



CHAPTER 4 -

WATER USE EFFICIENCY (WUE) PROGRAM



4.1 WATER USE EFFICIENCY (WUE) PROGRAM

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 WUE goals is July 1, 2009. WUE goals must be established through a public process for a six-year period and re-evaluated each cycle.

The following items are required to be included in a municipal water suppliers WUE program in accordance with WAC 246-290-810(4):

- Description of the current WUE 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 Conservation Program

Granger’s current Water Use Efficiency (WUE) Program was prepared in June 2014 as part of the the 2016 *Small Water System Management Program* preparation and consisted 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 4-1 is a summary of the population, number of water services, water consumption, and per capita water consumption from 2013 to 2019. Further information on historical water use is provided in CHAPTER 2. Total system annual water consumption, annual residential demand, and demand per service per day has remained the same since 2013.

TABLE 4-1 WATER CONSUMPTION INFORMATION 2013-2019						
Year	Population*	Total Water Services	Annual Water Consumption (MG)	Annual Residential Consumption (MG)	Residential Water Services	Residential Avg. Day Consumption per service (gal/service/day)
2013	3,315	740	82.363	46.161	645	196
2014	3,495	753	76.617	44.835	650	189
2015	3,640	791	78.73	47.207	678	191
2016	3,880	795	77.979	47.891	672	195
2017	3,905	822	81.845	47.712	684	191
2018	3,945	818	86.463	46.713	675	190
2019	4,075	837	87.349	50.819	690	202

* From Washington State OFM population estimates.

The City’s current *Water Use Efficiency Program* included a goal to reduce production by 0.5% over the next six years. As shown in Section 2.3.1, water production has remained steady over the last six years without a notable increase or decrease.

The City continues to replace aging and leaking water mains, service lines, and valves in an effort to reduce system demands. System demands and well production appear to remain steady despite continued system growth and addition of new water services.





4.1.3 Water Use Efficiency Goals

WUE goals are an integral component of the WUE program, setting the groundwork for more efficient use of water. The City of Granger has seen little change in annual consumption per service despite increases in new water service connections. Establishing a measurable goal for reducing water demand is essential to an effective WUE program. The City of Granger plans to further promote water use efficiency over the next planning period and has established the following WUE goal for their water system:

Reduce single-family residential water consumption per service by 1% over the next 10-year planning period.

It is anticipated that the reduction in single-family residential consumption per service could save about 500,000 gallons of water annually over the next 10-year period.

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.

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 4-2 shows the minimum number of measures required to be evaluated or implemented by the City of Granger.

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

A discussion of the demand side measures that the City of Granger 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.





Splash Park Water Control – In 2018 the City completed construction of a splash park facility in the Granger City Park near the old location of the City’s municipal pool. The water recreation facility is a flow-through type system that uses a significant amount of water in the summer months, depending on weather conditions and usage. The City can control the flow rate and operating hours of the splash park to minimize water consumption while still providing a recreation opportunity for the community. If daily operation and use of the 197 gpm system is reduced by two hours over three months, approximately 2.1 million gallons could be saved each year.

WUE Measure Cost Estimate: \$0. Existing splash park controls allow City adjustment of operation hours and flow rate (if needed).

Estimated Water Savings: Approximately 2.1 million gallons a year.

WUE Measure Action Status: Planned for implementation in 2021.

Customer Leak Detection – City Public Works staff will work closely with utility billing staff in identifying high water usage customers. When high usage is identified, 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: \$1,500 for time and printing materials.

Estimated Water Savings: Unknown, but if 1% of customers have a 100 gpd leak, approximately 300,000 gallons will be conserved each in a year.

WUE Measure Action Status: Planned for implementation in 2023.

Water Bill Notifications – The City plans to place notices on monthly water bills to encourage customers to check for leaks and be aware of excessive water use due to leaks. This measure will further educate the public on the purpose of water conservation and the benefits of reducing excessive and/or unnecessary water use. Minimal costs associated with this measure include preparing the notification language and updating the billing software to print the selected message. The low cost of implementing this measure makes it an effective way to accomplish the specified efficiency goal.

