

# Hawthorne Utilities

## WATER CONSERVATION PLAN

### 2019



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## INTRODUCTION

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The Nevada State Demographer estimates the total population of Hawthorne, Nevada decreased over the 14 years between 2000 and 2014 from 3,134, to 3,023 respectively. In 2005 Hawthorne Utilities had 1,702 connections. In 2019 the total connections were 1805, indicating a growth rate of approximate 0.5 percent per year over 10 years. As a result of the population growth and low connection rate there has not been a substantial increase in demand over that period.

Because of the limited revenue related to low growth Hawthorne Utilities, the utility must balance conservation with revenue requirements. In order to maintain this balance the utility has instituted an inclining block rate structure which encourages conservation while generating sufficient revenue for the operation of the utility.

Using the State Demographer total population estimate of 3,023 in 2014, current average per capita water use in Hawthorne is 121.1 gallons per person per day. Additional water savings could be achieved through the efforts of individual customers who currently use the most water. Additionally, since the last conservation plan was drafted in 2016, Hawthorne replaced the water distribution lines and upgraded to smart meters in about two thirds of town. The new distribution lines and meters have reduced unaccounted for water.

This conservation plan has been created with the above mentioned elements in mind and includes the following:

- Conservation goals
- Existing and planned conservation measures and incentives
- Hawthorne use profile
- Educational materials
- Drought Ordinance

This plan is compliant with Nevada Revised Statutes (NRS) sections 540.121 through 540.151 and is available for public inspection during office hours at the following locations:

**Hawthorne Utilities**  
**395 E Street**  
**Hawthorne, Nevada 89415**  
**(775) 945-2486**

**Mineral County Library**  
**110 1<sup>st</sup> Street**  
**Hawthorne, Nevada 89415**  
**(775) 945-2778**

Public comments about this plan are encouraged. Written comments may be sent to the Hawthorne Utilities office address above.

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## SECTION 1 – CONSERVATION GOALS

The following goals have been selected based upon Hawthorne Utilities current budget and staffing capabilities. Goals 1.1 and 1.2 address two of the three general categories of conservation incentives; educational and regulatory. Goal 1.3 focuses on managerial conservation measures that will allow for future conservation efforts. The objective will be to insure that the conservation plan is periodically revised to meet changing needs and resources.

### 1.1 Establishment of a Conservation Budget

Currently Hawthorne Utilities does not have specific money set aside for conservation purposes. A line item in the budget should be created for conservation incentives and for the purchase and distribution of conservation education materials. It would also be used to pay for the administrative costs associated with the creation of programs, procedures, and codes. Hawthorne Utilities does purchase conservation outreach and educational materials through services and supplies, but should be utilizing a specific line item dedicated to conservation. The utility participates in many community events and has used those opportunities to distribute such materials to the public.

### 1.2 Continue the Conservation Education Program

The creation of an education program will need to be done in stages. The first stage will be to distribute educational materials (see section 3). Conservation materials may be made available at the Hawthorne Utilities office, the Mineral County Library, and distributed by mail. The next stage may be periodic visits to local schools. After evaluating the success of these initial stages, the program can be fine-tuned in order to maximize efforts and expense. One of the primary focuses of the program will be to encourage low water use landscape including the reduction in lawn size or xeriscaping.

### 1.3 Conservation Plan Review

This plan will be reviewed and revised every five (5) years. Plan adoption and revision will conform to NRS 540.131 (2) and (4). Per these sections any interested person shall have the opportunity, “including, but not limited to, any private or public entity that supplies water for municipal, industrial or domestic purposes, to submit written views and recommendations on the plan.” Every revision will be made available for inspection by these persons or entities.

This plan is available for public inspection during office hours at the following location:

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**SECTION 2 – WATER USE PROFILE AND FORECAST**

This section outlines a profile of water production and use as well as a quantitative description of the Hawthorne Utilities water system that will include the following:

- Water rights information
- Existing supply sources and their production
- System water use profile with customer classifications and unaccounted for water

The purpose of this section is to compare water sources with demand and establish a basis for conservation measures and incentives.

**TABLE 2.1 Water Rights**

Table 2.1 summarizes current water rights permits and certificates held by Hawthorne Utilities.

**TABLE 2.1**

Summary of Hawthorne Utilities Ground Water Rights

App	Cert	Manner of Use	Well Desig	Point of Diversion					Div Rate (CFS)	Annual Duty (AFA)
				QQ	Qtr	Sec	TwN	Rng		
15750	4802	MUN	Well 2 (I Street)	SW	SE	27	08N	30E	0.31	224.428657
26663	9192	MUN	??	SE	NE	8	07N	30E	0.1	72.395351
26854	9194	MUN	Well 5	SE	NE	33	08N	30E	2.5	1809.484818
29761	9751	MUN	Non Potable	SE	SE	3	07N	29E	1.220000029	882.94
29762	9752	MUN	Non Potable	NE	NE	10	07N	29E	1.220000029	882.94
48897		OTH		NW	SW	33	08N	30E	2.1	1520
49948	1553 8	MUN	WF Well 2	SE	NE	18	06N	31E	2	574.590147
49949	1553 9	MUN	WF Well 1	NW	NW	20	06N	31E	1.4	424.889205
62876		MUN	WF Well 3	NE	SE	18	06N	31E	1.5	500
66430		MUN	WF Well 3	NE	SE	18	06N	31E	0.5	250
									<b>Total Combined Duty<sup>*</sup></b>	<b>1,500</b>
75616		MUN	W06	S W	SE	21	08N	30E	0.78	565
75617		MUN	W06	S W	SE	21	08N	30E	0.78	565
									<b>Total Combined Duty<sup>**</sup></b>	<b>5,054.25</b>

<sup>\*</sup>Permit Nos. 49948, 49949, 62876, and 66430 have a Total Combined Duty of 1,500 AFA, may be total combined diversion rate of 3.35 cfs

<sup>\*\*</sup>Permit Nos. 15750, 26663, 26854, 29761, 29762, 48897, 49948, 49949, 62876, 66431, 75616, and 75617 have a Total Combined Duty of 5,054.25 AFA

2.2 Supply Sources and Production

Table 2.2 shows the well demand in millions of gallons for 2018.

**TABLE 2.2**

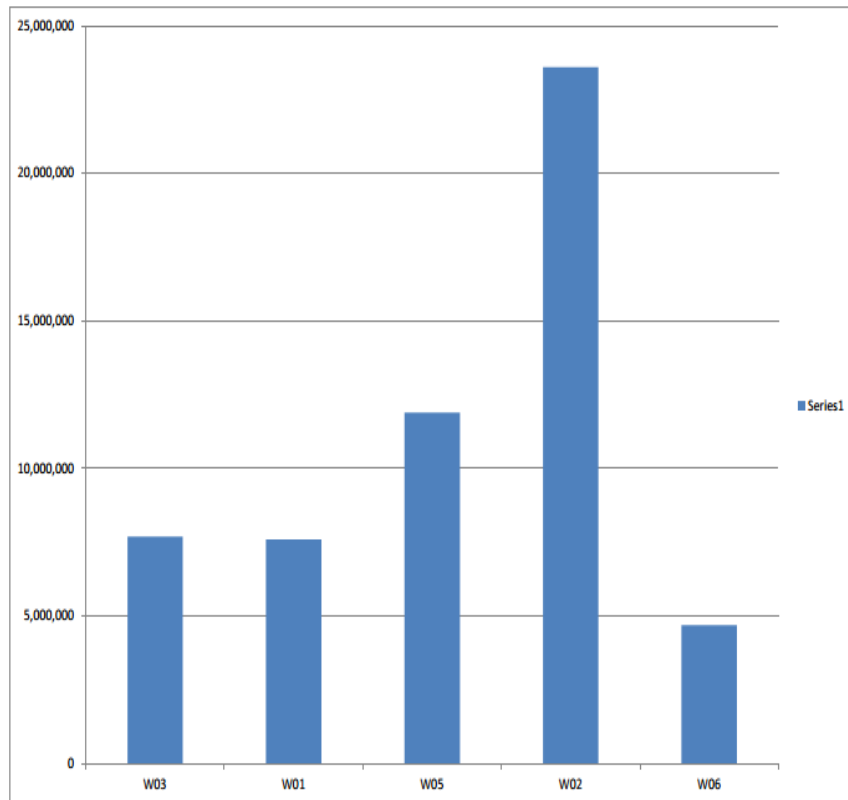
Peak Demand for 2018

Name	2018 Peak Demand (millions of gallons)	Month of Peak Demand
W03 (Whiskey Flats #1)	7.7	June
W01 (Whiskey Flats #2)	7.6	July
W05 (Whiskey Flats #3)	11.95	July
W02 (I Street Well #2)	23.6	September
W06 (Babbitt Well #7)	1.7	August

Figure 2.2 shows the Peak Demand production amounts for 2018 .

**FIGURE 2.2**

Well Production 2018 (Peak Demand totals for wells listed in Table 2.2)



**2.3 Water Use Profile**

Hawthorne Utilities customers can be divided into 5 basic groups for the purpose of determining the use profile. These groups include:

- Residential
- Commercial
- Industrial
- Institutional/Government
- Agricultural

Table 2.3 shows the customer use totals and per connection amount for the period January 1, 2018 to December 31, 2018. For the same period, Figure 2.3.1 is the water use percentages for Hawthorne Utilities customers and Figure 2.3.2 shows the amount of unaccounted for water. It should be noted that the amount of unaccounted for water is a rough approximation. Some water has been used for dust control as well as for flushing the wells. The unaccounted-for amount has been reduced substantially since 2015. This is due to improvements in the water and sewer systems that included the replacement of all distribution and collection lines as well as meters throughout the system.

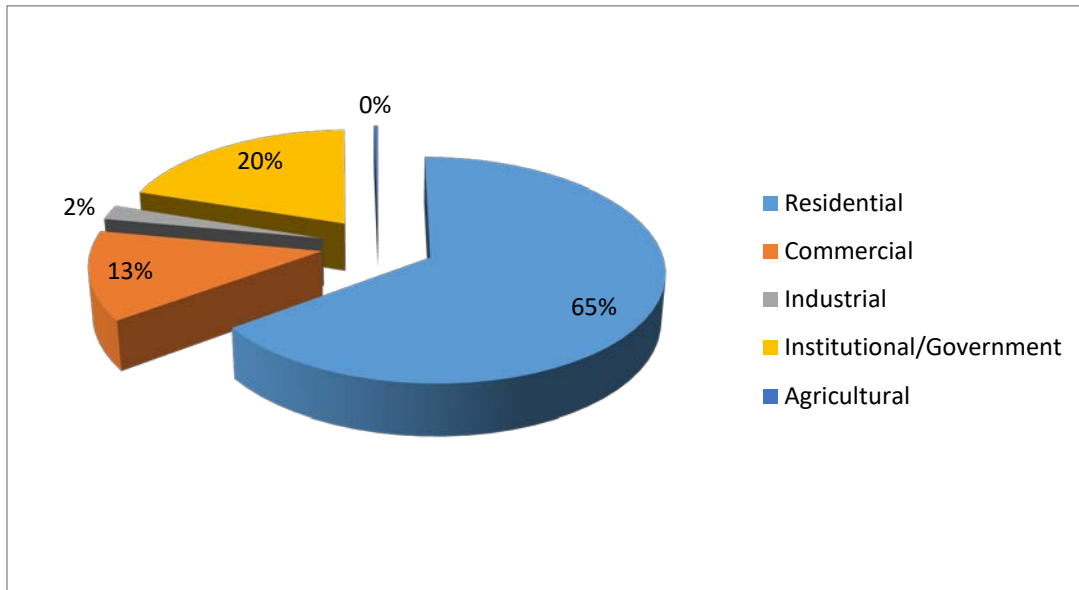
**TABLE 2.3**

Annual Customer Usage for 2018

Connection Type	Total Use / Type (Millions of Gallons)	No. of Connections	Use / Connection (1000's of Gallons)
Residential	145	1,426	101.7
Commercial	29	121	239.7
Industrial	4.7	6	783.3
Institutional/Government	43.8	63	695.2
Agricultural	0.7	20	35
<b>Total</b>	<b>223.2</b>	<b>1,636</b>	

**FIGURE 2.3.1**

Use Percentages by Customer Class 2018



**FIGURE 2.3.2**

Unaccounted-for Water 2018

<b>Name</b>	<b>Well Pumpage Report (Millions of gallons)</b>
W03 (Whiskey Flats #1)	52.6
W01 (Whiskey Flats #2)	53.1
W05 (Whiskey Flats #3)	79.9
W02 (I Street Well #2)	79.2
W06 (Babbitt Well #7)	5.1
<b>Total Pumped</b>	<b>269.9</b>
<b>Total Water Sold</b>	<b>223.2</b>
<b>Water Loss</b>	<b>46.7</b>
<b>Loss %</b>	<b>17%</b>

Per the 2010 United States Census, the average household size in Hawthorne is 2.3 persons. For 2018 the average gallons used per household per day in Hawthorne is 278.6 gallons per day so per capita use is approximately 121.1 gallons per capita per day (GCPD).

