordinate, and layout the Work in advance so as to avoid delay; and
 - 3. Achieve Substantial Completion of the Work and Final Acceptance in accordance with the requirements of Contract Documents.

4.2 SCHEDULE OF VALUES

- A. Unless otherwise specified, within fourteen (14) days after the date of Contract Execution, the Contractor shall submit to City a detailed Schedule of Values that identifies the various activities of the Work and their values and quantities, including the overhead and profit for each activity. The Contractor warrants that the values identified in its Schedule of Values accurately reflect the value of each work activity. The Schedule of Values shall be used as a basis for calculating all Progress Payments. Payment for Contract Work shall be made only for and in accordance with those activities identified in the Schedule of Values.
- B. The Contractor shall not be entitled to, nor shall City be required to make, payment for any Contract Work until the Schedule of Values has been accepted by City. Such acceptance shall not be unreasonably withheld.
- C. City shall review and accept the Schedule of Values or provide the Contractor with a written explanation of why the Schedule of Values was not acceptable. City shall use reasonable efforts to review the Schedule of Values within thirty (30) days of

City's receipt of the Contractor's submittal of its Schedule of Values. City's acceptance of the Schedule of Values shall not relieve the Contractor from its sole responsibility for the accuracy of the Schedule of Values and its compliance with all Contract requirements. The Contractor shall revise the Schedule of Values as necessary to accurately reflect Change Orders.

- D. Each Application for Payment shall include a current status of the Schedule of Values. No Application for Payment will be considered until the current status of the Schedule of Values has been submitted and accepted.
- E. The activities, which the Contractor identifies within its Schedule of Values, shall be specifically referenced within, and conform and be consistent with the activities set forth within the Project Schedule.

4.3 PROJECT SCHEDULE

- A. Unless otherwise specified, within fourteen (14) days after the date of Contract Execution, the Contractor shall submit to City a Project Schedule. The Project Schedule shall show the sequence in which the Contractor proposes to perform the Work, indicate the Critical Path, identify the dates on which the Contractor proposes to start and finish the scheduled activities of the Contract Work, indicate Substantial Completion within the Contract Time, indicate a date for Final Acceptance, and meet all the requirements as may be set forth in the Contract Documents.
- B. Within thirty (30) days of City's receipt of the Contractor's submittal of its Project Schedule or unless stated elsewhere in the Contract, City shall review the Project Schedule and provide the Contractor with written comments. City will review the Project Schedule only to determine whether the Project Schedule meets the requirements in the Technical Specifications on Project Schedule. To the extent the Project Schedule does not meet such Technical Specifications, the Contractor shall revise the Project Schedule to make it compliant.
- C. By reviewing the Project Schedule and providing written comments, City is not approving or adopting the Contractor's plan, schedule, means, methods, techniques, sequences, or procedures required to perform the Work. Review and comment by City of the Project Schedule shall not relieve the Contractor from the sole responsibility for the accuracy of a Project Schedule, and its compliance with all Contract requirements, and its responsibility to meet all required Contract completion dates. Failure by City to indicate items on the Project Schedule that do not conform with the Contract requirements shall not alter or waive the Contract requirements or relieve the Contractor from complying with all Contract requirements.
- D. The Contractor shall not be entitled to, nor shall City be required to make payment for any Contract Work until the Project Schedule complies with all Contract requirements.
- E. The Contractor shall schedule the Contract Work so that the Contract Work is completed within the Contract Time. Float in the project Schedule shall be defined as the period of time measured by the number of days each non-critical path activity may be delayed before it and its succeeding activities become part of the Critical Path. Contractor and Owner may both utilize float to offset delays to the Work.

- F. The Contractor shall regularly enter the actual progress of the Work and Contract Time extensions, if any, approved by City on the Project Schedule. Updated Project Schedules shall reflect actual progress and completion within the Contract Time and shall be provided to City with each Application for Payment in format(s) as required by the Contract. Applications for Progress Payments will not be considered by City and the Contractor will not be paid until the Contractor complies with these requirements. The updated Project Schedule shall be used to assist City in verifying the appropriate payment.
- G. If, in the opinion of City, the Contractor falls behind in its progress of the Work due to acts or omissions of the Contractor, Subcontractors, and Suppliers, the Contractor shall take all necessary steps to improve its progress and bring its progress back in-line with the accepted Project Schedule, without additional cost to City. In this circumstance the Contractor shall, as necessary, increase the number of shifts, overtime operations, and/or days of work, both on and off the Site, and submit for acceptance any supplementary schedule or schedules as City deems necessary to demonstrate how the accepted rate of progress will be regained. Failure of the Contractor to comply with the requirements under these provisions shall be grounds for a determination by City that the Contractor is not prosecuting the Work with sufficient diligence to ensure completion within the time specified in the Contract. Upon making this determination, City may pursue any right it has under the law or the Contract, including but not limited to default termination.

4.4 SUBMITTALS

- A. Submittals include shop drawings, setting and erection drawings, schedules of materials, product data, samples, certificates and other information prepared for the Work by the Contractor or a Subcontractor as set forth in the Technical Specifications ("Submittals"). The Contractor shall perform no portion of the Work requiring Submittals until the Submittals have been reviewed and returned by City with one of the following annotations: (1) no exceptions taken, or (2) note markings.
- B. When submitting information, the Contractor shall identify and state reasons for any alteration, variation, addition, deviation, or omission from the Contract. The Contractor shall not perform work that alters, varies, adds to, deviates from, or omits any requirement of the Contract Documents without prior specific written acceptance by City.
- C. The Contractor shall provide Submittals with reasonable promptness and in such sequence as to facilitate the timely completion of the Contract.
- D. City shall review the Contractor's Submittals and respond in writing with reasonable promptness so as not to unreasonably delay the progress of the Work. Unless otherwise agreed, no delay to the Work shall be attributable to the failure by City to respond to a Submittal until thirty (30) days after the Submittal is received by City, and then only if failure by City to respond is unreasonable and affects the Contract completion date.
- E. If the Contractor is required to resubmit a Submittal, any revisions on resubmittals shall be specifically identified in writing and the resubmitted Submittal shall be sequentially alpha denoted (for example: 22A followed by 22B, etc.) and note revisions in numerical order. The cost of the review of the initial Submittal and the first revised submittal shall be borne by City. The costs of all additional revised Submittals shall be charged to the Contractor. The cost of review shall include,

without limitation, administrative, design, and engineering activities directly related to review of Submittals. City may deduct these costs from any amounts due the Contractor.

- F. City shall review the Contractor's Submittals only for conformance with the design of the Work and compliance with the Contract. Review of the Submittals are not conducted to verify the accuracy of dimensions, quantities, or calculations, the performance of materials, systems, or equipment, or construction means, methods, techniques, sequences, or procedures, all of which remain the Contractor's responsibility. Failure by City to take exception to a Submittal shall not relieve the Contractor from any duty, including its responsibility for errors or omissions in Submittals, its duty to make Submittals and duty to perform the Work according to the requirements of the Contract. City's review of a Submittal shall not alter or waive the requirements of the Contract unless City has issued prior written approval of such change or alteration of the Contract requirements.
- G. The Contractor's failure to identify any error, deviation, or omission and subsequent acceptance of the Submittal by City shall not relieve the Contractor from complying with the Contract requirements.

4.5 REQUESTS FOR INFORMATION

- A. If the Contractor determines that some portion of the drawings, specifications or other Contract Documents require clarification or interpretation by City because of an apparent error, inconsistency, omission, or lack of clarity in the Contract, the Contractor shall promptly submit a Request For Information ("RFI") and, unless otherwise directed, shall not proceed with the affected work until City has responded to the RFI. The Contractor shall plan its work in an efficient manner so as to allow for timely responses to RFIs.
- B. City shall respond in writing with reasonable promptness to Contractor's RFI.
 - 1. At the request of the Engineer, the Contractor shall prioritize its RFIs, identify a date by which the Contractor prefers the RFI be answered, and reasons for such priority.
 - 2. If the Contractor submits a RFI on an activity less than thirty (30) days prior to the commencement of that activity, the Contractor shall not be entitled to any time extension or adjustment in Contract Price due to the time it takes City to respond to the RFI provided that City responds within fifteen (15) days. No delay to the Work or damages to the Contractor shall be attributable to the failure by City to respond to the RFI until fifteen (15) days after City's receipt of the RFI, and then only if the failure by City to respond is unreasonable and affects the Contract completion date.
- C. City's response to a RFI shall not be considered a change to the Contract requirements unless it is accompanied by a Request for Change Proposal. If the Contractor believes that City's response to the RFI constitutes changed work impacting Contract Price or Contract Time, the Contractor shall submit a Notice of Claim, Supplemental Information and a Request for Change Order to City in accordance with Articles 5, *Changes to the Contract*.

4.6 TESTS, INSPECTIONS, AND ACCESS TO THE WORK

- A. Contractor shall be responsible for inspection and quality assurance of all the Work including all work performed by any Subcontractor. The Contractor shall document and maintain an adequate testing and inspection program and perform such tests and inspections as are necessary or required to ensure that the Work conforms to the requirements of the Contract. The Contractor shall maintain all documentation related to testing and inspection and make such documentation available to City at its request. Unless otherwise provided, Contractor shall make arrangements for such tests, inspections, and approvals with an independent testing laboratory or entity acceptable to City, or with the appropriate public authority. If any governmental, regulatory, or permitting authority requires any portion of the Work to be inspected, tested, or approved, the Contractor shall make all arrangements for and cooperate with such inspections, tests, and approvals so as not to delay completion of the Work. The Contractor shall bear all related costs of tests, inspections, and approvals. The Contractor shall give City at least three (3) days' Notice of: (1) when the work is ready to be tested and inspected and (2) when and where tests and inspections are to be made. Contractor shall maintain complete inspection records and make them available to City upon request.
- B. The Contractor shall cooperate with City in the performance of any tests and inspections of the Work. The Contractor has the duty to coordinate all tests and inspections in a manner, which does not negatively impact Contractor's compliance with the Contract.
- C. If any Work required to be inspected, tested, or approved is covered without such inspection, testing or approval being obtained, it must, if requested by City, be uncovered for observation, and such uncovering shall be at Contractor's expense.
- D. City may, at any reasonable time and at its own cost, conduct inspections and tests as it deems necessary to ensure that the Work is in accordance with the Contract. City shall promptly notify Contractor if an inspection or test reveals that the Work is not in accordance with the Contract. City inspection and tests are for the sole benefit of City and do not:
 - 1. Constitute or imply acceptance;
 - 2. Relieve Contractor of responsibility for providing adequate quality control measures;
 - 3. Relieve Contractor of responsibility for risk of loss or damage to the Work, materials, or equipment;
 - 4. Relieve Contractor of its responsibility to comply with the requirements of the Contract; or
 - 5. Impair City's right to reject defective or nonconforming items, or to avail itself of any other remedy to which it may be entitled.
- E. Neither observations by an inspector retained by City, the presence or absence of such inspector on the Site, nor inspections, tests, or approvals by others, shall relieve Contractor from any requirement of the Contract. Inspectors are not authorized to change any term or condition of the Contract.
- F. Contractor shall promptly furnish, without additional charge, all facilities, labor, material and equipment reasonably needed for performing such safe and convenient inspections and tests as may be required by City. City may charge

Contractor any additional cost of inspection or testing when Work is not ready at the time specified by Contractor for inspection or testing, or when prior rejection makes reinspection or retest necessary. City shall perform its inspections and tests in a manner that will cause no undue delay in the Work.

4.7 CORRECTION OF WORK OR DAMAGED PROPERTY

- A. If material, equipment, workmanship, or work proposed for, or incorporated into the Work, does not meet the Contract requirements or fails to perform satisfactorily, City shall have the right to reject such work by giving the Contractor written notice and may require the Contractor to promptly repair, replace or correct it at no cost to the City.
- B. If the Contractor does not repair, replace or correct and/or remove defective or non-conforming Work or repair damaged property as required by City, in manner and/or schedule, City or City's designee may repair, replace or correct and/or remove it and deduct the cost of such effort from any payment due the Contractor.
 - 1. If the remaining payments due the Contractor are not sufficient to cover City's cost of remedying the defective or non-conforming Work, the Contractor shall pay the difference to City.
- C. The Contractor shall be liable for all damages and costs incurred by City caused by defective or non-conforming work or workmanship, including but not limited to all special, incidental, or consequential damages incurred by City.

4.8 SUBSTITUTION OF PRODUCTS & PROCESSES

- A. Substitutions requested by the Contractor will be subject to City's prior written acceptance and at City's sole discretion.
- B. Requests for substitution must specifically identify:
 - 1. Material, equipment, and labor costs included in the Contractor's bid associated with the original item to be substituted;
 - 2. All costs for material, equipment, labor associated with the proposed substitution, including any impact costs;
 - 3. Proposed change to the Contract Price and/or Contract Time; and
 - 4. Compatibility with or modification to other systems, parts, equipment or components of the Project and Contract Work.
- C. Contractor shall provide all documentation supporting its request as requested by City.
- D. All costs of any redesign or modification to other systems, parts, equipment or components of the Project or Contract Work, which result from the substitution, shall be borne by the Contractor.
- E. When City approves a substitution proposed by the Contractor, the Contractor shall guarantee the substituted article or materials to be equal to, or better than, those originally specified and shall be compatible with all other systems, parts, equipment or components of the Project and Contract Work. City has the right to order an unaccepted, substituted article removed and replaced without additional cost to City.

- F. City has a right to a deductive Change Order if the substituted product or process is less costly than the contractually required product or process.
- G. If City does not accept the substitution proposal the Contractor shall proceed, without delay or cost to City, with the Contract Work as originally specified.

4.9 INCREASED OR DECREASED QUANTITIES

- A. Payment to the Contractor will be made only for the actual quantities of work performed and accepted in conformance with the contract. When the accepted quantity of work performed under a unit item varies from the original proposal quantity, payment will be at the unit contract price for all work unless the total accepted quantity of any contract item, adjusted to exclude added or deleted amounts included in change orders accepted by both parties, increases or decreases by more than 25 percent from the original proposal quantity. In that case, payment for contract work may be adjusted as described herein:
 - 1. The adjusted final quantity shall be determined by starting with the final accepted quantity measured after all work under an item has been completed. From this amount, subtract any quantities included in additive change orders accepted by both parties. Then, to the resulting amount, add any quantities included in deductive change orders accepted by both parties. The final result of this calculation shall become the adjusted final quantity and the basis for comparison to the original proposal quantity.
 - a. Increased Quantities: Either party to the contract will be entitled to renegotiate the price for that portion of the adjusted final quantity in excess of 1.25 times the original proposal quantity. The price for excessive quantities will be determined by agreement of the parties, or, where the parties cannot agree, the price will be determined by the City based upon the actual costs to perform the work, including markup for overhead and profit in accordance with Paragraph 6.3, *Allowable Costs*.
 - b. Decreased Quantities: Either party to the contract will be entitled to an equitable adjustment if the adjusted final quantity of work performed is less than 75 percent of the original bid quantity. The equitable adjustment shall be based upon and limited to three factors:
 - i. Any increase or decrease in unit costs of labor, materials or equipment, utilized for work actually performed, resulting solely from the reduction in quantity;
 - ii. Changes in production rates or methods of performing work actually done to the extent that the nature of the work actually performed differs from the nature of the work included in the original plan; and
 - iii. An adjustment for the anticipated contribution to unavoidable fixed cost and overhead from the units representing the difference between the adjusted final quantity and 75% of the original plan quantity.
- B. The following limitations shall apply to renegotiated prices for increases and/or equitable adjustments for decreases:
 - 1. Labor, materials and equipment rates shall be actual costs but shall not exceed the rates set forth in Paragraph 6.3, *Allowable Costs* nor shall overhead and profit exceed the rates set forth in Paragraph 6.3, *Allowable Costs*.

2. No payment for consequential damages or loss of anticipated profits will be allowed because of any variance in quantities from those originally shown in the proposal form, contract provisions, and contract plans.
 3. The total payment (including the adjustment amount and unit prices for work performed) for any item which experiences an equitable adjustment for decreased quantity shall not exceed 75% of the amount original bid for the item.
- C. If the adjusted final quantity of any item does not vary from the quantity shown in the proposal by more than 25% then the Contractor and the City agree that all work under that item will be performed at the original contract unit price and within the original time for completion.
 - D. When ordered by the Engineer, the Contractor shall proceed with the work pending determination of the cost or time adjustment for the variation in quantities.
 - E. The Contractor and the City agree that there will be no cost adjustment for decreases if the City has entered the amount for the item in the proposal form only to provide a common proposal for bidders.

ARTICLE 5: CHANGES TO THE CONTRACT

5.0 GENERAL

- A. No provisions of the Contract may be amended or modified except by written agreement signed by the City.
- B. All Change Order work shall be performed in accordance with the original Contract requirements unless modified in writing by City.
- C. Any response to a Request For Information, or other directive, direction, instruction, interpretation, or determination (hereinafter referred to as "Direction" for the purposes of Article 5), provided by City is not considered a Change Order, a change to Contract requirements, and shall not constitute, in and of itself, entitlement to an adjustment in Contract Price and/or Contract Time.
- D. The Contractor shall not be entitled to any change in the Contract Price and/or Contract Time under the following conditions or events:
 1. They were reasonably foreseeable at the time the Contractor submitted its bid;
 2. They were caused by the acts of the Contractor, Subcontractor and/or Supplier, including but not limited to the choice of means, methods, techniques, sequences, or procedures for the Work, failure to provide labor, materials or equipment in a timely manner, and failure to take reasonable steps to mitigate delays, disruptions, or conditions encountered.
- E. The Contract requirements for time and price impacts related to Change Orders are set forth in Article 6, *Time and Price Adjustments*.
- F. If there is a bid item for "Minor Changes," payments or credits for changes that cost \$5,000 or less and do not affect time, may, at the discretion of the City, be made under that bid item in lieu of the procedures set forth in Sections 5.1 – 5.6. A Minor Change will be documented by a written Order for a Minor Change or by a notation confirming an oral agreement.

5.1 CONTRACTOR'S REQUEST FOR A CHANGE ORDER

- A. Notice of Claim and Supplemental Information. If the Contractor believes that it is entitled to additional compensation and/or time for any reason (other than for a differing site condition under Section 5.2), or if the Contractor disagrees with any written or oral direction, instruction, interpretation or determination from the City, the Contractor shall
- (1) Provide the Engineer with a written Notice of Protest before doing any work or incurring any costs for which it may seek additional compensation or time from the City.
 - (2) Supplement the written Notice of Protest within 14 days with a written statement that includes the following:
 - a. The date, circumstances, and basis of entitlement to additional compensation and/or time;
 - b. The estimated dollar cost of the protested work and a detailed breakdown showing how that estimate was determined;
 - c. An analysis of the progress schedule showing the schedule change or disruption if the Contractor is asserting a schedule change or disruption;
 - d. Substantive basis of the Request;
 - e. If the protest is continuing, the information required above shall be supplemented upon request by the Engineer until the protest is resolved; and
 - f. The Contractor waives all claims for additional compensation and time if it fails to provide both a timely Notice of Claim and Supplemental Information with the information required by this Section.
- B. Request for Change Order.
1. A Request for a Change Order must be submitted in writing to the Engineer no later than thirty-five (35) days after the Contractor submitted its supplemental information pursuant to Paragraph 5.1(A)(2).
 2. The Request for a Change Order shall include:
 - a. Specific dollar amount covering all costs associated calculated in accordance with Article 6, *Time and Price Adjustments*;
 - b. Specific request for time extension (number of days) calculated in accordance with Article 6, *Time and Price Adjustments*;
 - c. A copy of the written Notice of intent, including all attachments;
 - d. All documentation supporting the Request for a Change Order, including but not limited to a cost proposal prepared using the forms provided by City, all cost records, schedule analysis, and the documents identified in §00700, ¶3.10, *Maintenance and Inspection of Documents*, that are in any way relevant to the Contractor's Request for Change Order; and
 - e. The Contractor waives all claims for additional compensation and time if it fails to provide a timely Request for Change Order with the information required by this Section.
- C. City's Response to Contractor's Request for Change Order.

1. City will make a written determination with respect to the Contractor's Request for Change Order within thirty (30) days of receipt of said Request, unless one of the following activities occurs.
 - a. City may request additional information and specify a time period for receipt of the information. The Contractor shall comply with City's request for additional information.
 - b. City may inform the Contractor that additional time is needed to review the Contractor's Request for Change Order and identify a date certain when a decision will be rendered.
 2. If City requests additional information, City will make a written determination within thirty (30) days receipt of Contractor's additional information.
 3. If City does not make a determination within the applicable time period, the Request For Change Order is deemed denied.
- D. Approval of Request for Change Order and Execution of Change Order. If City determines that a Change Order is necessary, the parties may negotiate acceptable terms and conditions and execute a Bilateral Change Order or City may issue a Unilateral Change Order.
- E. Contractor Procedure upon Denial or Deemed Denial of a Request for a Change Order. If the Contractor disagrees with the denial, the Contractor's sole remedy shall be to file a fully documented Claim within thirty (30) days of deemed denial or the Contractor's receipt of the denial in accordance with Article 9, *Claims and Litigation*.
- F. Contractor's Obligation to Continue to Work. Pending resolution of the Contractor's Request for a Change Order, the Contractor shall continue to perform all Work including, at the written request of City that work associated with the pending Request for Change Order. The Contractor shall maintain its progress with the Work.
- G. Waiver. Failure to follow the provisions set forth herein shall constitute a waiver of the Contractor's right to receive any additional time or money as a result of any alleged direction, instruction, interpretation, determination by City and/or the event or impact to the Project.

5.2 DIFFERING SITE CONDITIONS

- A. Immediate Written Notice to City. If the Contractor encounters a Differing Site Condition as defined in Article 1.0 the Contractor shall immediately, and before the conditions are disturbed, give written Notice to City of Differing Site Conditions.
- B. Request for Change Order based on Differing Site Condition. Unless otherwise agreed upon in writing by the Engineer, within forty-five (45) days of the Contractor's initial written notification of the Differing Site Condition to City, the Contractor shall provide a Request for Change Order that includes all elements required for such a request, including:
 1. A detailed description of the Differing Site Condition; and
 2. Substantive, contractual, and technical basis supporting the existence of the Differing Site Condition and its impacts.
- C. Waiver.

1. If the Contractor's actions disturb the Site such that City or City's designee cannot adequately and fully investigate the alleged differing site condition, the Contractor waives its right to receive any additional time or money as a result of the Differing Site Condition.
 2. Failure by the Contractor to provide either (a) immediate Notice or (b) Request for Change Order shall constitute a waiver of the Contractor's right to receive any additional time or money as a result of the Differing Site Condition.
 3. The Contractor shall be responsible for any and all costs or damages incurred by City resulting from the Contractor's failure to provide appropriate notice and/or the Detailed Description and Request for Change Order.
- D. City's Response to the Differing Site Condition Request for Change Order. City shall investigate the alleged Differing Site Conditions and respond to the Differing Site Condition in accordance with the Request for Change Order procedures set forth above.
- E. Contractor's Obligation to Continue to Work. The Contractor shall not disturb the condition until receipt of written authorization from the Engineer that work can resume at the location of the alleged Differing Site Condition. The Contractor shall continue with performance of all other Work.

5.3 SUSPENSION OF WORK

A. City Issues Directive Suspending Work

1. City may order the Contractor, in writing, to suspend all or any part of the Work of this Contract for the period of time that City determines appropriate for the convenience of City. The Contractor shall not suspend the Work without written direction from City specifically authorizing the Suspension of Work.
2. Upon receipt of a written Notice suspending the Work, the Contractor shall immediately comply with its terms and take all reasonable steps to minimize costs attributable to such suspension. Within a period up to 120 days after the suspension notice is received by the Contractor, or within any extension of that period which City requires, City shall either:
 - a. Cancel the written notice suspending the Work; or
 - b. Terminate the Work for either default or convenience.
3. If a written notice suspending the Work is canceled or the period of the Suspension or any extension thereof expires, the Contractor shall resume Work as required by City.
4. If the performance of all or any part of the Work is, for an unreasonable period of time, suspended by the written direction of City, the Contractor may be entitled to an adjustment in the Contract Time, or Contract Price, or both, for increases in the time or cost of performance directly attributable to the suspension and provided that the Contractor sufficiently documents all costs and time impacts attributable to the suspension. No adjustments to Contract Price and/or Contract Time shall be allowed unless the Contractor can demonstrate that the period of suspension caused by City impacted Critical Path and delayed the Contractor from completing the Work on time.

B. Constructive Suspension of Work

1. If the Contractor believes that some action or omission on the part of City constitutes constructive suspension of Work, the Contractor shall immediately notify City in writing that the Contractor considers the actions or omission a constructive suspension of Work.
- C. To the extent the Contractor believes it is entitled to any additional money or time as a result of the suspension of Work or constructive suspension, Contractor shall submit a Notice of Protest, Supplemental Information and Request for Change Order to City in accordance with Article 5, *Changes to the Contract*.
- D. Failure to comply with these requirements shall constitute a waiver of Contractor rights to any adjustment in Contract Time and/or Contract Price.
- E. No adjustment shall be made under this provision for any suspension to the extent that Contractor's performance would have been suspended, delayed, or interrupted as a result of actions, omissions, fault or negligence caused, in whole or in part, by the Contractor or any of its Subcontractors.

5.4 FORCE MAJEURE

- A. To the extent the Contractor believes it is entitled to any additional time as a result of Force Majeure, Contractor shall submit a Notice of Protest, Supplemental Information and Request for Change Order to City in accordance with Article 5, *Changes to the Contract*.
- B. Contractor shall not be entitled to a change in Contract Price resulting from an act of Force Majeure.
- C. Contractor is not entitled to an adjustment in Contract Time if the act of Force Majeure did not impact progress of the Work on the Critical Path and delay the Contractor from completing the Work within the Contract Time.
- D. When a Contractor experiences concurrent delay caused by either City or Contractor and an act of Force Majeure, the Contractor shall only be entitled to a change in Contract Time. No change to the Contract Price shall be allowed as a result of such concurrent delay.

5.5 CHANGE ORDERS

A. Bilateral Change Orders

1. If City and Contractor reach agreement on the terms and conditions of any change in the Work, including any adjustment in the Contract Price and Contract Time, such agreement shall be incorporated into a Change Order and signed by both Parties. Such Bilateral Change Orders shall represent full and complete payment and final settlement of all changes, Claims, damages or costs for all (a) time; (b) direct, indirect, and overhead costs; (c) profit; and (d) any and all costs or damages associated with delay, inconvenience, disruption of schedule, impact, ripple effect, loss of efficiency or productivity, acceleration of work, lost profits, stand-by, and any other costs or damages related to any work either covered or affected by the Change Order, or related to the events giving rise to the Bilateral Change Order.

B. Unilateral Change Order

1. City's Right to Issue Unilateral Change Order.

- a. City may unilaterally issue a Change Order at any time, without invalidating the Contract and without notice to the sureties, making changes within the general scope of this Contract.
- b. If any such Change Order causes an increase or decrease in the cost of, or time required for, performance of any part of the Work, City may make an adjustment in the Contract Price, Contract Time, or both, in accordance with Articles 5, *Changes to the Contract*, and 6, *Time and Price Adjustments*.

2. Contractor Disagreement with Unilateral Change Order. If the Contractor disagrees with the adjustment to the Contract Price and/or Time as indicated in the Unilateral Change Order, the Contractor must submit a Notice of Protest, Supplemental Information and Request for Change Order to City in accordance with Article 5, *Changes to the Contract*.

3. Contractor's Obligation to Continue to Work. The Contractor is required to continue with performance of all Work, including work associated with the Unilateral Change Order.

5.6 CITY REQUEST FOR A CHANGE PROPOSAL

A. Request. City may request a written Change Proposal from the Contractor for a change in the Work.

B. Contractor's Proposal. Contractor shall submit its written Change Proposal within the time specified in City's request with the costs shown in a form acceptable to the City. The Change Proposal shall represent the Contractor's offer to perform the requested work, and the pricing set forth within the proposal shall represent full, complete, and final compensation for the proposed change and any impacts to any other Work, including any adjustments in the Contract Time.

C. City's Acceptance of Contractor Proposal. If City accepts the Change Proposal as submitted by the Contractor or as negotiated by the parties, City shall notify the Contractor in writing of its acceptance of the Proposal and direct that the change in the Work be performed.

D. Execution of a Bilateral Change Order. After acceptance of the Change Proposal or acceptance of the negotiated Change Proposal, City shall direct the Contractor to perform the work in accordance with the agreed upon terms; thereafter, the Parties shall execute a bilateral Change Order in accordance with the terms of the Change Proposal or negotiated Change Proposal.

E. Execution of Unilateral Change Order. If City does not accept the Change Proposal or the Parties cannot agree upon the appropriate price or terms for the Change Proposal, City may issue a unilateral Change Order.

ARTICLE 6: TIME AND PRICE ADJUSTMENTS

6.0 CHANGE IN THE CONTRACT TIME

A. The Contract Time shall only be changed by a Change Order.

- B. No change in the Contract Time shall be allowed to the extent the time of performance is changed due to the fault, act, or omission of Contractor, or anyone for whose acts or omissions the Contractor is responsible.
- C. Contractor is not entitled to a change in Contract Time unless the progress of the Work on the Critical Path is delayed and completion of the Contract Work within Contract Time is delayed.
- D. When a Contractor experiences concurrent delays which impact the Critical Path and are caused by (1) City and the Contractor; (2) City and an act of Force Majeure; or, (3) the Contractor and an act of Force Majeure, the Contractor shall only be entitled to a change in Contract Time. No change to the Contract Price shall be allowed as a result of such concurrent delay.
- E. A Request for Change Order that includes a request for an adjustment in the Contract Time shall:
 - 1. Be in writing and delivered to City within the appropriate time period specified in Article 5, *Changes in the Contract*.
 - 2. Include a clear explanation of how the event or conditions specifically impacted the Critical Path and overall Project Schedule and the amount of the adjustment in Contract Time requested.
 - 3. Be limited to the change in the Critical Path of a Contractor's Project Schedule, and any updates, attributable to the event or conditions, which caused the request for adjustment. No extension of time or compensation for damages resulting from delay will be granted unless the delay affects the timely completion of all Work under the Contract or timely completion of a portion of the Work for which time of completion is specific. Contractor shall be responsible for showing clearly on the Project Schedule, and any updates, that the event or conditions:
 - a. Had a specific impact on the Critical Path and was the sole cause of such impact;
 - b. Could not have been avoided by resequencing of the Work or other reasonable alternatives; and
 - c. Will prevent the Contractor from completing the Project within the current Contract completion date.
- F. Contractor shall make all reasonable efforts to prevent and mitigate the effects of any delay, whether occasioned by an act of Force Majeure or otherwise.

6.1 CHANGE IN THE CONTRACT PRICE

- A. The Contract Price shall only be changed by a Change Order.
- B. No change in the Contract Price shall be allowed when:
 - 1. Contractor's changed cost of performance is due to the fault, acts, or omissions of Contractor, or anyone for whose acts or omissions Contractor is responsible, including its subcontractors and suppliers;
 - 2. The change is concurrently caused by Contractor and City; or
 - 3. The change is caused by an act of a third party or Force Majeure.

- C. City shall not be responsible for, and the Contractor shall not be entitled to any compensation for unallowable costs. Unallowable costs include, but are not limited to:
1. Interest or attorney's fees of any type other than those mandated by Washington state statute;
 2. Claim preparation or filing costs;
 3. The cost of preparing or reviewing Change Proposals or Requests for Change Orders;
 4. Lost profits, lost income or earnings;
 5. Costs for idle equipment when such equipment is not at the Site, has not been employed in the Work, or is not scheduled to be used at the Site;
 6. Lost earnings or interest on unpaid retainage;
 7. Claims consulting costs;
 8. The costs of corporate officers or staff visiting the Site or participating in meetings with City;
 9. Loss of other business; and/or
 10. Any other special, consequential, or incidental damages incurred by the Contractor, Subcontractor, or Suppliers.
- D. A Request for Change Order that includes a request for an adjustment in Contract Price shall:
1. Be in writing and delivered to City within the applicable time period specified in Article 5, *Changes to the Contract*.
 2. Identify the following information:
 - a. The event or condition which caused the Contractor to submit its request for an adjustment in the Contract Price;
 - b. The nature of the impacts to Contractor and its Subcontractors, if any; and
 - c. The amount of the adjustment in Contract Price requested calculated in accordance with Paragraph 6.3, *Allowable Costs*, and using forms provided by City.
 3. Any requests by Contractor for an adjustment in the Contract Price and in the Contract Time that arise out of the same event or conditions shall be submitted together.
- E. The adjustments to the Contract Price provided for in this Article represent full, final, and complete compensation for all work done in connection with the request for an adjustment in Contract Price and all costs related to, resulting from, or affected by such change in Work including, but not limited to, all direct and indirect costs, overhead, profit, and all costs or damages associated with delay, inconvenience, disruption of schedule, impact, dilution of supervision, inefficiency, ripple effect, loss of efficiency or productivity, acceleration of work, lost profits, and any other costs or damages related to any work either covered or affected by the change in the Work, or related to the events giving rise to the change.

6.2 METHOD TO CALCULATE ADJUSTMENTS TO CONTRACT PRICE

- A. One of the following methods shall be used to calculate damages and/or adjustments to the Contract Price that result from or relate to Change Proposal, Request for Change Order, and/or Claim.
- B. Determination of the method to be used to calculate adjustments in the Contract Price shall be at the sole discretion of City.
- C. One of the following methods shall be used:
 - 1. Unit Price Method;
 - 2. Firm Fixed Price Method (also known as Lump Sum); or
 - 3. Time and Materials Method.
- D. **Unit Price Method**
 - 1. The City may direct the Contractor to perform extra work on a Unit Price basis. Such authorization shall clearly state the:
 - a. Scope of work to be performed;
 - b. Applicable Unit Price; and
 - c. Not to exceed amount of reimbursement as established by City.
 - 2. The applicable unit price shall include reimbursement for all direct and indirect costs of the work, including Overhead and profit, as limited by paragraph 6.3, *Allowable Costs*.
 - 3. Contractor shall only be paid under this method for the actual quantity of materials incorporated in or removed from the Work and such quantities must be supported by field measurement statements verified by City.
- E. **Firm Fixed Price Method**
 - 1. The Contractor and City may mutually agree on a fixed amount as the total compensation for the performance of changed work.
 - 2. The Contractor shall provide a detailed cost breakdown supporting the Contractor's requested adjustment to Contract Price and any other financial documentation requested by the Engineer, as limited by paragraph 6.3, *Allowable Costs*.
 - 3. Any adjustments to the Contract Price using the Firm Fixed Price Method shall include, when appropriate all reasonable costs for labor, equipment, material, Overhead and profit. Such labor, equipment, material, Overhead and profit shall be calculated in accordance with paragraph 6.3, *Allowable Costs*.
 - 4. Whenever City authorizes Contractor to perform changed work on a Firm Fixed Price Method, City's authorization shall clearly state:
 - a. Scope of work to be performed; and
 - b. Total Fixed Price payment for performing such work.
- F. **Time and Materials Method**
 - 1. Whenever City authorizes the Contractor to perform work on a Time and Material basis, City's authorization shall clearly state:

- a. Scope of work to be performed; and
 - b. A not to exceed amount of reimbursement as established by City.
2. Contractor shall:
- a. Cooperate with City and assist in monitoring the work being performed;
 - b. Substantiate the labor hours, materials and equipment charged to work under the Time and Materials Method by detailed time cards or logs completed on a daily basis before the close of business each working day;
 - c. Present the time card and/or log at the close of business each day to the Engineer so that City may review and initial each time card/log;
 - d. Perform all work in accordance with this provision as efficiently as possible;
 - e. Not exceed any cost limit(s) without City's prior written approval; and
 - f. Maintain all records of the work, including all records of the Subcontractor, Supplier, and Materialmen, and make such records available for inspection as required in paragraphs 3.8, *Record Documents*, 3.9, *Cost Records*, and 3.10, *Maintenance and Inspection of Document*.
3. Contractor shall submit costs and any additional information requested by City to support Contractor's requested price adjustment.
4. The Contractor shall only be entitled to be paid for reasonable costs actually incurred by the Contractor. The Contractor has a duty to control costs. If City determines that the Contractor's costs are excessive or unreasonable, City, at its discretion, shall determine the reasonable amount for payment.

G. Deductive Changes to the Contract Price

1. A deductive change to the Contract Price may be determined by taking into account:
- a. Costs incurred and saved by the Contractor as a result of the change, if any;
 - b. The costs of labor, material, equipment, and overhead saved and profit unearned by the deleted work. These costs shall be calculated following as closely as possible with the provisions identified in Article 6, Time and Price Adjustments; and/or,
 - c. At the discretion of City, costs set forth in the documents used by the Contractor to develop its bid.
2. Where City has elected not to correct incomplete or defective Work, the adjustment in the Contract Price shall take into account:
- a. The costs the City would have to expend to correct the Work;
 - b. The decreased value to City resulting from the incomplete or defective Work; and,
 - c. The increased future costs which City may incur by reason of the incomplete or defective Work.

H. Full Compensation

An adjustment calculated in accordance with the provisions of this Article shall be full and complete payment and final settlement of all changes, claims, damages and costs for all (a) time; (b) direct, indirect, and overhead costs; (c) profit; and (d) any and all costs or damages associated with delay, inconvenience, disruption of schedule, impact, ripple effect, loss of efficiency or productivity, acceleration of work, lost profits, standby, and/or any other costs or damages related to any Work either covered or affected by the changed Work, or related to the events giving rise to the change.

6.3 ALLOWABLE COSTS

- A. Any adjustments to the Contract Price shall be based on the following categories and shall incorporate markups for Overhead and profit as provided herein.
1. **Labor.** For all labor, including foreman supervision but excluding superintendents and other project management and consultants, the Contractor shall be reimbursed for labor costs provided herein. The labor cost of an event or condition shall be calculated as the sum of the following:
 - a. **Labor Rate.** The Labor Rate is the actual reasonable wage paid to the individual plus the actual reasonable costs incurred by the Contractor to cover costs associated with Federal Insurance Compensation Act (FICA), Federal Unemployment Tax Act (FUTA), State Unemployment Tax Act (SUCA), industrial insurance, fringe benefits, and benefits paid on behalf of labor by the Contractor. The applicable Labor Rates shall be multiplied by the number of hours reasonably expended in each labor classification because of the event or condition to arrive at a total cost of labor.
 - b. **Travel Allowance and/or Subsistence.** The labor calculation shall include the actual costs of travel and/or subsistence paid to the Contractor's employees engaged upon the Work when said payments are required by a labor agreement.
 2. **Materials.** The cost of materials resulting from an event or condition shall be calculated in one or more of the following methods, at City's election:
 - a. **Invoice Cost.** The Contractor may be paid the actual invoice cost of materials including actual freight and express charges and applicable taxes less all available discounts, rebates, and back-charges,. This method shall be considered only to the extent the Contractor's invoice costs are reasonable and the Contractor provides copies of vendor invoices, freight and express bills, and other evidence of cost accounting and payment satisfactory to City. As to materials furnished from the Contractor's stocks for which an invoice is not available, the Contractor shall furnish an affidavit certifying its actual cost of such materials and such other information as City may reasonably require;
 - b. **Wholesale Price.** The Contractor may be paid the lowest current wholesale price for which the materials are available in the quantities required, including customary costs of delivery and all applicable taxes less all available discounts, rebates, and back-charges; or

- c. **City Furnished Material.** City reserves the right to furnish such materials as it deems advisable, and the Contractor shall have no Claim for any costs, Overhead or profit on such materials. However, should the Contractor be required to pick up, transport and/or unload such materials the Contractor will be reimbursed for reasonable costs thereof.
- 3. **Equipment.** The additional cost, if any, of machine-power tools and equipment usage shall be calculated in accordance with the following rules:
 - a. **Equipment Rates.** The Contractor's own charge rates may be used if verified and approved by City and based on the Contractor's actual ownership and operating cost experience. Rental rates contained in published rate guides may be used if their cost formulas and rate factors are identifiable, reflect the Contractor's historical acquisition costs, utilization, and useful life, and do not include replacement cost, escalation contingency reserves, general and administrative expense, or profit. Rates shall be based on the Contractor's actual allowable costs incurred or the rates established according to the Rental Rate Blue Book for Construction Equipment, published by Equipment Watch, PRIMEDIA, whichever is less. The Rental Rate Blue Book established hourly equipment rate shall be the monthly rental rate for the equipment plus the monthly rental rate for required attachments, divided by 176 work hours per month, multiplied by the appropriate regional adjustment factor, plus the hourly operating cost. The established equipment rate shall apply for actual equipment usage up to eight hours per day. For all hours in excess of eight hours per day or 176 hours per month, the established equipment rate shall be the monthly rental rate plus the monthly rental rate for required attachments, divided by 352, multiplied by the regional adjustment factor, plus the hourly operating cost.
 - b. **Transportation.** If the necessary equipment is not already at the Site and it is not anticipated that it would be required for the performance of other work under the terms of the Contract, the calculation shall include a reasonable amount for the costs of the necessary transportation of such equipment.
 - c. **Standby.** The Contractor shall only be entitled to standby equipment costs if (a) the equipment is ready, able, and available to do the Work at a moment's notice; (b) Contractor is required to have equipment standby because of an event or condition solely caused by City and (c) the Contractor can demonstrate that it could have and intended to use the equipment on other projects/jobs. The Contractor shall be compensated at 50% of the monthly rental rate for the equipment, divided by 176, and multiplied by the appropriate regional adjustment factor, as identified in the Rental Rate Blue Book for Construction Equipment, published by Machinery Information Division of PRIMEDIA Information Inc. Standby shall not be paid during periods of Contractor-caused delay, concurrent delay, Force Majeure, during any seasonal shutdown, routine maintenance, down-time or broken equipment, late delivery of equipment or supplies, or other anticipated occurrence specified in the Contract Documents. No payment shall be made for standby on any piece of equipment, which has been used on the Project in any 24 hour period. Standby costs shall not be paid for weekends, holidays, and any time the equipment was not intended to be used on the Project as demonstrated by the Project Schedule.

4. **Subcontractor & Supplier.** Direct costs associated with Subcontractors and Suppliers shall exclude Overhead and Profit markups and shall be calculated and itemized in the same manner as prescribed herein for Contractor. Contractor shall provide detailed breakdown of Subcontractor and Supplier invoices.
5. **Overhead and Profit Markup.**
 - a. On a change to the Contract Price or any other claim for money by the Contractor, City will only pay Overhead, including Home Office Overhead, Site or Field Office Overhead, and unabsorbed home office overhead, and Profit pursuant to the Overhead and Profit Markups set forth herein. The Overhead and Profit Markups cover all overhead regardless of how the Contractor chooses to account for various costs in its books of account.
 - b. Overhead and Profit markups shall not be applied to freight, delivery charges, express charges, and sales tax.
 - c. The allowed Overhead and Profit markup shall not exceed the following:
 - i. If the Contractor is self-performing work: 18% combined Overhead and Profit markup on the Contractor's Direct Costs;
 - ii. If a Subcontractor or Supplier is performing work: 18% for the Subcontractor's Direct Cost for performing the work and 7% on the Direct Costs of the Subcontractors' or Suppliers'; provided that the 7% is to be divided among upper tier Subcontractors and the Contractor when a Subcontractor or Supplier is performing the work;
 - iii. If the value of material and equipment is greater than 50% of the total value of the change, the Overhead and Profit Markup shall only be 10% for material and equipment; and
 - iv. In no event shall the total combined Overhead and Profit markup for the Contractor and all Subcontractors and Suppliers of any tier exceed 25% of the Direct Cost to perform the Change Order work.

ARTICLE 7: PAYMENT AND COMPLETION

7.0 APPLICATIONS FOR PAYMENT

- A. On or about the first day of each month, the Contractor shall submit to City an Application for Payment. Each application shall be completed on a form acceptable to City and designated as an "Application for Payment."
- B. The Contractor is not entitled to payment for any work unless the Application for Payment includes all required documentation. City reserves the right to withhold payment pursuant to paragraph 7.2, *Payments Withheld* if it is subsequently determined that all required documentation was not provided by the Contractor or is in error.
- C. The application shall correlate the amount requested with the Schedule of Values and with the state of completion of the Work.
- D. The Contractor shall submit a breakdown of the cost of lump sum items to enable the Engineer to determine the Work performed on a monthly basis. Lump sum breakdowns shall be submitted prior to the first progress payment that includes

payment for the Bid Item. Absent a lump sum breakdown, the Engineer will make a determination based on information available.

7.1 PAYMENTS

- A. City shall comply with RCW 39.76, as amended, and promptly review each Application for Payment and identify in writing any cause for disapproval within 8 working days. In addition to withholding payment for unsatisfactory performance or failure to comply with Contract requirements, if the Contractor's Application for Payment fails to recognize any back-charges, off-sets, credits, change orders, or deductions in payment made in accordance with paragraph 7.2, *Payments Withheld*, City shall have the right to revise or disapprove Contractor's Application For Payment because the Application for Payment is not considered a properly completed invoice.
- B. The City shall withhold retainage from each Application for Payment as required by RCW 60.28, as amended.
- C. If an Application for Payment is accepted by City, it shall be paid within thirty (30) days of City's receipt of the properly prepared invoice (Application for Payment).

7.2 PAYMENT WITHHELD

- A. In addition to retainage withheld pursuant to RCW 60.28 and without waiver of any other available remedies, City has the right to withhold, nullify, or back-charge, in whole or in part, any payment or payments due or that have been paid to the Contractor as may be necessary to cover City's costs or to protect City from loss or damage for reasons including but not limited to:
 - 1. Failure of the Contractor to submit or obtain acceptance of a Progress Schedule, Schedule of Values, and any updated Schedules;
 - 2. Defective or non-conforming Work;
 - 3. Costs incurred by City to correct, repair or replace defective or non-conforming Work, or to complete the Work;
 - 4. A reasonable doubt that the Contract can be completed for the balance then unpaid;
 - 5. A reasonable concern by City that the materials, equipment or component parts are not in proper operating condition;
 - 6. Assessment of Liquidated Damages;
 - 7. Failure to perform in accordance with the Contract;
 - 8. Cost or liability that may occur to City as the result of the Contractor's or Subcontractor's acts, omissions, fault, or negligence;
 - 9. Deduction in the Work;
 - 10. Failure of Contractor to repair damaged materials, equipment, property, or Work;
 - 11. Failure of the Contractor to obtain approval of Submittals pertinent to the work accomplished;
 - 12. Failure to pay Subcontractors, Suppliers, employees or other obligations arising out of the Work;

13. Failure to keep Record Documents up to date;
 14. Failure to comply with all applicable federal, state, and local laws, statutes, regulations, codes, licenses, easements, and permits;
 15. Failure to obtain and maintain applicable permits, insurance, and bonds; and
 16. Failure to provide Statement of intent to Pay Prevailing Wage and/or Affidavits of Wages Paid and, if requested, Certified Payroll Records for the Contractor and for Subcontractors of any tier.
- B. The withholding, nullification, or back-charge of any payment(s) by City shall in no way relieve the Contractor of any of its obligations under this Contract.

7.3 TITLE

Title to all Work and materials covered by an accepted and paid Application For Payment shall pass to City at the time of such payment, free and clear of all liens, claims, security interest, and encumbrances. Passage of title shall not, however, (1) relieve Contractor from any of its duties and responsibilities for the Work or materials, including protection thereof, (2) waive any rights of City to insist on full compliance by Contractor with the Contract requirements, or (3) constitute acceptance of the Work or materials.

7.4 SUBSTANTIAL COMPLETION

- A. When the Contractor has achieved Substantial Completion (as defined in Section 1 above), the Contractor shall give written Notice to City.
1. City shall promptly inspect the Work and prepare a Punch List (list of items to be completed or corrected).
 - a. City reserves the right to add to, modify, or change the Punch List.
 - b. Failure by City to include any items on such list does not alter the responsibility of the Contractor to complete or correct the Work in accordance with the Contract.
- B. At the Contractor's request, City may identify those Punch List items that must be completed or corrected in order for the Contractor to achieve Substantial Completion.
1. When City determines that those Punch List items have been completed or corrected by the Contractor, City shall make a determination that the Work is Substantially Complete.
 2. A Certificate of Substantial Completion will be issued by City, which shall establish the date of Substantial Completion.
 3. This Certificate of Substantial Completion shall state the responsibilities of City and the Contractor for security, maintenance, heat, utilities, damage to the Work, and insurance.
- C. City shall assess liquidated damages for the Contractor's failure to Substantially Complete the Work within the Contract Time. The liquidated damage amounts, set forth elsewhere in the Contract Documents, will be assessed for Contractor's failure to achieve Substantial Completion within the Contract Time. These Liquidated Damages are not a penalty, but will be assessed against the Contractor for failure to achieve these Contract requirements. These Liquidated Damage amounts are

fixed and agreed upon by and between the Contractor and City because of the impracticability and extreme difficulty of fixing and ascertaining the actual damages City would in such events sustain. These amounts shall be construed as the actual amount of damages sustained by City, and may be retained by City and deducted from payments to the Contractor. Assessment of Liquidated Damages shall not release the Contractor from any further obligations or duties pursuant to the Work.

- D. As provided in the Contract Documents, City may grant Substantial Completion to specific subsystems or portions of the Work. The dates of Substantial Completion shall be determined, in writing, by City.

7.5 FINAL INSPECTION

- A. The Contractor shall correct all remaining Punch List items and complete all remaining Work within the time period stated in the Certificate of Substantial Completion or within 30 days, whichever is less. When all Punch List items have been successfully corrected and the work is complete the Contractor's shall give written notice to the City that the Work ready for final inspection. After verification by City that such completion was satisfactory, the Contractor shall submit a Final Application for Payment.

7.6 REQUIREMENTS FOR FINAL APPLICATION FOR PAYMENT

- A. In addition to any other requirement identified in the Contract Documents, the Final Application for Payment shall include the following documents:
 - 1. Affidavit of Wages Paid for Contractor and all Subcontractors in accordance with state law;
 - 2. Contractor's release of claims against City, except for Claims specifically described in the release document and submitted in accordance with Article 9, *Claims and Litigation*; and
 - 3. Contractor certification that all Subcontractors and Suppliers have been paid and there are no outstanding liens.

7.7 COMPLETION/FINAL ACCEPTANCE

- A. Completion/Final Acceptance shall be achieved when all the obligations of the Contract have been successfully performed by the Contractor in accordance with the Contract and accepted by City. Should Contractor fail to achieve Final Acceptance within the required time the City may assess actual damages caused by its failure to do so.
- B. Neither Final Acceptance, nor Final Payment, shall release Contractor or its sureties from any obligations under this Contract or the Performance and Payment Bonds, or constitute a waiver of any claims by City arising from or related to Contractor's performance or failure to perform the Work and to meet all Contractual obligations in accordance with the Contract, including but not limited to:
 - 1. Unsettled liens, security interests or encumbrances;
 - 2. Damaged, non-conforming, or defective Work discovered by City;
 - 3. Terms of any warranties or guarantees required by the Contract; and
 - 4. Payments made in error.

- C. Except for any Claims properly submitted in accordance with Article 9, *Claims and Litigation*, acceptance of Payment on the Final Application for Payment by the Contractor shall, on behalf of itself and its Subcontractors or Sureties, forever and unconditionally release and discharge City, its officers, agents, employees, from:
 - 1. Any and all disputes or claims, including but not limited to claims for damages, fines, interest, taxes, attorney fees, or costs, demands, rights, actions or causes of actions, known or unknown, arising out of or in any way related to the parties' performance under the Contract and/or Project; and
 - 2. Any and all known and/or unknown liabilities, obligations, demands, actions, suits, debts, charges, causes of action, requests for money and/or payment under the Contract, outstanding invoices, or claims directly or indirectly arising out of or related to the Contract and/or Project.

7.8 WARRANTY AND GUARANTY

- A. In addition to any special warranties provided elsewhere in the Contract, Contractor warrants that all Work conforms to the requirements of the Contract and is free from any defect in equipment, material, design, or workmanship performed by Contractor or its Subcontractors and Suppliers.
- B. The warranty period shall be for the longer period of: one year from the date of Final Acceptance of the entire Project or the duration of any special extended warranty offered by a supplier or common to the trade.
- C. With respect to all warranties, express or implied, for Work performed or materials furnished according to the Contract, Contractor shall:
 - 1. Obtain all warranties that would be given in normal commercial practice from the supplier and/or manufacturer;
 - 2. Prior to Final Acceptance require all warranties be executed, in writing, for the benefit of City;
 - 3. Enforce all warranties for the benefit of City; and
 - 4. Be responsible to enforce any warranty of a Subcontractor, manufacturer, or Supplier, should they extend beyond the period specified in the Contract.
- D. If, within an applicable warranty period, any part of the Work is found not to conform to the Contract, the Contractor shall correct it promptly after receipt of written Notice from City to do so. In the event City determines that Contractor corrective action is not satisfactory and/or timely performed, then City has the right to either correct the problem itself or procure the necessary services, recommendations, or guidance from third parties. All damages incurred by City and all costs for City's remedy shall be reimbursed by the Contractor.
- E. The warranty provided in this provision shall be in addition to any other rights or remedies provided elsewhere in the Contract or by applicable law.

7.9 PRIOR OCCUPATION

City shall have the right to occupy such part or parts of the Project in or upon which the Work is being done, as it may see fit, and such occupation shall not be construed as acceptance by City of the Work or constitute Substantial Completion of the Work.

ARTICLE 8: TERMINATION

8.0 CITY'S RIGHT TO TERMINATE CONTRACT

A. Termination for Default

1. City may terminate, without prejudice to any right or remedy of City the Work, or any part of it, for cause upon the occurrence of any one or more of the following events:
 - a. Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Substantial Completion of the Work within the Contract Time;
 - b. Contractor fails to prosecute the Work or any portion thereof with sufficient diligence to ensure Final Acceptance of the Work in a timely manner;
 - c. Contractor is adjudged bankrupt, makes a general assignment for the benefit of its creditors, or a receiver is appointed on account of its insolvency;
 - d. Contractor fails in a material way to repair, replace or correct Work not in conformance with the Contract;
 - e. Contractor repeatedly fails to supply skilled workers or proper materials or equipment;
 - f. Contractor repeatedly fails to make prompt payment to its employees or Subcontractors;
 - g. Contractor materially disregards or fails to comply with laws, ordinances, rules, regulations, permits, easements or orders of any public authority having jurisdiction;
 - h. Contractor fails to comply with all Contract safety requirements; or
 - i. Contractor is otherwise in material breach of any provision of the Contract, including but not limited to quality control, environmental requirements, administrative requirements, coordination and supervision.
2. If City reasonably believes that one of the aforementioned events has occurred, City will provide the Contractor with written Notice of its intent to terminate the Contractor for default, specifying within such notice the ground(s) for such termination. City, at its option, shall require the Contractor to either promptly correct the deficiencies noted in City's intent to terminate or provide City with a corrective action plan as to how such deficiencies will be remedied or cured in a timely fashion. However, if after receipt of the proposed remedy, City has a reasonable basis for concluding that the Contractor has (a) failed or is unwilling to repair, replace or correct the deficiencies, or (b) failed or is unwilling to provide a reasonable and satisfactory corrective action plan, City shall thereafter have the right to terminate this Contract for default.
3. Upon termination, City may at its option:
 - a. Take possession of the Site and possession of or use of all materials, equipment, tools, and construction equipment and machinery thereon owned by Contractor; and/or

- b. Finish the Work by whatever other reasonable method it deems expedient; or
 - c. Call upon the surety to perform its obligations under the performance and payment bonds, if applicable.
4. The Contractor and its sureties shall be liable for all damages and costs, including but not limited to: (1) compensation for architect and engineering services and expenses made necessary thereby; (2) any other costs or damages incurred by City in completing and/or correcting the Work; and (3) any other special, incidental or consequential damages incurred by City which results or arises from the breach or termination for default.
 5. In the event of termination for default City shall only pay the Contractor for Work successfully completed and accepted by City prior to the date of termination. City shall not be responsible for any other Contractor costs, expenses, or damages including any consequential, special, or incidental damages or lost profits associated with this Contract. In no event shall City reimburse the Contractor for any costs directly or indirectly related to the cause of this termination for default.
 6. If, after termination for default, it is determined that the Contractor was not in default, the rights and obligations of the parties will be the same as if the termination had been issued for the convenience of City.
 7. The rights and remedies of City in this provision are in addition to any other rights and remedies provided by law or under this contract.

B. Termination for Convenience

1. Upon written Notice City may terminate the Work, or any part of it, without prejudice to any right or remedy of City, for the convenience of City.
2. If City terminates the Work or any portion thereof for convenience, Contractor shall recover as its sole remedy:
 - a. Reasonable costs for all Work completed prior to the effective date of the termination and not previously paid for by City; and
 - b. A reasonable allowance for Overhead and profit for Work actually performed prior to the date of termination and accepted by City, at a rate not to exceed the percentage amount set forth in the Contract and in paragraph 6.3, *Allowable Costs*, subparagraph A.5, *Overhead and Profit*. The Contractor waives all other claims for payment and damages including without limitation, anticipated profit and overhead on work not performed and accepted by City.
3. The Contractor shall not be entitled to any other costs or damages, whatsoever. The total sum payable upon termination shall not exceed the Contract Price reduced by prior payments. Contractor shall be required to make its request for adjustment in accordance with Article 5, *Changes to the Contract*, and Article 6, *Time and Price Adjustments*.
4. If it appears that the Contractor would have sustained a loss on the entire Contract had it been completed, City shall not reimburse Contractor any profit for the Work completed and shall reduce the settlement to reflect the indicated rate of loss.

C. Contractor's Obligations During Termination

Unless City directs otherwise, after receipt of a written Notice of termination for default or termination for convenience, Contractor shall promptly:

1. Stop performing Work on the date and as specified in the Notice of termination;
2. Place no further orders or subcontracts for materials, equipment, services or facilities, except as may be necessary for completion of such portion of the Work not terminated;
3. Cancel all orders and subcontracts, upon terms acceptable to City, to the extent that they relate to the performance of Work terminated;
4. Assign as specifically requested by City all of the rights, title, and interest of Contractor in all orders and subcontracts;
5. Take such action as may be necessary or as directed by City to preserve and protect the Work, Site, and any other property related to this Project in the possession of Contractor in which City has an interest;
6. Continue performance of Work only to the extent not terminated; and
7. Take any other steps required by City with respect to this Project.

8.1 CITY'S RIGHT TO STOP THE WORK FOR CAUSE

- A. If Contractor fails or refuses to perform its obligations in accordance with the Contract, City may order Contractor, in writing, to stop the Work, or any portion thereof, until satisfactory corrective action has been taken.
- B. Contractor shall not be entitled to any adjustment in the Contract Time and/or Contract Price for any increased cost or time of performance attributable to Contractor's failure or refusal to perform its obligations under the Contract.

ARTICLE 9: CLAIMS AND LITIGATION

9.0 CONTRACTOR CLAIMS

A. Condition Precedent to Filing a Claim.

1. The following actions are a condition precedent to filing a Claim:
 - a. The Contractor submitted a timely Notice of Protest, Supplemental Information and Request for Change Order as required by paragraph 5.1;
 - b. The Request for Change Order has been denied or deemed denied by City;
or
 - c. A Unilateral Change Order is issued by City.

B. Failure to file a Timely Claim.

1. At least seven (7) days prior to appropriate time to file a Claim, the Contractor may request an extension of time for filing its Claim. The Contractor shall state the reasons for the request and identify a date certain when the Contractor shall provide a fully documented Claim. Unless otherwise agreed to in writing by the Engineer, a fully documented Claim shall be received by the City within thirty (30) days after:
 - a. Denial or deemed denial of a Request for Change Order; or

- b. Contractor's receipt of an Executed Unilateral Change Order.
- 2. Failure to comply with the time requirements set for filing a Claim shall constitute acceptance by the Contractor, on behalf of itself and its Subcontractors and Suppliers, of the Unilateral Change Order and/or City's denial or deemed denial of a Request for Change Order. Such acceptance shall be considered complete, full, and final settlement of all costs, damages, and Claims related to or arising from the Request for Change Order and/or Unilateral Change Order.
- C. Contractor's Obligation to Continue to Work. Pending final decision of a Claim hereunder, the Contractor shall proceed diligently with the performance of the Contract Work, including that work associated with the Claim, and maintain its progress with the Work.
- D. Information required in a Fully Documented Claim. Every Claim must be submitted by the Contractor, in writing and clearly designated by the Contractor as a fully documented Claim. At a minimum, a fully documented Claim must contain the following information:
 - 1. A detailed factual statement of the Claim providing all necessary details, locations, and items of Contract Work affected;
 - 2. The date on which facts arose that gave rise to the Claim;
 - 3. The name of each person employed or associated with the Contractor, Subcontractor, Supplier, and/or City with knowledge about the event or condition which gave rise to the Claim;
 - 4. Copies of documents and a written description of the substance of any oral communications that concern or relate to the Claim;
 - 5. The specific provisions of the Contract Documents on which the Claim is based;
 - 6. If an adjustment in the Contract Price is sought, the exact amount sought, calculated in accordance with the Contract including paragraph 6.3, *Allowable Cost* and accompanied by (a) all records supporting the Claim and (b) all records meeting the requirements of paragraph 3.10, *Cost Records*;
 - 7. If an adjustment in the Contract Time is sought, the specific days and dates for which it is sought; the specific reason the Contractor believes an adjustment in the Contract Time should be granted; and the Contractor's analyses of its Progress Schedule, any specific Schedule analysis as required by the Contract Documents, and all updates to demonstrate the reason for the adjustment in Contract Time; and
 - 8. A statement certifying, under penalty of perjury, that after the exercise or reasonable diligence and investigation the Claim is made in good faith, that the supporting cost and pricing data are true and accurate to the best of the Contractor's knowledge and belief, that the Claim is fully supported by the accompanying data, and that the amount requested accurately reflects the adjustment in the Contract Price or Contract Time for which the Contractor believes City is liable.
- E. Contractor's Duty to Cooperate. The Contractor shall cooperate with City or its designee in the evaluation of its Claim and provide all information and documentation requested by City, its auditors or its designee.

F. City's Evaluation of the Claim.

1. To assist City in the review of the Contractor's Claim, City or its designee may visit the Site, request additional information and/or documentation in order to fully evaluate the issues raised in the Claim and/or audit the Claim.
2. After the Contractor has submitted a fully documented Claim that complies with this provision, City shall respond, in writing, to the Contractor within sixty (60) days from the date the fully documented Claim is received with either:
 - a. A decision regarding the Claim; or
 - b. Written Notice extending for another thirty (30) days City's time to respond to the Claim.
3. Absent a thirty (30) day extension, the Claim shall be deemed denied upon the sixty-first (61st) day following receipt of the Claim by City. If City had a thirty (30) day extension, the Claim shall be deemed denied upon the ninety-first (91st) day following receipt of the Claim by City.

9.1 CONTRACTOR'S BURDEN OF PROOF ON CLAIM

- A. The Contractor shall have the burden of proof to demonstrate entitlement and damages.
- B. If the Contractor, on behalf of itself or its Subcontractors and Suppliers seeks an adjustment in the Contract Price or Contract Time not supported by Project cost records meeting the requirements of ¶3.10, *Cost Records*, the Claim is waived.
- C. Compliance with the record keeping requirements set forth in this Contract is a condition precedent to recovery of any costs or damages related to or arising from performance of the Contract Work. If City establishes non-compliance of the record-keeping requirement set forth in ¶ 3.10, *Cost Records*, no adjustment shall be made to the Contract Price and/or Contract Time with respect to that Claim.

9.2 LITIGATION

- A. As a mandatory condition precedent to the initiation of litigation by the Contractor against City, Contractor shall comply with all provisions set forth in this Contract including those stated in Article 5 and Article 9.
- B. Any litigation brought against City shall be filed and served on City within 365 days from either the issuance of the Certificate of Substantial Completion for the entire Contract or Final Acceptance if no Certificate of Substantial Completion of the entire Contract is issued.
- C. Venue and jurisdiction shall vest solely in the King County Superior Court.
- D. Failure to comply with these mandatory condition time requirements shall constitute a waiver of the Contractor's right to pursue judicial relief from or against the City.

ARTICLE 10: MISCELLANEOUS

10.0 COMPENSATION, WAGES, BENEFITS AND TAXES

City assumes no responsibility for the payment of any compensation, wages, benefits, or taxes owed by the Contractor by reason of this Contract. The Contractor shall indemnify and hold City, its elected officials, officers, agents and employees, harmless

against all liability and costs resulting from the Contractor's failure to pay any compensation, wages, benefits or taxes.

10.1 PREVAILING WAGES

The Contractor shall comply with the minimum wage requirements of RCW 39.12, as amended, including the obligation to pay at least the hourly minimum wage and fringe benefits to workers as required by RCW 39.12. The Contractor shall also post all notices required by the Washington Department of Labor & Industries on forms provided by the Department of Labor & Industries. The Contractor shall timely provide a "Statement of Intent to Pay Prevailing Wages" and timely provide an "Affidavit of Prevailing Wages Paid."

10.2 SUCCESSORS AND ASSIGNS

City and the Contractor each binds itself, its partners, successors, assigns and legal representatives to the other with respect to all covenants, agreements and obligations contained in the Contract. Neither party to the Contract shall assign the Contract or sublet it as a whole without the written consent of the other, nor shall the Contractor assign any moneys due or to become due to it hereunder, without the previous written consent of City.

10.3 THIRD PARTY AGREEMENTS

Except as otherwise may be provided, the Contract shall not be construed to create a contractual relationship of any kind between: any architect, engineer, construction manager, Subcontractor, Supplier, or any persons other than City and Contractor.

10.4 NONWAIVER OF BREACH

No action or failure to act by City shall constitute a waiver of any right or duty afforded to City under the Contract; nor shall any such action or failure to act by City constitute an approval of or acquiescence in any breach hereunder, except as may be specifically stated by City in writing.

10.5 NOTICE TO CITY OF LABOR DISPUTES

- A. If Contractor has knowledge that any actual or potential labor dispute is delaying or threatens to delay timely performance in accordance with the Contract, Contractor shall immediately give Notice, including all relevant information, to City.
- B. Contractor agrees to insert a provision in its Subcontracts and to require insertion in all sub-subcontracts, that in the event timely performance of any such contract is delayed or threatened by any actual or potential labor dispute, all Subcontractor or lower-tiered Subcontractor shall immediately notify the next higher tier Subcontractor. Subcontractor or Contractor, as the case may be, of all relevant information concerning the dispute.

10.6 HEADINGS

The headings used in the Contract are for convenience only and shall not be considered a part of or affect the construction or interpretation of any contractual provision therein.

10.7 CHOICE OF LAW

In the event that either party shall bring a lawsuit or action related to or arising out of this Contract, such lawsuit or action shall be brought in the Superior Court, King County,

Washington. This Contract shall be governed by, and construed and enforced in accordance with the laws of the State of Washington.

10.8 SEVERABILITY

The provisions of this Contract shall be effective in all cases unless otherwise prohibited by Washington State Law or applicable Federal Law. The provisions of this Contract are separate and severable. The invalidity of any sentence, paragraph, provision, section, Article, or portion of this Contract shall not affect the validity of the remainder of this Contract.

SUPPLEMENTAL CONDITIONS

“Supplemental Conditions” contains portion of Division 1 of the 2012 Standard Specifications for Road, Bridge, and Municipal Construction, prepared by the Washington State Department of Transportation (WSDOT). Section 1-01 to Section 1-09 of Division 1 are deleted and replaced by the “General Terms and Conditions” included in this document. The entire content of Section 1-10 “Temporary Traffic Control” remains in effect, along with revisions and supplements provided within this Section.

TEMPORARY TRAFFIC CONTROL

1-10 TEMPORARY TRAFFIC CONTROL

To disrupt public traffic as little as possible, the Contractor shall permit traffic to safely pass through the work with the least possible inconvenience or delay. The Contractor shall maintain existing roads, streets, sidewalks, and paths within the project limits, keeping them open, and in good, clean, safe condition at all times. Contractor is to develop, publish, and post on site specific traffic control plans for vehicles, pedestrians, bicycles, Mercer Island school busses, Metro busses, equestrians, and persons with disabilities. Deficiencies caused by the Contractor's operations shall be repaired at the Contractor's expense. Deficiencies not caused by the Contractor's operations shall be repaired by the Contractor when directed by the Engineer, at the Contracting Agency's expense. The Contractor shall also maintain roads, streets, sidewalks, and paths adjacent to the project limits when affected by the Contractor's operations. Snow and ice control will be performed by the Contracting Agency on all projects. Cleanup of snow and ice control debris will be at the Contracting Agency's expense. The Contractor shall perform the following:

1. The Contractor shall submit a detailed construction plan which identifies pavement cutting; pavement, walkway removals; trenching, pipe laying, backfilling and trench restoration; landscaping restoration; and final cleanup prior to beginning the work.
2. The Contractor shall maintain at least one lane in each direction. Lane closure, on streets other than Island Crest Way, is allowable with advanced written approval from the City of Mercer Island; vehicle waits shall be limited to 5 minutes; excluding emergency medical or fire response vehicles which shall have immediate access.
3. The Contractor shall not block access to businesses or homes unless coordinated in advance and in writing with the property owner.
4. The Contractor shall not store any materials on the street overnight, unless otherwise authorized by the Engineer. Those materials stored on the street during working hours are to be used completely during the day in which they are stored. Equipment and vehicles may be parked on the public right-of-way overnight as authorized by the Engineer, but shall not interfere with traffic or pedestrian travel.
5. The Contractor shall clear the work site at the end of every work day by the time specified as normal working hours and shall have completed all backfilling, temporary paving, removed all unused materials, and swept up all debris, dirt and excess materials and removed them from the street and walkways. Steel plates may be used only for pre-digging connections or when CDF is required as backfill. The edges of the plates shall be ramped with temporary hot mix asphalt to provide a smooth transition to the existing pavement.
6. Public access to residential streets shall be maintained throughout the project. Maintain driveways to properties which do not have another access and schedule their construction to minimize the impact to the property owner.
7. Safe routes for pedestrians shall be provided through the entire length of the project.
8. Remove or repair any condition resulting from the work that might impede traffic or create a hazard.

9. Maintain the striping on the roadway at the Contracting Agency's expense. The Contractor shall be responsible for scheduling when to renew striping, subject to the approval of the Engineer. When the scope of the project does not require work on the roadway, the Contracting Agency will be responsible for maintaining the striping.
10. Maintain existing permanent signing. Repair of signs will be at the Contracting Agency's expense, except those damaged due to the Contractor's operations.
11. Keep drainage structures clean to allow for free flow of water. Cleaning of existing drainage structures will be at the Contracting Agency's expense when approved by the Engineer, except when flow is impaired due to the Contractor's operations.

Special Events

No construction activity will be allowed on Island Crest Way or SE 40th Street during the following dates:

- Summer Celebration Weekend (July 12 - 14, 2015)
- Seafair Weekend (August 1 - 4, 2015)

1-10.1(2) Description

(May 25, 2006 APWA GSP)

Revise the third paragraph to read:

The Contractor shall provide signs and other traffic control devices not otherwise specified as being furnished by the Contracting Agency. The Contractor shall erect and maintain all construction signs, warning signs, detour signs, and other traffic control devices necessary to warn and protect the public at all times from injury or damage as a result of the Contractor's operations which may occur on highways, roads, streets, sidewalks, or paths. No work shall be done on or adjacent to any traveled way until all necessary signs and traffic control devices are in place.

An off-duty police officer with cruiser will be required for traffic control for any work within 200 feet of the intersection of Island Crest Way and SE 40th Street. Work hours are limited from 9:00 a.m. – 3:30 p.m. for all work within 650 feet of this intersection. The Contractor shall ensure that the intersection is completely open to traffic outside these limits.

All traffic control must comply with the requirements of the Manual on Uniform Traffic Control Devices (MUTCD), including but not limited to flagging, signage, and all other traffic control devices used. Sample Section K traffic control plans published by WSDOT are available in the Appendix of these Specifications as a guide for developing a site specific traffic control plan. The Contractor shall submit a site specific traffic control plan for all work within the project limits for review and approval by the City prior to beginning construction.

1-10.2 Traffic Control Management

1-10.3(1)A Flaggers and Spotters

Supplement

A minimum of two (2) flaggers will be required at all times during work hours. Three (3) flaggers will be required if the work zone is along a curve, or at any intersection along Island Crest Way or SE 40th Street.

1-10.3(3)A Construction Signs

Supplement

1-10.3(3) Construction Signs

(Special Provision)

Supplement

Construction Identification Signs

Seven working days prior to commencement of work the Contractor shall pick up four (4) project notification signs from the City's Maintenance Warehouse Facility located at 9601 SE 36th, Mercer Island, WA 98040, and install on each approach to the project or as directed by the Engineer. The signs will be furnished by the City.

The 4' X 8' signs shall be erected on 4' X 4' wooden posts and maintained by the Contractor in a neat and presentable condition throughout the life of the project.

The signs shall also include the City web address for the project information page.

All costs in connection with the delivery, installation, and maintenance of the signs, the removal at the Substantial Completion Date of the project, and the furnishing, installation, maintenance, removal, and site restoration at the Substantial Completion Date of the project related to the wooden posts shall be considered **incidental** to and included in the unit contract prices of other items in this contract.

The Contractor shall return the signs in good condition to the City's Maintenance Warehouse upon completion of the project.

Portable Changeable Message Signs

Seven days prior to any work on Island Crest Way, the Contractor shall install portable changeable message signs facing each direction on Island Crest Way warning commuters to expect delays and listing the dates and work hours. These signs shall remain in place for the duration of the work on Island Crest Way.

Seven days prior to any work at the intersection of SE 40th Street and 90th Avenue SE, the Contractor shall install portable changeable message signs facing each direction on SE 40th Street and at the intersection of N Mercer Way and SE 36th Street, warning commuters to expect delays and listing the dates and work hours. These signs shall remain in place for the duration of the work at the intersection of SE 40th Street and 90th Avenue SE.

TECHNICAL SPECIFICATIONS

CITY OF MERCER ISLAND
INTRODUCTION TO THE TECHNICAL SPECIFICATIONS

The accompanying Plans and these Specifications and any Addenda thereto, show and describe the location and type of work to be performed for the 2015 Water System Improvements project.

These Technical Specifications are intended to supplement Division 2 through Division 10 of the 2012 Standard Specifications for Road, Bridge, and Municipal Construction, prepared by the Washington State Department of Transportation (WSDOT) and the American Public Works Associations, Washington State Chapter and any amendments thereto, herein referred to as Standard Specifications. In case of conflict, these Technical Specifications shall take precedence over the Standard Specifications.

HEADINGS

Headings to parts, sections, forms, articles, and sub-articles are inserted for convenience or reference only and shall not affect the interpretation of the contract documents.

SPECIAL PROVISION'S STRUCTURE

The specifications noted herein are in addition to, or as a replacement for, the Standard Specifications. Where sections are marked "Revised Section," the specifications herein are intended to be a revision or partial revision to the Specifications section noted. Where sections are marked as "New Section," the specifications herein will be an addition to the Standard Specifications section noted. Where sections are marked "Supplement," the specifications herein are to be a supplement to the Standard Specifications section noted. Sections of the Standard Specifications that are not modified or replaced as addressed in these Technical Specifications shall remain as described in the Standard Specifications.

DIVISION 2 EARTHWORK

2-01 CLEARING, GRUBBING, AND ROADSIDE CLEANUP

2-01.1 Description

(Special Provision)

Supplement

The Contractor shall not disturb or damage existing trees on the project site unless specifically identified for removal on the plans and shall contact the Engineer if there is any conflict between the Plans and field conditions. All costs of protecting existing trees from damage shall be **incidental** with no separate bid item paid for this work.

Grading Around Trees: Where excavating, or filling within the branch spread of trees that are to remain, the work shall be performed as follows:

- *Trenching:* When trenching occurs around trees to remain, the tree roots shall not be cut, but the trench shall be tunneled under or around the roots by careful hand-digging and without injury to the roots.
- *Raising Grades:* When the existing grade at tree is below the new finished grade, and fill not exceeding sixteen (16) inches is required, clean washed gravel graded from one- to two-inch size shall be placed directly around the tree trunk. The gravel shall extend out from trunk on all sides a minimum of eighteen (18) inches and finish approximately two (2) inches above the finished grade at tree. Install gravel and cover with filter fabric before any earth fill is placed. New earth fill shall not be left in contact with the trunks of any trees requiring fill.
- Trees marked for preservation that are buried in fills over sixteen (16) inches deep shall have an open dry well of durable masonry (without mortar) situated at least twelve (12) inches from the tree trunk. All wells are to be properly drained. Before fills of over sixteen (16) inches are made upon the tree root areas, it is advisable to spread at least a six (6) inch minimum layer of broken stone or coarse gravel covered by inverted sod shall be spread to facilitate proper drainage and aeration.
- *Lowered Grades:* Existing trees in areas where the new finished grade is to be lowered, shall have regrading work done by hand to elevation as indicated. Roots as required shall be cut cleanly three inches below finished grade and cuts covered with tree paint. Trees marked for preservation that are located more than six inches above proposed grades shall stand on broad rounded mounds and be graded smoothly into the lower level. Exposed or broken roots shall be cut clean and covered with topsoil.

2-01.2 Disposal of Usable Material and Debris

2-01.2(2) Disposal Method No. 2 – Waste Site

(Special Provision)

Supplement

No waste site has been provided for the disposal of excess or excavated materials. The Contractor shall make his or her own arrangements for obtaining wastes sites in accordance with Section 2-03.3(7)C of the Standard Specifications and these Technical Specifications. All costs involved shall be considered **incidental** to and included in the unit contract price for other items in this contract.

2-02 REMOVAL OF STRUCTURES AND OBSTRUCTIONS

2-02.1 Description

(Special Provision)

Supplement

All work associated with removals shall be included in the bid item for “xx-inch D.I. Class 52 Water Main” unless specifically covered under a separate bid item. Only items listed in the bid proposal as being measured and paid as unit costs shall be specifically measured for payment.

2-02.3 Construction Requirements

(Special Provision)

Supplement

Existing trees, landscaping and plantings, utility boxes, signs, meters, bollards, mailboxes, posts, etc. located near the construction which conflict with the work shall be removed and replaced, or relocated, in a manner satisfactory to the Engineer to allow for construction, **incidental** to the work (unless a bid item for the work is included in the corresponding Bid Schedule).

2-02.3(3) Removing Pavement, Sidewalks, Curbs, and Gutters

(Special Provision)

Supplement

Asphalt pavement shall be milled in such a fashion to form a neat break line. Cement concrete driveways and walkways that need to be removed shall be vertically sawcut full depth with straight, uniform edges, unless otherwise noted on the Plans.

2-02.3(3)1 Removing Asphalt Concrete Pavement

(Special Provision)

New Section

Existing asphalt concrete pavement shall be removed at the locations shown in the Plans and where designated by the Engineer. This work shall be performed where shown in the Plans in accordance with Section 2-02.3(3) of the Standard Specifications and these Technical Specifications.