WUE Measure Cost Estimate: \$500 for preparation of materials.

Estimated Water Savings: Unknown, but if further education reduces ADD by 1 gpd in 20% of services, approximately 60,000 gallons will be conserved annually.

WUE Measure Action Status: Planned for implementation in 2025.

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.

A summary of the estimated costs to implement the selected measures, their estimated water savings, and overall cost-effectiveness are provided in Table 4-3.



TABLE 4-3 SUMMARY OF DEMAND SIDE WUE MEASURES			
Measure Description	Implementation Cost	Planned Year of Implementation	Projected Water Savings
Splash Park Water Control	\$0	2021	2.1 MG
Customer Leak Detection – Single-Family Residential	\$1,500	2023	300,000 gallons
Customer Leak Detection – Multi-Family Residential	–	2023	–
Water Bill Notifications – Single-Family Residential	\$500	2025	60,000 gallons
Water Bill Notification – Multi-Family Residential	–	2025	–

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-year planning period to reduce the system's current DSL percentage and satisfy the City's Water Loss Control Action plan objective. The estimated cost of these measures and anticipated water savings are also provided.

Source Meter Calibration – To obtain more accurate water production information and potentially reduce the City's current DSL percentage, Granger will begin calibrating its primary source meter every two to three years. 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 475,000 gallons, considering about 95 million gallons were pumped into the system in 2019. 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: \$2,000 for a spare source meter and \$1,000 annually for meter calibration.

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

WUE Measure Action Status: To be implemented in 2022.

Service Meter Replacement – Granger regularly replaces service meters that fail or are known to be inaccurate. Routine replacement of inaccurate, worn, or malfunctioning meters will help to further reduce DSL. Malfunctioning services meters can result in lost revenue or excessive usage going undetected. The City budgets approximately \$1,000 annually for replacement of service meters.

WUE Measure Cost Estimate: \$1,000 annually.

Estimated Water Savings: Unknown.

WUE Measure Action Status: Implemented.





Reservoir Cleaning and Inspection – The City periodically cleans and inspects its concrete reservoirs for damage, cracking, and any other deficiencies. Cracking 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 deficiencies and potential DSL. The approximate cost of inspecting and cleaning the City’s reservoirs is \$10,000, assuming no significant repairs are necessary.

WUE Measure Cost Estimate: About \$10,000 every 5 years.

Estimated Water Savings: Unknown.

WUE Measure Action Status: Implemented.

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

TABLE 4-4 SUMMARY OF SUPPLY SIDE WUE MEASURES			
Measure Description	Implementation Cost	Planned Year of Implementation	Projected Water Savings
Source Meter Calibration	\$3,000	2022	Unknown
Service Meter Replacement	\$1,000 annually	Implemented	Unknown
Reservoir Cleaning and Inspection	\$10,000	Implemented	Unknown

4.1.5 WUE Measure Implementation

A summary of the WUE program measures that are planned for implementation is provided in Table 4-5, including measure description, implementation cost, and year of implementation. All implemented measures support the system’s WUE goals to reduce distribution system leakage and residential consumption.

TABLE 4-5 SUMMARY AND PROJECTED SAVINGS OF WATER USE EFFICIENCY MEASURES			
Measure Description	Implementation Cost	Planned Year of Implementation	Projected Water Savings
Splash Park Water Control	\$0	2021	2.1 MG
Customer Leak Detection – Single-Family Residential	\$1,500	2023	300,000 gallons
Customer Leak Detection – Multi-Family Residential	–	2023	–
Water Bill Notifications – Single-Family Residential	\$500	2025	60,000 gallons
Water Bill Notification – Multi-Family Residential	–	2025	–
Source Meter Calibration	\$3,000	2022	Unknown
Service Meter Replacement	\$1,000 annually	Implemented	Unknown
Reservoir Cleaning and Inspection	\$10,000	Implemented	Unknown

The City plans to budget funds as necessary to complete the WUE measures listed above in TABLE 4-. These budget amounts are reflected in the proposed City of Granger financial plan in CHAPTER 9, 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. Granger currently publicizes its water conservation program in its annual *Consumer Confidence Report* to inform customers of the City's conservation efforts. In the future, the City plans to provide additional conservation information to customers in their annual *Consumer Confidence Report*, to further educate the public on the purpose of using water more efficiently.