#### **2.4 Water Demand Forecast**

At this time a demand forecast is stagnant, Hawthorne has not experienced population growth. According to U.S. Census Data the population decreased by 851 from 1990 to 2000 (4162 to 3311) and by 42 between 2000 and 2010.

Possible growth is likely in the near future so water demand should increase slightly based on current economic development. Once the results occur by the next Census there should be potential growth in the town of Hawthorne.



## SECTION 3 – CONSERVATION INCENTIVES

Conservation incentives increase awareness to encourage conservation. There are three general categories of conservation incentives; Educational, Financial, and Regulatory. The inclining block rate structure used by Hawthorne Utilities can be considered a financial incentive since rates increase with consumption Hawthorne Utilities is encouraging conservation. Regarding regulatory incentives, a copy of the drought conditions Mineral County Code Title 13, Chapter 30 and water conservation requirements Chapter 13.32 of water ordinance 192A are included in Appendix B.

This section covers the incentives that are planned for the Hawthorne Utilities service area.

### 3.1 Educational Conservation Incentives

3.1.1 Literature. The American Water Works Association (AWWA) and the University of Nevada Cooperative Extension Service publish a number of water conservation related pamphlets. Some of these pamphlets can be selected by Hawthorne Utilities to be distributed to water customers and made available at the Hawthorne Utilities office. Appendix F includes summaries of these pamphlets.

Hawthorne Utilities currently has a Lawn Care Guide that is available upon request. The Guide is shown in Appendix H and Appendix C includes a list of water saving plants that are idea for the Hawthorne area.

### 3.2 Regulatory Conservation Incentives

3.2.1 Drought Conditions and Water Conservation Requirements Chapters from Water Ordinance 192A. Water Ordinance, Title 13 chapter 30 and 32 have been included in the Mineral County Code as of 2006. Appendix B includes a copy of these chapters.

### 3.3 Financial Conservation Incentives

3.3.1 Water Meters. Hawthorne Utilities distribution system is fully metered at all end user connections. In 2011 Hawthorne Utilities started replacing the old conventional meters with Igloo Smart Meters. Currently 1,200 have installed. Smart Meters are installed at all new connections when service is activated. Meters are read monthly for billing purposes and the consumption data is also used for water auditing.

3.3.2 Water Rates. Hawthorne Utilities has an inclining block rate structure. This type of rate structure encourages conservation because rates increase with consumption. The most recent rate schedule (see Table 3.1) became effective July 1, 2018 and is reviewed annually by the Mineral County Commissioners.

**TABLE 3.1**

Hawthorne Utilities Rate Schedule

Block Limits	Cost Per 1000 Gallons						Standpipe
	¾"	1"	1 ½"	2"	3"	Low Income	
Base Rate/5000 gal	16.44	17.74	21.18	25.29	30.76	8.23	20.56
5,001 – 10,000	1.04	1.04	1.04	1.04	1.04	1.04	\$5.36 Per 1,000 gal
10,001 – 20,000	1.20	1.20	1.20	1.20	1.20	1.20	
20,001 – 30,000	1.35	1.35	1.35	1.35	1.35	1.35	
30,001 – 40,000	1.52	1.52	1.52	1.52	1.52	1.52	
40,001 – 50,000	1.71	1.71	1.71	1.71	1.71	1.71	
40,001 and above, Corey Canyon	6.02	6.02	6.02	6.02	6.02	6.02	
50.001 and above	1.87	1.87	1.87	1.87	1.87	1.87	

It is estimated that the distribution of literature that promotes water-wise habits would result in savings from 2-5%. Calculated from the total usage of 223.2 million gallons annually that would be a savings of about 4.46-11.2 million gallons per year.

Connection metering saves about 20% of water. Calculated from the total usage of 223.2 million gallons annually that would be a savings of about 44.6 million gallons per year.

A system using a 10% inclining usage rate is estimated to save 2-4% in residential use and 5-8% in non-residential use. Calculated from residential usage of 145 million gallons sold annually the savings would be 2.9-5.8 million gallons annually. Calculated from non-residential water usage of 78.2 million gallons annually the savings would be 3.9-6.3 million gallons annually.

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## SECTION 4 – CONSERVATION MEASURES

This section describes current and planned conservation measures within the Hawthorne Utilities service area. A conservation measure is a device or practice that reduces water consumption. Conservation measures are divided into two fundamental categories; Hardware or equipment and Behavioral or management practices. Examples of hardware measures include low-volume toilets and irrigation rain sensors. Examples of behavioral measures include not using the toilet as a trash can and watering lawn less frequently.

Some conservation measures are mandated by state and/or federal laws and others are voluntarily implemented by local water purveyors and/or customers. This section describes conservation measures that Hawthorne Utilities plans to implement and measures that can be implemented by Hawthorne Utilities customers.

### 4.1 Plumbing Standards

The most recent National Efficiency Standards for Fixtures and Appliances are included in Appendix G. These standards can help consumers make wise conservation related decisions as they retrofit fixtures and purchase new appliances. Contractors can also use these standards to insure that fixtures and appliances used in new construction are compliant with the applicable National standards.

### 4.2 Hawthorne Utilities Conservation Measures

Conservation measures implemented by Hawthorne Utilities will consist of management measures only. This is because of the size of the utility and a population trend of minimal growth. A measure such as water reuse is not economically feasible at this time.

4.2.1 Establishment of a Conservation Budget. All materials and labor associated with conservation will require funding. Because the water system is small, funding will be limited so the budget will be conservative. Cost estimates will be made prior to the start of any program and nothing will be implemented prior to the approval of the budget.

4.2.2 Water Watcher Procedures. Large water utilities employ full-time personnel who specialize in water waste detection and enforcement. Their duties include patrolling neighborhoods searching for water waste problems, levying fines, and providing educational materials to water customers. It is not feasible for Hawthorne Utilities to hire full-time personnel for this purpose however existing field personnel are trained in waste recognition and enforcement procedures. These procedures include the following:

- Definitions of watering restrictions and any exceptions. This might include provisions for new sod or seed and differences between residential, commercial, industrial and institutional watering schedules.
- Instructions on how to turn off valves in the event of a broken pipe.
- Hydrant use
- Water stealing
- Distribution of educational materials
- Customer service/relations
- Waste warnings
- Waste complaint system (see Appendix E has an example waste complaint form)
- Reporting to the Director any issues that may result in warning notices or fines.

Warning notices designed to hang on doorknobs will be considered as part of the procedures. The intent of these procedures are to increase the effectiveness of the water ordinance.

**4.3 Estimated Effect of Incentives and Measures**

Currently, the average residential usage for Hawthorne is approximately 121.1 Gallons per Capita per Day (GCPD). The average household in Hawthorne is estimated to be 2.31 persons with 1,426 residential connections. The anticipated best way to conserve water is in landscape. Summer water use in Hawthorne is approximately 30 percent of total annual use. Since overall use is relatively low in Hawthorne, a reasonable estimate of reduction in landscape use would be 4 percent based on 8 month growing season.

Additional reduction is anticipated as conservation education continues. Currently due to drought conditions, the citizens of Hawthorne have become aware of the need for conservation. Since current overall use is relatively low in Hawthorne as compared to other areas of the State, a reasonable estimate of reduction in household use would be 4 percent.

Total projected conservation is shown in Table 4.3.

**TABLE 4.3**

Estimate use reduction

Use	Current GCPD	Projected GCPD	Projected Annual Gallons Saved
Landscape	36	35	1,202,332
House fixtures/Appliances	85	82	3,606,996
<b>Totals:</b>	<b>121</b>	<b>117</b>	<b>4,809,328</b>

Thus, residential GCPD water use is projected to be reduced by an overall total of 4 percent or 4,809,328 gallons annually.

**4.4 Water Users Conservation Measures**

Appendix A contains a list of conservation measures that can be implemented by water consumers. The list includes measures for residential, commercial, industrial and institutional applications. Also a list of water related websites are included in Appendix D.

## APPENDIX A – CONSERVATION MEASURES

Conservation measures are divided into two types: (1) Hardware/Equipment and (2) Behavioral/Managerial. Each of these is subdivided into five categories of application: (1) Residential, (2) Landscape, (3) Industrial, Commercial, and Institutional (ICI) (4) Agricultural, and (5) Purveyor. The following conservation measures will be classified first by application and then by type.

### A.1 RESIDENTIAL CONSERVATION MEASURES

#### A.1.1 Behavioral Measures

A.1.1.1 Residential Water Audits. Water audits could target high use customers first and then be offered to all customers. The following elements should be part of an effective audit.

- Purpose for the audit.
- Estimation of use for all fixtures and appliances.
- Check for and repair leaks.
- Evaluation of Landscape (See “Landscape Conservation Measures”)
- Evaluation of outdoor water use.
- Evaluate efficiency measures.
- Educate customers using available flyers

An audit should take no more than 30 to 45 minutes.

A.1.1.2 Additional Measures. The sample pamphlets in Appendix A include additional behavioral conservation measures.

#### A.1.2 Hardware/Equipment Measures

The following is a list of devices/practices that will reduce water consumption in the home.

Measure	Description
<b><i>Bathroom/Kitchen Fixtures</i></b>	
Low-flow toilets	1.6 gallons per flush
Toilet retrofit devices	Bladders (bags), dams, early close flappers, other hardware and adjustments
Toilet leak repairs	Includes detection (dye tabs) and replacement of worn parts.
Low-volume shower heads	2.5 gallons per minute @ 80 psi
Showerhead retrofit devices	Includes temporary cutoff valves and restrictors.
Low-volume faucets	2.5 gallons per minute @ 80 psi
Faucet retrofit devices	Includes aerators, activation sensors, self-closing and metered valves
Faucet maintenance	Includes washer replacement, repacking, tightening, and cleaning aerators
Water pressure reduction	Only needed if house pressure exceeds what's required
<b><i>High Efficiency Appliances</i></b>	
Clothes washers	27 gallons per load
Dish washers	4.5 gallons per load

**A.2 LANDSCAPE CONSERVATION MEASURES**

**A.2.1 Behavioral Measures**

A.2.1.1 Landscape Water Audits. Landscape water audits should be conducted on park and golf course irrigation systems and could be considered an option on residential irrigation systems, targeting high-volume users.

