4.1 WATER USE EFFICIENCY PROGRAM (WUE)

4.1.1 Planning Requirements

In 2003, the Washington State Legislature passed the Municipal Water Supply-Efficiency Requirements Act (commonly called the Municipal Water Law) as part of a multi-year effort to reform the state's water laws. The act requires all municipal water suppliers to use water more efficiently in exchange for water right certainty and flexibility to meet future water demands. The Legislature directed the Department of Health to adopt a rule that establishes water use efficiency requirements for all municipal suppliers. The Water Use Efficiency (WUE) Rule, which became effective on January 22, 2007, includes the following key items:

- WUE Program – This element of the rule requires the collection of water production and consumption data, forecast of future water demands, evaluation of system leakage, evaluation of water rate structures, and the implementation of WUE measures. This Program is a required element of all Water System Plans prepared after January 22, 2008.

- Distribution System Leakage (DSL) Standard – Municipal water suppliers with 1,000 or more connections are required to satisfy a DSL standard equal to 10% or less of total production by July 1, 2010.

- WUE Goal Setting and Performance Reporting – Municipal water suppliers are required to set WUE goals through a public process and report annually on their performance to customers and to DOH. For water systems with 1,000 or more connections, the deadline for establishing systems goals was July 1, 2009. WUE goals must be established through a public process for a ten-year period, and should be re-evaluated each cycle.

The rule requirements and compliance deadlines are shown in Table 4-1.

TABLE 4-1 WATER USE EFFICIENCY RULE REQUIREMENTS

Requirement	Deadlines	
	1,000 or more Connections	Under 1,000 Connections
Begin Production & Consumption Data Collection	January 1, 2007	January 1, 2008
Establish WUE Goals	July 1, 2009	July 1, 2010
Include WUE Program in Planning Documents	January 22, 2008	January 22, 2008
Submit First Annual Performance Report	July 1, 2008	July 1, 2009
Submit Service Meter Installation Schedule	July 1, 2008	July 1, 2009
Meet DSL Standard	July 1, 2010	July 1, 2011
Complete Installation of all Service Meters	January 22, 2017	January 22, 2017

A WUE Program is one requirement of the WUE Rule. All Water System Plans submitted to the Department of Health after January 22, 2008, are required to include a WUE Program. WAC 246-290-810(4) requires municipal water suppliers to include the following items in their WUE program:

- Description of the current water conservation program including an estimation of water saved through program implementation over the last six years;

- Description of the chosen WUE goals;

- Evaluation and implementation of WUE measures;

- Projected water savings;

- Customer education;

- WUE program effectiveness; and
- DSL evaluation.

4.1.2 Current Water Use Efficiency Program

Union Gap's current Water Use Efficiency (WUE) Program was prepared in 2011 and adopted by the City Council July 11, 2011. As part of this *Water System Plan*, the City's current WUE Program was reevaluated and updated in accordance with WAC 246-290-810(4) and consists of the following elements:

- Water Use Efficiency Goals
- Evaluation and Implementation of Water Use Efficiency Measures
- WUE Measure Implementation
- Customer Education
- Water Use Efficiency Program Effectiveness
- Distribution System Leakage (DSL) Evaluation

Provided in Table 4-2 is a summary of the population, number of water services, water consumption, and per capita water consumption from 2011 to 2015. Further information on historical water use is provided in CHAPTER 2 of this Plan.

TABLE 4-2 WATER CONSUMPTION INFORMATION 2011-2015

Year	Population*	Total Water Services	Annual Water Production (gallons)	Annual Water Consumption (gallons)	Annual Residential Consumption (gallons)	Residential Water Services	Residential Avg. Day Consumption per service (gal/service/day)
2011	6,055	2,445	422,376,183	398,326,852	150,788,048	1,850	223
2012	6,105	2,557	445,010,449	415,234,902	160,199,540	1,947	225
2013	6,110	2,567	457,297,241	428,822,544	162,160,461	1,943	228
2014	6,140	2,436	408,892,340	378,892,810	164,253,101	1,818	248
2015	6,150	2,579	445,028,126	413,031,687	170,848,460	1,929	243

* From Washington State OFM population estimates.