Removal shall be accomplished by milling along the boundaries of the area to be removed. Milling shall be accomplished as previously specified with a self-propelled machine capable of cutting to a twelve (12) inch depth and approved by the Engineer. The use of pneumatic hammers or punches will not be permitted.

Care shall be taken in removing the pavement not to damage any of the existing pavement that is to remain in place. Any remaining asphalt concrete pavement damaged due to the Contractor's operations shall be replaced by the Contractor, to the satisfaction of the Engineer at the Contractor's expense.

Removal shall be accomplished using an asphalt milling attachment that grinds the asphalt pavement in place as approved by the Engineer. The Contractor shall submit a proposed plan to the Engineer for approval for asphalt removal. The plan shall identify the equipment and methods to be used for the removal and disposal of the pavement. The pulverized pavement may be used as trench backfill material in the area above the pipe zone and 12” below the asphalt path as approved by the Engineer.

2-02.3(3)4 Removing and/or Resetting of Miscellaneous Items

(Special Provision)

New Section

The Contractor shall remove and/or reset miscellaneous items as described in the Plans and as necessary to satisfactorily complete the work. The items requiring resetting shall be protected from damage during removal as far as is practical. If in the opinion of the Engineer an item requires replacement due to the Contractor's negligence it shall be replaced in kind at the Contractor's expense.

2-02.3(3)5 Sawcutting and Milling

(Special Provision)

New Section

All asphalt pavements in the roadway to be removed and/or restored shall be milled. All concrete curbs, gutters, sidewalks and driveways to be removed shall be sawcut where removals abut other pavement to remain or shall be removed to an existing construction joint. For the purposes of this Contract, all sawcutting and all milling necessary to satisfactorily remove items listed above shall be considered **incidental** to and included in the various bid items and no additional payments will be made. All sawcutting and milling necessary to install new improvements shall be considered **incidental** to unit contract price of the type and size of material installed.

The Contractor shall include in the various other bid items all costs necessary to provide milling as required by the Standard Specifications and these Technical Specifications.

The Contractor shall be responsible for ensuring that special precautions are undertaken so that no concrete or concrete by-products, or products and by-products used in the sawcutting of concrete or milling of asphalt are discharged into any storm drain or surface water system.

In accordance with the Department of Ecology guidelines, wastewater from Portland Cement Concrete, masonry, and asphalt concrete cutting operations shall not be discharged to storm drainage systems or surface waters. Cutting operations increase the pH of wastewater; therefore filtering prior to discharge is not acceptable.

To thoroughly clean sawcuts where necessary, the Contractor shall use high pressure water (high pressure water is considered greater than 1400 psi).

All wastewater shall be collected using a wet-dry vacuum or pumped into drums for disposal. Impervious surfaces contaminated with sediment and grit from cutting or milling operations shall be cleaned by sweepers to prevent contaminants from entering the storm drainage system or surface waters when it rains.

Collection of wasted water with vacuum system, and pollution control shall be considered **incidental** to and included in the unit contract price for associated removal bid items, which require sawcutting or milling.

2-03 ROADWAY EXCAVATION AND EMBANKMENT

2-03.1 Description

(Special Provision)

Supplement

For the purposes of this contract, Roadway Excavation Including Haul required for roadway widening shall not be measured and shall be **incidental** to other items in the Contract.

2-03.3 Construction Requirements

2-03.3(7) Disposal of Surplus Material

(Special Provision)

Supplement

All costs in connection with hauling surplus materials to a disposal site will be considered **incidental** to the various bid items of the project and no additional compensation will be made.

2-03.3(7)C Contractor-Provided Disposal Site

(Special Provision)

Supplement

No waste site has been provided by the City for the disposal of material and debris. The Contractor shall make all arrangements, at Contractor's expense, for the disposal of waste materials and shall protect the City from any and all damages arising therefrom.

2-04 HAUL

2-04.1 Description

(Special provision)

Supplement

In reference to the term "haul" as used in Section 2-04 and Section 2-09.3(1)D of the Standard Specifications, all costs and expense involved in haul will be considered **incidental** to the unit contract prices of the bid items and no additional compensation will be made.

2-06 SUBGRADE PREPARATION

2-06.1 Subgrade Preparation

(Special provision)

Supplement

Subgrade preparation shall include preparing roadbeds, curbs, curbs and gutters, sidewalks, driveway approaches, driveways, or any other permanent hard surface improvement for base material or final surfacing.

2-06.3 Construction Requirements

(Special provision)

Supplement

Compaction of the subgrade shall be considered **incidental** to and included in the unit contract prices of other items in the contract, and all costs thereof shall be included by the Contractor in other pay items. The subgrade shall be shaped and maintained to drain at all times during construction, including temporary ditches, and modifications to drainage structures necessary to eliminate standing water on the subgrade.

During the period of subgrade exposure local traffic will be allowed on the subgrade. All costs of protection of the subgrade, including replacement of damaged or contaminated suitable material, shall be considered **incidental** to and included in the unit contract prices for other items in the contract.

2-09 STRUCTURE EXCAVATION

2-09.3(1)E Backfilling

(Special Provision)

Supplement

Controlled Density Fill (CDF) shall be used at all utility crossings in which there is less than 18-inches of vertical separation between the new main or hydrant lead and the existing utilities. CDF may also be required at additional locations as determined by the Inspector or Engineer.

The area backfilled with CDF shall be covered with steel plates until the CDF has sufficient time to cure as determined by the Inspector or Engineer. Plates shall be ramped with temporary hot mix asphalt to provide a smooth transition to the existing pavement.

2-11 TRIMMING AND CLEANUP

2-11.3 Construction Requirements

(Special provision)

Supplement

The Contractor shall take every possible precaution to preserve the existing improvements to remain. All damages to existing improvements from the Contractor's operation, whether within the road right of way or in private property, shall be the sole responsibility of the Contractor to remedy. All such areas shall be restored to their preconstruction equivalent to the satisfaction of the Owner.

All areas disturbed by the Contractor shall be smoothed, finished, cleaned, and dressed to appear uniform in all respects in accordance with Section 2-11 of the Standard Specifications.

**DIVISION 3
PRODUCTION FROM QUARRY AND PIT SITES AND STOCKPILING**

3-01 PRODUCTION FROM QUARRY AND PIT SITES

3-01.4 Contractor Furnished Material Sources

(Special Provision)

Supplement

If the source of materials provided by the Contractor necessitates hauling over roads other than City streets, the Contractor shall at his or her own expense make all arrangements for the use of haul routes.

**DIVISION 4
BASES**

4-04 BALLAST AND CRUSHED SURFACING

4-04.2 Materials

(Special Provision)

Supplement

Add the following:

Crushed surfacing shall meet the requirements of section 9-03.9(3) of the Standard Specifications.

**DIVISION 5
SURFACE TREATMENTS AND PAVEMENTS**

5-04 HOT MIX ASPHALT

5-04.2 Materials

(Special Provision)

Supplement

The grade of paving asphalt shall be Commercial HMA Class B unless otherwise directed by the Engineer.

5-04.3(5)F Thickened Edges and Berms

(Special Provision)

New Section

Where existing thickened edges or berms are disturbed or as directed by the Engineer, the Contractor shall reconstruct thickened edges and berms to match the existing condition, without changing any existing drainage patterns.

Reconstruction of thickened edges, berms, and asphalt transitions will be paid for under the bid item for "Hot Mix Asphalt (HMA) Class B Trench Patch".

5-04.3(5)G Incidental Uses for HMA

(Special Provision)

New Section

Incidental uses for hot mix asphalt shall consist of adjustment to utilities, adjustment to paved areas such as the back of sidewalks, sidewalk ramps, behind driveway approaches, feathering joints and other such uses as directed by the Engineer.

Incidental uses for HMA shall be measured and paid as "Hot Mix Asphalt (HMA) Class B Trench Patch".

5-04.3(5)I Asphalt Speed Hump

(Special Provision)

New Section

Any existing Speed Humps that are disturbed shall be replaced to match the existing condition using Hot Mix Asphalt (HMA) Class B.

5-04.3(7)A Mix Design

(March 17, 2008 APWA GSP)

New Section

Section is deleted and replaced with:

1. General. Prior to the production of HMA, the Contractor shall determine a design aggregate structure and asphalt binder content in accordance with WSDOT Standard Operating Procedure 732. Once the design aggregate structure and asphalt binder content have been determined, the Contractor shall submit the HMA mix design on DOT form 350-042 demonstrating the design meets the requirements of Sections 9-03.8(2) and 9-03.8(6) of the Standard Specifications. Verification of the mix design by the Contracting Agency is not needed. The Project Engineer will determine anti-strip requirements for the HMA.

The mix design will be the initial Job Mix Formula (JMF) for the class of mix. Any additional adjustments to the JMF will require the approval of the Project Engineer and may be made per Section 9-03.8(7) of the Standard Specifications.

2. Non Statistical Evaluation. Non statistical acceptance will apply to all HMA not designated as Commercial HMA in the contract documents. Non statistical acceptance testing will be conducted as outlined in 5-04.3(8)A.
3. Commercial Evaluation. Where Commercial HMA is allowed it can be accepted by a Manufacturer's Certificate of Compliance stating the material meets the requirements in the contract. Where HMA Commercial is used for the traveled way, a minimum of one acceptance test to verify gradation, fracture, sand equivalent, and oil content is required in addition to the Manufacturer's Certificate of Compliance.

5-04.3(8)A Acceptance Sampling and Testing – HMA Mixture

(March 17, 2008 APWA GSP)

New Section

Items 1 & 2 are deleted and replaced with:

1. General. Acceptance of HMA shall be as provided under nonstatistical or commercial evaluation.

Sampling of HMA for nonstatistical evaluation will be as discussed in WSDOT Standard Specifications for Road, Bridge, and Municipal Construction, 2012 edition, Section 5-04.3(8)A, sections 3 through 6.

Commercial evaluation will be used for Commercial HMA and other classes of HMA as allowed by the contract. Commercial HMA may be used for amounts of HMA less than 2500 tons in any application. Testing beyond that specified in 5-04.3(7)A, item 3 for Commercial HMA will be at the discretion of the engineer. Anti-strip additive, where required, will be verified and documented by the engineer.

2. Aggregates. The acceptance criteria for aggregate properties of sand equivalent, voids in mineral aggregate (VMA), fracture and gradation will be their conformance to the requirements of Section 9-03.8(2) the Standard Specification, 2012 edition.

5-04.3(8)A Acceptance Sampling and Testing – HMA Mixture

(March 17, 2008 APWA GSP)

Deleted Section

Item 4, second paragraph is deleted.

5-04.3(8)A Acceptance Sampling and Testing – HMA Mixture

(March 17, 2008 APWA GSP)

Deleted Section

Item 7 is deleted.

5-05 CEMENT CONCRETE PAVEMENT

5-05.3 Construction Requirements

(Special Provision)

Supplement

This item is intended to cover the work of replacing and repairing existing cement concrete driveways that are damaged during construction to relocate water services. The contractor is to match the existing driveway thickness with new cement concrete driveway replacement. The extent of the driveway repair area shall be as determined with the Inspector in the field.

**DIVISION 7
DRAINAGE STRUCTURES, STORM SEWERS, SANITARY SEWERS, WATER MAINS, AND CONDUITS**

7-00 GENERAL MATTERS

7-00.1 General

(Special Provision)

Contractor submittal of Traffic Control Plans is required for the Right-of-Way Use Permit which must be obtained by the Contractor prior to the start of any work on the City's public Right-of-Way. No fees will be charged to the Contractor for the Right-of-Way Use Permit. The Traffic Control Plans should detail how traffic is to be directed or rerouted. The plans shall include maps showing detour routes, signing, barricades, and flagging personnel.

The Contractor shall pay a deposit at the Development Services Group counter and pick up a hydrant meter with backflow device from the City maintenance shop warehouse prior to the start of construction. All water used for construction shall be obtained through the meter. The undamaged meter apparatus shall be returned to the City maintenance shop warehouse at the end of construction.

The following addresses and telephone numbers of utility companies known or suspected of having facilities within the project limits are supplied for the Contractor's convenience:

City of Mercer Island (Water & Sewer)
9611 SE 36th Street
Mercer Island, WA 98040
Attention: Terry Smith
(206) 275-7812

Comcast Cable
14870 NE 95th Street
Redmond, WA 98052
Attention: David Burrows
(425) 867-7433

Puget Sound Energy (Gas & Power)
PO Box 97034 EST - 11W
Bellevue, WA 98009-9734
Attention: Kathy Johnson
(425) 462-3381

Century Link
1208 NE 64th Rm 402
Seattle, WA 98115
Attention: Jennifer Gorman
(206) 346-6537

The Contractor shall give seventy-two (72) hours notice to all utility companies/agencies involved where work is to take place and in all other respects comply with the provisions of Chapter 19.122 RCW.

For the convenience of the Contractor, the Plans show approximate locations of various existing utilities and other obstructions. This information, if shown, has been obtained from records and cannot be guaranteed accurate. The Contractor shall diligently check for interferences with existing utilities ahead of his or her work including exploration in advance of excavation.

The Contractor is further alerted to the provisions of RCW 19.122 and his or her responsibilities by performing excavation required by the Contract Documents and Standard Specifications.

Structure Excavation Class B Including Haul for the installation and/or removal of underground utilities, pipes, and structures shall be considered **incidental** to and included in the structure installed or removed.

7-08 GENERAL PIPE INSTALLATION

7-08.1 Description

(Special Provision)

Supplement

Material excavated shall not be used as backfill and shall be hauled away and wasted at the Contractor's expense.

Trench excavation shall be considered **incidental** to and included in the unit contract price for pipe. Bedding, backfill and compaction will be paid under the Crushed Surfacing Top Course bid item, as 100% import is required for this project. Trench shall be excavated to a sufficient width to allow for pipe installation, compaction equipment, and shoring when necessary. Paving width shall be as shown on the City Standard Detail. No additional payment will be made for excavation and backfill of additional trench widths beyond the maximum trench width (nor for related quantities such as bedding, paving, imported backfill, rock excavation, etc.) unless extra trench width has been specifically directed by the City Inspector.

Contractor shall pothole ahead of pipe-laying as outlined in Section 7-09.3(7) herein to make vertical adjustments as necessary to avoid existing utilities. Should the Contractor fail to pothole known utility crossings, any subsequent adjustments necessary shall not be cause for additional cost or time claim.

All construction shall conform to these Specifications, to the lines, limits and grades shown on the drawings and as designated by the Engineer. Backfill shall be compacted to 95% dry density. Line and grade shall be provided by the Contractor.

Trenches shall be backfilled to grade and paved with a temporary trench patch (if required – see 7-08.3(1)A herein) at the end of each working day. Steel plates may be used only for pre-digging connections or when CDF is required for backfill. The edges of the plates shall be ramped with temporary hot mix asphalt to provide a smooth transition to the existing pavement.

7-08.2 Materials

(Special Provision)

Supplement

Aggregates for foundation material, pipe zone bedding, pipe zone backfill, and trench backfill shall meet the requirements of Section 9-03.9(3) Crushed Surfacing of the Standard Specifications.

7-08.3 Construction Requirements

7-08.3(1)A Trenches

(Special Provision)

Supplement

All trenches within the roadway area shall be backfilled with 5/8" minus crushed surfacing top course material that meets the requirements of 9-03.9(3) of the Standard Specifications.

Backfilled trench surfaces on Island Crest Way, SE 40th Street and 85th Avenue SE shall be patched at the end of each working day with a 2" minimum compacted depth of temporary hot mix asphalt and maintained level with the existing grade until final surface restoration is completed. Backfilled trench surfaces on all other streets shall be backfilled to the top of the existing grade with 5/8" minus crushed surfacing top course at the end of each working day. The trench shall be patched at the end of each week with a 2" minimum compacted depth of temporary hot mix asphalt. The trench surface shall be kept reasonably smooth, free from ruts and potholes, and suitable for normal traffic flow. Temporary trench patches must be continually maintained by the Contractor at his expense.

Any such temporary patching and continuing maintenance of patching shall be incidental to the work and no additional payment shall be made.

7-08.3(1)B Shoring

(Special Provision)

Supplement

Shoring design shall be the responsibility of the Contractor. No implication of methods, means or materials is implied within the Plans.

7-08.3(1)C Bedding the Pipe

(Special Provision)

Supplement

If foundation material at the base of structure excavation is unsuitable, it shall be removed and replaced with compacted crushed surfacing top course. Care must be taken to hand tamp under mains, corporation stops and services.

Gravel backfill for pipe bedding indicated on the Plans shall be in accordance with Section 9-03.9(3) Crushed Surfacing of the Standard Specifications.

7-08.3(3) Backfilling

(Special Provision)

Supplement

Select trench backfill material shall be:

Crushed Surfacing Top Course 9-03.9(3)

All trenches shall be backfilled with select materials.

7-08.3(2)F Plugs and Connections

(Special Provision)

Supplement

Plugging Existing Pipe

Plugging existing utility pipe and structures shall be considered **incidental** to and included in the unit contract price of the various bid items in the contract.

7-08.5 Payment

(Special Provision)

Supplement

All costs associated with furnishing and installing bedding material and meeting these General Pipe Installation Requirements shall be considered **incidental** to and included in the unit contract price for the type and size of pipe installed.

7-09 WATER MAINS

7-09.2 Materials

(Special Provision)

Supplement

Pipe and fittings larger than 2 inch shall be of Ductile Iron construction, unless otherwise shown on the plans. Only domestic made ductile iron and steel materials are allowed.

Ductile Iron Pipe Fittings shall be per Section 9-30.2(2) of the Standard Specifications.

Valves 2 inches and larger shall be M & H Valves meeting AWWA C-515 and Kennedy Valves meeting AWWA C-509.

Replace the first sentence of paragraph 2 with the following: If requested by the Owner, the pipe manufacturer shall test all pipe and fittings as required by these Standard Specifications and the standards referenced.

Aggregates for foundation material, pipe zone bedding, pipe zone backfill, and trench backfill shall meet the requirements of Section 9-03.9(3) Crushed Surfacing of the Standard Specifications.

7-09.3(5) Grade and Alignment

(Special Provision)

Supplement

Replace the first sentence of the third paragraph with the following:

The depth of trenching for the water main shall be a minimum of 3 feet of cover, unless superseded by graphically showing more or less cover in the plan and profile drawings. Additionally, the Contractor shall pothole in accordance with Section 7-09.3(7) such that grade changes can be made so that hydrants can be installed without using vertical bends on the hydrant run to cross existing utilities.

7-09.3(7) Trench Excavation

(Special Provision)

Supplement

Costs for trenching shall be incidental to other bid items. Trench shall be excavated to a sufficient width to allow for pipe installation, compaction equipment, and shoring when necessary. Pay width shall be as shown on the City Standard Detail. No additional payment will be made for excavation of trench widths beyond these pay limits (nor for related quantities such as bedding, paving, import backfill, rock excavation, etc.) unless extra trench width has been specifically directed by the City Inspector.

(Special Provision)

Supplement

When proposed water mains or proposed fire hydrant laterals cross existing utilities and water mains the Contractor shall pothole to locate the existing utilities. Potholing of existing utilities and water mains must be performed at a minimum 150 feet in advance of installing the proposed water main to maintain positive slope and three (3) feet minimum cover. Failure to pothole at least 150 feet in advance of the proposed water main installation may result in the Contractor having to remove and reinstall the newly placed water main at his own expense. Potholing of the existing mains shall be paid per the lump sum bid price.

Potholing may also be required to locate other utility services such as water, sanitary sewer, storm drainage, gas, electrical, telephone, fiber optic and cable television, and shall be considered incidental and no payment shall be made.

Underground utilities are shown in the approximate location. There is no guarantee that all utility lines are shown, or that the depth, location, size and material is accurate. Existing water service lines shall be assumed to be un-locatable because they generally lack tracer wire. City staff will mark the service only to alert the Contractor of its presence. The Contractor shall exercise extreme caution when locating services. Services broken or damaged shall be repaired immediately. The Contractor shall uncover all indicated piping where crossing, interferences, or connections occur prior to trenching or excavation for any pipe or structures, to determine actual depth, locations, size and material. The Contractor shall make the appropriate provision for protection of said facilities. The Contractor shall notify One Call at 1-800-424-5555 two business days in advance and arrange for field location of existing facilities before construction.

Each pothole shall be milled and restored with hot mix asphalt to allow for safe passage by vehicles and pedestrians by the end of the working day.

After potholing and before constructing the ductile iron water main between Stations 13+50 and 14+32 (on Plan sheet WA-04), and 55+50 and 56+34 (on Plan sheet WA-09), the Contractor shall provide a list of stations and depths of all crossing utilities to the construction inspector, so that the City may consider whether to allow or require, at its sole discretion, an alternative alignment through these utilities. Crew downtime, if any, is incidental.

Contractor is not to grind asphalt or excavate through traffic loops until the traffic signal has been put on temporary video detection by the City.

7-09.3(10) Backfilling Trenches

(Special Provision)

Supplement

Backfilled trench surfaces on Island Crest Way, SE 40th Street and 85th Avenue SE shall be patched at the end of each working day with a 2" minimum compacted depth of temporary hot mix asphalt and maintained level with the existing grade until final surface restoration is completed. Backfilled trench surfaces on all other streets shall be backfilled to the top of the existing grade with 5/8" minus crushed surfacing top course at the end of each working day. The trench shall be patched at the end of each week with a 2" minimum compacted depth of temporary hot mix asphalt. The trench surface shall be kept reasonably smooth, free from ruts and potholes, and suitable for normal traffic flow. Temporary trench patches must be continually maintained by the Contractor at his expense.

Any such temporary patching and continuing maintenance of patching shall be incidental to the work and no additional payment shall be made.

7-09.3(19)A Connection to Existing Mains

(Special Provision)

Supplement

Connection L shall be completed prior to installing new water main.

No shutoff of mains will be permitted on Mondays, Fridays, overnight, over weekends, holidays, or the day before or after holidays, unless otherwise authorized by the Engineer.

The Contractor shall verify existing pipeline material, size, outside diameter, and location prior to starting connections to the existing water system.

The Contractor will conduct all work related to existing asbestos cement pipe in strict accordance with current WISHA safety regulations and provisions contained within WAC 296-62-077. All costs related to work in compliance with established rules and regulations shall be the responsibility of the Contractor. Removal of existing asbestos cement pipe from the ground, if required, will be permitted only after the proper permits are obtained from the Puget Sound Air Pollution Control Agency. The Contractor will be responsible for all associated fees and permits required for asbestos removal and disposal. The contractor shall provide work crews with proper protective clothing and equipment.

All materials and equipment (including emergency equipment) necessary to expedite the tie-in shall be on hand prior to the shutdown of existing water service or main.

The Contractor shall replace at his expense any and all existing utilities or structures removed or damaged during construction which were to remain.

The City will notify affected residents in advance, perform the shutdown and recharge the water main.

7-09.3(19)B Maintaining Service

(Special Provision)

Supplement

The Contractor shall schedule, cause, and control all work which requires shutdown of the existing water system and services to be performed and completed so that the shutdown is no longer than six (6) hours in duration. Whenever a shutdown exceeds six (6) hours in duration the Contractor shall provide temporary service. Water main shutdowns shall be scheduled from 9:00 am to 3:00 pm, Tuesday - Thursday.

Shutdown of existing water lines will be performed only by the City and upon request to the Engineer. Shutdown of service shall be planned in detail with appropriate scheduling of the work and coordination with the Engineer.

Individual water service users shall be notified one (1) week in advance of their service shutoff through door hangers, postcards, or personal contact. The Contractor shall provide two (2) weeks notice to the City when the water main shutdown is scheduled.

7-09.3(21) Concrete Thrust Blocking

(Special Provision)

Supplement

Bedding, blocking, encasement, or slope anchor concrete shall be mixed from materials acceptable to the Engineer and shall have a 30-day compressive strength of not less than 2,500 psi. The mix shall contain five (5) sacks of cement per cubic yard and shall be of such consistency that the slump is between 1 and 5 inches. All concrete shall be mechanically mixed. Blocks shall be left open for inspection. Polywrap is to be used on all bolt and fitting surfaces.

7-09.3(23) Hydrostatic Pressure Test

(Special Provision)

Supplement

The first sentence of the first paragraph is deleted. Paragraphs 4, 5, 6, and 7 are deleted.

The following is added:

All water main connections and appurtenances shall be tested in sections of convenient length under a hydrostatic pressure equal to 250 psi. All pumps, gauges, plugs, saddles, corporation stops, miscellaneous hose and piping, and measuring equipment shall be furnished and operated by the Contractor.

The Contractor, except where otherwise permitted by the Engineer, shall test sections between valves individually. The Contractor shall furnish all labor, materials, and equipment necessary to make the tests, including pressure gauges. Water shall be obtained from the City of Mercer Island in accordance with Section 7-00.1 of these Technical Specifications.

At points where pressure reaction and movement may occur, such as bends, tees, and plugs, the pipe shall be properly blocked or braced. Where permanent blocking is not required, the contractor shall furnish and install temporary blocking and remove it after testing. All costs to Contractor for installing temporary blocking shall be included in the unit bid price for the water main connection.

The test pressure shall be applied at the low end of the section of water main being tested. Air in the pipe shall be vented at all high points.

The hydrostatic test pressure shall be maintained until the Engineer has determined that the section of pipe, valves, and fittings are watertight. If there are no visible leaks without pumping for fifteen (15) minutes and no pressure drop, the main will be accepted as a watertight installation. Defective materials

or workmanship discovered as a result of hydrostatic field test shall be replaced by the Contractor at his expense.

Whenever it is necessary to replace defective material or correct the workmanship, the hydrostatic test shall be rerun at the Contractor's expense until a satisfactory test is obtained.

7-09.3(23)A Testing Extensions From Existing Main

(Special Provision)

Supplement

This section is changed to be as follows:

All new tee cut-ins into existing water mains under this Contract shall be tested independently from the existing system.

Hydrants installed and connected by wet-tapping or hydrants that are merely reset shall be tested per Section 7-09.3(23)C of the Standard Specifications.

7-09.3(24) Disinfection of Water Mains

7-09.3(24)A Flushing

(Special Provision)

Supplement

The last paragraph is changed to be as follows:

The Contractor shall secure a hydrant meter with approved backflow device from the City for obtaining water from the existing system during construction. A deposit of \$2,400 is required for the meter. All water used during construction must be obtained through the hydrant meter and backflow device. The hydrant meter and backflow device must be returned to the City at the end of the Project, after which the City will invoice the Contractor for water usage. Upon payment of the water charges, and after confirmation of no damage to the assembly, the City will return the full deposit to the Contractor.

Prior to placing new water main connections into service, the installed pipes shall be disinfected and flushed with City of Mercer Island water. A satisfactory test result shall be received by the City for the water samples collected after the flushing before the new main is allowed to be connected for service.

Disposal shall be to the sanitary sewer system at a rate of discharge approved by the Engineer. Precautions shall be taken to avoid backsiphonage and/or contamination of the water system (maintain an air-gap between all water discharging to the sewer system). Coordinate the flushing with the City of Mercer Island Maintenance Operations Manager.

7-09.3(24)D Dry Calcium Hypochlorite

(Special Provision)

Supplement

"70%" is changed to "75%".

7-09.3(24)N Final Flushing and Testing

(Special Provision)

Supplement

The following is added:

Ductile iron water pipe and fittings will not be accepted until the water in the pipe during acceptance tests remains free of deleterious tastes and odors. The Contractor shall, at his own expense, provide all necessary labor, equipment, and water for cleaning and flushing until pipe and fittings are acceptable.

The Contractor shall, at his own expense, handle and dispose of flushing water in accordance with current regulations in a manner acceptable to the Engineer. Disposal of chlorinated water shall be to the sanitary sewer system at a rate of discharge approved by the Engineer. Precautions shall be taken to avoid backsiphonage and/or contamination of the water system (maintain an air-gap between all water discharging to the sewer system).

7-09.3(25) Plugging Existing Pipe

(Special Provision)

New Section

All openings of water lines to be abandoned in place and plugged shall be plugged, capped, and/or flanged with a mechanical watertight ductile iron or steel plug, cap, or flange as indicated on the plans. Concrete for plugging pipes shall be Commercial Concrete conforming to Section 6-02 Concrete Structures of the Standard Specifications, and in accordance to the Standard Specifications Section 7-08.3(4).

7-12 VALVES FOR WATER MAINS

7-12.1 Description

(Special Provision)

Supplement

Adjusting Water Valves to Grade

Any settling of valve boxes shall be corrected by the Contractor by the end of the warranty period.

Adjusting newly installed water valve boxes to grade shall be **incidental** to the water main installation, water meter installation, air and vacuum assembly, blow off assembly, and/or fire hydrant assembly.

Air and Vacuum Assembly

Air and Vacuum Assemblies shall be constructed as shown on the plans and as indicated on the City of Mercer Island Standard Detail W-25.

7-12.3 Construction Requirements

(Special Provision)

Supplement

The following paragraphs are added:

Valves shall be installed so that the stems are vertical and centered in valve box, unless otherwise directed by the Engineer. Jointing shall conform to AWWA C600. Valves shall be installed in accordance with the details shown. Valves shall be tested with the adjacent pipeline. As specified herein, hydrostatic tests shall be conducted so as to limit the differential pressure across valves to 150 psi. If a valve joint leaks under test, the valve shall be disconnected and reconnected, and the valve and the pipeline re-tested. If valve leaks under test, valve shall be replaced and the new valve and the pipeline re-tested.

Backfill for valve and valve boxes shall be the same as specified for the adjacent pipe. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such manner that will not damage or displace the valve box from proper alignment or grade.

Misaligned valve boxes shall be excavated, plumbed, backfilled and the valve and adjacent pipeline re-tested at the Contractor's expense. A minimum 8-inch overlap between the upper and lower valve boxes will be required to ensure the valve box height can be adjusted during the future overlay.

When abandoning existing gate valves the Contractor is to close the existing valve and remove the valve box and lid to 1 foot below grade. Replace the lid and add PVC marker that reads "Abandoned Gate Valve." Valves from the abandoned water mains shall be removed and return to City storage yard as salvage.

7-12.3(1) Installation of Valve Marker Post

(Special Provision)

Replacement

Replace this section in its entirety.

Where required, generally outside of paved areas, a valve marker post shall be furnished and installed with each valve. Refer to the City Standard Detail.

7-14 HYDRANTS

7-14.1 Description

(Special Provision)

Supplement

This work shall also consist of removing existing hydrants and installing new hydrants per the City of Mercer Island Standard Detail W-24.

7-14.2 Materials

(Special Provision)

Supplement

Pipe and Fittings

Unless otherwise indicated, all pipe and fittings shall be ductile iron in conformance with Sections 9-30.1(1) and 9-30.2(1) of the Standard Specifications, except that the thickness for other than restrained mechanical joint pipe shall be Standard Thickness Class 52. Pipe and fittings shall be double-thickness cement-mortar lined and seal coated with bituminous material conforming to ANSI A21.4 or AWWA C 104 and shall have exterior bituminous coating conforming to ANSI A21.4 or AWWA C 104. US Pipe Ductile Iron Tyton Pipe or approved equal will be accepted.

Pipe joints shall be push-on joints unless otherwise shown or required. The pipe manufacturer shall supply a sufficient quantity of a non-toxic vegetable soap lubricant for installing the pipe.

Mechanical joints shall conform to ANSI A21.11 or AWWA C111. Bolts for mechanical joints shall be Dresserloy or Cor-Ten high strength, low-alloy steel conforming to ASTM A242 and A558. Sigma Mechanical Joint Bolts or approved equal will be accepted.

Flanged joints shall conform to ANSI A21.10 or AWWA C110, or ANSI A21.12 or AWWA C115. Flanges shall be ductile iron. Gaskets for flanged joints shall be 1/8-inch thick, cloth-inserted rubber, conforming to applicable parts of ANSI B16.21 and AWWA C207. Gasket material shall be free from corrosive alkali or acid ingredients and suitable for use in potable water lines. Gaskets shall be one-piece, full-face with holes to pass bolts.

Mechanical joint long-pattern solid-sleeve cast iron fittings shall conform to ANSI A21.10 or AWWA C110. Solid sleeve minimum length shall be twelve (12) inches.

Restrained joints shall conform to Section 9-30.2(6) of the Standard Specifications . For special water main connections where blocking is not viable as determined by the Engineer, the Contractor may use mechanical joint restraints such as Romac Romagrip or approved equal. Coat all bolts and parts with coal tar epoxy.

Hydrants

Unless otherwise indicated on the plans, all hydrants shall be new. There are some hydrants identified on the plans that are to remain in service and be reconnected to the new main. Hydrants shall conform to AWWA C502. Hydrants shall be break-flange or safety-top type. The inlet connection shall be mechanical joint. Nominal 5¼-inch compression type main valve opening with 6-inch bottom connections. Equip with two 2½-inch hose nozzles with American National Standard threads and one 4 ½ -inch pumper port with Seattle style threads and one 4-inch storz quick connection. Operating nut shall be 1½-inch National Standard Pentagon nut. The main valve shall be equipped with O-ring seals and shall open when turned counterclockwise. Acceptable hydrant models are Mueller Superior Centurion and M&H 929T.

Installation of hydrants shall conform to the provisions of AWWA C600. Locate hydrants to provide complete accessibility and to minimize the possibility of damage from vehicles or injury to pedestrians. A minimum 3-foot radius unobstructed working area shall be provided around all hydrants.

Set hydrants plumb and nozzles parallel with, or at right angles, to the curb or roadway, with the pumper nozzle facing the curb or roadway. Set hydrant so that the safety flange is two (2) inches above finished grade and bolts can be removed.

If the hydrant lead is longer than one full length of pipe a mechanical joint sleeve and Romac RomaGrips will be required to connect the pipe sections. Field Lok gaskets will not be allowed.

Place concrete block on firm, level sub-base to assure uniform support. Carefully place hydrant on base block to prevent the base block from breaking. Jointing procedures shall conform to AWWA C600. Strapping lugs shall not be used. After hydrant is in place and connected to the pipeline, place temporary blocks to maintain the hydrant in a plumb position during subsequent work.

Place drain rock and filter fabric around base block and hydrant bottom after hydrant has been blocked in place. Top of the drain rock shall not be less than 6-inches above hydrant drain opening.

After all installation and testing is complete, the exposed portion of the hydrant shall be thoroughly cleaned and painted with two coats of Farwest #250 high gloss white paint per City of Mercer Island Std. Detail W-24.

7-14.3(5) Reconnecting Existing Hydrants

(Special Provision)

Supplement

When reconnecting existing hydrants to a new main, a new tee and 6-inch gate valve shall be installed at the new main. The existing valve shall be removed and returned to the City. All new fittings and pipe are to be restrained joint. Any shackle rods or other joint restraint devices on the existing hydrant run are to be reconnected.

7-14.3(7) Removing Existing Hydrants

(Special Provision)

New Section

Existing hydrants shall be removed to the connection at the existing main. If the existing hydrant valve is not flanged to the existing hydrant tee, removal of the hydrant will require a shutdown of the existing main. The Contractor shall provide two (2) weeks notice to the City when the water main shutdown is scheduled. The Contractor is to have both 4-inch and 6-inch flanged and mechanical joint caps onsite prior to shutting down water system.

The hydrant shall be removed to the main by installing a plug and blocking (if it does not require a shutdown), or by cutting out the tee and providing spools and sleeves in place of the removed pipe and fittings (if it does require a shutdown). The City will notify affected residents in advance, conduct the shutdown and recharge the water main.

7-15 SERVICE CONNECTIONS

7-15.1 General

(Special Provision)

Supplement

This work consists of installing new water meters, constructing the new water services and reconnecting to the existing water service, and disconnecting and abandoning existing water service connections, all as shown on the Plans. If water meters are to be replaced, they will be provided by the City to the Contractor unless otherwise noted on the plans. Radio-Read meters, supplied by the City, shall be installed by the Contractor on all services on Island Crest Way. The City will crimp wires on the Radio-Read meters after the Contractor installs the Radio-Read meter. Water meter boxes are to be provided by the Contractor unless the existing box is to remain as noted in the water service tables on the plans.

Several water services are indicated on the plans to have a PRV installed behind the meter. A separate meter box will be required for the PRV per City of Mercer Island Standard Detail W-28. The Contractor shall set the PRV to match existing service pressure by placing a pressure gauge on the hose bib prior to transferring service.

7-15.2 Materials

(Special Provision)

Supplement

Materials

Water valve boxes shall be Olympic Foundry #VB940 or equal.

Materials for installation of new service connections shall conform to the following:

- Gate valves and valve boxes shall conform to Section 7-12.2 with insulated couplings.
- Brass fittings and copper pipe shall be used from the water main to the water meter.
- Brass fittings and nipples shall use TFE thread seal tape.
- The potable portion of the water system shall contain a maximum weighted average lead content of 0.25% in accordance with the Reduction of Lead in Drinking Water Act, effective January 4, 2014.
- Meter boxes shall be per City of Mercer Island Std. Detail W-18A.

All removed water meters, setters, valves, and other metal hardware removed from the job site should be returned to the City storage yard as salvage.

Valves

Gate valves shall be iron body, bronze-mounted, double-disc, parallel seat, NRS valves with O-ring seals and shall open when the stem is rotated counterclockwise. Valves shall have two (2) inch square wrench nut. Joint materials shall conform to AWWA C110. Valves shall be Mueller A2380 conforming to AWWA C500 or M & H epoxy coated resilient seat gate valves conforming to AWWA C509 and C550.

Valve boxes shall consist of cast iron top section, cover, and lower section manufactured by Olympic Foundry, Inc. Seattle, Washington. The top section shall be Model VB2C and shall have an overall length of eighteen (18) inches. The cover shall be Model VB2A and shall have ears and the word WATER cast in the top. The lower section shall be Model VB1C and shall have a minimum length of twenty-four (24) inches. No other manufacturer's type will be approved.

Valves shall be installed so that the stems are vertical, unless otherwise directed by the Engineer. Jointing shall conform to AWWA C600. Valves shall be tested at the same time as the adjacent pipeline. Hydrostatic tests shall be conducted so as to limit the differential pressure across valves to 150 psi. If a valve joint leaks under test, the valve shall be disconnected and reconnected and the valve and the pipeline re-tested. If a valve leaks under test the valve shall be replaced and the new valve and pipeline re-tested.

Backfill for valve and valve boxes shall be the same as specified for the adjacent pipe. Place backfill around the valve boxes and thoroughly compact to a density equal to that specified for the adjacent trench and in such a manner that will not damage or displace the valve box from proper alignment or grade.

Misaligned valve boxes shall be excavated, plumbed, backfilled, and the valve and adjacent pipe retested at the Contractor's expense.

7-15.3 Construction Requirements

(Special Provision)

Supplement

Construction

The water main shall be tapped using a tapping machine by experienced workers using tools in good repair with proper adapters for the size of the main being tapped. Do not place any service tap within two (2) feet of a pipe joint or another service tap.

The minimum depth of cover to the installed water service connection shall be thirty (30) inches from the final surface. Backfill for the service connection shall be as specified for water lines.

Maintain existing services until the new service connections (completed up to the curb stop) are tested, disinfected and flushed. Upon satisfactory waterline testing and receipt of satisfactory lab report, complete the water meter installation and connection to the existing private service line. Where required, disconnect the existing service by turning off the corporation stop at the waterline connection.

Backfill for disconnecting existing service shall be the same as specified for the new service.

Set meter boxes on firm compacted gravel backfill and adjust to finished grade. In traffic areas set meter box on concrete blocks that bear on compacted gravel. Meter dial must be centered under the reading lid. Boxes must be perpendicular to the street.

1-Inch services shall have a new 1-inch setter, except for those specified in the water meter tables on the plans. For existing $\frac{3}{4}$ -inch and $\frac{5}{8}$ -inch services, the Contractor shall use a meter adapter to maintain the 1-inch meter laying length, install existing meter, or a new meter provided by the City. For reconnecting at existing setter, all components within the meter box shall not be replaced. If the new water service requires a PRV, a 1-inch PRV shall be installed and the Contractor shall use adapters to connect to smaller lines on the customer side of the water service.

1 $\frac{1}{2}$ -Inch services shall have a new 2-inch service line from the new watermain and reconnect to the existing meter at the reducers (2" x 1-1/2") location per City of Mercer Island Std. Detail W-14. The existing valve shall be reused. All components within the meter box shall not be replaced.

2-Inch services shall have a new 2-inch service line from the new watermain and reconnect to the meter setter per City of Mercer Island Std. Detail W-14A. The existing valve shall be reused. All components within the meter box shall not be replaced.

While trench details for water services show open cuts, the City will require all long side services on Island Crest Way to be bored. All other services are allowed as open cuts but can be bored if the Contractor chooses to do so. All other provisions of the specifications shall apply and no additional payment will be

made beyond the unit price bid for the respective water service. Contractor shall verify all existing utility locations and repair any damaged utilities at their expense.

**DIVISION 8
MISCELLANEOUS CONSTRUCTION**

8-01 EROSION CONTROL AND WATER POLLUTION CONTROL

8-01.1 Description

(Special Provision)

Supplement

The Contractor shall install and maintain all temporary and permanent erosion control measures and Best Management Practices (BMP's) in accordance with the Plans, Standard Specifications, Technical Specifications, permit conditions, or as directed by the Engineer prior to clearing, grubbing, or grading or as necessary as clearing and grading progress. Such measures shall include, but are not necessarily limited to:

- Erosion and water pollution control for stockpiled materials
- Straw bale check dams
- Straw mulch, netting, and tackifier
- Temporary construction entrance/exit
- Inlet protection on existing and proposed drainage structures
- Reinforced silt fencing
- Plastic covering
- Temporary HMA thickened edge
- Disposal of sediments and materials
- Maintenance of BMPs including in the event of emergencies and as weather and field conditions dictate; and also including installation of additional BMPs which may become required as field and weather conditions evolve.
- Street sweeping and cleaning
- All materials, tools, and equipment necessary to meet these requirements

All disturbed areas shall be hydroseeded except as are designated to be planted. The seeding may be accomplished by approved hand methods when impractical to perform by hydroseeding. The Contractor shall submit the proposed plan for hand seeding to the Engineer for approval five days prior to any seeding.

All sawcutting residue and slurry must be vacuumed immediately behind the sawcut wheel. No sawcut residue shall enter City storm drain fixtures.

Water

The Contractor shall make, at the Contractor's expense, whatever arrangements may be necessary to ensure an adequate supply of water required for erosion control. The Contractor shall also furnish all necessary hose, equipment, attachments, and accessories for the adequate irrigation of planted areas as may be required to complete the work as specified.

8-01.3 Construction Requirements

8-01.3(2) Seeding, Fertilizing, and Mulching

(Special Provision)

Supplement

8-01.3(2)A Preparation for Application

(Special Provision)

Supplement

Seeding

All disturbed areas, which are not otherwise restored, shall be seeded. All areas to be seeded shall be raked or similarly treated so as to provide a smooth, consistent, friable surface, acceptable for seeding as determined by the Engineer.

All areas to be seeded shall be free of all visible clods, rocks, and debris measuring one (1) inch or larger in any dimension. Any exposed tree roots in cut slopes shall be cut neatly and protected, as detailed on the Plans. All costs involved in the seed bed preparation shall be included in the force account price for Property and Landscape Restoration.

8-01.3(2)B Seeding and Fertilizing

(Special Provision)

Supplement

Seeding

Where feasible, the hydroseeding method of application shall be used. A slurry consisting of seed, fertilizer, mulch and water shall be uniformly applied over all unpaved disturbed areas, except planter areas per Plans, within easements and right of way unless directed otherwise. Seed shall be applied at a rate per Section 9-14.2 Seed, of these Technical Specifications.

Hand Seeding

Seed shall be applied at the rate of six (6) pounds per 1,000 square feet. The seed shall be applied by an approved hand held spreader. The seed shall be evenly distributed over the disturbed area. Apply seed after the fertilizer has been accomplished and rake the seed into the surface of the soil to a depth of ¼-inch.

Fertilizing

Fertilizer shall be applied at the rates specified per Section 9-14.3 Fertilizer, of these Technical Specifications. Fertilizer shall be incorporated into the seed, mulch, and water slurry and shall be applied as specified under Seeding.

Liming

Agricultural lime shall be applied to all hydroseeded areas at the rate of 100 pounds per 1,000 square feet.

Hand Fertilizing

Fertilizer shall be applied at the rate of 10 pounds per 1,000 square feet. The fertilizer shall be applied by an approved hand or mechanical method. It shall be raked into the surface soil to a depth of one (1) inch.

8-01.3(2)D Mulching

(Special Provision)

Supplement

Mulch shall be applied at the rate of 2,000 pounds per acre. The Contractor shall follow the manufacturer's recommended quantities of mulch in pounds to the tank capacity in gallons. One thousand (1,000) pounds of mulch shall be included in the slurry of seed, fertilizer and water and applied to the areas to be seeded. The remaining 1,000 pounds of mulch shall be applied in a separate operation immediately following the first application. The force account price for Property and Landscape Restoration shall include two separate applications as specified and no further compensation made.

Hand Mulching

Straw shall be transported to the location site in bales for distribution. Bales shall be broken and the loose straw evenly spread over the hand seeded and fertilized areas to a depth of two (2) inches. Straw mulch shall be placed prior to any netting or tackifier. Each bale shall cover an area not to exceed 100 square feet.

8-01.3(8) Street Cleaning

(Special Provision)

Supplement

The Contractor shall be responsible for controlling dust, sawcutting residue, and mud within the project. The Contractor shall be prepared to use watering trucks equipped with high-velocity water jets and low-head sprinkling devices, power sweepers, and any other pieces of equipment necessary to avoid creating a nuisance. All streets used by the Contractor during the execution of the work under this contract shall be maintained in a clean condition. Any damage caused by dust and/or mud shall be the sole responsibility of the Contractor. In no case shall sediment-laden water be allowed to enter drainage facilities without prior filtration or sedimentation.

The roadway shall be swept daily and as needed. Flushing will not be permitted. Roadway sweeping and cleaning shall be included in the force account price for Additional Temporary Erosion and Sedimentation Control (TESC).

8-01.3(9)D Inlet Protection

(Special Provision)

Supplement

Inlet protection can be in the form of internal devices and shall be installed prior to clearing, grubbing or earthwork activities. Catch Basin inserts shall be installed on all existing and new catch basins that are located within the project.

When the depth of accumulated sediment and debris reaches approximately one-half (1/2) the height of an internal device or one-third (1/3) the height of the external device (or less if so specified by the manufacturers), the deposits shall be removed and stabilized on site.

Catch Basin Inserts

Catch basin inserts shall be installed at all catch basins within project limits and those immediately downstream of the project site that could possibly receive sediment laden runoff from the site. They shall be installed and meet the requirement of the detail in the Plans. Simply placing a piece of geotextile under the catch basin grate is not acceptable.

Catch basin inserts shall be installed, maintained, inspected, and removed per the Standard Specifications and as recommended by the manufacturer. Pre-approved manufactured products include:

- Siltsack by Atlantic Construction Fabrics, Inc. (800) 448-3636

- StreamGuard by Foss Environmental, (800) 909-3677
- Emcom Insert by Emcom NW, (425) 462-1280
- Beaver Dam or Dandy Bag by Dandy Products Inc., (800) 591-2284
- Envirodrain
- Drain Warden, or
- Approved Equal

8-01.3(16) Removal

(Special Provision)

Supplement

Removing Temporary Erosion / Water Pollution Control BMPs

The Contractor shall removal all Temporary Erosion / Water Pollution Control BMPs within twenty (20) days after final slope stabilization, landscape restoration, or after the BMPs are no longer needed. Trapped sediment shall be removed or stabilized on site.

8-01.3(17) Suspension of Work

(Special Provision)

New Section

If at any time during the life of this Contract it becomes necessary, or the Contractor elects to suspend work due to weather conditions, material delivery schedules, or other constraints, it shall be the Contractor's obligation to meet the following requirements:

- The Contractor shall remain obligated to meet the Temporary Water Pollution / Erosion Control requirements of the Plans during any suspension of work.
- The Contractor shall remain obligated to meet the Temporary Traffic Control (both vehicular and pedestrian) requirements of the Plans during any suspension of work.
- The Contractor shall maintain vigilance and maintain a safe project area free of hazards to public safety and shall remedy all hazardous situations immediately.

8-02 ROADSIDE RESTORATION

8-02.1 Description

(Special Provision)

Supplement

All plant materials required by the Plans shall be plant species including plant establishment (PSIPE) per the Standard Specifications.

8-02.2 Materials

(Special Provision)

Supplement

Refer to Section 9-14 Erosion Control and Roadside Planting of these Technical Specifications.

8-02.3(1) Responsibility During Construction

(Special Provision)

Supplement

The Contractor shall locate all underground utilities (both new and existing) prior to starting work and shall not disturb or damage them. The Contractor shall promptly notify the Engineer of any conflict between the proposed work and the obstructions. The Contractor shall be responsible for making any and all repairs for damage, at his own expense.

No flushing will be allowed. At the conclusion of the landscape construction, the Contractor shall remove surplus plant materials and installation debris from the construction site. The project shall be left in a condition acceptable to the Engineer.

8-02.3(2)A Chemical Pesticides

(Special Provision)

Supplement

No chemical herbicides will be allowed in any planting areas.

8-02.3(4)A Topsoil Type A

(Special Provision)

Supplement

Topsoil Type A shall conform to Section 9-14.1(1) Topsoil Type A of the Technical Specifications and shall be supplied by the Contractor's approved source.

Remove all construction debris prior to placing topsoil.

Subgrade will require review and approval by the Engineer prior to the placement of topsoil.

Thoroughly scarify subgrade in tree, shrub, and ground cover areas to a minimum depth of six (6) inches. Scarified subgrade shall be inspected and approved by the Engineer prior to placement of topsoil. Remove all construction debris and rocks over one (1) inch in diameter prior to the placement of topsoil.

Upon approval of the subgrade by Engineer, place Topsoil Type A to depth as indicated and shown on the Plans. Topsoil Type A shall be used in areas indicated for planting as shown on the Plans. Topsoil and subgrade material shall be cultivated to a depth of twelve (12) inches except in tree grate pits. Remove rocks, roots, and debris over one (1) inch in diameter. Lightly compact soil and establish a smooth and uniform finished grade that protects against obstruction to surface drainage and ponding. Materials shall be placed so that after settlement of finished grades the top of the root zone will be flush with the top of sidewalks in lawn areas. For bark mulch areas, finished grade prior to placement of bark shall be one (1) inch below top of sidewalk.

8-02.3(5) Planting Area Preparation

(Special Provision)

Supplement

The costs of removing all excess material and debris shall be included in the force account price for Property and Landscape Restoration.

Preparation for Topsoil Installation

After all planting and seeding areas have been brought to required subgrade, the areas shall be reviewed and approved by the Engineer. Prior to topsoil installation, they shall be cultivated to a depth of six (6) inches unless otherwise specified. Cultivation of the soil shall be done by farm disk, harrow, or other suitable equipment approved by the Engineer. This operation should be done at right angles to the natural flow of

water on slopes unless otherwise directed by the Engineer. All costs and expense incurred in performing the specified work shall be included in the force account price for Property and Landscape Restoration.

Remove all visible rocks, clods, stumps, and debris one (1) inch or larger in any dimension. Any exposed tree roots in cut slopes shall be neatly pruned at the finish subgrade and the cuts treated with an approved sealer.

Placement of Topsoil

Topsoil Type A shall be installed to a minimum six (6) inch compacted depth in all shrub and groundcover areas and as required to bring disturbed areas to finished grade. All hydroseeded areas shall receive minimum two (2) inch depth of Topsoil Type A, or as required to bring subgrade to finished grade. Swale seeded areas shall received compost incorporated into the subgrade as noted on the plans, no topsoil is required.

Finish Grading of Topsoil

Finish grade all topsoil areas removing all rocks, sticks, and other debris one half inch (1/2") or larger in any dimension from the topsoil surface. Rake, float, drag, roll, and perform all necessary operations to produce a firm, smooth surface without depressions and with positive drainage. Finish grades of topsoil shall be one (1) inch, or the specified depth of mulch, below walks, curbs, tops of walls, valve and junction boxes, and driveways, unless otherwise shown on plans or specified. Finish grades shall be reviewed and approved by the Engineer prior to any planting or seeding.

8-02.3(7) Layout of Planting

(Special Provision)

Supplement

The Contractor shall layout plantings as directed by the Engineer.

The Contractor shall place groundcover plantings starting from the perimeter of the planting area and progress to the center. Field adjustments for plant layout shall be approved by the Engineer.

8-02.3(10) Fertilizer

(Special Provision)

Supplement

Fertilizers shall be approved by the Engineer. Trees and shrubs shall be fertilized at a rate of nine (9) tablets per tree, three (3) tablets per 5-gallon shrub or one (1) tablet per 1-gallon shrub or groundcover. Fertilizer tablets (or Paks) shall be considered included in the project and no additional compensation will be made.

8-02.3(11) Bark or Wood Chip Mulch

(Special Provision)

Supplement

Weed-free Bark Mulch shall be placed over all planting beds to a depth no less than three (3) inches. Bark Mulch shall be placed in a minimum 5-foot diameter around trees with a 1-inch gap between the trunk/stem and mulch such that mulch is not in direct contact with the planting. The City may require greater diameter for large-caliper trees. Thoroughly water and hose down plants with a fine spray to wash the leaves of the plants immediately after application.

8-02.3(17) Property Restoration

(Special Provision)

New Section

Roadside planting for property restoration shall consist of fine grading adjacent landscaped areas, placement of additional plant materials, extra seeding or bark mulch, slope restorations, and all other work not currently identified on the Plans, as directed by the Engineer.

The Contractor is specifically reminded that unnecessary damage caused beyond the limits of clearing or construction shall be repaired in like or better condition at the Contractor's sole expense.

8-19 ASPHALT SIDEWALKS

8-19.1 Description

(Special Provision)

New Section

This work consists of replacing existing asphalt sidewalks where water main and water service construction has caused removal or damage to the existing asphalt sidewalk.

8-19.2 Materials

(Special Provision)

New Section

Commercial Grade HMA Class B shall be used unless otherwise directed by the Engineer.

8-19.3 Construction Requirements

(Special Provision)

New Section

Replacement of asphalt sidewalks shall consist of a minimum 2-inch thick layer of HMA compacted to 91% maximum density over crushed surfacing top course backfill compacted to 95%. The exact limits of sidewalk replacement areas shall be determined by the Inspector in the field. Minimum sidewalk replacement area shall be the full sidewalk width by 5 feet long.

8-23 TEMPORARY PAVEMENT MARKINGS

8-23.1 Description

(Special Provision)

Supplement

During construction, the Contractor shall install and maintain temporary reflective tape striping as directed. Temporary striping shall remain in place until permanent lane markings are installed.

8-23.2 Construction Requirements

(Special Provision)

Supplement

The temporary striping shall be left in place until immediately prior to paint stripe or raised pavement marker installation to prevent painting over the tape. Any damage to the roadway surface caused by removing temporary pavement marking shall be repaired at the Contractor's expense.

**DIVISION 9
MATERIALS**

9-14 EROSION CONTROL AND ROADSIDE PLANTING

The materials for Property Restoration shall meet the requirements of Section 9-14 of the Standard Specifications supplemented as follows. Irrigation water shall conform to the provisions of Section 9-25.2 of the Standard Specifications.

9-14.1 Soil

9-14.1(1) Topsoil, Type A (Supplement)

Topsoil Type A shall be two-way soil mix or approved equal, with the following specifications:

Soil mix shall be a mixture of pure compost, and sand, sandy loam or silty sand. The soil shall be high in organic content and comprised of fully composted and mature organic materials. No fresh sawdust or other fresh wood by-products shall be added to extend the volume after the composting process.

Compost shall be 98 percent minimum material derived from the aerobic decomposition of recycled plant waste and/or secondary sewage treatment. It shall be free of viable weed seeds and other plant propagules and shall have a moisture content that has no visible free water or dust produced when handling the material.

Chemical/physical characteristics shall comply with the following:

Screen Size (approx. particle size)	7/16" maximum
Total Nitrogen	.25% minimum
Organic Matter	10% minimum
pH Range	5.5-7.5
Conductivity	5 mmhos/cm maximum

The following are acceptable sources/products for Topsoil:

Pacific Topsoil Environmental Mix, Cedar Grove 2 Way Mix, or approved equal.

9-14.2 Seed (Supplement)

Non-Residential lawns, pastures, and vacant land may be restored with Hydroseed meeting the following requirements:

Hydroseed Mix #1 (Master Lawn Mix) as follows, available from Grass Master, Redmond, WA (425) 867-1117, or approved equal:

<u>Common Name</u>	<u>Volume Percentage</u>
Chewing Fescue	20%
Hard Fescue	10%
Perennial Rye Grass (3 different varieties)	70%

9-14.3 Fertilizer (Supplement)

Fertilizers shall be delivered to job sites, mixed as specified in standard size unopened containers showing weight, analysis, and name of manufacturer. Material shall be uniform in composition, free-flowing, and

suitable for application by mechanical equipment. All fertilizers shall be protected from the weather, particularly moisture, both on and off the job site.

The Contractor shall submit material certification for all fertilizers to the Project Engineer for approval before beginning planting or seeding work.

Fertilizer for initial planting of trees, shrubs and ground covers shall have N-P-K analysis of 4-2-2. Fertilizer shall be slow release, non-burning, contain Nitroform, Frittered Trace Elements (FTE), and MagAmp.

Acceptable product: Agro "Transplanter" or approved equal.

Fertilizer for plant establishment during the 60-day maintenance period shall have N-P-K analysis of 6-10-8 and shall meet the following requirements:

1. 50 percent of nitrogen (N) derived from Nitroform "Blue Chip".
2. 50 percent of potash (K) derived from sulfate of potash-magnesium.
3. Additives, including 2 percent Frittered Trace Elements (FTE) and 0.5 percent Multitracin.

Fertilizer for plant establishment shall have the following sieve analysis:

1. 0 percent retained No. 4 sieve.
2. 65 percent retained No. 20 sieve.
3. 100 percent retained No. 80 sieve.

Acceptable product: Lilly Miller or approved equal.

Fertilizer for hydroseeding shall be as recommended by seed supplier.

9-30 WATER DISTRIBUTION MATERIALS

9-30.2(2) Ductile Iron Fittings

(Special Provision)

New Section

Unless otherwise shown, all pipe and fittings shall be ductile iron in conformance with Sections 9-30.1(1) and 9-30.2(1) of the Standard Specifications, except that thickness class for other than restrained mechanical joint pipe shall be standard thickness class 52 minimum. Pipe and fittings shall be double-thickness cement-mortar lined and seal coated with bituminous material in accordance with ANSI A21.4/AWWA C104 and shall have exterior bituminous coating conforming to ANSI A21.4/AWWA C104.

Pipe joints shall be push-on joints unless otherwise shown or required. A nontoxic vegetable soap lubricant shall be supplied by the pipe manufacturer in sufficient quantities for installing the pipe.

Fitting joints shall be as shown. Mechanical joints shall conform to ANSI A21.11 or AWWA C111. Bolts for mechanical joints shall be Dresserloy or Cor-Ten high-strength, low-alloy steel conforming to ASTM A242 and A558.

Flanged joints shall conform to ANSI A21.10/AWWA C110 or ANSI A21.15/AWWA C115. Flanges shall be ductile iron. Gaskets for flanged joints shall be 1/8 inch thick, cloth-inserted rubber, conforming to applicable parts of ANSI B16.21 and AWWA C207. Gasket material shall be free from corrosive alkali or acid ingredients and suitable for use in potable water lines. Gaskets shall be one-piece, full-face, with holes to pass bolts.

9-30.3(1) Gate Valves (3 Inches to 12 Inches)

(Special Provision)

Supplement

Replace this section in its entirety.

Gate valves shall be iron body, bronze-mounted, NRS valves with O-ring seals, and shall open when the stem is rotated counter-clockwise. Valves shall have 2-inch square wrench nut. Valve ends and valve sizes shall be shown. Joint materials shall conform to AWWA C110. Valves shall be M&H or Kennedy epoxy coated resilient seat gate valves conforming to AWWA C509 and C550.

9-30.3(4) Valve Boxes (Replacement Section)

(Special Provision)

Replacement Section

Valve boxes shall consist of cast iron top section, cover, and lower section manufactured by Olympic Foundry, Inc., Seattle, Washington. The top section shall be Model VB2C and shall have an overall length of 18 inches. The cover shall be Model VB2A and shall have ears and the word WATER cast in the top. The lower section shall be Model VB1C and shall have a minimum length of 24 inches. No other manufacturer's type will be approved.

9-30.3(5) Valve Marker Posts

(Special Provision)

Replacement Section

Replace this section in its entirety. Refer to City Standard Detail.

9-30.3(6) Valve Stem Extensions

(Special Provision)

Replacement Section

Refer to City Standard Detail for additional requirements.

9-30.3(7) Combination Air Release/Vacuum Valves

(Special Provision)

Replacement Section

The air and vacuum release valve assembly shall be constructed to permit the escape of large volumes of air when the waterline is being filled with water so that small amounts of accumulated air will be released under normal operating conditions, and so that air may re-enter the waterline to break any vacuum caused by water suction. The valve shall be designed to operate under working pressure not less than 150 psi and shall have been tested at a pressure not less than 300 psi. Provide test certification if requested by the Engineer.

The air and vacuum release valve shall be a 1-inch combination air and vacuum release valve assembly, Val Matic 101S or approved equal. The inlet and outlet shall have iron pipe threads.

Refer to City Standard Detail W-25 for additional requirements.

9-30.6(1) Saddles

(Special Provision)

Replacement Section

Replace this section in its entirety. Refer to City Standard Details W-13, W-14 and W-14A.

9-30.6(5) Meter Setters

(Special Provision)

Replacement Section

Replace this section in its entirety. Refer to City Standard Details W-13, W-14 and W-14A.

9-30.6(7) Meter Boxes

(Special Provision)

Replacement Section

Replace this section in its entirety.

All new meter boxes for water meters shall be Mid-States plastic meter box with ductile iron lid.

Refer to City Standard Detail W-18A. Refer to City Standard Detail W-28 for PRV meter boxes.

**DIVISION 10
MEASUREMENT AND PAYMENT**

MEASUREMENT AND PAYMENT (Additional Section)

It is the intention of these specifications that the performance of all work under the bid for each item shall result in the complete construction in an accepted operating condition, of each item.

Work and material not specifically listed in the proposal, but required according to the contract plans, specifications, and general practice shall be included in the contractor's bid price. No separate payment of any kind will be made for these incidental items.

The Contract Price shall constitute full compensation for furnishing all plans, labor, equipment, incidentals and materials, applicable sales tax for materials and equipment, and performing all operations required to complete the work, as specified, as shown on the Contract Plans or as otherwise directed. Notwithstanding the omission or mention of any incidental work, the Contract Price and payment shall also constitute full compensation for all work incident or incidental to completion of the item, unless such work is otherwise specifically mentioned for separate payment under another bid item. In the event any work is required by the Specifications or by the Proposal, or which is not directly incident or incidental to the completion of any such item, the Contract Price of all enumerated items shall also constitute full compensation for such work.

Unless a specific bid item for the following work has been provided in the Proposal/Construction Contract, or the work has been specifically included in a bid item, such work shall be considered incidental to and included in the various bid items of work:

- Furnishing Manufacturer's Certificates of Compliance
- Clearing and grubbing
- Protection of existing trees to remain
- Disposal of waste materials
- Haul
- Sawcutting
- Milling pavement
- Watering
- Dust control
- Trimming and cleanup
- Construction Staking
- Maintaining Asbuilt Redlines for Submittal to City
- Pre-construction photographs

No separate or extra payment of any kind shall be made for this work under the Contract.

Mobilization

The lump sum price for "Mobilization" shall cover the complete cost of providing, furnishing, and installing all work and materials necessary to move or organize equipment and personnel onto the site, provide and maintain support facilities, obtain all necessary permits, licenses, and bonds. This bid item is not to exceed seven (7) percent of total bid.

Demobilization

The lump sum price for “Demobilization” shall cover the complete cost of dressing and trimming the project area after construction of improvements and moving all personnel and equipment off the site after contract completion. This bid item is not to exceed three (3) percent of total bid.

Shoring and Trench Safety Systems

The lump sum price for “Shoring and Trench Safety Systems” shall cover the complete cost of furnishing, installing and removing all sheeting, shoring, cribbing and coffer dams necessary to support the trench and excavation walls as specified in the contracts documents and as necessary for the proposed utility work. Partial payments for this bid item will be based on the percentage of main line installed.

Traffic Control Supervisor

The contract unit price per hour for “Traffic Control Supervisor” shall be measured and paid according to 2012 WSDOT Standard Specifications 1-10.4(2) and 1-10.5(2).

Flaggers and Spotters

The contract unit price per hour for “Flaggers and Spotters” shall be measured and paid according to 2012 WSDOT Standard Specifications 1-10.4(2) and 1-10.5(2).

Off-Duty Police Officer for Traffic Control

The contract unit price per hour for “Off-Duty Police Officer for Traffic Control” shall constitute full compensation for all costs associated with having an Off-Duty Police Officer and his police cruiser onsite to assist with traffic control.

Sequential Arrow Sign

The contract unit price per hour for “Sequential Arrow Sign” shall be measured and paid according to 2012 WSDOT Standard Specifications 1-10.4(2) and 1-10.5(2). This item is intended to be measured and paid per hour, during working hours, while the sign is operating.

Portable Changeable Message Sign

The contract unit price per hour for “Portable Changeable Message Sign” shall be measured and paid according to 2012 WSDOT Standard Specifications 1-10.4(2) and 1-10.5(2). This item is intended to be measured and paid per hour, 24 hours per day, for the duration the sign is on the project and operating.

Other Temporary Traffic Control

The lump sum price for “Other Temporary Traffic Control” shall be measured and paid according to 2012 WSDOT Standard Specifications 1-10.4(2) and 1-10.5(2).

The Contractor is reminded that specifically included in the price bid for Other Temporary Traffic Control are all costs for:

- Furnishing, installing, maintaining and removing traffic control, construction warning and detour signs other than sequential arrow signs and portable changeable message signs
- Removing, salvaging, relocating and re-installing existing roadway signs
- Furnishing, installing, maintaining and removing traffic cones, barrels, barricades and the like
- Furnishing, installing, maintaining and removing steel plating, pins, shims and incidentals
- Furnishing, installing, maintaining and removing all temporary pavement markers and markings
- Prepare, revise and implement any traffic control/detour plans required per the Right-of-Way Use permit or the Right-of-Way Use Official. **This includes submitting for a permit to review the traffic**

control plans. Permit fee for the Right-of-Way Use Permit will be paid for by the City, not the contractor.

Potholing

The lump sum price for “Potholing” shall constitute compensation for all costs associated with potholing existing utilities as specified.

xx-inch D.I. Class 52 Water Main

No measurement shall be made for clearing and grubbing, removal of existing street pavement, protection of existing utilities and services, or trench excavation. When listed as separate pay items, other work shall be measured in accordance with the Standard Specification as modified by these specifications.

The Contract Price per linear foot for installing water pipe of the size, type and class specified shall constitute full compensation for all labor, materials and equipment required for:

- Sawcutting
- Milling
- Excavating trench
- Removing and disposing pavement, curbs, gutters, sidewalks and the like
- Trench dewatering (if needed)
- Hauling and disposing of surplus and unsuitable excavated material
- Furnishing and installing water pipe, including restrained-joint water pipe and all incidentals
- Ductile Iron Fittings shown on the Plans
- Deflecting pipe as required to cross over or under buried utilities
- Crossing under existing water, sewer and storm pipes including temporarily supporting the existing pipe
- Placing and compacting temporary HMA patch
- Performing backfill compaction tests and furnishing test reports to the Engineer
- Furnishing and installing concrete blocking and/or Romagrip restraints.
- Testing water mains
- Disinfecting and flushing water mains
- Furnishing, installing and removing a temporary two-inch feeder from the existing main to the new main
- Replacing, protecting and/or maintaining utilities
- All complete in-place, fully operational and ready for use

Furnishing imported pipe bedding and imported trench backfill will be paid for under the specific items set forth in the Proposal/Construction Contract.

Pipe required for Fire Hydrants Assemblies, Water Services, and Connection to Existing Water Mains shall be incidental to those bid items and not paid on a per foot basis.

Additional D.I. Fittings

Ductile iron fittings shown on the Plans shall be considered incidental to the bid item for “xx-inch D.I. Class 52 Water Main”. Measurement and payment for “Additional D.I. Fittings” shall include supplementary

ductile iron fittings determined necessary during the course of construction, as approved by the City Inspector prior to installation. The unit price per pound for “Additional D.I. Fittings” of the size, type, and class specified shall constitute full compensation for all labor, materials and equipment required for the fittings to be complete in-place, fully operational, and ready for use.

Measurement and payment for mechanical joint fittings shall be made on the basis of the ANSI A21.53 published weights for ductile iron compact MJ fittings not including accessories and not including cement linings.

Measurement and payment for flanged fittings shall be made on the basis of the ANSI A21.10 published weights not including accessories and not including cement linings.

Measurement and payment for RomaGrip-type joint restraints shall be made on the basis of the manufacturer’s published weights not including accessories.

Furnishing imported pipe bedding and imported trench backfill will be paid for under the specific items set forth in the Proposal/Construction Contract.

Concrete thrust blocking, shackles, tie rods and other miscellaneous hardware will not be measured for payment and are considered incidental to and included in the price bid for the various items of work.

8-inch Gate Valve Assembly (Located Outside of Connections)

The unit price per each shall be full compensation for furnishing and installing the gate valve assembly per plans and specifications. The price shall include but not be limited to the valve, bricks for support if required, valve box, nut extension, valve marker and appurtenances, milling, excavation, disposal of displaced material, bedding, backfill and compaction, temporary asphalt patch installation and maintenance, testing and cleanup. Measurement and payment shall be based upon the number of gate valves installed. This bid item is only intended for gate valves that are not installed as part of a connection. Gate valves installed as part of the connection detail will be paid under the bid item for the connection.

Install New Fire Hydrant Assembly

The unit price per each “Install New Fire Hydrant Assembly” shall be full compensation for furnishing all materials and installing the fire hydrant assembly. This price includes but is not limited to milling, excavation, dewatering if required, main line tee, 6-inch valve, valve box, pipe, vertical bends as required, thrust restraints, fire hydrant, concrete bearing block, washed rock, geotextile fabric, backfill and compaction, blue reflector in pavement, storz, concrete guard posts if required, flushing, testing, disinfection, painting, removal of existing fire hydrant and any other items not covered in the other bid items. Measurement and payment for this bid item shall be based on each fire hydrant assembly installed.

Install Cut-In Fire Hydrant Assembly

The unit price per each “Install Cut-In Fire Hydrant Assembly” shall be full compensation for furnishing all materials and installing the fire hydrant assembly. This price includes but is not limited to milling, excavation, dewatering if required, main line tee, 6-inch valve, valve box, pipe, sleeves/couplings, vertical bends as required, thrust restraints, fire hydrant, concrete bearing block, washed rock, geotextile fabric, backfill and compaction, blue reflector in pavement, storz, concrete guard posts if required, flushing, testing, disinfection, painting, removal of existing fire hydrant and any other items not covered in the other bid items. Measurement and payment for this bid item shall be based on each fire hydrant assembly installed.

Install New Fire Hydrant Assembly (ICW/44th)

The lump sum price per each “Install New Fire Hydrant Assembly (ICW/44th)” shall be full compensation for furnishing all materials and installing the fire hydrant assembly. This price includes but is not limited to milling, excavation, dewatering if required, thrust restraints, fire hydrant, concrete bearing block, washed rock, geotextile fabric, backfill and compaction, blue reflector in pavement, storz, concrete guard posts if required, flushing, testing, disinfection, painting, removal of existing fire hydrant and any other items not covered in the other bid items.

Note: The hydrant, tee, valve, valve box and 6-inch lead were installed as part of Phase I of this project. It is anticipated the Contractor will install the fire hydrant assembly on the 6-inch lead provided. Any cutting/removing/disposing of existing 6-inch lead, removing and disposing of caps and blocking or other work necessary to install the hydrant shall be included in the lump sum price.

Reconnect Existing Fire Hydrant

The unit price per each “Reconnect Existing Fire Hydrant” shall be full compensation for furnishing all materials necessary to remove and dispose of the existing valve, tee and hydrant lead, furnish new valve, tee, sleeves, hydrant lead and joint restraint, reconnect any existing joint restraint, milling, excavation, dewatering if required, backfill and compaction, blue reflector in pavement, storz, flushing, testing, disinfection, and any other items not covered in the other bid items. Measurement and payment for this bid item shall be based on each fire hydrant assembly reconnected.

Remove Existing Fire Hydrant (Requiring Shutdown)

The unit price per each “Remove Existing Fire Hydrant (Requiring Shutdown)” shall be full compensation for furnishing all materials necessary to remove and return the existing hydrant and fittings to the City to the main including cutting out the existing pipe, valve, tee, any fittings, and blocking, and providing spools, sleeves, joint restraint, milling, excavation, dewatering if required, backfill and compaction, temporary patching and any other items not covered in the other bid items. Measurement and payment for this bid item shall be based on each fire hydrant removal requiring shutdown. Fire hydrant removals not requiring a shutdown shall be considered incidental to the bid item “Abandon Existing Water System.”

Note: The City will notify affected residents in advance, conduct the shutdown and recharge the water main.

Air and Vacuum Release Assembly

The unit price per each “Air and Vacuum Release Assembly” shall be full compensation for furnishing and installing the air and vacuum release assembly per Plans and Specifications. The unit price shall include but not be limited to the milling, excavation, backfill, air and vacuum release valve, connection to the water main, vault, washed gravel, all pipe and fittings, and all appurtenances necessary to provide the air/vac assembly. Measurement and payment shall be per each based upon each complete assembly installed.

Blow-Off Assembly

The unit price per each “Blow-Off Assembly” shall be full compensation for furnishing and installing the permanent blow-off assembly per Plans and Specifications. The unit price shall include but not be limited to the milling, excavation, backfill, all components of the blow-off assembly as shown on the City standard detail, connection to the water main, all pipe and fittings, valve boxes and lids, and all appurtenances necessary to provide the blow-off assembly. Measurement and payment shall be per each based upon each complete assembly installed.

Reconnect SPU Sampling Station

The lump sum price for “Reconnect SPU Sampling Station” shall be full compensation for all work associated with reconnecting the SPU Sampling Station to the 8-inch water main. The lump sum price shall include but not be limited to the milling, excavation, pipe and fittings, connection to the water main, temporary trench patching and all appurtenances necessary to make the connection. The meter box will be paid for under the meter box bid item. The City will provide the meter for the Contractor to install.

1-Inch Water Service, Short Side

The unit price per each for “1-Inch Water Service, Short Side” shall be full compensation for all work to construct each proposed water service connection as shown on the Plans and as specified. This item includes, but is not limited to, exploratory excavation, milling, temporary water service if required, excavation, tapping the main, temporary and permanent valves, corporation stops, pipe and fittings, disconnecting and reconnecting the existing service and abandoning the existing service connection, proposed setter and adapter, proposed water service line, placement and compaction of backfill material,

meter box installation and relocation, miscellaneous materials, testing, flushing, and disinfecting the new service connection complete and operational, and temporary pavement restoration. Measurement and payment shall be per each water service installed.

This item includes the Contractor installing the new or existing water meter and new or existing meter box but does not include the cost of the water meter or the meter box. The City will provide a new meter if needed and provide radio read meters on Island Crest Way, and some meter boxes will be reused. The Contractor will install the meter (new or existing) under this bid item. The City will connect radio read meters to the transmitter after the contractor installs the meter. New meter boxes will be paid for under the specific bid item "Meter Box".

1-Inch Water Service, Long Side

The unit price per each for "1-Inch Water Service, Long Side" shall be full compensation for all work to construct each proposed water service connection as shown on the Plans and as specified. This item includes, but is not limited to, exploratory excavation, milling, temporary water service if required, excavation, tapping the main, temporary and permanent valves, corporation stops, pipe and fittings, all costs associated with boring the service if required, disconnecting and reconnecting the existing service and abandoning the existing service connection, proposed setter and adapter, proposed water service line, placement and compaction of backfill material, meter box installation and relocation, miscellaneous materials, testing, flushing, and disinfecting the new service connection complete and operational, and temporary pavement restoration. Measurement and payment shall be per each water service installed.

This item includes the Contractor installing the new or existing water meter and new or existing meter box but does not include the cost of the water meter or the meter box. The City will provide a new meter if needed and provide radio read meters on Island Crest Way, and some meter boxes will be reused. The Contractor will install the meter (new or existing) under this bid item. The City will connect radio read meters to the transmitter after the contractor installs the meter. New meter boxes will be paid for under the specific bid item "Meter Box".

1-1/2-Inch Water Service, Short Side

The unit price per each for "1-1/2-Inch Water Service, Short Side" shall be full compensation for all work to construct each proposed water service connection as shown on the Plans and as specified. This item includes, but is but not limited to, exploratory excavation, milling, temporary water service if required, excavation, tapping the main, temporary and permanent valves (Contractor to reuse existing valve), corporation stops, pipe and fittings, all costs associated with boring the service if required, disconnecting and reconnecting the existing service and abandoning the existing service connection, proposed water service line, placement and compaction of backfill material, meter box installation and relocation, miscellaneous materials, testing, flushing, and disinfecting the new service connection complete and operational and temporary pavement restoration. Measurement and payment shall be per each water service installed.

This item includes the Contractor installing the new or existing water meter and new or existing meter box but does not include the cost of the water meter or the meter box. The City will provide a new meter if needed and provide radio read meters on Island Crest Way, and some meter boxes will be reused. The Contractor will install the meter (new or existing) under this bid item. The City will connect radio read meters to the transmitter after the contractor installs the meter. New meter boxes will be paid for under the specific bid item "Meter Box".

1-1/2-Inch Water Service, Long Side

The unit price per each for "1-1/2-Inch Water Service, Long Side" shall be full compensation for all work to construct each proposed water service connection as shown on the Plans and as specified. This item includes, but is but not limited to, exploratory excavation, milling, temporary water service if required, excavation, tapping the main, temporary and permanent valves (Contractor to reuse existing valve), corporation stops, pipe and fittings, all costs associated with boring the service if required, disconnecting and reconnecting the existing service and abandoning the existing service connection, proposed water service line, placement and compaction of backfill material, meter box installation and relocation,

miscellaneous materials, testing, flushing, and disinfecting the new service connection complete and operational and temporary pavement restoration. Measurement and payment shall be per each water service installed.

This item includes the Contractor installing the new or existing water meter and new or existing meter box but does not include the cost of the water meter or the meter box. The City will provide a new meter if needed and provide radio read meters on Island Crest Way, and some meter boxes will be reused. The Contractor will install the meter (new or existing) under this bid item. The City will connect radio read meters to the transmitter after the contractor installs the meter. New meter boxes will be paid for under the specific bid item "Meter Box".