- Purpose for the audit.
- Estimation of outdoor use based on meter records.
- Check for and repair leaks.
- Evaluation of Landscape (size, soil, amount of turf, types of plants)
- Evaluation of irrigation system (timers, Use of drip, precipitation amounts).
- Efficiency recommendations.
- Educate customers using available flyers

A residential landscape audit should take no more than an hour. Parks and golf courses could take substantially longer.

A.2.1.2 Xeriscape™. Xeriscape is a method of landscaping that employs low-water use plants, turf, ground covers, shrubs and trees. It includes careful planning, soil analysis, and irrigation system design.

A.2.1.3 Additional Measures. The sample pamphlets in Appendix A include additional behavioral conservation measures.

**A.2.2 Hardware/Equipment Measures**

Landscape hardware measures consist of two basic groups: (1) Landscape materials and (2) irrigation equipment.

Measure	Description
<b><i>Landscape Materials</i></b>	
Trees, plants, and grass	Should be well suited to climate and altitude and be drought tolerant
Organic mulch	Grass clippings, leaves, wood chips, bark, and pine needles. Organic mulches help to retain soil moisture and keep ground cool around plants.
Inorganic mulch	Boulders, gravel, pavers, decomposed granite, and stepping stones. Inorganic mulches are generally more for decorative purposes but they reduce the amount of trees, plants, and turf thereby conserving water.
Compost	Made of manure or biosolids and wood, straw, grass, and leaves. Helps plants stay healthy and retains moisture in the soil.
<b><i>Irrigation Equipment</i></b>	
Valves	Should be sized to meet requirements and checked periodically for leaks
Sprinkler Heads	Should match water volume requirements of area being irrigated.
Sprinkler Nozzles	Should have proper arc of coverage and proper trajectory.
Irrigation Controllers	Should have required number of stations, programs, and starts. Also rain delays and sensor terminals.
Drip irrigation	Insures water is directed to where it's needed.

**A.3 INDUSTRIAL, COMMERCIAL, AND INSTITUTIONAL (ICI) CONSERVATION MEASURES**

**A.3.1 Behavioral and Hardware/Equipment Measures**

A.3.1.1 ICI Water Audits. Since ICI water audits can require a substantial amount of time (4 hours or more), it may be necessary to have a private engineering firm hired by the water user conduct the audit. There is incentive for ICI customers to pay for audits since the results of an audit could translate into substantial savings. An ICI water audit should include the following elements:

- Support from ICI owners, managers, and employees
- Survey/Estimation of facility use based on meter records.
- Calculation of water-related costs.
- Evaluation of efficiency measures.
- Evaluation of payback periods for measures.
- Efficiency recommendations and implementation.
- Tracking and reporting system.

A.3.1.2 Manual Washing. Manual washing is cleaning done on surfaces with hoses and cloths.

<b>MANUAL WASHING</b>	
<b>Behavioral Measures</b>	<b>Hardware/Equipment Measures</b>
<ul style="list-style-type: none"> <li>• Surfaces should be swept or brushed off before using water to clean.</li> </ul>	<ul style="list-style-type: none"> <li>• High pressure low-volume hoses with automatic off nozzles</li> <li>• High-pressure pumps, steam cleaners.</li> </ul>

A.3.1.3 Vehicle Washing. Vehicle washing includes manual washing and automated car washes or a combination of both.

<b>VEHICLE WASHING</b>	
<b>Behavioral Measures</b>	<b>Hardware/Equipment Measures</b>
<ul style="list-style-type: none"> <li>• Limit number of spray nozzles and set flow rates at lowest volume and pressure required.</li> <li>• Adjust nozzles in automated systems so that they take full advantage of gravity and position. Also make sure water is off after vehicles have passed.</li> <li>• Increase conveyor speeds or reduce rinse cycle time.</li> <li>• Sweep wash area before using water to clean.</li> <li>• Establish a regular maintenance schedule that includes checking for leaks and making repairs.</li> </ul>	<ul style="list-style-type: none"> <li>• Recycling systems. These would include filters and storage tanks.</li> <li>• High pressure pumping systems.</li> </ul>

A.3.1.4 Kitchens and Restaurants. Kitchen and restaurant conservation is divided into four areas of application; 1. Food and drink preparation, 2. Dishwashing, 3. Garbage disposal and scraping trough, and 4. Ice making.

**FOOD AND DRINK PREPARATION**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Presoak and wash food service articles in basins instead of running water.</li> <li>• Reduce thawing of food with hot water unless required by law. If required use lower flow.</li> <li>• Avoid running water to melt ice in sinks.</li> <li>• Use full loads in dishwashers and other automated equipment.</li> <li>• Serve water only when requested by customers.</li> </ul>	<ul style="list-style-type: none"> <li>• Low-volume faucets</li> <li>• Hands-free foot pedal valves for faucets</li> <li>• On demand hot water dispensers</li> </ul>

**DISHWASHING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Presoak utensils, dishes, and pots and pans in basins of water instead of using running water prior to loading dishwashing machines.</li> <li>• Scrape food off of plates rather than use running water.</li> <li>• Operate scraping troughs only while dishes are actually being washed.</li> <li>• Assess the water efficiency of the current dishwashing system to determine where improvements might be made.</li> <li>• Always wash full loads in automated machines.</li> <li>• Operate conveyor type dishwashers only when dishes are actually passing through the machine.</li> <li>• Verify that the dishwashing equipment is using the minimum amount of flow recommended by the manufacturer.</li> <li>• Since many older automated dishwashing systems are neither energy nor water efficient, evaluate the cost of retrofitting or replacing existing equipment.</li> <li>• Turn dishwashers off when not in use.</li> <li>• Routinely check all dishwashing equipment to ensure there are no leaks.</li> <li>• Post signs requesting that personnel minimize their use of utensils, dishes, and pots and pans to save water.</li> </ul>	<ul style="list-style-type: none"> <li>• Manual pre-wash sprayers with “dead man” with off controls.</li> <li>• Low-flow spray heads on all sprayers.</li> <li>• New water efficient dishwashing equipment.</li> <li>• Electronic eye sensors that shut off conveyer type systems when dishes are not passing through the machine.</li> </ul>



**GARBAGE DISPOSER AND SCRAPING TROUGH**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Eliminate disposers and troughs.</li> <li>• Use the minimum acceptable flow rate on all machines.</li> <li>• Reuse wastewater in the mixing chamber of the disposer.</li> </ul>	<ul style="list-style-type: none"> <li>• Garbage strainers (instead of disposers)</li> <li>• Sensors that detect the amount of flow in a disposer and regulate flow accordingly.</li> <li>• Solenoid valves that turn water off when the disposer is off.</li> <li>• Flow regulators for disposer supply lines.</li> </ul>

**ICE MAKERS**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Use the minimum flow rate recommended by the manufacturer on water cooled icemakers.</li> <li>• Adjust machines to produce ice only when it's needed.</li> </ul> <p>Collect spent cooling water and reuse it for non-potable purposes.</p>	<ul style="list-style-type: none"> <li>• Air-cooled icemakers.</li> <li>• Re-circulating systems for water-cooled icemakers.</li> <li>• Ice flake machines that use less bleed off than cube machines.</li> </ul>

A.3.1.5 Laundries and Laundromats. This section includes measures that are applicable in hotels, motels, hospitals, nursing homes, diaper services, restaurants, and coin operated Laundromats.

**LAUNDRIES AND LAUNDROMATS**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Operate equipment with full loads only.</li> <li>• Reduce water levels for partial loads.</li> <li>• Back flush filters or softeners only when necessary.</li> </ul>	<ul style="list-style-type: none"> <li>• Computer controlled rinse water reclamation systems.</li> <li>• Wash and rinse water treatment and reclamation systems.</li> <li>• Continuous batch washers.</li> <li>• Ozone laundry systems.</li> <li>• Horizontal axis washers.</li> </ul>

A.3.1.6 Swimming Pools. The measures in this section can be applied to commercial and residential swimming pools.

**SWIMMING POOLS**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Limit the frequency of pool refilling.</li> <li>• Cover the pool with an insulated cover when not in use to reduce losses due to heat and evaporation.</li> <li>• Reduce the level of the pool to avoid losses due to splashing.</li> <li>• Lower the pool temperature.</li> <li>• Back wash filters only when necessary. If backwash is timed, verify that frequency is efficient.</li> <li>• Regularly check pool for leaks and cracks. Keep pool and filter clean to avoid unnecessary backwashing.</li> </ul>	<p>There are no special equipment measures that would help conserve water in pools. It is important however that available equipment is efficient and used properly as recommended by manufactures.</p>

A.3.1.7 Cooling Systems. This section includes measures for three types of cooling systems: 1. Single-pass, 2. Evaporative, and 3. Equipment. Single-pass cooling uses fresh water to cool without re-circulating any of the water used in the first pass. Evaporative coolers are used for cooling in commercial and residential applications and are commonly known as swamp coolers. Equipment cooling includes both single-pass and re-circulating systems that are used to cool equipment and machinery.

**SINGLE-PASS COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Reuse water for landscaping, vehicle washing, or another cooling application that allows for water to be at a higher temperature.</li> <li>• Eliminate single-pass systems.</li> </ul>	<ul style="list-style-type: none"> <li>• Air-cooled equipment (i.e. compressors, pumps, icemakers, etc...)</li> <li>• Automatic controls that insure coolers only operate when needed.</li> </ul>

**EVAPORATIVE COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Regularly check for leaks in hoses and pan.</li> <li>• Replace pads at least annually.</li> <li>• Shut off cooler off when building is unoccupied.</li> <li>• Annually service the equipment by oiling moving parts and cleaning off accumulated scale or corrosion.</li> </ul>	<p>There are currently no equipment measures for evaporative coolers. The design of the coolers is relatively simple.</p>

**EQUIPMENT COOLING**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Reuse water in single pass systems for other cooling purposes. Examples of reuse include cooling molten materials, landscape, or boiler make-up water.</li> <li>• Replace al single pass cooling systems with closed-loop systems or replace water-cooled equipment with air-cooled.</li> </ul>	

A.3.1.8 Heating Systems. This section deals with conservation measures for boilers and steam generators which are used to heat large buildings and multiple-building facilities.

**HEATING SYSTEMS**

Behavioral Measures	Hardware/Equipment Measures
<ul style="list-style-type: none"> <li>• Regularly inspect systems for leaks and make repairs.</li> <li>• Insulate all piping.</li> <li>• Limit boiler bleed-off to a level that satisfies water quality requirements.</li> <li>• Discharge blow-down into an expansion tank instead of using cold water to cool it.</li> </ul>	<ul style="list-style-type: none"> <li>• Flow meters for make-up and blow-down valves.</li> <li>• Automatic controls to discharge blow-down.</li> </ul>

A.3.1.9 Leaks and Water Losses. This section covers water conservation measures relating to leaks and losses.

<b>LEAKS AND WATER LOSSES</b>	
<b>Behavioral Measures</b>	<b>Hardware/Equipment Measures</b>
<ul style="list-style-type: none"> <li>• Regularly check for leaks at all water connections. Keep in mind that higher pressure applications have more incidences of leakage.</li> <li>• Regularly check all vessels that contain water for cracks or bad seals.</li> <li>• Regularly check all heating and cooling systems.</li> <li>• Repair any leaks that are discovered.</li> </ul>	<ul style="list-style-type: none"> <li>• Leak detection equipment. This could include sonic or probe type equipment.</li> <li>• Any equipment used to stop a leak. This would depend on the material of the pipe or vessel that has a leak.</li> </ul>

A.3.1.10 ICI Maintenance Practices. This section reemphasizes maintenance conservation measures for ICI facilities that have been mentioned in previous sections. These measures should become standard procedure at all ICI facilities.