The City's 2011 *Water Use Efficiency Program* included a goal to reduce average residential water consumption by two (2) gallons per service per day over the next six-year period. The City's goal has not been met, as shown in Table 4-2.

4.1.3 Water Use Efficiency Goals

WUE goals are an integral component of the WUE program, setting the ground work for more efficient use of water. Past conservation efforts have not yet yielded reductions to meet past goals. The City of Union Gap has proposed the following WUE goal for their water system:

- Reduce average residential water consumption by two (2) gallons per service per day over the next ten-year period.

Presentation of the WUE goal to the public, completion of the public forum, and adoption of the goal by the City Council is planned to be completed while the water system plan update is adopted. Adoption of the

above WUE goal is expected to improve system performance and consequently reduce water production volumes despite projected growth within the City. It is anticipated that the reduction in residential use of two gallons per service per day could save over 14 million gallons per year over this ten-year period, based upon the City currently having approximately 1,968 residential services and is expected to grow to approximately 2,098 residential services in six years.

4.1.4 Evaluation and Implementation of Water Use Efficiency Measures

Water use efficiency (WUE) measures are necessary actions taken to attain a water system's established efficiency goals. Measures are intended to support the WUE program and should address both supply and demand efficiencies. For this reason, the WUE measures that have been evaluated and/or implemented are separated into two primary categories, demand side and supply side measures. All of the selected WUE measures pertaining to Union Gap's WUE goals will be presented to the public during the goal setting process.

Demand Side Measures

Municipal water systems are required to evaluate or implement a specified number of demand side water use efficiency (WUE) measures based upon the size of the water system. Table 4-3 shows the minimum number of measures required to be evaluated or implemented by the City of Union Gap.

TABLE 4-3 WATER USE EFFICIENCY MEASURES

Number of Service Connections	Number of Water Use Efficiency Measures to be Evaluated
Less than 500	1
500 - 999	4
1,000 – 2,499	5
2,500 – 9,999	6 (Union Gap's current requirement)
10,000 – 49,999	9
Greater than 50,000	12

A discussion of the demand side measures that the City of Union Gap has evaluated to achieve its specified efficiency goal are provided below, along with the estimated costs to implement the measures and the projected water savings. Evaluation of the following measures for cost-effectiveness is primarily based upon the overall implementation costs as compared to the amount of potential water savings.

It should be noted that water savings attributable to public information activities are difficult to quantify because they are not directly linked to physically saving water. Although these measures cannot be specifically quantified, they are an integral part of the WUE Program, raising awareness of the importance of water conservation and increasing community participation in other conservation activities.

Water Bill Consumption History – The City of Union Gap has converted to a utility billing software that allows them to show customers a consumption history graph. The City plans to continue including the consumption history in future billings. It is anticipated that showing the customers a history of consumption will raise awareness of usage and its effect on their bill, and hopefully contribute to the overall goal of reducing residential consumption by five gallons per service per day. This measure was found to be cost-effective, given the low cost of implementation and high potential for reducing both future residential and commercial daily consumption per service.

WUE Measure Cost Estimate: $2,000 for preparation of curriculum materials.

Estimated Water Savings: Unknown, but anticipated to reduce residential average consumption per service per day.

WUE Measure Action Status: Scheduled annually.

WUE Information Newsletter – In addition to publishing required WUE information in their annual Consumer Confidence Report (CCR), the City has begun placing articles in their bi-monthly newsletter regarding water conservation tips. In effort to further educate customers on the efficient use of water, the City plans to continue publishing important water savings tips in future bi-monthly newsletters.

WUE Measure Cost Estimate: $2,000 for preparation of newsletter information.

Estimated Water Savings: Unknown, but anticipated to reduce residential average consumption per service per day.

WUE Measure Action Status: Scheduled annually.