2-Inch Water Service, Long Side

The unit price per each for "2-Inch Water Service, Long Side" shall be full compensation for all work to construct each proposed water service connection as shown on the Plans and as specified. This item includes, but is but not limited to, exploratory excavation, milling, temporary water service if required, excavation, tapping the main, temporary and permanent valves (Contractor to reuse existing valve), corporation stops, pipe and fittings, all costs associated with boring the service if required, disconnecting and reconnecting the existing service and abandoning the existing service connection, proposed water service line, placement and compaction of backfill material, meter box installation and relocation, miscellaneous materials, testing, flushing, and disinfecting the new service connection complete and operational and temporary pavement restoration. Measurement and payment shall be per each water service installed.

This item includes the Contractor installing the new or existing water meter and new or existing meter box but does not include the cost of the water meter or the meter box. The City will provide a new meter if needed and provide radio read meters on Island Crest Way, and some meter boxes will be reused. The Contractor will install the meter (new or existing) under this bid item. The City will connect radio read meters to the transmitter after the contractor installs the meter. New meter boxes will be paid for under the specific bid item "Meter Box".

Meter Box

The unit price per each for "Meter Box" shall be full compensation for furnishing a meter box for the services identified on the Plans to receive a new meter box and as specified. Measurement and payment shall be per each meter box furnished.

Meter box installation shall be considered incidental to the various bid items for water services.

Individual PRV

The unit price per each for "Individual PRV" shall be full compensation for furnishing an individual PRV, meter setter and all piping and adapters necessary for the services identified on the Plans. Measurement and payment shall be per each individual PRV installed and calibrated by the Contractor to match the existing water service pressure.

Meter Box (PRV)

The unit price per each for "Meter Box (PRV)" shall be full compensation for furnishing and installing a meter box for the individual PRV where identified on the Plans. Measurement and payment shall be per each meter box furnished and installed.

Connection to Existing System

The lump sum price for "Connection to Existing System" shall be full compensation for the connection of the proposed water main to the existing water system per the Plans and Specifications. The price shall include milling, excavation, dewatering and proper disposal of water, hauling and disposal of excess or unsuitable material, temporary blow offs, temporary backflow prevention apparatus, temporary and permanent pipe, spools, fittings, gate valves, thrust restraints included but not limited to mechanically mixed concrete blocking, Romagrips, gaskets, bolts and other hardware, removal of existing plugs, pipe sterilization, testing, disposal of excess material, backfill, compaction, cutting and capping the existing main, temporary paving

and clean up. Measurement and payment shall be for the entire connection complete in-place, fully operational, and ready for use.

Note: The City will notify affected residents in advance, conduct the shutdown and recharge the water main.

Connection to Existing System (Wet Tap)

The lump sum price for “Connection to Existing System (Wet Tap)” shall be full compensation for the connection of the proposed water main to the existing water system per the Plans and Specifications. The price shall include milling, excavation, dewatering and proper disposal of water, hauling and disposal of excess or unsuitable material, temporary blow offs, temporary backflow prevention apparatus, temporary and permanent pipe, tapping tee and tapping valve, spools, fittings, gate valves, thrust restraints included but not limited to mechanically mixed concrete blocking, Romagrips, gaskets, bolts and other hardware, removal of existing plugs, pipe sterilization, testing, disposal of excess material, backfill, compaction, cutting and capping the existing main, temporary paving and clean up. Measurement and payment shall be for the entire connection complete in-place, fully operational, and ready for use.

Note: The City will notify affected residents in advance, conduct the shutdown and recharge the water main.

Abandon Existing Water System

The lump sum price for “Abandoning Existing Water System” shall be full compensation for the abandonment of existing water main and other water facilities as shown in the Plans and Specifications. The price shall include but not be limited to milling, excavation, draining the existing water system including proper disposal of water, removal of all valves and valve boxes within the abandonment limits on the lines to be abandoned, air/vacuum assemblies, blow-off assemblies, and fire hydrants not requiring a main shut down, concrete for plugging existing pipe, caps, and other material necessary to abandon the existing system, disposal of excess material, backfill, compaction, temporary paving and clean up.

Crushed Surfacing Top Course

The unit price per ton of “Crushed Surfacing” shall be full compensation for furnishing, hauling, placing and compacting 5/8” minus crushed rock pavement base, pipe bedding and imported backfill per Plans and Specifications. The price shall include all necessary grading of road base, installation and compaction of the crushed rock as a road base, shoulder, and driveway or as pipe bedding and imported backfill. Measurement and payment shall be per ton of crushed rock in place based on actual truck weight tickets. The quantity shown for this bid item in the Bid Schedule is estimated and may vary. This bid item is not subject to price adjustments should the actual quantity used be higher or lower than the quantity estimated in the bid. No additional payment shall be made for removing, hauling and disposing of unsuitable materials which the Crushed Surfacing Top Course is replacing.

Controlled Density Fill (CDF)

The unit price per cubic yard for Controlled Density Fill (CDF) shall constitute full compensation for all labor, materials, tools and equipment necessary and incidental to furnish, deliver, and place the CDF in the trench at locations to be determined by the Engineer. The unit contract price shall also include removing, loading, hauling and disposing of unsuitable material that is being replaced by CDF. Also included in the unit price is the cost to furnish, place, maintain and remove steel plates to allow the CDF to cure.

The quantity shown for this bid item in the Bid Schedule is estimated and may vary. This bid item is not subject to price adjustments should the actual quantity used be higher or lower than the quantity estimated in the bid. The use of this bid item is subjected to authorization by the Engineer and no payment will be made to the Contractor for quantities used without prior authorization by the Engineer.

Certified tickets shall be furnished with each load of material delivered. No payment will be made without a ticket.

Hot Mix Asphalt (HMA) Class B Permanent Trench Patch

The unit price per ton of “Hot Mix Asphalt (HMA) Class B Permanent Trench Patch” shall be full compensation for all labor, equipment, tools and materials required to furnish and place Class B hot mix asphalt pavement for permanent trench patching in roadways and driveways. The unit price shall include all necessary pavement grinding, preparation of edges with asphalt emulsion, removal and disposal of temporary patching, base preparation, installation and compaction of the Class B hot mix asphalt, and sealing of joints. Measurement and payment shall be per ton of hot mix asphalt placed based on actual truck weight tickets.

The limits of the Hot Mix Asphalt Class B Permanent Trench Patch will be along the water main, service and appurtenances alignments at the widths specified in the “Trench Section” detail shown on sheet WD-01. Construction related damages to pavement outside of these limits will be repaired by the Contractor at his expense. Any areas of existing wear and tear (not caused by construction) identified and approved by the Engineer or Inspector to be repaired will be paid under the bid item “Hot Mix Asphalt (HMA) Class B Spot Road Repair.”

Hot Mix Asphalt (HMA) Class B Spot Road Repair

The unit price per ton of “Hot Mix Asphalt (HMA) Class B Spot Road Repair” shall be full compensation for all labor, equipment, tools and materials required to complete the removal of failing asphalt, recompaction of existing base material and placing and compaction of HMA Class B required to repair failing pavement areas adjacent to or within the vicinity of the water main replacement. The unit price shall also include all necessary pavement grinding, sawcutting, preparation of edges with asphalt emulsion, removal and disposal of asphalt pavement, and sealing of joints. No work covered by this bid item is to be performed without prior approval from the City. The quantity shown for this bid item in the Bid Schedule is estimated and may vary. This bid item is not subject to price adjustments should the actual quantity used be higher or lower than the quantity estimated in the bid.

Raised Pavement Marker Type 1

The unit price per hundred of “Raised Pavement Marker Type 1” shall be full compensation for furnishing and placing the Type 1 Raised Pavement Marker as shown in the plans and detailed in the specifications. The price shall include removing existing damaged markers, preliminary spotting, preparing roadway surfaces and installing the new pavement marker. Measurement and payment shall be per hundred of new pavement markers installed.

Raised Pavement Marker Type 2

The unit price per hundred of “Raised Pavement Marker Type 2” shall be full compensation for furnishing and placing the Type 2 Raised Pavement Marker as shown in the plans and detailed in the specifications. The price shall include removing existing damaged markers, preliminary spotting, preparing roadway surfaces and installing the new pavement marker. Measurement and payment shall be per hundred of new pavement markers installed.

Thermoplastic Traffic Arrow

The unit price per each of “Thermoplastic Traffic Arrow” shall be full compensation for furnishing the thermoplastic traffic arrow as shown on plans and detailed in the specifications. The price shall include removing existing damaged traffic arrow, preliminary spotting, preparing road surfaces, and pavement marking. Measurement and payment shall be per each of thermoplastic traffic arrow installed.

Thermoplastic Crosswalk Line

The unit price per lineal foot of “Thermoplastic Crosswalk Line” shall be full compensation for furnishing the thermoplastic crosswalk line as shown on plans and detailed in the specifications. The price shall include removing existing damaged crosswalk line, preliminary spotting, preparing road surfaces, and pavement marking. Measurement and payment shall be per lineal foot of thermoplastic crosswalk line installed.

Thermoplastic Stop Bar

The unit price per lineal foot of “Thermoplastic Stop Bar” shall be full compensation for furnishing the thermoplastic stop bar as shown on plans and detailed in the specifications. The price shall include removing existing damaged stop bar, preliminary spotting, preparing road surfaces, and pavement marking. Measurement and payment shall be per lineal foot of thermoplastic stop bar installed.

Replace Existing Traffic Loops

The unit price per each of “Replace Existing Traffic Loops” shall be full compensation for all work necessary to replace all traffic loops damaged by construction, including feeder cables and connections.

Replace Existing Concrete Curb and Gutter

The unit price per lineal foot of “Replace Existing Concrete Curb and Gutter” shall be full compensation for all labor, equipment, tools and materials required to complete the layout, preparation, forming, curb placing and finishing. Also included is the removal and disposal of the existing curb and gutter.

Replace Existing Asphalt Sidewalk

The unit price per square foot of “Replace Existing Asphalt Sidewalk” shall be full compensation for all labor, equipment, tools and materials required to place and compact the asphalt sidewalk including all prep work and finish work including joint sealing. Also included is the removal and disposal of the existing asphalt sidewalk.

Catch Basin Insert

The unit price per each “Catch Basin Insert” shall be full compensation for all labor, equipment, tools and materials required to install, inspect daily, continually maintain throughout the duration of the project as recommended by the manufacturer and remove upon project completion. Measurement and payment will be per each catch basin insert in place. If the same catch basin insert is moved to different catch basins as the work zone moves, it will only be paid once.

Additional Temporary Erosion and Sedimentation Control (TESC)

The force account price for “Additional Temporary Erosion and Sedimentation Control (TESC)” will be made for TESC beyond the need for Catch Basin Inserts, and shall be full compensation for furnishing all materials, installation, maintenance and removal as required. Additional TESC measures may be required based on weather and field conditions at the time of construction. This includes, but is not limited to, the excavation, fence installation “keying in” fence fabric, maintenance of fence during construction, removal and disposal of fence, restoration of surface following fence removal, and maintenance of the TESC system, excluding Catch Basin Inserts.

Tree Removal

The unit price per each for “Tree Removal” shall be full compensation for all labor, equipment, tools and materials required for the removal of the tree including, flush cut of the stump as close as possible to existing grade, stump grinding, removal and disposal of all wood, limbs, brush and grinding debris, and cleanup of the area.

Property and Landscape Restoration

The force account price for “Property and Landscape Restoration” shall be full pay for preserving, removing, and restoring existing lawn, shrubs, landscaping plantings, rockeries, and other restoration of disturbed surfaces, improvements, and features, resulting from the construction, except for pavement removal and restoration, and crushed surfacing. Also included is the cost of removal and disposal of existing concrete, sawcutting, excavation, backfill, compaction of subgrade, prep work, forming, placing, finishing and protecting concrete until it is ready to be driven over and cleanup and any other incidentals necessary to restore the concrete driveway to existing or better condition. The extent of the replacement area shall be as determined in the field with the Inspector.

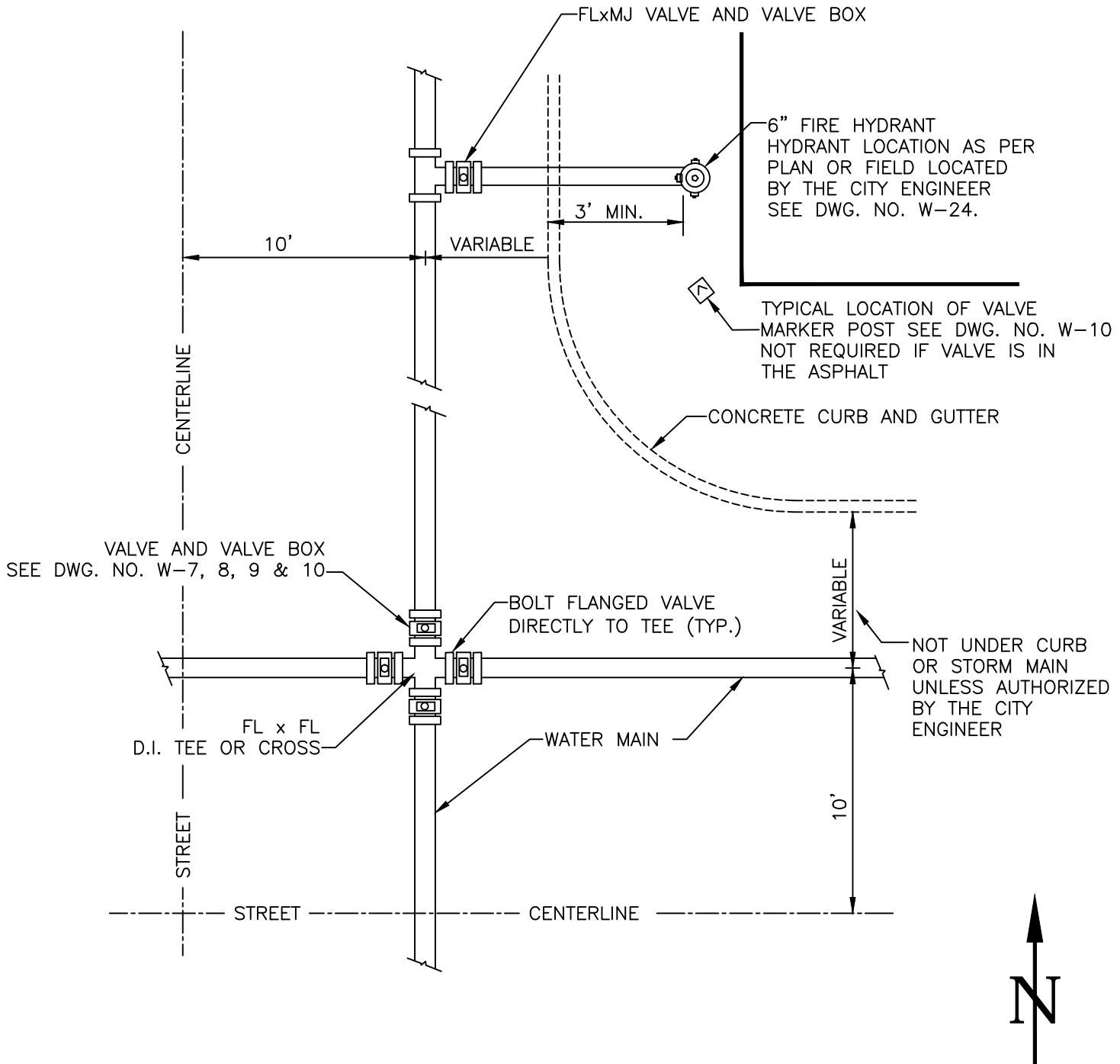
Minor Change

The force account for “Minor Change” shall include all work as describe in Division 1-04.4(1) in the Standard Specifications. Measurement and payment shall be on a force account basis.

STANDARD WATER DETAILS


STANDARD WATER DETAILS DRAWING INDEX

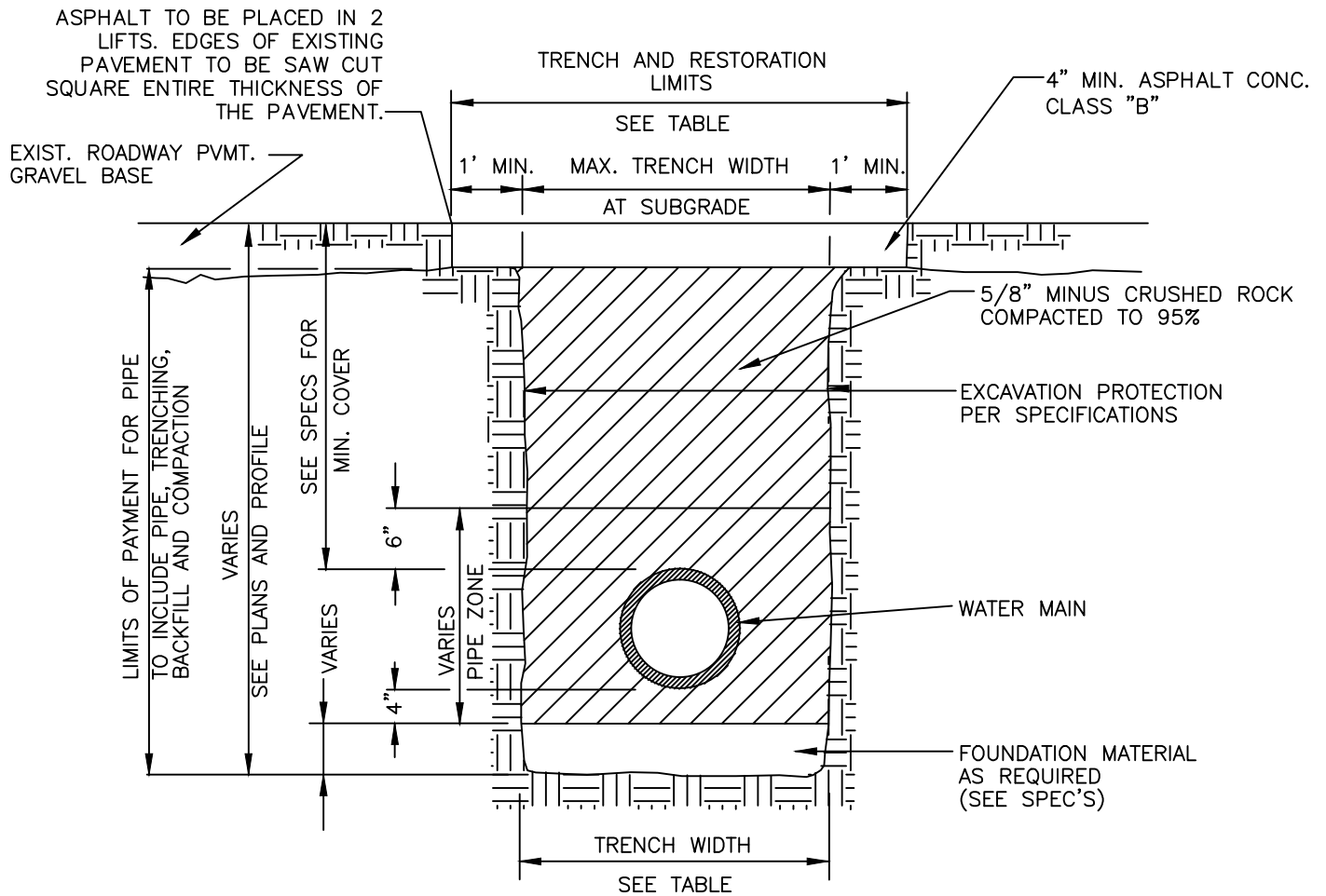
<u>NO.</u>	<u>NAME</u>	<u>DATE</u>
W-1	Not Used	
W-2	Intersection Layout	08-12-2009
W-3	Trench Section	12-23-2013
W-4	Not Used	
W-5A	Horizontal Concrete Blocking	03-20-2006
W-5B	Vertical Concrete Blocking.....	01-08-2007
W-6A	Alternate "A" Pipe Anchor	07-01-2014
W-6B	Alternate "B" Pipe Anchor	03-20-2006
W-7	Water Valve Box.....	03-20-2006
W-8	Water Valve Box.....	12-23-2013
W-9	Water Valve Extension	12-23-2013
W-10	Valve Marker Post	07-01-2014
W-11	Tapping Tee	08-12-2009
W-12	Not Used	
W-13	1" Water Meter Installation	10-16-2013
W-14	1 1/2" Water Meter Installation	10-16-2013
W-14A	2" Water Meter Installation	10-16-2013
W-15	3" – 4" Domestic Meter Installation	09-03-2014
W-16	Water Meter Placement.....	03-20-2006
W-17	1" & 2" Steel Water Meter Box	12-23-2013
W-18A	1", 1 1/2" & 2" Plastic Water Meter Box	12-23-2013
W-19A	Double Detector Check Valve Assembly	07-01-2014
W-19B	Material List Double Detector Check	07-01-2014
W-20	Not Used	
W-21	Not Used	
W-22	Not Used	
W-23	Not Used	
W-24	Fire Hydrant Connection.....	02-05-2014
W-25	Air and Vacuum Assembly.....	03-25-2015
W-25A	2" Air & Vacuum Valve Assembly	03-25-2015
W-26	2" Blow-Off Assembly	07-01-2014
W-27A	Pressure Reducing Valve Vault – Plan	09-03-2014
W-27B	Pressure Reducing Valve Vault – Material List	09-03-2014
W-27C	Pressure Reducing Valve Vault – Ladder and Support Detail.....	09-24-2013
W-27D	Pressure Reducing Valve Vault – Pipe Penetration Detail and Wall Anchor.....	09-24-2013
W-28	Residential Pressure Reducing Valve	12-24-2013
W-29	Not Used	
W-30	Not Used	
W-31	Not Used	
W-32	Typical Water Main Flushing	08-12-2009



NOTES

1. MECHANICAL JOINTS WITH ROMAC PIPE RESTRAINERS MAY BE USED AT FITTINGS IN LIEU OF FLANGE TO FLANGE CONNECTIONS SHOWN ABOVE, WHERE APPROVED BY THE CITY ENGINEER.
2. BUTTERFLY VALVE OPERATING NUTS SHALL BE ON THE NORTH AND WEST SIDE OF THE MAIN.

	<p>CITY OF MERCER ISLAND STANDARD DETAILS WATER</p>	
<p>INTERSECTION LAYOUT</p>		
08-12-2009	NO SCALE	W-2
REV DATE	APPROVED	



TRENCH WIDTH			
PIPE SIZE	PIPE ZONE MAX. TRENCH WIDTH	MAX. TRENCH WIDTH AT SUBGRADE	MAX. RESTORATION WIDTH AT SURFACE
WATER SERVICES	2'-0"	2'-0"	4'-0"
4" OR 6"	2'-2"	3'-0"	5'-0"
8"	2'-4"	4'-0"	6'-0"
10"	2'-6"	4'-0"	6'-0"
12"	2'-8"	4'-6"	6'-6"
16"	3'-0"	5'-0"	7'-0"

NOTES

1. CALL TWO BUSINESS DAYS BEFORE YOU DIG. (1-800-424-5555)
2. ALL TRENCH BACKFILL MATERIAL SHALL BE 100% 5/8" MINUS CRUSHED ROCK PER WSDOT 9-03.9(3) UNLESS DIRECTED OTHERWISE BY CITY ENGINEER.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

TRENCH SECTION

12-23-2013

NO SCALE

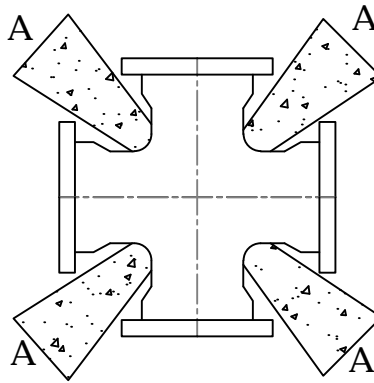
W-3

REV DATE

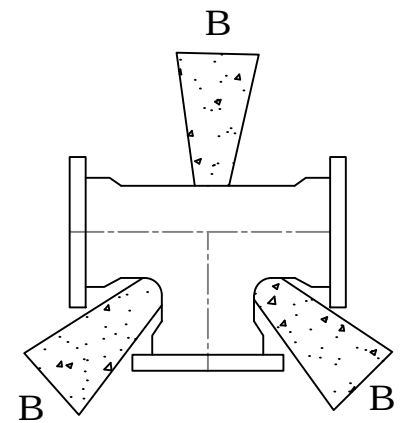
APPROVED

THRUST BLOCKING TABLE

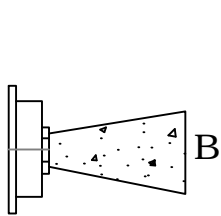
PIPE SIZE	MINIMUM BEARING AREA AGAINST UNDISTURBED SOIL IN SQUARE FEET				
	A	B	C	D	E
4	2	2	2	2	2
6	4	3	2	2	2
8	7	5	4	2	2
10	11	8	6	3	2
12	16	12	9	5	3
14	22	16	12	6	3
16	29	20	16	8	4



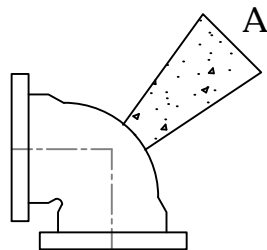
CROSS



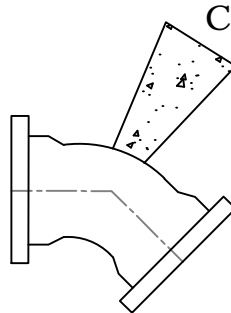
TEE



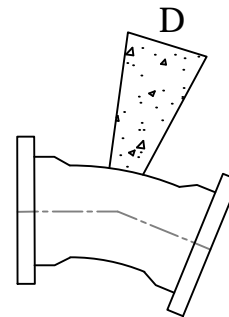
CAP



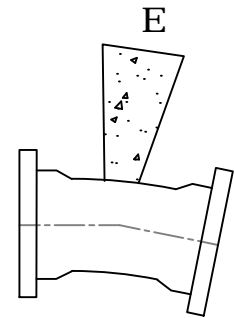
90° BEND



45° BEND



22-1/2° BEND



11-1/4° BEND

NOTES

1. AFTER INSTALLATION, WIRE BRUSH CLEAN RODS. PAINT WITH TWO COATS ASPHALTIC VARNISH ROYSTON ROSKOTE #612XM OR APPROVED EQUAL.
2. SHACKLE RODS SHALL BE ROUND MILD STEEL ASTM A-36, 6" MAX. BEND ON ENDS.
3. ROMAC MJ WEDGE ACTION RETAINER MAY BE SUBSTITUTED FOR VERTICAL BLOCKING UPON PRIOR APPROVAL OF THE CITY ENGINEER.
4. CONCRETE THRUST BLOCKING SHALL BE POURED AGAINST UNDISTURBED EARTH.
5. THRUST BLOCKS SHALL BE CONSTRUCTED WITH CLASS 3000 OR COMMERCIAL CONCRETE. IF THREE OR MORE BLOCKS ARE REQUIRED ON A GIVEN JOB, PREMIXED CONCRETE MUST BE USED.
6. BLOCK SHALL BEAR AGAINST FITTINGS ONLY AND SHALL BE CLEAR OF BOLTS AND JOINTS TO PERMIT TAKING UP OR DISMANTLING JOINT. WRAP FITTINGS WITH 8 MIL THICK POLYETHYLENE SHEETING PRIOR TO POURING CONCRETE.
7. BEARING AREA MUST BE ADJUSTED FOR HIGHER INTERNAL PRESSURES AND LOWER SOIL BEARING VALUES.
8. CONCRETE BLOCKING SHALL BE CAST-IN-PLACE AND HAVE A MINIMUM OF 1/4 SQUARE FOOT BEARING AGAINST THE FITTING.
9. THE CONTRACTOR SHALL INSTALL BLOCK WHICH IS ADEQUATE TO WITHSTAND FULL TEST PRESSURE AS WELL AS TO CONTINUOUSLY STAND OPERATING PRESSURE UNDER ALL CONDITIONS OF SERVICE.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

HORIZONTAL CONCRETE BLOCKING

3-20-2006

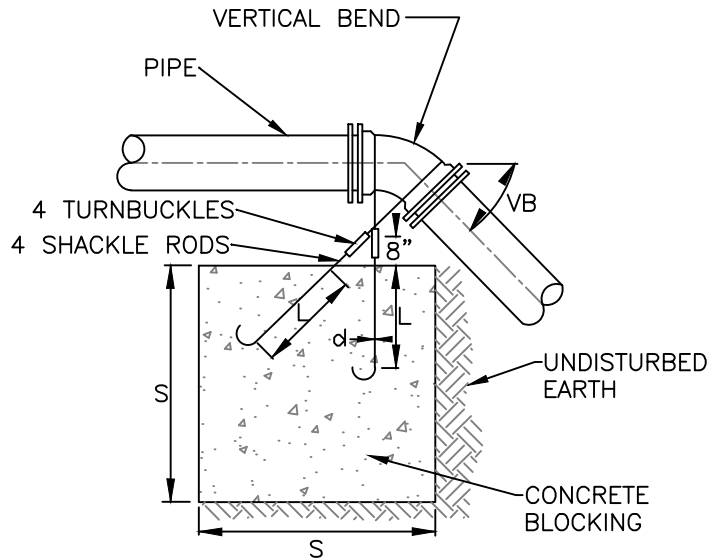
NO SCALE

W-5A

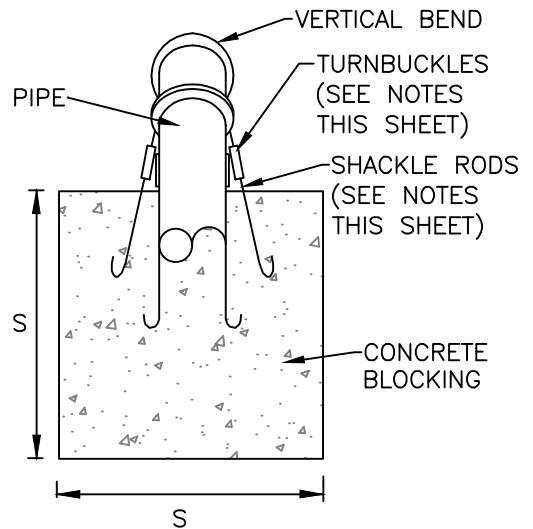
REV DATE

APPROVED

VERTICAL THRUST BLOCKING FOR 11 1/4° - 22 1/2° - 45°							NUMBER OF TIE RODS SETS (2 EMBEDDED RODS PER SET)
PIPE SIZE NOM. DIAMETER - INCHES	TEST PRESSURE P.S.I.	VB VERTICAL BEND DEGREES	AMOUNT CONCERT BLOCKING - CU. FT.	S LENGTH OF SIDE FEET	d SHACKLE ROD DIA. - INCHES	L DEPTH OF ROD IN CONCRETE INCHES	
3"	300	11-1/4	3.4	1.5	5/8	12"	2
		22-1/2	5.4	1.75	5/8	12"	
		45	11.4	2.25	5/8	12"	
4"	300	11-1/4	5.4	1.75	5/8	12"	2
		22-1/2	11.4	2.25	5/8	12"	
		45	20.8	2.75	5/8	12"	
6"	300	11-1/4	11.4	2.25	5/8	12"	2
		22-1/2	27.0	3.0	5/8	12"	
		45	42.9	3.5	5/8	12"	
8"	300	11-1/4	20.8	2.75	5/8	12"	2
		22-1/2	42.9	3.5	5/8	12"	
		45	76.8	4.25	5/8	12"	
10"	300	11-1/4	34.3	3.25	5/8	12"	2
		22-1/2	64.0	4.0	5/8	12"	
		45	125	5.0	3/4	24"	
12"	300	11-1/4	42.9	3.5	5/8	12"	2
		22-1/2	91.1	4.5	5/8	12"	
		45	166	5.5	5/8	12"	
14"	250	11-1/4	52.7	3.75	5/8	12"	2
		22-1/2	107	4.75	3/4	24"	
		45	190	5.75	3/4	24"	
16"	225	11-1/4	64.0	4.0	5/8	12"	2
		22-1/2	125	5.0	5/8	12"	
		45	216	6.0	5/8	12"	
18"	200	11-1/4	64.0	4.0	3/4	24"	2
		22-1/2	145	5.25	3/4	24"	
		45	244	6.25	3/4	24"	




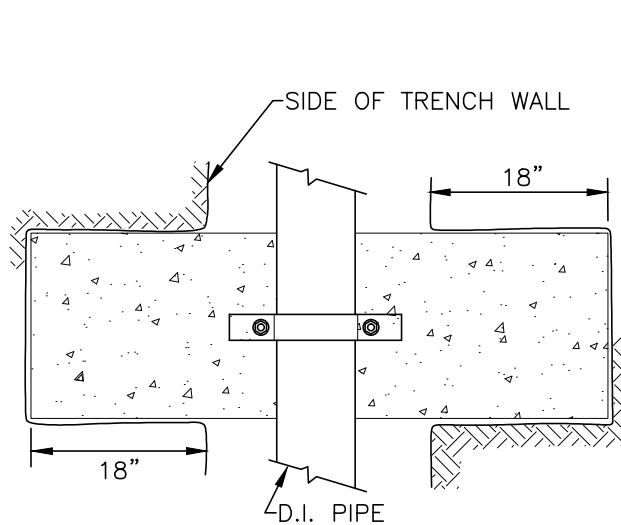
BLOCKING FOR VERTICAL BENDS



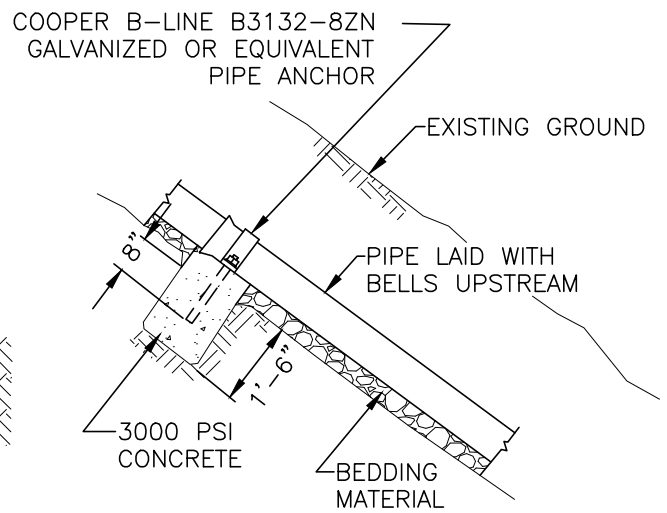
NOTES

1. CONCRETE SHALL HAVE A MINIMUM 28 DAY COMPRESSIVE STRENGTH OF 3000 P.S.I.
2. TIE ROD ASSEMBLIES SHALL BE COATED WITH ROYSTON RESCOAT #612SM OR APPROVED EQUAL.
3. BOTH RIGHT-HAND THREAD AND LEFT-HAND THREAD TIE RODS SHALL BE PROVIDED AND TURN-BUCKLES SHALL HAVE ONE END RIGHT-HAND THREAD AND ONE END LEFT-HAND THREAD TO ENABLE TIGHTENING OF TIE RODS.

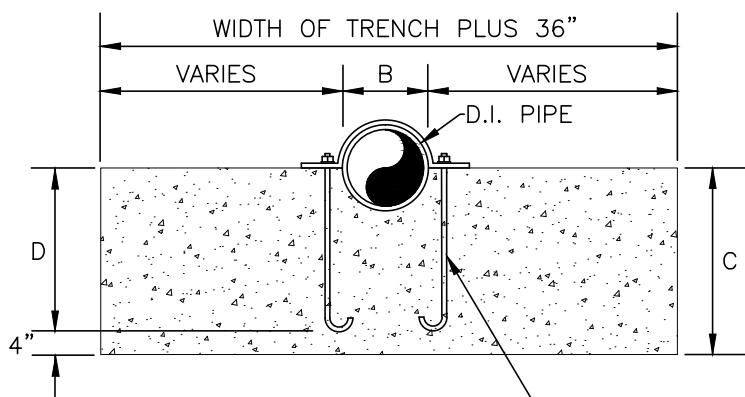
	CITY OF MERCER ISLAND STANDARD DETAILS WATER	
	VERTICAL CONCRETE BLOCKING	
1-8-2007	NO SCALE	W-5B



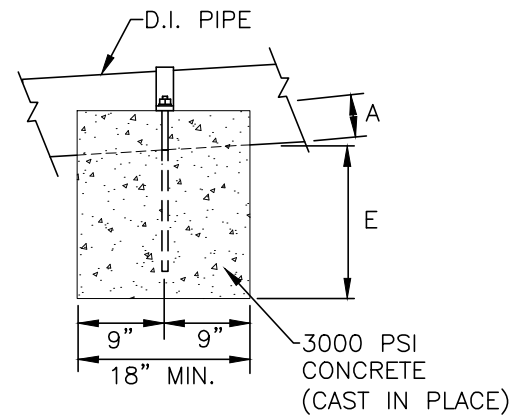
PLAN



PROFILE



ELEVATION



SECTION

J-BOLT STAINLESS STEEL AND THREADED FOR CONNECTION TO PIPE CLAMP. FOLLOWING INSTALLATION ALL EXPOSED CONNECTORS TO BE COATED W/ROYSTON ROSCOTS (SEE W-5 FOR DETAILS).

PIPE SIZE	DIMENSIONS INCHES				
	A	B	C	D	E
4"	2.4	4.8	17	13	14.6
6"	3.5	6.9	18	14	14.5
8"	4.5	9.1	19	15	14.5
10"	5.6	11.1	20	16	14.4
12"	6.6	13.2	21	17	14.4
14"	7.7	15.3	22	18	14.3
16"	8.7	17.4	23	19	14.3
18"	9.8	19.5	24	20	14.2

NOTES

1. SLOPES GREATER THAN 20% - PROVIDE CONCRETE SLOPE ANCHORS (20' TO 25' ON CENTER)
2. RESTRAINED JOINT PIPE, ROMAC PIPE RESTRAINERS OR OTHER METHODS OF RESTRAINT MAY BE USED WITH PRIOR APPROVAL OF THE CITY ENGINEER.

CITY OF MERCER ISLAND

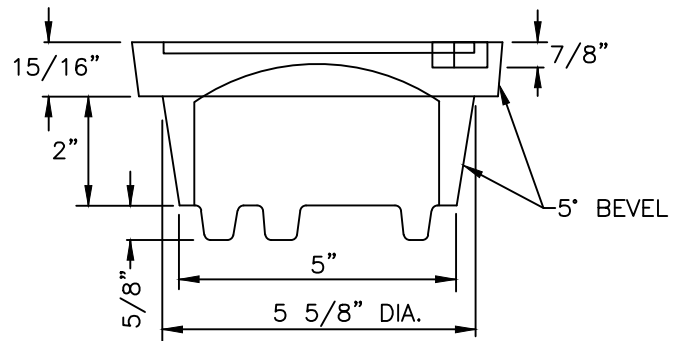
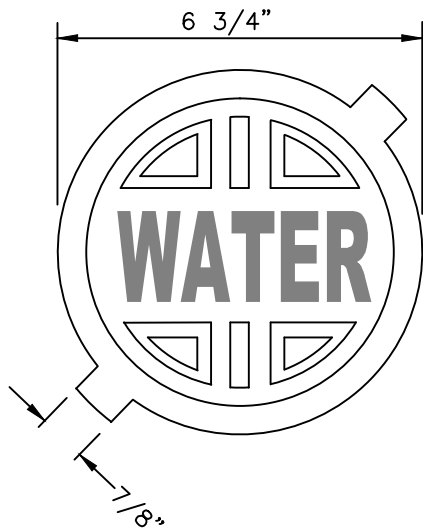
STANDARD DETAILS

WATER

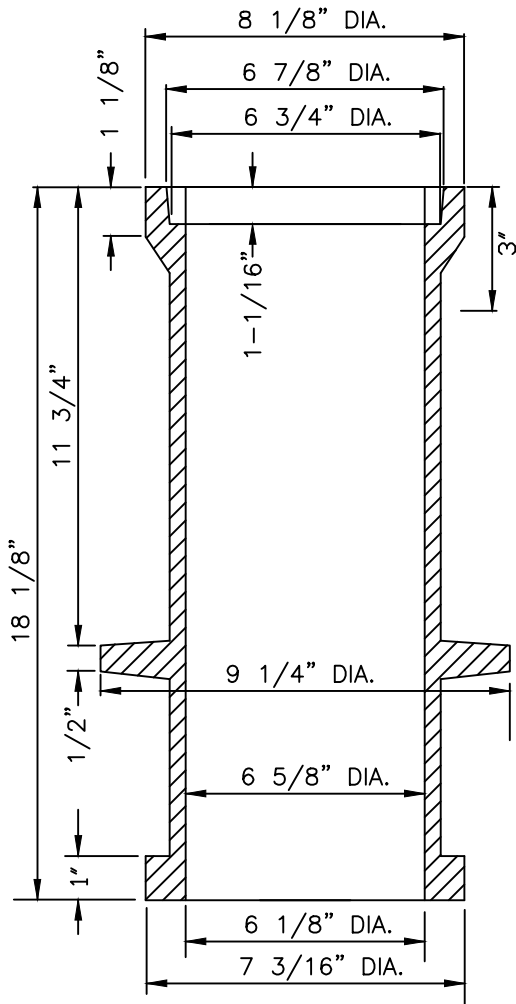
ALTERNATE "A" PIPE ANCHOR

7-01-2014	NO SCALE	W-6A
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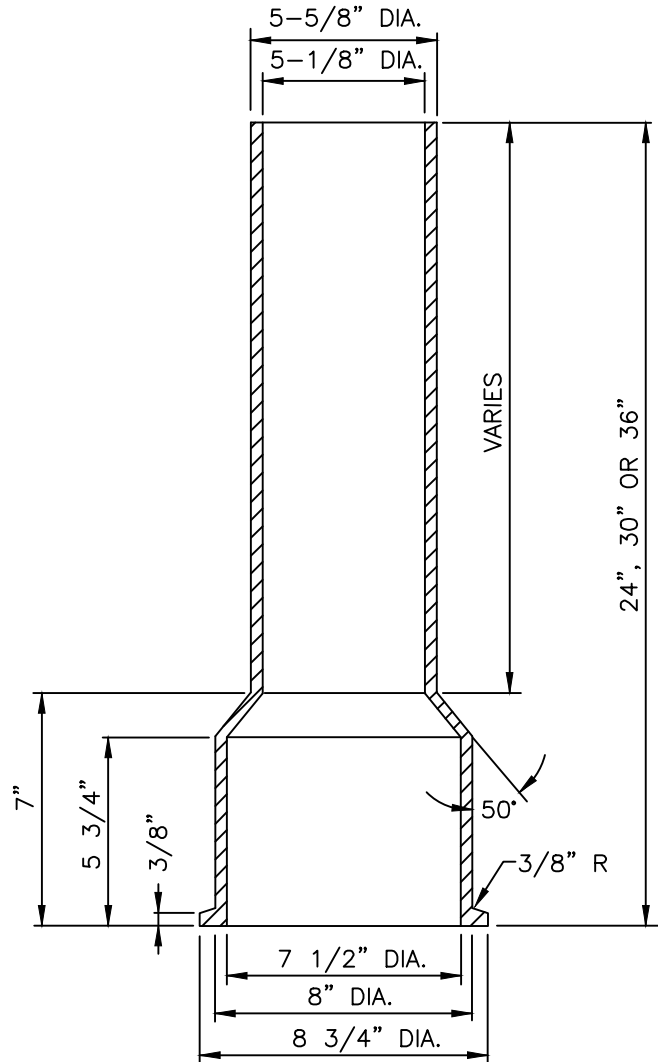
REV DATE			APPROVED
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VALVE BOX LID



VALVE BOX TOP



VALVE BOX BOTTOM

NOTES

1. VALVE BOX SHALL BE OLYMPIC FOUNDRY PART NO. VB940 OR EQUAL.
2. THE TOP AND LID SHALL HAVE A MACHINED FIT.
3. LOCKING LID, WHEN REQUIRED, SHALL BE OLYMPIC FOUNDRY PART NO. 13-5200 OR EQUAL.



CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

WATER VALVE BOX

3-20-2006

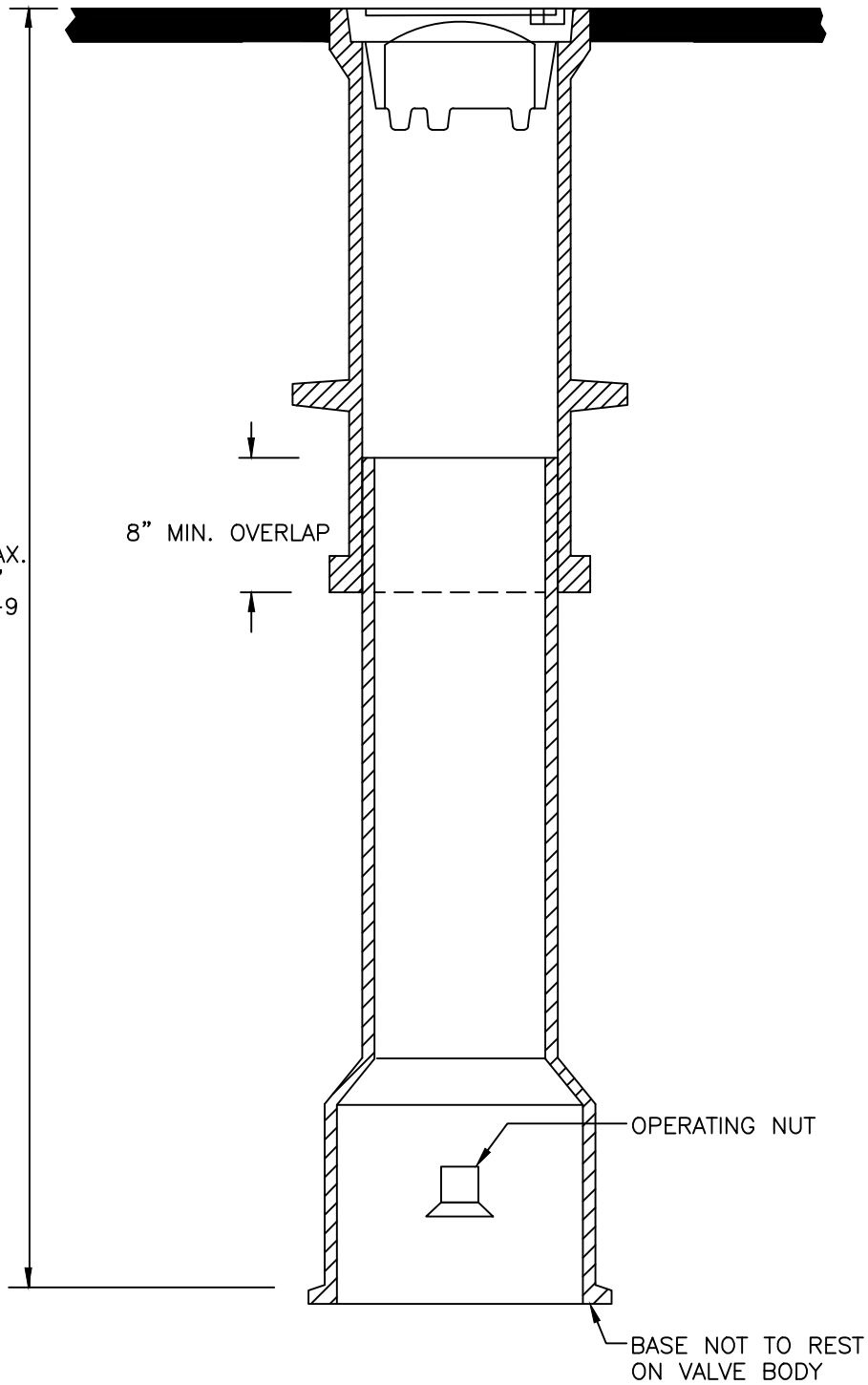
NO SCALE

W-7

REV DATE


APPROVED

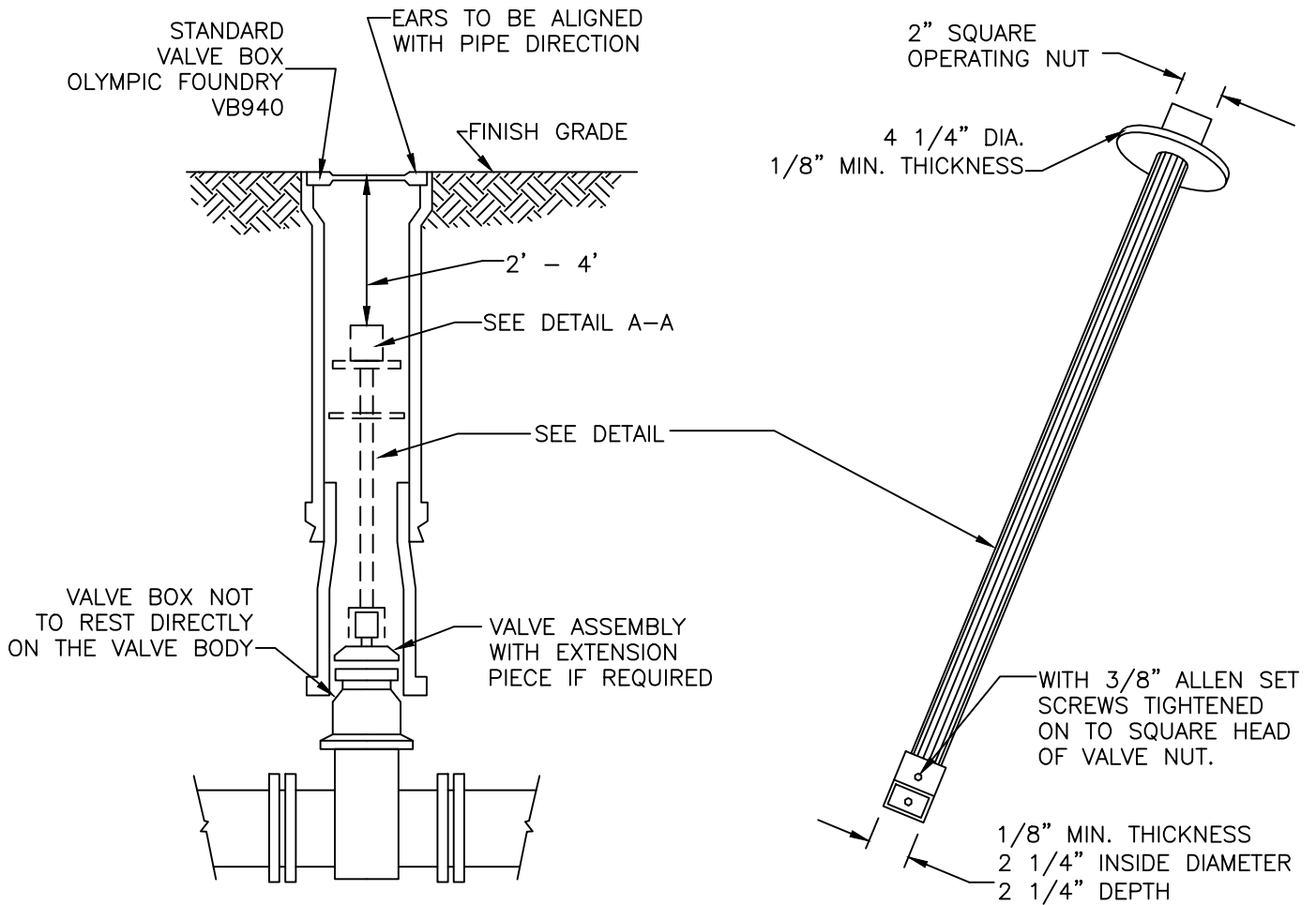
4'-0" MAX.
IF OVER 4'
SEE DWG. NO. W-9



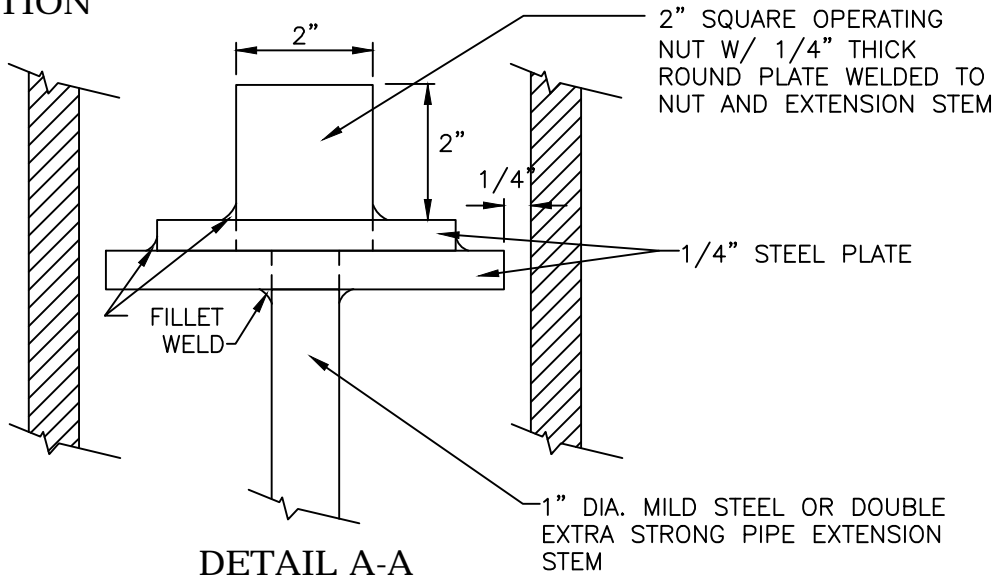
NOTES

1. VALVE BOX RISER WITH PAVING LUGS SHALL BE OLYMPIC NO. VB2 OR EQUAL.
2. MINIMUM VALVE BOX BOTTOM LENGTH OVERALL = 21 1/16". SHORT RISERS ARE NOT PERMITTED.
3. SEE DWG. NO. W-7 FOR DETAILS.

	CITY OF MERCER ISLAND STANDARD DETAILS WATER	
	WATER VALVE BOX	
12-23-2013	NO SCALE	W-8
REV DATE		APPROVED




SECTION

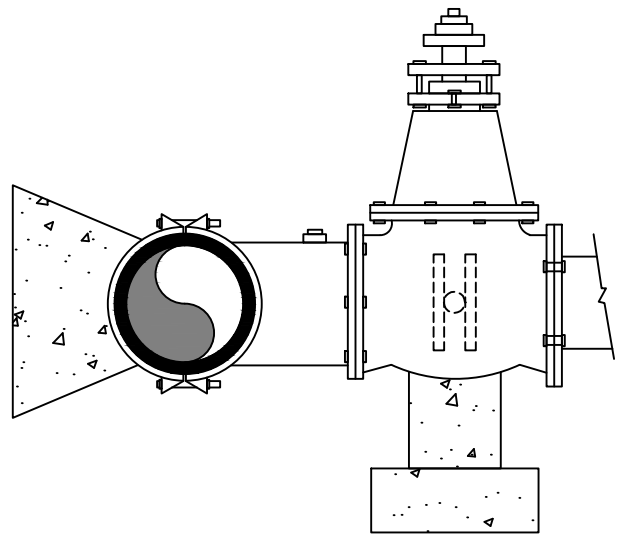
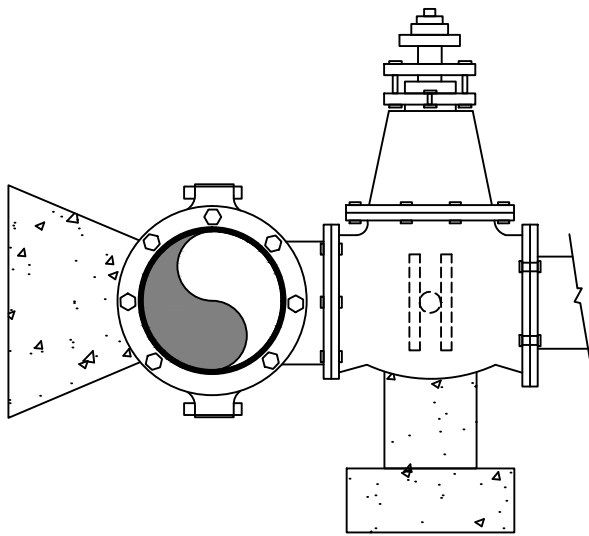
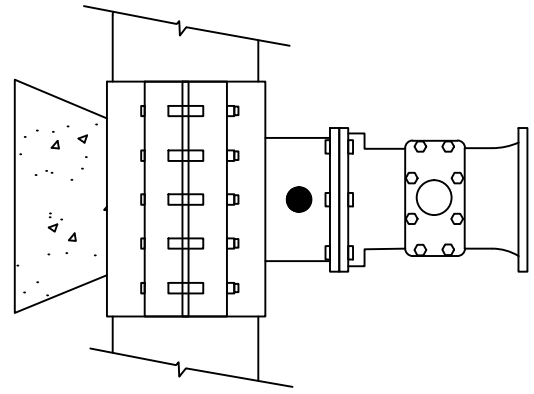
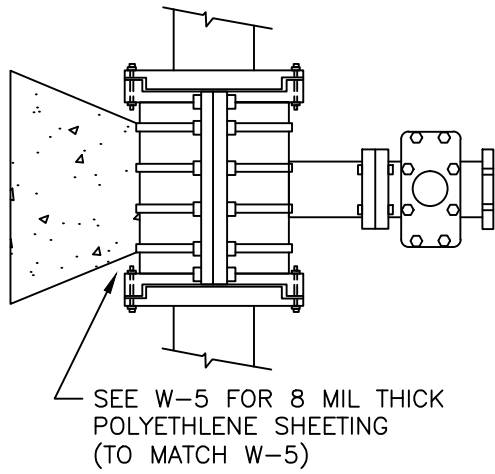


DETAIL A-A

NOTES

1. EXTENSIONS ARE REQUIRED WHEN THE VALVE NUT IS MORE THAN FOUR (4) FEET BELOW FINISHED GRADE.
2. EXTENSIONS ARE TO BE A MINIMUM OF ONE (1) FOOT LONG. ONLY ONE EXTENSION PER VALVE WILL BE ALLOWED.
3. ALL EXTENSIONS ARE TO BE MADE OF CAST OR DUCTILE IRON, SIZED AS NOTED AND PAINTED WITH TWO COATS ASPHALTIC VARNISH.

	CITY OF MERCER ISLAND	
	STANDARD DETAILS	
WATER		
WATER VALVE EXTENSION		
12-23-2013	NO SCALE	W-9
REV DATE		APPROVED



**DUCTILE IRON TAPPING TEE
MECHANICAL JOINT SLEEVE**

INSTALLED ON ASBESTOS CEMENT PIPE,
CAST IRON PIPE AND DUCTILE IRON PIPE

STAINLESS STEEL TAPPING TEE

INSTALLED ON ASBESTOS CEMENT PIPE,
CAST IRON PIPE AND DUCTILE IRON PIPE

NOTES

1. STAINLESS STEEL TAPPING TEES SHALL HAVE FULL CIRCLE SEAL.
2. STEEL TAPPING TEES SHALL BE EPOXY COATED.
3. NO SIZE ON SIZE TAPS. TAP SHALL BE AT LEAST 2" SMALLER DIAMETER THAN THE EXISTING MAIN.
4. TAPPING TEES SHALL BE MULLER OR EQUAL.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

TAPPING TEE

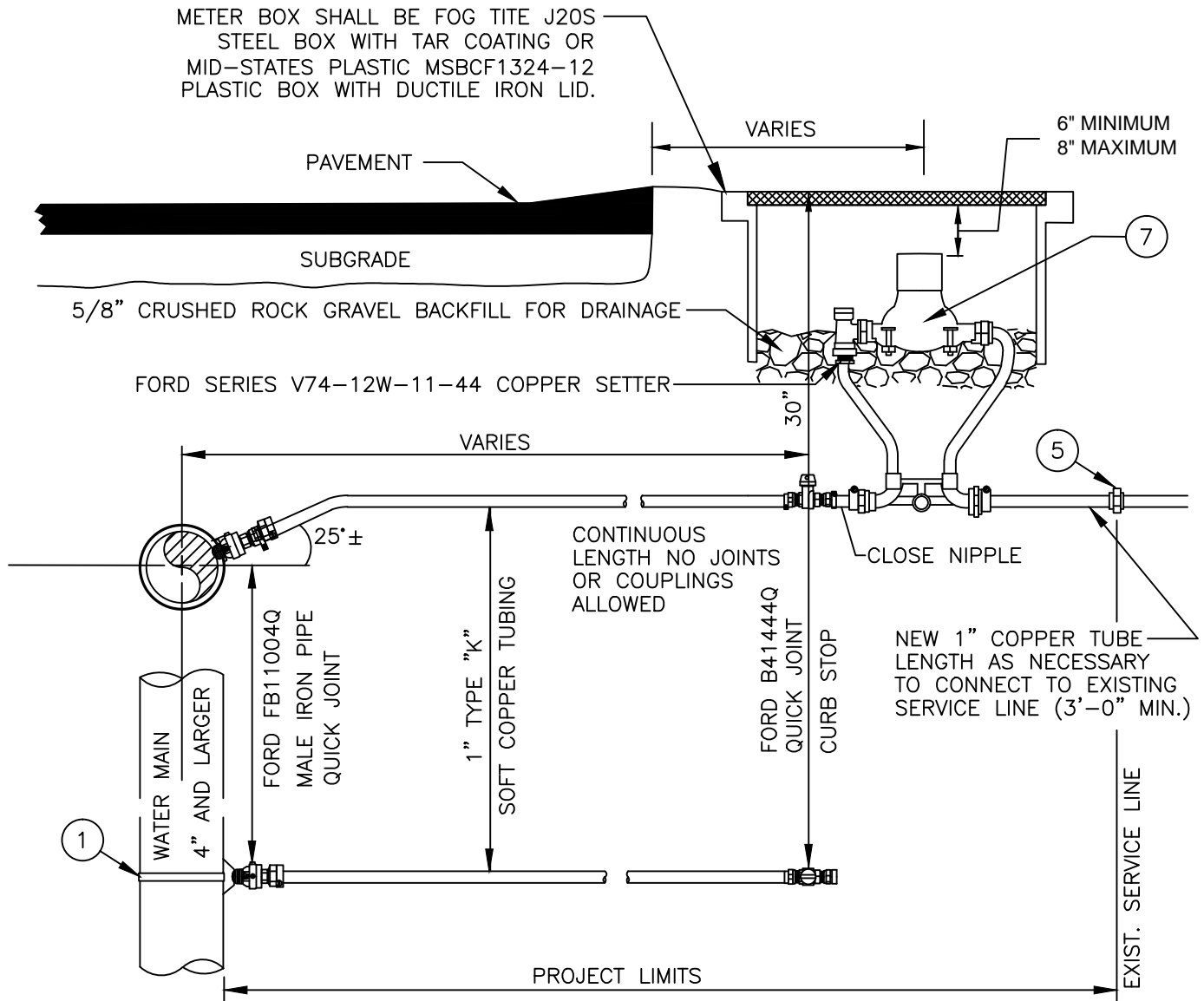
8-12-2009

NO SCALE

W-11

REV DATE

APPROVED



NOTES

1. ON EXISTING WATER MAINS USE NYLON COATED D.I. SADDLE WITH STAINLESS STEEL SINGLE STRAP, ROMAC 101NS, OR APPROVED EQUAL. ON NEW DUCTILE IRON WATER MAIN 6" DIA. OR LARGER, THE SERVICE MAY BE DIRECTLY TAPPED.
2. MINIMUM DISTANCE BETWEEN CORP STOPS SHALL BE 18". MINIMUM DISTANCE BETWEEN TAPS, BETWEEN CORP STOP AND PIPE ENDS SHALL BE 24", ALL HORIZONALLY STAGGERED.
3. PLASTIC METER BOXES SHALL NOT BE INSTALLED WITHIN ROADWAY, SIDEWALK, OR DRIVEWAYS.
4. WHEN METER BOXES ARE INSTALLED IN PORTLAND CEMENT CONCRETE PAVEMENT OR SIDEWALK, CONTINUOUS FELT EXPANSION MATERIAL SURROUNDING THE PERIMETER OF THE METER BOX SHALL BE PROVIDED.
5. WHEN CONNECTING TO EXISTING SERVICE LINE CONTAINING FERROUS METAL, PROVIDE INSULATING COUPLING (DB SERIES WITH C21 SERIES ADAPTERS) AND PROVIDE REDUCER AS NECESSARY TO MATCH EXISTING SERVICE LINE DIAMETER.
6. SERVICE LINE SHALL BE PERPENDICULAR TO THE WATER MAIN AND STRAIGHT TO WATER METER, UNLESS OTHERWISE APPROVED BY CITY ENGINEER. PROVIDE WINDING SLACK IN THE SERVICE LINE BETWEEN THE MAIN AND WATER METER.
7. WATER METER SUPPLIED BY CITY.
8. ALL FITTINGS TO BE BRASS COMPRESSION TYPE, FORD QUICK JOINT OR EQUAL.
9. NO SERVICE CONNECTIONS BETWEEN BLOW-OFF AND END OF MAIN.



CITY OF MERCER ISLAND STANDARD DETAILS WATER

1" WATER METER INSTALLATION

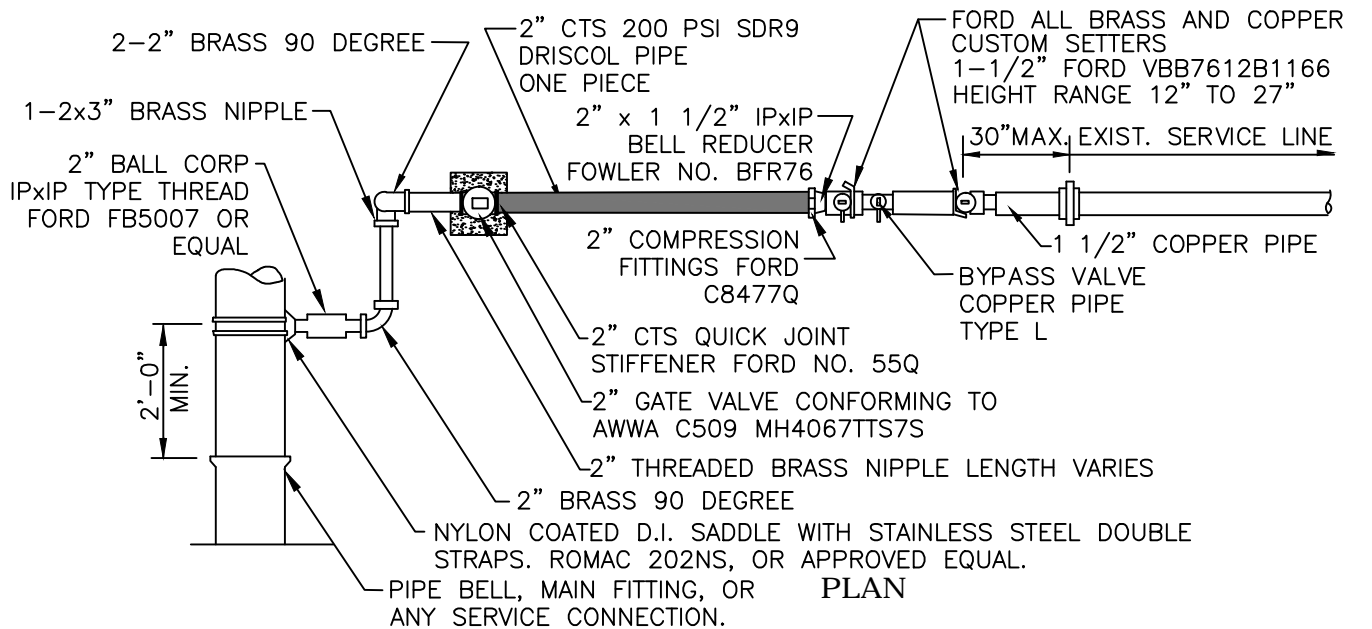
10-16-2013

NO SCALE

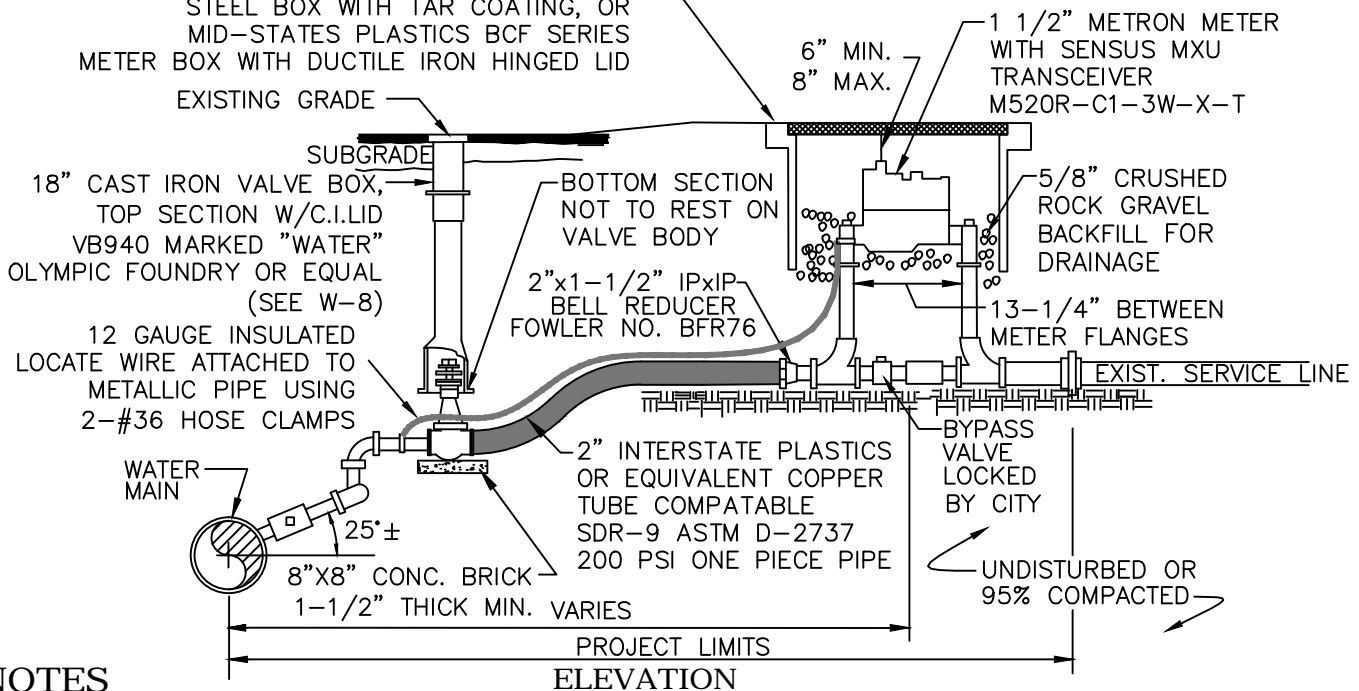
W-13

REV DATE

APPROVED



METER BOX SHALL BE FOG TITE #2 ALL STEEL BOX WITH TAR COATING, OR MID-STATES PLASTICS BCF SERIES METER BOX WITH DUCTILE IRON HINGED LID EXISTING GRADE



NOTES

1. MINIMUM DISTANCE BETWEEN CORP STOPS SHALL BE 18". MINIMUM DISTANCE BETWEEN TAPS, BETWEEN CORP STOP AND PIPE ENDS SHALL BE 24", ALL HORIZONALLY STAGGERED.
2. PLASTIC METER BOXES SHALL NOT BE INSTALLED WITHIN ROADWAY, SIDEWALK, OR DRIVEWAYS.
3. WHEN METER BOXES ARE INSTALLED IN PORTLAND CEMENT CONCRETE PAVEMENT OR SIDEWALK, CONTINUOUS FELT EXPANSION MATERIAL SURROUNDING THE PERIMETER OF THE METER BOX SHALL BE PROVIDED.
4. WHEN CONNECTING TO EXISTING SERVICE LINE CONTAINING FERROUS METAL, PROVIDE INSULATING COUPLING (DB SERIES WITH C21 SERIES ADAPTERS) AND PROVIDE REDUCER AS NECESSARY TO MATCH EXISTING SERVICE LINE DIAMETER.
5. SERVICE LINE SHALL BE PERPENDICULAR TO THE WATER MAIN AND STRAIGHT TO WATER METER, UNLESS OTHERWISE APPROVED BY CITY ENGINEER. PROVIDE WINDING SLACK IN THE SERVICE LINE BETWEEN THE MAIN AND WATER METER.
6. WATER METER SUPPLIED BY CITY.
7. ALL FITTINGS TO BE BRASS COMPRESSION TYPE, FORD QUICK JOINT OR EQUAL.
8. NO SERVICE CONNECTIONS BETWEEN BLOW-OFF AND END OF MAIN.



CITY OF MERCER ISLAND STANDARD DETAILS WATER

1-1/2" WATER METER INSTALLATION

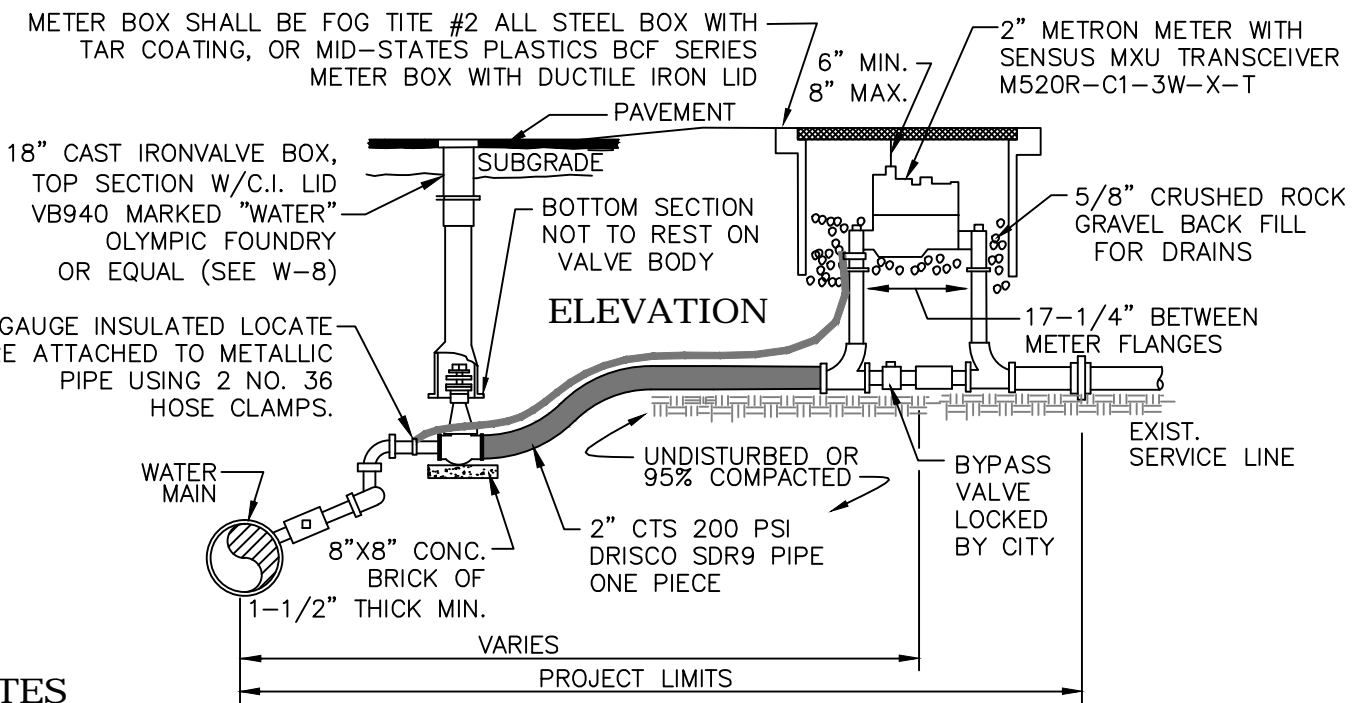
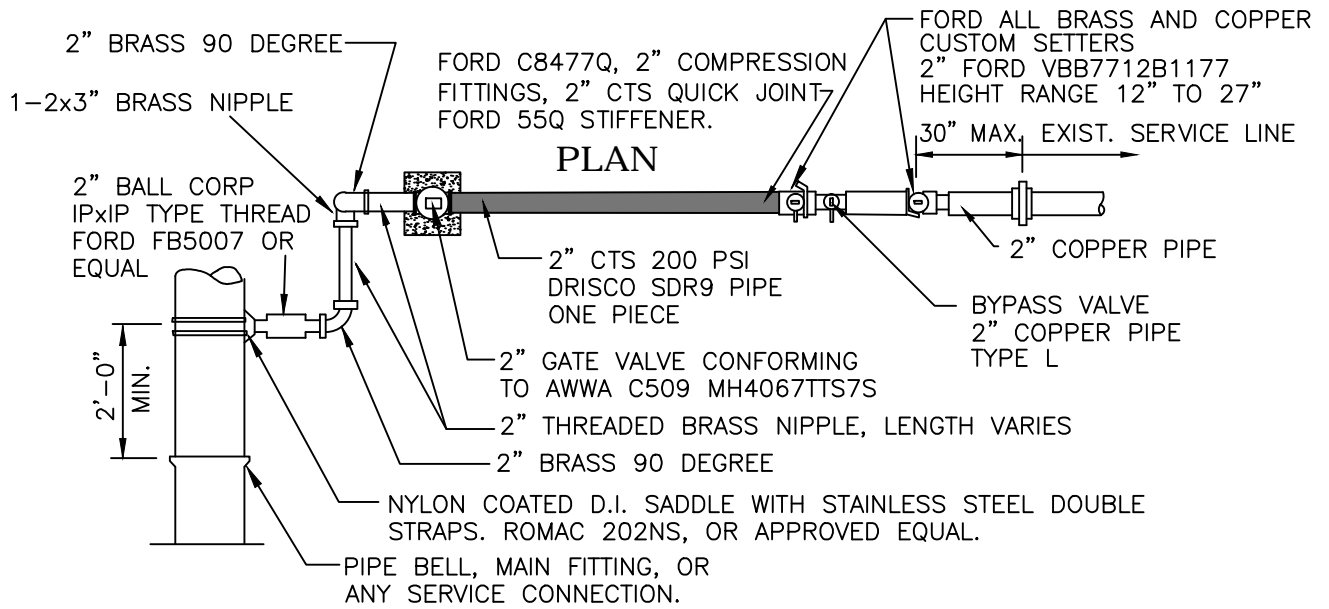
10-16-2013

NO SCALE

W-14


REV DATE

APPROVED



NOTES

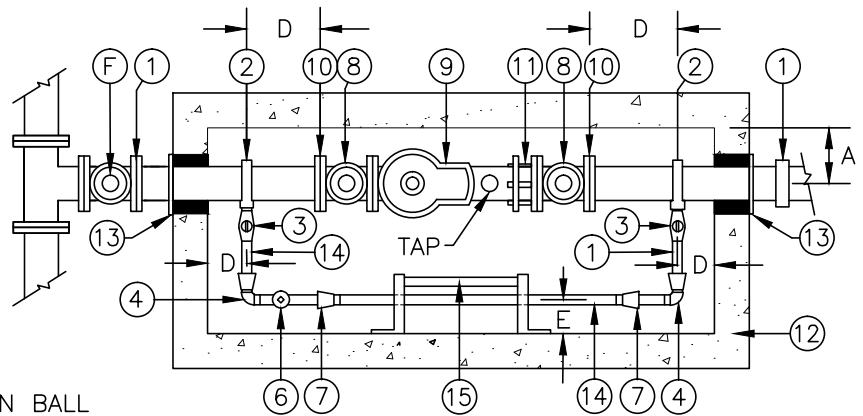
1. MINIMUM DISTANCE BETWEEN CORP STOPS SHALL BE 18". MINIMUM DISTANCE BETWEEN TAPS, BETWEEN CORP STOP AND PIPE ENDS SHALL BE 24", ALL HORIZONALLY STAGGERED.
2. PLASTIC METER BOXES SHALL NOT BE INSTALLED WITHIN ROADWAY, SIDEWALK, OR DRIVEWAYS.
3. WHEN METER BOXES ARE INSTALLED IN PORTLAND CEMENT CONCRETE PAVEMENT OR SIDEWALK, CONTINUOUS FELT EXPANSION MATERIAL SURROUNDING THE PERIMETER OF THE METER BOX SHALL BE PROVIDED.
4. WHEN CONNECTING TO EXISTING SERVICE LINE CONTAINING FERROUS METAL, PROVIDE INSULATING COUPLING (DB SERIES WITH C21 SERIES ADAPTERS) AND PROVIDE REDUCER AS NECESSARY TO MATCH EXISTING SERVICE LINE DIAMETER.
5. SERVICE LINE SHALL BE PERPENDICULAR TO THE WATER MAIN AND STRAIGHT TO WATER METER, UNLESS OTHERWISE APPROVED BY CITY ENGINEER. PROVIDE WINDING SLACK IN THE SERVICE LINE BETWEEN THE MAIN AND WATER METER.
6. WATER METER SUPPLIED BY CITY.
7. ALL FITTINGS TO BE BRASS COMPRESSION TYPE, FORD QUICK JOINT OR EQUAL.
8. NO SERVICE CONNECTIONS BETWEEN BLOW-OFF AND END OF MAIN.