- Create a maintenance schedule that includes schedules for leak detection inspections and meter reading, and repair procedures.
- Monitor water-use records keeping track of any increases or decreases in use.
- Conduct water audits every one to three years.
- Shut off supply lines to areas that are not being used.
- Install pressure reducers where feasible.
- Keep a maintenance schedule to clean cooling and heating equipment regularly.
- Recycle and reuse water when feasible.
- Insulate all hot water pipes.
- Replace old equipment with water saving equipment.
- Install timers wherever possible.
- Educate employees on water saving techniques.

**A.4 General Residential Behavioral Measures**

This list of conservation behaviors and is divided into four parts: Home, Landscaping, Community, and Miscellaneous.

**HOME BEHAVIORS**

1. When washing dishes by hand, don't let the water run while rinsing. Fill one sink with wash water and the other with rinse water.
2. Don't use running water to thaw food.
3. Teach your children to turn the faucets off tightly after each use.
4. Soak your pots and pans instead of letting the water run while you scrape them clean.
5. Keep a pitcher of water in the refrigerator instead of running the tap for cold drinks, so that every drop goes down you not the drain.
6. Designate one glass for your drinking water each day. This will cut down on the number of times you run your dishwasher.

7. Wash your produce in the sink or a pan that is partially filled with water instead of running water from the tap.
8. Collect the water you use for rinsing produce and reuse it to water houseplants.
9. Scrape off food with a utensil or used paper napkin when pre-cleaning for dishwasher.
10. Throw trimmings and peelings from fruits and vegetables into your yard compost to prevent from using the garbage disposal.
11. Use the garbage disposal sparingly. Compost instead and save gallons every time.
12. Cook food in as little water as possible. This will also retain more of the nutrients.
13. Select the proper size pans for cooking. Large pans require more cooking water than may be necessary.
14. Do not pre-rinse dishes except in cases of sticky or burn-on food.
15. If you accidentally drop ice cubes when filling your glass from the freezer, don't throw them in the sink. Drop them in a house plant instead.
16. For hanging baskets, planters and pots, place ice cubes under the moss or dirt to give your plants a cool drink of water and help eliminate water overflow.
17. Install an instant water heater on your kitchen sink so you don't have to let the water run while it heats up. This will also reduce heating costs for your household.
18. Cut back on rinsing if your dishwasher is new. Newer models clean more thoroughly than older ones.
19. We're more likely to notice leaky faucets indoors, but don't forget to check outdoor faucets, pipes, and hoses for leaks.
20. Grab a wrench and fix that leaky faucet. It's simple, inexpensive, and can save 140 gallons a week.
21. Insulate hot water pipes so you don't have to run as much water to get hot water to the faucet.
22. Turn off the water while you brush your teeth and save 4 gallons a minute. That's 200 gallons a week for a family of four.
23. Make sure there are aerators on all of your faucets.
24. When you are washing your hands, don't let the water run while you lather.
25. Turn off the water while you shave and you can save more than 100 gallons a week.
26. To save water and time, consider washing your face or brushing your teeth while in the shower.
27. If your shower can fill a one-gallon bucket in less than 20 seconds, then replace it with a water efficient showerhead.
28. Time your shower to keep it under 5 minutes. You'll save up to 1,000 gallons a month.
29. Before you lather up, install a low-flow showerhead. They're inexpensive, easy to install, and can save your family more than 500 gallons a week.
30. Turn the water off while you shampoo and condition your hair and you can save more than 50 gallons a week.

31. Keep a bucket in the shower to catch water as it warms up or runs. Use this water to flush toilets or water plants.
32. Plug the bathtub before turning the water on, and then adjust the temperature as the tub fills up.
33. Bathe your young children together.
34. Install low-volume toilets.
35. Drop that tissue in the trash instead of flushing it and save gallons every time.
36. Put food coloring in your toilet tank. If it seeps into the toilet bowl, you have a leak. It's easy to fix, and you can save more than 600 gallons a month.
37. Make sure your toilet flapper doesn't stick open after flushing.
38. If your toilet was installed prior to 1980, place a toilet dam or bottle filled with water in your toilet tank to cut down on the amount of water used for each flush. Be sure these devices do not interfere with operating parts.
39. Listen for dripping faucets and toilets that flush themselves. Fixing a leak can save 500 gallons each month.
40. When doing laundry, match the water level to the size of the load.
41. Wash clothes only when you have a full load and save up to 600 gallons each month.
42. Pre-treat stains before washing clothes to avoid re-washing.
43. Use the shortest wash cycle for lightly soil cloths.
44. Run your washing machine and dishwasher only when they are full and you could save 1,000 gallons a month.
45. Check washing machine hoses regularly for leaks.
46. When you shop for a new appliance, consider one offering cycle and load size adjustments. They are more water and energy-efficient than older appliances.
47. Make sure you know where your master water shut-off valve is located. This could save gallons of water and damage to your home if a pipe were to burst.
48. Install water softening systems only when necessary. Save water and salt by running the minimum number of regenerations necessary to maintain water softness.
49. Choose new water-saving appliances, like washing machines that save up to 20 gallons per load.
50. When you clean your fish tank, use the water you've drained on your plants. The water is rich in nitrogen and phosphorus, providing you with a free and effective fertilizer.
51. Evaporative coolers require a seasonal maintenance checkup. For more efficient cooling, check your evaporative cooler annually.
52. Winterize outdoor spigots when temps dip to 20 degrees F to prevent pipes from bursting or freezing.
53. Use a broom instead of a hose to clean your driveway or sidewalk and save 80 gallons of water every time.
54. Check your water meter usage on bill to track your water usage monthly.

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**LANDSCAPE BEHAVIORS**

1. Check your sprinkler system frequently and adjust sprinklers so only your lawn is watered and not the house, sidewalk, or street.
2. Avoid planting turf in areas that are hard to water such as steep inclines and isolated strips along sidewalks and driveways.
3. Plant during the spring or fall when the watering requirements are lower.
4. Minimize evaporation by watering during the early morning hours, when temperatures are cooler and winds are lighter.
5. Use a layer of organic mulch around plants to reduce evaporation and save hundreds of gallons of water a year.
6. Divide your watering cycle into shorter periods to reduce runoff and allow for better absorption every time you water.
7. Only water your lawn when needed. You can tell this by simply walking across your lawn. If you leave footprints, it's time to water.
8. Adjust your lawn mower to a higher setting. Longer grass shades root systems and holds soil moisture better than a closely clipped lawn.
9. Use the sprinkler for larger areas of grass. Water small patches by hand to avoid waste.
10. Use porous materials for walkways and patios to keep water in your yard and prevent wasteful runoff.
11. Direct downspouts and other runoff towards shrubs and trees, or collect and use for your garden.
12. Install a rain shut-off device on your automatic sprinklers to eliminate unnecessary watering.
13. Choose a water-efficient drip irrigation system for trees, shrubs and flowers. Watering at the roots is very effective, be careful not to over water.
14. Reduce the amount of grass in your yard by planting shrubs and ground cover with rock and granite mulching.
15. Remember to check your sprinkler system valves periodically for leaks and keep the heads in good shape.
16. Don't water your lawn on windy days. After all, sidewalks and driveways don't need water.
17. Water your plants deeply but less frequently to create healthier and stronger landscapes.
18. When watering grass on steep slopes, use a soaker hose to prevent wasteful runoff.
19. Group plants with the same watering needs together to get the most out of your watering time.
20. Remember to weed your lawn and garden regularly. Weeds compete with other plants for nutrients, light, and water.
21. While fertilizers promote plant growth, they also increase water consumption. Apply the minimum amount of fertilizer needed.
22. Avoid installing ornamental water features and fountains that spray water into the air. Trickling or cascading fountains lose less water to evaporation.

## **Appendix A – Conservation Measures**

23. Buy a rain gauge to track how much rain or irrigation your yard receives. Check with your local water agency to see how much rain is needed to skip an irrigation cycle.
24. Teach your family how to shut off your automatic watering systems. Turn sprinklers off if the system is malfunctioning or when a storm is approaching.
25. Set a kitchen timer when watering your lawn or garden with a hose.
26. Next time you add or replace a flower or shrub, choose a low water use plant for year-round landscape color and save up to 550 gallons each year.
27. Use a screwdriver as a soil probe to test soil moisture. If it goes in easily, don't water. Proper lawn watering can save thousands of gallons of water annually.
28. Avoid over-seeding your lawn with winter grass. Once established, ryegrass needs water every three to five days, whereas dormant Bermuda grass needs water only once a month.
29. Landscape with Xeriscape trees, plants and groundcovers. Call your local conservation office for more information about these water thrifty plants.
30. If you have an evaporative cooler, direct the water drain to a flowerbed, tree, or your lawn.
31. Leave lower branches on trees and shrubs and allow leaf litter to accumulate on top of the soil. This keeps the soil cooler and reduces evaporation.
32. Start a compost pile. Using compost when you plant adds water-holding organic matter to the soil.
33. Use sprinklers that throw big drops of water close to the ground. Smaller drops of water and mist often evaporate before they hit the ground.
34. More plants die from over-watering than from under-watering. Be sure only to water plants when necessary.
35. Water only as rapidly as the soil can absorb the water.
36. Aerate your lawn. Punch holes in your lawn about six inches apart so water will reach the roots rather than run off the surface.
37. When you give your pet fresh water, don't throw the old water down the drain. Use it to water your trees or shrubs.

### **COMMUNITY BEHAVIORS**

1. Encourage your school system and local government to help develop and promote a water conservation ethic among children and adults.
2. Make suggestions to your employer to save water (and dollars) at work.
3. Support projects that use reclaimed wastewater for irrigation and other uses.
4. Encourage your friends and neighbors to be part of a water-conscious community.
5. Pick-up the phone and report significant water losses from broken pipes, open hydrants and errant sprinklers to the property owner or your water management district.

### **MISCELLANEOUS BEHAVIORS**

1. Install covers on pools and spas and check for leaks around your pumps.

2. Periodically check your pool for leaks if you have an automatic refilling device.
3. Make sure your swimming pools, fountains, and ponds are equipped with re-circulating pumps.
4. When backwashing your pool, consider using the water on your landscaping.
5. Use a commercial car wash that recycles water.
6. Don't buy recreational water toys that require a constant flow of water.
7. Use a grease pencil to mark the water level of your pool at the skimmer. Check the mark 24 hours later. Your pool should lose no more than ¼ inch each day.
8. When the kids want to cool off, use the sprinkler in an area where your lawn needs it the most.
9. Wash your car on the grass. This will water your lawn at the same time.
10. Bathe your pets outdoors in an area in need of water.
11. While staying in a hotel or even at home, consider reusing your towels.
12. When you have ice left in your cup from a take-out restaurant, don't throw it in the trash, dump it on a plant.

**Conservation Measures Estimated Annual Savings**

**Irrigation Water Audit** -It is estimated that an irrigation water audit will save about 10-20% of the water used. It is also estimated that during the summer months the irrigation use accounts for about 30% of water used by the customers of Hawthorne Utilities. If all residential customers were to have an irrigation water audit performed the savings calculated from 30% of 121.1 gallons per capita per day (GCPD) with 1,426 residential connections with an estimated 2.3 persons per connection that would be about 4,368,071 – 8,736,142 gallons per year.

**Toilet Tank Displacement** -Can save about 2-3% of water. Calculated from 121.1 gallons per capita per day (GCPD) with 1,426 residential connections with an estimated 2.3 persons per connection that would be a savings of about 2,899,442-4,349,162 gallons per year.

**A Toilet Retrofit** - Is known to save about 8-14 gallons per capita per day (GCPD). If all 1426 residential customers made this improvement the system could save up to about 9,577,016 - 16,759,778 gallons annually.