Water Conservation School Outreach Program – This measure involves preparation of educational programs for school children targeted to increase awareness of local water resources and encourage water conservation practices, and may include school presentations, preparation of curriculum material, and tours of water system facilities. Costs associated with this measure would primarily be for preparation of curriculum material and time involved in working with the school district for the presentation of the program.

WUE Measure Cost Estimate: $5,000 for printing materials

Estimated Water Savings: Unknown, but anticipated to reduce residential average consumption per service per day.
WUE Measure Action Status: Scheduled for 2019.

Event Displays – Prepare a portable display and/or booth of water conservation practices and devices for use at the City's numerous community events.

WUE Measure Cost Estimate: $5,000 for printing materials

Estimated Water Savings: Unknown, but anticipated to reduce residential average consumption per service per day.
WUE Measure Action Status: Scheduled annually.

Conservation-Based Water Rate Structure – This measure involves the use of conservation-based water rates to reduce consumption. In January 2007, the City evaluated the applicability and cost effectiveness of several rate structures, including conservation-based rates. Following this evaluation, the City implemented the new rate structure in 2008, updated it in 2014, and anticipating being updated again in 2017. The current rate structure is based on a monthly ready-to-serve charge plus a volume-based consumption charge. As a result, customer utility bills increase with increased water use.

Changing the current rate structure to an inclining-block rate structure, or another similar type of rate that further financially penalizes customers for excessive water use, may result in additional water savings. If approximately 10% of residential customers (1,968 in 2017) used 10% less water annually (ADD of 240 GPD/service), as a result of inclining-block rates, annual water system consumption could be reduced by approximately 1.7 million gallons (0.4% of annual system demand). However, this type of rate structure may have some potential negative impacts on customers, including large swings in monthly bills due to irrigation or other seasonal uses, unfairly penalizing customers that require higher usage (e.g., larger households or larger consumptive use), or placing an additional burden on low-income users. This type of rate structure may also negatively impact the City with the potential for increased variability in revenue streams.

Evaluation of alternative rate structures would be necessary in the future prior to implementation, to determine what structure would be the most suitable and effective for the system. Estimated costs for future evaluation and implementation of an alternative rate structure are provided below. Additional information on current water rates is provided in CHAPTER 9 of this Plan.

WUE Measure Cost Estimate: $10,000 for further evaluation and implementation of alternative rate structures.

Estimated Water Savings: Approximately 1.7 MG per year.

WUE Measure Action Status: Current rate structure implemented in 2014. Alternative rate structure evaluation and/or implementation is not scheduled at this time.

Customer Leak Detection – The City of Union Gap Public Works staff will work closely with utility billing staff in identifying high water usage customers. When high usage is revealed, Public Works staff will contact the customer in a timely manner. Staff will provide leak detection services to customers and offer solutions for leak repairs. Following inspections, customers will receive Department of Health pamphlets promoting water conservation and tips toward consumption reduction.

WUE Measure Cost Estimate: $500 for printing materials.

Estimated Water Savings: Unknown, but anticipated to reduce residential average consumption per service per day.

WUE Measure Action Status: Not scheduled.

A summary of the estimated costs to implement the selected measures, their estimated water savings, and overall cost-effectiveness are provided in Table 4-4.

TABLE 4-4 SUMMARY OF DEMAND SIDE WUE MEASURES

Measure Description	Implementation Cost	Year of Implementation	Estimated Water Savings, 10-year period, MG
Water Bill Consumption History	$2,000	2011	Unknown
WUE Information Newsletter	$2,000	2011	Unknown
Water Conservation School Outreach Program	$5,000	Scheduled for 2019	Unknown
Event Displays	$5,000	Scheduled Annually	Unknown
Conservation-Based Rate Structure	$10,000	Not Scheduled	10.2 MG
Customer Leak Detection	$500	Scheduled for 2018	Unknown

The above measures are planned to be implemented as shown in Table 4-6. The City will reevaluate the effectiveness of the measures during each program update to determine its potential for future implementation. Costs to implement these measures are included in the City's water operations budget.

