

## **CHAPTER 4**

### **WATER USE EFFICIENCY PROGRAM**

#### **INTRODUCTION**

A viable water use efficiency plan is a requirement of water system planning. This chapter identifies conservation and water use efficiency requirements and outlines the Town of Hamilton (Town) Water Use Efficiency (WUE) plan for the next 6 years.

#### **WATER USE EFFICIENCY PLANNING REQUIREMENTS**

The Washington Legislature passed the Water Use Efficiency Act of 1989 (43.20.230 RCW), which directs the Department of Health (DOH) to develop procedures and guidelines relating to water use efficiency.

In 2003, the Municipal Water Supply – Efficiency Requirements Act (Municipal Water Law) was passed and amended RCW 90.46 to require additional conservation measures. The Municipal Water Law, among other things, directed DOH to develop the Water Use Efficiency (WUE) Rule, which was adopted in October 2006. The WUE Rule is outlined in the Water Use Efficiency Guidebook (Third Edition).

These documents provide guidelines and requirements regarding the development and implementation of conservation and efficiency programs for public water systems. Conservation and efficiency programs developed in compliance with these documents are required by DOH as part of water system planning documents, and by the Washington State Department of Ecology (Ecology) as part of a public water system water right application. Conservation must be evaluated and implemented as an alternate source of supply before state agencies approve applications for new or expanded water rights.

Conservation can be used effectively to help meet the increased demand for water, to protect the environment, to delay the development of costly infrastructure, and to ensure that water is available to meet economic and population growth consistent with the Growth Management Act by using existing supplies more efficiently. Public awareness and participation are necessary for NBWD to develop an active and beneficial conservation plan.

The third and most recent edition of the WUE Guidebook was released in January 2017. The WUE Rule sets stringent requirements for public water purveyors. The WUE Rule is comprised of the following six sections:

1. WUE Requirements
2. Water Metering
3. Data Collection

4. Distribution System Leakage (DSL)
5. Water Demand Forecasting
6. WUE Goals
7. WUE Measures

## WATER USE EFFICIENCY REQUIREMENTS

The WUE Guidebook establishes varying implementation and evaluation requirements for municipal water suppliers (MWS). The requirements focus on the importance of measuring water usage and evaluating the effectiveness of the WUE program. The Rule outlines three fundamental elements which include planning, Distribution System Leakage (DSL) standards, and goal setting and performance reporting.

Table 4-1 provides a summary of the WUE Rule requirements applicable to the Town.

**TABLE 4-1**

### Summary of WUE Requirements

Requirement	Deadlines <sup>(1)</sup>	Town Status
Install Source Meters	Jan. 22, 2007	In Compliance
Begin Collecting Production and Consumption Data	Jan. 1, 2008	In Compliance
Include WUE Program in Planning Documents	Jan. 22, 2008	In Compliance
Set WUE Goal through a Public Process	Jul. 1, 2010	In Compliance
Submit Service Meter Installation Schedule	Jul. 1, 2009	In Compliance
Submit First Annual Performance Report	Jul. 1, 2009	In Compliance
Meet Distribution Leakage Standard	Jul. 1, 2011 <sup>(2)</sup>	Not in Compliance <sup>(3)</sup>
Complete Installation of All Service Meters	Jan. 22, 2017	In Compliance

(1) Deadlines listed are for systems with fewer than 1,000 connections.

(2) Or 3 years after installing all service meters, or implement a Water Loss Control Action Plan.

(3) The Town has implemented a Water Loss Control Action Plan.

## WATER METERING

The WUE Rule requires all sources and customer service connections to be metered by 2017. The Town currently meters all sources and customers and is, therefore, in full compliance with this requirement. All new sources and customers will continue to be metered.

**DATA COLLECTION AND REPORTING**

The WUE Rule requires regular collection of production and consumption data. Data must be reported in Hamilton planning documents and an annual performance report to DOH. Water use data is used for the following:

- Calculating leakage;
- Forecasting demand for future water needs;
- Identifying areas for more efficient water use;
- Evaluating the success of the WUE program;
- Describing water supply characteristics; and
- Aiding in decision-making about water management.

Table 4-2 summarizes the water use data collection requirements

**TABLE 4-2**

**Summary of Water Use Data Collection**

<b>Data Type</b>	<b>Unit of Measure</b>	<b>Collection Frequency</b>	<b>Comments</b>
Source of Supply Meter Data	Cubic Feet	Daily	
Peak Month	Cubic Feet	-	Peak Month is tabulated monthly based on monthly water production reports
Distribution System Leakage	Gallons and Percent	-	Based on the annual difference of water produced and consumed. Reported to DOH annually
Unmetered, Unbilled Authorized Uses	Gallons	Annually	Calculated from Town records of flushing and testing.
Residential Service Meter Readings	Cubic Feet	Monthly	
Industrial/Commercial Service Meter Readings	Cubic Feet	Monthly	

This data is needed to meet the planning and performance reporting requirements and to check compliance with the distribution system leakage standard of the WUE Rule.