**Toilet Leak Repairs** -Save about 600 gallons per week or more. For each user that prevents this waste there will be a savings of about 31,200 gallons annually.

**Low-Volume Shower Heads** -Save about 400 gallons a week or more. With 1,426 residential connections that would result in a savings of about 29,660,800 gallons annually.

**Showerhead Retrofit Devices** -Save about 4 gallons per capita per day (GCPD). Calculated from the 1,426 residential connections with an estimated 2.3 persons per connection that would be a savings of about 4,788,508 gallons per year.

**Faucet Maintenance** -Can save up to 140 gallons of water per week. With 1,426 residential connections there would be a savings of about 10,381,280.

**Water Pressure Reduction** -Can save about 5-30% when adjusted down from higher than needed pressure. Outside of Corey Canyon, most pressures in the system are within an adequate range so it is not likely that there could be savings in this area. Corey Canyon has 40 connections that are required to have pressure reducing valves due to high pressure in the area. Calculating the average of 2.3 residents per connection and 121.1 gallons per capita per day (GCPD) the savings in that area is about 204,2011 – 1,225,266 gallons annually.



**Chapter 13.30  
DROUGHT CONDITIONS**

**13.30.010: GENERAL:**

Conditions of drought are not uncommon in the area served by the utility department and by action of the Mineral County Board of Commissioners, drought conditions may be declared. (MC Ord. 192A§ 16, 2006)

**13.30.020: ACTIONS OF THE UTILITY DEPARTMENT:**

In the event of declared drought conditions, the utility department will take such actions as necessary to ensure the available utility department water supply is utilized for the benefit of the greatest number of the utility department customers. The utility department may enact water rationing, time of use schedules, limitation of use, or such other measures as deemed necessary to ensure continued water availability. (MC Ord. 192A § 16, 2006)

**13.30.030: CUSTOMER RESPONSIBILITY:**

It will be the express responsibility of the customer to carefully observe all rules, regulations, and prohibitions set by the utility department in the event of declared drought conditions. The unavailability of water or a prohibition of water use at certain times shall not relieve the customer of paying the fees set by the utility department as set forth in subsection [13.16.020A](#) of this title. (MC Ord. 192A § 16, 2006)

**Chapter 13.32  
WATER CONSERVATION REQUIREMENTS**

**13.32.010: PURPOSE:**

These requirements are set forth to ensure the most efficient use of the water resources available to the utility department and to enable the water system to be operated in the most effective manner for the benefit of all of the water utility customers. (MC Ord. 192A § 17, 2006)

**13.32.020: REQUIREMENTS FOR NEW CONSTRUCTION:**

- A. Requirements For New Single-Family Uses: All new single-family uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, water saving toilets, and pressure reducing valves when such a device is required to maintain sixty (60) psi or less within the structure.
- B. Requirements For New Multi-Family Uses: All new multi-family uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, water saving toilets, and pressure reducing valves when such a device is required to maintain sixty (60) psi or less within the structures.

- C. Requirements For New Public Uses: All new public uses shall be equipped with approved water saving shower heads, water saving aerators on kitchen sinks and lavatories, self-closing valves on lavatories, any water saving toilets, and pressure reducing valves when such a device is required to maintain sixty (60) psi or less within the system.
- D. Insulation Of Water Pipes In New Construction: All hot water pipes installed within any new construction shall be insulated to UPC (uniform plumbing code). (MC Ord. 192A § 17, 2006)

**13.32.030: EMERGENCY CONDITIONS:**

When, in the opinion of the board, circumstances require water conservation by utility customer, the board may impose one or more of the following conditions after consideration of those circumstances at a regular public hearing after notice to the customers as provided for in Nevada Revised Statutes 318.199.

**A. Limited Conservation:**

- 1. Restrict watering to early morning hours and late evening hours. There is no restriction to hand watering using hoses with self-closing nozzles.
- 2. No outdoor watering while windy.
- 3. Do not utilize water for the irrigation of lawns between one o'clock (1:00) P.M. and five o'clock (5:00) P.M.
- 4. Prohibit wash down of driveways, sidewalks, parking lots, and other impervious surfaces.

**B. Moderate Conservation:**

- 1. All items under limited conservation.
- 2. Restrict landscape irrigation to alternate days. Odd numbered addresses allowed to water on odd numbered calendar days; even numbered addresses allowed to water on even numbered calendar days. No irrigation allowed on the thirty first day of the month.
- 3. Limit use of water from fire hydrants to actual firefighting use.
- 4. Hand washing of vehicles allowed only with hoses equipped with self-closing nozzles.

**C. Strict Conservation:**

- 1. All items under moderate conservation.
- 2. No landscape or lawn irrigation under any circumstances.
- 3. No new lawn or landscape installation.
- 4. No wash down of automobiles, trucks, vans, or other motorized equipment except at commercial washing facilities that recycle wash water.

5. Impose an excess consumption charge of three hundred percent (300%) of the existing rate per one thousand (1,000) gallons for water use in excess of the base rate.

**D. Circumstances Under Which Conservation May Be Required: The Board, upon its findings that one or more of the following emergency conditions are present, may impose any or all of the above mentioned restrictions:**

1. Water scarcity condition exists or is likely to exist.
2. Failure of water production, storage or distribution system(s).
3. Demand for service in excess of the utility department's authorized water rights.
4. Order of any agency of the federal, state, or local government having jurisdiction in such matters.
5. Any other condition that may require such action. (MC Ord. 192A § 17, 2006)

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**Estimated Water Savings**

**Limited Conservation**

The specific savings from time of day watering would be difficult to calculate as variables would include the type of sprinklers used and factors that affect the rate of evaporation. Never the less, this is accepted as a sound practice that would result in significant water savings.

The savings from restriction of watering hours and abstaining from watering during windy conditions will vary between different locations, however it remains obvious that these would be sound practices that would result in significant mitigation of lost water.

Restricting the washing of impervious surfaces will save an estimated 80 gallons per cleaning. While there is no specific data available regarding the frequency of washings performed by the users it could be assumed that if weekly washing normally took place at the 1,426 residential connections there is a potential for a savings of about 5,932,160 gallons annually.

**Moderate Conservation**

An odd/even watering schedule is currently in place in the Hawthorne Utilities water system. Large cities, including Los Angeles, California and Austin, Texas have reported savings between 20-30% due to odd/even schedules and the associated restrictions (watering hours, etc...). It is also estimated that during the summer months the irrigation use accounts for about 30% of water used by the customers of Hawthorne Utilities. If all residential customers were to have an odd/even watering schedule the savings calculated from 30% of 121.1 gallons per capita per day (gpcpd) with 1,426 residential connections that have an estimated 2.3 persons per connection that would be about 8,698,325 - 13,047,487 gallons per year.

The saving realized from limiting hydrants to **firefighting only** will vary depending on the habits of the community. It is not currently known exactly how much would be saved however this will be a sound practice should the supply become scarce.

The savings realized by requiring a positive shutoff on outdoor hoses will vary depending on the habits of the user. It is the case that many would waste more water than they would use if a hose is left running while they engage in other activities between watering or washing.

### **Strict Conservation**

Since it is estimated that about 30% of the water produced in the summer is used for the watering of landscape it can be assumed that the restriction of that activity will save the full 30% during the summer months or about 10,872,906 gallons annually from residential irrigation.

The activity of washing down of vehicles uses a large amount of water. The water savings would be based on how many and how often the activity would have otherwise taken place. Though that information is not available at this time, the utility would expect a significant savings from this restriction.

The residential connections receive their initial 5,000 gallons along with their base rate and pay additionally for usage beyond that. While it is difficult to predict the reaction to a change in the user rate it is likely that most consumers would respond to a 300% increase of the consumption charge by maintaining usage at a level near the 5,000 gallon base rate to avoid paying for additional consumption.

The 1,426 residential connections used about 145 million gallons in 2018 which averages per connection use of about 101,683 gallons annually or 8,474 per month. It is possible that this limitation could save about 3,474 gallons monthly per connection or 59,447,088 gallons annually system wide.

The following list is taken from the Truckee Meadows Water Authority (TMWA) website. Hawthorne's climate is similar to Reno's so these plants will thrive in the Hawthorne Utilities service area. More information on these plants can be found at [www.tmwandscapeguide.com](http://www.tmwandscapeguide.com).

**PERENNIAL FLOWERS**

[Artemisia species](#)/Sage or Wormwood (Perennial)—water use: Very Low

[Eriogonum umbellatum](#)/Sulfur Flowered Buckwheat (Perennial)—water use: Very Low

[Achillea species](#)/Yarrow (Perennial)—water use: Low

[Agastache cana](#)/Bubblemint (Perennial)—water use: Low

[Aurinia saxatilis](#)/Basket-of-Gold (Perennial)—water use: Low

[Coreopsis species](#)/Tickseed (Perennial)—water use: Low

[Crocus species](#)/Spring Crocus (Perennial)—water use: Low

[Diant species](#)/Pinks (Perennial)—water use: Low

[Eschscholzia californica](#)/California poppy (Perennial)—water use: Low

[Gaillardia grandiflora](#)/Blanket Flower (Perennial)—water use: Low

[Iris germanica](#)/Iris germanica (Perennial)—water use: Low

[Linum species](#)/Flax (Perennial)—water use: Low

[Narcissus species](#)/Daffodil or Narcissus (Perennial)—water use: Low

[Nepeta racemosa](#)/Catmint (Perennial)—water use: Low

[Oenothera species](#)/Evening Primrose (Perennial)—water use: Low

[Perovskia atriplicifolia](#)/Russian Sage (Perennial)—water use: Low

[Sedum species](#)/Stonecrop (Perennial)—water use: Low

[Senecio Cineraria](#)/Dusty Miller (Perennial)—water use: Low

[Stachys byzantina](#)/Lamb's Ears (Perennial)—water use: Low

[Thermopsis montana](#)/No Lupine (Perennial)—water use: Low

[Tulbaghia violacea](#)/Society Garlic (Perennial)—water use: Low

[Alcea rosea](#)/Hollyhock (Perennial)—water use: Moderate

[Antirrhinum majus](#)/Snapdragon (Perennial)—water use: Moderate

[Armeria maritima](#)/Sea Pinks (Perennial)—water use: Moderate

[Aster species](#)/Aster (Perennial)—water use: Moderate

[Echinacea purpurea](#)/Coneflower (Perennial)—water use: Moderate

[Gaura lindheimeri](#)/Gaura (Perennial)—water use: Moderate

[Geranium species](#)/Handy Geranium (Perennial)—water use: Moderate

[Gypsophila species](#)/Baby's Breath (Perennial)—water use: Moderate

[Hemerocallis hybrids](#)/Daylily (Perennial)—water use: Moderate

[Heuchera sanguinea](#)/Coral Bells (Perennial)—water use: Moderate

[Iberis sempervirens](#)/Candytuft (Perennial)—water use: Moderate

[Kniphofia uvaria](#)/Red Hot Poker (Perennial)—water use: Moderate

[Lavandula angustifolia](#)/Lavender (Perennial)—water use: Moderate

[Lilium species](#)/Lily (Perennial)—water use: Moderate

[N/A](#)/Pussy toes (Perennial)—water use: moderate

[Papaver species](#)/Poppy (Perennial)—water use: Moderate

[Penstemon species](#)/Beard Tongue (Perennial)—water use: Moderate

[Platycodon grandiflorus](#)/Balloon Flower (Perennial)—water use: Moderate

[Rudbeckia fulgida](#)/Black-Eyed Susan (Perennial)—water use: Moderate

[Salvia Species](#)/Sage or Salvia (Perennial)—water use: Moderate

[Saponaria species](#)/Soapwort (Perennial)—water use: Moderate

[Tanacetum species](#)/Painted or Michaelmas Daisy (Perennial)—water use: Moderate