	CITY OF MERCER ISLAND	
	STANDARD DETAILS	
WATER		
2" WATER METER INSTALLATION		
10-16-2013	NO SCALE	W-14A

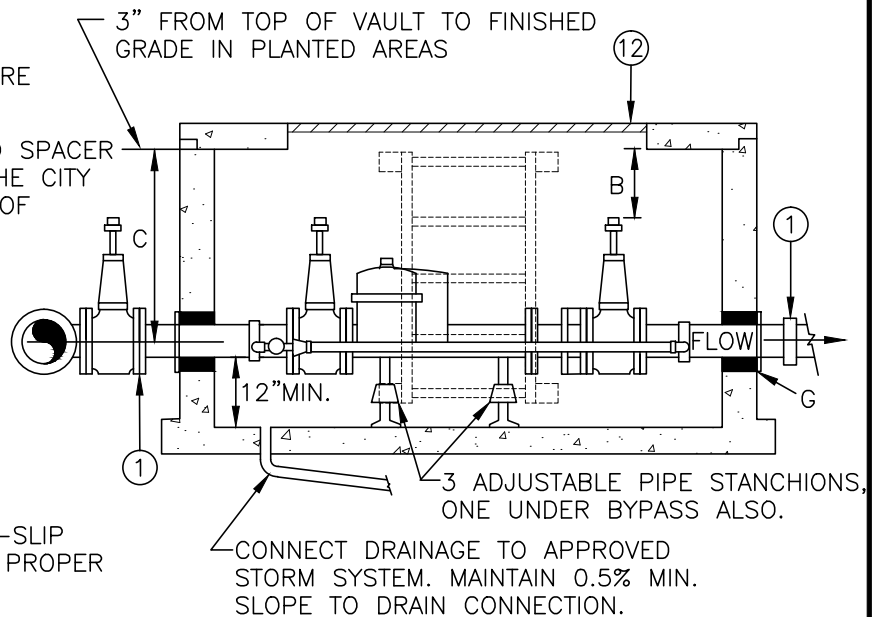
REV DATE			APPROVED
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MATERIAL LIST, 3" & 4" METER

1. FLEX. CPLG. TO FIT, ROMAC 501 OR APPROVED EQUAL. (4" X 3" REDUCER, M.J. FOR 3" METER INSTALLATION)
2. DOUBLE STRAP SADDLE, ROMAC 202NU OR APPROVED EQUAL.
3. 2" IPXIP BALL CORP. FORD FB500-7 OR APPROVED EQUAL.
4. 2" BRASS 90° BEND.
6. 2" FORD B11-777 FIPS X FIPS 1/4 TURN BALL VALVE (WITH LOCKING EAR), OR APPROVED EQUAL, WITH ONE 2" X 6" BRASS NIPPLE.
7. FORD QUICK JOINT C85-77Q OR APPROVED EQUAL.
8. M&H C515 STYLE 7000 FLG X FLG RESILIANT SEATED GATE VALVE WITH SQUARE OPERATING NUT OR APPROVED EQUAL.
9. METRON METER WITH 2" TAPPED FLANGED SPACER AND SENSUS RADIO MXU PROVIDED BY THE CITY AT THE CONTRACTORS EXPENSE. LENGTH OF VARIES BY SIZE
10. FLG X SPOOL, 12" MINIMUM. CONNECTION AT GATE VALVE MAY USE OPTIONAL EZ FLANGE 1000 OR APPROVED EQUAL.
11. CPLG ADPT, FLG ROMAC FCA 501 OR APPROVED EQUAL.
12. PRECAST VAULT TO BE APPROPRIATELY SIZED FOR SIZE OF WATER SERVICE. ACCESS HATCH TO BE LW PRODUCTS, HS-30, 3' X 5' SINGLE DOOR WITH NON-SLIP FINISH. LID OPENING TO BE PLACED FOR PROPER LADDER ACCESS.
13. ROMA-GRIP RESTRAINT OR APPROVED EQUAL.
14. 2" BRASS PIPE CUT AND THREADED TO FIT.
15. LADDER PER W-27C.
17. WHEN INSTALLING VAULT IN SIDEWALK OR PAVED AREAS, SET FRAME AND HATCH AT FINISHED GRADE. VAULT TOP SLAB SHALL REMAIN BELOW GRADE.



PLAN VIEW



SIDE VIEW

NOTES:

- A. - 9.5" MIN.
- B. - 6.0" MIN.
- C. - 2.5" MIN.
- D. - 1.0" MIN.
- E. - 4.0" MIN.
- F. - PIPING FROM MAIN TO VAULT SHALL BE D.I. WITH A 4" MIN. TAP.
- G. - PIPE OPENINGS SHALL BE CORED AND SEALED USING A LINK SEAL OR APPROVED EQUAL. NO GROUT PERMITTED.



CITY OF MERCER ISLAND STANDARD DETAILS WATER

3" & 4" DOMESTIC METER INSTALLATION

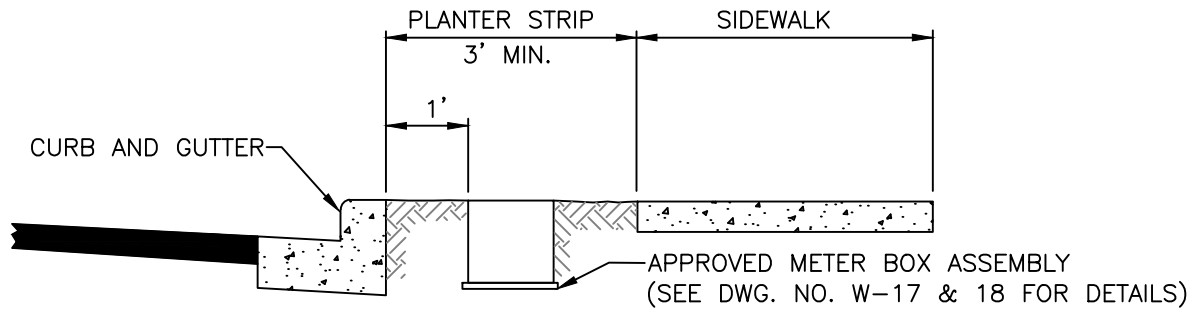
9-03-2014

NO SCALE

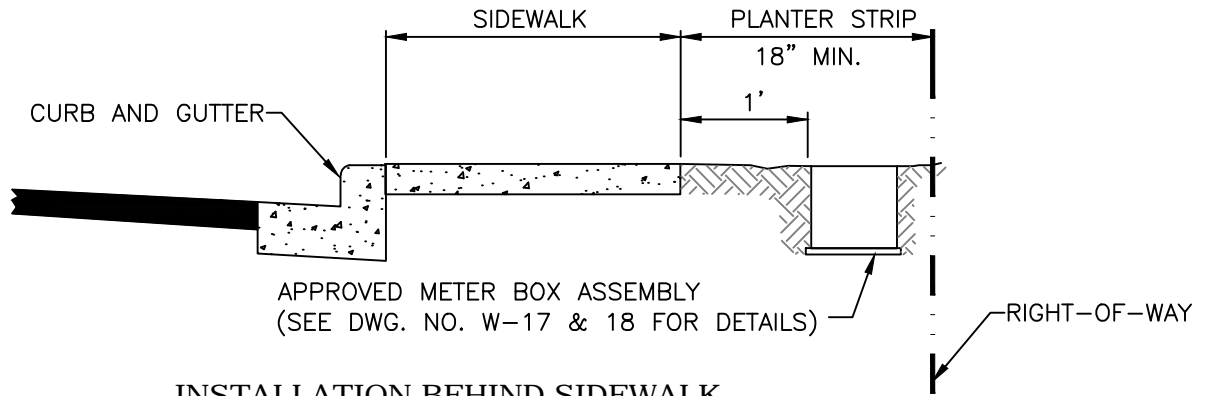
W-15

REV DATE

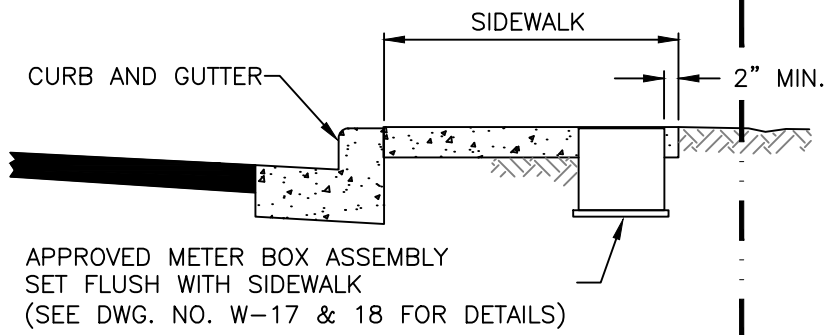
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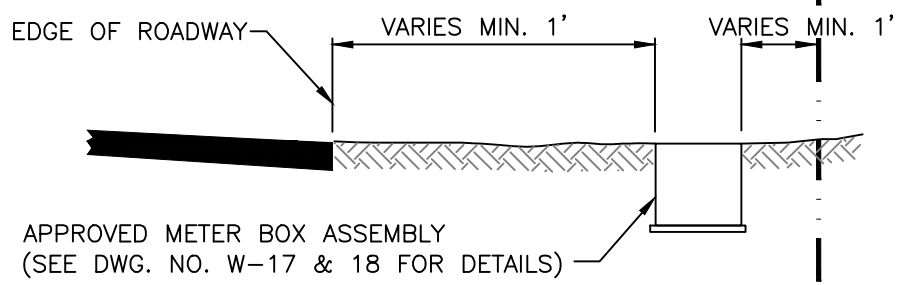
INSTALLATION IN PLANTER STRIP 3' OR WIDER




INSTALLATION BEHIND SIDEWALK

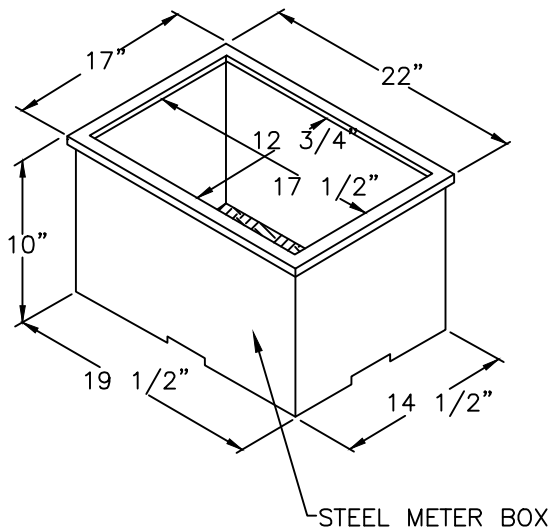
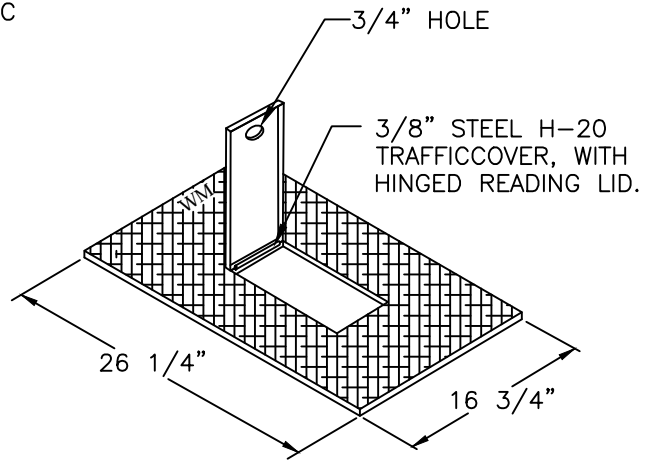
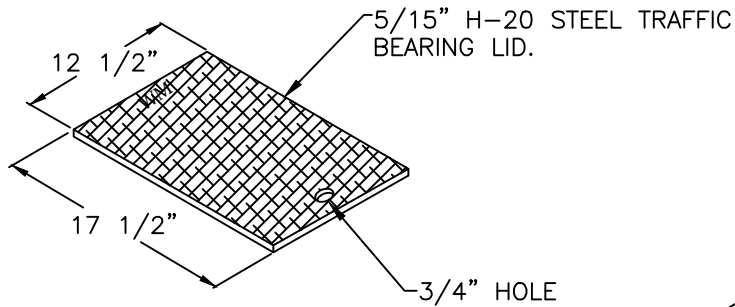


INSTALLATION IN SIDEWALK

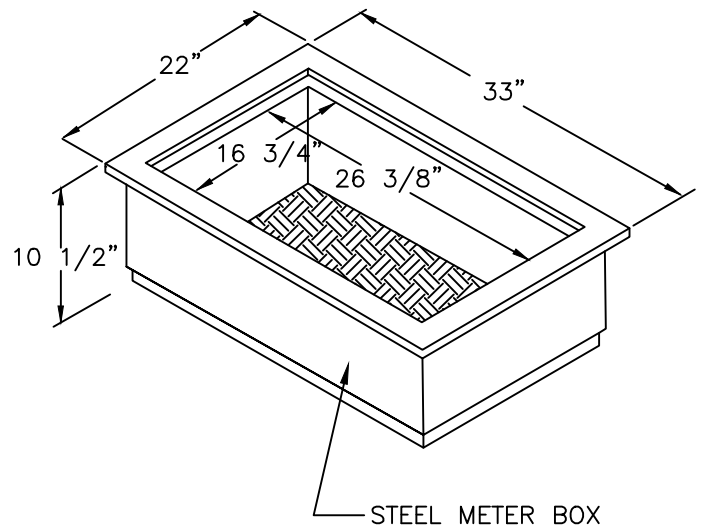


INSTALLATION WITH NO SIDEWALK

	<p>CITY OF MERCER ISLAND STANDARD DETAILS WATER</p>	
	<p>WATER METER PLACEMENT</p>	
<p>3-20-2006</p>	<p>NO SCALE</p>	<p>W-16</p>
<p>REV DATE</p>	<p>APPROVED</p>	<p>APPROVED</p>



1" STEEL METER BOX



2" STEEL METER BOX

NOTES

1. FOR 1" STEEL BOX, USE FOG TITE J20S LID OR EQUAL, WITH A 3/4" ROUND HOLE.
2. 2" METER BOX SHALL BE FOG TITE #2J20S ALL STEEL BOX WITH TAR COATING. LID SHALL BE HINGED WITH 3/4" DIA. LIFTING HOLE.



CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

1" AND 2" STEEL
WATER METER BOX

12-23-2013

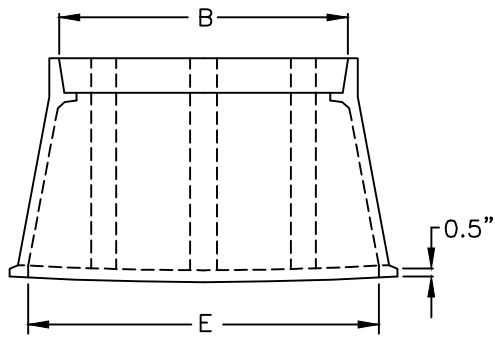
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W-17

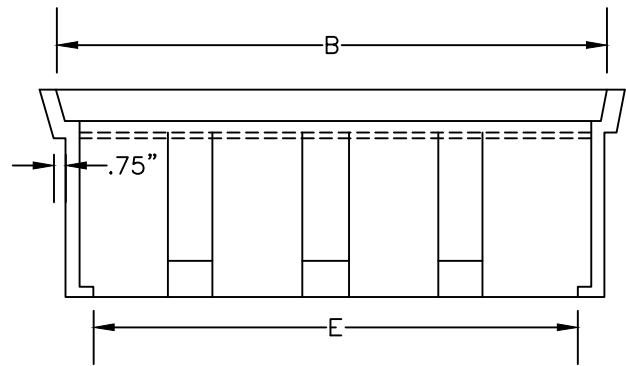
REV DATE

APPROVED

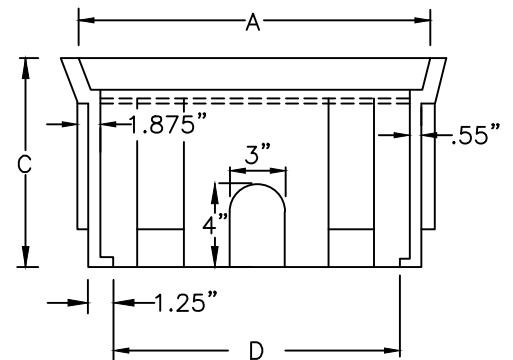
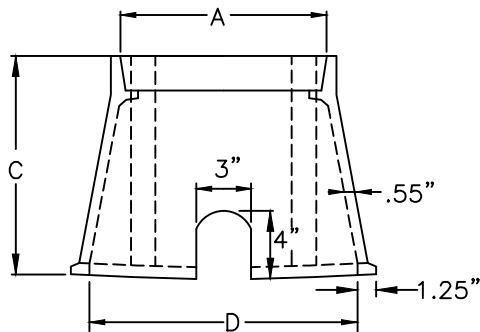
MSBC



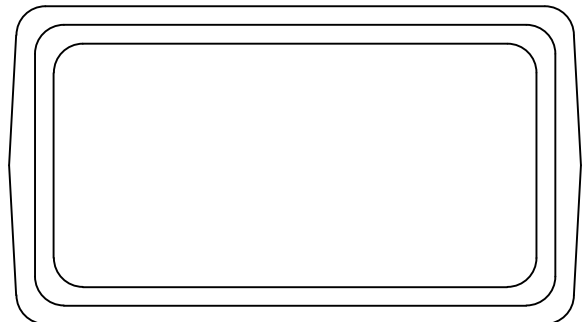
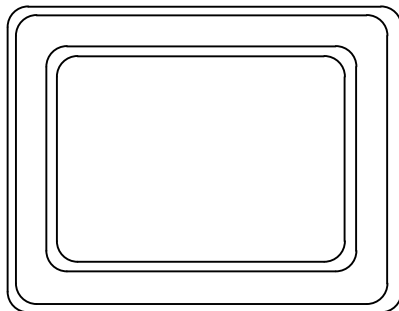
MSBCF



LONG SIDE VIEW



SHORT SIDE VIEW



TOP VIEW

WATER SERVICE SIZE	PART NO.	A	B	C	D	E
1"	MSBCF1324-12	13.75"	23.1875"	12"	12.125"	24.5"
2"	MSBC1730-18	17.625"	30.5"	18"	22.875"	35"

NOTES:

- METER BOX SHALL BE MID-STATES PLASTICS AS SHOWN, WITH A DUCTILE IRON LID WITH A FLIP OR HINGED INSPECTION LID TO INCLUDE A 3/4" PICK HOLE.
- PLASTIC WATER METER BOXES SHALL NOT BE INSTALLED WITHIN A DRIVING OR PARKING AREA.



CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

1" & 2" PLASTIC
WATER METER BOX

12-23-2013

NO SCALE

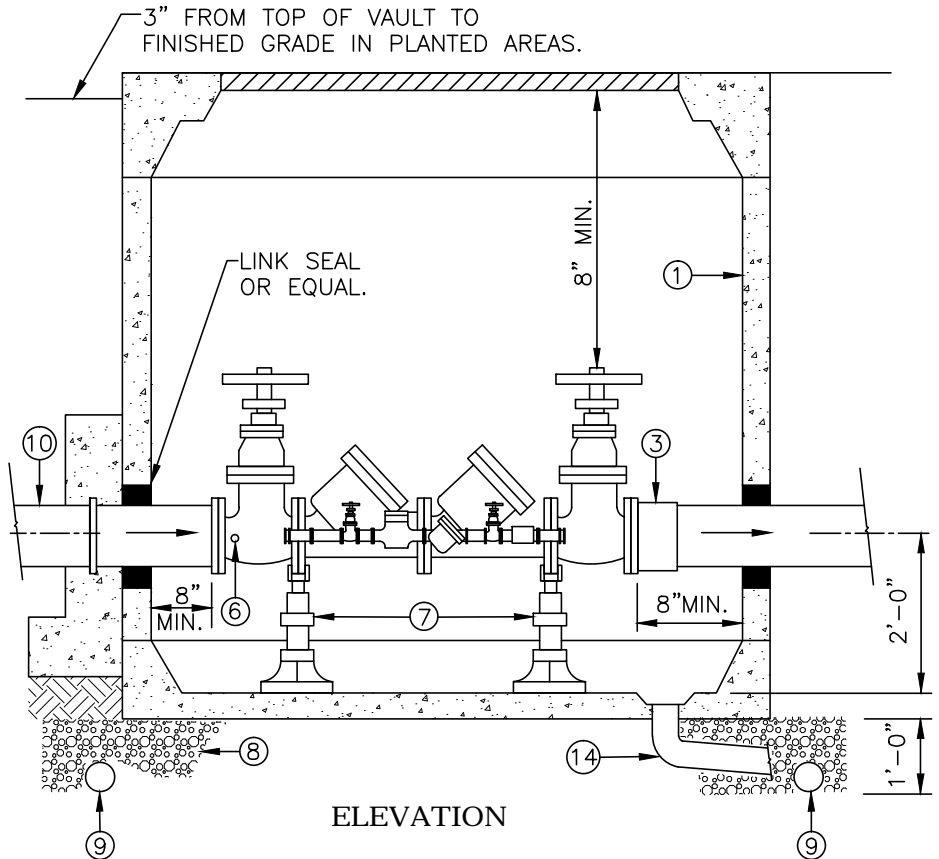
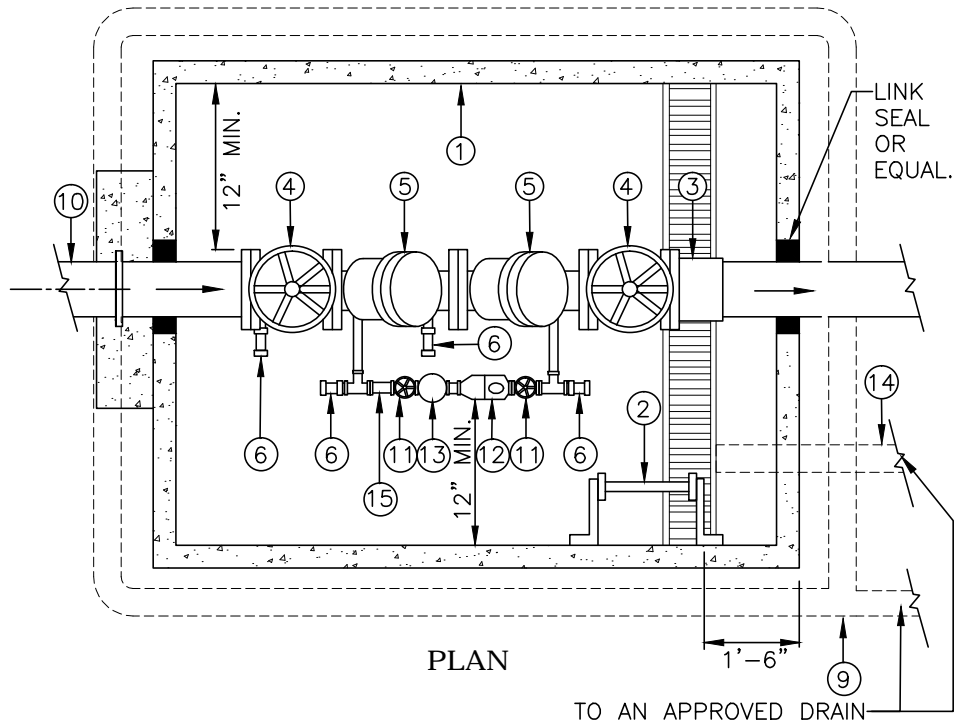
W-18A


REV DATE

APPROVED

GENERAL NOTES

- A. SEE W-19B FOR MATERIAL LIST.
- B. VALVE ASSEMBLY TO BE CENTERED IN VAULT.
- C. TEE AND GATE VALVE REQUIRED ON MAIN.
- D. WHEN DOUBLE CHECK VALVE ASSEMBLY IS USED IN SAME LINE WITH DOMESTIC BUILDING METER, METERED DETECTOR BYPASS SHALL BE OMITTED.
- E. ASSEMBLY TO BE MAINTAINED BY OWNER AND ANNUAL CERTIFICATION IS REQUIRED.
- F. THE CITY OF MERCER ISLAND MUST TEST AND CERTIFY THE FIRE LINE BEFORE CONNECTION TO THE CITY SYSTEM IS ALLOWED.
- G. FIRELINE SHALL NOT BE PUT INTO SERVICE UNTIL THE DOUBLE CHECK VALVE ASSEMBLY IS APPROVED BY THE CITY.
- H. VAULT PENETRATIONS SHALL BE CORE DRILLED.
- I. A THRUST RING OR APPROVED EQUAL SHALL BE INSTALLED ON INLET SIDE OF PIPE RESTRAINED JOINT.
- J. MATERIALS FOR BY PASS SHALL BE ALL BRASS AND COPPER WITH SWIVEL COUPLINGS BETWEEN SHUT-OFF VALVES FOR REPLACEMENT.



	<p>CITY OF MERCER ISLAND</p> <p>STANDARD DETAILS</p> <p>WATER</p>	
<p>DOUBLE DETECTOR</p> <p>CHECK VALVE ASSEMBLY</p>		
7-01-2014	NO SCALE	W-19A
		APPROVED

REV	DATE				
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KEY NO.	QUANTITY		MATERIAL
	4"	6" & 8"	
1	1	–	PRE CAST CONCRETE VAULT AS APPROVED BY THE CITY ENGINEER
1	–	1	PRE CAST CONCRETE VAULT AS APPROVED BY THE CITY ENGINEER
1	1	–	PRE CAST CONCRETE VAULT AS APPROVED BY THE CITY ENGINEER
1	–	1	PRE CAST CONCRETE VAULT AS APPROVED BY THE CITY ENGINEER
1	–	1	PRE CAST CONCRETE VAULT AS APPROVED BY THE CITY ENGINEER
1	1	1	LW PRODUCTS ALUMINUM, SINGLE DOOR, H-20 OR EQUAL.
2	1	1	FABRICATED BOLT-ON LADDER. USE THREE SETS OF MOUNTING BRACKETS ATTACHED TO VAULT WALL WITH 5/8" DIAMETER CORROSION RESISTANT ANCHOR BOLTS (HILTI KWIK BOLT, PHILIPS RED HEAD OR APPROVED EQUAL). ALL STEEL FOR LADDER SHALL BE A-36, OSHA APPROVED HOT DIPPED GALVANIZED AFTER FABRICATION. SEE DRAWING NO. W-27C.
3	1	–	4" DIAMETER FLEXIBLE FLANGED COUPLING ADAPTER ROCKWELL TYPE 912
3	–	1	8" OR 6" DIAMETER FLEXIBLE FLANGED COUPLING ADAPTER ROCKWELL TYPE 912
4	1	–	4" O.S. & Y. GATE VALVE U.L. APPROVED
4	–	1	8" OR 6" O.S. & Y. GATE VALVE U.L. APPROVED
5	1	–	4" D.S.H.S. APPROVED DOUBLE CHECK VALVE ASSEMBLY, INCLUDING 2 O.S. & Y. GATE VALVES, TEST COCK, 3/4" DOUBLE CHECK VALVE, SINGLE OR MULTI JET METER (TO READ IN CUBIC FEET) AND 3/4" BRASS OR COPPER BYPASS WITH IN LINE VALVE.
5	–	1	8" OR 6" D.S.H.S. APPROVED DOUBLE CHECK VALVE ASSEMBLY, INCLUDING 2 O.S. & Y. GATE VALVES, TEST COCK, 3/4" DOUBLE CHECK VALVE, SINGLE OR MULTI JET METER (TO READ IN CUBIC FEET) AND 3/4" BRASS OR COPPER BYPASS WITH IN LINE VALVES.
6	1	1	3/4" DIAMETER TEST COCKS
7	2	2	ADJUSTABLE PIPE SADDLE SUPPORT (ITT GRINNEL FIG 264 OR APPROVED EQUAL). ATTACH TO VAULT FLOOR WITH FOUR 1/2" DIAMETER CORROSION RESISTANT ANCHOR BOLTS (HILT KIWI BOLT, PHILIPS RED HEAD OR APPROVED EQUAL). SEE DRAWING NO. W-27C.
8	–	–	PEA GRAVEL BACKFILL FOR PIPE BEDDING UNDER PRECAST CONCRETE UTILITY VAULT.
9	–	–	4" DIAMETER UNDERDRAIN, CONNECT TO DRAINAGE SYSTEM, SCHEDULE 200 PERFORATED PVC WITH GALVANIZED SCREEN EACH END.
10	–	–	4" DIAMETER CL. 52 DUCTILE IRON PIPE
10	–	–	6" OR 8" DIAMETER CL. 52 DUCTILE IRON PIPE
11	1	1	3/4" GATE VALVE U.L. LISTED
12	1	1	5/8" x 3/4" ACCULINK MULTINET MASTER METER WITH SENSUS COMPATIBLE MXU READ IN CU. FT. MULTI-JET
13	1	1	3/4" DOUBLE CHECK VALVE
14	1	1	SOLID PVC PIPE SUMP DRAIN. SIZE PER MANUFACTURER'S RECOMMENDATION. CONNECT TO DRAINAGE STRUCTURE AS APPROVED
15	1	1	3/4" "Y" STRAINER

NOTES

- ALL VAULT, BASED AND TOPS TO BE COATED WITH DAMPPROOFING.
- SIZE DETERMINED ON BASIS OF ACTUAL FIRE DEMAND.
- SEE W-19A FOR ADDITIONAL DETAILED MATERIAL NOTES.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

**MATERIAL LIST
DOUBLE DETECTOR CHECK**

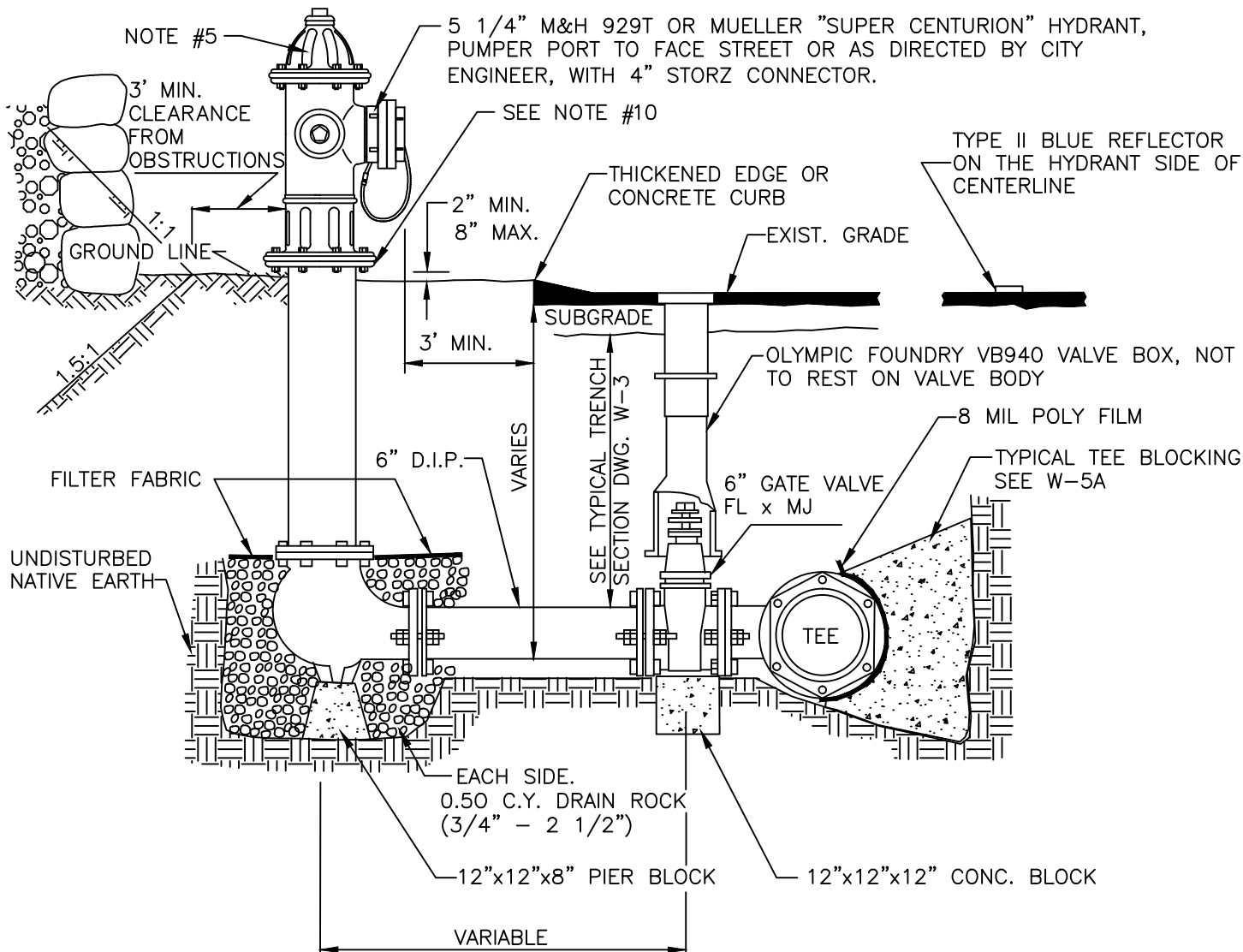
7-01-2014

NO SCALE

W-19B


REV DATE

APPROVED

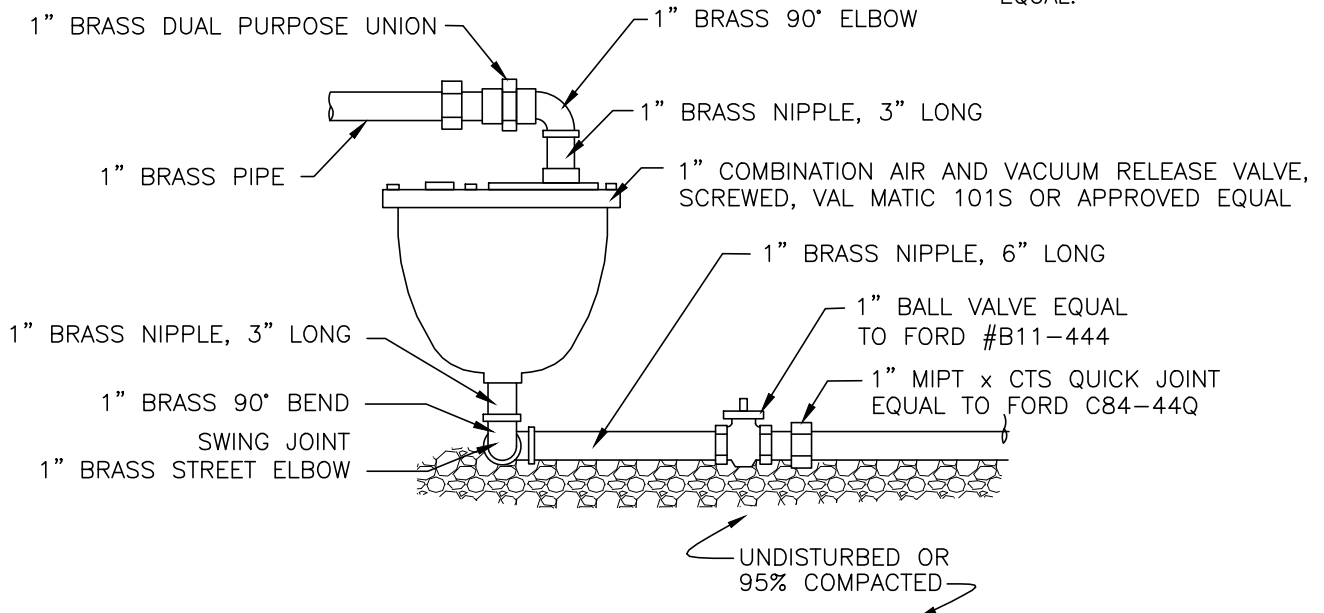
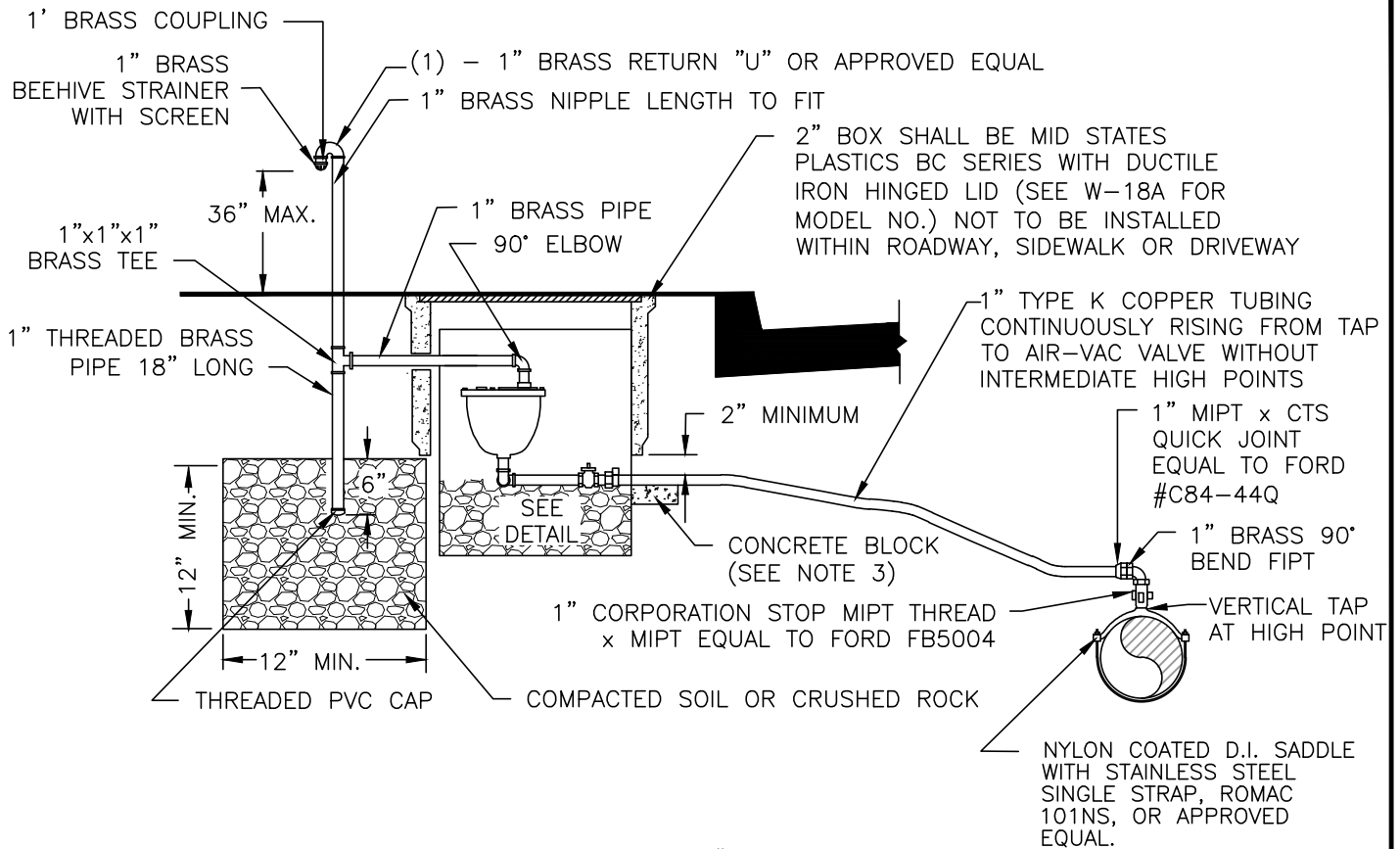


NOTE:

1. NO DOMESTIC CONNECTIONS CAN BE MADE TO THE FIRE HYDRANT RUNS.
2. ANY FIRE HYDRANT RUN OVER 18 FEET IN LENGTH OF PIPE SHALL HAVE RESTRAINED JOINT GASKETS.
3. USE ROMA GRIP, OR APPROVED EQUAL, PIPE RESTRAINERS AT VALVE AND HYDRANT BASE.
4. HYDRANT SHALL BE PAINTED WITH 2 COATS OF FARWEST #250 HIGH GLOSS WHITE PAINT, OR APPROVED EQUAL, APPLIED WITH A PAINT BRUSH. DO NOT APPLY PAINT TO STORZ FITTING, BRASS PORT THREADS, OR BELOW SAFETY FLANGE.
5. 1-5 1/4" M.V.O. HYDRANT WITH 2-2 1/2" N.T.S. AND 1-4" PUMPER, SEATTLE STANDARD PIPE THREAD WITH 4" STORZ CONNECTOR. M.J. INLET WITH LUGS, BRASS-TO-BRASS SUB-SEAT, M&H 929T OR MUELLER "SUPER CENTURION".
6. BOLLARDS MAY BE USED TO PROTECT THE HYDRANT WHEN NO CURBS ARE PRESENT OR IN EXPOSED AREAS OF PARKING LOTS.
7. STRAIGHT PIPE TO HYDRANTS FROM MAIN, NO BENDS.
8. REMOVE CHAINS FROM HYDRANT CAPS.
9. VALVE AND HYDRANT MUST BE PLUMB.
10. THIS DISTANCE IS MEASURED FROM BOTTOM OF SAFETY FLANGE TO LEVEL OF FINISH GRADE BELOW HYDRANT.

	CITY OF MERCER ISLAND	
	STANDARD DETAILS	
WATER		
FIRE HYDRANT CONNECTION		
2-05-2014	NO SCALE	W-24


REV DATE			APPROVED
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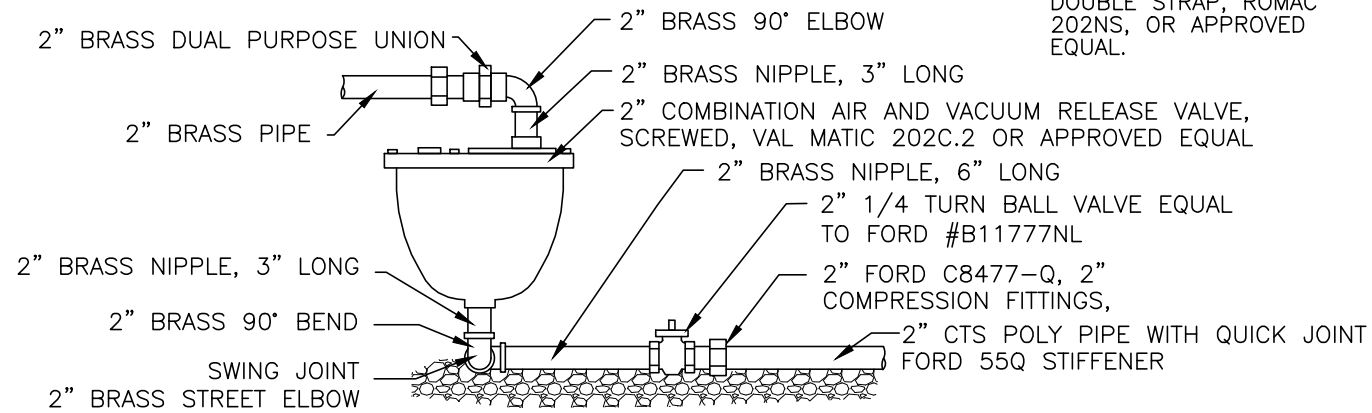
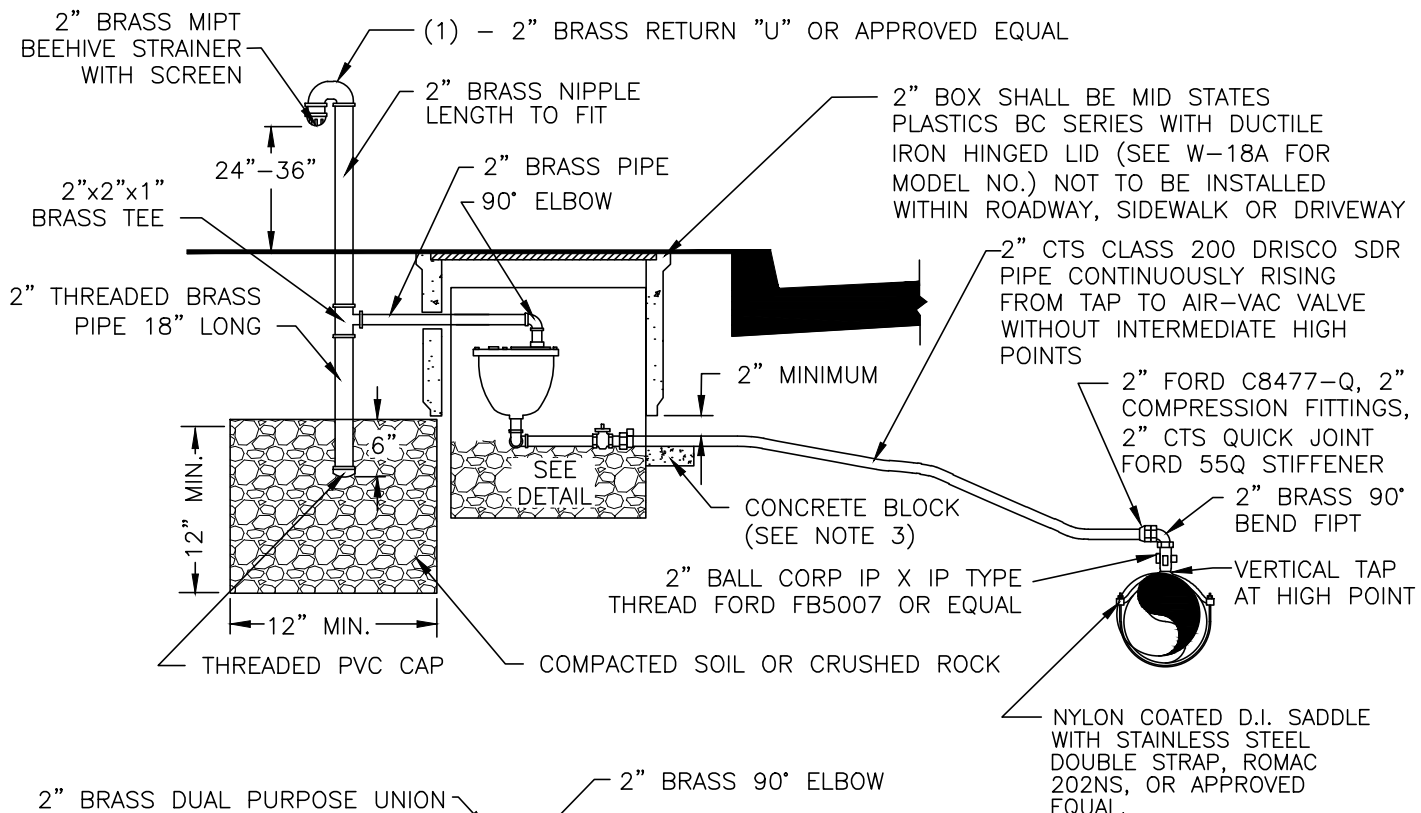


VALVE ASSEMBLY DETAIL

NOTES

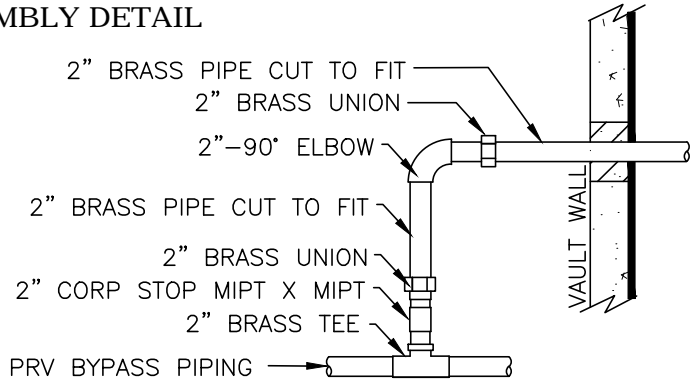
1. ALL FITTINGS SHALL BE BRASS, ALL PIPE SHALL BE COPPER, UNLESS OTHERWISE SHOWN.
2. TAP FOR COMBINATION AIR AND VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF WATER MAIN. EXACT LOCATION OF ASSEMBLY TO BE DETERMINED BY CITY.
3. AT THE CITY INSPECTORS DISCRETION A CONCRETE BLOCK SHALL BE PLACED UNDER VALVE BOX TO KEEP BALL VALVE EXPOSED.

	CITY OF MERCER ISLAND	
	STANDARD DETAILS	
WATER		
1" AIR & VACUUM VALVE ASSEMBLY		
3-25-2015	NO SCALE	W-25
REV DATE	APPROVED	



VALVE ASSEMBLY DETAIL


UNDISTURBED OR 95% COMPACTED

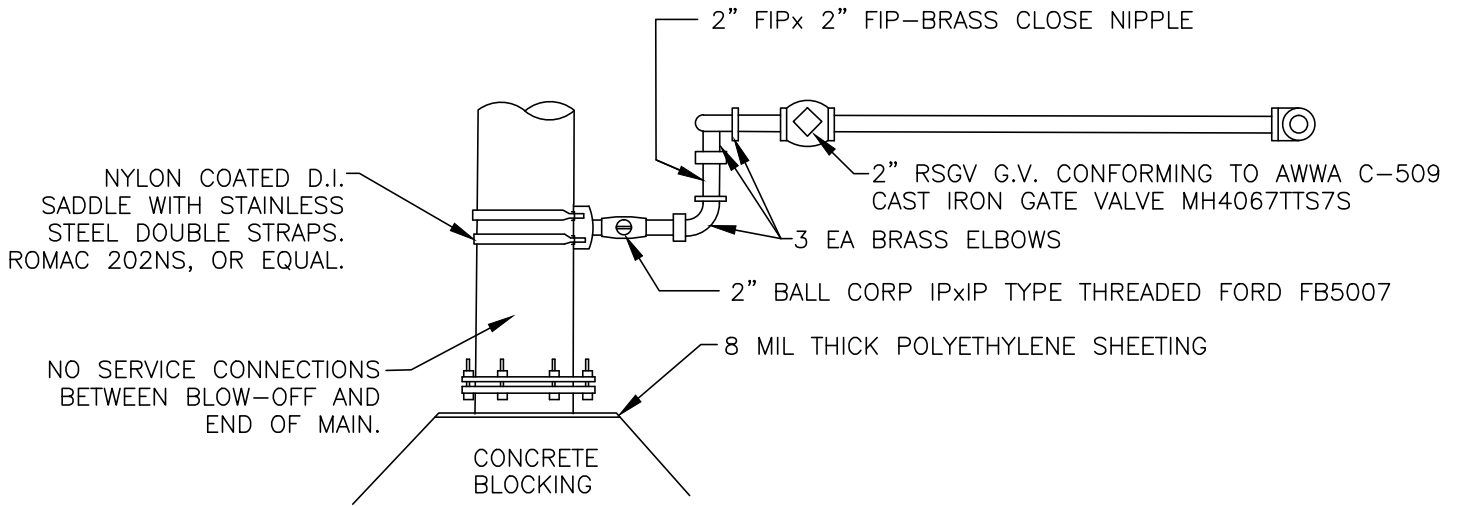


PRV VAULT INSTALLATION DETAIL

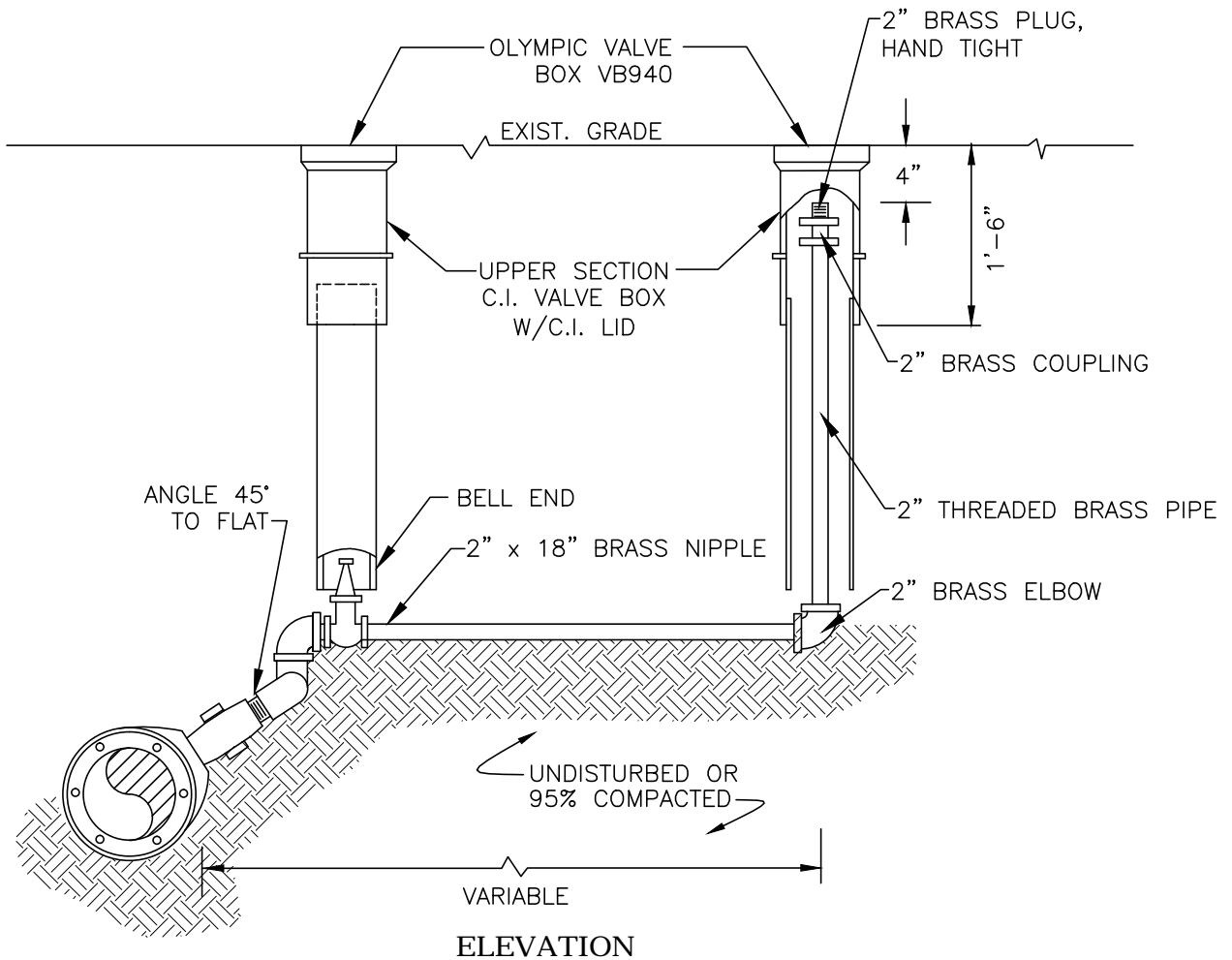
NOTES

1. ALL FITTINGS SHALL BE BRASS.
2. TAP FOR COMBINATION AIR AND VACUUM VALVE ASSEMBLY MUST BE INSTALLED AT HIGHEST POINT OF WATER MAIN. EXACT LOCATION OF ASSEMBLY TO BE DETERMINED BY CITY.
3. AT THE CITY INSPECTORS DISCRETION A CONCRETE BLOCK SHALL BE PLACED UNDER VALVE BOX TO KEEP BALL VALVE EXPOSED.

	CITY OF MERCER ISLAND STANDARD DETAILS WATER	
	2" AIR & VACUUM VALVE ASSEMBLY	
3-25-2015	NO SCALE	W-25A
REV DATE		APPROVED



PLAN VIEW



NOTES

1. ALL PIPING MATERIALS, FITTINGS, COUPLINGS SHALL BE BRASS.
NO GALVANIZED MATERIALS WILL BE ALLOWED.



CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

2" BLOW-OFF ASSEMBLY

7-01-2014

NO SCALE

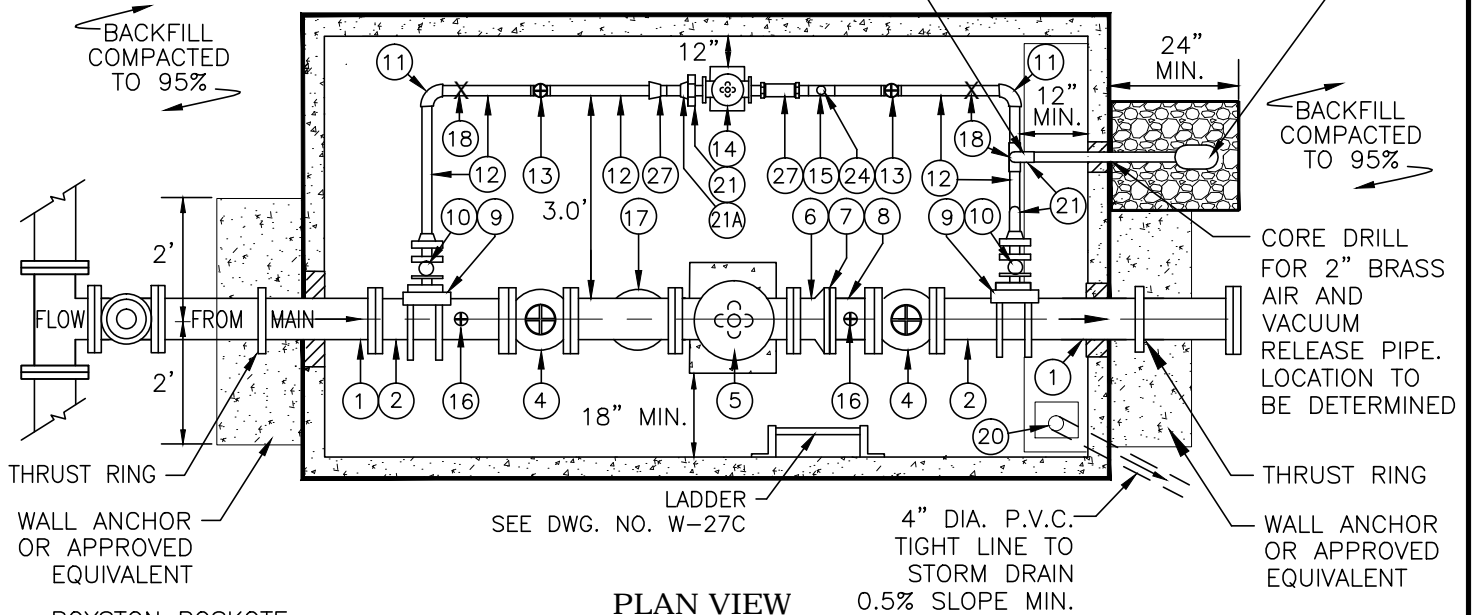
W-26

REV DATE

APPROVED

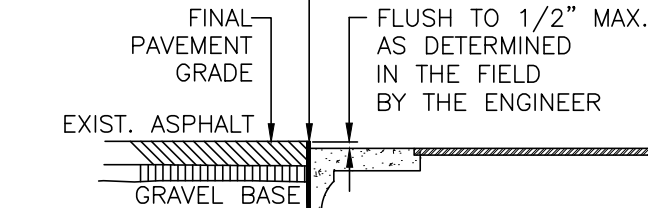
LOCATION TO BE DETERMINED. INSTALL 2" BRASS TEE, 2" IP X IP BRASS BALL CORP, 2" COMBINATION AIR AND VACUUM RELEASE VALVE THREADED VALMATIC 202C.2 OR APPROVED EQUAL.

2" BRASS PIPE CUT TO FIT FOR RISER, 1 - 2" BRASS RETURN "U" OR APPROVED EQUAL CUT TO FIT EXISTING VAULT

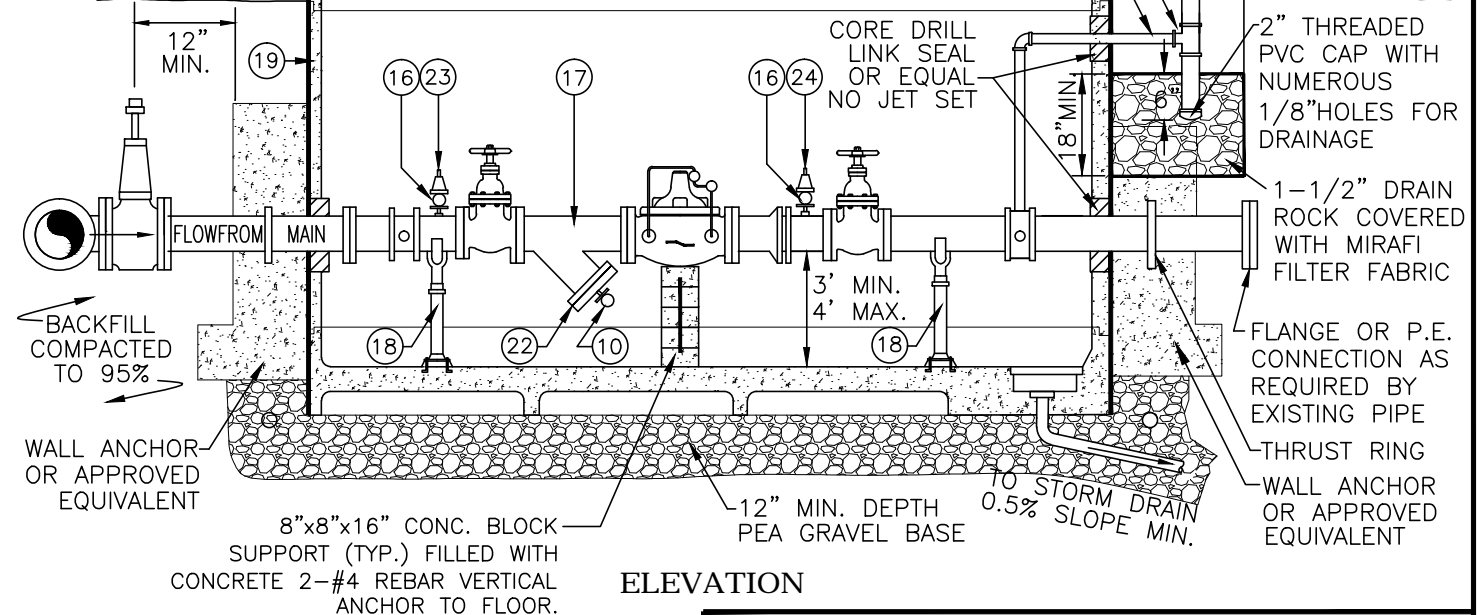


PLAN VIEW

ROYSTON ROSKOTE-612XM DAMPROOF PRIOR TO BACKFILLING



ELEVATION



NOTES

1. SEE DRAWING NO. W-27B FOR A MATERIAL LIST.
2. SEE DRAWING NO. W-27C & W-27D FOR DETAILS.



CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

6" PRESSURE REDUCING VALVE VAULT

9-3-2014

NO SCALE

W-27A

REV DATE

APPROVED

MATERIALS FOR 6" PRESSURE REDUCING VALVE (PRV) STATION

KEY NO.	QUANTITY	DESCRIPTION
1	1	6" SPOOL – FLxFL WITH THRUST RING
2	1	6" SPOOL W/2" IP TAP – FLxFL
4	2	6" GATE VALVE– MUELLER A-2380-6, WHEEL VALVE, CLASS 125 OR EQUAL FLxFL EPOXY COATED RESILIENT SEAT
5	1	6" PRESSURE REDUCING VALVE FLxFL PILOT SYSTEM TO FACE TOWARD CENTER OF VAULT. CITY TO PROVIDE EXACT PRV SPECIFICATIONS.
6	1	6" ADJUSTABLE CONNECTION – CLOW F-1439, FLxMJ
7	1	6" MECHANICAL JOINT RETAINER GLAND
8	1	6" SPOOL – FLxPE
9	1	6"x2" DOUBLE STRAP SADDLE ROMAC 202NS
10	4	2" – I.P.xI.P. BRONZE BALL VALVE
11	3	2" x 90° ELBOW BRASS
12	6'±	2" BRASS PIPE AND FITTINGS
13	2	2" GATE VALVE – MUELLER 2360, EPOXY COATED CLASS 125 – I.P. x I.P. OR EQUAL, W/HAND WHEEL
14	1	2" PRESSURE REDUCING VALVE I.P. x I.P. PILOT SYSTEM TO FACE TOWARDS CENTER OF VAULT. CITY TO PROVIDE EXACT PRV SPECIFICATIONS.
15	1	2"x3/4" TEE, 3/4" I.P. CORP STOP WITH A 3/8" QUARTER TURN BALL-VALVE, OR EQUAL BRASS 3/4"x3/8" BELL REDUCERS, ALL BRASS
16	2	THD, 3/4" I.P. CORP STOP – MUELLER WITH 3/8" QUARTER TURN BALL VALVE, OR EQUAL 3/4"x3/8" BELL REDUCERS, ALL BRASS
17	1	6" Y-STRAINER (FLxFL) EQUAL TO MUESSCO NO. 751
18	5	ADJUSTABLE PIPE SUPPORT – GRINNELL FIG. 264 BOLTED TO FLOOR (2)-2", (2)-6"
19	1	VALVE CHAMBER – SIZE AS REQUIRED UTILITY VAULT LW PRODUCTS ALUMINUM LID, SPRING ASSISTED H-20 OR EQUAL OUT OF TRAFFIC OR H-30 IN DRIVING SURFACE OR SIDEWALK
20	1	DRAIN SUMP W/4" OUTLET
21	6	2" BRASS UNION
21A	2	2" X 6" BRASS NIPPLES
22	1	6" BLIND FLANGE W/2" TAP
23	1	0-200 PSI PRESSURE GAUGES, GLYCOL FILLED 3/8" I.P.
24	2	0-100 PSI PRESSURE GAUGES, GLYCOL FILLED 3/8" I.P.
25	1	2" COMBINATION AIR & VACUUM RELEASE VALVE, SCREWED, VALMATIC 2026.2 OR APPROVED EQUAL.
26	3	CORE DRILL HOLES IN VAULT, USE LINK SEAL OR EQUAL, NO JET SET
27	2	2" CTS BRASS DRESSER COUPLINGS, PROVIDED ACCESS HATCH AND CONNECT INTO VAULT DRAINAGE.

NOTES

- SIZES PER APPROVED DESIGN.
- SEE DRAWING NO. W-27A FOR VAULT PLAN.
- SEE DRAWING NO. W-27C & W-27D FOR OTHER DETAILS.
- PAINT INTERIOR VAULT WALLS WITH 2 COATS OF OYSTER WHITE PAINT.
- PRIMER COAT AND PAINT ALL PIPING WITH 2 COATS OF SHERWIN WILLIAMS ACROLON 218HS, CUSTOM COLOR #8605-36202 OR APPROVED EQUAL.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

MATERIAL LIST
6" PRESSURE REDUCING VALVE

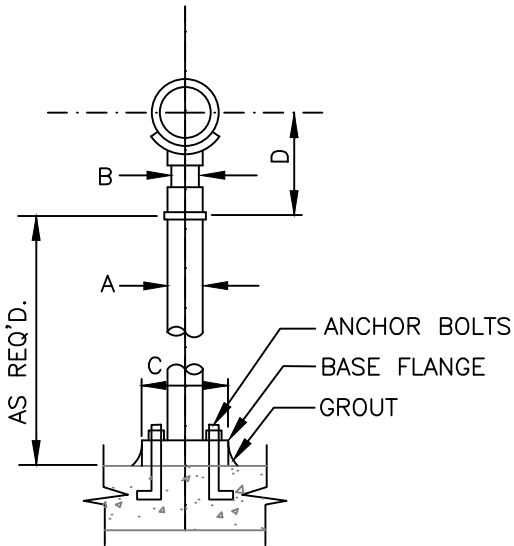
9-3-2014

NO SCALE

W-27B

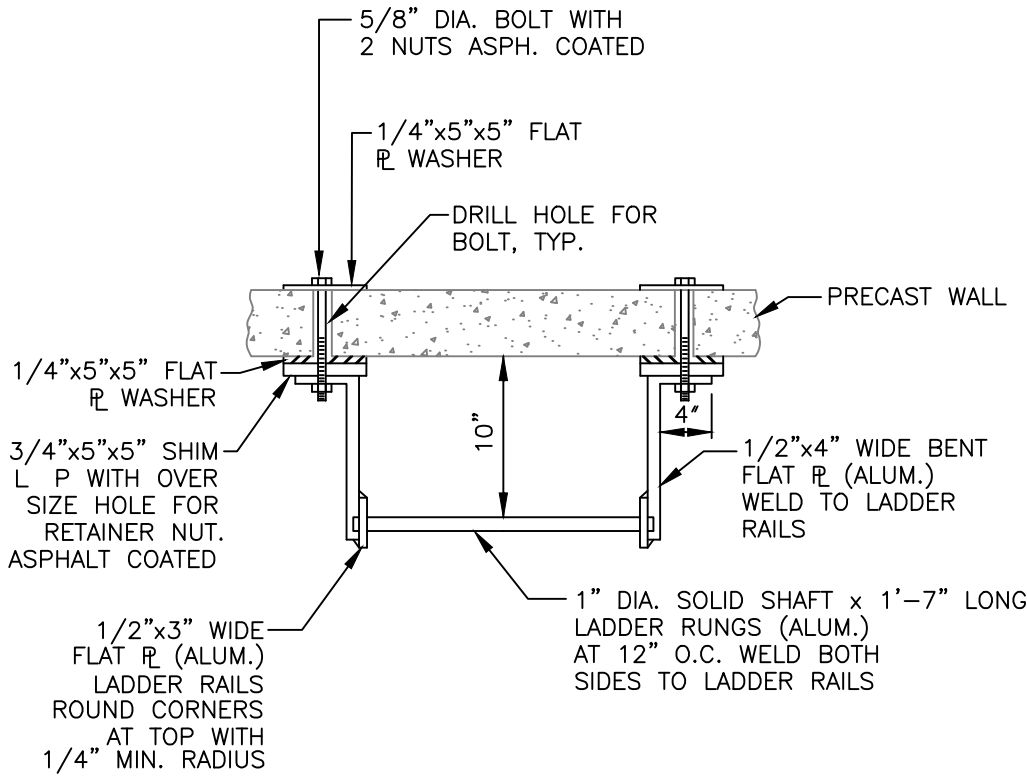
REV DATE

APPROVED

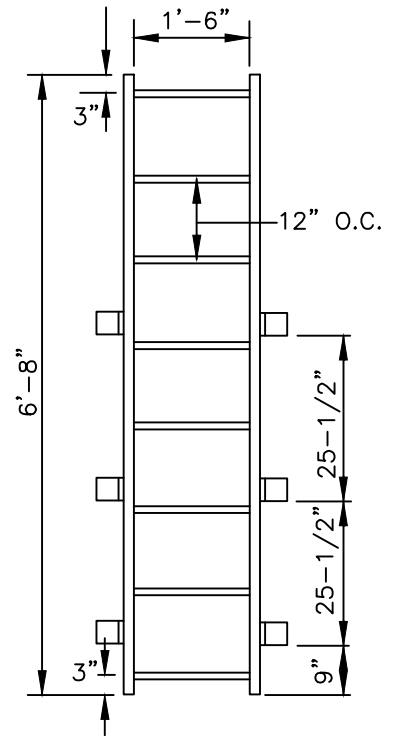


ADJUSTABLE PIPE SUPPORT

ADJUSTABLE PIPE SADDLE SUPPORT SCHEDULE (IN INCHES)					
PIPE SIZE	A	B	C	D	
				MIN.	MAX.
2 1/2	2 1/2	1 1/2	9	8	13
3	2 1/2	1 1/2	9	8 1/4	13 1/4
3 1/2	2 1/2	1 1/2	9	8 1/2	13 1/2
4	3	2 1/2	9	9 1/4	14
5	3	2 1/2	9	10	14 3/4
6	3	2 1/2	9	10 1/2	15 1/4
8	3	2 1/2	9	11 3/4	16 1/2
10	3	2 1/2	9	13 1/2	18 1/4
12	3	2 1/2	9	15	19 3/4
16	6	3 1/2	13 1/2	19 1/2	24




LADDER SECTION

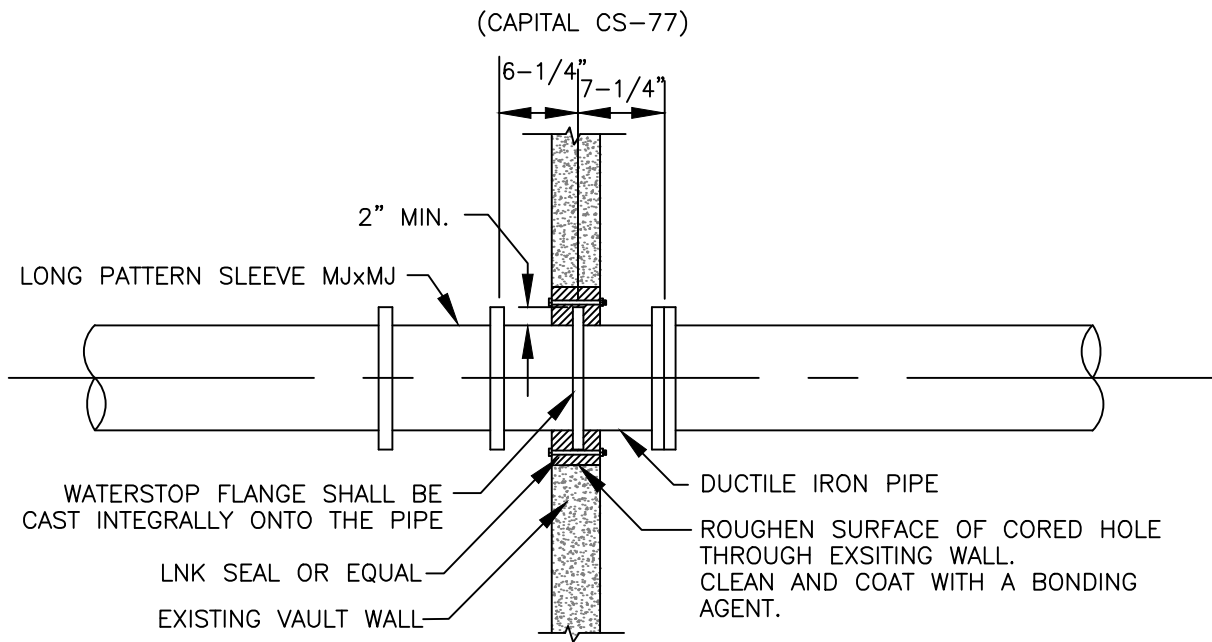


LADDER PLAN

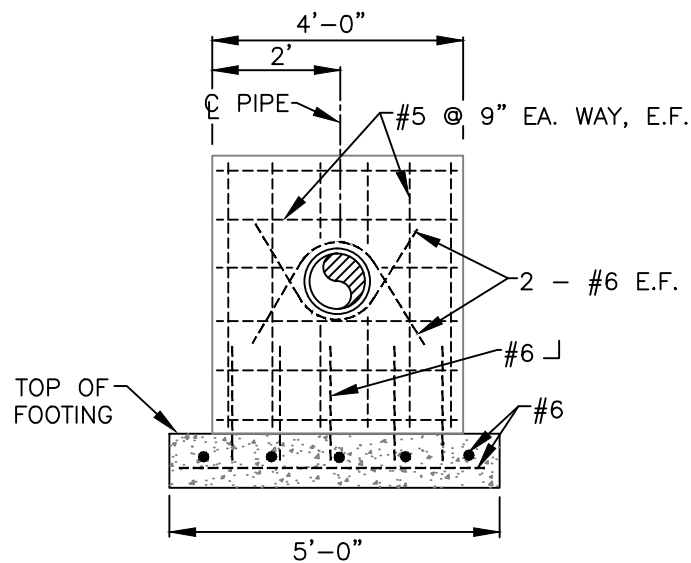
NOTES

1. SEE DRAWING NO. W-27A FOR VAULT PLAN.
2. SEE DRAWING NO. W-27B FOR MATERIAL LIST.
3. SEE DRAWING NO. W-27D FOR ADDITIONAL DETAILS.

	CITY OF MERCER ISLAND STANDARD DETAILS WATER	
	DETAILS PRESSURE REDUCING VALVE VAULT	
9-24-2013	NO SCALE	W-27C



PIPE PENETRATION DETAIL



WALL ANCHOR DETAIL

NOTES

1. SEE DRAWING NO. W-27A FOR VAULT PLAN.
2. SEE DRAWING NO. W-27B FOR MATERIAL LIST.
3. SEE DRAWING NO. W-27C FOR ADDITIONAL DETAILS.