Supply Side Measures

Supply side measures are essential to control distribution system leakage (DSL), improve supply efficiency, and overall system performance. The following are discussions of supply side WUE measures that have already, or will be implemented within the next ten years to reduce the system's current DSL percentage and satisfy the City's WUE Program objective. The estimated cost of these measures and anticipated water savings are also provided.

Source and Service Meter Calibration – To improve the accuracy of water production and consumption information, and potentially reduce the current DSL percentage, Union Gap will begin calibrating all source and large service (≥ four-inch diameter) meters approximately every two years, as recommended by DOH in Chapter 5 of the Water System Design Manual. Actual water savings from meter calibration is unknown, but if the accuracy of all source meters is improved by 0.5%, the resulting water savings could be as much as two million gallons, considering that over 380 million gallons are pumped into the system annually. It should be noted that the opposite of water savings could result, therefore, it is unknown if distribution system leakage (DSL) will be reduced or how much water could be saved through meter calibration.

WUE Measure Cost Estimate: Approximately $5,000 annually for calibration of half of the City's five source meters and five large service meters each year.

Estimated Water Savings: Unknown; but potentially significant reduction in DSL.

WUE Measure Action Status: Scheduled regularly.

Service Meter Replacement – The City has over 2,600 service meters, the majority of which are more than 10 years old. Replacement of older service meters is necessary to improve accuracy and potentially reduce the percentage of DSL. The City plans to continue budgeting funds each year for replacement of both large and small service meters that are known to be old and/or worn-out.

WUE Measure Cost Estimate: Approximately $5,000 annually for calibration of half of the City's five source meters and five large service meters each year.

Estimated Water Savings: Unknown; could potentially reduce DSL by 0.5%.

WUE Measure Action Status: Already implemented.

Water Main Replacement – As discussed in CHAPTER 3 and CHAPTER 8 of the Plan, much of the City's distribution system east of the railroad tracks and south of Ahtanum Road is made up of aging and undersized cast iron pipes, many of which were part of the original distribution system constructed in 1930's and 1940's. The condition of each of these water mains in not fully known, but significant corrosion and leaking is suspected and the City has reported that many valves in this area are inoperable and in need of replacement. Replacement of these aging and undersized pipes will likely reduce the current DSL percentage. Many of the water mains are scheduled for replacement as recommended future improvements, but the City also plans to budget funds each year for in-house replacement of existing water mains. The City will replace water mains known to be leaking and/or in the poorest condition first.

WUE Measure Cost Estimate: Approximately $30,000 annually for in-house replacement of existing water mains.

Estimated Water Savings: Unknown, but potentially significant reduction in DSL.

WUE Measure Action Status: Already Implemented.

Reservoir Cleaning and Inspection – The City periodically cleans and inspects its reservoirs for leaks and any other deficiencies. Corrosion causes unnecessary leakage directly contributing to distribution system losses (DSL). The City's reservoirs should be cleaned and inspected every five (5) years to identify any corrosion and potential DSL. The approximate cost of inspecting and cleaning the Johnson Hill Reservoirs is $12,000, and $6,000 for Fullbright Reservoir, assuming no significant repairs are necessary. This measure is included in the O&M Improvements Schedule in CHAPTER 8.

WUE Measure Cost Estimate: Approximately $18,000 for both reservoirs.

Estimated Water Savings: Unknown.

WUE Measure Action Status: Annual budgeting and inspection schedule.

The following Table 4-5 is a summary of supply side measures implemented by the City.

TABLE 4-5 SUMMARY OF SUPPLY SIDE WUE MEASURES			
Measure Description	Implementation Cost	Year of Implementation	Projected Water Savings
Source and Service Meter Calibration	$5,000 annually	Implemented	Unknown
Service Meter Replacement	$5,000 annually	Implemented	Unknown
Water Main Replacement	$30,000 annually	Implemented	Unknown
Reservoir Cleaning and Inspection	$18,000 every five years	Implemented	Unknown

4.1.5 WUE Measure Implementation

A summary of the WUE program measures that are planned for implementation is provided in Table 4-6, including measure description, implementation cost, and year of implementation. All of the implemented measures support the system's WUE goals to reduce distribution system leakage and residential consumption.