[Tulipa species](#)/Tulip (Perennial)—water use: Moderate

[Veronica spicata](#)/Spike Speedwell (Perennial)—water use: Moderate

[Viola species](#)/Violet or Pansy (Perennial)—water use: Moderate

## GROUNDCOVERS, VINES, AND GRASSES

[Opuntia polyacantha](#)/Prickly Pear Cactus (Groundcovers)—water use: Very Low

[Clematis species](#)/Clematis (Groundcovers)—water use: Low

[Euphorbia species](#)/Spurge (Groundcovers)—water use: Low

[Helictorichon sempervirens](#)/Blue Oat Grass (Groundcovers)—water use: Low

[Hypericum calycinum](#)/Jacob's Ladder or Aaron's Beard (Groundcovers)—water use: Low

[Juniperus horizontalis](#)/Groundcover Junipers (Groundcovers)—water use: Low

[Lathyrus latifolius](#)/Perennial Sweet Pea (Groundcovers)—water use: Low

[Lonicera species](#)/Honeysuckle (Groundcovers)—water use: Low

[Panicum virgatum](#)/Switch Grass (Groundcovers)—water use: Low

[Polygonum species](#)/Polygonum (Groundcovers)—water use: Low

[Santolina species](#)/Lavender Cotton (Groundcovers)—water use: Low

[Vinca minor](#)/Dwarf Periwinkle (Groundcovers)—water use: Low

[Wisteria sinensis](#)/Chinese Wisteria (Groundcovers)—water use: Low

[Zauschneria californica](#)/California Fuschia (Groundcovers)—water use: Low

[Calmagrostis x acutiflora](#)/Feather Reed Grass (Groundcovers)—water use: Moderate

[Campsis radicans](#)/Red Trumpet Creeper (Groundcovers)—water use: Moderate

[Cerastium tomentosum](#)/Snow in Summer (Groundcovers)—water use: Moderate

[Delosperma cooperi](#)/Hardy Purple Ice Plant (Groundcovers)—water use: Moderate

[Hedera helix](#)/Ivy (Groundcovers)—water use: Moderate

[Helianthemum nummularium](#)/Sunrose (Groundcovers)—water use: Moderate

[Mahonia repens](#)/Creeping Mahonia (Groundcovers)—water use: Moderate

[N/A](#)/Northern seacats (Groundcovers)—water use: moderate

[Phlox subulata](#)/Moss Pink (Groundcovers)—water use: Moderate

[Potentilla neumanniana](#)/Cinquefoil (Groundcovers)—water use: Moderate

[Sedum species](#)/Stonecrop (Groundcovers)—water use: Moderate

[Thymus species](#)/Thyme (Groundcovers)—water use: Moderate

## SHRUBS

[Artemisia tridentata var. tridentata](#)/Big Sagebrush (Shrubs)—water use: Very Low

[Atriplex canescens](#)/Four Wing Saltbrush (Shrubs)—water use: Very Low

[Chrysothamnus nauseosus](#)/Rubber Rabbitbrush (Shrubs)—water use: Very Low

[Amelanchier species](#)/Serviceberry or Juneberry (Shrubs)—water use: Low

[Aronia species](#)/Chokeberry (Shrubs)—water use: Low

[Berberis species](#)/Barberry (Shrubs)—water use: Low

[Caragana species](#)/Peashrub (Shrubs)—water use: Low

[Caryopteris x clandonensis](#)/Blue Mist Spiraea (Shrubs)—water use: Low

[Chaenomeles speciosa](#)/Flowering Quince (Shrubs)—water use: Low

[Cytisus species](#)/Broom (Shrubs)—water use: Low

[Elaeagnus commutata](#)/Silverberry (Shrubs)—water use: Low

[Euonymus species](#)/Euonymus (Shrubs)—water use: Low

[Forestiera neomexicana](#)/New Mexico Privet (Shrubs)—water use: Low

[Genista species](#)/Dwarf Broom (Shrubs)—water use: Low

[Hibiscus syriacus](#)/Rose of Sharon (Shrubs)—water use: Low

[Ligustrum species](#)/Privet (Shrubs)—water use: Low

## APPENDIX C – PLANTS IDEAL FOR HAWTHORNE

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[Lonicera tatarica](#)/Tatarian Honeysuckle (Shrubs)—water use: Low

[Mahonia aquifolium](#)/Oregon Grape (Shrubs)—water use: Low

[Pinus mugo](#)/Mugo Pine (Shrubs)—water use: Low

[Prunus species](#)/Bush Cherry (Shrubs)—water use: Low

[Pyracantha coccinea](#)/Firethorn or Pyracantha (Shrubs)—water use: Low

[R species](#)/Sumac (Shrubs)—water use: Low

[Ribes aureum](#)/Golden Currant (Shrubs)—water use: Low

[Shepherdia argentea](#)/Silver Buffaloberry (Shrubs)—water use: Low

[Symphoricarpos albus](#)/Snowberry (Shrubs)—water use: Low

[Syringa vulgaris](#)/Common Lilac (Shrubs)—water use: Low

[Yucca species](#)/Yucca (Shrubs)—water use: Low

[Acer circinatum](#)/Vine Maple (Shrubs)—water use: moderate

[Amorpha canescens](#)/Leadplant (Shrubs)—water use: moderate

[Buddleia species](#)/Butterfly Bush (Shrubs)—water use: Moderate

[Catalpa x Chilopsis](#)/Chitalpa (Shrubs)—water use: moderate

[Ceratoides lanata](#)/Winterfat (Shrubs)—water use: moderate

[Cercocarpus ledifolius](#)/Mt. Mahogany (Shrubs)—water use: moderate

[Chamaebatiaria millifolium](#)/Fernbush (Shrubs)—water use: moderate

[Chilopsis linearis](#)/Desert or Flowering Willow (Shrubs)—water use: moderate

[Cotoneaster species](#)/Cotoneaster (Shrubs)—water use: Moderate

[Cowania mexicana](#)/Cliffrose (Shrubs)—water use: moderate

[Fallugia paradoxa](#)/Apache Plume (Shrubs)—water use: moderate

[Forsythia species](#)/Forsythia (Shrubs)—water use: Moderate

[Hamamelis x intermedia](#)/Witch Hazel (Shrubs)—water use: Moderate

[Hesperaloe parviflora](#)/Red Yucca (Shrubs)—water use: moderate

[Juniperus chinensis](#)/Sea Green Juniper (Shrubs)—water use: Moderate

[Kerria japonica](#)/Kerria (Shrubs)—water use: Moderate

[Kolkwitzia amabilis](#)/Beautybush (Shrubs)—water use: moderate

[Philadelph virginialis](#)/Mock Orange (Shrubs)—water use: Moderate

[Picea glauca var. albertiana 'Conica'](#)/Dwarf Alberta Spruce (Shrubs)—water use: Moderate

[Pinus contorta 'Latifolia'](#)/Lodgepole Pine (Shrubs)—water use: moderate



[Potentilla fruticosa](#)/Shrubby Potentilla (Shrubs)—water use: Moderate

[Purshia tridentata](#)/Bitterbrush (Shrubs)—water use: moderate

[R. frangula 'Asplenifolia'](#)/Fernleafed buckthorn (Shrubs)—water use: Moderate

[R. frangula 'Columnaris'](#)/Tall Hedge Buckthorn (Shrubs)—water use: Moderate

[Rhamnus frangulia](#)/Sea buckthorn (Shrubs)—water use: Moderate

[Rosa species](#)/Hardy Shrub Roses (Shrubs)—water use: Moderate

[Spiraea species](#)/Spiraea (Shrubs)—water use: Moderate

[Symphoricarpa x chenaultii](#)/Coralberry 'Hancock' (Shrubs)—water use: Moderate

[Tja occidentalis](#)/American Arborvitae (Shrubs)—water use: Moderate

[Viburnum species](#)/Viburnum (Shrubs)—water use: Moderate

## TREES

[Acer ginnala](#)/Amur Maple (Trees)—water use: Deep Water 10-14 days

[Ailant altissima](#)/Tree of Heaven (Trees)—water use: Deep Water 10-14 days

[Calocedrus decurrens](#)/Incense Cedar (Trees)—water use: Deep Water 10-14 days

[Catalpa species](#)/Catalpa (Trees)—water use: Deep Water 10-14 days

[Cedrus atlantica glauca](#)/Blue Atlas Cedar (Trees)—water use: Deep Water 10-14 days

[Celtis occidentalis](#)/Hackberry (Trees)—water use: Deep Water 10-14 days

[Crataegus species](#)/Hawthorn (Trees)—water use: Deep Water 10-14 days

[Elaeagnus angustifolia](#)/Russian Olive (Trees)—water use: Deep Water 10-14 days

[Gleditsia triacanthos inermis](#)/Honeylocust (Trees)—water use: Deep Water 10-14 days

[Juniperus species](#)/Tree Juniper (Trees)—water use: Deep Water 10-14 days

[Maackia amurensis](#)/Maackia (Trees)—water use: Deep Water 10-14 days

[Maclura pomifera](#)/Osage Orange (Trees)—water use: Deep Water 10-14 days

[Malus hybrids](#)/Crabapple (Trees)—water use: Deep Water 10-14 days

[Pinus species](#)/Pine (Trees)—water use: Deep Water 10-14 days

[Platanus acerifolia](#)/Sycamore (Trees)—water use: Deep Water 10-14 days

[Quercus species](#)/Oak (Trees)—water use: Deep Water 10-14 days

[Robinia species](#)/Locust (Trees)—water use: Deep Water 10-14 days

[Sequoiadendron giganteum](#)/Giant Redwood (Trees)—water use: Deep Water 10-14 days

[Ulmus parvifolia](#)/Chinese elm (Trees)—water use: Deep Water 10-14 days

[Zelkova serrata](#)/Zelkova (Trees)—water use: Deep Water 10-14 days

## APPENDIX C – PLANTS IDEAL FOR HAWTHORNE

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[Aesculus hippocastanum](#)/Common Horsechestnut (Trees)—water use: Deep Water 7-10 days

[Carpinus betulus](#)/Hornbeam (Trees)—water use: Deep Water 7-10 days

[Cotinus coggygria](#)/Smoke Tree (Trees)—water use: Deep Water 7-10 days

[Cupressus glabra](#)/Arizona Cypress (Trees)—water use: Deep Water 7-10 days

[Fraxinus species](#)/Ash (Trees)—water use: Deep Water 7-10 days

[Ginkgo biloba](#)/Maidenhair Tree (Trees)—water use: Deep Water 7-10 days

[Koelreuteria paniculata](#)/Golden Rain Tree (Trees)—water use: Deep Water 7-10 days

[Laburnum watereri](#)/Golden Chain Tree (Trees)—water use: Deep Water 7-10 days

[Liquidambar styraciflua](#)/Sweetgum (Trees)—water use: Deep Water 7-10 days

[Liriodendron tulipifera](#)/Tulip Tree (Trees)—water use: Deep Water 7-10 days

[Malus domestica](#)/Fruiting Apple Tree (Trees)—water use: Deep Water 7-10 days

[Morus alba](#)/Mulberry (Trees)—water use: Deep Water 7-10 days

[Phellodendron amurense](#)/Amur Cork Tree (Trees)—water use: Deep Water 7-10 days

[Picea species](#)/Spruce (Trees)—water use: Deep Water 7-10 days

[Pistacia chinensis](#)/Chinese Pistache (Trees)—water use: Deep Water 7-10 days

[Prunus species](#)/Plum or Cherry (Trees)—water use: Deep Water 7-10 days

[Pyrus Species](#)/Pear (Trees)—water use: Deep Water 7-10 days

[Sophora japonica](#)/Japanese Pagoda Tree (Trees)—water use: Deep Water 7-10 days