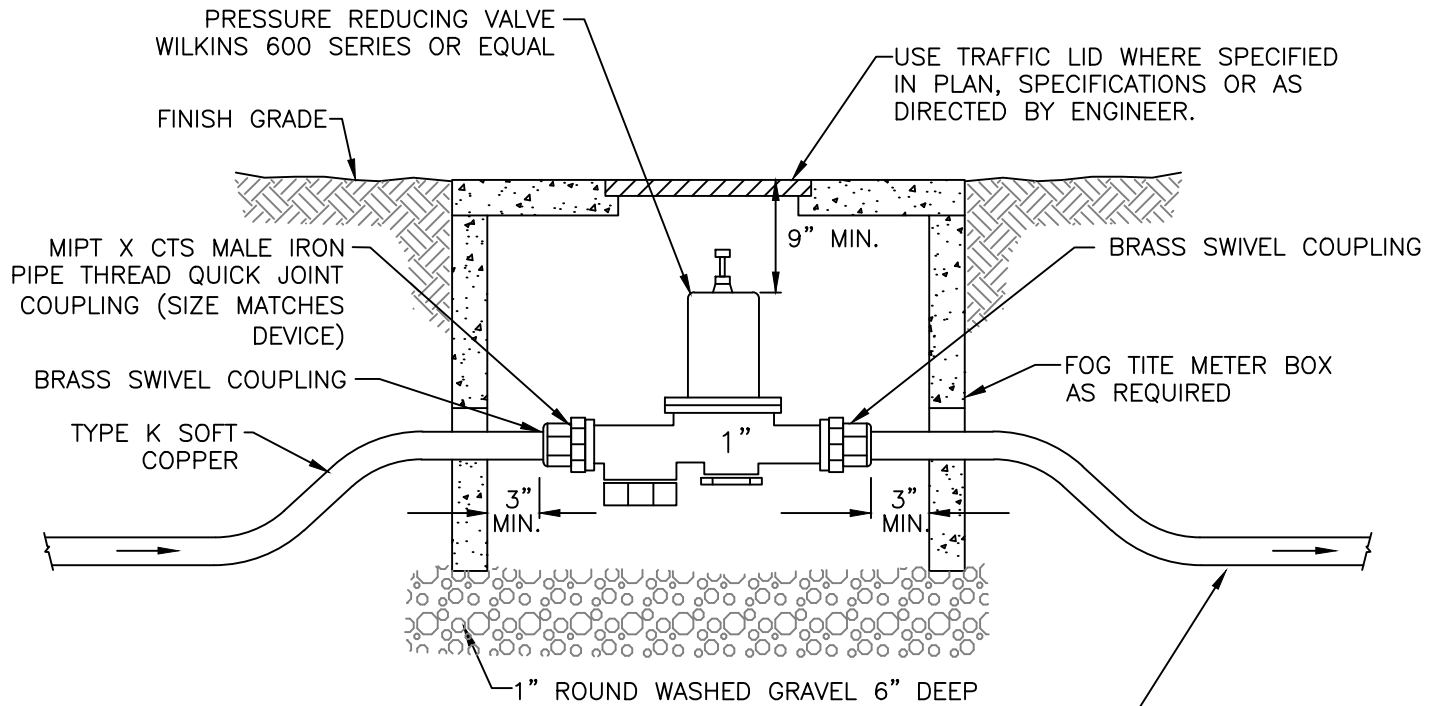
CITY OF MERCER ISLAND
STANDARD DETAILS
WATER

DETAILS
PRESSURE REDUCING VALVE VAULT

9-24-2013

NO SCALE

W-27D



1. TYPE K SOFT COPPER
2. CONNECT TO CUSTOMER
SIDE PER DRAWING W-13, ⑤

NOTES

1. ALL FITTINGS TO BE COPPER AND BRASS
2. CONNECT TO CUSTOMER SIDE PER STANDARD
WATER SERVICE DETAILS (W-13) ⑤



CITY OF MERCER ISLAND STANDARD DETAILS WATER

1" RESIDENTIAL
PRESSURE REDUCING VALVE

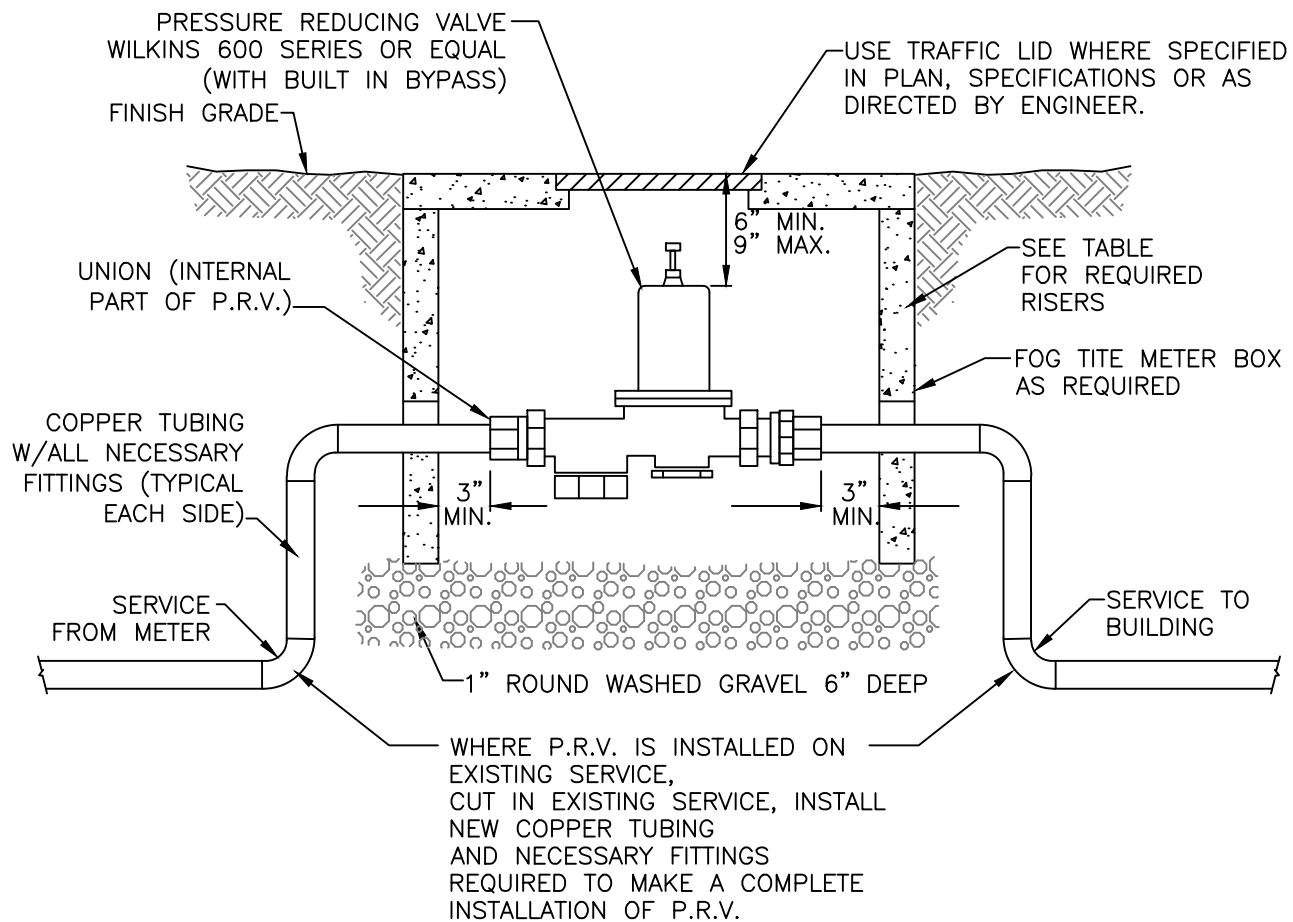
12-18-2014

NO SCALE

W-28

REV DATE

APPROVED



P.R.V. SIZE	FOG TITE METER BOX NO.	RISER REQUIRED
2"	2	12"
1-1/2"	2	12"
1-1/4"	1	6"
1"	1	6"
3/4"	1	4"
1/2"	1	4"

NOTES

1. P.R.V. SHALL HAVE AN INTEGRAL BYPASS.



**CITY OF MERCER ISLAND
STANDARD DETAILS
WATER**

**RESIDENTIAL
PRESSURE REDUCING VALVE**

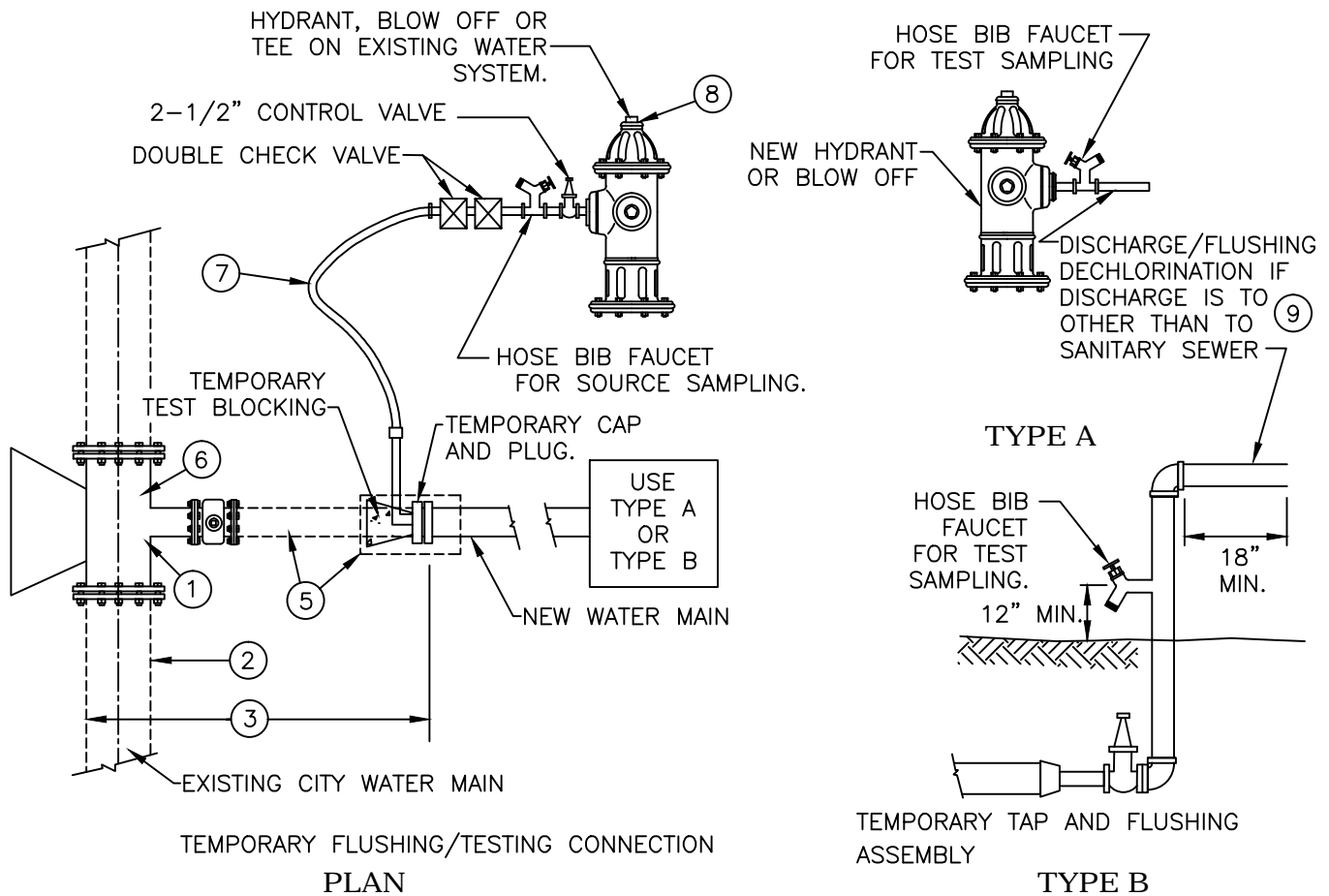
12-24-2013

NO SCALE

W-28

REV DATE


APPROVED



- ① CONTRACTOR TO DETERMINE ALIGNMENT, SIZE AND GRADE OF EXISTING FACILITIES PRIOR TO SHUTDOWN.
- ② ALL EXCAVATION, PIP, FITTINGS, MATERIALS, BACKFILL COMPACTION AND STREET RESTORATION ARE THE CONTRACTORS RESPONSIBILITY.
- ③ ALL MATERIALS TO BE ON SITE PRIOR TO SHUTDOWN OF EXISTING MAIN.
- ④ ALL PRESSURE TESTING, DISINFECTION, BACTERIA TESTING, TASTE TESTING AND NOTIFICATION OF RESIDENTS EFFECTED BY THE SHUTDOWN SHALL BE COMPLETED IN ACCORDANCE WITH SECTION 7, 8 & 9 OF DIVISION 9, WATER ENGINEERING STANDARDS, PRIOR TO CONNECTION TO THE CITY SYSTEM OF THE NEW WATERMAIN.
- ⑤ LONG PATTERN MECHANICAL JOINT, SLEEVE, WITH PIPE CUT TO FIT GAP – FURNISH AND INSERTED AT TIME OF CONNECTION.
- ⑥ TEE OR TAPPING TEE AND MATERIALS NECESSARY TO MAKE THE FINAL CONNECTION TO THE CITY WATER SYSTEM SHALL BE SUPPLIED AND INSTALLED BY THE CONTRACTOR.
- ⑦ CLEAN POTABLE WATER HOSE, WATER METER AND DCVA PROVIDED BY CITY, A RENTAL FEE IS REQUIRED.
- ⑧ HYDRANT PERMIT REQUIRED.
- ⑨ CHECK WITH SEWER DEPARTMENT BEFORE DISCHARGING INTO THE SANITARY SEWER SYSTEM. ALL CHLORINATED WATER MUST BE DISCHARGED INTO THE SANITARY SEWER SYSTEM, UNLESS DECHLORINATED FIRST.

NOTES

- 1. ALL FITTINGS TO BE DUCTILE IRON.
- 2. ALL EXCAVATION SHALL PROVIDE A MINIMUM OF 1' CLEAR AROUND PIPE AND FITTINGS.

	CITY OF MERCER ISLAND	
	STANDARD DETAILS	
WATER		
WATER MAIN FLUSHING		
8-12-2009	NO SCALE	W-32

REV DATE			APPROVED
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Appendix H

Water Use Efficiency

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**BUSINESS OF THE CITY COUNCIL
CITY OF MERCER ISLAND, WA**

**AB 4927
February 24, 2014
Consent Calendar**

REGIONAL WATER CONSERVATION GOAL	Proposed Council Action: Adopt Resolution No. 1478, establishing Mercer Island's regional water conservation goal.
---	--

DEPARTMENT OF	Maintenance (Glenn Boettcher)
COUNCIL LIAISON	n/a
EXHIBITS	1. Resolution No. 1394 2. Proposed Resolution No. 1478
APPROVED BY CITY MANAGER	

AMOUNT OF EXPENDITURE	\$	n/a
AMOUNT BUDGETED	\$	n/a
APPROPRIATION REQUIRED	\$	n/a

SUMMARY

In 2003, the Washington State Legislature passed the Municipal Water Law to reform the state's water laws. This law provides municipalities water right flexibility and certainty in exchange for using water more efficiently. The Legislature directed the state Department of Health to develop a Water Use Efficiency (WUE) rule to implement and regulate the law. The WUE rule is intended to increase awareness about how the efficient use of water strengthens the relationship between the reliability and safety of water supplies. Specifically, the WUE rule helps to protect against water disruptions and contamination of the water supply. The requirements of the program also are intended to promote efficient operation and management of water systems, reduce energy use and save money.

The WUE rule required municipal water suppliers to adopt a water conservation goal. Mercer Island participates in the Saving Water Partnership which covers Seattle Public Utilities (SPU) and nearly 20 other water utilities receiving water from SPU. The Saving Water Partnership established a regional goal focusing on programmatic savings. In 2007, Mercer Island implemented this goal and complied with the WUE rule by adopting Resolution No. 1394 (Exhibit 1). That goal was for the most part achieved, and the regional conservation programs now in place are viewed as highly effective.

The WUE rule also requires that a new regional conservation goal be established every six years. The new goal set forth by the Saving Water Partnership is to "reduce regional per capita water use from current levels so that total average annual retail water use of members of the Saving Water Partnership is less than 105 MGD from 2013 through 2018, despite forecasted population growth." This goal looks more broadly at savings from multiple factors that contribute to conservation, including those generated through the work of the Saving Water Partnership, state and national plumbing codes and changes in customer behavior in response to changing utility rates. The goal focuses on keeping water use below the level of 105 MGD, rather than setting a specific target for water savings. SPU will report the results annually to the state Department of Health.

Proposed Resolution No. 1478 (Exhibit 2) establishes this goal and will bring Mercer Island into compliance with the WUE rule. Adoption of the new goal will have no rate or programmatic impact on Mercer Island. If the regional goal is not met, there is no penalty to Mercer Island.

RECOMMENDATION

Maintenance Director

MOVE TO: Adopt Resolution No. 1478 establishing Mercer Island's water conservation goal as required by the Water Use Efficiency rule.

**CITY OF MERCER ISLAND
RESOLUTION NO. 1478**

**A RESOLUTION ADOPTING A WATER CONSERVATION GOAL AS
REQUIRED BY THE WATER USE EFFICIENCY RULE (CHAPTER 246-
290 WASHINGTON ADMINISTRATIVE CODE), WHICH IMPLEMENTS
THE 2003 MUNICIPAL WATER LAW (ENGROSSED SECOND
SUBSTITUTE HOUSE BILL 1338).**

WHEREAS, the 2003 Municipal Water Law requires municipal water suppliers to use water more efficiently in exchange for water right certainty and the flexibility to meet growing demand for water;

WHEREAS, the Department of Health implements and regulates the Municipal Water Law by the Water Use Efficiency Rule;

WHEREAS, the Washington Administrative Code (WAC 246-290-800) designates the City of Mercer Island as a municipal water supplier, and as such the City must comply with the requirements of the Water Use Efficiency Rule;

WHEREAS, the Water Use Efficiency Rule requires municipal water suppliers to adopt a water conservation goal every six years;

WHEREAS, Mercer Island is a member of the Saving Water Partnership which includes Seattle Public Utilities and other water utilities receiving water from Seattle Public Utilities;

WHEREAS, the Saving Water Partnership establishes regional water conservation goals to comply with the Water Use Efficiency Rule;

WHEREAS, in 2007, Mercer Island adopted Resolution No. 1394, which established the Saving Water Partnership six-year regional water conservation goal;

WHEREAS, to remain in compliance with the Water Use Efficiency Rule, Mercer Island must adopt a new six-year water conservation goal;

WHEREAS, the Saving Water Partnership set forth a new six-year regional water conservation goal to reduce regional per capita water use;

WHEREAS, the residents of Mercer Island have for many years demonstrated a strong conservation ethic and the desire to use water and other resources as efficiently as possible; and

WHEREAS, wise use of the region's water supply will become even more critical in the future.

NOW THEREFORE, BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF MERCER ISLAND, WASHINGTON, AS FOLLOWS:

The City of Mercer Island adopts a six-year regional water conservation goal of reducing per capita water use from current levels so that the total average annual retail water use of the members of the Saving Water Partnership is less than 105 mgd from 2013 through 2018 despite forecasted population growth.

PASSED BY THE CITY COUNCIL OF THE CITY OF MERCER ISLAND, WASHINGTON,
AT ITS REGULAR MEETING ON THE 24TH DAY OF FEBRUARY 2014.

CITY OF MERCER ISLAND

Bruce Bassett, Mayor

ATTEST:

Allison Spietz, City Clerk

Annual Water Use Efficiency Performance Report Form



You must submit this report by email.

Save the completed form with your water system's name and email it to WUE@doh.wa.gov by July 1.

General Water System Information:

System Name: Mercer Island, City of

System ID #: 536405

County: King

Your Name: Terry Smith

Your Title: Utilities Operations Manager

Your email address: terry.smith@mercergov.org

Your Phone Number: (206) 275-7812 Enter without dashes. Example: 3601234567

Today's Date: 05/29/09 Enter as mm/dd/yy. Example: 01/01/09

Who should we contact if we have questions about this report?

Name: Same as above

Phone Number: _____ Enter without dashes. Example: 3601234567

Meter Installation Information:

Is your water system fully metered? Yes

If Yes, continue to next page.

If not fully metered:

Current status of meter installation:

Describe efforts to minimize leakage:

Production, Authorized Consumption, and Distribution System Leakage Information:

Reporting Year: 2008

12-Month WUE Reporting Period:

01/01/08 to 12/31/08 Enter as mm/dd/yy. Example: 07/01/08

Incomplete or missing data for the year? No

If yes, explain:

Distribution System Leakage Summary:	
Total Water Produced and Purchased (TP) – Annual Volume	777,670,000 gallons
Authorized Consumption (AC) – Annual Volume	697,000,000 gallons
Distribution System Leakage – Annual Volume TP - AC	80,670,000 gallons
Distribution System Leakage – Percent DSL = [(TP - AC) / TP] x 100	10.4 %

Goal Setting Information:

Date of Most Recent Public Forum: 12/03/07 Enter as mm/dd/yy.
Example: 10/01/08

Goals must be established through a public process.

Has goal been changed since last annual WUE report? No

Each goal must identify the measurable water savings that will be achieved at a specific time in the future. Identify all water saving goals established by elected governing board.

WUE Goals:

<p>Supply Side Goal (if applicable):</p> <p>Demand Side Goal (required):</p> <p>Mercer Island is one of a group of 17 utilities that purchase wholesale water from Seattle Public Utilities and are part of the Regional 1% Water Conservation Program administered by SPU. The Saving Water Partnership has set a regional conservation goal of 11 mgd of cumulative annual average savings from 2000-2010 and a goal of 15 mgd cumulative annual average from 2011-2030. The 6 year portion of these goals from 2007-2013 totals 5.98 mgd.</p>

I don't have this information

Describe Progress in Reaching Goals:

- Estimate how much water you have saved.
- Report progress toward meeting goals within your established timeframe.
- Identify any WUE measures you are currently implementing.

<p>Supply Side Goal Progress:</p> <p>Demand Side Goal Progress:</p> <p>In 2008, the Regional Conservation Program achieved an estimated 0.75 mgd of annual average savings. Savings for 2007 (1.28 mgd) plus 2008 (.75) mgd are 2.03 (or 34%) mgd toward the 6-year cumulative total of 5.98 mgd. Since 2000 the program has achieved an estimated 8.4 mgd of the 2010 cumulative 11 mgd goal.</p> <p>Specifically on Mercer Island, annual water consumption categories (in hundreds of cubic ft)</p> <p>Average ccf used per single family residential customer; 2006 (119.9), 2007 (107.8) 2008 (103.4). Total ccf used City owned buildings & other facilities; 2006 (6431), 2007 (9242) 2008 (6340). Total ccf used by City owned parks; 2006 (36533), 2007 (37080), 2008 (30337)</p>

Additional Information Regarding Supply and Demand Side WUE Efforts

- If you established a goal to maintain a historic level (such as maintaining daily consumption at 65 gallons per person per day), you must explain why you are unable to reduce water use below that level.
- Include any other information that describes how you and your customers use water efficiently.

- 1) The Regional Conservation Program experienced financial resource reductions in 2007 and 2008; 2009 will also be constrained.
- 2) The mgd savings noted above are estimates based on: a) the number of water saving hardware measures installed by customers; and b) estimated water savings from changes in customer behavior.

As a way to double-check the annual savings estimates, a second methodology is under review to calculate programmatic conservation savings. Results from this analysis will be available for the 2009 WUE report.

The Regional Conservation Program offers customers many ways to conserve:

Rebates are available for

* Single family residential customers: High-efficiency clothes washers (WashWise).

Automatic irrigation system upgrades

*Multifamily property owners: Toilet Rebates, Showerheads and aerators, Coin-op laundry, WashWise washers in multifamily buildings, Irrigation system upgrades

*Business customers: Commercial toilets and urinals, Commercial laundry, Food steamers, Cooling and refrigeration systems, Medical equipment, Irrigation systems, Process water improvements, Other water use technologies

*New construction and major remodels: Toilets and urinals, Showerheads, Washers, Irrigation systems

Education on our website, Mercer Island's quarterly newsletter, our annual CCR, & materials handed out at our street fairs & celebrations add up to big water savings, for example:

*Wash full loads of clothes and dishes

*Find and fix toilet and faucet leaks

*Install efficient showerheads and toilets

*Mulch your garden beds to retain moisture longer

For more information please see the 2008 Regional 1% Program Annual Report, available on-line at http://savingwater.org/docs/water_conservation_report.pdf

For more information, visit our Web at <http://www.doh.wa.gov/ehp/dw/programs/wue.htm> or contact a regional planner:

Eastern Regional Office—Spokane—Main Office: (509) 456-3115

Southwest Regional Office—Tumwater—Main Office: (360) 236-3030

Northwest Regional Office—Kent—Main Office: (253) 395-6750

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).



Date Submitted: 4/30/2010

Water Use Efficiency Annual Performance Report - 2009

WS Name: MERCER ISLAND, CITY OF

Water System ID# : 53640

WS County: KING

Report submitted by: *Smith Terry*

Meter Installation Information:

Is your water system fully metered? Yes

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: 01/01/2009 To 12/31/2009

Incomplete or missing data for the year? No

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	773,310,824 gallons
Authorized Consumption (AC) – Annual Volume	750,350,216 gallons
Distribution System Leakage – Annual Volume TP – AC	22,960,608 gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	3.0 %
3-year annual average	7.9 %

Goal-Setting Information:

Date of Most Recent Public Forum: 12/03/2007 Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Mercer Island is one of a group of 17 utilities that purchase wholesale water from Seattle Public Utilities and are part of the Regional 1% Water Conservation Program administered by SPU. The Saving Water Partnership has set a regional conservation goal of 11 mgd of cumulative annual average savings from 2000-2010 and a goal of 15 mgd cumulative annual average from 2011-2030. The 6 year portion of these goals from 2007-2013 totals 5.98 mgd.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

In 2009, the Regional Conservation Program achieved an estimated 0.61 mgd of annual average savings; savings for 2007 (1.28 mgd) plus 2008 (.75 mgd) plus 2009 (.61 mgd) are 2.64 mgd toward the 6-year cumulative total of 5.98 mgd. 2.64 mgd is 44% of the total 6-year goal (5.98 mgd).

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

Since 2000 the Program has achieved and estimated 9 mgd of the 2010 cumulative 11 mgd target. Perspective on Savings: The mgd savings are estimates based on: a)the number of water saving hardware measures installed by customers; and b)estimated water savings from changes in customer behavior. As a way to double-check the annual savings estimates, a second way to calculate cumulative programmatic savings has been developed. This methodology employs the SPU demand forecast model to produce a "back-cast" of what water demand would have been without the 1% Conservation Program. Looking at the difference between this and actual demand provides an estimate of conservation savings over time. The two methods provide similar estimates of conservation savings.

The Regional Conservation Program offers customers many ways to conserve:

Rebates are available for

** Single family residential customers: High-efficiency clothes washers (WashWise).*

Automatic irrigation system upgrades

**Multifamily property owners: Toilet Rebates, Showerheads and aerators, Coin-op laundry,*

WashWise washers in multifamily buildings, Irrigation system upgrades

**Business customers: Commercial toilets and urinals, Commercial laundry, Food steamers, Cooling and refrigeration systems, Medical equipment, Irrigation systems, Process water improvements, Other water use technologies*

**New construction and major remodels: Toilets and urinals, Showerheads, Washers, Irrigation systems. Education on our website, Mercer Island's quarterly newsletter, our annual CCR, & materials handed out at our street fairs & celebrations add up to big water savings, for example:*

**Wash full loads of clothes and dishes*

**Find and fix toilet and faucet leaks*

**Install efficient showerheads and toilets*

**Mulch your garden beds to retain moisture longer*

For more information please see the 2009 Regional 1% Program Annual Report, available on-line at http://savingwater.org/docs/water_conservation_report.pdf

Do not mail, fax, or email this report to DOH



Date Submitted: 5/31/2011

Water Use Efficiency Annual Performance Report - 2010

WS Name: MERCER ISLAND, CITY OF

Water System ID# : 53640

WS County: KING

Report submitted by: Terry Smith

Meter Installation Information:

Is your water system fully metered? Yes

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: 01/01/2010 To 12/31/2010

Incomplete or missing data for the year? No

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	640,500,000 gallons
Authorized Consumption (AC) – Annual Volume	648,300,000 gallons
Distribution System Leakage – Annual Volume TP – AC	-7,800,000 gallons
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	-1.2 %
3-year annual average	7.9 %

Goal-Setting Information:

Date of Most Recent Public Forum: 12/03/2007 Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Mercer Island is one of a group of 17 utilities that purchase wholesale water from Seattle Public Utilities and are part of the Regional 1% Water Conservation Program administered by SPU. The Saving Water Partnership has set a regional conservation goal of 11 mgd of cumulative annual average savings from 2000-2010 and a goal of 15 mgd cumulative annual average from 2011-2030. The 6 year portion of these goals from 2007-2013 totals 5.98 mgd.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

In 2010, the Regional Conservation Program achieved an estimated 0.57 mgd of annual average savings; savings for 2007 (1.28 mgd) plus 2008 (.75 mgd) plus 2009 (.61 mgd) plus 2010 (.57 mgd) are 3.21 mgd toward the 6-year cumulative total of 5.98 mgd.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

Since 2000 the Program has achieved and estimated 9 mgd of the 2010 cumulative 11 mgd target. Perspective on Savings: The mgd savings are estimates based on: a) the number of water saving hardware measures installed by customers; and b) estimated water savings from changes in customer behavior. As a way to double-check the annual savings estimates, a second way to calculate cumulative programmatic savings has been developed. This methodology employs the SPU demand forecast model to produce a "back-cast" of what water demand would have been without the 1% Conservation Program. Looking at the difference between this and actual demand provides an estimate of conservation savings over time. The two methods provide similar estimates of conservation savings.

The Regional Conservation Program offers customers many ways to conserve:

Rebates are available for

** Single family residential customers: High-efficiency clothes washers (WashWise).*

**Automatic irrigation system upgrades.*

**Multifamily property owners: Toilet Rebates, Showerheads and aerators, Coin-op laundry, WashWise washers in multifamily buildings, Irrigation system upgrades.*

**Business customers: Commercial toilets and urinals, Commercial laundry, Food steamers, *Cooling and refrigeration systems, Medical equipment, Irrigation systems, Process water improvements. Other water use technologies:*

**New construction and major remodels: Toilets and urinals, Showerheads, Washers, Irrigation systems. Education on our website, Mercer Island's quarterly newsletter, our annual CCR, & materials handed out at our street fairs & celebrations add up to big water savings, for example:*

**Wash full loads of clothes and dishes*

**Find and fix toilet and faucet leaks*

**Install efficient showerheads and toilets*

**Mulch your garden beds to retain moisture longer*

For more information please see the 2010 Regional 1% Program Annual Report, available on-line at http://savingwater.org/docs/water_conservation_report.pdf

- replacing 40-50 older 1 ½" and larger meters annually with higher efficient low flow accurate meters*
- inspected 1200+ fire hydrants for leaking seat gaskets*
- performing a contracted annual water system leak investigation program*
- metering of all water used during water main flushing, tanker truck filling, contractor work and more*
- tracking of all water main breaks and associated post main condition assessments in order to prioritize future water main replacement programs*
- installed telemetry enabled metering of a pressure zone*

DOH has a policy that if a utility reports a negative number that reporting year is not used. Realizing that different factors can create hard to explain reporting in the WUE report, such as timing of meter reads between purveyor and wholesaler meters, I continue to look at the possibility of Sta. 67's meter accuracy. I've mentioned on different occasions Mercer Island's desire to have this electronic meter tested. A few years ago SPU and Mercer Island worked together with the concept of installing a testing point for this meter. Mercer Island paid for this connection in its entirety and to my

knowledge only one physical flow test has been performed by SPU on this meter thus far. SPU has told me that the Khrono meter testing opinion is in the line of every three years for meter calibration. In July of 2010 a presentation to the Operating Board stated: Electronic Meters, Khrono & Badger Mag meters - These meters will be tested yearly to confirm the meter reads zero when no flow is going through the meter, and any other manufacturer recommended diagnostics.

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Date Submitted: 5/31/2012

Water Use Efficiency Annual Performance Report - 2011

WS Name: MERCER ISLAND, CITY OF

Water System ID# : 53640

WS County: KING

Report submitted by: Terry Smith

Meter Installation Information:

Estimate the percentage of metered connections: 100%

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: 01/01/2011 To 12/31/2011

Incomplete or missing data for the year? No

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	691,184,912 gallons
Authorized Consumption (AC) – Annual Volume	666,863,692 gallons
Distribution System Leakage – Annual Volume TP – AC	24,321,220 gallons
Distribution System Leakage – Percent DSL = [(TP – AC) / TP] x 100	3.5 %
3-year annual average	5.6 %

Goal-Setting Information:

Date of Most Recent Public Forum: 12/03/2007 Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Mercer Island adopted the Regional Conservation Program water savings target (and any additional utility savings goals). Mercer Island is one of a group of 18 utilities that purchase wholesale water from Seattle Public Utilities and are part of the Regional Water Conservation Program administered by SPU. This Saving Water Partnership has set a regional conservation target of 11 million gallons per day of cumulative annual average savings from 2000 through 2010 and a savings target of 15 mgd cumulative annual average savings from 2011 through 2030.

The six-year portion from 2007-2012 is Mercer Island adopted WUE goal and totals 5.98 mgd of cumulative savings.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

WUE Goal: In 2011, the Regional Conservation Program achieved an estimated 1.4 mgd of annual average savings. The regional WUE Goal and the 2011 estimated savings from customer demand reduction includes customer price response to water and consumption-based sewer rates over the combined SWP service area for 2011 and 2012. Savings for 2007 (1.28 mgd) plus 2008 (.75 mgd) plus 2009 (.61 mgd) plus 2010 (.57 mgd) plus 2011 (1.4 mgd) are 4.61 mgd toward the 6-year cumulative total of 5.98 mgd.

Perspective on Savings:

Our water consumption has decreased by more than 20 percent since 2000. Our water consumption is as low as it was in the late 1950s, even though our population has grown by more than 60 percent since then.

The mgd savings noted above are estimates based on: a) the number of water saving hardware measures installed; and b) estimated water savings from changes in customer behavior due to conservation program messages and response to price (price elasticity of demand).

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

The Regional Conservation Program offers customers many ways to conserve:

In all or part of 2011, rebates were available for

? Single family residential customers: High-efficiency clothes washers (WashWise), Automatic irrigation system upgrades, WaterSense toilets

? Multifamily property owners: WaterSense toilets, , Coin-op laundry, WashWise washers in multifamily buildings, Irrigation system upgrades

? Business customers: Commercial toilets and urinals, Commercial laundry, Food steamers, Cooling and refrigeration systems, Medical equipment, Irrigation systems, Process water improvements, Other water use technologies

? New construction and major remodels: Toilets and urinals, Showerheads, Washers, Irrigation systems

Educational messages reminded customers about actions to take that save water, for example:

? Find and fix toilet and faucet leaks – 2 videos produced and published on web site, for a total of 5

? Install efficient toilets

? Mulch your garden beds to retain moisture longer

? Right Plant, Right Place

For more information please see the 2011 Regional Water Conservation Program Annual Report, available on-line at http://savingwater.org/docs/water_conservation_report.pdf as of May, 2012.

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Date Submitted: 5/29/2013

Water Use Efficiency Annual Performance Report - 2012

WS Name: MERCER ISLAND, CITY OF

Water System ID# : 53640

WS County: KING

Report submitted by: Terry Smith

Meter Installation Information:

Estimate the percentage of metered connections: 100%

If not fully metered - Current status of meter installation:

Production, Authorized Consumption, and Distribution System Leakage Information:

12-Month WUE Reporting Period: 01/01/2012 To 12/31/2012

Incomplete or missing data for the year? No

If yes, explain:

Distribution System Leakage Summary:

Total Water Produced and Purchased (TP) – Annual Volume	730,400,000 gallons
Authorized Consumption (AC) – Annual Volume	672,700,000 gallons
Distribution System Leakage – Annual Volume TP – AC	57,700,000 gallons
Distribution System Leakage – Percent DSL = $[(TP - AC) / TP] \times 100$	7.9 %
3-year annual average	4.8 %

Goal-Setting Information:

Date of Most Recent Public Forum: 12/03/2007 Has goal been changed since last performance report? No

Note: Customer goal must be re-established every 6 years through a public process

WUE Goals:

Customer Goal (Demand Side):

Mercer Island adopted the Regional Conservation Program water savings target (and any additional utility savings goals). Mercer Island is one of a group of 18 utilities that purchase wholesale water from Seattle Public Utilities and are part of the Regional Water Conservation Program administered by SPU. This Saving Water Partnership has set a regional conservation target of 11 million gallons per day of cumulative annual average savings from 2000 through 2010 and a savings target of 15 mgd cumulative annual average savings from 2011 through 2030. The six-year portion from 2007-2012 is Mercer Island adopted WUE goal and totals 5.98 mgd of cumulative savings.

Describe Progress in Reaching Goals:

Customer (Demand Side) Goal Progress:

In all or part of 2012, rebates were available for

? Single family residential customers: Automatic irrigation system upgrades, WaterSense toilets. 15 homes installed rain sensors on their irrigation systems. 30 homes installed more efficient toilets.

? Multifamily property owners: WaterSense toilets, Coin-op laundry, Irrigation system upgrades. One multi-family complex installed 15 more efficient toilets.

? Business customers: Commercial toilets and urinals, Commercial laundry, Food steamers, Cooling and refrigeration systems, Medical equipment, Irrigation systems, Process water improvements, Other water use technologies

Educational messages reminded customers about actions to take that save water, for example:

? ? Find and fix toilet and faucet leaks – In addition to direct mail and TV ads, 5 “fix a leak” videos were translated into Chinese, Somali, Spanish and Vietnamese , and published on web site

? Install efficient toilets

? Mulch garden beds to retain moisture longer

? Plant the “Right Plant in the Right Place” for healthier gardens

? Plant trees, shrubs and perennials in the fall so they can develop stronger roots before next year’s dry summer weather.

? Attend free Savvy Gardener classes to create and maintain healthy landscapes that are good for families and for the environment.

Additional Information Regarding Supply and Demand Side WUE Efforts

Include any other information that describes how you and your customers use water efficiently:

In 2012 Mercer Island continued to control non revenue water in our distribution system by: replacing forty 1 1/2" and larger less accurate water meters, performed an annual system wide leak detection survey which included 1200+ fire hydrants, 114+ miles of water main and 7500 service lines. We meter all known tanker truck filling, contractor water use, and track all water main breaks and associated post main condition assessments in order to prioritize future water main replacement programs. Our annual water main flushing is metered and our water telemetry is able to signal us at the early stages of any abnormally high water usage.

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Attachment 9: Water Reclamation Checklist for Systems with 1,000 or more connections

1. Evaluation of water reclamation opportunities

Large Water Users:

- City of Mercer Island
- Washington State Department of Transportation (WSDOT)
- Farmers Insurance Company
- Mercer Island School District (MISD)
- Albertsons Grocery

Potential reclaimed water users:

- City of Mercer Island
- Washington State Department of Transportation (WSDOT)
- Mercer Island School District (MISD)

Although listed above, the City is not certain if or not WSDOT or MISD are interested in exploring the reclaimed water opportunities.

Estimates of water saved:

- Street sweeping – possibly 45CCF (15% of total annual water use)
- Parks/Playground irrigation – possibly 280CCF (5% of total annual water use)

Project identification:

Currently there are no identified opportunities or plans to create reclaimed water related facilities.

Financial and operation feasibility:

No projects were in planning, thus no financial studies were done.

2. Results of evaluation

The evaluation was based on ideas and predictions only. No actual opportunities were identified.

Mercer Island is an island. The geographical condition makes it difficult to build pipelines from the wastewater treatment facility to the Island for reclaimed water usage.

3. Copy of evaluation from wastewater facility

No evaluation from the wastewater facility is done for the City.

4. Copy of governing mechanism

Not applicable.

5. Existing reclaimed facility

Currently no reclaimed water is available within the service area of the City's water system.

Appendix I

Cross-Connection Control Plan

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Cross-Connection Control Program



City of Mercer Island

Prepared by: The City of Mercer Island and Backflow Management Inc.
17752 NE San Rafael
Portland, OR 97230

Cross-Connection Control Program for
The City of Mercer Island

A. Requirement for Program

The City of Mercer Island, ID #536405 hereinafter referred to as “the City,” has the responsibility to protect the public water system from contamination due to cross connections. A cross connection is defined as “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.” (WAC 246-290-010(62)).

All public water systems are required to develop and implement cross-connection control (CCC) programs. The CCC requirements are contained in Washington Administrative Code (WAC) 246-290-490 of the Group A Drinking Water Regulations. The minimum required elements of a CCC program are:

1. Establishment of legal authority and program policies;
2. Evaluation of premises for cross-connection hazards;
3. Elimination and/or control of cross connections;
4. Qualified personnel to develop and implement CCC program;
5. Inspection and testing of backflow preventers;
6. Quality control of testing process;
7. Response to backflow incidents;
8. Public education for consumers;
9. Record keeping for CCC program; and
10. Special requirements for reclaimed water use.

Other CCC program requirements include:

1. Coordination with the Authority Having Jurisdiction (AHJ), e.g., the local building or plumbing official regarding CCC activities.
2. Prohibition of the return of used water into the public water system (PWS) distribution system.
3. Inclusion of a written CCC program in the City's Water System Plan (WSP).

B. Program Objective

The objectives of the CCC program are to:

1. Reasonably reduce the risk of contamination of the public water distribution system.
2. Reasonably reduce the City's exposure to legal liability arising from the backflow of any contaminant originating from the customer's plumbing system and then supplied to other consumers.
3. Cooperate with the AHJ by joint operation of program administrative tasks.

C. Summary of CCC Program

- Premises isolation and in-premises protection (combination program)
- Joint program with AHJ
- Ordinance; implied service agreement with customer
- Rely upon shut-off of water service for enforcement
- Assessment and Re-assessment of hazards performed by City's staff or equivalent
- Premises Isolation Assemblies will be on the customers service line
- City will have a staff member certified as a cross-connection control specialist (CCS) through the Department of Health (DOH)
- Consumer will employ a backflow assembly tester (BAT) to test their assemblies
- Each customer will directly bear the costs

D. Required Elements of Program

The drinking water regulations for Group A public water systems in Washington, chapter 246-290 WAC, require CCC programs to include certain minimum elements. The elements are listed in WAC 246-290-490(3). This section describes how the water system intends to comply with each of the required program elements. Elements are numbered the same as they appear in the WAC.

Element 1: *Adoption of a written legal instrument authorizing the establishment and implementation of a CCC program.*

On June 15, 2015 the City of Mercer Island adopted Ordinance No. 15C-09, codified at Mercer Island City Code ("MICC") 15.14, which authorizes the City to implement a CCC program. The ordinance also authorizes the City to impose monetary penalties or terminate water service to consumers who do not comply with the specified requirements. However, the primary method for protection of the distribution system will be the installation of a backflow preventer by the consumer, at the consumer's expense.

Element 2: *Development and implementation of procedures and schedules for evaluating new and existing service connections to assess the degree of hazard.*

Initial Cross-Connection Hazard Surveys

The procedures for evaluating the backflow prevention requirements for new and existing consumers are as follows:

1. For all ***new non-residential services***, the City will require that the consumer install an approved premises isolation backflow assembly prior to providing water service.
2. For all ***new residential services***, the City's Department of Health -certified cross-connection control

specialist (CCS) will review the permit application for a new water service to assess the degree of hazard it poses to the water distribution system. The CCS will then determine the applicable premises isolation backflow prevention assembly or method to be installed. Appropriate backflow protection must be installed prior to providing water service.

3. For all *existing non-residential services*, the City will require the consumer to submit to the City, within 30 days of notification, a completed “Cross Connection Property Owner Certification.” The City’s DOH-CCS will review the certification to assess the degree of hazard the service connection poses to the water system. The CCS will then verify with the consumer the accuracy of the certification and determine the applicable premises isolation backflow prevention assembly or method to be installed. The City’s CCS may request to conduct a site survey to verify the results and accuracy of the certification. As an alternative to the site survey by the City’s CCS, the consumer may agree to install an approved Air gap or Reduced Pressure Backflow Assembly within 30 days of the notification or an alternate time period acceptable to the Department of Health and the City.
4. For all *existing residential services*, the City will require the consumer to submit to the City, within 30 days of notification, a completed “Cross Connection Property Owner Certification.” The City’s DOH-CCS will review the certification to assess the degree of hazard the service connection poses to the water system. The CCS will then verify with the consumer the accuracy of the certification and determine the applicable premises isolation backflow prevention assembly or method to be installed. The City’s CCS may request to conduct a site survey to verify the results and accuracy of the certification. As an alternative to the site survey by the City’s CCS, the consumer may agree to install an approved Air gap or Reduced Pressure Backflow Assembly within 30 days of the notification or an alternate time period acceptable to the Department of Health and the City.
5. For all existing services, should the consumer fail to submit a completed “Cross Connection Property Owner Certification,” the City will take enforcement action in accordance with MICC 15.14.060.

Cross-Connection Hazard Survey Schedule for Initial Hazard Assessments

The schedule for initial hazard assessment is outlined in the following table. The schedule starts from the date the CCC program is adopted by City Council.

Initial Assessment Task	Schedule
Assessment of all new connections	At time of application for water service
Identification and assessment of high health hazard premises which are listed on Table 9 of WAC 246-290-490	Within 9 months
Identification and assessment of hazardous premises supplemental to Table 9 of WAC 246-290-490	Within 12 months
Identification of residential connections with special plumbing facilities and/or water use on the premises	Within 15 months

Cross-Connection Hazard Survey Schedule for Subsequent Hazard Re-Assessments

For subsequent cross-connection hazard re-assessments, procedures for evaluating the backflow prevention requirements are:

1. For **residential services**, the City will require the consumer to submit to the City, within 30 days of City notification, a completed “Cross Connection Property Owner Certification.” The procedure used for evaluating the hazard re-assessment and the potential change in the required backflow prevention will be the same as used for the initial hazard survey.
2. For all **non-residential services**, the City will require the consumer to submit to the City, within 30 days of notification, a completed “Cross Connection Property Owner Certification.” The procedure used for evaluating the hazard re-assessment and the potential change in the required backflow prevention will be the same as used for the initial hazard survey.

The frequency of hazard re-assessments are shown in the table below:

Type of Service	Frequency of Re-Evaluation
Any services with reduced-pressure principle backflow assembly (RPBA) installed for premises isolation	None required as long as the RPBA passes annual tests and inspections
Commercial services with double-check valve assembly (DCVA) installed for premises isolation	Every five years and upon change in use or ownership – (Property Owner Certification)
Commercial services when City relies upon in-premises protection	Every five years and upon change in use, ownership, or plumbing system – (Property Owner Certification)
Residential services with special plumbing where the City relies upon compliance with Uniform Plumbing Code (UPC)	Every 2-3 years – Property Owner Certification)
Residential services with DCVA installed for premises isolation	Every 4-5 years – (Property Owner Certification)
Residential services with no known special plumbing or water use on the premises	Every 4-5 years and upon change in use, ownership, or plumbing system – (Property Owner Certification)

Element 3: *Development and implementation of procedures and schedules for elimination and/or control of cross-connections.*

Backflow Preventer Requirements

The following water service policy shall apply to all new and existing consumers:

1. The City will require that water service to new **non-residential consumers** be isolated at the meter by a DOH-approved DCVA or RPBA/Air gap acceptable to the City. See MICC 15.14.050(B). All high health hazard premises of the type described in Table 9 of WAC 246-290-490 shall be isolated with an RPBA for premises isolation.
2. The City will require all **residential consumers** with facilities of the type described in Table 9 of WAC 246-290-490 or other high health hazards determined by the City CCS to be isolated with an RPBA/Air Gap for premises isolation refer to (http://www.mercergov.org/files/SF_RPBA_Handout_2016.pdf). All other residential consumers with special plumbing or water use on the premises will be isolated with a DCVA or RPBA for premises isolation, unless appropriate in-premises protection is installed and maintained in accordance with the UPC. “Special plumbing” includes, but is not limited to, the following:
 - A lawn irrigation system
 - A solar heating system
 - An unapproved auxiliary source of supply
 - Property containing a small boat moorage
 - Hoses near a dock
 - Water operated boat lifts
 - Swimming pools
 - Water pumps
 - Hoses near a shoreline
 - Water features
 - All new waterfront lots and waterfront lots undergoing a substantial alteration
3. The City has chosen to supplement Table 9 of WAC 246-290-490(4) by identifying additional premises or premises types for which premises isolation is mandated. Such premises will include premises with complex plumbing, premises with plumbing subject to frequent changes, plumbing with a repeat history of cross-connections being established or reestablished, cross-connection hazards are unavoidable or not correctable, such as, but not limited to, tall buildings.
4. Premises isolation backflow prevention assemblies and methods installed on service connections to protect the City’s water distribution system shall be:
 - Purchased and installed by the consumer (at the consumer's expense) immediately downstream of the water meter in accordance with the City's standards described hereinafter.
 - Maintained, tested, and inspected in accordance with the City's standards described hereinafter.

For new consumers, the City will not turn on water (except for testing purposes) at the meter until the consumer complies with the above requirements.

In the event of failure of the consumer to comply with the City's installation and maintenance requirements the City may then proceed with the corrective action provisions set forth in MICC 15.14.080.

Approved Backflow Preventers and Installation

All backflow preventers required to be installed shall meet the definition of “approved backflow preventer” as set forth in WAC 246-290-010. The City will obtain and maintain a current list of assemblies approved for installation in Washington State.

All backflow preventers shall be installed in:

- The orientation for which they are approved
- A manner and location that facilitates their proper operation, maintenance, and testing or inspection
- A manner that will protect them from weather-related conditions such as flooding and freezing
- Compliance with applicable safety regulations

Installation standards contained in the most recently published edition of the University of Southern California Foundation for Cross-Connection Control and Hydraulic Research *CCC Manual* and the City's Standard Detail Drawings shall be followed unless the manufacturer's requirements are more stringent.

The City has no regulatory responsibility or authority over the installation and operation of the consumer's plumbing system. The consumer is solely responsible for compliance with all applicable regulations and for prevention of contamination of their plumbing system from sources within his/her premises. Any action taken by the City to survey plumbing, inspect or test backflow prevention assemblies, or to require premises isolation is solely for the purposes of reducing the risk of contamination of the City's water distribution system.

The City will inform the consumer that any action taken by the City shall not be construed by the consumer as guidance on the safety or reliability of the consumer's plumbing system. The City will not provide advice to the consumer on the design and installation of plumbing other than through the general public education program discussed in Element 8.

Except for easements containing the City's water distribution system, the City will not undertake work on the consumer's premises.

Schedule for Installation of Backflow Preventers

The schedule that the City will follow for installation of backflow preventers, when they are required, is shown below (based on the hazard evaluation)

Type of Service	Schedule
New connections with cross-connection hazards	Before service is initiated
Existing connections with Table 9-type hazards and other high-health hazards	Within 90 days after notification
Existing connections with other than Table 9 of WAC 246-290-490 or high-health hazards	Within 90 days after notification
Existing fire protection systems using chemicals or supplied by unapproved auxiliary water source	Within 90 days after notification
Existing fire protection systems not using chemicals and supplied by City's water	Within 1 year after notification (suggested)

The City may consider granting an extension of time for installation of backflow preventer for an existing connection if requested in writing by the premises owner.

Element 4: *Provision of qualified personnel, including at least one person certified as a CCS, to develop and implement the CCC program.*

Program Administration

1. The responsibility for administration of the CCC Program rests with the City. General policy direction and risk management decisions are established by the City Council. By an internal agreement, the Authority Having Jurisdiction (AHJ) will consult with the City's CCS on matters related to CCC.
2. The City will employ or have on-staff at least one person certified by DOH as a CCS to develop and implement the CCC program to act as the day to day contact for the cross-connection control program. As an alternative, or when no staff or employees are properly qualified, the City may retain a DOH-certified CCS on contract to provide the necessary expertise and services.
3. The following cross-connection related tasks will be performed by or under the direction of the City's certified CCS (on staff or under contract):
 - Preparation of and recommendations regarding changes to the CCC program
 - Performance of and/or reviews of CCC hazard evaluations
 - Recommendations on the type of backflow preventer to be installed
 - Recommendations on schedules for retrofitting of backflow preventers
 - Inspections of backflow preventers for proper application and installation
 - Reviews of backflow preventer inspection and test reports
 - Reviews of backflow testing quality control information
 - Recommendations and/or the granting of exceptions to mandatory premises isolation
 - Participation in or cooperation with other water utility staff in the investigation of backflow incidents and other water quality problems
 - Completion of Backflow Incident Reports
 - Completion of CCC Activity and Program Summary Reports
4. The City may delegate other CCC program activities to other personnel who are not certified CCS's, including clerical support staff. These activities include but are not limited to:
 - Administration of paperwork associated with service agreements
 - Mailing, collecting, and initial screening of hazard evaluation/water use questionnaires
 - Mailing of assembly testing notices
 - Receiving and screening of assembly testing reports
 - CCC program database administration and record keeping
 - Dissemination of public education material
 - Assisting tasks associated with coordination with the AHJ

Element 5: *Development and implementation of procedures to ensure that approved backflow preventers are inspected and/or tested (as applicable).*

1. Inspection and Testing of Backflow Preventers

All backflow preventers that the City relies upon for protection of the City's water system will be subject to inspection and, if applicable, testing. This includes backflow preventers installed for in-premises protection that the City relies upon for protection of the water system.

Inspection and testing of backflow preventers shall be as follows:

- The City's CCS will inspect backflow preventers for proper application (i.e., to ensure that the preventer installed is commensurate with the assessed degree of hazard).
- The City's CCS will perform inspections for proper installation of Premise/In-premise Isolation backflow preventers. The AHJ will inspect in-premises backflow assemblies when a premises isolation backflow preventer is provided.
- A DOH-certified BAT will test all assemblies relied upon by the City to protect the public water system.

2. Frequency of Inspection and Testing

Inspection and testing of backflow preventers will be conducted:

- At the time of installation
- Annually after installation
- After a backflow incident
- After repair, reinstallation, relocation, or re-plumbing

The City may require a backflow preventer to be inspected and/or tested more frequently than once a year, when it protects against a high-health hazard or when it repeatedly fails tests or inspections.

3. Responsibility for Inspection and Testing

The City will be responsible for inspection and testing of all City-owned backflow preventers.

The City will require the consumer to be responsible for inspection and testing of backflow preventers owned by the consumer. The consumer shall employ, at consumer expense, a DOH-certified BAT registered with the City to conduct the inspection and test within the time period specified in the testing notice sent by the City. The test report shall be completed and signed by the BAT, and sent to the City. Test reports must be received on pre-approved forms and in a format that is acceptable to the City which may include electronic submission before the specified due date. Test reports must be received by the City within 30 days from the date of testing. The consumer may request an extension of the due date for returning a test report by submitting a written request to the City. The City may grant one extension up to 90 days.

4. Approved Test Procedures

The City will require that all assemblies relied upon to protect the public water system be tested in accordance with DOH-approved test procedures as specified in WAC 246-290-490(7)(d).

The City will require all assembly tests to be reported in a format acceptable to the City as well as meet the requirements of WAC 246-292-036 and returned as specified above refer to (<http://www.mercergov.org/SIB/files/Backflow%20Prev%20Form.pdf>).

5. Notification of Inspection and/or Testing

The City will notify in writing all consumers who own backflow preventers that are relied upon to protect the public water system to have their backflow preventer(s) inspected and/or tested. Notices will be sent out not less than 15 days before the due date of the inspection and/or test. The notice will also specify the date (up to 30 days after the due date of the inspection and/or test date) by which the inspection/test report must be received by the City.

6. Enforcement

When a consumer fails to comply with testing requirements, the City may take enforcement action in accordance with MICC 15.14.080.

Element 6: *Development and implementation of a backflow prevention assembly testing quality assurance/quality control program.*

1. List of Backflow Assembly Testers (BAT)

The City will maintain a list of local, DOH-certified BAT that are registered with the City to perform the following activities:

- Backflow preventer inspection for proper installation
- Backflow assembly testing

2. Qualifications/Eligibility

BAT's who wish to provide testing in the City's service area must apply to the City and furnish the following information:

- Evidence of current DOH certification in good standing
- Make and model of testing equipment
- Evidence of test equipment verification of accuracy and/or calibration within the past 12 months
- Current City Business License

3. Quality Assurance

The City's CCS will review within 30 days of receipt the backflow preventer inspection/test report forms submitted by the BAT consumer.

The City's CCS will provide follow up on test reports that are deficient in any way.

The City's CCS will report incidences of suspected fraud or gross incompetence on the part of any BAT to the DOH Operator Certification program staff.

Element 7: *Development and implementation (when appropriate) of procedures for responding to backflow incidents.*

1. Backflow Incident Response Plan

The City has developed an incident response plan that is part of the water system's emergency response program as required by WAC 246-290-415(2). The backflow incident response plan includes, but is not be limited to:

- Immediate notification of affected population.
- Immediate notification, no later than the end of the next business day, and coordination with other agencies, such as DOH, the AHJ, and the local health jurisdiction.
- Identification of the source of contamination.
- Onsite inspection to determine the extent of the backflow incident.

- Isolation of the source of contamination and the affected area(s).
- Cleaning, flushing, sampling, and other measures to mitigate and correct the problem.
- Document the backflow incident using DOH's Backflow Incident Report Form refer to (<http://www.doh.wa.gov/Portals/1/Documents/Pubs/331-457-F.pdf>)
- Apply corrective action to prevent future backflow occurrences
- Include all Backflow Incident Reports as part of the ASR

Element 8: *Development and implementation of a cross-connection control public education program.*

1. Consumer Education

The City will distribute with water bills, in their consumer confidence report or some other means, at regular intervals, public education brochures to system consumers. For residential consumers, such brochures will describe the cross-connection hazards in homes and the recommended assemblies or devices that should be installed by the homeowner to reduce the hazard to the public water system. The education program will emphasize the responsibility of the consumer in preventing the contamination of the public water supply. The City's staff will produce the public education brochures refer to (http://www.doh.wa.gov/Portals/1/Documents/4200/cross_connection.pdf).

The information distributed by the City will include, but not be limited to, the following subjects:

- Cross-connection hazards in general
- Irrigation system hazards and corrective actions
- Fire sprinkler cross-connection hazards
- Importance of annual inspection and/or testing of backflow preventers
- Thermal expansion in hot water systems when backflow preventers are installed for premises isolation

The City will distribute information brochures to consumers every two to three years, and to new consumers.

2. Public Outreach

In cooperation with other water utilities, the City may participate in an outreach program consisting of:

- Distribution of cross-connection control information to hardware and plumbing stores serving the area.
- Participation in fairs, exhibits, and other event.
- Special education sessions for irrigation contractors, fire sprinkler contractors, local backflow assembly testers, etc.

Element 9: *Development and maintenance of cross-connection control records.*

1. Types of Records and Data to be Maintained

The City will maintain and retain records of the following types of information required by WAC 246-290-490(8)(a):

- Active service connections/consumer premises information including:
 - Assessed degree of hazard; and
 - Required backflow preventer to protect the public water system.
- Backflow preventer inventory and information including:
 - Air gap location, installation and inspection dates, inspection results and person conducting inspection;
 - Backflow assembly location, assembly description (type, manufacturer, make, model, size, and serial number), installation, inspection and test dates, test results and data, and person performing test; and

The City will maintain records on all assemblies that protect the public water system from contamination. At a minimum, the City will maintain records on all premises isolation assemblies required to protect the public water system. Where applicable, the above information will also be maintained for backflow preventers installed for in-premises protection that are relied upon by the City to protect the public water system.

2. Reports to be Prepared and Submitted to DOH

The City will prepare the following reports required by WAC 246-290-490 including:

- CCC program activities report for the calendar year, to be sent to DOH when requested;
- CCC program summary information, when required, or when there are significant policy changes
- Backflow incident reports to DOH (and voluntarily to the PNWS-AWWA CCC Committee)
- Documentation when exceptions to mandatory premises isolation are granted

At a minimum, the City's CCS will prepare and sign the exceptions reports

The City's CCS will prepare and sign all CCC-related reports required by WAC 246-290-490.

The utilities operations manager shall sign the CCC reports before submission to DOH.

Element 10: *Additional cross-connection control requirements for reclaimed water.*

At this time the City of Mercer Island does not receive or distribute reclaimed water. In the event that reclaimed water use is proposed within the City's service area, the City will make all cross-connection control requirements mandated by the Permitting Authority in accordance with chapter 90.46 RCW part of the written CCC program plan and comply with such additional requirements.

E. Other Provisions

1. Coordination with the AHJ

Both WAC 246-290-490 and the Uniform Plumbing Code amended for Washington require coordination between the City and the AHJ in all matters pertaining to cross-connection control. The City will provide information to the AHJ in a timely manner regarding any:

- Requirement imposed on a residential consumer for the installation of a DCVA or an RPBA on the service, with a description of the cross-connection hazard identified.
 - Upgrade of the premises isolation backflow preventer, e.g., from a DCVA to an RPBA.
 - Action taken to discontinue water service to a consumer.
 - Backflow incident known by the City to have contaminated the public water system or a consumer's plumbing system.
2. The City will pursue development of a written agreement with the AHJ regarding the details of the coordination on CCC issues between the two parties. The agreement will include, but not be limited to, the following items:
- The purpose of the written agreement
 - Identification of the parties and other interested agencies
 - Delineation of responsibilities
 - Procedures regarding new service connections
 - Procedures regarding existing and changes to existing services
 - Special policies and procedures, such as for fire protection and irrigation services
 - Procedures regarding water service shut-offs, backflow incidents, and other events
 - Communications between parties
 - Other contingencies
3. **Prohibition of Return of Used Water.** The City of Mercer Island prohibits the intentional return of used water to the City's distribution system per WAC 246-290-490 (2)(1).

Used water is defined as water that has left the control of the City. This includes water used for heating and cooling purposes and water that may flow back into the distribution system from consumers with multiple connections.

It is the policy of the City to:

- Prohibit the intentional return of used water to the distribution system by any consumer served by the public water system.
 - Require that all consumers with multiple connections, where the hydraulics permit the potential return of used water, to install a backflow preventer (DCVA or RPBA) commensurate with the degree of hazard at each point of connection.
4. **Unapproved Auxiliary Supplies.** All water supplies other than those owned by the City are considered unapproved auxiliary supplies as defined in WAC 246-290-010. The City will require backflow protection for consumers with unapproved auxiliary supplies on their premises commensurate with the assessed degree of hazard.
5. **Tanker Trucks.** The City may allow tanker trucks or other mobile units to obtain water from the City's water system under the following conditions:
- Via City owned meter/backflow assembly, rented at consumer's expense.
6. **Interties and Wholesale Water Consumers.** The City will require that interties with other public water systems or wholesale consumers (such as mobile home parks) be isolated at the point of delivery by:

- A minimum of an RPBA if the City considers the purchasing system or wholesale consumer to pose a high-health hazard to the City's system.

F. Relationship to Other Planning and Operations Program Requirements

The City will consider the requirements and consequences of the CCC program on the utility's planning and operations requirements. Such considerations include, but are not limited to ensuring:

- Promoting adequate communication between CCC program personnel and other water utility staff.
- That adequate training is provided to all staff to recognize potential cross-connection control problems.
- That cross-connection issues be considered in water quality investigations.
- That the design of the water distribution system makes adequate provisions for expected head losses incurred through the installation of backflow assemblies.
- That CCC program personnel be consulted in the design of water and wastewater treatment facilities and when proposals are made to receive or distribute reclaimed water.
- That operations under normal and abnormal conditions do not result in excessive pressure losses.
- That adequate financial and administrative resources are available to carry out the CCC program.

G. APPENDICES

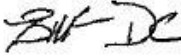
- 1. Building Department Agreement (Draft)**
- 2. Certification Letter (Draft)**
- 3. Second Notification Letter (Draft)**



MEMORANDUM

9601 SE 36th Street
Mercer Island, WA 98040
206.275.7608 / 206.275.7814 Fax
mi_maintenance@mercergov.org

To: Don Cole, Building Official

From: Brian McDaniel, Utilities Operation Manager 

CC: Jason Kintner, Public Works Director
Scott Greenburg, Development Services Director
Patrick Yamashita, City Engineer

Date: June 24, 2016

Re: CROSS CONNECTION CONTROL DELINEATION OF DUTIES

Background:

The City of Mercer Island is proud to provide high quality drinking water to our customers. The City actively uses several methods and barriers to ensure that our drinking water is clean, safe, and reliable. A major component of ensuring water quality is the active implementation of a Cross Connection Control Program. Because the City's adopted program includes policies and procedures that fall under the control of both the Plumbing Code's Authority Having Jurisdiction (the Building Official within the City Development Services Group, (DSG)) and the Cross Connection Control Specialist (CCS) within the City water utility), this agreement between the two Departments intends to delineate roles, responsibilities and establish clear jurisdictional boundaries.

Program:

The City Utility Department Cross Connection Control Specialist, (CCS) will coordinate program implementation activities with DSG. The CCS's jurisdictional responsibility includes the water system storage and distribution system, up to the downstream connection of the premises isolation backflow assembly, which may be located on private property. The CCS will be responsible for inspection and tracking maintenance activities for premises isolation backflow assemblies. The CCS, for both premises and in premises backflow assemblies, will keep inspection and testing records. The City's CCS will perform inspections for proper installation of Premise/In-premise Isolation backflow preventers. The CCS will perform periodic hazard evaluations/inspections/surveys of properties for potential cross connections as referenced within the written program.

DSG's jurisdictional responsibility is downstream of the premises isolation, specifically the inspection of permitted work for appropriate installation of in premises protection as required by the adopted plumbing code. DSG will provide inspection and testing records to the CCS for tracking purposes. DSG responds to written complaints of work performed without required permits, but does not perform hazard evaluations/inspections/surveys for potential cross connections of properties that have not obtained a permit (unless responding to a written complaint). DSG will notify the CCS of such written complaints.

Activities:

All new installations require a plumbing permit. The CCS will have the authority to inspect and approve plumbing permits when a premises isolation backflow assembly is required. The CCS will document the inspections in the City's permit tracking software. The CCS will notify DSG when taking enforcement actions for the installation, repair, or maintenance of all backflow assemblies. The CCS will participate in the final inspection process for new construction projects.



MERCER ISLAND WATER UTILITY
9611 SE 36TH Street
Mercer Island, WA 98040
206-275-7782 Fax: 206-275-7787

Cross Connection Lakefront Property Owner Certification

Date:

Consumer's Name
 Consumer's Address

Are you renting or do you own this property? Rent: _____ Own: _____

Please answer the following questions related to the use of lake water on your property: *Circle*

1. Do you have a lawn or garden sprinkler system that draws water from Lake Washington? Can you switch between irrigating with Lake water and City water? Did you ever convert from City water to Lake water? If so, approx when _____ Is the irrigation system protected with a backflow prevention assembly?	Yes Yes Yes Yes	No No No No
2. Is City water supplied to your dock via a hose bib or to a hydraulic boat lift ? Is City water supplied to a hose bib at or within 50 feet of the shoreline or dock? Is the connection protected with a backflow prevention assembly?	Yes Yes Yes	No No No
3. Do you have a booster pump, well pump, or any water pump on your property? Please specify what type: _____ Is the connection protected with a backflow prevention assembly?	Yes Yes	No No
4. Are you aware of any other situation that could create a cross-connection between Lake Washington and the City's water supply? Please specify: _____ Is the connection protected with a backflow prevention assembly?	Yes Yes	No No
5. Do you have a premises isolation backflow preventer near the meter on your property? When was is installed? _____	Yes	No

Comments or additional information:

CONTINUE CERTIFICATION FORM ON BACKSIDE →

Please respond to the following questions related to property features which may require a backflow prevention assembly, but which do not involve the use of lake water:

Plumbing Cross Connection Type	Is connection present?		Is connection protected?	
	Yes	No	Yes	No
Auxiliary water source such as a well or use of reclaimed water	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Irrigation System / Underground lawn sprinkler system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Lawn sprinkler system using chemicals, fertilizer, or with booster pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Swimming pool, hot tub, or jacuzzi	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water system booster pump, well pump, or any other type of water pump	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Boiler or steam system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Water connected radiant floor heat	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Fire suppression system / Fire sprinkler system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Greenhouse or greenhouse equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Solar hot water system	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Duck or fish pond	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
Medical, dental, or dialysis equipment	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

Do you have any situation that you are aware of that could create a cross connection to the water supply? If so, please use the box below to describe.

Comments or additional information:

Contact phone number (please fill in the best phone number to reach you at):	
--	--

<i>To the best of my knowledge, the above information is true, accurate, and complete.</i>		
_____	_____	_____
Water Customer (printed name)	Signature	Date

For questions, call Casey Leyde at 206-275-7782.

Please return this certification form to the City using the pre-addressed envelope, or mail to:
 Cross-connection control Specialist, City of Mercer Island, 9611 SE 36th Street, Mercer Island, WA 98040



Date:

Address:

Dear Lakefront Property Owner or Resident,

SECOND NOTICE (WARNING)

In the interest of public health the City is actively identifying properties with an elevated risk of exposing the City's water system to contamination from cross-connections. Your property has been identified as having a cross-connection with an elevated risk of contaminating the City's water system. The Department of Health requires that premises that pose elevated risks must be protected by the installation of an Approved Backflow Prevention Assembly (Reduced Pressure Backflow Assembly) or Method (Air gap).

On February 25, 2016 we mailed a notice requesting that you install an Approved Backflow Prevention Assembly no later than May 31, 2016. As of today we do not have record that a permit has been issued for the installation of that Approved Backflow Prevention Assembly.

If a permit for the installation for an Approved Backflow Assembly is not received, monetary penalties will be enforced pursuant to Mercer Island City Code 15.14.080(B). If the permit or satisfactory installation of an Approved Backflow Assembly for Premise Isolation and test results are not received within 30 days of date of this letter, you will be subject to a \$100.00 penalty. Further delay of installing premise isolation will lead to an additional \$150.00 penalty. If necessary, water service may be terminated if the satisfactory installation of an Approved Backflow Assembly for Premise Isolation and test results are not met.

A plumbing permit is required for all installations of Backflow Prevention Assemblies. A licensed contractor may obtain a City of Mercer Island plumbing permit at City Hall or online at www.mybuildingpermit.com. Once the work has been completed, the City will need to inspect the installation (before backfilling). Please call 206-275-7782 to schedule the inspection.

As a homeowner, you are responsible for installing Backflow Prevention Assemblies (BPAs) where required, registering them with the City, and having them inspected and tested annually. For more information about the cross-connection control program, please visit the City's website at www.mercergov.org/backflow, and review the letter sent on February 25, 2016.

Thank you for your cooperation as we work to ensure safe drinking water for all customers. If you have any questions you can contact me directly.

Sincerely,

Casey Leyde
Water Quality Technician
Casey.leyde@mercergov.org
206-275-7782

Premises Isolation Notice 2

Appendix J

Water Quality Monitoring

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Water Quality Monitoring Schedule

System: MERCER ISLAND, CITY OF
Contact: Terry Smith

PWS ID: 53640 5
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

	May 2014	Jun 2014	Jul 2014	Aug 2014	Sep 2014	Oct 2014	Nov 2014	Dec 2014	Jan 2015	Feb 2015	Mar 2015	Apr 2015
Coliform Monitoring Population	22720	22720	22720	22720	22720	22720	22720	22720	22720	22720	22720	22720
Number of Routine Samples Required	18*	18*	18*	18*	18*	18*	18*	18*	18*	18*	18*	18*

*Indicates the requirement is an exception from WAC 246-290.

- 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.
- Collect no less than 5 routine samples in the month following one or more unsatisfactory samples, in accordance with your system's Coliform Monitoring Plan.
- For systems that chlorinate, record chlorine residual (measured when the coliform sample is collected) on the coliform lab slip.

Chemical Monitoring Requirements

Distribution Monitoring

<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>
Total Trihalomethane (THM)	2	Apr 2014 - Jun 2014	Initial - Quarterly	01/15/2014	Apr 2014
Total Trihalomethane (THM)	2	Jul 2014 - Sep 2014	Initial - Quarterly	01/15/2014	Jul 2014
Total Trihalomethane (THM)	2	Oct 2014 - Dec 2014	Initial - Quarterly	01/15/2014	Oct 2014
Halo-Acetic Acids (HAA5)	2	Apr 2014 - Jun 2014	Initial - Quarterly	01/15/2014	Apr 2014
Halo-Acetic Acids (HAA5)	2	Jul 2014 - Sep 2014	Initial - Quarterly	01/15/2014	Jul 2014
Halo-Acetic Acids (HAA5)	2	Oct 2014 - Dec 2014	Initial - Quarterly	01/15/2014	Oct 2014

Notes on Distribution System Chemical Monitoring

For *Disinfection Byproducts (HAA5 and THM)*: Collect the samples at the locations identified in your Disinfection Byproducts (DBP) monitoring plan.

Generated on: 05/12/2014

Other Information

Other Reporting Schedules	Due Date
Submit Consumer Confidence Report (CCR) to customers and ODW (Community systems only):	07/01/2014
Submit CCR certification form to ODW (Community systems only):	10/01/2014
Submit Water Use Efficiency report online to ODW (Community and other municipal water systems only):	07/01/2014
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 end of monitoring period

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:	Jolyn Leslie: (253) 395-6762 or jolyn.leslie@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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Annual
WATER
QUALITY
REPORT

Reporting Year 2013



Presented By
City of Mercer Island

PWS ID#: 536405

There When You Need Us

We are once again proud to present our annual water quality report covering all testing performed between January 1 and December 31, 2013. Over the years, we have dedicated ourselves to producing drinking water that meets all state and federal standards. We continually strive to adopt new methods for delivering the best-quality drinking water to you. As new challenges to drinking water safety emerge, we remain vigilant in meeting the goals of source water protection, water conservation, and community education while continuing to serve the needs of all our water users.

Why do I get this report each year?

Community water system operators are required by federal law to provide their customers an annual water quality report. The report helps people make informed choices about the water they drink. It lets people know what contaminants, if any, are in their drinking water and how these contaminants may affect their health. It also gives the system operators a chance to tell customers what it takes to deliver safe drinking water.

Please remember that we are always available to assist you should you ever have any questions or concerns about your water.

Mercer Island Takes Its Water Seriously.

During 2013, we purchased 750.9 million gallons of water from Seattle Public Utilities, of which our records account for 676.6 million gallons. These figures represent a 9.2% three-year annual average of unaccounted for water that we remain vigilant in identifying. Efforts made in 2013 to reduce our unaccounted-for water included the replacement of inaccurate water meters, fire hydrant inspections and repairs, and our annual system-wide leak detection survey. To account for all water, our crews meter water usage during our annual water main distribution flushing program. We also meter water used during our fire hydrant inspection and repair program and all new capital improvement projects.

In addition, we could use your help. If you see or suspect a water leak, call us. If you notice a truck connected to a fire hydrant that clearly isn't a City vehicle, or if you see a hose connected to a hydrant and there is no meter attached, please call us.

Substances That Could Be in Water

In order to ensure that tap water is safe to drink, the U.S. EPA and/or the Washington state board of health prescribes regulations that limit the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, in some cases, radioactive material; and substances resulting from the presence of animals or from human activity. Substances that may be present in source water include:

Microbial Contaminants, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, or wildlife;

Inorganic Contaminants, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming;

Pesticides and Herbicides, which may come from a variety of sources such as 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, and may also come from gas stations, urban stormwater runoff, and septic systems;

Radioactive Contaminants, which can be naturally occurring or may be the result of oil and gas production and mining activities.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.

Mercer Island's Emergency Well Leads The Way In Earthquake Preparedness

To ensure water for residents following a disaster such as an earthquake, the City of Mercer Island became the first jurisdiction in Washington state to receive a "source permit" for an emergency well. The emergency well was drilled to a depth of 570 feet in 2007 at Rotary Park in the center of the Island.

Water from the well will be available to residents on either a walk-up basis or by water truck, depending on emergency conditions existing at the time. The well is not designed to supply the Island's water distributions system. The relatively small flows produced by the well are not hydraulically sufficient to move through 121 miles of pipes and open 85 pressure-reducing stations, and could serve only a small portion of the Island. In addition, the state's approval for the well clearly does not allow it to be connected to the system.

Community Participation

You are invited to participate in our public forum and share your comments about your drinking water. The Utility Board meets at 7 pm on the second Tuesday of most months in the City Council Chambers at City Hall located at 9611 SE 36th Street, Mercer Island. You can find meeting and contact information on the City of Mercer Island Web site at <http://www.mercergov.org/CCBIndex.asp?CCBID=8>.

Water Conservation

Water utilities in Washington State are required to set a six-year water conservation goal by the WA State Department of Health (DOH).

You, our residential and commercial customers, continue to do a great job with water conservation. Conservation saves you money, protects fish and wildlife, and helps ensure a reliable future supply despite regional growth and climate uncertainty.

The Saving Water Partnership (SWP) – which is made up of Mercer Island and its 18 water utility partners – has set a six-year conservation goal: reduce per capita use from current levels so that the SWP's total average annual retail water use is less than 105 mgd from 2013 through 2018 despite forecasted population growth. To meet the goal, the amount of water used per person will need to decrease to offset growth. For 2013, the Saving Water Partnership met the goal, using 93.1 mgd.

For more Mercer Island conservation information please visit our Web site at www.mercergov.org/waterconservation. Additional information is also available at www.savingwater.org.

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or <http://water.epa.gov/drink/hotline>.

QUESTIONS?

For more information about this report, or for any questions related to your drinking water, please contact the City of Mercer Island Maintenance Department at (206) 275-7608. This 2014 report, indicating water testing done in 2013, is also available on the city's Web site at <http://www.mercergov.org/files/2013WaterQualityReport.pdf>.

Source Water Assessment

Washington's Source Water Assessment Plan (SWAP) is now available from the Department of Health (DOH) website at <http://doh.wa.gov/communityandenvironment/drinkingwater/sourcewater/sourcewaterprotection.aspx>. This plan is conducted by (DOH) Office of Drinking Water (ODW) and is an assessment of the delineated area around their listed sources through which contaminants, if present, could migrate and reach our source water. By default, the DOH assigns a susceptibility rating of "high" for all surface water sources.

Where Does My Water Come From?

The City of Mercer Island receives its surface water supply from Seattle Public Utilities (SPU). Our primary water source from SPU is the Cedar River Watershed, with the Tolt River's South Fork providing an alternate supply. SPU's uninhabited watersheds are supplied by the melting snow pack in the Cascade Mountains with supplements from our annual rainfall totals.