Customer education programs that Granger 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 *Consumer Confidence 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, Granger intends to initiate program promotion with its annual *Consumer Confidence Report* and water bill notifications.
- 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.
- 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.
- 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.

At this time, Granger does not plan to further evaluate or implement any of the additional customer education programs listed above.

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.



Granger 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*, which will be published on the City's website. WUE Program effectiveness will also be evaluated every six years when the Water System Plan is updated again. At this time both goals and measures will be reevaluated to determine the most cost-effective method to achieve the updated goals.

4.2 DISTRIBUTION SYSTEM LEAKAGE

4.2.1 Distribution System Leakage Summary

The distribution leakage standard is a significant element of the WUE requirements. This standard requires that all water systems monitor total water consumption by all services. The difference between water consumption and water production is considered DSL. DSL includes meter inaccuracies, water theft, leaking water mains, and reservoir overflows. DSL may also include un-metered uses such as hydrant use for firefighting, and water used for distribution system flushing (if these uses are un-metered or un-estimated). The WUE Rule requires water distribution leakage to be 10% or less of total production based on a three-year rolling average.

All the City's water sources are metered, and the meters are read daily. All services in City's distribution system are metered and read monthly. When replacement meters are needed, meters are purchased through the City's Water Operating Fund. A summary of the City's water production, consumption, and distribution system leakage for the last three years is provided in Table 4-6.

TABLE 4-6 DISTRIBUTION SYSTEM LEAKAGE SUMMARY 2017-2019				
Year	Production	Consumption	DSL	% DSL
2017	97,828,800	81,845,311	15,983,489	16.34%
2018	93,955,000	86,464,748	7,490,252	7.97%
2019	95,400,000	87,348,344	8,051,656	8.44%
3-Year Average	95,118,267	82,095,962	13,022,305	13.69%

Granger does not currently meet the 10% DSL leakage standard, based on the most recent three-year average. However, the last two years show a significant improvement in DSL. It should be noted that the DSL calculations for years prior to year 2018 are higher than those provided in the annual WUE reports. The reason for this difference is unknown but is possibly due to data inaccuracies in preparation of the annual reports. The three-year average is expected to be below the 10% DSL standard, starting in year 2020. The City will continue to monitor water production and consumption and make further improvements to continue reducing the DSL percentage.

4.2.2 Water Loss Control Action Plan

Water systems exceeding the 10% DSL standard must develop a Water Loss Control Action Plan (WLCAP) to achieve the primary objective of reducing DSL below 10%. The WLCAP must include information on measures that will be used to reduce DSL, an estimate of how long it will take to meet the DSL standard, and a budget demonstrating how leakage control will be paid for.





CHAPTER 4 – WATER USE EFFICIENCY (WUE) PROGRAM 2021 WATER SYSTEM PLAN

As discussed in Section 4.1.4, the City plans to begin routine source meter calibration, continue replacement of malfunctioning service meters, and continue regular cleaning and inspection of its storage tanks in an effort to further reduce the difference between production and consumption and identify potential leakage that may contribute to increases in DSL. The City also plans to replace aging and potentially leaking water mains, valves, and hydrants through recommended system improvements.

The DSL percentage in the last two years is below the 10% standard. This recent trend is expected to continue. The City anticipates meeting the 10% leakage standard by year 2021 but will continue to implement supply measures and distribution system improvements to further reduce the DSL percentage in future years. The cost of implementing the WLCAP will be through budgeting funds to implement WUE measures as described in Section 4.1.5.