TABLE 4-6 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES			
Measure Description	Implementation Cost	Year of Implementation	Projected Water Savings
Water Bill Consumption History	$2,000	2011	Unknown
WUE Information Newsletter	$2,000	2011	Unknown
Water Conservation School Outreach Program	$5,000	2013	Unknown
Event Displays	$5,000	Scheduled Annually	Unknown
Conservation-Based Rate Structure	$10,000	Not Scheduled	10.2 MG
Customer Leak Detection	$500	Not Scheduled	Unknown
Source and Service Meter Calibration	$5,000 annually	Implemented	Unknown
Service Meter Replacement	$5,000 annually	Implemented	Unknown
Water Main Replacement	$30,000 annually	Implemented	Unknown
Reservoir Cleaning and Inspection	$18,000 every five years	Implemented	Unknown

The City plans to budget funds each year for the next ten-year period to fund the WUE measures listed above in Table 4-6. These budget amounts are reflected in the proposed City of Union Gap financial plan in CHAPTER 9 of this Plan as part of the general operational budget and/or O&M improvement costs.

4.1.6 Customer Education

Customer education is intended to inform citizens about the need for, and the methods to achieve water conservation. Customer education involves publicizing and promoting the need for water conservation to all classes of customers. Union Gap currently publicizes water conservation information in its annual *Water Quality Report* to inform customers of the City's conservation efforts. In the future, the City plans to provide additional conservation information to customers on their website, to further educate the public on the purpose of using water more efficiently. The City also plans to continue publishing conservation information in their bi-monthly City newsletter and provide customers with a consumption history on their monthly bills.

Customer education programs that Union Gap has considered for further evaluation include the following:

- Program Promotion – Program promotion can include public service announcements, news articles, information provided in the City's annual *Water Quality Report*, bill inserts, providing water use history as part of utility bills, and distribution of inexpensive, easily installed water-saving devices such as shower flow restrictors, toilet tank water displacement bags, and leak detection dye tablets. As previously discussed, Union Gap intends to continue program promotion in 2017 through the use of its annual *Water Quality Report*.

- Speakers Bureaus – Speakers bureaus involve identifying water conservation speaking opportunities appropriate to various civic, service, community and other groups. Such speaking opportunities focus on increasing public awareness of water resource and conservation issues, and may involve the use of audio and visual aids.

- Theme Shows and Fairs – This activity involves preparation of a portable display of water conservation devices and selected written material, and making this display available at local area theme festivals and activities.

- School Outreach – School outreach involves preparation of educational programs for school children targeted to increase awareness of local water resources and encourage water conservation practices. These may include school presentations, preparation of curriculum material, and tours of water system facilities. As previously discussed, representatives of Union Gap's Public Works Department will attend a Career Day at the local schools and teach children about the many ways to protect and conserve the City's water source.

Union Gap has identified some of these customer education programs as evaluated WUE measures that may be implemented in the future, as discussed in Section 4.1.4

4.1.7 Water Use Efficiency Program Effectiveness

The Water Use Efficiency Rule requires the completion of annual performance reporting to system customers and to the Department of Health (DOH). The City will use preparation of the Annual WUE Performance Report as an opportunity to review the effectiveness of the WUE measures, and determine if established goals require revision. The annual effectiveness evaluation and the Annual WUE Performance Report will include the following elements:

- Calculation of distribution system leakage in terms of volume and percent of total water production;

- Identification of WUE goals;

- Evaluation of established WUE goals, including estimating water savings achieved through implemented measures and progress towards satisfying goals.

Union Gap will submit its Annual WUE Performance Report to DOH by July 1st of each year. Information contained in the Annual WUE Performance Report will also be included in the City's Consumer Confidence Report distributed to all water system customers annually. WUE Program effectiveness will also be evaluated every ten years when the Water System Plan is updated. At this time both goals and measures will be reevaluated to determine the most cost-effective method to achieve the updated goals.