Each watershed is closed to unauthorized access and is carefully managed to supply clean, pristine drinking water to more than 1.4 million people in the greater Seattle area. The rainfall and snow melt collected in the Cedar and Tolt rivers meets or surpasses all federal standards for drinking water. Water samples are tested every day for a wide variety of substances.

To learn more about their watersheds, treatment facilities and their water quality analysis on the Internet, go to the Seattle Public Utilities Web site at http://www.seattle.gov/util/MyServices/Water/Water_Quality/index.htm.

How Is My Water Treated and Purified?

Mercer Island receives its water primarily from the Cedar River Water supply via Seattle Public Utilities (SPU) transmission system.

At SPU's Cedar treatment facility, which was completed in 2003, the water is screened to remove debris (twigs, leaves), disinfected with chlorine to remove microbial contaminants, fluoridated for dental health protection, and adjusted with lime for pH-adjusted corrosion control to minimize lead leaching in older plumbing systems. In 2004, SPU added two more steps to its water treatment at this facility: ozonation for odor and taste improvements and Giardia control and ultraviolet light (UV) disinfected to disable microbial contaminants such as chlorine-resistant *Cryptosporidium*.

The Tolt water supply has ozonation, filtration, chlorination, fluoridation, pH, and alkalinity adjustment.

Storing and Treating Emergency Drinking Water

Having an ample supply of clean water is a top priority in an emergency. A normally active person needs to drink at least two quarts of water each day. You will also need water for food preparation and hygiene. Store a total of at least one gallon per person, per day. You should store at least a two-week supply of water for each member of your family. For further information regarding emergency water disinfection and storage please visit our website at <http://www.mercergov.org/files/disinfection.pdf>

What's a Cross-connection?

Outside water taps and garden hoses tend to be the most common sources of cross-connection contamination at home. The garden hose creates a hazard when submerged in a swimming pool or when attached to a chemical sprayer for weed killing. Garden hoses that are left lying on the ground may be contaminated by fertilizers, cesspools or garden chemicals. Improperly installed valves in your toilet could also be a source of cross-connection contamination.

Naturally Occurring Bacteria

The simple fact is, bacteria and other microorganisms inhabit our world. They can be found all around us: in our food; on our skin; in our bodies; and, in the air, soil, and water. Some are harmful to us and some are not. Coliform bacteria are common in the environment and are generally not harmful themselves. The presence of this bacterial form in drinking water is a concern because it indicates that the water may be contaminated with other organisms that can cause disease. Throughout the year, we tested many water samples for coliform and fecal coliform bacteria. In that time, none of those samples came back positive.

What Are PPCPs?

When cleaning out your medicine cabinet, what do you do with your expired pills? Many people flush them down the toilet or toss them into the trash. Although this seems convenient, these actions could threaten our water supply. Instead, check to see if the pharmacy where you made your purchase accepts medications for disposal, or contact your local health department for information on proper disposal methods and drop-off locations.

Lead in Home Plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

Variations and Exemptions

As a consumer you are entitled to know what variations and waivers are in force with your water utility. The City of Mercer Island currently has one waiver with the Department of Health, and it concerns asbestos-cement (AC) water main piping. The Washington State Department of Health (DOH) does not require any water supplier to report on systems with less than 10% total AC piping. Our waiver simply acknowledges that a very small amount of AC pipe exists in our system. The water distribution system on Mercer Island is composed of 98% cast iron, ductile iron, or steel; the remaining 2% is AC pipe. AC is an old material that is no longer used in construction, and the small amounts of material in our system pose no threat to drinking water quality. Further, Seattle Public Utilities has not detected any naturally occurring asbestos in its watersheds.

Sampling Results

During the past year Seattle Public Utilities has taken hundreds of water samples on Mercer Island's behalf to determine the presence of any radioactive, biological, inorganic, volatile organic or synthetic organic contaminants. The table below shows only those contaminants that were detected in the water. The state requires us to monitor for certain substances less than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

Mercer Island participated in the 3rd stage of the EPA's Unregulated Contaminant Monitoring Regulation (UCMR3) program by performing additional tests on our drinking water. UCMR3 benefits the environment and public health by providing the EPA with data on the occurrence of contaminants suspected to be in drinking water. This data assists EPA in determining if new regulatory standards need to be introduced to improve drinking water quality. Mercer Island had no UCMR3 detections. Contact us for more information on this program.

REGULATED SUBSTANCES							
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppb)	2013	2,000	2,000	1.8	one sample	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Bromate (ppb)	2013	10	0	0.08 (average)	ND-2	No	By-product of drinking water disinfection
Chlorine (ppm)	2013	[4]	[4]	0.91 (average)	0.24-1.5	No	Water additive used to control microbes
Fluoride ¹ (ppm)	2013	4	4	0.8 (average)	0.7-0.8	No	Erosion of natural deposits; Water additive which promotes strong teeth; Discharge from fertilizer and aluminum factories
Haloacetic Acids [HAA]-Stage 2 (ppb)	2013	60	NA	34.9 (average)	20.4-46.4	No	By-product of drinking water disinfection
TTHMs [Total Trihalomethanes]-Stage 2 (ppb)	2013	80	NA	33.8 (average)	25.8-39.7	No	By-product of drinking water disinfection
Total Organic Carbon (ppm)	2013	TT	NA	0.8 (average)	0.4-1.4	No	Naturally present in the environment
Turbidity (NTU)	2013	TT	NA	0.4 (average)	0.2-2.7	No	Soil runoff
Tap water samples were collected for lead and copper analyses from sample sites throughout the community							
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH%TILE)	SITES ABOVE AL/TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper ² (ppm)	2013	1.3	1.3	0.096	0/52	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2013	15	0	3.6	0/52	No	Corrosion of household plumbing systems; Erosion of natural deposits
OTHER SUBSTANCES							
SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
<i>Cryptosporidium</i> ³ (# positive samples)	2013	NA	NA	ND	NA	No	Naturally present in the environment

¹ According to the Centers for Disease Control and Prevention, the introduction of fluoride into drinking water and toothpaste is viewed as one of the 10 greatest accomplishments of the 20th century.

² For both Lead and Copper 5 of the 50 sample sites throughout the Seattle Public Utility Cedar River Purveyor service area were taken at Mercer Island residences.

³ *Cryptosporidium* was not detected in any samples of the three samples taken from the Cedar Watershed.

Definitions

AL (Action Level): The concentration of a contaminant which, if exceeded, triggers treatment or other requirements which a water system must follow.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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).

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.



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mwhlabs@mwhglobal.com

UCMR3 FACT SHEET

For Utilities serving >10,000 retail population



Key dates?

- Representative Sample Plans (Groundwater Systems) are due **August 1, 2012**.
- Sample Inventory Location and Schedule updates (all Systems) are due **October 1, 2012**.
- Sampling may commence on **January 1, 2013**.
- All monitoring must be completed by **December 31, 2015**.

Who must monitor?

Any systems (including 100% consecutive systems) serving a retail population of >10,000 must monitor for List 1 (Assessment Monitoring). All very large systems (>100,000 retail population) must also monitor for List 2 (Screening Survey). A randomly selected set of 320 large systems (>10,000 retail population) must also monitor for List 2. Retail population is based on what is in the Safe Drinking Water Information System (SDWIS/Fed) as of December 31, 2010. If your agency has not yet received your UCMR3 Customer Retrieval Key (CRK) letter which provides Safe Drinking Water Accession and Review System (SDWARS) access to see your specific requirements and schedule you should contact EPA.

What must be monitored?

Assessment Monitoring (List 1) includes 21 compounds listed in six (6) individual EPA methods (200.8, 218.7, 300.1, 522, 524.3, and 537). Screening Survey Monitoring (List 2) includes 7 natural and synthetic hormones (EPA method 539). A complete summary of the methods, reporting limits and required sample locations is shown in the table.

Where do you monitor?

All entry points to the distribution system (EPTDS) must be sampled. Additionally, samples must also be collected at the Distribution System Maximum Residence Time (DSMRT) for metals (200.8), hexavalent chromium (218.7), and chlorate (300.1). The DSMRT location should be your farthest point relative to the EPTDS, which is usually your highest Stage 2 TTHM sample location. EPA's SDWARS database has been pre-populated with these sample locations. Systems may review and edit this information in SDWARS up until October 1, 2012.

What if you buy water from a wholesaler and have multiple turnouts?"

You can sample at a representative turnout (for any number of connections to the same source), rather than sampling at all turnouts, but you must choose the turnout with the highest volume at the entry point. If that turnout is not operating at the time of scheduled sampling you must sample an alternate turnout.

Can you use representative samples if you are a groundwater system with multiple entry points?

If you already had a "representative sampling plan" in place for your UCMR2 monitoring, those sites have been pre-loaded into SDWARS by EPA and are (by default) approved for use in UCMR3. If you want to edit your existing representative sampling plan, you must submit your proposed new plan to EPA by August 1, 2012. When identifying a representative well, the well must be representative of the highest producing (based on annual volume) and most consistently active wells. In addition, the representative well must be in use at the scheduled sampling time. An alternative location must be sampled if the representative EPTDS is not available at the time of scheduled sampling.

When and how often do you monitor?

Monitoring must commence on or after January 1, 2013 and conclude by December 31, 2015. EPA has pre-populated SDWARS with your designated start date. However, you may modify your own schedule to meet your particular operational or budgetary constraints anytime before October 1, 2012. Groundwater systems must sample twice in one year, 5-7 months apart. Surface water systems (or GWUI systems) must monitor quarterly for one year. For the second and subsequent sampling events, if the designated sample location is non-operational for 1 month before or after the scheduled sampling, the water system must contact EPA to establish a revised sample schedule.

How do you select a laboratory?

EPA will shortly publish a list of all approved laboratories. Approved laboratories will undergo ongoing audits by EPA to retain approval. Only **EPA Approved** laboratories may perform UCMR3 compliance analysis. MWH (CA00006) is fully approved for all UCMR3 required methods. See http://www.mwhlabs.com/files/certs/UCMR3_Lab_Approval.pdf

What about field blanks?

Because of the low reporting limits, four analytical methods (metals by 200.8, volatiles by 524.3, perfluorinated compounds by 537 and hormones by 539) require the collection of a field blank with EACH sample to verify that any detects are not the result of field contamination. Based on guidance from EPA, the laboratory will provide specific instructions for how to collect the field blank, which differs from method to method. If any analytes are detected in a sample, the field blank must also be analyzed, and if there are any detects in that field blank, the sample results will be considered invalid and will require re-collection.

When do you report your results to EPA?

Labs have 120 days after sampling to post results. Once posted, the water system will receive notification electronically to review and approve the data submitted by the laboratory. You then have 60 days after posting to approve the data. If no action is taken within the 60 days, the data will automatically be uploaded to the National Contaminant Occurrence Database (NCOD).

What else do you need to report?

There are a number of pieces of information in addition to lab results that must be reported. Many of these will be reported by the laboratory (e.g. sample event code, sample date, analysis date, etc). However there are some that you must report, including all disinfectant type(s) being used for EACH sampling point (there are numerous choices), the sample location type (EPTDS or DSMRT), facility ID, sample point ID, and water source type. Many of these (except the disinfectant information) can be pre-populated in the database to streamline your data entry. There are also some one time reporting requirements (e.g. zip codes for all customers, contact information, etc.).

Analyte	Method	Reporting Limit (ug/L)	EPTDS	DSMRT	Field Blank
List 1 (Assessment Monitoring)					
1,2,3-trichloropropane	EPA 524.3	0.03	✓		✓
1,3-butadiene	EPA 524.3	0.1	✓		✓
chloromethane (methyl chloride)	EPA 524.3	0.2	✓		✓
1,1-dichloroethane	EPA 524.3	0.03	✓		✓
bromomethane (methyl bromide)	EPA 524.3	0.2	✓		✓
chlorodifluoromethane (HCFC-22)	EPA 524.3	0.08	✓		✓
bromochloromethane (halon 1011)	EPA 524.3	0.06	✓		✓
1,4-Dioxane	EPA 522	0.07	✓		
vanadium	EPA 200.8	0.2	✓	✓	✓
molybdenum	EPA 200.8	1	✓	✓	✓
cobalt	EPA 200.8	1	✓	✓	✓
strontium	EPA 200.8	0.3	✓	✓	✓
chromium	EPA 200.8	0.2	✓	✓	✓
chromium-6	EPA 218.7	0.03	✓	✓	
chlorate	EPA 300.1	20	✓	✓	
perfluorooctanesulfonic acid (PFOS)	EPA 537	0.04	✓		✓
perfluorooctanoic acid (PFOA)	EPA 537	0.02	✓		✓
perfluorononanoic acid (PFNA)	EPA 537	0.02	✓		✓
perfluorohexanesulfonic acid (PFHxS)	EPA 537	0.03	✓		✓
perfluoroheptanoic acid (PFHpA)	EPA 537	0.01	✓		✓
perfluorobutanesulfonic acid (PFBS)	EPA 537	0.09	✓		✓
List 2 (Screening Monitoring)					
17-β-estradiol	EPA 539	0.0004	✓		✓
17-α-ethynylestradiol (ethinyl estradiol)	EPA 539	0.0009	✓		✓
16-α-hydroxyestradiol (estriol)	EPA 539	0.0008	✓		✓
equilin	EPA 539	0.004	✓		✓
estrone	EPA 539	0.002	✓		✓
testosterone	EPA 539	0.0001	✓		✓
4-androstene-3,17-dione	EPA 539	0.0003	✓		✓



MWH
LABORATORIES

mwhlabs@mwhglobal.com

Main Laboratory:

750 Royal Oaks Drive
Monrovia, California 91016-3629
Phone: (626) 386-1100
Fax: (626) 386-1101
1-800-566-LABS (1-800-566-5227)

Service Centers:

- Sacramento, California
- Colton, California
- Scottsdale, Arizona

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Coliform Monitoring Plan



City of Mercer Island

Coliform Monitoring Plan for: City of Mercer Island

A. System Information

Plan Date: 12/08/2015

Water System Name: City of Mercer Island	County: King	System I.D. Number: 53640 5
Name of Plan Preparer: Brian McDaniel	Position: Utilities Operations Manager	Daytime Phone #: (206) 275-7812
Sources: DOH Source Number, Source Name, Well Depth, Pumping Capacity	Seattle Public Utilities, 3205 gallons per minute	
Storage:	Two 4 million gallon reservoirs	
Treatment:	No treatment	
Pressure Zones:	Freeway, Intermediate, Reservoir, First Hill, Pumped, Fragmented low	
Population by Pressure Zone:	Freeway 5912, Intermediate 2840, Reservoir 2362, First Hill 500, Pumped 7486, Fragmented low 2761	
Number of Routine Samples Required Monthly by Regulation: 25	Number of Sample Sites Needed to Represent the Distribution System: 14	
*Request DOH Approval of Triggered Source Monitoring Plan?	Yes <input type="checkbox"/> No <input checked="" type="checkbox"/>	

B. Laboratory Information

Laboratory Name: Seattle Public Utilities, Water Quality Laboratory	Office Phone #: (206) 684-7834
Address: 800 S. Stacy St. Seattle, WA 98134	After Hours #: (206) 684-7407 or (425)-885-1664
Hours of Operation: Monday – Friday 7:00 am – 4:00 pm	
Contact Name: Lynn Kirby	
Emergency Laboratory Name: Am Test	Office Phone #: (425) 885-1664
Address: 13600 NE 126 th PL Suite C Kirkland, WA 98034	After Hours #: (425) 770-7037 (206) 387-8722
Hours of Operation: Monday –Friday 7:00 am – 5:00 pm	
Contact Name: Aaron Young (206) 387-8722	

C. Routine and Repeat Sample Locations

<u>ROUTINE LOCATIONS</u>			
<u>STATION ID</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>PRESSURE ZONE</u>
MI-1	47.539422	-122.234766	PUMPED
MI-2	47.560169	-122.220185	PUMPED
MI-3A	47.587135	-122.250882	FREEWAY
MI-4A	47.575507	-122.226904	PUMPED
MI-6	47.524931	-122.226932	AVALON
MI-7	47.540615	-122.239741	MEADOW LN/ HOLLY HILL
MI-8	47.551066	-122.210855	RYDEEN
MI-9	47.589548	-122.226933	FREEWAY
MI-10	47.544802	-122.215051	INTERMEDIATE
MI-11	47.563431	-122.212355	INTERMEDIATE
MI-12	47.572239	-122.207029	MERCERWOOD
MI-13	47.579056	-122.209168	FREEWAY
MI-14	47.578477	-122.240356	FIRST HILL
MI-15	47.587376	-122.245034	RESERVOIR
MI-16	47.57761	-122.23468	FREEWAY
MI-17	47.564134	-122.230296	FOREST
MI-18	47.527484	-122.229871	INTERMEDIATE
MI-19	47.535051	-122.219675	PUMPED

REPEAT LOCATIONS			
<u>FACILITY ID</u>	<u>LATITUDE</u>	<u>LONGITUDE</u>	<u>Pressure Zone</u>
MI-1-2	47.539326	-122.235475	PUMPED
MI-1-3	47.53932	-122.233095	PUMPED
MI-2-2	47.560671	-122.220147	PUMPED
MI-2-3	47.559855	-122.219375	PUMPED
MI-3A-2	47.588215	-122.2509	FREEWAY
MI-3A-3	47.586933	-122.2501	FREEWAY
MI-4A-2	47.575834	-122.22577	PUMPED
MI-4A-3	47.57464	-122.223127	PUMPED
MI-10-2	47.544597	-122.214464	INTERMEDIATE
MI-10-3	47.545032	-122.212022	INTERMEDIATE
MI-11-2	47.56409	-122.21155	INTERMEDIATE
MI-11-3	47.562653	-122.211949	INTERMEDIATE
MI-12-2	47.573092	-122.208439	MERCERWOOD
MI-12-3	47.57273	-122.205476	MERCERWOOD
MI-13-2	47.579364	-122.209197	FREEWAY
MI-13-2	47.57874	-122.208435	FREEWAY
MI-14-2	47.578658	-122.240655	FIRST HILL
MI-14-3	47.578213	-122.241886	FIRST HILL
MI-15-2	47.587905	-122.245198	RESERVOIR
MI-15-3	47.586672	-122.244946	RESERVOIR
MI-16-2	47.578208	-122.235106	FREEWAY
MI-16-3	47.577052	-122.234603	FREEWAY
MI-17-2	47.565514	-122.231062	FOREST
MI-17-3	47.564191	-122.230794	FOREST
MI-18-2	47.52807	-122.230675	INTERMEDIATE
MI-18-3	47.527303	-122.229028	INTERMEDIATE
MI-19-2	47.535485	-122.219956	PUMPED
MI-19-3	47.535062	-122.218845	PUMPED

Important Notes for Sample Collector:

*** Repeat sample sites are located in meter setters at the above locations that provide a designated meter sample station. Assess each sample site for sanitary conditions and off normal events such as construction or irregular plumbing. Alternant sites must be used should varied conditions exist. Refer to sample collection guidance document and reference materials in appendix B of this plan.**

*** Samples taken at the reservoir site shall be for investigation only and marked as such on the analysis request form.**

D. Routine Sample Rotation Schedule

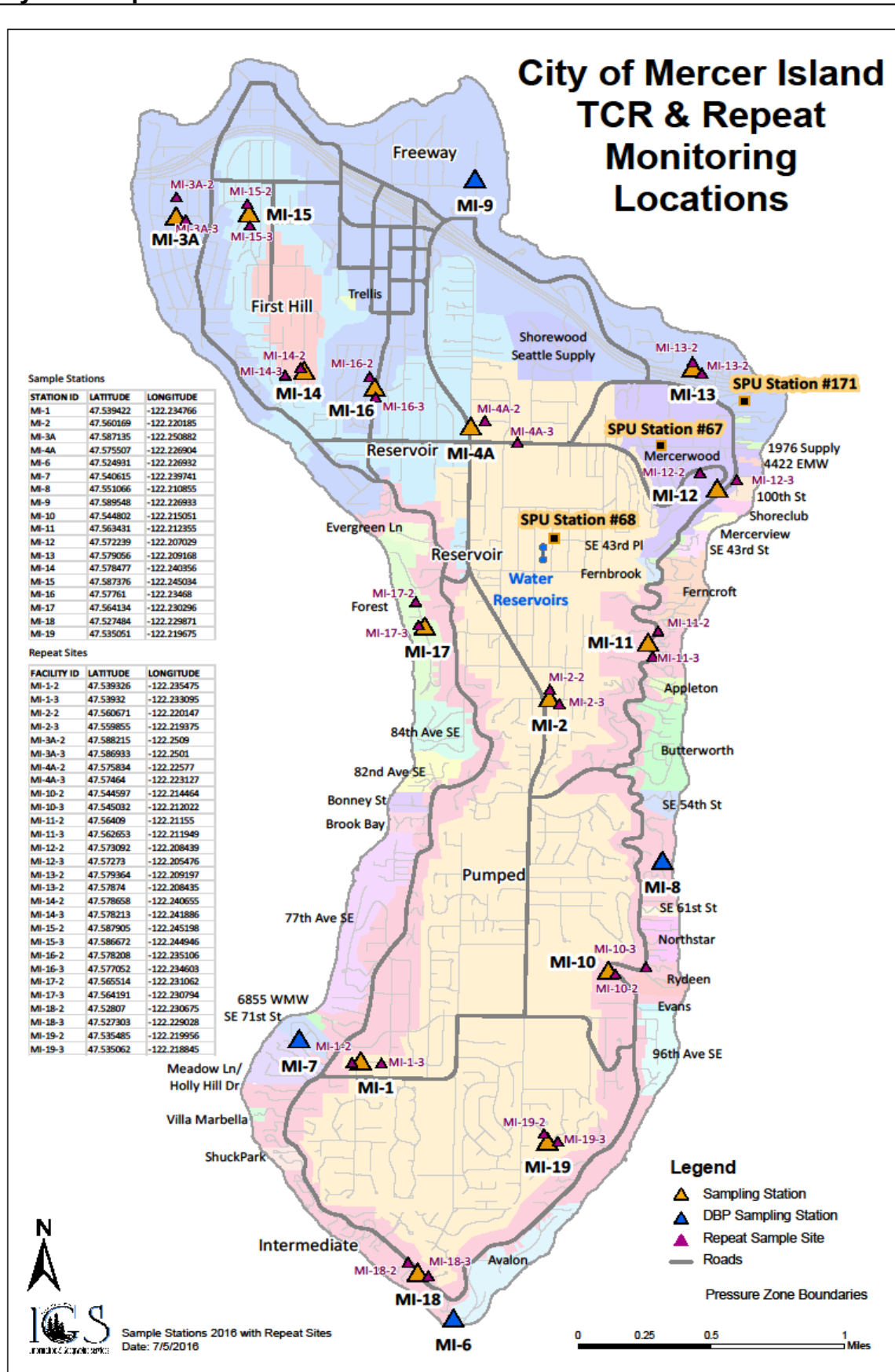
Monthly Routine Sample Rotation Schedule

Sample Site	Address	Map Page	SPU LAB Weekly collection schedule							TOTAL
			Sunday	Monday	Tuesday	Wednesday	Thursday	Friday	Saturday	
Existing MI-1	SE 71st ST & 78th Ave SE	H3					wk1/wk3			2
Existing MI-2	SE 48th ST & 89th Ave SE	E4					wk1/wk3			2
* MI-3A	SE 27th ST & 62nd Ave SE	B1			wk1/wk3					2
MI-4A	SE 39th ST & Island Crest Way	C4			wk1/wk3					2
* MI-10	6500 Blk. East Mercer Way	H5					wk2			1
* MI-11	4500 Blk. East Mercer Way	E5				wk4			wk2	2
* MI-12	4200 Blk. Mercerwood Drive	D5				wk4			wk1	2
* MI-13	3400 Blk. 97th Ave SE	C5				wk4			wk1	2
* MI-14	3400 Blk 74th Ave SE	C2			wk1/wk3					2
* MI-15	2500 Blk. 70th Ave SE	B2			wk1					1
* MI-16	3400 Blk. 77th PL SE	C3			wk2/wk4					2
* MI-17	4500 Blk. Forest Ave SE	E3					wk1/wk3			2
* MI-18	8200 Blk. West Mercer Way	J3					wk2		wk3	2
* MI-19	8800 Blk. SE 74th Place	I4					wk2			1
Total Routine TCR SCHEDULED										25
* = Installed 2015										

E. *E. coli*-present response plan

Distribution System <i>E. coli</i> Response Plan
<p>If we have <i>E. coli</i> in a routine distribution system sample we will immediately:</p> <ol style="list-style-type: none">1. Call Department of Health by end of the day that lab notified the City of positive sample.2. Contact Emergency Operations Center.3. Contact Seattle Public Utilities.<ul style="list-style-type: none">• Review source water data• Identify operational changes4. Contact Public Health Seattle King County5. Collect repeat samples outlined in section C or alternate locations that are expected to represent pathways of contamination into the distribution system.<ul style="list-style-type: none">• Collect investigative samples as needed.6. Inspection of potential pathways and correct as needed:<ul style="list-style-type: none">• Review SCADA records for pressure irregularities.• Initiate air vacuum valve inspection.• Reservoir inspection for potential pathways; screens, hatches, locks, etc.• Interview staff for operational changes, water main breaks, pressure outages, etc.• Review cross connection program and status.• Review construction activities.<p><i>(See Appendix A for Level 1 Assessments as a reference guide)</i></p>7. Review repeat sample results.<ul style="list-style-type: none">• Repeat samples all satisfactory – No action needed.• Any repeat samples that are unsatisfactory: Issue health advisory. Conduct Level 2 Assessment.

F. System Map



G. Appendix A – (RTCR) Assessments

The RTCR aims to increase public health protection through the identification and reduction of defects that could either (1) provide pathways that allow fecal contamination and waterborne pathogens to enter into the distribution system; or (2) indicate a failure or imminent failure in a barrier that is already in place. Performing assessments will also help identify problems with the sampling practices. This proactive approach is intended to prevent serious contamination by early identification and correction of problem.

Systems are required to conduct either a Level 1 or a Level 2 assessment depending on the condition that triggered the assessment. A Level 2 assessment is triggered by conditions that pose an immediate and/or more severe public health risk compared to conditions that trigger a Level 1 assessment. Therefore, the Level 2 is a more detailed assessment than a Level 1 assessment and may involve more effort and resources.

A Level 1 assessment is a basic examination of the source water, treatment, distribution system (including storage facilities) and relevant operational practices. It is intended as a self-assessment and will be performed by a responsible party of the system in most cases (40 CFR 141.859(b)(3)).

A Level 2 assessment is a more detailed examination of the system, its operational practices and its monitoring program and results. **The elements of a Level 2 assessment are the same as those of a Level 1 assessment, but each element is investigated in detail** because the incidents that trigger a Level 2 assessment are of a more critical nature and are more likely to result in direct public health impact. Level 2 assessments are performed by a professional engineer, a certified operator (certified as a WDM 3 or higher), or if available to do so Washington State Department of Health or Public Health Seattle King County staff. Mercer Island anticipates that it will contract with a professional engineer to conduct a Level 2 assessment if the City ever needs to conduct one.

A Level 2 assessment is triggered if sampling results in any one of the following scenarios (40 CFR 141.859(a)(2)):

1. An *E. coli* maximum contaminant level (MCL) violation; or
2. Triggering of a second Level 1 assessment within a rolling 12-month period, unless the state has determined a likely cause for the situation that resulted in the initial Level 1 treatment technique trigger and establishes that the system has fully corrected the problem.

City of Mercer Island

Revised Total Coliform Rule (RTCR) Level 1 Assessment Form

PWS ID#: <u>53640 5</u>	Water System Name: <u>City of Mercer Island</u>
System Operator (PRINT): _____ Phone Number: _____ Date: _____	
Reason for Assessment: _____	

Assessment Elements	Issues?			Issue Description	Corrective Action Taken or Planned to be taken and date
	Y	N	N/A		
1.0 Review of the sample sites				Indicate Element number being described	
1.1 Was the sample taken at the routine site?					
1.2 Was the Tap Area unsanitary at the time of sampling					
1.3 Was the sample taken from an outside faucet?					
1.4 Was the sample taken from a swivel faucet?					
1.5 Did the sample tap have a point of use treatment device?					
1.6 Does the building where the sample was taken have a point of entry treatment device?					
1.7 Has this location undergone any plumbing changes?					
1.8 Are there any possible cross connections around the sample site?					
1.9 Is this location near a storage tank or dead end water main?					
1.10 Any other sample site issues not previously mentioned?					
2.0 Review of sample protocol					
2.1 Is the sampler a regular, trained sampler?					
2.2 Was the laboratory-provided sample bottles used?					
2.3 Was the aerator removed?					
2.4 Was the tap flushed for 5 minutes?					
2.5 Was the tap disinfected or flamed? (circle one)					
2.6 Did the sample get too warm prior to being					
2.7 Was there other sampler error? Describe					

City of Mercer Island

Revised Total Coliform Rule (RTCR) Level 1 Assessment Form

2.8 Any other sample protocol issues not previously mentioned?					
3.0 Review of the distribution system					
3.1 Have any mains been recently replaced or service lines?					
3.2 Have any fire hydrants or blow offs been recently flushed?					
Assessment Elements					
Assessment Elements	Issues?			Issue Description	Corrective Action Taken or Planned to be taken and date
	Y	N	N/A		
3.3 Have valves been recently exercised to direct flow?				Indicate Element number being described	
3.4 Any Leaks or main breaks?					
3.5 Are all of the backflow prevention assemblies maintained?					
3.6 Was there a total loss of pressure, low pressure (<20 psi) or changes in water pressure? If so when?					
3.7 Any areas in the distribution system with low chlorine levels (<0.2 mg/L)?					
3.8 Any recent pump station failures or repairs?					
3.9 Air relief valve leaking?					
3.10 Standing water or debris in vault?					
3.11 Any recent power outages?					
3.12 Any unprotected cross connections (including yard hydrants)?					
3.13 Any other distribution issues not previously mentioned?					
4.0 Review of storage tanks					
4.1 Is there presence of animals or insects in the tank?					
4.2 Are there any breaches or holes of any kind in the tanks?					
4.3 Is there presence of animal droppings around the tank?					
4.4 Is there presence of animal droppings near vents and overflows?					
4.5 Is the #24-mesh screen damaged or not properly installed on the vents?					

City of Mercer Island

Revised Total Coliform Rule (RTCR) Level 1 Assessment Form

4.6 Have the tanks been cleaned in the last 5 years? When cleaned last?					
4.7 Is there floating debris on the tank					
4.8 Does the hatch have a solid, waterproof shoebox type lid that is properly sealed?					
4.9 Was the hatch secured and locked?					
4.10 Has the tank level been maintained?					
4.11 Have there been high or low flows through the tank?					
Assessment Elements	Issues?			Issue Description	Corrective Action Taken or Planned to be taken and date
	Y	N	N/A		
4.12 Was the sample taken when the tank level was at the low-level mark?				Indicate Element number being described	
4.13 Failure or improper operation on tank telemetry / altitude valve?					
4.14 Any recent tank repairs?					
4.15 Was there any power outages?					
4.16 Was the tank or perimeter vandalized or been subject to tampering?					
4.17 Any other storage tank issues not previously mentioned?					
5.0 Source Review (<i>coordinated effort with Seattle Public Utilities, (SPU)</i>)					
5.1 Contact SPU for a review of source water					
5.2 Have flows varied at point of connection					
5.3 Was there a total loss of pressure, low pressure (<20 psi) or changes in water pressure? If so when?					
5.4 Has there been a change in source water?					
5.5 Has there been significant precipitation in the prior 30 days?					
6.0 Significant Deficiencies					

City of Mercer Island

Revised Total Coliform Rule (RTCR) Level 1 Assessment Form

6.1 Are there any unaddressed significant deficiencies? This may indicate that the problem is known and is in the process of being remedied. Include approved corrective action date and status of each corrective action.

Additional Comments:

Name of person completing form (PRINTED): _____ Date: _____

Signature: _____ Date: _____

City of Mercer Island responsible party (PRINTED): _____ Date: _____

Signature: _____ Date: _____

G. Appendix B – Coliform Sample Procedures

- **Mercer Island Coliform Sample Collection – Kupferle Eclipse # 88 - SS Sample Stands**
- **Mercer Island Coliform Sample Collection – Meter Pit Sample Stands**
- **Mercer Island Coliform Sample Collection – Running Sample Stands**
- **AmTest Laboratory – Chain of Custody Form**
- **Seattle Public Utilities Water Quality Laboratory – Chain of Custody Form**



CITY OF MERCER ISLAND, WASHINGTON

9611 S.E. 36th St. • Mercer Island, WA 98040-3732

(206) 275-7608 • FAX: (206) 275-7814

www.mercergov.org

Mercer Island Coliform Sample Collection – Kupferle Eclipse #88-SS Sample Stands

Safety Equipment: *18” Road Cones, Safety Glasses, Safety vest*

Equipment: *Service Vehicle, City photo identification, SPU key, SPU lab key, HACH Pocket Colorimeter, Thermometer, Sterilized sample bottles with extra, Cooler with ice pack, Sample form, Chain of Custody form, sample stand pump,*

1. Place sample bottles in cooler. Two ice packs are required for the large coolers and a single ice pack is required for the small coolers. Always take at least 2 to 3 extra bottles along with you in case a sample bottle is contaminated in the field. Make sure the sample bottles are designated for bacteriological use and are labeled with a SPU Water Quality LIMS bar code.
2. Observe and report any anomalies, signs of vandalism, evidence of tampering, construction projects affecting the stand, fresh landscaping, etc.
3. When you arrive at the sample stand, unlock, and open sample stand. Remove black rubber cap from spigot. Start water flowing fully open. Open ¼” valve fully. Let the sample stand flow at a high velocity for 3 to 5 minutes. Ensure that water is not splashing back onto the sample stand.
4. Close the ¼” valve. Then reduce water the flow to a small steady stream and allow to flow for an additional 2 to 3 minutes. Before sampling, complete lab sheet paperwork.
5. Measure the water temperature and chlorine residual by using the digital thermometer and digital HACH Pocket Colorimeter. Record on your field data sheet.
6. Collecting a sample, hold the bottle at the base, remove the sterile seal, and unscrew the cap. Hold the cap so that the threads are facing downward. Do not set the sample cap down and do not allow your fingers to touch the inner surface of the cap.
7. Immediately fill the sample bottle up to the shoulder leaving ample air space (approximately 1 inch of air space is adequate). Avoid splashing while filling the bottle and do not overflow the bottle. If you do overflow the bottle, get a new sample bottle and try again. At no point during sampling should the sample bottle touch the sample tap or any other surface. (If it is raining, avoid allowing any water dripping off the sample stand cover to get into the sample bottle).
8. After filling the bottle to the appropriate level, immediately cap the bottle securely. Write the sample location on the bottle label and place bottle in an upright position in the cooler. Do not throw or toss the bottle in the cooler. It is important that samples remain cool (<10°C) during transit, so keep cooler lid closed when not in use.
9. Turn water off. Attach sterilized pump to ¼” tap and open valve. Pump excess water out to prevent contamination and prevent frost damage. Replace rubber cap. Secure door and lock stand.
10. If at any point you are uncertain of the sterility of the sample bottle or your sample collection technique, get a new bottle and start all over. (Bottles are inexpensive).
11. Place samples in cooler dedicated solely for transporting drinking water samples. Keep your coolers clean by washing with soap and water.





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Mercer Island Coliform Sample Collection – Meter Pit Sample Stands

Safety Equipment: *18” Road Cones, Safety Glasses, Safety vest, work gloves, rubber gloves*

Equipment: *Service Vehicle, City photo identification, SPU key, SPU lab key, HACH Pocket Colorimeter, Thermometer, Sterilized sample bottles with extra, Cooler with ice pack, Sample form, Chain of Custody form, meter box bilge pump, standard screwdriver, spray bottle with 5.25% bleach, sample collection tube*

1. Place sample bottles in cooler. Two ice packs are required for the large coolers and a single ice pack is required for the small coolers. Always take at least 2 to 3 extra bottles along with you in case a sample bottle is contaminated in the field. Make sure the sample bottles are designated for bacteriological use and are labeled with a SPU Water Quality LIMS bar code.
2. Observe and report any anomalies, signs of vandalism, evidence of tampering, construction projects affecting the stand, fresh landscaping, etc. Ensure site around meter box and sampling area, no pet waste is visible.
3. Sample pipe is located in designated meter box. Using a standard screwdriver, remove lid along with any spiders, webs, and debris around cap and valve of sample tap. If box is flooded, remove ground water with bilge pump. Water level must be below sample fittings and valves. Remove dust cap. Spray fittings with two good shots of bleach solution. Use proper PPE when using bleach solution.
4. Remove dust cap from each end of sample collection tube and spray with bleach. Be careful not to contaminate collection tube once it has been sanitized. When handling and inserting the sample tube, do not allow the exposed end to come in contact with soil, pavement, or your hands. The smallest amount of substances can result in a false positive test result.
5. Attach sample collection tube to meter setter. Turn water on fully for 3 to 5 minutes. Be ready to redirect flowing water to not run back into meter box.
6. Reduce water the flow to a small steady stream and allow to flow for an additional 2 to 3 minutes. Before sampling, complete lab sheet paperwork.
7. Measure the water temperature and chlorine residual by using the digital thermometer and digital HACH Pocket Colorimeter. Record on your field data sheet. You may then collect a sample.
8. When you are ready to collect a sample, hold the bottle at the base, remove the sterile seal, and unscrew the cap. Hold the cap so that the threads are facing downward. Do not set the sample cap down and do not allow your fingers to touch the inner surface of the cap.
9. Immediately fill the sample bottle up to the shoulder leaving ample air space (approximately 1 inch of air space is adequate). Avoid splashing while filling the bottle and do not overflow the bottle. If you do overfill the bottle, get a new sample bottle and try again. At no point during sampling should the sample bottle touch the sample tap or any other surface. (If it is raining, avoid allowing any water dripping off the sample collection tube to get into the sample bottle).
10. After filling the bottle to the appropriate level, immediately cap the bottle securely. Write the sample location on the bottle label and place bottle in an upright position in the cooler. Do not throw or toss the bottle in the cooler. It is important that samples remain cool (<10°C) during transit, so keep cooler lid closed when not in use. Turn off sample stand. Remove sample tube and install protection caps on setter and sample tube. Reinstall meter lid, paying close attention that lid is properly seated into box.
11. If at any point you are uncertain of the sterility of the sample bottle or your sample collection technique, get a new bottle and start all over. (Bottles are inexpensive).
12. Place samples in cooler dedicated solely for transporting drinking water samples. Keep your coolers clean by washing with soap and water.





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Mercer Island Coliform Sample Collection – Running Sample Stands

Safety Equipment: 18” Road Cones, Safety Glasses, Safety vest

Equipment: Service Vehicle, City photo identification, SPU key, SPU lab key, HACH Pocket Colorimeter, Thermometer, Sterilized sample bottles with extra, Cooler with ice pack, Sample form, Chain of Custody form

1. Place sample bottles in cooler. Two ice packs are required for the large coolers and a single ice pack is required for the small coolers. Always take at least 2 to 3 extra bottles along with you in case a sample bottle is contaminated in the field. Make sure the sample bottles are designated for bacteriological use and are labeled with a SPU Water Quality LIMS bar code.
2. Observe and report any anomalies, signs of vandalism, evidence of tampering, construction projects affecting the stand, fresh landscaping, etc.
3. When you arrive at the sample stand check the flow. If the flow is acceptable, no flow changes should be made. If the water is not flowing or flowing at a low velocity, flush the sample stand at a high velocity for 5 to 10 minutes. Then return the flow to an acceptable velocity and allow to flow for an additional 2 to 3 minutes. Before sampling, complete lab sheet paperwork. Then measure the water temperature and chlorine residual by using the digital thermometer and digital HACH Pocket Colorimeter. Record on your field data sheet.
4. Collecting a sample, hold the bottle at the base, remove the sterile seal, and unscrew the cap. Hold the cap so that the threads are facing downward. Do not set the sample cap down and do not allow your fingers to touch the inner surface of the cap.
5. Immediately fill the sample bottle up to the shoulder leaving ample air space (approximately 1 inch of air space is adequate). Avoid splashing while filling the bottle and do not overflow the bottle. If you do overflow the bottle, get a new sample bottle and try again. At no point during sampling should the sample bottle touch the sample tap or any other surface. (If it is raining, avoid allowing any water dripping off the sample stand cover to get into the sample bottle).
6. After filling the bottle to the appropriate level, immediately cap the bottle securely. Write the sample location on the bottle label and place bottle in an upright position in the cooler. Do not throw or toss the bottle in the cooler. It is important that samples remain cool (<10°C) during transit, so keep cooler lid closed when not in use.
7. Turn water off then close and lock sample stand.
8. If at any point you are uncertain of the sterility of the sample bottle or your sample collection technique, get a new bottle and start all over. (Bottles are inexpensive).
9. Place samples in cooler dedicated solely for transporting drinking water samples. Keep your coolers clean by washing with soap and water.





AmTest Laboratories

COLIFORM BACTERIA ANALYSIS

Date Sample Collected Month Day Year	Time Sample Collected <input type="checkbox"/> AM <input type="checkbox"/> PM	County KING
Type of Water System (check only one box) <input checked="" type="checkbox"/> Group A Public <input type="checkbox"/> Group B Public <input type="checkbox"/> Private Household <input type="checkbox"/> Other: _____		
Group A and Group B Systems Provide from Water Facilities Inventory (WFI) ID# 53640 System Name: CITY of MERCER ISLAND		
Contact Person: BRIAN MCDANIEL		
Day Phone: 206-275-7812	Cell Phone: 206-406-5181	
Eve. Phone:	FAX: 206-275-7814	
Send results to (Print full name, address and zip code) CITY of MERCER ISLAND ATTN: BRIAN MCDANIEL 901 SE 26th ST. 98040		
SAMPLE INFORMATION		
Sample collected by (name):		
Specific location where sample collected (address or sample site, and type of faucet):		
Special instructions or comments:		
Type of Sample (must check only one box of #1 through #4 listed below)		
1. <input type="checkbox"/> Routine Distribution Sample Provide information below. Chlorinated: <input type="checkbox"/> Yes <input type="checkbox"/> No Chlorine Residual: Total _____ Free _____	2. <input type="checkbox"/> Repeat Sample (follow-up to an unsatisfactory sample) Provide information below. Unsatisfactory routine lab number: _____ Unsatisfactory routine collect date: _____/_____/_____ Chlorinated: Yes _____ No _____ Chlorine Residual: Total _____ Free _____	
3. <input type="checkbox"/> Raw Water Source Sample Required for Surface Water, GWI, and some Spring Sources Public Systems must provide Source Number from (WFI)		
4. <input type="checkbox"/> Sample Collected for Information Only <input type="checkbox"/> Construction <input type="checkbox"/> Repairs <input type="checkbox"/> Private Residence <input type="checkbox"/> Other		
LAB USE ONLY DRINKING WATER RESULTS LAB USE ONLY		
<input type="checkbox"/> Unsatisfactory Total Coliform Present and <input type="checkbox"/> E. coli present <input type="checkbox"/> E. coli absent <input type="checkbox"/> Fecal coliform present <input type="checkbox"/> Fecal coliform absent		<input type="checkbox"/> Satisfactory
<input type="checkbox"/> Replacement Sample Required Sample not tested because: <input type="checkbox"/> Sample too old (>30 hours) <input type="checkbox"/> Improper Container <input type="checkbox"/> _____ Test unsuitable because: <input type="checkbox"/> TNTC <input type="checkbox"/> Turbid Culture <input type="checkbox"/> _____		
Bacterial Density Results: Plate Count _____ / ml. E.coli _____ /100 ml. Total Coliform _____ /100 ml. Fecal Coliform _____ /100 ml.		
Method Code:	Date and Time Received: 3/22/2006, 16:00	
Date Analyzed:	Date Reported: 10/ 6/06	
Sample Number (DOH number plus five digits)	Lab Use Only:	

Name: City of Mercer Island
 Address: 9601 S.E. 36th St.
Mercer Island, WA 98040
 Telephone: 206-406-5181
 Fax: 206-275-7814

Submitter: _____ Signature(s): _____
 PWS ID # 536405
 Source # _____

Repeat New Main
 Routine Main Break
 Other Cust. Call

Sample Date	Sample Time	Sampler	Location	Lab Sample #
				A
				A
				A
				A
				A
				A
				A
				A

Field Data (Client Entry)		Testing Parameters (Check requested tests)				Results		
Field Chlorine	Field pH	Field Temperature	Field Turbidity	P/A	MPN	FC	HPC	Other
				Presence/Absence	Most Probable Number (MPN)	Fecal Coliform (CFU/100mL)	Heterotrophic Plate Count (CFU/ml)	Other

COMMENTS: _____
 Total # of containers: _____
 Travel Temp: _____ °C

Relinquished by: _____ (signature)	Received by: _____ (signature)
Date _____	Date _____
Time _____	Time _____
Faxed <input type="checkbox"/> Results sent by: _____ E-mail <input type="checkbox"/> Date/Time: _____	

TC- Total Coliform
 EC- E. Coli
 FC- Fecal Coliform
 HPC- Heterotrophic Plate Count
 P/A- Presence/Absence
 MPN- Most Probable Number

G. Appendix C – Chlorine Residual Monitoring Plan

The chlorine residual monitoring plan (CRMP) was developed to characterize the water quality in the distribution system and to assist the operators in identifying abnormalities in water quality. Analysis of free available chlorine (CL₂), temperature, Iron (Fe), pH, turbidity, and HPC coliform samples are collected from various locations and at varying times on a routine schedule. The data is compiled helping system operators make data driven decisions for the day to day operation of the system.

Free available chlorine is used as the initial indicator of an abnormality in the distribution system. The City has adopted a distribution operational target of ≥ 0.6 mg/L in 95% of chlorine residual samples collected.

ACTION:

If a sample result is recorded that falls below this minimum, the following will be taken into consideration before changing operations:

- Notify shift supervisor
- Review historical data from distribution system monitoring
- Review operational changes, including source water
- Perform additional follow up analysis –
 - Verify result at specific site
 - Sample for, but not limited to: Turbidity, HPC's, Fe, Temperature, pH
- Verify distribution activities – service crews, construction activities, etc.
- Determine if flush is needed
- Document results and solution

The following technical memo, from Confluence Engineering Group, LLC, explains the data collection and recording process that will be followed on the schedule described within.



To: Brian McDaniel; Mercer Island
Anne-Tonella Howe; Mercer Island

Subject: Chlorine Residual Monitoring Plan - DRAFT

From: Melinda Friedman, Michael Hallett;
Confluence

Project: Microbial Occurrence Response and
Distribution System Best Practices
Road Map - Phase 2,
City of Mercer Island

Date: January 12, 2016

Introduction

The Washington State Department of Health (DOH) has asked the City of Mercer Island (the City) to include a Chlorine Residual Monitoring Plan (CRMP) as a supplement the City's Total Coliform Rule (TCR) Plan currently under approval. The CRMP provides both a snapshot and longer term trending data for chlorine residual conditions on a routine basis, and demonstrates that the City is aware of and taking action if necessary to maintain adequate chlorine residuals. As part of the City's Microbial Response Action Plan, the City has agreed to maintain a disinfectant residual of ≥ 0.6 mg/L in 95% of chlorine residual samples collected within the distribution system under the CRMP.

The CRMP is an amalgamation of the following different monitoring plans that the City, Seattle Public Utilities (SPU), and Confluence Engineering Group, LLC (Confluence) are currently undertaking as part of the on-going coliform response effort:

1. Weekly TCR Coliform Monitoring Plan (formerly "Transition Monitoring Plan") - SPU
2. Monthly Surveillance Monitoring Plan – Confluence/City
3. Quarterly Island-Wide Survey Including Dead-Ends – City
4. Daily/Continuous Analyzer Readings – City

Each individual plan is summarized below. Sample locations, pressure zones, parameters, and frequencies for the CRMP are summarized in Table 1 and shown in Figure 1.

Overview of Current Monitoring Plans that Form the CRMP

TCR Monitoring Plan (Formerly "Transition Monitoring Plan")

The City is a member of the SPU regional TCR Program. Following the *E. coli* event, the City embarked on significant additional coliform and chlorine residual monitoring to demonstrate that the event had been mitigated. A "Transition Plan" was then followed by the City, which was comprised of 29 sites monitored for several months on a weekly basis, and then reduced to bi-weekly monitoring. The "transition" period ended when the City located and installed nine additional TCR sample stands at sites approved by DOH in the spring of 2015, and SPU took over monitoring under the regional TCR Program in September, 2015. The City's current TCR Plan requires that 25 monthly samples are collected from 14 sites (5 existing and 9 new TCR sites).

SPU compiles daily residual readings from its regional purveyors and submits monthly compliance reports to DOH as required under WAC 246-290-664(6), demonstrating that readings are ≥ 0.2 mg/L in 95% of

samples collected. SPU has agreed to notify the City by the following day of any residual reading that is ≤ 0.6 mg/L so that the City can take the appropriate action as described in the Microbial Response Action Plan. The City will obtain all chlorine results on a weekly basis from SPU for internal tracking and trending purposes under this CRMP.

Surveillance Monitoring Plan

Confluence worked with the City to develop a distribution system surveillance water quality monitoring plan to document existing conditions, as well as for troubleshooting purposes, and to support the completion of other recommended action items such as creating a baseline dataset that will provide a relative point for possible future system upsets. Twelve sample sites which provide a reasonable geographic distribution of the Island are sampled once per month. Nine of the surveillance sites are also dedicated TCR sites. Three sites are sampled from hydrants. Selected sites include different pipe materials and pressure zones, emphasize sites with previous low free chlorine residuals and/or coliform-positives, and sites reflecting the likely flow path from the point-of-entry through the distribution system. Surveillance monitoring is typically conducted during the third week of each month and samples are analyzed for temperature, pH, HPCs, chlorine residuals, and total iron.

Quarterly Island-Wide Survey

The City has independently designed and implemented a quarterly island-wide chlorine residual survey with the intent of maintaining a baseline of chlorine residuals at the higher water age areas of their system. Twenty five sites including several dead-end locations and representing most of the system's larger pressure zones are included. Samples are collected from hydrants at all 25 sites.

Hourly/Continuous Monitoring

Continuous chlorine residual monitoring with hourly recorded results is conducted at the entry point to the City's system, leaving each of the two reservoirs, and at the First Hill Booster Pump Station. The City uses this data to demonstrate that adequate residuals are entering the water system from SPU and that adequate residuals are maintained and served to the rest of the system. Reservoir effluent levels would also reflect residuals obtained by chlorine boosting (when in operation at the reservoirs).

Data Management

Data Tracking and Record Keeping

Currently, the data generated from each of the monitoring plans is tracked in separate spreadsheets. Confluence is preparing a spreadsheet template to be used by the City so that results from all monitoring efforts (aside from continuous monitoring) are stored in one file. Microsoft Excel spreadsheets will be used for entering the raw data and presenting the data in graphical formats to allow trends and correlations among parameters to be more easily identified. Confluence will participate in regular reviews of the collected data and help define monitoring alert and actions levels.

Reporting To DOH

DOH has requested that wholesale customers purchasing treated surface water collect daily chlorine residual measurements and submit monthly reports to DOH. For the City, this would require chlorine residual sampling on days when SPU does not collect routine coliform samples.

The City conducts continuous chlorine monitoring recorded on an hourly basis at 4 locations within its system (entry point, leaving the North and South reservoirs, and at the First Hill Booster Pump Station). It is recommended that one reading per weekday be recorded in a log sheet from these four locations to














meet the minimum daily reporting request. An example log sheet is provided as Attachment 1. Results from all four locations should be recorded from approximately the same time of day to provide a snapshot of results at that particular time step in a given day, however, a different time of day should be recorded each weekday to ensure that routine diurnal fluctuations are captured. In addition to submitting this log sheet on a monthly basis, DOH can review the data sets and graphics being generated by the monitoring plans described above, as requested.

Table 1. Summary of CRMP Sample Locations, Parameters, and Frequencies

Site ID ¹	Address	Parameter ¹					Plan Origin			Sample Frequency			
		Free Chlorine (mg/L as Cl ₂)	HPC (R2A agar) ²	Turbidity (NTU) ³	pH and Temperature (°C)	Iron (mg/L as Fe)	Long term TCR Plan	Surveillance Monitoring Plan	Quarterly Island-Wide Survey	Bi-weekly (Week 1,2,3,4)	Monthly	Quarterly	Hourly/Continuous
Pumped - 492 Zone													
SPU	Reservoir Inlet	✓			✓								✓
M-1	71st St & 78th Ave	✓	✓	✓	✓	✓	✓	✓			1/3	✓	
M-2	SE 48 th St & 89 th Ave SE	✓	✓				✓				1/3	✓	
M-4	SE 39 th St & Island Crest Way	✓	✓	✓	✓	✓	✓	✓			2/4	✓	
M-19	8889 SE 74th Place	✓	✓	✓	✓	✓	✓	✓			2	✓	
G4-11	8812 SE 59th St	✓	✓	✓	✓	✓		✓				✓	
E4-20	9105 SE 46 th Street	✓							✓				✓
E4-25	8410 SE 47 th Street	✓							✓				✓
F4-27	5300 Landsdowne Ln	✓							✓				✓
F4-38	8980 SE 52 nd Street	✓							✓				✓
G3-20	8270 SE 61 st Street	✓							✓				✓
G4-25	8454 SE 63 rd Street	✓							✓				✓
H3-12	6551 81 st Ave SE	✓							✓				✓
H4-36	8541 SE 71 st Street	✓							✓				✓
I3-30	7640 81 st Place SE	✓							✓				✓
Intermediate - 361 Zone													
M-10	7239 East Mercer Way	✓	✓				✓				2		
M-11	4591 East Mercer Way	✓	✓	✓	✓	✓	✓	✓			2/4	✓	
M-18	8281 West Mercer Way	✓	✓	✓	✓	✓	✓	✓			2/3	✓	
H5-07	9301 SE 68 th Street	✓							✓				✓
Freeway - 282 Zone													
M-3A	SE 27 St & 62 nd Ave SE	✓	✓	✓	✓	✓	✓	✓			1/3	✓	
M-13	3316 94 th Ave SE	✓	✓				✓				1/4		
M-16	3486 77th Ave SE	✓	✓	✓	✓	✓	✓	✓			2/4	✓	
C2-06	3440 West Mercer Way	✓	✓	✓	✓	✓		✓				✓	

Site ID ¹	Address	Parameter ¹					Plan Origin			Sample Frequency			
		Free Chlorine (mg/L as Cl ₂)	HPC (RZA agar) ²	Turbidity (NTU) ³	pH and Temperature (°C)	Iron (mg/L as Fe)	Long term TCR Plan	Surveillance Monitoring Plan	Quarterly Island-Wide Survey	Bi-weekly (Week 1,2,3,4)	Monthly	Quarterly	Hourly/Continuous
B4-02	8448 North Mercer Way	✓	✓	✓	✓	✓		✓			✓		
A1-01	5916 SE 20 th Street	✓							✓			✓	
A2-02	1630 Roanoke	✓							✓			✓	
B1-22	6004 SE 32 nd Street	✓							✓			✓	
B3-89	7834 SE 32 nd Street	✓							✓			✓	
B4-18	3002 Shorewood Drive	✓							✓			✓	
C5-66	East Mercer Way & Frontage Rd	✓	✓	✓	✓	✓		✓			✓		
D3-40	4148 Boulevard Place	✓	✓				✓					✓	
Mercerwood - 356 Zone													
M-12	4248 Mercerwood Drive	✓	✓	✓	✓	✓	✓	✓			1/4	✓	
C5-30	9601 SE 36 th Street	✓	✓				✓						✓
Forest - 266 Zone													
M-17	4546 Forest Ave SE	✓	✓				✓				1/3		
Reservoir - 398 Zone													
POE	Hydrant C5-102	✓	✓	✓	✓	✓		✓				✓	
N. Res	N. Reservoir Outlet	✓			✓								✓
S. Res	S. Reservoir Outlet	✓			✓								✓
M-15	2526 70 th Ave SE	✓	✓				✓				1		
B3-27	2919 84 th Ave SE	✓							✓				✓
C3-46	3870 81 st Ave SE	✓							✓				✓
D5-53	4238 93 rd Ave SE	✓							✓				✓
Butterworth - 218													
F5-12	9444 SE 52 nd Street	✓							✓				✓
77th Ave SE - 271													
G3-16	6225 77 th Ave SE	✓							✓				✓
Avalon - 211													
J4-02	8560 SE 82 nd Street	✓							✓				✓
J4-08	8355 Avalon Drive	✓							✓				✓
First Hill - 456													
M-14	3450 74 th Ave SE	✓					✓				1		
FHBPS	First Hill	✓			✓								✓

Mercer Island Sampling Locations Points

-  Sample Station (SPU)
 -  Old Sample Station (MI-3)
 -  Meter
 -  Hydrant
- Monitoring**
-  Scada- Continuous Chlorine Monitoring
 -  TCR Sample Site
 -  Mercer Island Surveillance Monitoring
 -  Mercer Island Quarterly Chlorine Survey
 -  TTMH Quarterly Monitoring (DBP)
- Other**
-  Dead End Distribution Main
 -  Other Water Main
 -  Pressure Zone
 -  Map Grid

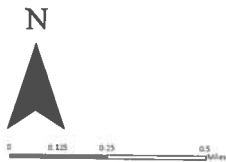
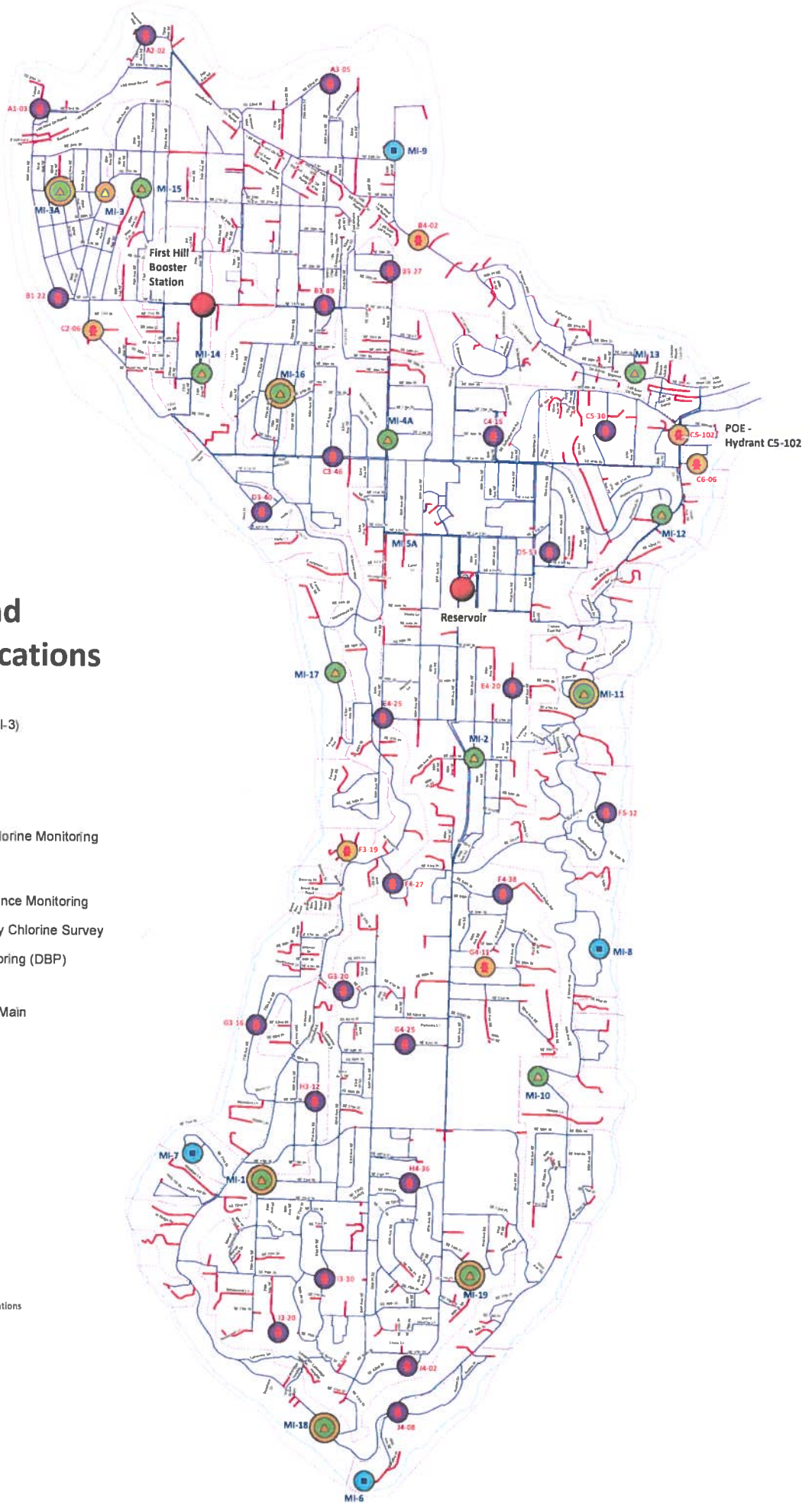


Figure 1. CRMP Sampling Categories and Locations



Attachment 1. Daily Residual Tracking Log Sheet

City of Mercer Island Daily Chlorine Residual Log Sheet

PWS ID#: 536405

Month: January, 2016

Sample Date	Sample Time	Chlorine Residual (mg/L)			
		POE	North Reservoir	South Reservoir	FHBPS
1-Jan-16					
2-Jan-16					
3-Jan-16					
4-Jan-16					
5-Jan-16					
6-Jan-16					
7-Jan-16					
8-Jan-16					
9-Jan-16					
10-Jan-16					
11-Jan-16					
12-Jan-16					
13-Jan-16					
14-Jan-16					
15-Jan-16					
16-Jan-16					
17-Jan-16					
18-Jan-16					
19-Jan-16					
20-Jan-16					
21-Jan-16					
22-Jan-16					
23-Jan-16					
24-Jan-16					
25-Jan-16					
26-Jan-16					
27-Jan-16					
28-Jan-16					
29-Jan-16					
30-Jan-16					
31-Jan-16					

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Appendix K

Consumer Confidence Report (CCR)

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Annual
WATER
QUALITY
REPORT

Reporting Year 2012



Presented By
City of Mercer Island

PWS ID#: 536405

There When You Need Us

We are once again proud to present our annual water quality report covering all testing performed between January 1 and December 31, 2012. Over the years, we have dedicated ourselves to providing drinking water that meets all state and federal standards. We continually strive to adopt new methods for delivering the best-quality drinking water to you. As new challenges to drinking water safety emerge, we remain vigilant in meeting the goals of source water protection, water conservation, and community education while continuing to serve the needs of all our water users. As your water utility, it is our goal to meet your need for a clean, plentiful supply of drinking water at a reasonable cost.

Why do I get this report each year?

Community water system operators are required by Federal law to provide their customers an annual water quality report. The report helps people make informed choices about the water they drink. It lets people know what contaminants, if any, are in their drinking water and how these contaminants may affect their health. It also gives the system operators a chance to tell customers what it takes to deliver safe drinking water.

Please remember that we are always available to assist you should you ever have any questions or concerns about your water.

Where Does My Water Come From?

The City of Mercer Island receives its surface water supply from Seattle Public Utilities (SPU). Our primary water source from SPU is the Cedar River Watershed with the Tolt River's South Fork providing an alternate supply. SPU's uninhabited watersheds are supplied by the melting snow pack in the Cascade Mountains with supplements from our annual rainfall totals.

Each watershed is closed to unauthorized access and is carefully managed to supply clean, pristine drinking water to more than 1.4 million people in the greater Seattle area. The rainfall and snow melt collected in the Cedar and Tolt rivers meets or surpasses all federal standards for drinking water. Water samples are tested every day for a wide variety of substances.

To learn more about their watersheds, treatment facilities, and water quality analysis on the Internet, go to the Seattle Public Utilities Web site at http://www.seattle.gov/util/MyServices/Water/Water_Quality/WaterQualityAnalyses/index.htm.

Tap vs. Bottled

Thanks in part to aggressive marketing, the bottled water industry has successfully convinced us all that water purchased in bottles is a healthier alternative to tap water. However, according to a four-year study conducted by the Natural Resources Defense Council, bottled water is not necessarily cleaner or safer than most tap water. In fact, about 25 percent of bottled water is actually just bottled tap water (40 percent, according to government estimates).

The Food and Drug Administration is responsible for regulating bottled water, but these rules allow for less rigorous testing and purity standards than those required by the U.S. EPA for community tap water. For instance, the high mineral content of some bottled waters makes them unsuitable for babies and young children. Furthermore, the FDA completely exempts bottled water that's packaged and sold within the same state, which accounts for about 70 percent of all bottled water sold in the United States.

People spend 10,000 times more per gallon for bottled water than they typically do for tap water. If you get your recommended eight glasses a day from bottled water, you could spend up to \$1,400 annually. The same amount of tap water would cost about 49 cents. Even if you installed a filter device on your tap, your annual expenditure would be far less than what you'd pay for bottled water.

For a detailed discussion on the NRDC study results, check out their Web site at www.nrdc.org/water/drinking/bw/exesum.asp.

Community Participation

You are invited to participate in our public forum and share your comments about your drinking water. The Utility Board meets at 7 p.m. on the second Tuesday of most months in the City Council Chambers at City Hall, located at 9611 SE 36th Street, Mercer Island, WA. You can find meeting and contact information on the City of Mercer Island Web site at <http://www.mercergov.org/CCBIndex.asp?ccbid=8>.

QUESTIONS?

For more information about this report, or for any questions related to your drinking water, please contact the City of Mercer Island Maintenance Department at (206) 275-7608. This 2013 report, indicating water testing performed in 2012, is also available on the City web site at <http://www.mercergov.org/files/2012WaterQualityReport.pdf>.

Mercer Island Takes Its Water Seriously

During 2012, we purchased 730.4 million gallons of water from Seattle Public Utilities, of which our records account for 672.7 million gallons. These figures represent a 4.8 percent, three-year annual average of unaccounted-for water that we remain vigilant in identifying. Efforts made in 2012 to reduce our unaccounted-for water included the replacement of inaccurate water meters, fire hydrant inspections and repairs, and our annual system-wide leak detection survey. To account for all water, our crews meter water usage during our annual water main distribution flushing program. We also meter water used during our fire hydrant inspection and repair program.

In addition, we could use your help. If you see or suspect a water leak, call us. If you notice a truck connected to a fire hydrant that clearly isn't a City vehicle, or if you see a hose connected to a hydrant and there is no meter attached, please call us.

Personal Water Conservation

You can play a role in conserving water and save yourself money in the process by becoming conscious of the amount of water your household is using and by looking for ways to use less whenever you can. It is not hard to conserve water. Here are a few tips:

- Automatic dishwashers can use 15 gallons for every cycle, regardless of how many dishes are loaded. So get a run for your money and load it to capacity.
- Turn off the tap when brushing your teeth, washing your face, or shaving.
- Check every faucet in your home for leaks. Just a slow drip can waste many gallons per day. Don't forget those outside faucets as well!
- Mulch your garden beds to retain a moisture layer.

Water Conservation

You, our residential and commercial customers, continue to do a great job with water conservation. Conservation saves you money, protects fish and wildlife, and helps ensure a reliable future supply despite regional growth and climate uncertainty. In 2012, the Regional Water Conservation Program achieved an estimated 780,000 gallons per day of water savings, enough to supply 5,200 single family homes. In the last six years, the Saving Water Partnership, a coalition of 19 regional water utilities of which Mercer Island is part, has collectively saved about 5.4 million gallons per day (mgd) toward the 2012 goal of nearly 6 mgd. Water utilities in Washington State are required to set a six-year water conservation goal by the Washington State Department of Health.

Under this program on Mercer Island during 2012:

- 15 homes installed Rain Sensors on their irrigation systems
- 30 homes installed more efficient toilets
- 1 multifamily complex installed 15 more efficient toilets

Important Health Information

Some people may be more vulnerable to contaminants in drinking water than the general population. Immunocompromised persons such as persons with cancer undergoing chemotherapy, persons who have undergone organ transplants, people with HIV/AIDS or other immune system disorders, some elderly, and infants may be particularly at risk from infections. These people should seek advice about drinking water from their health care providers. The U.S. EPA/CDC (Centers for Disease Control and Prevention) guidelines on appropriate means to lessen the risk of infection by *Cryptosporidium* and other microbial contaminants are available from the Safe Drinking Water Hotline at (800) 426-4791 or <http://water.epa.gov/drink/hotline>.

Checking a Toilet for Leaks

Unknown water use is most often the result of a leaking toilet. Sometimes toilet leaks are neither seen nor heard. Check your toilets for leaks by putting a few drops of food coloring in the tank. Watch for a few minutes to see if the color shows up in the bowl. It is a good idea to check your toilets for leaks at least once a year.

The main causes of a toilet leak are either a "fill valve" that will not shut off or a bad "flapper."

A fill valve problem will cause water to flow over the "overflow tube," either because the water level is set too high or it won't shut the water off. If you cannot adjust the water level lower or cannot get the fill valve to shut off, replace the fill valve.

If you had water run into the bowl during the dye test and the water level is not set too high, your flapper is probably leaking and it should be replaced. Flappers tend to harden more quickly when chlorine tablets are placed in the tank. If flappers aren't pliable, they will not completely seat and leaks will occur.

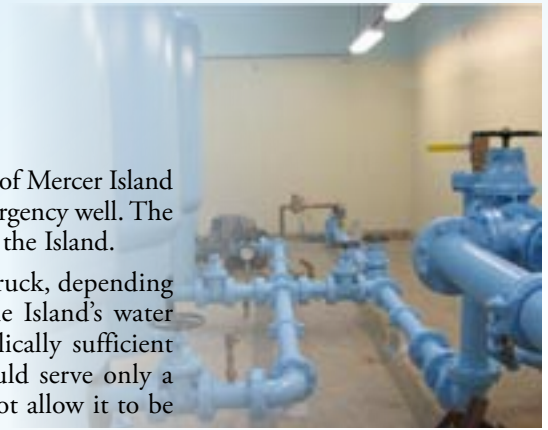
You can also use your water meter to detect hidden leaks. Simply turn off all taps and water-using appliances. Then check the meter after 15 minutes. If the meter dial moved, you have a leak. Tip: Don't let that automatic ice maker fool you if it cycles during this test.

For more Mercer Island conservation information, please visit our Web site at www.mercergov.org/waterconservation. The Washington State Department of Health also provides information at <http://www.doh.wa.gov/ehp/dw/Publications/331-450a.pdf>.

Mercer Islands Emergency Well Leads the Way in Earthquake Preparedness

In order to ensure water for residents following a disaster such as an earthquake, the City of Mercer Island became the first jurisdiction in Washington State to receive a “source permit” for an emergency well. The emergency well was drilled to a depth of 570 feet in 2007 at Rotary Park in the center of the Island.

Water from the well will be available to residents on either a walk-up basis or by water truck, depending on emergency conditions existing at the time. The well is not designed to supply the Island’s water distributions system. The relatively small flows produced by the well are not hydraulically sufficient to move through 121 miles of pipes and open 85 pressure-reducing stations, and could serve only a small portion of the Island. In addition, the State’s approval for the well clearly does not allow it to be connected to the system.



Storing and Treating Emergency Drinking Water

Having an ample supply of clean water is a top priority in an emergency. A normally active person needs to drink at least two quarts of water each day. You also need water for food preparation and hygiene. Store a total of at least one gallon per person, per day. You should store at least a two-week supply of water for each member of your family.

Store your water in thoroughly washed plastic, glass, fiberglass, or enamel-lined metal containers. Plastic containers, such as soft drink bottles, are best. You can also purchase food-grade plastic buckets or drums. Seal water containers tightly, label them, and store them in a cool, dark place. Rotate water every six months.

Boiling water is the safest method of treating water. Bring water to a rolling boil for 3 to 5 minutes, keeping in mind that some water will evaporate. Let the water cool before drinking. Boiled water will taste better if you put oxygen back into it by pouring the water back and forth between two clean containers. This practice will also improve the taste of stored water.

For disinfection, you can use household liquid bleach to kill microorganisms. Use only regular household liquid bleach that contains 5.25 percent sodium hypochlorite. Do not use scented bleaches, color-safe bleaches, or bleaches with added cleaners. Add 16 drops of bleach per gallon of water, stir and let stand for 30 minutes. If the water does not have a slight bleach odor, repeat the dosage and let stand another 15 minutes. If, after the second treatment, the water does not have a bleach odor, use the water for flushing and begin a new treatment process.

Naturally Occurring Bacteria

The simple fact is, bacteria and other microorganisms inhabit our world. They can be found all around us: in our food, on our skin, in our bodies, and in the air, soil, and water. Some are harmful to us and some are not. Coliform bacteria are common in the environment and are generally not harmful themselves. The presence of this bacterial form in drinking water is a concern because it indicates that the water may be contaminated with other organisms that can cause disease. Throughout the year, we tested many water samples for coliform bacteria. In that time, none of the samples came back positive for the bacteria.

Federal regulations require that public water that tests positive for coliform bacteria must be further analyzed for fecal coliform bacteria. Fecal coliform are present only in human and animal waste. Because these bacteria can cause illness, it is unacceptable for fecal coliform to be present in water at any concentration. Our tests indicate no fecal coliform is present in our water.

Source Water Assessment

Washington’s Source Water Assessment Plan (SWAP) is now available from the Department of Health (DOH) website at <http://doh.wa.gov/ehp/dw/default.htm>. This plan describes the assessment conducted by the DOH Office of Drinking Water (ODW) of the delineated area around the listed sources through which contaminants, if present, could migrate and reach our source water. By default, the DOH assigns a susceptibility rating of “high” for all surface water sources.

Lead in Home Plumbing

If present, elevated levels of lead can cause serious health problems, especially for pregnant women and young children. Lead in drinking water is primarily from materials and components associated with service lines and home plumbing. We are responsible for providing high-quality drinking water, but we cannot control the variety of materials used in plumbing components. When your water has been sitting for several hours, you can minimize the potential for lead exposure by flushing your tap for 30 seconds to 2 minutes before using water for drinking or cooking. If you are concerned about lead in your water, you may wish to have your water tested. Information on lead in drinking water, testing methods, and steps you can take to minimize exposure is available from the Safe Drinking Water Hotline or at www.epa.gov/safewater/lead.

How Is My Water Treated and Purified?

Mercer Island receives its water primarily from the Cedar River Water supply via the Seattle Public Utilities transmission system.

At SPU's Cedar treatment facility, which was completed in 2003, the water is screened to remove debris (twigs, leaves), disinfected with chlorine to remove microbial contaminants, fluoridated for dental health protection, and adjusted with lime for pH-adjusted corrosion control to minimize lead leaching in older plumbing systems. In 2004, SPU added two more steps in water treatment at this facility: ozonation for odor and taste improvements and Giardia control and ultraviolet light (UV) disinfection to disable microbial contaminants such as chlorine-resistant *Cryptosporidium*.

The Tolt water supply has ozonation, filtration, chlorination, fluoridation, and pH and alkalinity adjustment.

The introduction of fluoride into drinking water and toothpaste is viewed as one of the 10 greatest accomplishments of the 20th century, according to the Centers for Disease Control and Prevention (CDC).

Substances That Could Be in Water

In order to ensure that tap water is safe to drink, the U.S. EPA and/or the Washington State Department of Health prescribe regulations that limit the amount of certain contaminants in water provided by public water systems. U.S. Food and Drug Administration regulations establish limits for contaminants in bottled water, which must provide the same protection for public health. Drinking water, including bottled water, may reasonably be expected to contain at least small amounts of some contaminants. The presence of these contaminants does not necessarily indicate that the water poses a health risk.

The sources of drinking water (both tap water and bottled water) include rivers, lakes, streams, ponds, reservoirs, springs, and wells. As water travels over the surface of the land or through the ground, it dissolves naturally occurring minerals, in some cases, radioactive material, and substances resulting from the presence of animals or from human activity. Substances that may be present in source water include: **Microbial Contaminants**, such as viruses and bacteria, which may come from sewage treatment plants, septic systems, agricultural livestock operations, or wildlife; **Inorganic Contaminants**, such as salts and metals, which can be naturally occurring or may result from urban stormwater runoff, industrial or domestic wastewater discharges, oil and gas production, mining, or farming; **Pesticides and Herbicides**, which may come from a variety of sources such as 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 and may also come from gas stations, urban stormwater runoff, and septic systems; **Radioactive Contaminants**, which can be naturally occurring or may be the result of oil and gas production and mining activities.

For more information about contaminants and potential health effects, call the U.S. EPA's Safe Drinking Water Hotline at (800) 426-4791.



You may not be aware of it, but every time you pour fat, oil, or grease (FOG) down your sink (e.g., bacon grease), you are contributing to a costly problem in the sewer collection system. FOG coats the inner walls of the plumbing in your house as well as the walls of underground

pipings throughout the community. Over time, these greasy materials build up and form blockages in pipes, which can lead to wastewater backing up into parks, yards, streets, and storm drains. These backups allow FOG to contaminate local waters, including drinking water. Exposure to untreated wastewater is a public health hazard. FOG discharged into septic systems and drain fields can also cause malfunctions, resulting in more frequent tank pump-outs and other expenses.

Communities spend billions of dollars every year to unplug or replace grease-blocked pipes, repair pump stations, and clean up costly and illegal wastewater spills. Here are some tips that you and your family can follow to help maintain a well-run system now and in the future:

NEVER:

- Pour fats, oil, or grease down the house or storm drains.
- Dispose of food scraps by flushing them.
- Use the toilet as a waste basket.

ALWAYS:

- Scrape and collect fat, oil, and grease into a waste container such as an empty coffee can, and dispose of it with your garbage.
- Place food scraps in waste containers or garbage bags for disposal with solid wastes.
- Place a wastebasket in each bathroom for solid wastes like disposable diapers, creams and lotions, and personal hygiene products including nonbiodegradable wipes.

What Are PPCPs?

When cleaning out your medicine cabinet, what do you do with your expired pills? Many people flush them down the toilet or toss them into the trash. Although this seems convenient, these actions could threaten our water supply.

Recent studies are generating a growing concern over pharmaceuticals and personal care products (PPCPs) entering water supplies. PPCPs include human and veterinary drugs (prescription or over-the-counter) and consumer products, such as cosmetics, fragrances, lotions, sunscreens, and household cleaning products.

The best and most cost-effective way to ensure safe water at the tap is to keep our source waters clean. Never flush unused medications down the toilet or sink. Instead, check to see if the pharmacy where you made your purchase accepts medications for disposal, or contact your local health department for information on proper disposal methods and drop-off locations. You can also go on the Web at www.Earth911.com to find more information about disposal locations in your area.