[Sorbus species](#)/Mountain Ash (Trees)—water use: Deep Water 7-10 days

[Tja occidentalis](#)/Arborvitae (Trees)—water use: Deep Water 7-10 days

[Tilia species](#)/Linden (Trees)—water use: Deep Water 7-10 days

[Gymnocladus dioica](#)/Kentucky Coffee Tree (Trees)—water use: Moderate

[Juniperus monosperma](#)/Singleseed Juniper (Trees)—water use: moderate

[Pinus edulis](#)/Pinon Pine (Trees)—water use: moderate

**WATER**

- [www.energystar.gov](http://www.energystar.gov)
- [www.water.nv.gov](http://www.water.nv.gov)

**DROUGHT**

- <http://droughtmonitor.unl.edu/>

**LANDSCAPE**

- [www.tmwlandscapeguide.com/landscape\\_guide/interactive/index.php](http://www.tmwlandscapeguide.com/landscape_guide/interactive/index.php)

**EDUCATION**

- [www.wateruseitwisely.com](http://www.wateruseitwisely.com)
- [www.washoeet.dri.edu](http://www.washoeet.dri.edu)
- [www.unce.unr.edu/counties/mineral](http://www.unce.unr.edu/counties/mineral)

**INSTITUTIONAL**

- [www.lvwd.com](http://www.lvwd.com)
- [www.snwa.com](http://www.snwa.com)
- [www.tmh20.com](http://www.tmh20.com)
- [www.cabq.gov](http://www.cabq.gov)

**LEAK DETECTION**

- [www.americanleakdetection.com](http://www.americanleakdetection.com)
- [www.leakdetection.com/water](http://www.leakdetection.com/water)

# Hawthorne Utilities WATER WASTE REPORT FORM

Please use this form to report water waste. Our investigators must witness the waste in progress to issue a violation form. Please provide as much information as possible of help us identify the problem.

**TIME OBSERVED:**

**DATE OBSERVED (M/D/Y):**

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**ADDRESS OR LOCATION OF WASTE:**

<b>STREET ADDRESS:</b>	<b>CITY:</b>
------------------------	--------------

**MAJOR CROSS STREETS:**

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- |   |   |
|---|---|
| <input type="checkbox"/> OVER-WATERING          | <input type="checkbox"/> FOUNTAIN / WATER FEATURE VIOLATION |
| <input type="checkbox"/> BROKEN SPRINKLER       | <input type="checkbox"/> BROKEN PIPE OR ONSITE LEAK         |
| <input type="checkbox"/> TIME-OF-DAY VIOLATION  | <input type="checkbox"/> MISTING SYSTEM VIOLATION           |
| <input type="checkbox"/> ASSIGNED DAY VIOLATION | <input type="checkbox"/> OTHER                              |

**DESCRIPTION:**

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**Water Conservation at Home** Sixteen illustrated pages of water conservation tips for homeowners includes information on toilets, showers, bathtubs, shaving, tooth brushing, kitchen, laundry, leaks, water-saving devices, shutoff valves, emergencies, and water meters. (see figure 1).

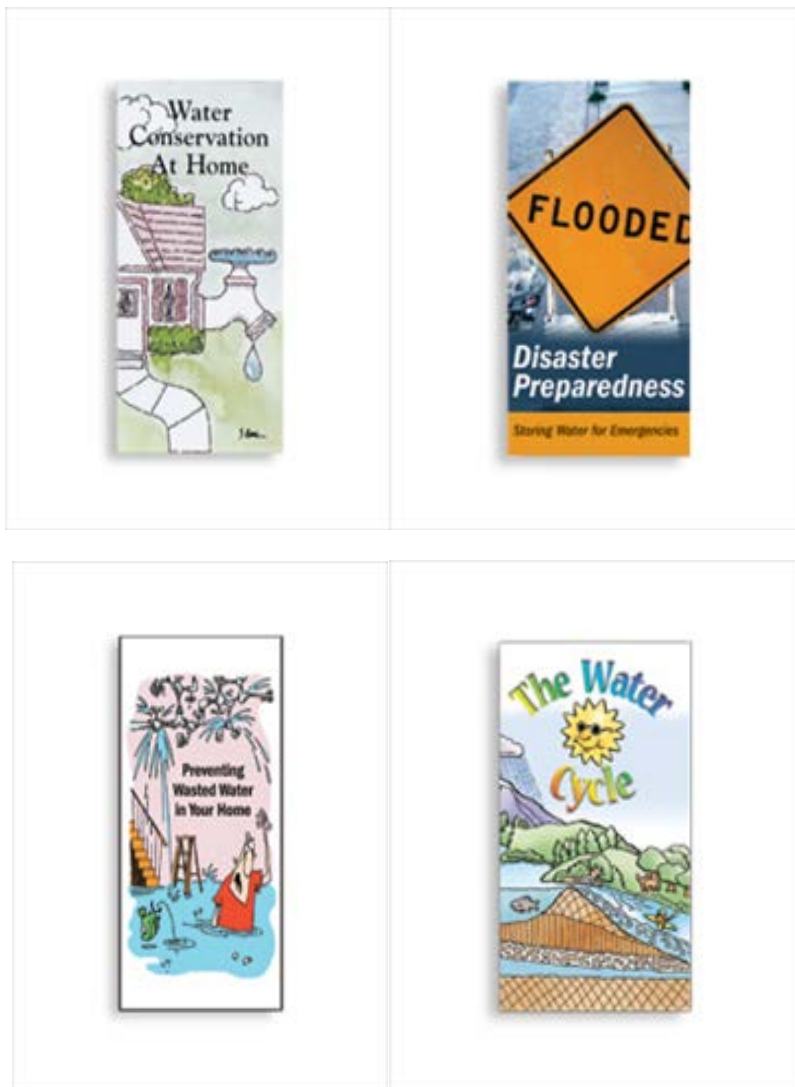
**Disaster Preparedness: Storing Water for Emergencies** Consumers learn how much water to store, what storage containers to use, how long water will keep, and what a Boil-Water Order is. (see figure 2).

**Preventing Wasted Water in Your Home** Some leaks are obvious (drip, drip), while others are silent and subtle. This bill stuffer will help your customers become leak detectives. (see figure 3).

**The Water Cycle** Educate kids and adults alike about the hydrologic (water) cycle with this fun, fill-in-the-blank brochure. (see figure 4).

**FIGURES 1-4**

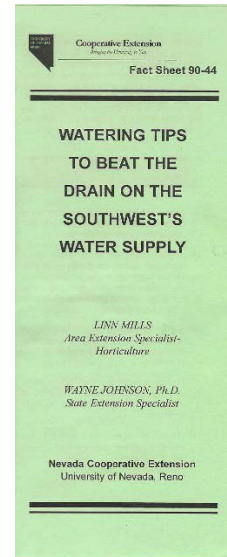
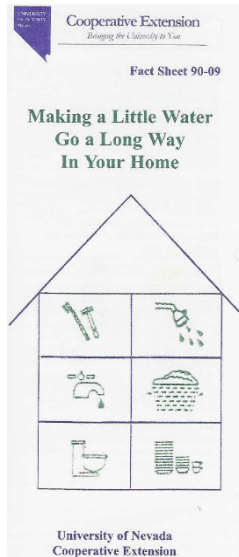
AWWA Conservation Pamphlets



In addition to the above mentioned AWWA publications, The University of Nevada Cooperative Extension publishes Fact Sheets that encourage conservation. Fact Sheet 90-09 “Making a Little Water Go a Long Way in Your Home” contains residential conservation tips (see figure 5) and Fact Sheet 90-40 “Watering Tips to Beat the Drain on the Southwest’s Water Supply” provides tips to make landscapes more water efficient (see figure 6).

**FIGURES 5 & 6**

University of Nevada Cooperative Extension Fact Sheets



# APPENDIX G – NATIONAL EFFICIENCY STANDARDS FOR FIXTURES AND APPLIANCES

**National Efficiency Standards and Specifications  
for Residential and Commercial Water-Using Fixtures and Appliances**  
*(Compiled from information provided by the Alliance for Water Efficiency, U.S. EPA Office of Water,  
U.S. Dept. of Energy, Energy Star, Consortium for Energy Efficiency, and other sources)*

Fixtures and Appliances	Federal Standard: from EPA Act 1992, EPA Act 2005, "Energy Independence and Security Act of 2007", NAECA updates, other sources		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed Future Standard	Current Requirements	Proposed/Future Requirements	Current Specification	Proposed /Future Specification
Commercial Clothes Washers	As of Jan 9, 2013: Top loaders: 1.0 MCF and WF < 4.5 gal/cycle <sup>2</sup> Front loaders: 2.0 MCF and WF < 5.5 gal/cycle <sup>2</sup>		Energy Star: Effective February 1, 2013 2.2 MCF and < 4.5 WF gal/cycle <sup>2</sup> For both front and top loaders (NOTE: defined as a built-mounted front or top loading machine for use in common areas and coin-op facilities with capacity greater than 1.0 cubic feet and not a combo washer-dryer; does NOT include multi-load, high-volume machines used in cooperative or commercial laundries)		As of January 9, 2013, CEE specification is no longer active.	Considering reinstatement in 2014 or later

<sup>2</sup>Washing loads not subject to flow rate maximum

DOE: Department of Energy; EPA: Environmental Protection Agency; EPCAC 1992: Energy Policy Act of 1992; EPCAC 2005: Energy Policy Act of 2005; gpf: gallons per flush; kWh: kilowatt-hour; MCF: million cubic feet; mod: modified energy factor; max: maximum performance; NAECA: National Appliance Energy Conservation Act; pcf: pounds per square inch; Lpf: Liters per flush; Rev. March 21, 2014 – by John Koeller  
2014 Alliance for Water Efficiency/Koeller & Co. Page 5

**National Efficiency Standards and Specifications  
for Residential and Commercial Water-Using Fixtures and Appliances**  
*(Compiled from information provided by the Alliance for Water Efficiency, U.S. EPA Office of Water,  
U.S. Dept. of Energy, Energy Star, Consortium for Energy Efficiency, and other sources)*

Fixtures and Appliances	Federal Standard: from EPA Act 1992, EPA Act 2005, "Energy Independence and Security Act of 2007", NAECA updates, other sources		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed Future Standard	Current Requirements	Proposed/Future Requirements	Current Specification	Proposed Future Specification
Commercial Dishwashers	No standard		Energy Star v.2.0 - Effective 2/1/2013: Under counter: H4 Temp: < 0.86 gal/min; < 0.5 kWh; L4 Temp: < 1.10 gal/min; < 0.3 kWh Stationary Single Tank Door: H4 Temp: < 0.80 gal/min; < 0.7 kWh; L4 Temp: < 1.10 gal/min; < 0.6 kWh Flat, Pan, and Glass: H4 Temp: < 0.58 gal/min; < 0.7 kWh; L4 Temp: < 0.58 gal/min; < 0.6 kWh Single Tank Conveyor: H4 Temp: < 0.70 gal/min; < 1.5 kWh; L4 Temp: < 0.70 gal/min; < 1.5 kWh Multiple Tank Conveyor: H4 Temp: < 0.54 gal/min; < 2.25 kWh; L4 Temp: < 0.54 gal/min; < 2.0 kWh Single Tank Flight Type: Requires formula for both H4 and low temp machines: Gphs per hour (gph) < 2.87 times of of belt + 55 Multiple Tank Flight Type: Requires formula for both H4 and low temp machines: Gph < 4.96 times of of belt + 17 <b>NOTE: See Full Energy Star requirements for definitions and details.</b>		Specification is 6 years old and is no longer applicable	CEE waiting for final test methods before revisiting possible changes to their specification