The Town has two meters for potable water pumped from well S02, and one meter for mitigation water, as discussed in Chapter 1 and 2. Meter readings for all three are taken every weekday (Monday to Friday) excluding holidays. All service connections have meters which are read monthly. All new connections are also required to be metered.

## **WATER USE EFFICIENCY PROGRAM**

Under the WUE Rule, the Town must develop a water use efficiency program as part of its planning documents. This program includes several elements, such as evaluating past conservation efforts, evaluating distribution system leakage, setting water use efficiency goals, and evaluating and implementing measures to meet these goals.

## **PAST WATER USE EFFICIENCY PROGRAM**

In Hamilton's 2013 Water System Plan, two goals were placed for the WUE Program:

- Increase awareness among all water users of the value and importance of conserving water and of the methods available to achieve reductions in water use.
- Reduce overall system withdrawal from the well.

The Town proposed several implementation methods for these goals, including providing WUE educational materials at Town Council meetings, billing water use with an increasing block structure, and showing consumption history on water bills. Although "awareness" is a qualitative goal, the Town's residential ADD per ERU (averaging 121 gpd/ERU from 2019 through 2022) has stayed well below the national average of 300 gpd/ERU (2023 value from the US Environmental Protection Agency).

The system withdrawal from the well (S02) reported in the 2015 WSP was 12.0 million gallons (MG) in 2012 with an average withdrawal of 17.75 MG between 2009 and 2012. Comparatively, the withdrawal in 2022 was 11.05 MG with an average withdrawal of 10.79 MG between 2020 and 2022. While the withdrawal did increase to 12.45 MG in 2021, this was due to a leak at Janicki which was remedied near the end of the year. Thus, the Town has been largely successful in reducing overall system withdrawal.

## **DISTRIBUTION SYSTEM LEAKAGE**

The WUE Rule requires that water distribution systems maintain a DSL rate less than 10 percent of finished water production based on a 3-year rolling average. DSL is defined as the difference between the total water production and authorized consumption. Authorized consumption includes metered water consumption by customers and known or credibly estimated uses that were unbilled or unmetered. Unmetered uses typically include flushing mains and fire flows. DSL is typically attributed to water loss due to leaks or unauthorized uses such as illegal service connections, accounting errors,

inaccurate source and customer meters, and water leaving the system for any unmetered use.

Hamilton DSL for 2020 through 2022 is summarized in Table 4-3. The Town’s 3-year rolling average DSL is currently 14.3 percent which is greater than the WUE Rule’s 10 percent maximum allowable leakage requirement. As a result, a Water Loss Control Action plan must be implemented and will be discussed later in this chapter.

**TABLE 4-3**

**Distribution System Leakage**

	Metered Potable Water Production (MG)	Metered Consumption (MG)	DSL	
			(MG)	(Percent)
2020	8.87	7.49	1.38	15.6 %
2021	12.39	11.46	0.93	7.5 %
2022	11.02	8.83	2.19	19.9 %
<b>Average</b>				14.3 %

The Town’s DSL has varied in recent years with a sizeable increase between 2021 and 2022. Some large stretches of the Town’s water main are quite old and made from AC concrete, leading to possible small, undetected leaks and a couple large main breaks. Most significantly, in December 2022, there was a main break on Cumberland Street. Due to these known issues, the Town has voraciously replaced AC pipes with C900 PVC through 2023. The entire AC main on Cumberland has been replaced and improvements such as additional valves and fire hydrants were added during that construction. The next phase, begun in 2023 with planned completion in 2024, is the replacement of the AC main on Nolle Avenue from Maple Street to South Street.

During 2023 construction, a leaking valve was identified along Cumberland Street. Once all services have been transferred to the new Cumberland water main, the valve will be abandoned.

## REVISED GOALS

Under the new WUE Rule, the Town must outline new water use efficiency goals as part of the WSP update, adopt these goals through a public process, and measure progress towards these goals each year. These goals must include a measurable outcome and address water demands and supply characteristics. The Town's two new goals are summarized below.

- **Goal 1 (Demand) – Reduce ERU<sub>ADD</sub> by 1 percent per year.**

Determined in Chapter 2, the Town has a fairly low ERU<sub>ADD</sub> value of 142 gpd/person/day. Recall that in 2019, 2020, and 2021, the ERU<sub>ADD</sub> was 111 gpd/person/day and, rather than the four-year average, the maximum value, found in 2022, was used for planning. Multiple customers in 2022 experienced leaking pipes, which contributed to the higher value that year. Because repairs have been made since then, and because the Town plans to install new connections for services along the streets experiencing the most leaks (Cumberland and Nolle), it is feasible for the Town to reduce usage back to pre-2022 volumes. Table 4-4 shows the impact of meeting the reduced demand goal.