What's a Cross-connection

Cross-connections that contaminate drinking water distribution lines are a major health concern for your family and the community where you live. A cross-connection is formed at any point where a drinking water line connects to equipment (boilers), systems containing chemicals (air conditioning systems or fire sprinkler systems), irrigation systems that are connected to lake water, or water sources of questionable quality such as water-actuated boat lifts. Cross-connection contamination can occur when the pressure in the equipment or system is greater than the pressure inside the drinking water line (backpressure). Contamination can also occur when the pressure in the drinking water line drops due to rare occurrences (main breaks, heavy water demand), causing contaminants to be sucked out from the equipment and into the drinking water line (backsiphonage).

Outside water taps and garden hoses tend to be the most common sources of cross-connection contamination at home. The garden hose creates a hazard when submerged in a swimming pool or when attached to a chemical sprayer for weed killing or fertilizing. Garden hoses and irrigation systems can also be contaminated by pets. Improperly adjusted fill valves in your toilet could also be a source of cross-connection contamination.

Community water supplies are continuously jeopardized by cross-connections unless appropriate valves, known as backflow prevention devices, are installed and maintained. We have surveyed many commercial and institutional facilities in the service area to make sure that all potential cross-connections are identified and eliminated or protected with the proper type of backflow preventer. We also require that each backflow preventer be inspected and tested annually to make sure that it is providing maximum protection.

For more information, review the Cross-Connection Control Manual from the U.S. EPA's Web site at <http://water.epa.gov/infrastructure/drinkingwater/pws/crossconnectioncontrol/crossconnectioncontrolmanual.cfm>. You can also call the Safe Drinking Water Hotline at (800) 426-4791.

Variations and Exemptions

As a consumer, you are entitled to know what variances and waivers are in force with your water utility. The City of Mercer Island currently has one waiver with the Department of Health, and it concerns asbestos-cement water main piping. The Washington State Department of Health does not require any water supplier to report on systems with less than 10 percent total asbestos-cement piping. Our waiver simply acknowledges that a very small amount of asbestos-cement pipe exists in our system. The water distribution system on Mercer Island is composed of 98 percent cast iron, ductile iron, or steel; the remaining 2 percent is AC (asbestos-cement) pipe. AC is an old material that is no longer used in construction, and the small amounts of material in our system pose no threat to drinking water quality. Furthermore, Seattle Public Utilities has not detected any naturally occurring asbestos in their watersheds.

Sampling Results

During the past year, Seattle Public Utilities has taken hundreds of source water samples in order to determine the presence of any radioactive, biological, inorganic, volatile organic, or synthetic organic contaminants. The tables below show only those contaminants that were detected in the water. Although most of the substances listed here are under the Maximum Contaminant Level (MCL), we feel it is important that you know exactly what was detected and how much of the substance was present in the water.

Water quality data for nonregulated parameters or secondary substances, such as pH, alkalinity, hardness, and conductivity, are available on SPU's web site, http://www.seattle.gov/util/MyServices/Water/Water_Quality/WaterQualityAnalyses/index.htm.

The State requires us to monitor for certain substances less often than once per year because the concentrations of these substances do not change frequently. In these cases, the most recent sample data are included, along with the year in which the sample was taken.

REGULATED SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
Barium (ppm)	2012	2	2	0.0018	1 sample taken	No	Discharge of drilling wastes; Discharge from metal refineries; Erosion of natural deposits
Cadmium (ppb)	2012	5	5	ND	1 sample taken	No	Corrosion of galvanized pipes; Erosion of natural deposits; Discharge from metal refineries; Runoff from waste batteries and paints
Chlorine (ppm)	2012	[4]	[4]	0.96 Average	0.16–1.39	No	Water additive used to control microbes
Fluoride (ppm)	2012	4	4	0.8 Average	0.7–0.9	No	Erosion of natural deposits; Water additive that promotes strong teeth; Discharge from fertilizer and aluminum factories
Haloacetic Acids [HAAs]–Stage 2 (ppb)	2012	60	NA	26 LRAA	19–31	No	By-product of drinking water disinfection
Nitrate (ppm)	2012	10	10	0.02	One sample taken	No	Runoff from fertilizer use; Leaching from septic tanks, sewage; Erosion of natural deposits
TTHMs [Total Trihalomethanes]–Stage 2 (ppb)	2012	80	NA	34 LRAA	26–41	No	By-product of drinking water disinfection
Total Organic Carbon (ppm)	2012	TT	NA	0.7 Average	0.4–1.1	No	Naturally present in the environment
Turbidity ¹ (NTU)	2012	TT	NA	0.3 Average	0.2–2.3	No	Soil runoff

Tap water samples were collected for lead and copper analyses from sample sites throughout the community²

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	AL	MCLG	AMOUNT DETECTED (90TH% TILE)	SITES ABOVE AL/ TOTAL SITES	VIOLATION	TYPICAL SOURCE
Copper (ppm)	2012	1.3	1.3	0.096	0/52	No	Corrosion of household plumbing systems; Erosion of natural deposits
Lead (ppb)	2012	15	0	3.6	0/52	No	Corrosion of household plumbing systems; Erosion of natural deposits

OTHER SUBSTANCES

SUBSTANCE (UNIT OF MEASURE)	YEAR SAMPLED	MCL [MRDL]	MCLG [MRDLG]	AMOUNT DETECTED	RANGE LOW-HIGH	VIOLATION	TYPICAL SOURCE
<i>Cryptosporidium</i> ³	2012	NA	NA	ND	NA	NA	Naturally occurring

¹ Turbidity is a measure of the cloudiness of the water. We monitor it because it is a good indicator of the effectiveness of our filtration system.

² Five of the 52 sample sites throughout the Seattle Public Utility Cedar River Purveyor service area were taken at Mercer Island residences.

³ Cryptosporidium was not detected in any of the 3 samples taken from the Cedar supply.

Definitions

AL (Action Level): The concentration of a contaminant that, if exceeded, triggers treatment or other requirements that a water system must follow.

LRAA: Locational running annual average.

MCL (Maximum Contaminant Level): The highest level of a contaminant that is allowed in drinking water. MCLs are set as close to the MCLGs as feasible using the best available treatment technology.

MCLG (Maximum Contaminant Level Goal): The level of a contaminant in drinking water below which there is no known or expected risk to health. MCLGs allow for a margin of safety.

MRDL (Maximum Residual Disinfectant Level): The highest level of a disinfectant allowed in drinking water. There is convincing evidence that addition of a disinfectant is necessary for control of microbial contaminants.

MRDLG (Maximum Residual Disinfectant Level Goal): The level of a drinking water disinfectant below which there is no known or expected risk to health. MRDLGs do not reflect the benefits of the use of disinfectants to control microbial contaminants.

NA: Not applicable

ND (Not detected): Indicates that the substance was not found by laboratory analysis.

NTU (Nephelometric Turbidity Units): Measurement of the clarity, or turbidity, of water. Turbidity in excess of 5 NTU is just noticeable to the average person.

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).

TT (Treatment Technique): A required process intended to reduce the level of a contaminant in drinking water.

Appendix L

PRV Data

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PRV STATION	STATION LOCATION	VALVE ID	MAIN/BYPASS	ELEVATION		CORRECT ELEVATION	SOURCE	DIAMETER		CORRECT DIAMETER	SOURCE	SETTING (PSI)	
				TIN (MODEL)	TABLE			MODEL	TABLE			UPSTREAM PRESSURE	SETTING @ PRV
A1-1	60th Ave SE & SE 24th St (I-90)	A1-1	main			55.9	P		8.0			92.0	92.0
A2-A	72nd Ave & I-90	A2-A	main	173.6	174.9	174.9	p	6.0	6.0	6.0	C	96.0	34.0
A2-A	72nd Ave & I-90	A2-A-BP	bypass	173.8	174.9	174.9	P	2.0	2.0	2.0	C	96.0	42.0
A2-B	66th Ave SE & SE 24th St	A2-B	main	188.9	186.0	186.0	L	8.0	10.0	10.0	C	90.0	36.0
B2-B	32nd & 69th Ave Off West Mercer Way	B2-B	main	183.7	184.1	184.1	P	6.0	6.0	4.0	C	90.0	40.0
B2-C	29th & 75th Ave SE	B2-C	main	184.1	180.7	185.0	L	6.0	6.0	6.0	C	84.0	42.0
B2-D	2703 72ND Ave SE	B2-D	Main										42.0
B3-A	29th & 76th Ave	B3-A	main	145.8	148.0	148.0	P	8.0	10.0	10.0	C	109.0	48.0
B3-B	3200 ICW	B3-B	main	175.4	175.8	175.8	P	6.0	8.0	8.0	C	92.0	41.0
B3-C	2800 81st PI SE	B3-C	main			156.1	P			8.0	C	106.0	50.0
B3-C	2800 81st PI SE	B3-C-BP	bypass			156.1	P			2.0	C	106.0	55.0
B3-D	29th & 82nd	B3-D	main	180.4	179.8	179.8	L	6.0	8.0	8.0	C	90.0	40.0
C2-A	38th & 72nd PI	C2-A	main	163.4	164.3	164.3	P	6.0	8.0	8.0	C	102.0	46.0
C3-A	3820 76th Ave SE	C3-A	main	184.4	185.7	185.7	P	6.0	6.0	6.0	C	92.0	34.0
C3-B	3419 80th Ave SE (36th & 80th)	C3-B	main	168.9	169.1	169.1	P	6.0	6.0	6.0	C	98.0	48.0
C3-C	78th & 40th	C3-C	main	183.6	183.9	183.9	P	6.0	8.0	8.0	C	90.0	43.0
C5-A	Bottom of Gallagher Hill Rd	C5-A	main	175.9	179.8	179.8	P	6.0	8.0	8.0	C	126.0	68.0
C5-B	I-90 (9400 Blk of 36th)	C5-B	main	103.4	106.0	106.0	P	12.0	10.0	10.0	C	106.0	65.0
C5-B	I-90 (9400 Blk of 36th)	C5-B-BP	bypass	103.5	106.0	106.0	p	2.0	3.0	3.0	C	106.0	69.0
C5-C	9900 Blk SE 36th St	C5-C	main	103.7	107.8	107.8	P	8.0	8.0	8.0	C	104.0	63.0
C5-C	9900 Blk SE 36th St	C5-C-BP	bypass	103.8	107.8	107.8	P	2.0	2	2.0	C	104.0	69.0
C5-D	3712 EMW	C5-D	main	106.0	103.8	103.8	P	8.0	6.0	6.0	C	145.0	67.0
C5-D	3712 EMW	C5-D-BP	bypass	106.0	103.8	103.8	P	2.0	2.0	2.0	C	145.0	70.0
C5-E	3826 EMW (SE 38th & EMW)	C5-E	main	111.6	111.9	111.9	P	6.0	6.0	6.0	C	150.0	65.0
C5-E	3826 EMW (SE 38th & EMW)	C5-E-BP	bypass	111.6	111.9	111.9	P	2.0	2.0	2.0	C	150.0	70.0
C5-F	9300 Blk of SE 40th St in front of 9304 Mercerwood Dr	C5-F	main	289.6	294.0	294.0	P	6.0	6.0	6.0	C	86.0	35.0
C5-F	9300 Blk of SE 40th St in front of 9304 Mercerwood Dr	C5-F-BP	bypass	290.1	294.0	294.0	P	2.0	2.0	2.0	C	86.0	35.0
C5-G	SE 36th St & EMW	C5-G	main			103.3	P					140.0	62.0
C5-G	SE 36th St & EMW	C5-G	bypass			104.3	P					140.0	65.0
C5-H	SE 40th St & 97th Ave SE (West)	C5-H	main			179.6	P					140.0	58.0
C5-H	SE 40th St & 97th Ave SE (West)	C5-H	bypass			180.6	P					140.0	60.0
C5-I	SE 40th St & 97th Ave SE (East)	C5-I	main			178.0	P					106.0	63.0
C6-A	By 3862 East Mercer Way	C6-A	main	118.0	116.0	115.0	L	6.0	6.0	6.0	C	140.0	50.0
C6-A	By 3862 East Mercer Way	C6-A-BP	bypass	118.4	116.0	115.0	L	2.0	2.0	2.0	C	140.0	55.0
D2-A	40th and WMW (by 7505 SE 40th St)	D2-A	main	146.2	147.4	147.4	P	6.0	6.0	6.0	C	100.0	50.0
D2-B	76th and WMW	D2-B	main	160.0	152.5	160.0	L	6.0	6.0	4.0	C	100.0	42.0
D3-A	41st and 78th Ave	D3-A	main	182.5	182.5	182.5	P	6.0	6.0	6.0	T	90.0	36.0
D3-B	4180 WMW (East)	D3-B	main	176.1	174.8	174.8	P	6.0	8.0	6.0	C	100.0	65.0
D3-B	4180 WMW (East)	D3-B-BP	bypass	175.3	174.8	174.8	P	2.0	2.0	2.0	C	100.0	70.0
D3-C	Holly Lane-In front of 4 Holly Lane	D3-C	main	134.0	128.0	128.0	L	6.0	4.0	4.0	C	95.0	52.0
D3-D	Evergreen Lane (In front of 8150 Evergreen Ln)	D3-D	main	210.3	82.7	210.3	L	6.0	2.0	6.0	C	60.0	45.0
D3-D	Evergreen Lane (In front of 8150 Evergreen Ln)	D3-D-BP	bypass	210.2	82.7	210.3	L	2.0	2.0	2.0	C	60.0	50.0
D3-E	4180 WMW (West)	D3-E	main	170.8	166.0	167.9	P	6.0	6.0	6.0	C	78.0	38.0
D5-A	9510 Mercerwood Dr (9500 BLK)	D5-A	main	247.4	248.2	248.2	P	6.0	6.0	6.0	C	110.0	34.0

PRV STATION	STATION LOCATION	VALVE ID	MAIN/BYPASS	ELEVATION		CORRECT ELEVATION	SOURCE	DIAMETER		CORRECT DIAMETER	SOURCE	SETTING (PSI)	
				TIN (MODEL)	TABLE			MODEL	TABLE			UPSTREAM PRESSURE	SETTING @ PRV
D5-A	9510 Mercerwood Dr (9500 BLK)	D5-A-BP	bypass	247.7	248.2	248.2	P	2.0	2.0	2.0	C	110.0	38.0
D5-B	4018 EMW	D5-B	main	107.6	130.0	107.6	L	6.0	6.0	6.0	C	140.0	65.0
D5-B	4018 EMW	D5-B-BP	bypass	108.4	130.0	107.6	L	2.0	2.0	2.0	C	140.0	65.0
D5-C	100th and EMW	D5-C	main	123.7	129.8	129.8	P	6.0	6.0	6.0	C	98.0	70.0
D5-C	101st and EMW	D5-C	bypass	123.7	129.8	129.8	P	6.0	6.0	6.0	C	98.0	75.0
D5-D	4150 EMW/4262 EMW	D5-D	main	138.0	134.6	134.6	P	6.0	6.0	6.0	C	145.0	72.0
D5-D	4150 EMW/4262 EMW	D5-D-BP	bypass	138.0	134.6	134.6	P	2.0	2.0	2.0	C	145.0	80.0
D5-F	4298 EMW	D5-F	main	123.5	122.6	122.6	P	6.0	6.0	6.0	C	90.0	38.0
D5-F	4298 EMW	D5-F-BP	bypass	123.2	122.6	122.6	P	2.0	2.0	2.0	C	90.0	42.0
D5-G	4340 EMW	D5-G	main	127.8	90.0	116.2	P	6.0	6.0	6.0	C	95.0	60.0
D5-H	4315 EMW (Fernbrook)	D5-H	main	140.2	142.0	142.0	P	6.0	6.0	6.0	C	90.0	70.0
D5-H	4315 EMW (Fernbrook)	D5-H-BP	bypass	140.3	142.0	142.0	P	2.0	2.0	2.0	C	90.0	75.0
D5-I	EMW & SE 42ND PL	D5-I	main	133.9	#N/A	133.9	OM	6.0	#N/A	6.0	C	0.0	50.0
D5-I	EMW & SE 42ND PL	D5-I	bypass	134.9	#N/A	134.9	OM	7.0	#N/A	7.0	C	0.0	50.0
E3-A	Forest and Merrimount	E3-A	main	150.5	150.0	149.1	P	6.0	6.0	6.0	C	98.0	50.0
E3-A	Forest and Merrimount	E3-A-BP	bypass	149.4	150.0	149.1	P	2.0	2.0	2.0	C	98.0	55.0
E3-B	8350 Merrimount	E3-B	main	261.1	260.2	260.2	P	12.0	10.0	10.0	C	62.0	40.0
E3-B	8350 Merrimount	E3-B-BP	bypass	261.1	260.2	260.2	P	2.0	4.0	4.0	C	62.0	45.0
E3-C	47th and 84th Ave	E3-C	main	257.9	258.5	258.5	P	6.0	6.0	6.0	C	100.0	40.0
E3-D	4714 81st Ave SE	E3-D	main	141.0	141.3	141.3	P	6.0	6.0	6.0	C	0.0	40.0
E3-D	4714 81st Ave SE	E3-D-BP	bypass	141.0	141.3	141.3	P	6.0	6.0	6.0	C	0.0	44.0
E5-A	4365 EMW (Fernbrook)	E5-A	main	146.6	148.3	148.3	P	6.0	6.0	6.0	C	160.0	80.0
E5-A	4365 EMW (Fernbrook)	E5-A-BP	bypass	147.4	148.3	148.3	P	2.0	2.0	2.0	T	160.0	85.0
E5-B	4406 EMW	E5-B	main	144.0	146.8	146.8	P	6.0	6.0	6.0	T	155.0	50.0
E5-B	4406 EMW	E5-B-BP	bypass	144.0	146.8	146.8	P	2.0	2.0	2.0	T	155.0	55.0
E5-C	4419 EMW (West Valve)	E5-C	main	150.6	142.0	149.6	P	8.0	8.0	8.0	T	140.0	80.0
E5-D	4419 EMW (East valve)	E5-C-BP	bypass	148.1	#N/A	149.6	P	8.0	#N/A	8.0	OM	140.0	80.0
E5-E	4500 EMW	E5-E	main	144.9	148.3	148.3	P	6.0	6.0	6.0	T	98.0	46.0
E5-E	4500 EMW	E5-E-BP	bypass	145.6	148.3	148.3	P	2.0	2.0	2.0	T	98.0	50.0
E5-F	4753 EMW	E5-F	main	247.9	247.6	247.6	P	6.0	6.0	6.0	T	100.0	40.0
E5-F	4753 EMW	E5-F-BP	bypass	248.2	247.6	247.6	P	2.0	2.0	2.0	T	100.0	45.0
E5-G	4700 EMW	E5-G	main	149.8	150.0	150.0	P	6.0	6.0	6.0	T	90.0	38.0
E5-G	4700 EMW	E5-G-BP	bypass	150.0	150.0	150.0	P	2.0	2.0	2.0	T	90.0	42.0
F3-A	4800 BLK & Forest	F3-A	main	154.3	154.6	154.6	P	6.0	6.0	6.0	T	95.0	46.0
F3-A	4800 BLK & Forest	F3-A-BP	bypass	153.9	154.6	154.6	P	2.0	2.0	2.0	T	95.0	52.0
F3-B	5245 W Mercer Way (82nd & Forest)	F3-B	main	148.0	#N/A	145.0	L	6.0	#N/A	6.0	C	90.0	44.0
F3-B	5245 W Mercer Way (82nd & Forest)	F3-B-BP	bypass	148.2	#N/A	145.0	L	2.0	#N/A	2.0	C	90.0	48.0
F5-C	5300 Blk EMW (Butterworth)	F5-C	main	146.8	149.5	153.3	L	6.0	6.0	6.0	C	92.0	37.0
F3-D	5400 Blk WMW (Brook Bay)	F3-D	main	151.1	150.6	150.6	P	6.0	6.0	6.0	C	80.0	40.0
F3-D	5400 Blk WMW (Brook Bay)	F3-D-BP	bypass	150.6	150.6	150.6	P	2.0		2.0	C	80.0	45.0
F4-A	Landsdowne Ln (in front of 8412 SE 53rd Pl)	F4-A	main	235.1	234.1	234.1	P	8.0	8.0	8.0	C	115.0	54.0
F4-B	53rd Pl ICW	F4-B	main	264.7	261.9	261.9	P	6.0	8.0	6.0	C	84.0	32.0
F5-A	4800 EMW	F5-A	main	143.9	148.9	148.9	p	6.0	6.0	6.0	C	90.0	28.0
F5-B	5200 Blk EMW (Dawn Terrace)	F5-B	main	148.0	141.0	149.9	P	6.0	6.0	6.0	C	98.0	28.0
F5-B	5200 Blk EMW (Dawn Terrace)	F5-B-BP	bypass	148.0	141.0	149.9	P	2.0	2.0	2.0	C	98.0	33.0
F5-D	5400 Blk EMW	F5-D	main	155.5	116.5	157.9	P	6.0	6.0	6.0	C	88.0	38.0
F5-D	5400 Blk EMW	F5-D-BP	bypass			157.9	p			2.0	C	88.0	38.0
G3-A	8032 SE 57th Pl	G3-A	main	135.4	136.7	136.7	P	6.0	8.0	8.0	C	92.0	50.0
G3-A	8032 SE 57th Pl	G3-A-BP	bypass	135.4	136.7	136.7	P	6.0	8.0	8.0	C	N/A	N/A
G3-C	6007 79th Ave SE	G3-C	main	147.9	#N/A	148.7	P	6.0	#N/A	6.0	C	0.0	45.0
G5-B	6200 BLK EMW (Eastbay)	G5-B	main	144.3	144.6	144.6	P	6.0	8.0	8.0	C	93.0	45.0

PRV STATION	STATION LOCATION	VALVE ID	MAIN/BYPASS	ELEVATION		CORRECT ELEVATION	SOURCE	DIAMETER		CORRECT DIAMETER	SOURCE	SETTING (PSI)	
				TIN (MODEL)	TABLE			MODEL	TABLE			UPSTREAM PRESSURE	SETTING @ PRV
G5-B	6200 BLK EMW (Eastbay)	G5-B-BP	bypass	144.8	144.6	144.6	P	2.0	2.0	2.0	C	93.0	50.0
G5-C	EMW & SE 61st PL	G5-C	main	153.8	#N/A	158.9	P	6.0	#N/A	6.0	OM	86.0	32.0
G5-C	EMW & SE 61st PL	G5-C-BP	main	153.8	#N/A	158.9	P	6.0	#N/A	6.0	OM	86.0	35.0
H3-A	6700 WMW (Blackford Ln)	H3-A	main	167.5	163.0	163.0	L	6.0	6.0	6.0	C	90.0	43.0
H3-B	6850 WMW	H3-B	main	167.4	161.0	170.9	P	6.0	6.0	6.0	C	82.0	56.0
H3-B	6850 WMW	H3-B-BP	bypass	167.6	161.0	170.9	P	2.0	2	2.0	C	82.0	60.0
H3-C	70th and 81st Ave	H3-C	main	245.0	245.4	245.4	P	6.0	6.0	6.0	T	100.0	46.0
H3-C	70th and 81st Ave	H3-C	bypass	245.0	245.4	245.4	P	6.0	6.0	6.0	T	100.0	50.0
H3-D	71st and WMW	H3-D	main	166.6	114.9	167.5	P	6.0	6.0	6.0	T	74.0	28.0
H3-D	71st and WMW	H3-D-BP	bypass	166.5	114.9	167.5	P	2.0	2.0	2.0	T	74.0	35.0
H5-A	64th & EMW (by 6434 EMW)	H5-A	main	148.0	150.7	150.7	P	6.0	4.0	4.0	T	100.0	35.0
H5-A	64th & EMW (by 6434 EMW)	H5-A-BP	bypass	148.0	150.7	150.7	P	2.0	2.0	2.0	T	100.0	42.0
H5-B	6630 EMW	H5-B	main	153.8	158.3	158.3	P	6.0	4.0	4.0	T	92.0	35.0
H5-B	6630 EMW	H5-B	bypass	153.8	158.3	158.3	P	6.0	4.0	4.0	T	92.0	38.0
H5-C	68th and EMW (in front of 6806 EMW)	H5-C	main	152.9	140.0	155.2	P	6.0	6.0	6.0	C	92.0	46.0
H5-C	68th and EMW (in front of 6806 EMW)	H5-C-BP	bypass	153.5	140.0	155.2	P	2.0	2.0	2.0	C	92.0	50.0
H5-D		H5-D	main									76.0	35.0
H5-D		H5-D	main									76.0	40.0
I2-A	7200 WMW Meadow Lane	I2-A	main	168.6	170.0	170.0	P	6.0	8.0	8.0	T	74.0	45.0
I2-A	7200 WMW Meadow Lane	I2-A	bypass	168.6	170.0	170.0	P	6.0	8.0	8.0	T	74.0	50.0
I2-B	7200 WMW- But really it's in front of 7321 West Mercer Way (Villa Marbella)	I2-B-BP	bypass	126.9	126.7	126.7	P	2.0	2.0	2.0	T	96.0	55.0
I2-B	7200 WMW- But really it's in front of 7321 West Mercer Way (Villa Marbella)	I2-B	main	127.2	126.7	126.7	P	6.0	8.0	8.0	T	96.0	60.0
I2-C	7444 WMW (West Firs)	I2-C	main	244.0	245.0	245.0	P	6.0	6.0	6.0	T	104.0	40.0
I2-D	7623 WMW (7600 WMW)	I2-D	main	174.4	175.7	175.7	P	6.0	6.0	6.0	C	72.0	27.0
I2-D	7623 WMW (7600 WMW)	I2-D-BP	bypass	174.3	175.7	175.7	P	2.0	2	2	T	72.0	32.0
I2-E	7625 WMW (7600 WMW)	I2-E	main	173.2	175.3	175.3	P	6.0	4.0	4.0	T	74.0	27.0
I2-E	7625 WMW (7600 WMW)	I2-E	bypass	173.2	175.3	175.3	P	6.0	4.0	4.0	T	74.0	32.0
I4-A	7932 EMW	I4-A	main	123.9	123.7	123.7	P	6.0	6.0	6.0	T	100.0	40.0
I4-A	7932 EMW	I4-A-BP	bypass	124.0	123.7	123.7	P	2.0	2.0	2.0	T	100.0	44.0
I4-B		I4-B	main	239.1	#N/A	239.1	OM	6.0	#N/A	6.0	OM		
I5-A	7219 EMW	I5-A	main	99.6	101.0	101.0	P	6.0	6.0	6.0	T	116.0	64.0
I5-A	7219 EMW	I5-A-BP	bypass	99.3	101.0	101.0	P	2.0	2.0	2.0	T	116.0	68.0
I5-B	7430 92nd	I5-B	main	183.4	188.7	188.7	P	8.0	10.0	10.0	T	130.0	50.0
I5-B	7430 92nd	I5-B-BP	bypass	182.9	188.7	188.7	P	2.0	4.0	4.0	T	130.0	60.0
J3-A	7942 Lake View Lane	J3-A	main									105.0	40.0
J3-A	7942 Lake View Lane	J3-A	bypass									105.0	45.0
J3-B	8130 West Mercer Way	J3-B	main	232.5	230.6	230.6	P	6.0	6.0	6.0	T	120.0	40.0
J3-B	8130 West Mercer Way	J3-B-BP	bypass	232.2	230.6	230.6	P	2.0	2.0	2.0	T	120.0	45.0
J3-C	8430 Blk West Mercer Way	J3-C	main	238.0	239.7	239.7	P	6.0	6.0	6.0	T	110.0	50.0
J4-A	N Avalon	J4-A	main	127.6	128.7	128.7	P	6.0	6.0	6.0	C	104.0	44.0
J4-B	S Avalon (in front of 8370 Avalon Drive)	J4-B	main	144.0	144.1	144.1	P	6.0	6.0	6.0	T	95.0	48.0

SOURCES:

- P PACE (elevation)
- L Lidar (elevation)
- T City's PRV Table
- C Verified by City
- OM Old Model

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Appendix M

Material Safety Data Sheets

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MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: DPD Free Chlorine Reagent
Catalog Number: 2105569

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00109
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: May cause sensitization. May cause irritation.
Date of MSDS Preparation:
Day: 11
Month: December
Year: 2008

2. COMPOSITION / INFORMATION ON INGREDIENTS

Salt of N,N-Diethyl-p-Phenylenediamine

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 1.0 - 5.0
Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 970 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause sensitization. May cause irritation.

Carboxylate Salt

CAS No.: Confidential
TSCA CAS Number: Confidential
Percent Range: 55.0 - 65.0
Percent Range Units: weight / weight
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation. Toxic properties unknown.

Sodium Phosphate Dibasic, Heptahydrate

CAS No.: 7782-85-6
TSCA CAS Number: 7558-79-4
Percent Range: 30.0 - 40.0

Percent Range Units: weight / weight
LD50: Oral rat LD₅₀ = 12930 mg/kg.
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

Ethylenediaminetetraacetic Acid, Disodium Salt

CAS No.: 6381-92-6
TSCA CAS Number: 139-33-3
Percent Range: 1.0 - 10.0
Percent Range Units: weight / weight
LD50: Oral rat LD50 = 2000 mg/kg
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: May cause irritation.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: White or light pink powder

Odor: None

MAY CAUSE EYE AND RESPIRATORY TRACT IRRITATION
MAY CAUSE ALLERGIC SKIN REACTION

HMIS:

Health: 2

Flammability: 1

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 1

Flammability: 1

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: May cause irritation

Skin Contact: May cause irritation May cause allergic reaction

Skin Absorption: None reported

Target Organs: None reported

Ingestion: DPD Oral rat LD50 studies revealed decreased locomotor activity, depressed respiration, muscle spasms, loss of righting reflex and death. Autopsies revealed ulcerated stomach, enteritis, gas and congested lungs.

Target Organs: None reported

Inhalation: May cause: respiratory tract irritation Effects similar to those of ingestion.

Target Organs: None reported

Medical Conditions Aggravated: Allergy or sensitivity to salts of N,N-Diethyl-p-phenylenediamine Pre-existing: Eye conditions Skin conditions Respiratory conditions

Chronic Effects: DPD may cause allergic skin reactions in some people causing severe skin rashes and itching.

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

This product does NOT contain any IARC listed chemicals.

This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.

Skin Contact (First Aid): Wash skin with soap and plenty of water. Call physician if irritation develops.

Ingestion (First Aid): Call physician immediately. Give 1-2 glasses of water under medical supervision.
Never give anything by mouth to an unconscious person.

Inhalation: Remove to fresh air.

5. FIRE FIGHTING MEASURES

Flammable Properties: Can burn in fire, releasing toxic vapors.

Flash Point: Not applicable

Method: Not applicable

Flammability Limits:

Lower Explosion Limits: Not applicable

Upper Explosion Limits: Not applicable

Autoignition Temperature: Not determined

Hazardous Combustion Products: Toxic fumes of: carbon monoxide, carbon dioxide, phosphorus oxides, nitrogen oxides.

Fire / Explosion Hazards: None reported

Static Discharge: None reported.

Mechanical Impact: None reported

Extinguishing Media: Use media appropriate to surrounding fire conditions

Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Stop spilled material from being released to the environment.

Clean-up Technique: Scoop up spilled material into a large beaker and dissolve with water. Flush reacted material to the drain with a large excess of water. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate as needed to perform spill clean-up. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a water pollutant.

304 EHS RQ (40 CFR 355): Not applicable

D.O.T. Emergency Response Guide Number: Not applicable

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe dust. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Store between 10° and 25°C. Protect from: light moisture heat

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have an eyewash station nearby. Have a safety shower nearby. Use general ventilation to minimize exposure to mist, vapor or dust. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with: eyes skin clothing Do not breathe: dust Wash thoroughly after handling. Protect from: light moisture heat

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: White or light pink powder

Physical State: Solid

Molecular Weight: Not applicable

Odor: None

pH: of 1% soln. = 6.35 @ 25°C

Vapor Pressure: Not applicable

Vapor Density (air = 1): Not applicable

Boiling Point: Not applicable

Melting Point: 110 C decomp

Specific Gravity (water = 1): 1.76

Evaporation Rate (water = 1): Not applicable

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: Not determined

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Exposure to light. Excess moisture Heating to decomposition.

Reactivity / Incompatibility: None reported

Hazardous Decomposition: Heating to decomposition releases toxic and/or corrosive fumes of: carbon dioxide carbon monoxide phosphorus oxides nitrogen oxides

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: None reported

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: Salt of DPD Oral rat LD50 = 970 mg/kg; Sodium Phosphate Dibasic Oral Rat LD50 = 17 g/kg; EDTA Disodium Salt Oral Rat LD50 = 2000 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: --

No ecological data available for the ingredients of this product.

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: Not applicable

Special Instructions (Disposal): Dilute to 3 to 5 times the volume with cold water. Open cold water tap completely, slowly pour the material to the drain. Allow cold water to run for 5 minutes to completely flush the system.

Empty Containers: Rinse three times with an appropriate solvent. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Not Currently Regulated

--

DOT Hazard Class: NA

DOT Subsidiary Risk: NA

DOT ID Number: NA

DOT Packing Group: NA

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Not Currently Regulated

--

ICAO Hazard Class: NA

ICAO Subsidiary Risk: NA

ICAO ID Number: NA

ICAO Packing Group: NA

I.M.O.:

I.M.O. Proper Shipping Name: Not Currently Regulated

--

I.M.O. Hazard Class: NA
I.M.O. Subsidiary Risk: NA
I.M.O. ID Number: NA
I.M.O. Packing Group: NA

Additional Information: There is a possibility that this product could be contained in a reagent set or kit composed of various compatible dangerous goods. If the item is NOT in a set or kit, the classification given above applies. If the item IS part of a set or kit, the classification would change to the following: UN3316 Chemical Kit, Class 9, PG II or III. If the item is not regulated, the Chemical Kit classification does not apply.

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard. (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard Delayed (Chronic) Health Hazard

S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

--
302 (EHS) TPQ (40 CFR 355): Not applicable

304 CERCLA RQ (40 CFR 302.4): 5000 lbs. Sodium phosphate, dibasic

304 EHS RQ (40 CFR 355): Not applicable

Clean Water Act (40 CFR 116.4): Sodium phosphate, dibasic - RQ 5000 lbs.

RCRA: Contains no RCRA regulated substances.

C.P.S.C.: Not applicable

State Regulations:

California Prop. 65: No Prop. 65 listed chemicals are present in this product.

Identification of Prop. 65 Ingredient(s): None

California Perchlorate Rule CCR Title 22 Chap 33:

Trade Secret Registry: New Jersey Trade Secret Registry Number 80100131-5001 (Carboxylate Salt) New Jersey Trade Secret Registry Number 80100131-5002 (DPD Salt) New York Trade Secret Registry Number 478 (DPD Salt) New York Trade Secret Registry Number 479 (Carboxylate Salt) This product complies with Pennsylvania Trade Secret Regulations. This product is registered as a trade secret in the state of Illinois. This product is registered as a trade secret in the state of Massachusetts. This product is registered as a trade secret in the state of New York.

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of Free Chlorine

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Outside Testing. Sax, N. Irving. Dangerous Properties of Industrial Materials, 7th Ed. New York: Van Nostrand Reinhold Co., 1989.

Revision Summary: Updates in Section(s) 14,

World Headquarters
Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Page 7
Date Printed 2/23/09
MSDS No: M00109

Legend:

NA - Not Applicable	w/w - weight/weight
ND - Not Determined	w/v - weight/volume
NV - Not Available	v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE. HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

MSDS No. M00461

MATERIAL SAFETY DATA SHEET

1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product Name: SPADNS Fluoride Reagent
Catalog Number: 2506025

Hach Company
P.O.Box 389
Loveland, CO USA 80539
(970) 669-3050

Emergency Telephone Numbers:
(Medical and Transportation)
(303) 623-5716 24 Hour Service
(515)232-2533 8am - 4pm CST

MSDS Number: M00481
Chemical Name: Not applicable
CAS No.: Not applicable
Chemical Formula: Not applicable
Chemical Family: Not applicable
Hazard: Causes burns.
Date of MSDS Preparation:
Day: 26
Month: March
Year: 2007

2. COMPOSITION / INFORMATION ON INGREDIENTS

Hydrochloric Acid

CAS No.: 7647-01-0
TSCA CAS Number: 7647-01-0
Percent Range: 30.0 - 40.0
Percent Range Units: volume / volume
LD50: Oral rabbit LD50 = 900 mg/kg
LC50: Inhalation rat LC50 = 3124 ppm/1 hour
TLV: 5 ppm ceiling
PEL: 5 ppm ceiling
Hazard: Causes burns.

Demineralized Water

CAS No.: 7732-18-5
TSCA CAS Number: 7732-18-5
Percent Range: 60.0 - 70.0
Percent Range Units: volume / volume
LD50: None reported
LC50: None reported
TLV: Not established
PEL: Not established
Hazard: No effects anticipated.

Other components, each

CAS No.: Not applicable
TSCA CAS Number: Not applicable

Percent Range: < 0.1

Percent Range Units: Not applicable

LD50: Not applicable

LC50: Not applicable

TLV: Not established

PEL: Not established

Hazard: Any ingredient(s) of this product listed as "Other component(s)" is not considered a health hazard to the user of this product.

Sodium Arsenite

CAS No.: 7784-46-5

TSCA CAS Number: 7784-46-5

Percent Range: 0.01 - 0.1

Percent Range Units: weight / volume

LD50: Oral rat LD₅₀ = 41 mg/kg

LC50: None reported

TLV: 0.01 mg (As) /m³

PEL: 0.01 mg (As) /m³

Hazard: Highly toxic. Carcinogen.

3. HAZARDS IDENTIFICATION

Emergency Overview:

Appearance: Dark red liquid

Odor: Acidic

CAUSES BURNS

HMIS:

Health: 3

Flammability: 0

Reactivity: 0

Protective Equipment: X - See protective equipment, Section 8.

NFPA:

Health: 3

Flammability: 0

Reactivity: 0

Symbol: Not applicable

Potential Health Effects:

Eye Contact: Causes eye burns.

Skin Contact: Causes burns.

Skin Absorption: None reported

Target Organs: None reported

Ingestion: Causes: burns ulceration of the digestive tract abdominal pain nausea vomiting sedation muscular twitching

Target Organs: None reported

Inhalation: Causes: burns choking teeth erosion difficult breathing

Target Organs: None reported

Medical Conditions Aggravated: Pre-existing: Eye conditions Skin conditions Respiratory conditions Impaired pulmonary function such as obstructive airway diseases.

Chronic Effects: Chronic overexposure may cause erosion of the teeth

Cancer / Reproductive Toxicity Information:

This product does NOT contain any OSHA listed carcinogens.

An ingredient of this mixture is: IARC Group 3: Non-classifiable
Hydrochloric acid
This product does NOT contain any NTP listed chemicals.

Additional Cancer / Reproductive Toxicity Information: None reported
Toxicologically Synergistic Products: None reported

4. FIRST AID

Eye Contact: Immediately flush eyes with water for 15 minutes. Call physician.
Skin Contact (First Aid): Wash skin with plenty of water for 15 minutes. Remove contaminated clothing. Call physician immediately.
Ingestion (First Aid): Do not induce vomiting. Give 1-2 glasses of water. Call physician immediately. Never give anything by mouth to an unconscious person.
Inhalation: Remove to fresh air. Give artificial respiration if necessary. Call physician.

5. FIRE FIGHTING MEASURES

Flammable Properties: Not Flammable, but reacts with most metals to form flammable hydrogen gas. During a fire, corrosive and toxic gases may be generated by thermal decomposition.
Flash Point: Not applicable
Method: Not applicable
Flammability Limits:
Lower Explosion Limits: Not applicable
Upper Explosion Limits: Not applicable
Autoignition Temperature: Not applicable
Hazardous Combustion Products: This material will not burn.
Fire / Explosion Hazards: Contact with metals gives off hydrogen gas which is flammable
Static Discharge: None reported.
Mechanical Impact: None reported
Extinguishing Media: Use media appropriate to surrounding fire conditions
Fire Fighting Instruction: As in any fire, wear self-contained breathing apparatus pressure-demand and full protective gear. Evacuate area and fight fire from a safe distance.

6. ACCIDENTAL RELEASE MEASURES

Spill Response Notice:

Only persons properly qualified to respond to an emergency involving hazardous substances may respond to a spill according to federal regulations (OSHA 29 CFR 1910.120(a)(v)) and per your company's emergency response plan and guidelines/procedures. See Section 13, Special Instructions for disposal assistance.

Containment Technique: Releases of this material may contaminate the environment. Absorb spilled liquid with non-reactive sorbent material. Stop spilled material from being released to the environment. Dike large spills to keep spilled material from entering sewage and drainage systems or bodies of water.

Clean-up Technique: Cover spilled material with an alkali, such as soda ash or sodium bicarbonate. Scoop up slurry into a large beaker. Adjust to a pH between 6 and 9 with an alkali, such as soda ash or sodium bicarbonate. Dispose of material in an E.P.A. approved hazardous waste facility. Decontaminate the area of the spill with a soap solution.

Evacuation Procedure: Evacuate local area (15 foot radius or as directed by your facility's emergency response plan) when: any quantity is spilled. If conditions warrant, increase the size of the evacuation.

Special Instructions (for accidental release): Mixture contains a component which is regulated as a hazardous air pollutant. Mixture contains a component which is regulated as a water pollutant. Product is regulated as RCRA hazardous waste.

304 EHS RQ (40 CFR 355): Sodium Arsenite - RQ 1 lbs

D.O.T. Emergency Response Guide Number: 157

7. HANDLING / STORAGE

Handling: Avoid contact with eyes skin clothing Do not breathe mist or vapors. Wash thoroughly after handling. Maintain general industrial hygiene practices when using this product.

Storage: Keep container tightly closed when not in use. Protect from heat. Keep away from metals.

Flammability Class: Not applicable

8. EXPOSURE CONTROLS / PROTECTIVE EQUIPMENT

Engineering Controls: Have a safety shower nearby. Have an eyewash station nearby. Maintain general industrial hygiene practices when using this product.

Personal Protective Equipment:

Eye Protection: safety glasses with top and side shields

Skin Protection: disposable latex gloves lab coat

Inhalation Protection: adequate ventilation

Precautionary Measures: Avoid contact with eyes skin clothing Do not breathe mist/vapor. Protect from heat. Keep away from metals.

TLV: Not established

PEL: Not established

9. PHYSICAL / CHEMICAL PROPERTIES

Appearance: Dark red liquid

Physical State: Liquid

Molecular Weight: Not applicable

Odor: Acidic

pH: <0.5

Vapor Pressure: Not determined

Vapor Density (air = 1): Not determined

Boiling Point: 105° C (221° F)

Melting Point: Not determined

Specific Gravity (water = 1): 1.015

Evaporation Rate (water = 1): 0.64

Volatile Organic Compounds Content: Not applicable

Partition Coefficient (n-octanol / water): Not applicable

Solubility:

Water: Soluble

Acid: Soluble

Other: Not determined

Metal Corrosivity:

Steel: 0.207 in/yr

Aluminum: Not determined

10. STABILITY / REACTIVITY

Chemical Stability: Stable when stored under proper conditions.

Conditions to Avoid: Evaporation Heating to decomposition.

Reactivity / Incompatibility: May react violently in contact with strong bases oxidizers. Incompatible with metals.

Hazardous Decomposition: Contact with metals may release flammable hydrogen gas. Heating to decomposition releases toxic and/or corrosive fumes of arsenic compounds chlorides.

Hazardous Polymerization: Will not occur.

11. TOXICOLOGICAL INFORMATION

Product Toxicological Data:

LD50: Oral rat LD50 = 540 mg/kg

LC50: None reported

Dermal Toxicity Data: None reported

Skin and Eye Irritation Data: None reported

Mutation Data: None reported

Reproductive Effects Data: None reported

Ingredient Toxicological Data: Hydrochloric Acid: Oral rat LD50 = 900 mg/kg, Inhalation rat LC50 = 3124 ppm/1H; Sodium Arsenite Oral rat LD50 = 41 mg/kg, Dermal rat LD50 = 150 mg/kg

12. ECOLOGICAL INFORMATION

Product Ecological Information: --

No ecological data available for this product.

Ingredient Ecological Information: LC100 trout 10 mg/L 24-hr; LC50 shrimp 100 to 330 ppm/48-hr (salt water); LC50 Starfish 100 to 330 mg/L/48-hr; LC50 cockle 330 to 1,000 mg/L/48-hr; TLM mosquito fish 282 ppm/96-hr (fresh water); LC50 goldfish 178 mg/L

13. DISPOSAL CONSIDERATIONS

EPA Waste ID Number: D002, D004

Special Instructions (Disposal): Dispose of material in an E.P.A. approved hazardous waste facility.

Empty Containers: Rinse three times with an appropriate solvent. Rinsate from empty containers may contain sufficient product to require disposal as hazardous waste. Dispose of empty container as normal trash.

NOTICE (Disposal): These disposal guidelines are based on federal regulations and may be superseded by more stringent state or local requirements. Please consult your local environmental regulators for more information.

14. TRANSPORT INFORMATION

D.O.T.:

D.O.T. Proper Shipping Name: Hydrochloric Acid Solution

--

DOT Hazard Class: 8

DOT Subsidiary Risk: NA

DOT ID Number: UN1789

DOT Packing Group: II

I.C.A.O.:

I.C.A.O. Proper Shipping Name: Hydrochloric Acid Solution

--

ICAO Hazard Class: 8

ICAO Subsidiary Risk: NA

ICAO ID Number: UN1789

ICAO Packing Group: II

I.M.O.:

I.M.O. Proper Shipping Name: Hydrochloric Acid Solution

--

I.M.O. Hazard Class: 8

I.M.O. Subsidiary Risk: NA

I.M.O. ID Number: UN1789

I.M.O. Packing Group: II

Additional Information: This product may be shipped as part of a chemical kit composed of various compatible dangerous goods for analytical or testing purposes. This kit would have the following classification:
Hazard Class: 9 UN Number 3316. Proper Shipping Name: Chemical Kit

15. REGULATORY INFORMATION

U.S. Federal Regulations:

O.S.H.A.: This product meets the criteria for a hazardous substance as defined in the Hazard Communication Standard, (29 CFR 1910.1200)

E.P.A.:

S.A.R.A. Title III Section 311/312 Categorization (40 CFR 370): Immediate (Acute) Health Hazard
S.A.R.A. Title III Section 313 (40 CFR 372): This product does NOT contain any chemical subject to the reporting requirements of Section 313 of Title III of SARA.

302 (EHS) TPQ (40 CFR 355): Sodium Arsenite 500 lbs.

304 CERCLA RQ (40 CFR 302.4): Hydrochloric Acid 5000 lbs. and Sodium Arsenite 1 lb.

304 EHS RQ (40 CFR 355): Sodium Arsenite - RQ 1 lbs

Clean Water Act (40 CFR 116.4): Hydrochloric Acid - RQ 5000 lbs. Sodium Arsenite - RQ = 1 lb.

RCRA: Contains RCRA regulated substances. See Section 13, EPA Waste ID Number.

C.P.S.C.: The label for this product bears the signal word "POISON" because the concentration of Hydrochloric Acid in the product is greater than/equal to 10%.

State Regulations:

California Prop. 65: WARNING - This product contains a chemical known to the State of California to cause cancer.

Identification of Prop. 65 Ingredient(s): Sodium Arsenite

Trade Secret Registry: Not applicable

National Inventories:

U.S. Inventory Status: All ingredients in this product are listed on the TSCA 8(b) Inventory (40 CFR 710).

TSCA CAS Number: Not applicable

16. OTHER INFORMATION

Intended Use: Determination of fluoride

References: TLV's Threshold Limit Values and Biological Exposure Indices for 1992-1993. American Conference of Governmental Industrial Hygienists, 1992. Air Contaminants, Federal Register, Vol. 54, No. 12. Thursday, January 19, 1989. pp. 2332-2983. In-house information. Technical Judgment. Outside Testing. NIOSH/OSHA Occupational Health Guidelines for Chemical Hazards. Cincinnati: Department of Health and Human Services, 1981. Vendor Information. CCINFO RTECS. Canadian Centre for Occupational Health and Safety. Hamilton, Ontario Canada: 30 June 1993.

Revision Summary: Updates in Section(s) 14,

Legend:

NA - Not Applicable

ND - Not Determined

NV - Not Available

w/w - weight/weight

w/v - weight/volume

v/v - volume/volume

USER RESPONSIBILITY: Each user should read and understand this information and incorporate it in individual site safety programs in accordance with applicable hazard communication standards and regulations.

THE INFORMATION CONTAINED HEREIN IS BASED ON DATA CONSIDERED TO BE ACCURATE.
HOWEVER, NO WARRANTY IS EXPRESSED OR IMPLIED REGARDING THE ACCURACY OF
THESE DATA OR THE RESULTS TO BE OBTAINED FROM THE USE THEREOF.

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Close this window

Common Name: ULTRA REGULAR BLEACH
Manufacturer: CLOROX
MSDS Revision Date: 10/19/2001

Grainger Item Number(s): 1VN32
Manufacturer Model Number(s):

MSDS Table of Contents

Click the desired link below to jump directly to that section in the MSDS.

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CLOROX
REGULAR

THE CLOROX COMPANY
1221 BROADWAY
OAKLAND, CA 94612
TEL. (510) 271-7000

MATERIAL SAFETY DATA SHEET

I PRODUCT

PRODUCT:	ULTRA CLOROX REGULAR BLEACH
DESCRIPTION: ODOR	CLEAR, LIGHT YELLOW LIQUID WITH A CHLORINE
OTHER DESIGNATIONS:	LAUNDRY BLEACH
DISTRIBUTOR:	CLOROX SALES COMPANY 1221 BROADWAY

OAKLAND, CA 94612

EMERGENCY TELEPHONE NOS.:
 FOR MEDICAL EMERGENCIES CALL: (800) 446-1014

FOR TRANSPORTATION EMERGENCIES
 CHEMTREC: (800) 424-9300

II HEALTH HAZARD DATA

CORROSIVE TO THE EYES. MAY CAUSE SEVERE IRRITATION OR DAMAGE TO EYES AND SKIN. HARMFUL IF SWALLOWED; NAUSEA, VOMITING, AND BURNING SENSATION OF THE MOUTH AND THROAT MAY OCCUR. THE FOLLOWING MEDICAL CONDITIONS MAY BE AGGRAVATED BY EXPOSURE TO HIGH CONCENTRATIONS OF VAPOR OR MIST: HEART CONDITIONS, OR CHRONIC RESPIRATORY PROBLEMS SUCH AS ASTHMA, CHRONIC BRONCHITIS OR OBSTRUCTIVE LUNG DISEASE. SOME CLINICAL REPORTS SUGGEST A LOW POTENTIAL FOR SKIN SENSITIZATION UPON EXAGGERATED EXPOSURE TO SODIUM HYPOCHLORITE, PARTICULARLY ON DAMAGED OR IRRITATED SKIN. ROUTINE CLINICAL TESTS CONDUCTED ON INTACT SKIN WITH CLORAX LIQUID BLEACH FOUND NO SENSITIZATION IN THE TEST SUBJECTS. NO ADVERSE HEALTH EFFECTS ARE EXPECTED WITH RECOMMENDED USE.

FIRST AID:

EYE CONTACT:
 IMMEDIATELY FLUSH EYES WITH WATER FOR 15 MINUTES. CONTACT A PHYSICIAN.

INGESTION:
 DRINK A GLASSFUL OF WATER. DO NOT INDUCE VOMITING. IMMEDIATELY CONTACT A PHYSICIAN OR POISON CONTROL CENTER.

SKIN CONTACT:
 REMOVE CONTAMINATED CLOTHING. FLUSH SKIN WITH WATER. CONTACT A PHYSICIAN IF IRRITATION OR DISCOMFORT PERSISTS.

INHALATION:
 REMOVE FROM EXPOSURE TO FRESH AIR.

III HAZARDOUS INGREDIENTS

INGREDIENT EXPOSURE LIMIT	CONCENTRATION	WORKER
SODIUM HYDROXIDE CAS # 1310-73-2	<0.2%	2 MG/M3 TLV-C
SODIUM HYPOCHLORITE CAS # 7681-52-9	6-7.35%	NOT ESTABLISHED

NONE OF THE INGREDIENTS IN THIS PRODUCT ARE ON THE IARC, OSHA OR NTP CARCINOGEN LISTS.

TLV-C = THRESHOLD LIMIT VALUE-CEILING. THE WORKER EXPOSURE LIMIT SHOULD NOT BE EXCEEDED AT ANY TIME. SOURCE: ACGIH, 1997.

IV SPECIAL PROTECTION AND PRECAUTIONS

THE FOLLOWING RECOMMENDATIONS ARE GIVEN FOR PRODUCTION FACILITIES AND FOR OTHER CONDITIONS AND SITUATIONS WHERE THERE IS INCREASED POTENTIAL FOR ACCIDENTAL, LARGE-SCALE, OR PROLONGED EXPOSURE.

HYGIENIC PRACTICES:

WEAR SAFETY GLASSES AND NITRILE, NEOPRENE OR BUTYL RUBBER GLOVES. THE AVAILABILITY OF AN EYE WASH AND SHOWER IS RECOMMENDED IN A MANUFACTURING ENVIRONMENT.

ENGINEERING CONTROLS:

USE GENERAL VENTILATION TO MINIMIZE EXPOSURE TO VAPORS.

WORK PRACTICES:

AVOID EYE AND SKIN CONTACT AND INHALATION OF VAPOR OR MIST.

KEEP OUT OF REACH OF CHILDREN

V TRANSPORTATION AND REGULATORY DATA

U.S. DOT HAZARD CLASS:

NOT RESTRICTED PER 49 CFR 172.101(C) (12) (IV) .

U.S. PROPER SHIPPING NAME:

NONE

IMDG:

NOT RESTRICTED PER IMDG CODE PAGE 40 PARAGRAPH 2.3.1.3.

IATA:

NOT RESTRICTED PER IATA DGR SPECIAL PROVISION A3 AND ICAO SPECIAL PROVISION 223.

EPA - SARA TITLE III/CERCLA:

BOTTLED PRODUCT IS NOT REPORTABLE UNDER SECTIONS 311/312 AND CONTAINS NO CHEMICALS REPORTABLE UNDER SECTION 313. THIS PRODUCT DOES CONTAIN CHEMICALS (SODIUM HYDROXIDE <0.2% AND SODIUM HYPOCHLORITE <7.35%) THAT ARE REGULATED UNDER SECTION 304/CERCLA.

TSCA/DSL STATUS:

ALL COMPONENTS OF THIS PRODUCT ARE ON THE U.S. TSCA INVENTORY AND CANADIAN DSL.

VI SPILL PROCEDURES/WASTE DISPOSAL

SPILL PROCEDURES:

CONTROL SPILL. CONTAINERIZE LIQUID AND USE ABSORBENTS ON RESIDUAL LIQUID; DISPOSE APPROPRIATELY. WASH AREA AND LET DRY. FOR SPILLS OF MULTIPLE PRODUCTS, RESPONDERS SHOULD EVALUATE THE MSDS'S OF THE PRODUCTS

FOR INCOMPATIBILITY WITH SODIUM HYPOCHLORITE. BREATHING PROTECTION SHOULD BE WORN IN ENCLOSED, AND/OR POORLY VENTILATED AREAS UNTIL HAZARD ASSESSMENT IS COMPLETE.

WASTE DISPOSAL:

DISPOSE OF IN ACCORDANCE WITH ALL APPLICABLE FEDERAL, STATE, AND LOCAL REGULATIONS.

VII REACTIVITY DATA

STABLE UNDER NORMAL USE AND STORAGE CONDITIONS. STRONG OXIDIZING AGENT. REACTS

WITH OTHER HOUSEHOLD CHEMICALS SUCH AS TOILET BOWL CLEANERS, RUST REMOVERS, VINEGAR, ACIDS OR AMMONIA CONTAINING PRODUCTS TO PRODUCE HAZARDOUS GASES, SUCH AS CHLORINE AND OTHER CHLORINATED SPECIES. PROLONGED CONTACT WITH METAL MAY CAUSE PITTING OR DISCOLORATION.

VIII FIRE AND EXPLOSION DATA

FLASH POINT: NONE

SPECIAL FIREFIGHTING PROCEDURES: NONE

UNUSUAL FIRE/EXPLOSION HAZARDS:

NONE. NOT FLAMMABLE OR EXPLOSIVE.

PRODUCT DOES NOT IGNITE WHEN EXPOSED TO OPEN FLAME.

IX PHYSICAL DATA

BOILING POINT: APPROX. 212 DEG. F/100 DEG. C

SPECIFIC GRAVITY (H2O = 1): APPROX. 1.11 AT 70 DEG. F

SOLUBILITY IN WATER: COMPLETE

PH: APPROX. 11.4

(C) 1963, 1991 THE CLOROX COMPANY

DATA SUPPLIED IS FOR USE ONLY IN CONNECTION WITH OCCUPATIONAL SAFETY AND HEALTH DATE PREPARED: 10/19/01

MCXU

VITA-D-CHLOR™ Neutral



Manufactured by:
Integra Chemical Co
1216 6th Ave N
Kent WA 98032
253.479.7000

MATERIAL SAFETY DATA SHEET

MSDS Number: V333N, Revision 006
Revision date: Aug 3, 2011
Page 1 of 2

24 Hour Emergency Response: CHEMTREC 800-424-9300
(Outside USA: 703-527-3887)

PRODUCT IDENTIFICATION

Product name: Vita-D-Chlor, Neutral
Functional use: Dechlorinator
Chemical formula: Proprietary
Chemical family: Organic salt
Product number: V333.50

HAZARD OVERVIEW

HMIS Rating: 0-1-0-B
NPFA: None established

Warning Label: Caution. Use safe chemical handling practices. Keep container closed. Use with adequate ventilation. Avoid breathing dust. Avoid contact with skin, eyes, and clothing. Wash thoroughly after handling.

COMPOSITION/INFORMATION ON INGREDIENTS

	ACGIH TLV/TWA	OSHA PEL/TWA
Organic acid	Not listed	Not listed

PHYSICAL DATA

Boiling point: NA	Vapor density: NA
Melting point: decomposes @ 218°C	Solubility: 1.3g/1mL water @20°C
Specific gravity: NA	pH of aqueous solution: 6.5 to 7.5
Evaporation rate: NA	Appearance and Odor: Odorless, fine white crystals
Vapor pressure: NA	

FIRE AND EXPLOSION DATA

Flash point: NA
Auto-ignition temperature: NA
Flammable limits (% by volume in air)
Upper: NA
Lower: NA
Fire extinguishing media: Water spray, CO2, dry chemical, or foam
Special firefighting procedures: Use water to cool nearby containers and structures. Wear full protective equipment, including suitable respiratory protection.
Unusual fire and explosion hazards: None identified

HEALTH HAZARD INFORMATION

Effects of overexposure:
Contact: May be irritating to the eyes.
Ingestion: Ingestion of small amounts is not likely to produce harmful effects.
Inhalation: Inhalation of large quantities, or prolonged inhalation, may irritate the respiratory system.
Chronic effects of overexposure: None identified
Medical conditions aggravated by exposure: None identified
Target organs: None identified
Reproductive effects: None identified
Exposure limits: None established
Toxicity data: No information available
Carcinogenicity: No listings by NTP, IARC, or OSHA

VITA-D-CHLOR™ Neutral



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253.479.7000

MATERIAL SAFETY DATA SHEET

MSDS Number: V333N, Revision 006
Revision date: Aug 3, 2011
Page 2 of 2

**24 Hour Emergency Response: CHEMTREC 800-424-9300
(Outside USA: 703-527-3887)**

EMERGENCY FIRST AID PROCEDURES

Skin contact: Wash with soap and water. Seek medical attention if irritation develops.
Eye contact: Flush eyes with water for at least 15 minutes. If irritation persists, seek medical attention.
Inhalation: Remove to fresh air. If adverse symptoms develop, seek medical attention.
Ingestion: If adverse symptoms develop, seek medical attention.

REACTIVITY DATA

Stability: Stable
Hazardous polymerization: Will not occur
Incompatibles: Incompatible with strong oxidizers.
Decomposition products: Oxides of carbon (CO, CO₂)
Conditions to avoid: Exposure to light, air, moisture and high temperatures.

SPILL AND DISPOSAL PROCEDURES

Spill and leak procedures: Remove all ignition sources. Sweep or scoop disposal container in a manner that minimizes dust dispersion. Wear suitable protective equipment.
Disposal procedures: Dispose in accordance with all Local, State and Federal regulations.

PROTECTIVE EQUIPMENT

Ventilation: Use adequate general or local exhaust ventilation to keep fume dust levels as low as possible.
Respiratory protection: None needed unless use generates annoying or irritating dusts. Use a dust respirator mask if necessary.
Skin and eye protective equipment: Safety glasses. Use good chemical handling practices.

STORAGE AND HANDLING PRECAUTIONS

Storage area: General. Store in a cool, dry, well-ventilated area. Keep away from incompatible materials. Protect from direct light and minimize contact with air. Protect containers from physical damage. Keep material dry.

TRANSPORTATION INFORMATION

Material is not regulated via either ground or air transportation.

REGULATORY INFORMATION

TSCA Inventory: SARA EHS TPQ:
CERCLA RQ: SARA 313 Toxic Release de minimus:
SARA hazard categories: Acute Chronic Flammability Pressure Reactivity
Clean Air Act categories: SOCM1 HAP Volatile HAP Organic HAP/Ozone depleting
FDA Recommended Dietary Allowance for ascorbic acid: 60mg/day
NSF60 Maximum Use: 12mg/L

MSDS Revision History: 005 - Updated header information
001 - Original MSDS 006 - Overall review
002 - Updated header information
003 - Zip Code Change
004 - Overall review, reformat

NE = Not established; NA = Not applicable or Not available

The information presented above is offered for informational purposes only. This MSDS, and the associated product, is intended for use only by technically qualified persons, and at their own discretion and risk. Since conditions and manner of use are outside the control of Integra Chemical Company, we make no warranties, either expressed or implied, and assume no liability in connection with any use of the information.

Appendix N

City Ordinances

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Chapter 15.12 WATER SYSTEM

Sections:

- [15.12.010](#) Water use charges – Date of imposition – Billings.
- [15.12.020](#) Water use charges – Delinquency – Reconnection and disconnection charges.
- [15.12.030](#) Meter installation charges.
- [15.12.040](#) Connection charges.
- [15.12.050](#) Meter installation and connection charges – Due and payable when – Delinquency – Lien for nonpayment.

15.12.010 Water use charges – Date of imposition – Billings.

A. The city council shall establish by resolution the following classifications of water users and schedules of rates and charges:

1. Classification of water users and schedule of charges for water usage and rates for unauthorized use;
2. Schedule of rates for fire service;
3. Schedule of special service charges.

Three copies of the resolution shall be on file in the office of the city clerk.

B. The charges for water shall be imposed from the date on which the water service connection shall be turned on. No charges shall be imposed upon any user after the date on which the water service connection is shut off. Billings will be made to the owner of each separate residence or commercial property served, except that, where authorized by the owner and the tenant in writing, the city may make its billing to the tenant. Billings for multiple separated residence service shall be made to the applicant therefor. (Ord. A-7 § 1, 1981; Ord. 348 § 2, 1974).

15.12.020 Water use charges – Delinquency – Reconnection and disconnection charges.

A. There shall be one billing every two months for single-family water users and one billing every month for multifamily, commercial, public and institutional water users. All charges which are unpaid 60 days after the billing date shall be delinquent charges. Water service may be discontinued because of such delinquent charges. In the event water service is discontinued because of delinquent charges, a fee shall be charged for reconnecting water service in an amount established by the city council by resolution.

B. In the event water service has been shut off at the request of the user, a fee shall be charged for disconnecting such service in an amount established by the city council by resolution. (Ord. A-17 § 1, 1982; Ord. 348 § 3, 1974).

15.12.030 Meter installation charges.

The city council shall establish by resolution a schedule of meter installation charges for connections of meters to the city water system. Three copies of the resolution shall be on file in the office of the city clerk. (Ord. A-7 § 2, 1981; Ord. 348 § 4, 1974).

15.12.040 Connection charges.

In order to provide that property owners bear their equitable share of the cost of the city water system, the city council shall establish by resolution a schedule of connection charges for installation of water service to property not previously served and/or for the installation of additional water service and/or for water service where the previous type of use has been increased or changed to a more intense use. Three copies of the resolution shall be on file in the office of the city clerk.

These charges shall be in addition to any meter and service installation charge and/or any assessment charges, or charges in lieu thereof, due on the property. These charges are found to be reasonable ones for the privilege of connecting to a fully integrated existing water system in order to ensure an equitable sharing of the cost of such system. (Ord. A-7 § 3, 1981; Ord. 348 § 5, 1974).

15.12.050 Meter installation and connection charges – Due and payable when – Delinquency – Lien for nonpayment.

All meter and service installation charges and all connection charges shall be due and payable at the time the new connection or changed or additional service is requested and shall be delinquent if unpaid at the time the connection or changed or increased service is actually made. A penalty of 10 percent shall be added to the amount of any such charges which become delinquent. All charges provided for by this chapter which have been delinquent for four months, shall be certified to the treasurer of King County and such charges, together with any penalties added thereto, shall be a lien against the property receiving such service subject only to the lien for general taxes. (Ord. 348 § 6, 1974).

The Mercer Island Municipal Code is current through Ordinance 14C-04, passed May 5, 2014.

Disclaimer: The City Clerk's Office has the official version of the Mercer Island Municipal Code. Users should contact the City Clerk's Office for ordinances passed subsequent to the ordinance cited above.

Chapter 15.14 UNLAWFUL CROSS-CONNECTIONS

Sections:

- [15.14.010](#) Definitions.
- [15.14.020](#) Cross-connection declared unlawful.
- [15.14.030](#) Backflow prevention devices required.
- [15.14.040](#) Regulation of private water supplies.
- [15.14.050](#) Adoption of state regulations.
- [15.14.060](#) Abatement of unlawful cross-connection and installation of backflow prevention devices – Procedures.
- [15.14.070](#) Inspections.
- [15.14.080](#) Violation – Penalty.

15.14.010 Definitions.

For the purposes of this chapter, the following words or phrases shall have the meanings as hereinafter set forth:

- A. “Backflow” means a flow other than in the intended direction of flow, of any foreign liquids, gases or substances into the distribution system of a public water supply.
- B. “Backflow prevention device” means a device approved by the state of Washington, Department of Social and Health Services or such other state department that shall have jurisdiction over the subject matter of backflow prevention devices and by the American Waterworks Association used to counteract back pressure or prevent siphonage into the distribution system of a public water supply.
- C. “Cross-connection” means any physical arrangement whereby a public water system is connected, directly or indirectly, with any other water supply system, sewer, drain, conduit, pool, storage reservoir, plumbing fixture, or any other source of wastes or liquids of any unknown or unsafe quality which are capable of imparting contamination to a public water supply. (Ord. A-38 § 1, 1985).

15.14.020 Cross-connection declared unlawful.

The installation or maintenance of a cross-connection which, in the opinion of the city manager or his designee, will endanger the water quality of any portion of the potable water supply system of the city is declared to be unlawful. (Ord. A-38 § 1, 1985).

15.14.030 Backflow prevention devices required.

Backflow prevention devices shall be installed and maintained by any service customer on any service connection to the city’s water supply system where the backflow prevention device is deemed to be necessary for the protection of the city’s water supply. (Ord. A-38 § 1, 1985).

15.14.040 Regulation of private water supplies.

The use or operation of a private water supply system, contrary to the provision of the ordinances of the city, or the laws of the state of Washington, or the rules and regulations of the State Board of Health regarding public water supplies, is declared to be unlawful. (Ord. A-38 § 1, 1985).

15.14.050 Adoption of state regulations.

Rules and regulations of the State Board of Health regarding public water supply systems, entitled "Cross Connection Control" as set forth in WAC [248-54-285](#), as presently set forth therein or as such rules and regulations may be amended from time to time in the future, are adopted by this reference and incorporated herein as if set forth herein in full. (Ord. A-38 § 1, 1985).

15.14.060 Abatement of unlawful cross-connection and installation of backflow prevention devices – Procedures.

Cross-connections which are declared by this chapter to be unlawful, whether presently existing or hereinafter installed, and/or services requiring backflow prevention devices, and/or unlawful use of a private water supply system, are declared to be public nuisances. In addition to any other provisions of the municipal code or ordinances of the city pertaining to abatement of public nuisances, these nuisances shall be subject to abatement in accordance with the following procedures:

A. In the event that the city manager or his designee determines that a nuisance as hereinafter provided exists, written notice shall be sent to the person in whose name the water service is established under the records of the city's public services department or alternatively, a copy of such written notice shall be posted on the premises involved.

B. The notice shall provide that the nuisance described therein shall be corrected within 30 days of the date the notice is mailed or posted on the premises.

C. In the event the nuisance is not abated within the prescribed period of time, water service to the premises shall be discontinued.

D. In the event that the nuisance, in the opinion of the city manager or his designee, presents an immediate danger of contamination to the public water supply service from the city water supply system to the premises may be terminated immediately without prior notice, provided notice will be posted on the premises in the manner heretofore provided at the time the service is terminated. (Ord. A-38 § 1, 1985).

15.14.070 Inspections.

A. The city manager, or his designee, upon presenting identification, shall be allowed access to all portions of the premises, including buildings and structures, to which water is supplied, at reasonable hours of the day and for the sole purpose of inspecting and determining whether or not there has been compliance with the provisions of this chapter.

B. Water service may be refused or discontinued to any premises for failure to allow necessary access and inspections. (Ord. A-38 § 1, 1985).

15.14.080 Violation – Penalty.

Violation of, or failure to comply with any of the provisions of this chapter shall be a gross misdemeanor, and any person found guilty thereof shall be punished by a fine not exceeding \$500, or imprisonment not exceeding six months, or both such fine and imprisonment. It shall be a separate offense for each and every day, or portion thereof, during which any violation of the provisions of this chapter is committed, continued or permitted. (Ord. A-38 § 1, 1985).

The Mercer Island Municipal Code is current through Ordinance 14C-04, passed May 5, 2014.

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Chapter 15.16 FLUORIDATION

Sections:

[15.16.010](#) Approval.

[15.16.020](#) Commencement.

15.16.010 Approval.

A source of fluoridation approved by the Washington State Department of Health shall be added to the water supply of the city under the rules and regulations of the Washington State Board of Health, such addition to be administered and controlled in a manner approved by the Washington State Department of Health. (Ord. 165 § 1, 1967).

15.16.020 Commencement.

The fluoridation of the water supply shall be commenced as soon as practicable after the effective date of the ordinance codified in this section and MICC 15.16.010, and the approval of the Washington State Department of Health. (Ord. 165 § 2, 1967).

The Mercer Island Municipal Code is current through Ordinance 14C-04, passed May 5, 2014.

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Chapter 15.18 WATER USE RESTRICTIONS

Sections:

- [15.18.010](#) Purpose.
- [15.18.020](#) Definitions.
- [15.18.030](#) Use restrictions.
- [15.18.040](#) Powers.
- [15.18.050](#) Enforcement – Conservation information.

15.18.010 Purpose.

This chapter is an exercise of the police power of the city for the protection of the public health, safety and welfare of the citizens of the city. The city is authorized to impose water use restrictions in the event of a declared water supply emergency. The city manager is authorized to implement water conservation measures and to provide public education efforts regarding the benefits and necessity of conservation by the public. (Ord. A-86 § 1, 1990).

15.18.020 Definitions.

For the purposes of this chapter:

“City manager” means the city manager of the city of Mercer Island or his/her designee.

“Restrictions” means as follows:

1. The city shall limit water use to the level of or lower than “consumption” as defined by Seattle water department (SWD). Consumption is derived by SWD by computing annual consumption for the past preceding years and factoring in any forecasted growth.
2. Customers of the city shall limit use of water outdoors except at times specified in this chapter.

“Use of water outdoors” means lawn and turf irrigation; building, sidewalk and street washing; use of any nonrecirculating ornamental fountains; use of spigot or faucet not equipped with a shutoff valve; vehicle washing except in recirculating or re-use automatic car washes; and any other waste or use inconsistent with a water supply emergency.

“Water supply emergency” means an event when, in the judgment of SWD, the available supply of water will not meet the demand and will result in loss of service to any part of the SWD service area. Declaration of an emergency recognizes that an absence of water service may endanger public health and safety.

“Restriction device” means a solid orifice plate with a one-quarter-inch hole drilled in it installed on the city-side of the water meter. (Ord. A-86 § 1, 1990).

15.18.030 Use restrictions.

In the case of a water supply emergency, the city manager is authorized to impose water use restrictions in order to efficiently safeguard the safety and health of the general public and to provide for public convenience. The use of water for irrigation, cooling or other uses may be forbidden, restricted, or regulated and such regulations may be made applicable to all customers and/or to any particular class of customers in order to achieve compliance. (Ord. A-86 § 1, 1990).

15.18.040 Powers.

The city manager shall provide public education efforts regarding the benefit and necessity of conservation by the public and is authorized to promulgate such rules and regulations as may be necessary to implement water use restrictions. The city manager is further authorized to make exceptions to the restrictions in specific cases, including, but not limited to, watering newly seeded or sodded lawns, alleviating unnecessary economic hardship to commercial or industrial activities, or preventing possible damage to the health, safety or welfare of any resident of the city. (Ord. A-86 § 1, 1990).

15.18.050 Enforcement – Conservation information.

A. The city manager may assign enforcement authority to any member of the fire department, any member of the police department, any member of the maintenance department or any member of the building department.

B. The maintenance department shall, at the city manager's direction, send a notice to the billing address or deliver to and/or post a notice at the service address advising customers of their water usage practices which exceed the water use restrictions and further advise that a water use restriction device may be installed in the customer service line in order to reduce consumption in the event of noncompliance with the water use restrictions.

C. The city manager is authorized to install a water restriction device on the city-side of the water meter serving any person or business who continues to use water in excess of that permitted by the water use restriction after receipt of two or more notices of excessive water use as provided for above. If the restriction device is removed by someone other than a member of the city maintenance department, the city manager may require the water service to be terminated to the property until compliance with the water use restrictions is guaranteed to the satisfaction of the city manager. (Ord. 06C-06 § 2; Ord. A-86 § 1, 1990).

The Mercer Island Municipal Code is current through Ordinance 14C-04, passed May 5, 2014.

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Appendix O

Emergency Well Documents

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**BUSINESS OF THE CITY COUNCIL
CITY OF MERCER ISLAND, WA**

**AB 4198
June 18, 2007
Study Session**

**EMERGENCY WATER SUPPLY WELL
PROJECT**

Proposed Council Action:

No formal action required. Provide direction to staff on next steps.

DEPARTMENT OF

Maintenance, (Rona Lin)

COUNCIL LIAISON

Mike Grady

EXHIBITS

1. Test Well Drilling and Evaluation - Executive Summary
2. DOH Emergency Drinking Water Rule

APPROVED BY CITY MANAGER

Rich Conrad 6-12-07

AMOUNT OF EXPENDITURE	\$	n/a
AMOUNT BUDGETED	\$	n/a
APPROPRIATION REQUIRED	\$	n/a

SUMMARY

Background

Preventing a major disaster from disrupting Mercer Island's water supply has been a top priority of the City and its Water Utility for many years. With the successful completion of the test well phase of the Emergency Water Supply Well Project at Rotary Park, the City is poised to make a tremendous leap forward in preparedness.

The test well, which was drilled to a depth of 570 feet earlier this year, has produced water of both the quality and quantity to serve as a short-term source in the event of an interruption in the Island's supply from Seattle Public Utilities. Exhibit 1 discusses the water quality issues that will need to be dealt with before the well could be activated. These include the presence of manganese and the presence of coliform bacteria. The well will be treated immediately according to the treatment actions recommended by the consultants. During pump tests in April, the test well produced 300 gallons per minute (gpm) for 24 hours. The threshold established for the project was 220 gpm, which would be enough water to provide about five gallons per person on a daily basis for up to seven days.

Staff is requesting direction from the Council this evening to move forward on the following:

- Determine what is necessary to create temporary pumping ability until the test well can be converted to a production well.
- Begin planning the conversion to a production well.
- Create a financing strategy to fund the conversion to a production well.

Test Well Drilling

Drilling of the test well began in January of 2007 and was completed in March 2007. The well depth reached 570 feet below ground surface with an aquifer encountered at a depth below 500 feet. A well screen was installed in April, and a series of pump tests were conducted. Water samples were collected for a variety of laboratory testing.

A drilling report was prepared by hydro-geologists from Robinson Noble and Saltbush, and an evaluation on water quantity and water quality was performed by the project's engineering consultants at Roth Hill Engineering. The pump tests demonstrated that the aquifer the well draws from has the capacity to provide an adequate quantity of water. Based on the lab results, the water quality of the well is acceptable as an emergency drinking water source. No water treatment should be required except for the initial water disinfection with chlorine solution mixture. Periodic water quality monitoring and flushing will be needed after the well facility is built. The cost of monitoring will be minimal and will be incorporated into the Maintenance Department's Utility Team budget.

Project History

Even before the well project became a reality, groundwater has been viewed as a potential emergency water source for the Island. In 2001, the City Council asked staff to research the water wells existing on the Island.

In 2004, a Vulnerability Assessment (VA) of the Island's water system was completed as required by the Bioterrorism Preparedness and Response Act. The consultant who carried out the seismic element of the VA made a variety of recommendations. A key recommendation was that the City should establish a pair of emergency wells to provide potable water for residents in the event of a major disaster or emergency. The VA took an in-depth look at the seismic effect of various types of earthquake events and concluded that the City's water supply from SPU is likely to be disrupted by the failure of the transmission lines running across Mercer Slough and the East Channel.

In 2005, the Utility Board and City Council agreed that it was time to pursue a well. The City retained a consultant team in 2005 to conduct the first phase of work, an Emergency Water Supply Feasibility Study to investigate the viability of an emergency groundwater supply source. A significant amount of research data was collected through the Department of Ecology (DOE), the Pacific Northwest Center for Geologic Mapping Studies, and others. Based on the geological research results and the recommendations from the consultants, a test well site was selected at Rotary Park located at SE 44th Street and 88th Ave SE just south of the City's reservoir site. With feasibility work completed late in 2005, design work for the test well began in 2006.

Coordination with State

Before being able to proceed with a test well, the City had to persuade the state Department of Ecology and the Department of Health to allow an emergency source of water to be established without a previously established water right. An Emergency Water Source Authorization policy was drafted by the City's legal consultant, Tom Mortimer. The proposed policy was submitted to DOE, reviewed by multiple divisions of the agency, and adopted in September 2006. The new policy allows public water entities to seek and establish emergency water sources, and to activate the use of the emergency water source in a pre-approved application process outlined in the policy.

In May of this year, the state Department of Health adopted a new rule that defines how emergency water sources can be used (Exhibit 2).

Project Budget and Expenditures

The project budget and actual expenditures to date on the Emergency Well project are detailed below.