- **Goal 2 (Supply) - Reduce Distribution System Leakage (DSL) by 5 percent per year.**

The DSL in 2022 was almost 20 percent of total water production due to major main breaks and a leaking valve along Cumberland. The 3-year rolling average in 2022 was 14.3. The Town has worked diligently to replace the faulty main on Cumberland and, with new and dedicated staff, will continue to identify and repair system deficiencies to meet the goal of 5 percent DSL reduction per year (5 percent of the previous year's volume). Table 4-5 shows the impact of meeting the reduced supply goal.

**TABLE 4-4**

**Water Savings with Demand Goal**

Year	Projected ERUs (Excluding DSL) <sup>(1)</sup>	No Conservation		Conservation		Annual Water Savings (gal/Y)
		ERU <sub>ADD</sub>	Average Daily Consumption (gpd)	ERU <sub>ADD</sub>	Average Daily Consumption (gpd)	
2024	130	142	18,422	141	18,330	33,600
2025	133	142	18,919	141	18,731	68,900
2026	137	142	19,430	140	19,140	105,800
2027	141	142	19,955	139	19,559	144,600
2028	144	142	20,493	138	19,986	185,100
2029	148	142	21,047	138	20,423	227,600
2030	152	142	21,615	137	20,870	272,000
2031	156	142	22,199	136	21,326	318,500
2032	161	142	22,798	136	21,792	367,100
2033	165	142	23,414	135	22,269	417,800
2034	169	142	24,046	134	22,756	470,800

(1) From Table 2-13.

**TABLE 4-5**

**Water Savings with Supply Goal**

Year	DSL w/o WUE Goal (gpd) <sup>(1)</sup>	DSL w/WUE Goal		Annual Water Savings (gal/Y)
		(gpd)	(%) <sup>(2)</sup>	
2024	5,964	5,666	18%	108,800
2025	5,964	5,383	16%	212,200
2026	5,964	5,113	14%	310,500
2027	5,964	4,858	13%	403,800
2028	5,964	4,615	13%	492,400
2029	5,964	4,384	12%	576,700
2030	5,964	4,165	11%	656,700
2031	5,964	3,957	10%	732,700
2032	5,964	3,759	10%	804,900
2033	5,964	3,721	9%	818,600
2034	5,964	3,684	9%	832,200

(1) From Table 2-13.

(2) % DSL = 100\*(DSL w/WUE Goals) / (Average Daily Consumption with WUE Goals from Table 4-4).

**TABLE 4-6**

**Total Water Savings – Demand and Supply Goals**

<b>Year</b>	<b>Annual Supply Goal Water Savings (gal/Y)</b>	<b>Annual Demand Goal Water Savings (gal/Y)</b>	<b>Total Water Savings (gal/Y)</b>
2024	108,800	33,600	142,400
2025	212,200	68,900	281,100
2026	310,500	105,800	416,300
2027	403,800	144,600	548,400
2028	492,400	185,100	677,500
2029	576,700	227,600	804,300
2030	656,700	272,000	928,700
2031	732,700	318,500	1,051,200
2032	804,900	367,100	1,172,000
2033	818,600	417,800	1,236,400
2034	832,200	470,800	1,303,000

**WATER USE EFFICIENCY MEASURES**

The WUE Rule requires the evaluation or implementation of water use efficiency measures to help meet the WUE goals. The WUE Guidebook states several measures that must be implemented or evaluated and provides a list of measures that can be counted as supplemental measures in the WUE Program. WAC 246-290-810 identifies the minimum number of supplementary water use efficiency measures that must be evaluated based on system size. Because the Town serves under 500 customers, a minimum of one water use efficiency measure must be implemented. As stated in the WUE Guidebook, any WUE measure implemented across multiple customer classes counts as one measure for each customer class to which it is applied.

The following sections describe both the mandatory and supplementary water use efficiency measures evaluated and indicate which have been or will be implemented by the Town.

**Implement Source and Service Metering and Meter Calibration (Mandatory)**

As stated previously, Hamilton currently meters all existing customers and sources and plans to meter all new customers and sources. They will also continue to calibrate source meters as scheduled and service meters as requested.



### **Implement Water Loss Control Action Plan (Mandatory if DSL >10 Percent)**

Hamilton's DSL rate was 14.3 percent based on a 3-year rolling average in 2022, which did not meet the DOH requirement of 10 percent. As a result, the Town is required to implement a Water Loss Control Action Plan (WLCAP) to remain in compliance per WAC 246-290-820(4). The Town's WLCAP is included at the end of this Chapter.

The Town of Hamilton has established measures to reduce the annual and 3-year rolling average DSL to 10 percent or less of total production. Some of these measures include leak identification, meter replacement and calibration, and replacement of old, aging, and undersized pipe segments.

### **Customer Education (Mandatory)**

Hamilton educates customers about efficient water use by providing inserts with utility bills on an annual basis, at minimum. The May 2023 insert is included in Appendix K with the annual Consumer Confidence Report. The inserts inform the customers of ways to reduce their water demands and also educate customers about the ways the Town is working to improve system efficiency. The Town will continue to distribute water use efficiency information to its customers annually.

### **Evaluate and Implement Conservation Rate Structure (Mandatory and Supplementary)**

Hamilton has adopted a rate structure to promote conservation among its customers, which is discussed further in Chapter 7. The Town has created a rate structure aimed at curbing excessive water use by charging increased rates for monthly water volumes as the volume increases. Because the Town has implemented a conservation rate structure that affects all customer classes, this measure counts as two additional WUE measures. This measure is aimed to help reduce customer consumption and meet WUE goal 2.

### **Bills Showing Consumption History (Supplementary)**

Water utility bills that show consumption history can help customers monitor their water consumption trends. These bills give feedback to customers on their own attempts to conserve and give a reference that helps in identifying leaks or changes in water usage that customers might otherwise not be aware of. The Town currently presents a summary of past usage on all bills that go to both residential and commercial customers, which qualifies this measure as two supplementary measures.

**Summary of Measures**

The WUE Rule requires all municipal water systems with under 500 connections to implement five mandatory water use efficiency measures, to evaluate one mandatory measure, and to either implement or evaluate one additional measure. The Town’s water use efficiency measures are listed in Table 4-7.

**TABLE 4-7**

**Water Use Efficiency Measures**

<b>Requirement</b>	<b>Measure</b>	<b>District Compliance</b>	<b>Number of Measures</b>
Mandatory Implementation	Install Production Meters	✓	5
	Install Consumption Meters	✓	
	Perform Meter Calibration	✓	
	WLCAP if DSL >10%	✓	
	Educate Customers about WUE Practices Once Per Year	✓	
Mandatory Evaluation	Conservation Rate Structure	✓	2
	Reclaimed Water Use	✓	
Supplementary Implementation	Conservation Rate Structure	✓	4 <sup>(1)</sup>
	Bills Showing Consumption History	✓	

(1) These two measures are applied to both Residential and Commercial customers. Measures implemented across multiple customer classes count as one measure for each customer class to which they are applied.

**EVALUATING WATER USE EFFICIENCY EFFECTIVENESS**

The Town of Hamilton will evaluate the effectiveness of its production side WUE efforts through an annual review of DSL. The Town can then prioritize projects (such as waterline replacement and meter replacement) based on the DSL percentage trend. The Town plans to evaluate the effectiveness of its consumption side WUE efforts through annual review of the residential per capita water use. This evaluation will determine if education efforts are having the desired effect.

**PERFORMANCE REPORTING**

The Town must submit a performance report to DOH by July 1 each year. This annual report must include:

- Total source production and customer consumption;
- Distribution system leakage in percentage and volume; and
- Description of current WUE goals, schedule and progress toward meeting goals.

DOH has developed an online reporting form that must be used by water systems to file their annual report. Previous year's WUE annual performance reports are available on the DOH website.

## **WATER LOSS CONTROL ACTION PLAN**

In 2022, the Town of Hamilton's DSL was 19.9 percent with a 3-year rolling average of 14.3 percent. Both values are above the DSL standard of 10 percent. As a result, the Town must implement a Water Loss Control Action Plan (WLCAP). The following elements are included in the WLCAP:

- The water loss control methods include pipe replacement to reduce leakage and replacing faulty water meters, valves, and fire hydrants. The Town has already replaced the most common perpetrator of water main breaks, the main along Cumberland Street, and plans to replace all AC pipe in the system by 2025. Meter replacement to remote-access meters is planned in the upcoming years and is included in the CIP in Chapter 8. The replacement of aging fire hydrants is also included in the CIP.
- The water system staff, primarily managed by Si Adams, will continue to improve system knowledge so leaks can be quickly recognized and addressed as needed.
- The Town's Capital Improvement Program, which is detailed in Chapter 8, outlines future customer service line and valve replacement programs. Aging customer service lines and valves can be at increased risk of leakage. Projects to replace these are included in the Town's CIP budget. Customer service lines which are made of steel have been known to be especially faulty and; therefore, these will be replaced first.
- There are no anticipated technical or financial concerns that could prevent the Town from complying with the standard. The Town's financial information can be found in Chapter 9.