Description	Budget	Actual
Feasibility and Alternatives for Emergency Supply (2005-2006)	100,000	105,518
Test Well - Design and Construction (2006-2007)	460,000	253,850
Production Well - Convert from Test to Production (2008)	<u>890,000</u>	<u>-</u>
Total - Emergency Supply Well	1,450,000	359,368

To date, the City has invested \$359,368 in establishing an emergency supply well.

When the 2007-2008 budget was adopted, it was anticipated that \$450,000 of the emergency supply well project cost would be paid from current water rates, and that an additional \$1 million in new funding would be needed to fund the construction of this new capital facility. This additional \$1 million could come from a variety of sources including debt or sale of property.

RECOMMENDATION

Project Manager

MOVE TO: No formal action is required.

City of Mercer Island

Emergency Water Supply - Test Well

Phase II - Executive Summary

Project Considerations

- Supply water for 7 days – SPU to re-establish supply line
- Provide 5 gal/day for personal use
- Support projected population of 26,000
- Establish 2 wells on opposite ends of the island for reliability and access
- Operate well site 10 hours/day
- Wells not connected to distribution system
- Dispense water to residents at wellhead
- Fire flow provided from other sources

Test Well Drilling

- January 5 - Hokkaido Drilling, Inc. mobilized
- January 8 - Drilling started
- March 14 - Drilling completed to a depth of 570 feet
- April 19 - Temporary submersible pump installed
- April 23 - Short-term variable rate pump test conducted
- April 24-25 - Long-term constant rate pump test conducted
- Well capacity up to 300 gpm



Well Evaluation

- Quantity
 - 220 gpm, planned pumping supply
 - Pumping depth approximately 500 feet
- Quality

Test Parameters	Limits	Results	Action
Microbiological (coliform)	0	Positive (Total)	Chlorinate immediately
Inorganic Compounds (Manganese)	<.05	.12	No treatment required*
Volatile Organic Compounds	Varies	0	None
Nitrates	10	0.2	None

* Emergency sources do not require treatment for secondary parameters.

Summary

Single well source capable of delivering clean water suitable for emergency domestic use



Emergency Drinking Water Sources

Requirements for using emergency sources safely

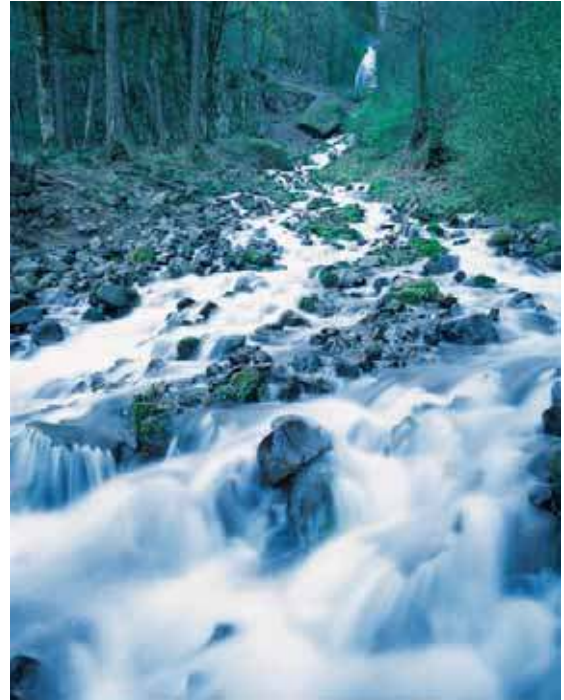
Emergency sources are wells, springs or other water sources drinking water systems use when their primary and seasonal sources are insufficient to meet consumer demands. Emergency sources can be a viable means of resolving a water supply shortage. However, the Department of Health Office of Drinking Water (ODW) only allows systems to use emergency water sources when they can show the sources are safe from a public health standpoint.

Water systems use emergency sources only during extreme, mostly unpredictable circumstances. A water system operator who anticipates using an emergency source must ensure, in advance, that the water is safe and the source will provide reliable production levels. In addition, the system must issue a health advisory to its customers before it starts using an emergency source, unless it operates the source under conditions ODW specifically approves.

State rule defines emergency water sources as:

- ODW approved for emergency purposes only.
- Not used for routine or seasonal water demands.
- Physically disconnected.
- Identified in the water system's emergency response plan.

More than 700 Group A public water systems in Washington report one or more emergency water source.



Monitoring is required

Water systems must test for coliform bacteria and nitrates before bringing an emergency source on line. ODW also highly recommends testing for inorganic chemicals, volatile organic chemicals and synthetic organic chemicals (SOCs).

The system must apply appropriate treatment if tests indicate microbiological contaminants or nitrates exceed drinking water standards. ODW may determine the need for SOC tests on a case-by-case basis.

Nitrate – The system must take special precautions (providing bottled water for at-risk individuals, blending and so on) if levels exceed the maximum contaminant level of 10 mg/L.

Inorganic or organic chemicals – The system may still use the source when levels are elevated if ODW concludes there will be no significant health impacts over the expected duration of the emergency.

For precautions and advice, call the nearest ODW regional office (see page 4).



HELPING TO ENSURE SAFE AND RELIABLE DRINKING WATER



ODW ranks emergency sources in order of preference

1. **The best** is water from an ODW-approved source, including an intertie with a neighboring water system.
2. **Next** are unapproved groundwater wells with satisfactory coliform and nitrate test results.
3. **Next** is water from wells or springs with unsatisfactory coliform and nitrate results. If the nitrate level exceeds the standard, the system must issue a health advisory and take special precautions.
4. **Least preferred** is unfiltered surface water and groundwater under the influence of surface water (GWI). Systems may use these sources only as a last resort. They must issue a health advisory that will remain in effect until water is adequately treated.



Groundwater wells – The system must monitor weekly for coliform unless it can document that the source is safe for continued use. If coliform is present, the system must issue a health advisory and provide continuous disinfection.

Potential GWI and springs – The system must monitor weekly for coliform. If coliform is present, the system must issue a health advisory and provide continuous disinfection.

Unfiltered surface water and GWI – These sources are at higher risk for contamination. The system must issue a health

advisory to remain in effect until the system makes provisions for effective disinfection against viruses, bacteria and protozoa (3-log for *Giardia*, 2-log for *Cryptosporidium*).



Before using an emergency source

The water system should notify customers of water quality issues or changes in service that may occur while using the emergency source. Even if the water is safe, changes in taste, color or odor may concern consumers. An emergency plan can include the best ways to tell customers what to expect, and what the system expects of them, before a system has to use an emergency source.

The system should also review source facilities to find out what water quality issues it may need to address. Even if there are no health-related concerns, aesthetic problems could occur if there are high levels of iron, lead or manganese; rust-encrusted casings, pumps and other rarely used equipment; or elevated turbidity.

Preparing emergency source pumps, valves, gauges or other equipment

Flush the source to waste, and not into the distribution system (about three casing volumes for a well). Water quality changes can occur when activating an emergency source due to flow reversals, different velocity gradients, suspension of accreted sediments, or increased corrosivity. You may need to flush the distribution system before initiating service from the emergency source, and possibly periodically throughout the time of the emergency.

Disinfect the source (use accepted procedures such as those in AWWA Standard C654), then flush to waste again, to ensure chlorine residual is zero before collecting coliform and nitrate samples.

Exercise all valves and operational controls to ensure they function properly.

Ensure control systems do not waste water through reservoir overflows. This is especially important if the emergency source will operate manually.

Assess the area around the source for contaminants that may be present during the time the system expects to use the source. Protect the source from all contaminating influences (chemicals, oil spillage, livestock and so on) to the extent possible.

Ask the Department of Ecology if you need to get “emergency water rights” before using an emergency source. Ecology’s staff directory is online at <http://www.ecy.wa.gov/org.html>



Health Implications

A system must use care when deciding whether to use an emergency source. It must test the water to ensure it meets drinking water health standards and treat it, as needed, to ensure it is safe.

The main health concerns are:

Microbiological contaminants – Bacteria, viruses and protozoa can quickly cause severe gastrointestinal illness, diarrhea and dehydration. Surface water sources, groundwater directly affected by surface water, and shallow hand-dug wells are most vulnerable to microbial contamination. Activities near the wellhead can also contaminate groundwater (wells and some springs). Shallow, poorly constructed wells, or those recharged through porous rock formations, are especially at risk.

Nitrates – Special precautions are needed to protect unborn babies and children less than 1 year old.

Interties with other utilities using unapproved surface or ground water sources – This could occur if a water system uses an emergency intertie with an irrigation district, or any type of water provider that does not ordinarily provide drinking water.

Primary inorganic contaminants – Health effects depend on the concentration of the contaminant. They may be immediate or occur only after long-term exposure. Test all emergency sources and take precautions if the concentration exceeds levels that may affect health during the period the system plans to use the source.



Potential health effects from exposure to elevated levels of organic, and some inorganic, contaminants are less acute than microbiological contaminants. Volatile organic compounds and certain synthetic organic compounds could affect health when consumed over long periods – usually many years. They are of less concern in source water used for short duration under emergency conditions.



Health Advisories

If a system must bring an emergency source on line and the safety of the water is in question, it must issue a health advisory.

A health advisory tells customers how to stay healthy when their drinking water could be unsafe. It is issued when a water system, or state or local health officials, determines health risks are sufficient to advise customers to take action. For example, if a system brings an emergency source online without all required sampling, the advisory would inform customers the water is not, or may not be safe to drink; list ways to protect health; and let them know the system will notify them when it has water quality results.

Health advisories usually take the form of a drinking water warning, boil-water notice or bottled-water order. ODW works closely with water systems to help determine when they need to issue advisories. In any event, a health advisory must be well thought out and provide very clear messages.

ODW has tools to help water systems prepare to issue a health advisory. Learning about health advisories, and how to issue one before you need it, will make the process easier. Fact sheets, brochures and templates are online at http://www.doh.wa.gov/ehp/dw/our_main_pages/dwflood.htm



Before you activate an emergency source

Consult with the nearest ODW regional office about testing requirements, source construction issues, potential sources of microbiological contaminants in the wellhead area or watershed, and the pumping and pump control system. You may have to improve the source physically before using it.

Flush and disinfect wells. If an emergency water source is a well, plan to flush and disinfect it before using it.

Sample water sources and treat them accordingly.

Collect at least two coliform samples and one nitrate sample from each emergency source before bringing it on line. If coliform is present, or nitrate exceeds the standard, you must apply appropriate treatment. For example, if you detect coliform in a well, you must provide continuous chlorination with sufficient contact time before the first point of service. Ask the ODW regional office about disinfection treatment.

ODW Regional Offices

After Hours Hotline (877) 481-4901

Northwest - Kent (253) 395-6750

Southwest - Tumwater (360) 236-3030

Eastern - Spokane (509) 456-3115

Warn your customers. If you plan to use an unfiltered surface water source, you must issue a health advisory to all customers before and during the period the source is in service. You must work closely with your ODW regional office if your emergency source is unfiltered surface water or inadequately treated ground water under the direct influence of surface water.

Continue coliform sampling. Once an emergency source is on line, expect to sample for coliform at least once a week, unless your ODW regional office specifies an alternate monitoring schedule.

Continue chemical sampling. If the emergency source operates longer than two months, expect to sample for complete inorganic and organic chemicals as prescribed by your ODW regional office.

Finally, if you bring an emergency source on line without advance planning or water quality testing, you must immediately issue a health advisory to remain in effect until the water quality is established.



Keeping your emergency source ready for use

Water systems use emergency sources only during emergencies. Sometimes water systems have problems getting them into operational condition when they need them. Most problems occur when water quality changes or operational components deteriorate during the vast majority of time, when systems are not using them.

To ensure emergency sources are ready to use, systems should have a maintenance strategy, make needed repairs in a timely manner and keep good records of inspections. The strategy should include:

Testing – To protect water quality, periodically test the source water for coliform and nitrates. Quarterly testing is usually appropriate. A system may need more frequent testing, possibly monthly, if it expects to use the source more often during a particular time of the year, or a drought. A good practice is to assess the source and develop a sampling plan to fit the water system's needs.

Inspecting – To keep components in good working order, inspect physical facilities and operational controls at least quarterly. Check electrical connections and components for corrosion; inspect the sanitary seal, vents and other hardware; and clear undesirable items away from the source.

Operating – To ensure the source is ready to produce a water sufficient supply, periodically operate the pump(s). It is also important to check and exercise all valves and controls.

Memo



Maintenance Department

To: Utility Board Members
From: Rona Lin, Utilities Engineer
Date: 5/14/2014
Re: Emergency Water Supply Phase IV Project Update

Since receiving the recommendation from the Utility Board in February to move forward with the above ground well facility design option and obtaining direction from the Council in April to move forward with the design, the project team has put together a design scope and has begun design work.

At tonight's meeting, staff and the consultant team will present the 60% design plans to the Board. Staff is asking the Board for feedback on the design. The major milestone of the design at this time includes:

- Well building: designed to be as small and inconspicuous as possible with a footprint of 24 ft by 32 ft.
- Storage: three pressurized bladder tanks with a total capacity of over 3000 gallons are to be installed in the well building.
- Pump: will be selected with a capacity range from 200 to of 250 gallons per minute (gpm).
- Wellhead: will be housed in an underground vault with electrical conduits and water pipes connected to the well building.
- Mechanical components: pipes, valves, and associated assemblies to convey the ground water from the wellhead to the well building then to the beginning point of the distribution system has been designed with consideration for both regular maintenance and emergency operations.
- Electrical components: from the existing switchboard and generator at the reservoir to the well building and wellhead are designed with both manual and automatic operation features.

The architectural style of the building is important because the well building will be located in Rotary Park which is surrounded by residential homes. The idea is to have a structure as small as possible that can blend in with the surroundings. The proposed well building will be located at the northwest corner of the Park and will have a pitched metal roof with cedar siding, and a single dormer.

Attachments: Roth Hill memorandum.



**BUSINESS OF THE CITY COUNCIL
CITY OF MERCER ISLAND, WA**

**AB 4435
June 15, 2009
Regular Business**

**EMERGENCY WATER SUPPLY WELL FACILITY
AT ROTARY PARK BID AWARD**

Proposed Council Action:
Award construction contract.

DEPARTMENT OF	Maintenance (Rona Lin)
COUNCIL LIAISON	n/a
EXHIBITS	1. Vicinity Map
APPROVED BY CITY MANAGER	

AMOUNT OF EXPENDITURE	\$	812,000
AMOUNT BUDGETED	\$	1,075,000
APPROPRIATION REQUIRED	\$	0

SUMMARY

At its Nov. 3, 2008, Study Session the City Council reviewed the ninety percent (90%) design plans for the emergency well facility. The Council provided feedback to staff on the building style and features. Council directed staff to continue final design with the goal of bidding the project in early 2009. Staff also was asked to research the renewable energy options that could be considered for the power source for the well building.

At its Dec. 1, 2008, meeting Council approved staff's suggestion to modify the roof design in preparation for future installation of solar panels, and authorized staff to complete the final design and proceed to bid. Bids were opened in late May and Mercer Island once again benefitted from the current favorable bidding climate.

Recap of the Project History

In 2004, with the assistance of outside engineering expertise, the City conducted a Vulnerability Assessment (VA) of the Island's water system. The seismic element of the VA study concluded that the City's water supply from Seattle Public Utilities (SPU) is likely to be disrupted for an extended period of time by an earthquake or other catastrophic event that severely damages SPU's system. The VA study recommended that the City develop and install emergency wells to mitigate the impacts of losing SPU's supply.

Phase One of the Emergency Water Supply project, a Feasibility Study, was completed in December of 2005. The Feasibility Study investigated the viability of a ground water supply source on the Island that could be used as a source of water in the event of an emergency. In 2006, the project focused on well site selection, drilling permit application, the creation of an Emergency Use Authorization Policy with the state, and the design of a test well.

In January of 2007, Phase Two of the project began with the drilling of the test well at Rotary Park. A deep water aquifer was encountered at about 500 feet. By the end of the spring of 2007, after pump tests and water quality tests, it was concluded that the City could use this ground water source as an emergency water supply. At its June 18, 2007, meeting the Council directed staff to develop a temporary use strategy for the test well and begin planning for a permanent well facility.

In October of 2007, Phase Three began with work on the temporary use plan, pre-design of the permanent well facility, and preparation of the request for “source approval” from the Department of Health. Temporary use planning focused on how to activate the well in the event of an emergency before a permanent facility could be constructed. After months of exploring different options for a permanent facility and an interim facility, it became clear that it would not be cost-effective to build an interim facility and later convert it to a permanent facility. Instead, the test well contractor agreed to assist with well activation on an interim basis, including providing a well pump, should it be necessary. In April of 2008, with recommendations from the Utility Board and direction given by the Council, staff started developing the scope of work for the design of an above-ground permanent well facility.

Phase Four of the project, the Final Design, started in August of 2008. The design process incorporated input from the Parks Department, Utility Board, City Council, and the City’s Building Permit reviewers as the design was refined. The primary goal was to build a reliable well facility that also would fit nicely in a neighborhood park setting.

Updates

Final design of the well facility was completed in early May. The project was advertised for bids in mid-May. Nine (9) bids were received on the bid opening date of May 28, 2009. Due to strong competition in the current bidding climate, the majority of the bids received were much lower than the engineer’s estimate. Five bids were 20% below the engineer’s estimate.

Following is the summary of bid results:

TABLE 1: BID RESULTS

COMPANY NAME	TOTAL BID AMOUNT
Equity Builders LLC	\$453,165.75
Hisey Construction	\$487,822.50
Gary Harper Construction	\$494,808.60
Stouder General Construction	\$497,907.45
VLS Construction	\$507,696.75
Award Construction Inc. (ACI)	\$599,182.35
Prospect Construction	\$601,703.00
Harbor Pacific Contractors	\$693,135.00
R. L. Alia Company	\$702,223.50

The low bidder is Equity Builders, LLC from Bellingham, Washington. Equity Builders, LLC has recently completed a similar well facility for a private development company and has completed several pump stations for private and public projects.

Project Budget – Emergency Water Supply Well Facility

In addition to the construction work to be carried out by the contractor, several tasks are expected to take place immediately after construction. These tasks include the construction of a distribution system by City utility crews, the installation of landscaping by Parks maintenance, the development of an operations manual, the training of volunteer well operators and a public education push to tell Island residents about

the well. Also, additional equipment will need to be purchased for transporting large water containers called totes to Island neighborhoods.

The following is the total construction project budget and its breakdown:

TABLE 2: TOTAL CONSTRUCTION PROJECT BUDGET

	Engineers Estimate	Equity Builders, LLC
Construction	\$589,200	\$413,850
Sales Tax @ 9.5%	\$55,974	\$39,316
<u>Total Construction Contract</u>	<u>\$645,174</u>	<u>\$453,166</u>
Construction Contingency @ 15%		\$67,974
Project Management/Construction Administration		\$80,000
Inspection Services		\$35,000
1% for Arts		\$4,530
Total Construction Phase		\$640,670
Distribution System/Off-site Equipment		\$67,000
Other Construction (Landscaping/Security)		\$6,000
Permits		\$10,000
Operating Manual/Volunteer Training/Public Education (Working Cap)		\$15,000
Final Design Costs and Source Approval (May 2009 to Present)		\$9,830
Interest and Financing costs on 2 year loan for \$1.015 million		\$63,500
Total Project Budget		\$812,000

Total Project Cost and Funding

As of April 30, 2009, \$630,935 has been spent on feasibility, test well drilling, temporary use planning, preliminary and final design of the permanent well facility. The entire project is estimated to cost \$1,451,460. A summary is included in the table below:

TOTAL PROJECT BUDGET AND COSTS TO DATE				
Description	Budget	Actual 4/30/2009	Estimate to Complete	Total Project
Feasibility and Alternatives for Emergency Supply (2005-2006)	100,000	105,518		105,518
Test Well Construction (2006-June 2007)	300,000	273,202		273,202
Pre-Design & Temp Use Planning (July 2007-2008)	160,000	109,135		109,135
Final Design of Production Well Facility (2008)	135,000	143,080	8,525	151,605
Construction - Production Well Facility (2009)	<u>1,075,000</u>	-	<u>812,000</u>	<u>812,000</u>
Total - Emergency Supply Well	1,770,000	630,935	820,525	1,451,460

The original funding plan for the Emergency Water Supply Well (Adopted 2007-2008 Budget) anticipated that the water utility (water rate payers) would pay \$300,000 of the full cost of the well project, and that an additional \$1,000,000 would be paid from debt or other financing sources.

Later tonight, Council will review the documentation required to obtain a 2-year short-term loan for \$1.015 million to cover the cost of constructing the permanent well facility as well as to pay for a portion of the previously paid costs of designing the well facility. Federal rules for reimbursement of prior expenses allow reimbursement of preliminary expenses (design, permitting, etc.) up to 20% of the issue price of the bonds, as well as reimbursement of preliminary expenses made within 60 days of approval of the Bond Ordinance authorizing debt financing. The City intends to include both of these eligible costs in the bond proceeds. Preliminary expenses being now and in the prior 60 days have been included in the project budget for the Well Facility.

CALCULATION OF AMOUNT TO BE FINANCED	
Description	Budget
Reimburse Prelim and Final Design Costs - 20% of Loan (\$1,015,000)	203,000
Construction - Production Well Facility (2009)	812,000
Total - Short Term Loan Financing	1,015,000

In effect, since the water fund pre-paid many of the expenses for this project, a portion of this loan will be a reimbursement to the water fund, providing the cash needed for other water system improvement projects planned for 2009 and beyond.

The total project financing for the Emergency Well project is summarized below:

SUMMARY OF PROJECT FINANCING SOURCES	
Description	Budget
Debt - Short Term Loan	1,015,000
Water Rates	436,460
Total Project Financing	1,451,460

Operating Plan for the Emergency Well Facility

The operating plan for the well facility will be created in parallel with construction. Staff estimates about two months will be required to complete the plan. Construction is expected to take about five (5) months.

It will require the involvement of the engineers who designed the well, the Utility Operations Manager and his crews, the Utility Engineer, the Emergency Preparedness Officer, and representatives from the City Attorney's Office and the Parks Department.

The well was designed to be as straightforward as possible to operate. In the event that the well must be activated when utility crews are not on duty, volunteers will be called into action. Water from the well is to be distributed both on-site and will be transported off-site for wider distribution.

On-Site Distribution

Following construction of the well facility, Utility crews will build a distribution system that will consist of a shallow line at the perimeter of the park along 88th Avenue Southeast and Southeast 44th Street. The number of filling stations and traffic circulation through the area both will be finalized during development of the operating plan.

Off-Site Distribution

To move water from the well to Island neighborhoods, totes with capacity of 275 to 325 gallons will be used. Eight totes have been procured so far. More totes can be purchased if needed and if extra funding is available. The totes weigh 1 to 1.3 tons when full. The totes will be moved on a dedicated trailer, and will need to be loaded with a crane. Funds to purchase both the trailer and crane also are included in the construction budget.

Permit Status

Currently, there are three pending permits. A building permit application is under review by the City's Permitting Group at this time. It is expected that the permit will be issued prior to the beginning of the construction. Department of Ecology (DOE) is working on a Ground Water Permit for this well. It is anticipated that the DOE permit will be issued in the fall of 2009. Another permit pending is the Source Approval from the Department of Health (DOH). The Source Approval submittal was sent to DOH for review and approval in mid-February, 2009. In early April, DOH provided its review comments and requested additional information. The City's response along with the final design plans were re-submitted to DOH on May 14, 2009. Source Approval from DOH is expected to be issued to the City prior to the beginning of the construction.

RECOMMENDATION

Utilities Engineer

MOVE TO: Award the Emergency Water Supply Well Facility at Rotary Park to Equity Builders, LLC in the amount of \$453,165.75, set the total project budget at \$812,000 and direct staff to administer the construction contract.



STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY

Northwest Regional Office • 3190 160th Ave SE • Bellevue, WA 98008-5452 • 425-649-7000
711 for Washington Relay Service • Persons with a speech disability can call 877-833-6341

MAR 12 2015

Mercer Island City
9611 SE 36th Street
Mercer Island WA 98040

Re: Water Right Permit No. **G1-28425P**

Dear Mercer Island City:

In response to your request, the development schedule for the above referenced water right has been extended as follows:

Complete Construction: July 1, 2022

Basis of extension approval:

- Additional time is needed to drill the second emergency well and bring it online.

Please mail in the enclosed *Construction Notice* by the deadline. If you have any questions, please contact Arlene Harris at arha461@ecy.wa.gov or (425) 649-7020.

Your Right To Appeal

You have a right to appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt of this Order. The appeal process is governed by Chapter 43.21B RCW and Chapter 371-08 WAC. "Date of receipt" is defined in RCW 43.21B.001(2).

To appeal you must do the following within 30 days of the date of receipt of the Order.

File your appeal and a copy of this Order with the PCHB (see addresses below). Filing means actual receipt by the PCHB during regular business hours.

- Serve a copy of your appeal and this Order on Ecology in paper form - by mail or in person. (See addresses below.) E-mail is not accepted.



- You must also comply with other applicable requirements in Chapter 43.21B RCW and Chapter 371-08 WAC.

Street Addresses	Mailing Addresses
Department of Ecology Attn: Appeals Processing Desk 300 Desmond Drive SE Lacey, WA 98503	Department of Ecology Attn: Appeals Processing Desk PO Box 47608 Olympia, WA 98504-7608
Pollution Control Hearings Board 1111 Israel RD SW Ste 301 Tumwater, WA 98501	Pollution Control Hearings Board PO Box 40903 Olympia, WA 98504-0903

For additional information visit the Environmental Hearings Office Website: <http://www.eho.wa.gov>. To find laws and agency rules visit the Washington State Legislature Website: <http://www1.leg.wa.gov/CodeReviser>.

Signed at Bellevue, Washington, this 11th day of March 2015.



Tom Buroker, Section Manager

Enclosures: *Your Right to Be Heard*
Construction Notice Form

By certified mail: 7012 3460 0000 2587 0704

Appendix P

2014 Water Rate Information – Resolution 1470

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**CITY OF MERCER ISLAND
RESOLUTION NO. 1470**

A RESOLUTION OF THE CITY OF MERCER ISLAND, WASHINGTON ESTABLISHING CLASSIFICATIONS OF WATER USERS AND A SCHEDULE OF CHARGES FOR WATER USAGE, ESTABLISHING A SCHEDULE OF RATES FOR FIRE SERVICE, ESTABLISHING A SCHEDULE OF SPECIAL SERVICE CHARGES, ESTABLISHING METER AND SERVICE INSTALLATION CHARGES, ESTABLISHING CONNECTION CHARGES EFFECTIVE JANUARY 1, 2014 AND THEREAFTER.

BE IT RESOLVED BY THE MAYOR AND CITY COUNCIL OF THE CITY OF MERCER ISLAND, WASHINGTON AS FOLLOWS:

Section 1. Classifications of Water Users, Schedule of Rates and Charges for Water Use

The following classifications of water user, schedule of rates and charges for water usage and rates for unauthorized use are hereby adopted by the City for all classes of users of City water system effective January 1, 2014, and thereafter.

- A. Classification – Rates.** The rates for metered water supplied by the City of Mercer Island for each one hundred (100) cubic feet of water consumed in two months, or fractional part thereof, there shall be charged the following rates in accordance with the "Classification of User" as set forth below:

Residential Bimonthly Water Rates					
Class	Fixed Charge	Volume Charge			
	Per Meter Equivalent*	Block 1 (0-10 ccf)	Block 2 (11-20 ccf)	Block 3 (21-30 ccf)	Block 4 (31+ ccf)
Single Family Residential	\$23.40	\$2.78	\$4.70	\$5.65	\$7.59
Low-Income Residential	\$23.40	\$0.70	\$1.18	\$1.41	\$1.90
Conservation Surcharge**				\$0.10	\$0.30
Class	Fixed Charge	Volume Charge			
	Per Meter Equivalent*	All Use (0-99+ ccf)			
Multi-Family Residential	\$23.40	\$4.11			

* Meter Equivalents are summarized in a following table. The total meter equivalent charge is based on the meter size and is calculated by multiplying the meter equivalents by the per meter equivalent rate.

** A surcharge of \$0.10 per ccf for single family residential bimonthly usage between and including 21 and 30 ccf, and \$0.30 per ccf for bimonthly usage in excess of 30 ccf will be included in the rates, as an incentive to conserve and may be used to fund conservation education. This rate will apply on consumption of water from June 1 through September 30.

Non-Residential Bimonthly Water Rates			
Class	Fixed Charge	Volume Charge	
	Per Meter Equivalent*	Winter** (All Usage)	Summer** (All Usage)
Commercial/Public	\$23.40	\$2.55	\$6.36
Irrigation	\$23.40	\$3.82	\$8.04

* Meter Equivalents are summarized in a following table. The total meter equivalent charge is based on the meter size and is calculated by multiplying the meter equivalents by the per meter equivalent rate.

** Seasons: Summer is June 1 through September 30; rest of year is winter.

Table of Meter Equivalents and Fixed Charges		
Meter Size	Meter Equivalent	Fixed Charge
3/4 Inch or Smaller	1.0	\$23.40
1 Inch	2.5	\$58.50
1-1/2 Inch	5.0	\$117.00
2 Inch	8.0	\$187.20
3 Inch	16.0	\$374.40
4 Inch	25.0	\$585.00
6 Inch	50.0	\$1,170.00

For purposes of this section, the various "Classification of User" shall be defined as follows:

- B. Single Family.** Single Family shall mean a residential structure or dwelling as defined in the City of Mercer Island Zoning Code, capable of being conveyed by separate title, served by a single domestic water meter. Provided, that where prior to December 1, 1980, more than one single family dwelling was served through a single common water meter, such service shall be allowed to continue under the "Single Family" classification until such time as the property or properties are subdivided into separate parcels, or when a higher demand for water service, as determined by the City, is required by a change in use or zoning.
- C. Home Hemodialysis Patients.** Home Hemodialysis Patients shall mean those persons who require medical life-support equipment in the home which utilizes mechanical or artificial means to sustain, restore or supplant a vital function, and which requires the use of water.
- D. Low Income User.** "Low Income User" shall be a person who shows satisfactory proof that he or she is living in a single family residence, and has a maximum annual income of not more than seventy percent (70%) of the Washington State median income as applicable for the number of individuals in the household as computed annually by the State or City. Applicants shall provide such data as to verify eligibility, upon forms provided by and in the manner determined by the City of Mercer Island.

- E. Multi-Family.** Multi-Family shall mean a residential structure or facility designed and/or used to house two or more families living independently of each other, including, but not limited to, duplexes, triplexes, apartment buildings and condominiums, but shall not include hotels and motels.
- F. Commercial.** Commercial shall mean a structure or facility designed and/or used to conduct business and commerce, including but not limited to, motels, hotels, professional, private schools, industrial, churches and all other commercial/business users.
- G. Public/Institutional.** Structures and facilities used by governmental entities including the state, county, City of Mercer Island and other municipal corporations of the state and public schools.
- H. Irrigation Meters.** The term "All Irrigation Meters" is hereby defined as "All meters used for the purpose of watering shrubbery, lawns, flower beds, gardens, ornamentals and the like."
- I. Rates for Unauthorized Use.** Water taken through unauthorized connections shall be charged for at double the rates set forth above, under "Classification of User", from the date of the commencement of such unauthorized use.

Section 2. Rates for Fire Services, Services Charges, Meter Installation Charges and Connection Charges

The following rates for fire service, various operational costs, meter installation charges, and connection charges are hereby adopted by the City.

- A. Fire Service Rates.** There is hereby established a schedule of rates for fire service which are the minimum monthly service charges for fire protection purposes exclusively for any two months, or fractional part hereof as follows:

Service Connection	Rate
2 inch	\$21.95
3 inch	\$21.95
4 inch	\$27.72
5 inch	\$27.72
8 inch	\$39.31

- B. Service Charges.** There is hereby established a schedule of service charges to recover operating costs incurred in establishing new accounts, changes in occupancy, special service requests by customers, delinquent account collections and processing of NSF checks as follows:

Service	Service Cost
New Water Set Up Fee (meter reading)	\$40
Water shut-off, requested by user, during normal working hours	\$30
Water shut-off, requested by user, after hours	\$170
Non-payment door hanger notification (each)	\$25
Non-payment Turn on/Turn off, normal working hours	\$80
Non-payment Turn on/Turn off, after hours	\$195
Locking Water Meter due to Theft	\$250
Non-sufficient funds check handling fee	\$40

C. Meter Installation Charges. There is hereby established a schedule of meter installation charges for connection of new meters to the City water system, and for changes to water service where the previous type of use has been changed or increased as follows: For meters of all sizes, the charge will be based on the actual cost of installation.

D. Connection Charges. There is hereby established a schedule of connection charges for the installation of water service to property not previously served or for the installation of water service for an additional type of use and/or increase in meter size as follows:

Meter Size	Connection Charge
3/4 Inch or Smaller	\$ 2,222
1 Inch	5,555
1-1/2 Inch	11,110
2 Inch	17,776
3 Inch	35,552
4 Inch	55,550
6 Inch	111,100

Connection charges are studied periodically and adjusted for inflation in years between studies. The inflation factor applied is CPI-W First Half for Seattle-Tacoma-Bremerton.

For meter upsizes, the difference in the connection charge between the new meter size and the old meter size will be charged.

The provision of this section shall not be construed to apply to additional water service for fire protection purposes.

E. Due Date. All meter and service installation charges, and all connection charges shall be due and payable at the time the new connection or changed or additional service is requested and shall be delinquent if unpaid at the time the connection or changed or increased service is actually made. A penalty of 10% shall be added to the amount of any such charges that shall become delinquent. All charges provided for by this Resolution which shall have been delinquent for four (4) months shall be certified to the Treasurer of King County and such charges, together with any penalties added thereto, shall be a lien against the property receiving such service subject only to the lien for general taxes.

Section 3. Effective Date

This resolution shall take effect and be in force on and after January 1, 2014. Nothing contained herein shall affect the amount of collection of rates, fees, and charges established prior to January 1, 2014.

PASSED BY THE CITY COUNCIL OF THE CITY OF MERCER ISLAND, WASHINGTON
AT ITS REGULAR MEETING ON THE 18TH DAY OF NOVEMBER 2013.

CITY OF MERCER ISLAND

Bruce Bassett, Mayor

ATTEST:

Allison Spietz, City Clerk

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Appendix Q

Hydraulic Modeling Technical Memo

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City of Mercer Island Hydraulic Model Update and Verification

PREPARED FOR: Rona Lin, City of Mercer Island

PREPARED BY: Jennifer Henke, CH2M HILL

DATE: July 13, 2013

PROJECT NUMBER:

Background

The City of Mercer Island (City) decided to update their existing H2OMap hydraulic model to an integrated geographic information system (GIS)-based hydraulic model in InfoWater™. The InfoWater™ model will run inside of ArcGIS, and additional features for transferring data is available with the use of GIS tools.

To accomplish development of the hydraulic model, CH2M HILL utilized the City's existing GIS, billing record information, historical peak usage information, and historical hydrant test information to build, verify, and apply the new InfoWater™ for analysis of the system performance. The activities performed to develop the hydraulic model and the results of the model verification are summarized in this Technical Memorandum (TM). The results of the hydraulic analysis and the relationship between the recent model updates to the requirements of the Washington State Department of Health (DOH) are also presented.

Model Development

The development of the hydraulic model consists of several steps. First, the physical network is developed. This includes pipes, valves, pump stations, and tanks. Next, demand is allocated to the network, and demand data sets are developed to simulate the various demand conditions for evaluation in the hydraulic model. Operational information for the facilities is then input, and this includes pressure settings for all of the PRVs, pump curve and operating information for the pump stations, and tank geometry information for the tanks.

For the City's model, the first import the pipe information from the City's geodatabase showed that there were some areas where the connectivity needed to be investigated. The City updated these areas, and a new import of data was performed. The pressure reducing valves (PRV) were also imported into the model from the geodatabase, and pump station and tank information was manually input. Elevations were applied to system nodes and PRVs by using the contour information provided by the City.

The demand was allocated using the InfoWater™ Demand Allocator tools which uses the spatial information from the meter record data to spatially link the meters to nearby model junctions, and PRV settings were input based upon the most recent survey of the PRVs in the City system.

Scenario Development

Four scenarios were developed for use with the hydraulic model, and these scenarios represented the following conditions:

Average Day Demand (ADD): 2.53 mgd

Maximum Day Demand (MDD): 4.08 mgd

Peak Hour Demand (PHD): 7.76 mgd

MDD plus Fire Flow : 4.08 mgd

These scenarios were only developed for the existing demand conditions, based upon recent water usage data from the City. For future analysis, the City should consider updating the future demand projections and develop those scenarios for the new hydraulic model.

In the investigation of peaking factors for the model update, the diurnal supply information to the City's system was evaluated, and this evaluation showed a higher peaking factor of 1.9 for PHD/MDD than had been used in the past. The City's diurnal curve was evaluated for a month-long period during the summer, and the peaking factor of the daily peak hour demand to the average daily demand was consistently higher than the factor of 1.7 used in the past. Summer demands were reviewed for the demand assessment because summer demands reflect the maximum day of usage and then the maximum usage during that maximum day is used for peak hour. A summary of the diurnal curve data is shown in Attachment 1. Therefore, the scenarios and analysis runs conducted for the updated model used the higher PHD peaking factor of 1.9, and the City should continue to observe the diurnal demand for the City and determine if a similar trend in diurnal peaking factors is observed during this year's peak summer demand.

Model Verification

The model verification process entailed running the ADD, MDD, and PHD scenarios and comparing the model predicted pressure to the historical pressure information collected at the hydrants in the City's system. As has been discussed with City staff, the actual demand of the system with the hydrant test data was collected is unknown, so the comparison is made among the results of all of the demand conditions to the historical data. The model predicted data is expected to be within 5 to 7 psi of the field pressures. Where the pressure difference was greater than 7 psi, the elevation of the nodes was checked, and then PRV settings were investigated. If either of those evaluations did not fix the pressure discrepancy, the areas were flagged for future evaluation. Figure 1 shows the distribution of the pressure difference at the hydrant locations, and Figure 2 shows the areas where the pressure difference was greater than 7 psi. Since a full calibration effort was not included as part of this scope of work, these areas have been flagged for future evaluation.

As shown in Figure 2, there are a few groupings of hydrants where there is a pressure difference of greater than 7 psi. Many of these areas are in individual pressure zones, and the pressures could be brought in line with slight modifications to the PRV settings in the model. The PRV settings in the model use the elevation of the PRV to calculate the hydraulic grade line (HGL) of the downstream side of the PRV, which is used in solving the hydraulic calculations by the model. Since many of these smaller PRV zones have very little headloss under normal conditions, the HGL at the PRV and the HGL at the hydrant should be very similar. The model results indicate that the PRV downstream HGL and the HGL at the hydrant are similar, but the field pressures do not align with the recently reported PRV pressures. This difference could also be related to recent changes in PRV settings and the hydrant pressures were from a prior year.

System Analysis

The system analysis consisted of running the ADD, MDD, PHD, and MDD plus fire flow scenarios and reporting on those results. The results of these analyses are shown in Figure 3 through Figure 7. For the ADD, MDD, and PHD runs, the minimum system pressure required is 30 psi, and this pressure is met for all conditions. Figure 6 shows the available fire flow under MDD conditions, with no velocity requirement, and Figure 7 shows the available fire flow under MDD conditions with a 10 ft/sec velocity requirement. While Figure 6 and Figure 7 show that at least 1,000 gpm is available at most locations in the City's system. For those areas where 1,000 gpm is not available, it is usually due to a dead end 4-inch or 6-inch pipelines. When comparing Figure 6 and Figure 7, there are some additional areas that show that less than 1,000 gpm is available in Figure 7. This is also due to the small diameter, dead end pipelines since the maximum flow in a 4-inch pipe at 10 ft/sec is 391 gpm, and the maximum flow in a 6-inch pipe at 10 ft/sec is 880 gpm. With the 10 ft/sec criteria, neither a single 4-inch nor 6-inch pipeline will ever meet the fire flow requirement with a limiting velocity of 10 ft/sec.

Washington State Department of Health Requirements

The DOH has the following requirements outlined for system analysis with the hydraulic model:

Evaluate MDD and PHD for a minimum pressure of 30 psi

Evaluate MDD plus fire flow for available fire flow at 20 psi

Based upon the information presented in Figures 3 through 7, the City’s system is performing well, except for some localized limitations in fire flow. The City has been undertaking projects to replace smaller diameter pipe and improve fire flow, and these improvements could be incorporated into a program for efficient management.

Additional system analyses that are also performed for DOH include an analysis of supply availability and storage capacity. Neither of these analyses was performed for this model update because they are not performed exclusively with the hydraulic model. However, the demand developed for the ADD, MDD, and PHD plus will support conducting those analyses in the future.

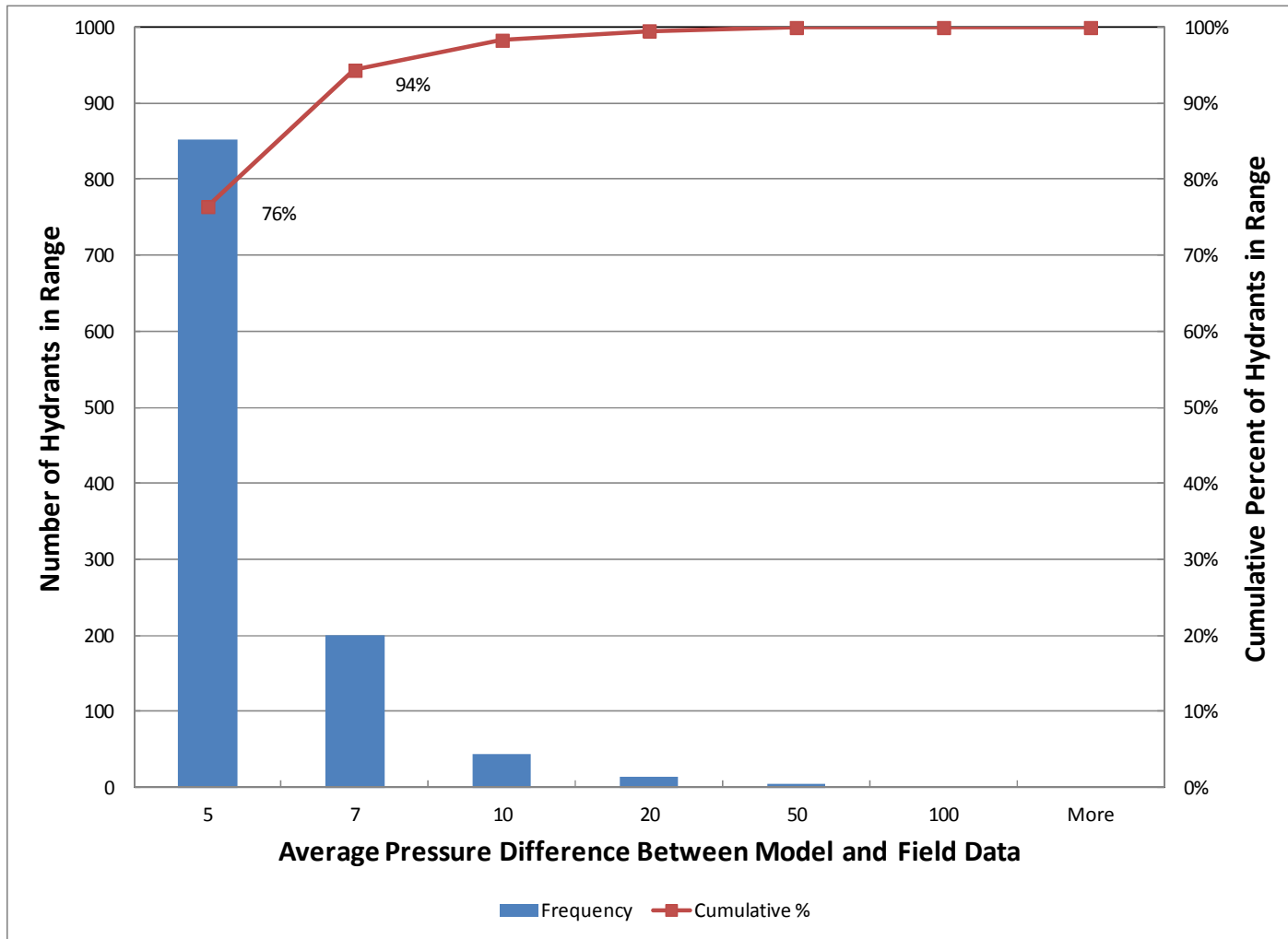


FIGURE 1
 Historical and Modeled Hydrant Pressure Difference Distribution
City of Mercer Island Hydraulic Model Update

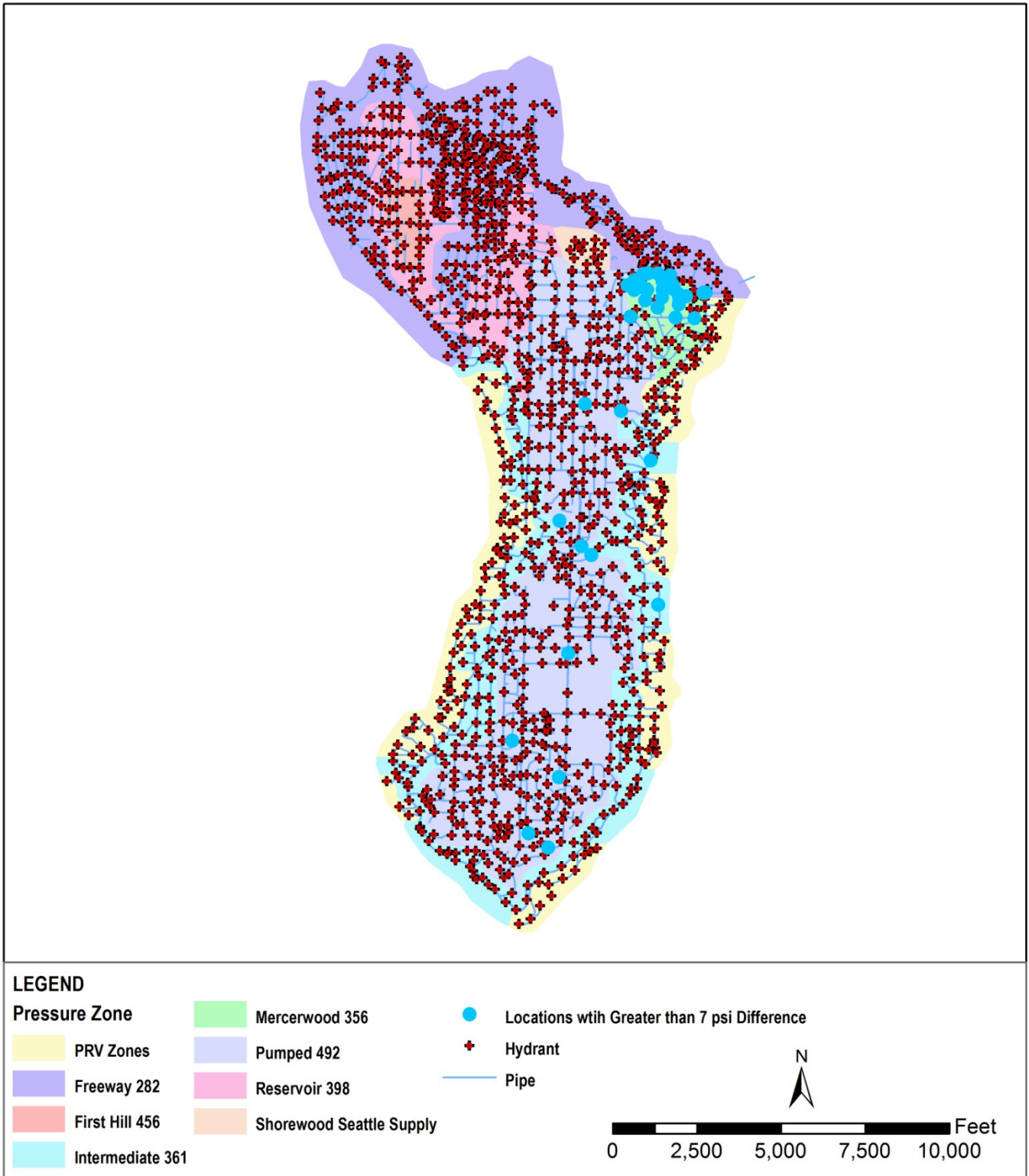


FIGURE 2
 Locations of Pressure Difference Greater than 7 psi
 City of Mercer Island Hydraulic Model Update

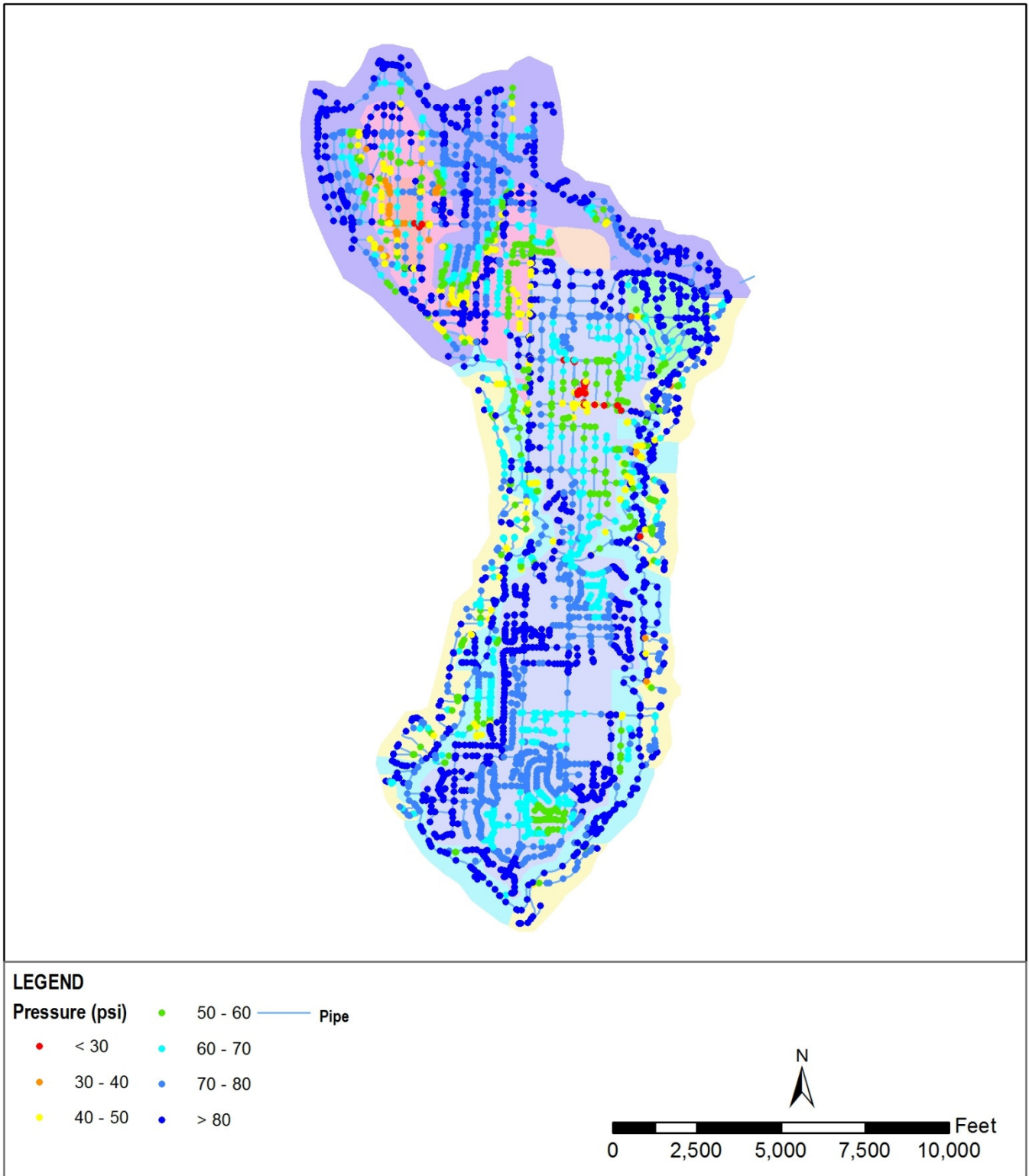


FIGURE 3
Average Day Demand Pressure Distribution
City of Mercer Island Hydraulic Model Update

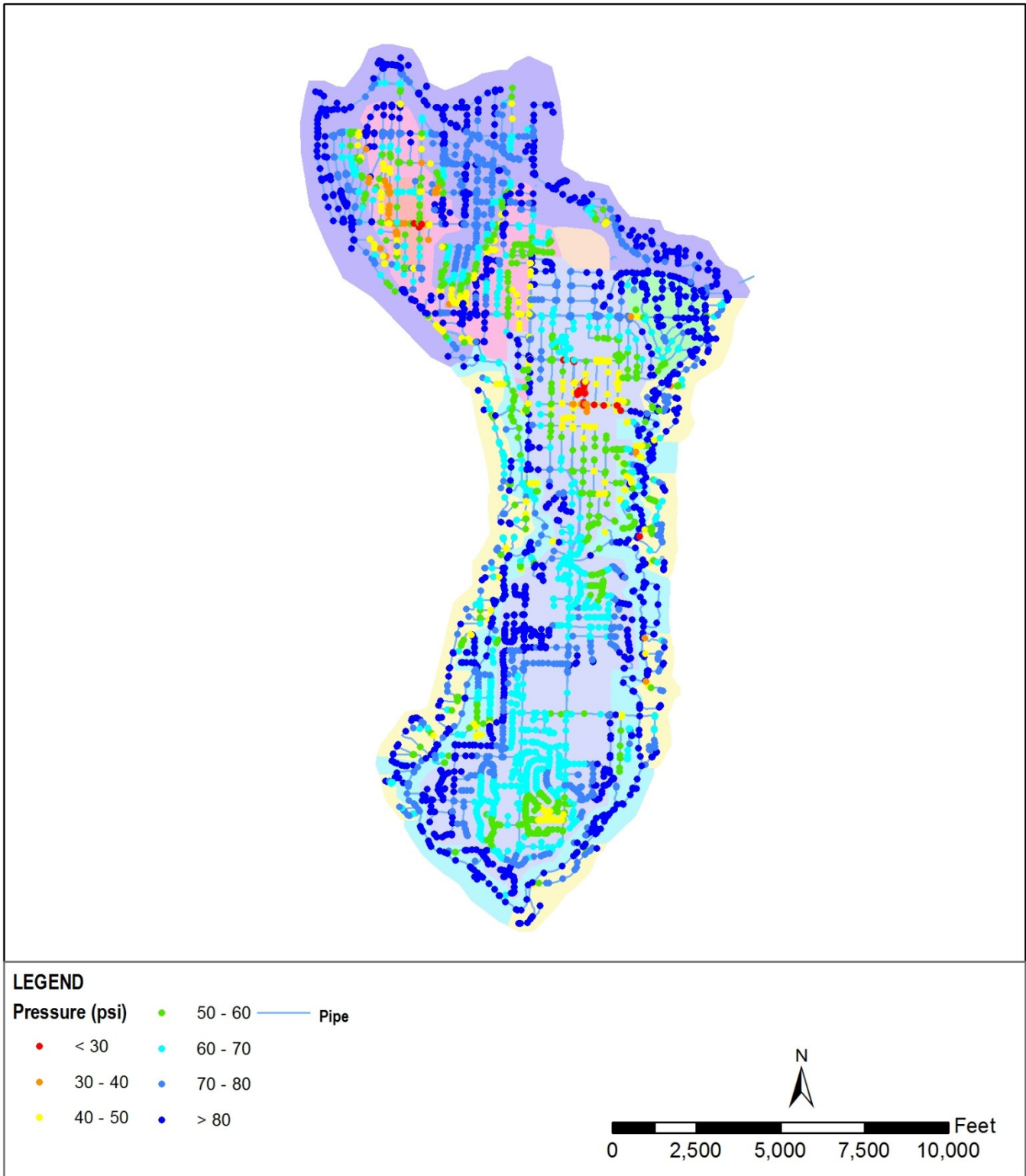


FIGURE 4
Maximum Day Demand Pressure Distribution
City of Mercer Island Hydraulic Model Update

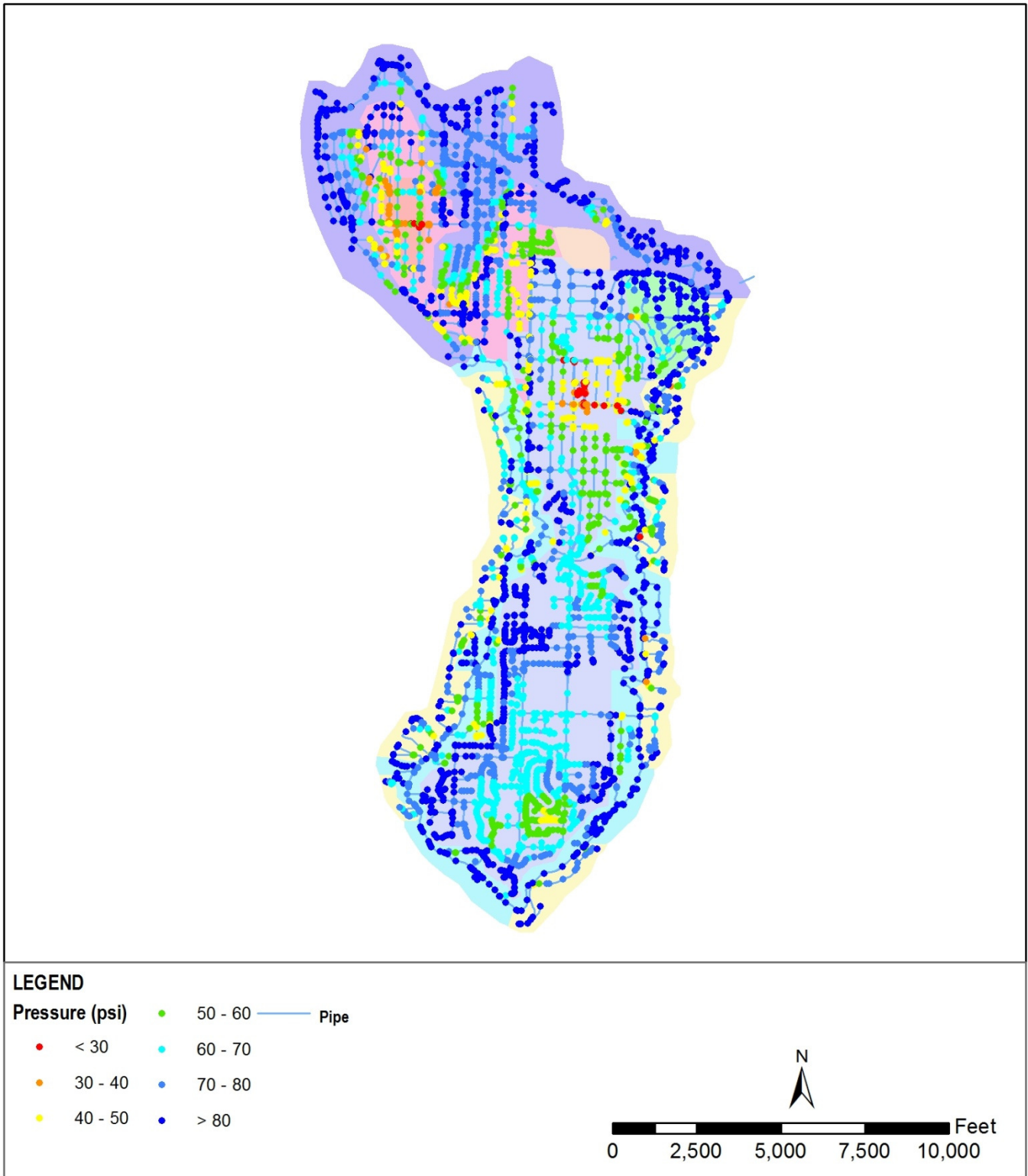


FIGURE 5
Peak Hour Demand Pressure Distribution
City of Mercer Island Hydraulic Model Update

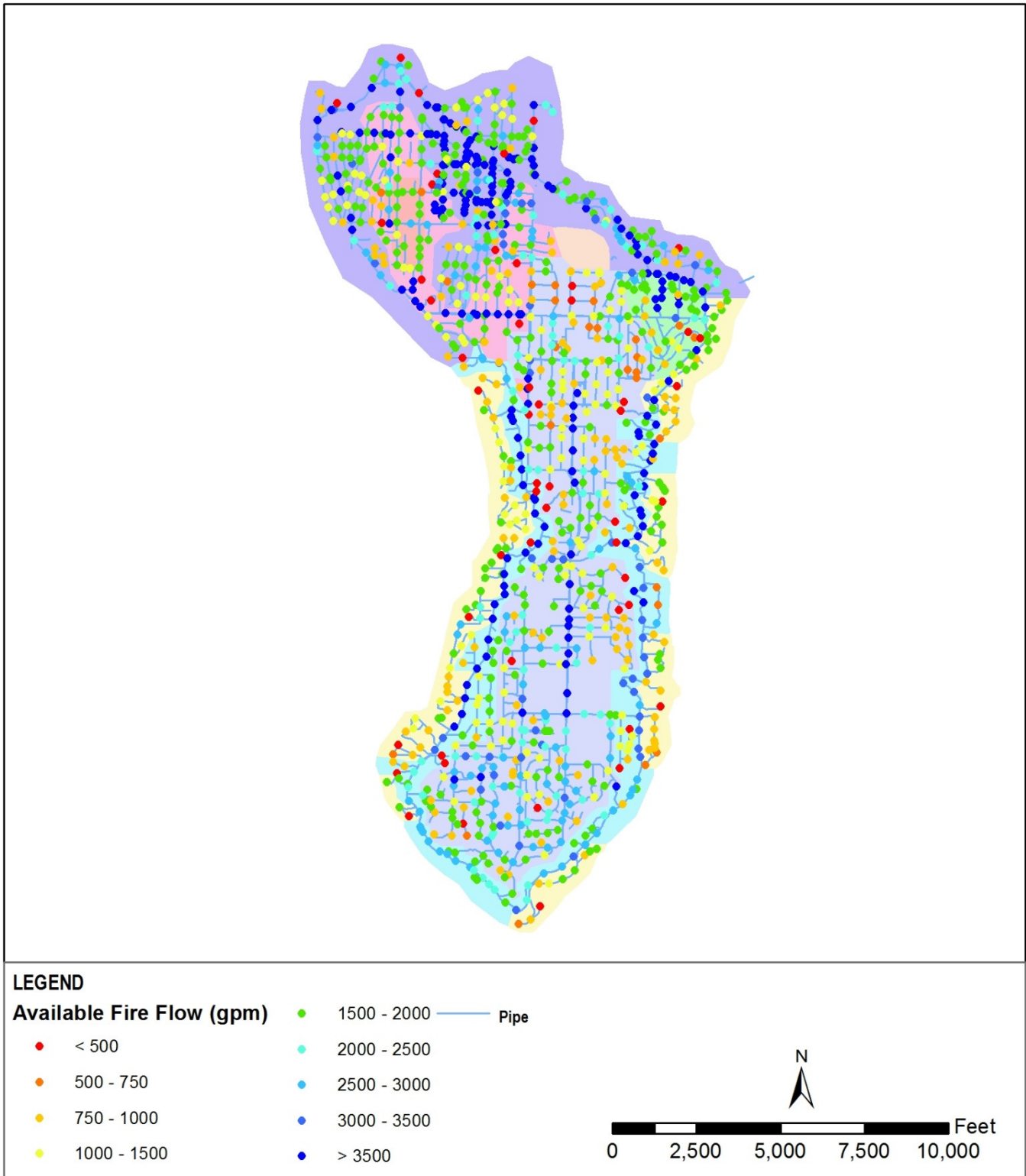


FIGURE 6
 Available Fire Flow at 20 psi, with 10 ft/sec Velocity Limitation
 City of Mercer Island Hydraulic Model Update

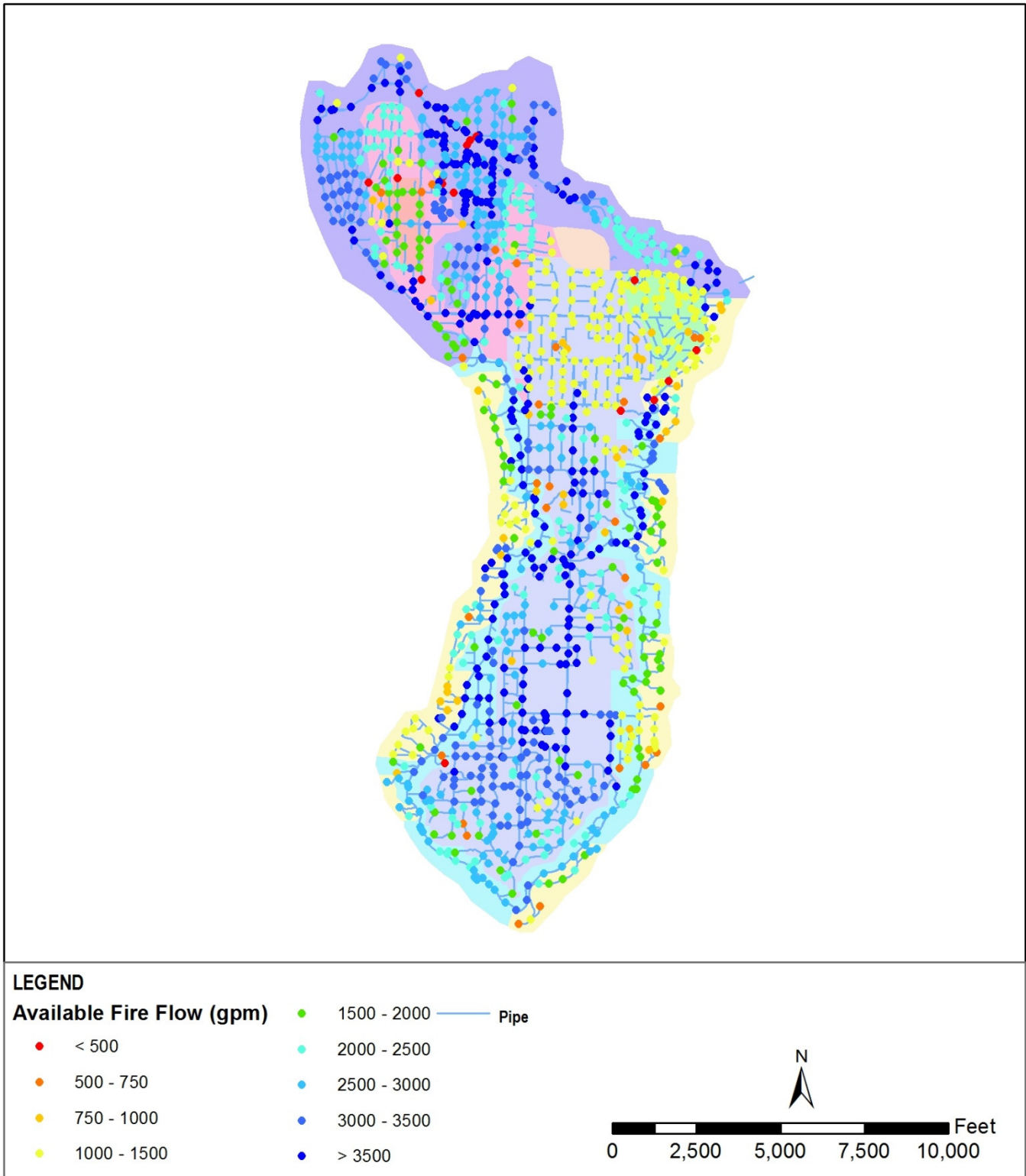
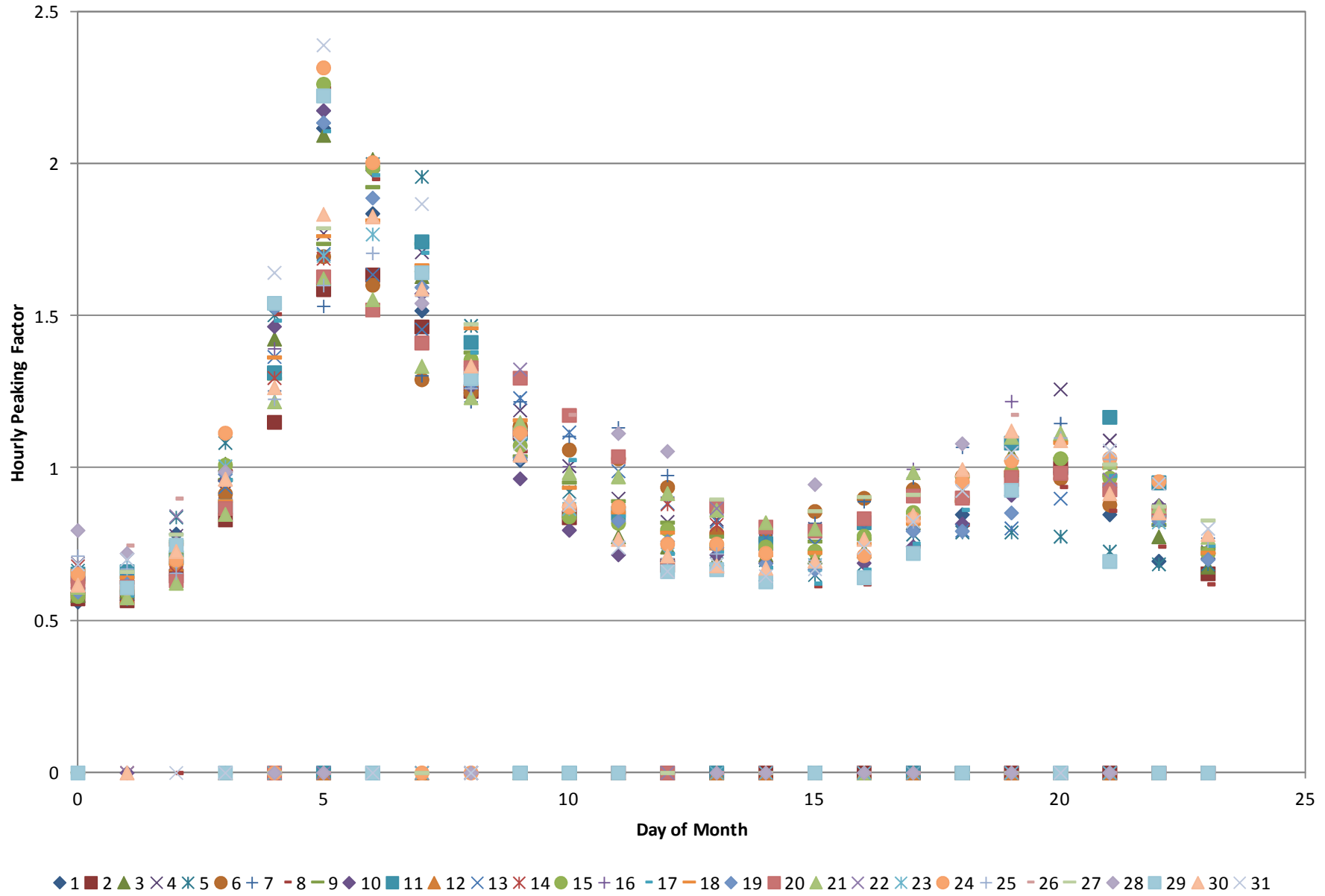


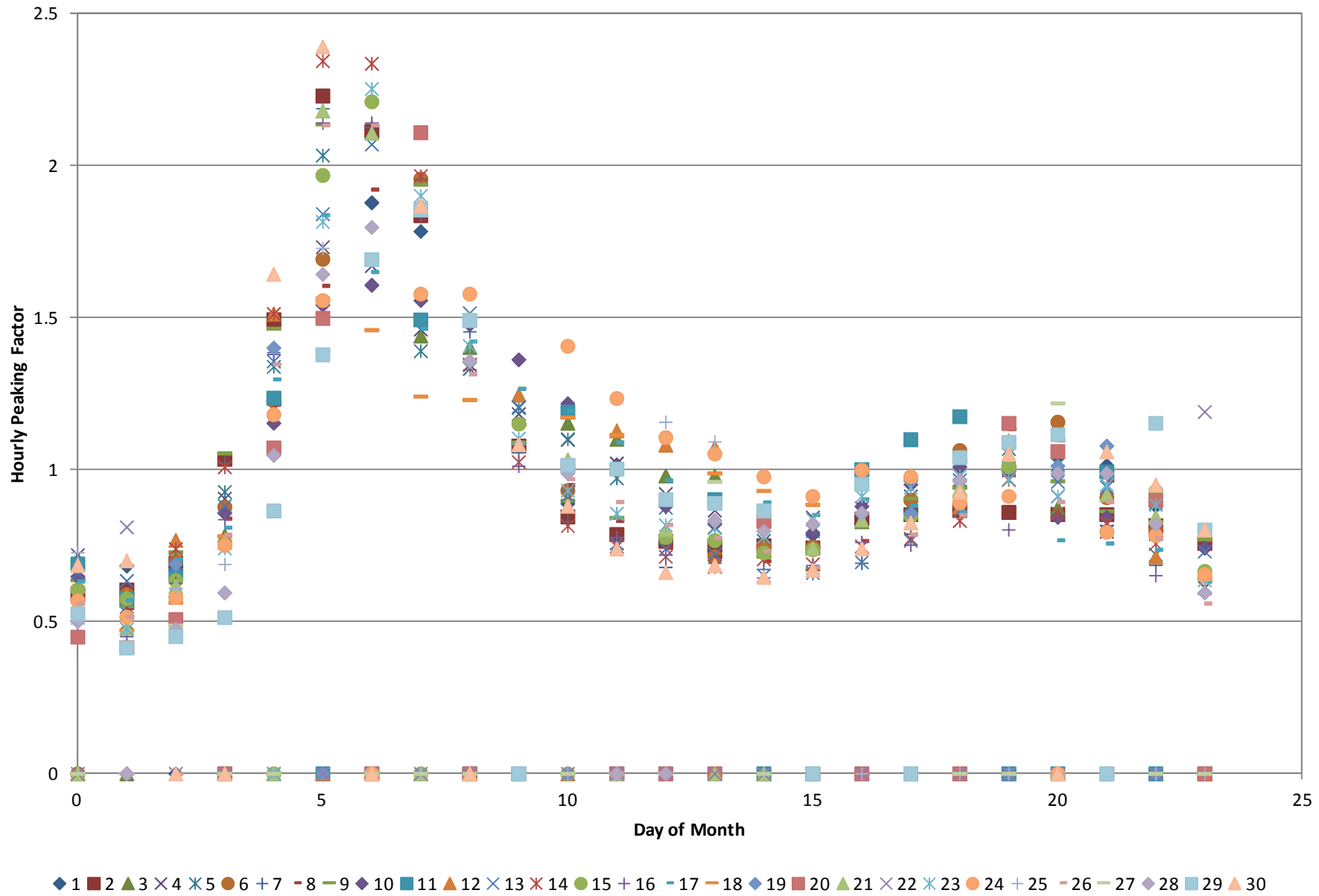
FIGURE 7
 Available Fire Flow at 20 psi, with no Velocity Limitation
 City of Mercer Island Hydraulic Model Update

Attachment 1: Diurnal Curve Data

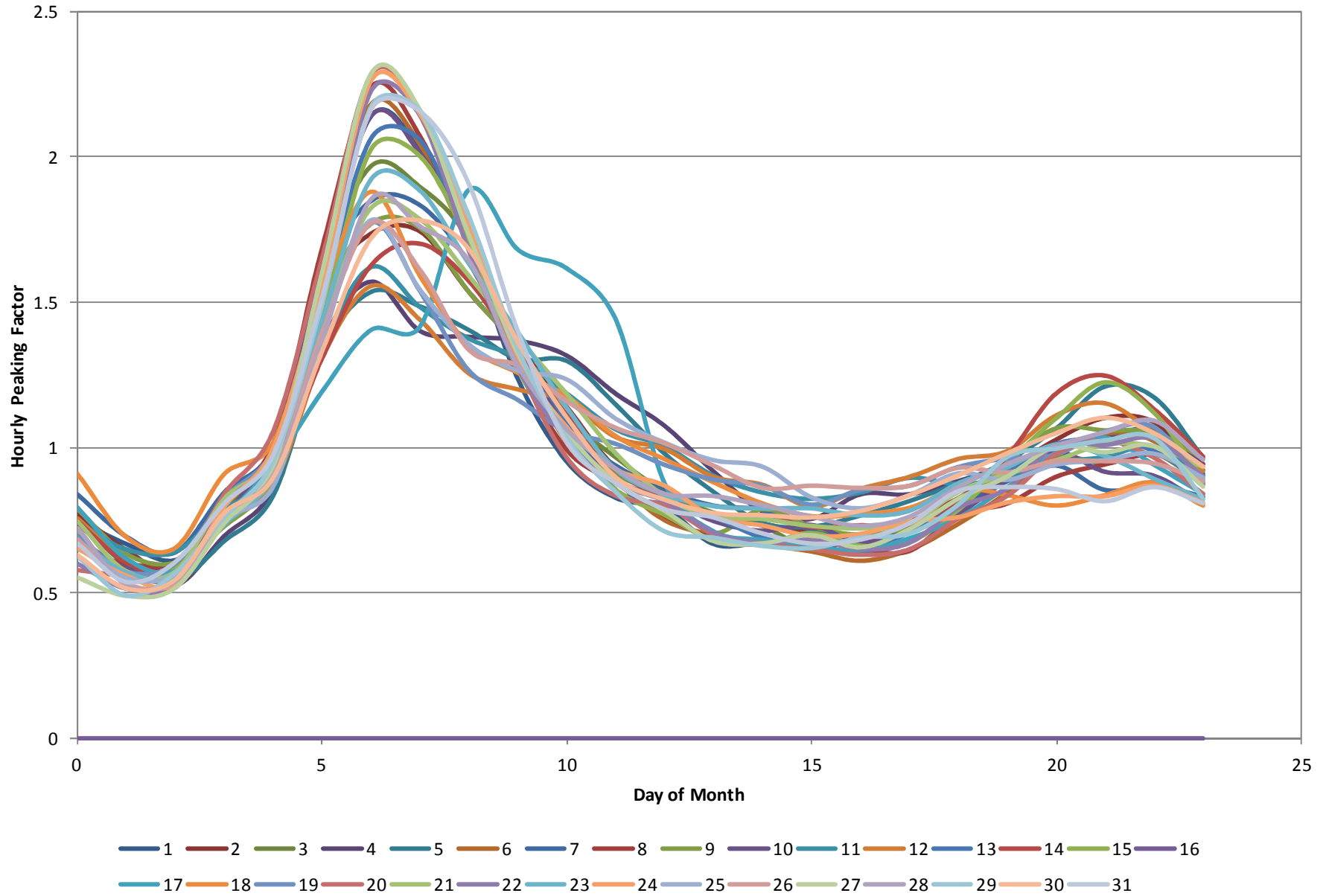
August 2011



September 2012



August 2012



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