DOE: Department of Energy; EPA: Environmental Protection Agency; EPCAC 1992: Energy Policy Act of 1992; EPCAC 2005: Energy Policy Act of 2005; gpf: gallons per flush; kWh: kilowatt-hour; MCF: million cubic feet; mod: modified energy factor; max: maximum performance; NAECA: National Appliance Energy Conservation Act; pcf: pounds per square inch; Lpf: Liters per flush; Rev. March 21, 2014 – by John Koeller  
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**National Efficiency Standards and Specifications  
for Residential and Commercial Water-Using Fixtures and Appliances**  
*(Compiled from information provided by the Alliance for Water Efficiency, U.S. EPA Office of Water,  
U.S. Dept. of Energy, Energy Star, Consortium for Energy Efficiency, and other sources)*

Fixtures and Appliances	Federal Standard: from EPA Act 1992, EPA Act 2005, "Energy Independence and Security Act of 2007", NAECA updates, other sources		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed Future Standard	Current Requirements	Proposed/Future Requirements	Current Specification	Proposed Future Specification
Automatic Commercial Ice Makers <sup>3</sup>	Effective January, 2012: Energy and condenser water efficiency standards vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table)		Energy Star: Energy and water efficiency standards vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table). Water cooled machines excluded from Energy Star.		Energy and water (potable and recirculated) standards are listed and vary by equipment type on a sliding scale depending upon harvest rate and type of cooling (see link to additional information at end of this table)	
Commercial Pre-rinse Spray Valves (for food service applications)	Flow rate < 1.0 gpm (10 pressure specific), no performance requirement		WaterSense: Flow rate < 1.2 gpm (includes key performance requirements)	No change to existing specification is planned by WIS	No specification at this time	Specification in development

<sup>3</sup>Optional standards for other types of automatic ice makers are also authorized under EPCAC 2005.

DOE: Department of Energy; EPA: Environmental Protection Agency; EPCAC 1992: Energy Policy Act of 1992; EPCAC 2005: Energy Policy Act of 2005; gpf: gallons per flush; kWh: kilowatt-hour; MCF: million cubic feet; mod: modified energy factor; max: maximum performance; NAECA: National Appliance Energy Conservation Act; pcf: pounds per square inch; Lpf: Liters per flush; Rev. March 21, 2014 – by John Koeller  
2014 Alliance for Water Efficiency/Koeller & Co. Page 7

**National Efficiency Standards and Specifications  
for Residential and Commercial Water-Using Fixtures and Appliances**  
*(Compiled from information provided by the Alliance for Water Efficiency, U.S. EPA Office of Water,  
U.S. Dept. of Energy, Energy Star, Consortium for Energy Efficiency, and other sources)*

Fixtures and Appliances	Federal Standard: from EPA Act 1992, EPA Act 2005, "Energy Independence and Security Act of 2007", NAECA updates, other sources		WaterSense® or Energy Star®		Consortium for Energy Efficiency	
	Current Standard	Proposed Future Standard	Current Requirements	Proposed/Future Requirements	Current Specification	Proposed Future Specification
Commercial Steam Cookers <sup>4</sup>	No standard		Energy Star (EPA) Electric: 50% cooking energy efficiency; (EIR rate 400-800 kWh) Gas: 38% cooking energy efficiency; (EIR rate 4,250-12,500 British thermal units) <sup>4</sup> Energy Star has no specified water use factor		Electric: Same as Energy Star	Water Use Factor (WU) for both electric and gas models: Tier 1A: < 15 gal/hr per compartment Tier 1B: < 4 gal/hr per compartment

<sup>4</sup>Water use standards vary for 1A, 1B, 1C, and 1D size commercial steam-cooker models.

DOE: Department of Energy; EPA: Environmental Protection Agency; EPCAC 1992: Energy Policy Act of 1992; EPCAC 2005: Energy Policy Act of 2005; gpf: gallons per flush; kWh: kilowatt-hour; MCF: million cubic feet; mod: modified energy factor; max: maximum performance; NAECA: National Appliance Energy Conservation Act; pcf: pounds per square inch; Lpf: Liters per flush; Rev. March 21, 2014 – by John Koeller  
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**The All Seeing All Knowing Lawn Care Manual**  
Your Lawn and Water

SP-93-02

Your lawn is more than just grass. It's one of the things that makes a house a home. We walk on it, play on it, and even lie down on it to watch the clouds roll by on a summer day. It also helps the environment by trapping many pollutants before they can get into the ground water.

Imagine the perfect lawn. A green velvet carpet that's cool on your feet and springs back when you walk on it.

This can be your lawn and with less water—more than 20 percent less—than you may already be using.

We've developed a system that will let you water less and still have an attractive lawn. It will show you how to use just the right amount of water to replace moisture that is lost from the soil and grass.

We call it "EvapoTranspiration-ET" for short.

The ET method of lawn watering helps us save Nevada's most precious resource—water. ET also helps improve water quality. By watering less, you avoid runoff. Overwatering causes more water to run off than soak in. This runoff could carry pollutants from the gutter into our surface water supply.

The ten key ingredients to using water efficiently are knowing how much water your sprinkler system puts on your lawn and how much water your lawn needs.

This manual explains how you can determine both, through the ET system.

By using ET, you can save water, time and money and still enjoy:

- A cool, green lawn
- Cleaner water
- The pride of knowing you are making a difference.

**Turf Tip #1 Check Your Sprinklers**

Good watering practices begin from the ground up, so let's start with the sprinklers.

First, check your sprinkler system. This will tell you if you're getting even water distribution. Dry, brown spots and wet, swampy areas in your lawn are the most obvious signs that there's a problem with your sprinklers.

Another sign is water constantly draining from the sprinkler system and running into the gutter. This could indicate a broken line, a plugged valve or stuck automatic drain valve.

From a well-designed sprinkler system needs regular checkups and necessary corrections.

**Turf Tip #3 Take the ET Test**

You are now ready to take the ET test. This will determine how long and how often to water your lawn. First, you will need these items:

- 10 or more straight-sided cups or cans (We recommend coffee cups or soup cans, at least 4" to 6" deep, all with the same diameter)
- A pencil
- A ruler
- A calculator



Now, just follow these simple steps to take the ET test:

**Step One:** On a calm day (early morning to best), distribute the cans randomly around your front yard.

**Step Two:** Run the sprinklers for 15 minutes. If the water begins to puddle or run off the lawn before the 15 minutes are up, write the number of minutes the sprinkler ran before runoff occurred. If runoff occurs wait for an hour, then turn the sprinklers back on long enough to complete the 15 minutes. Record the length of time the sprinkler ran here: \_\_\_\_\_. This is the longest you can run this set of sprinklers at a time, so we'll explain on Page 9.

**Pause for a moment:** Note the amount of water in the cans. There should be about the same amount in each can. You may need to make some minor sprinkler adjustments, such as turning the screws in the center of a nozzle to restrict or increase the water spray. However, if the water levels are more than 30 percent different (for example, one can contains 3/4" water and another 1 1/2", you might need some major repairs. If so, call in a professional).

Once an area is irrigated by a second station, and the spray pattern is needed to complete the coverage for the area. In this case, randomly place the cans over the area covered by both stations and run the water for 15 minutes for each station. Pick up the cans and continue to Step Three.

**Step Three:** For easier figuring, pour the water into one of the cans used in the test. It may take more than one can to collect all the water.

**Step Four:** Next, place these cans of water on a level surface. With your ruler, measure the depth of water in each can and record the amount. Using your calculator, add the figures and divide by the number of cans used to get: This will determine the average inches of water your sprinkler system applied. Record the average water depth here: \_\_\_\_\_

**Step Five:** To determine how much and how often you need to water, check the ET charts on pages 10 and 12. For example, you have done the test on your lawn and your average water depth is .5 (1/2"). Look on Chart 1 (twice a week watering) and under average can depth find .5" (from Step Four). In the column directly under it, go down to where the zeros column reads June. It tells you to water your lawn 22 minutes on each watering day in June. Record this number here for future reference:

Check the ET chart every month to make sure you're using the right amount of water on your lawn. Adjust your clock accordingly. If it rains during the week and the amount of moisture adds up to the amount you would be applying on your next watering day, skip watering that day and resume on the next watering day.

**Step Six:** Repeat Steps One through Five for the side yards and back yard to get the average water depths for those areas. These water depths may be different than your front yard.

Record these numbers for future reference: \_\_\_\_\_

**Side Yard:** \_\_\_\_\_ **Back Yard:** \_\_\_\_\_

If puddling or runoff occurs before the 15 minutes used in the test, break up your watering time. For example, if your required watering time is 12 minutes but runoff begins after 6 minutes, water twice—six minutes each cycle—one or two hours apart. Allow the water to soak in. (Remember: Water and Wait!)

If you water with a hose you still need to do a can test. Place the cans in the front yard and turn on the water for 15 minutes using the sprinkler you normally use for watering the lawn. If you have more than one station to cover the front yard, place the sprinkler at each spot and run the water for 15 minutes for each location. Take the average from the ten cans and use the charts.

**Turf Tip #4 Water Early in the Morning**

During the summer, water early in the morning when it's calm. Here are some reasons why:

- Less water is lost from evaporation
- Spray drift caused by wind is reduced
- Water soaks deep into the soil and is there when it's most needed—in the heat of the day

**Turf Tip #5 Shape Up Your Turf**

**Problem #1 Thatch:** If you're still experiencing water runoff or if dry spots won't go away, your lawn may have developed too much thatch. To check for thatch, take a sample of grass and soil 2" wide by 2" deep. If the spongy area between the grass and soil is more than 1/2" thick, you probably have a thatch problem. This may be due to overwatering or overfertilizing.

- To remove the thatch, use a power rake or hire a professional.
- Before dethatching, mark your sprinkler heads to avoid damaging them. Recheck your irrigation system after power raking to be sure it's still okay.

**Problem #2 Compacted Soil:** Your lawn may have developed compacted soil. This soil will not allow water and nutrients to soak down to the roots. Aeration (or coring) in the spring and fall is a way to open up compacted soil and reduce water runoff. It also helps to reduce thatch buildup.

Coring is done by inserting hollow tubes 1/2" wide by 4" deep and spaced 4" to 6" apart into the ground. Cores of soil come out of the tubes to allow water, air and fertilizer to penetrate deep into the soil. Leave these cores on the grass—your mower will break them up and they will filter back into the soil. Purchase a hand soil aerator (about \$20) to do the aerating or rent a coring machine from a local garden outlet. To make the job easier, have it done professionally.

Aerating and dethatching:

- Improve water penetration
- Reduce water runoff on slopes
- Increase fertilizer effectiveness
- Lessen thatch accumulation
- Help grass root growth
- Relieve compaction

**Turf Tip #6 Fertilize Less to Save Water**

You still need to fertilize your lawn but do it in the spring and autumn when it's cool to promote root growth not top growth. Reduce or even eliminate fertilizing during the summer. By fertilizing less, you'll slow down grass growth and use less water.

Select a balanced, slow-release lawn fertilizer with iron and especially with potassium to build in heat and cold resistance, stimulate root growth and increase disease protection.

Follow the instructions on the package and apply only the amount needed. Water immediately after applying the fertilizer to promote quick absorption. However, avoid overwatering to prevent runoff and pollution of our water supply.

Sprinkler Problem	Solution
Clogged sprinkler heads.	Clean sprinkler heads by removing and blowing them out. If you can't unclog them, replace them.
Broken, worn or leaking sprinkler heads.	Replace them with the same kind of sprinkler heads. This will ensure the same rate of water application. Never try to mix sprinkler head brands on the same circuit.
Crooked or tilted sprinklers.	Straighten the sprinklers to their upright positions.
Sunken sprinkler or grass growing around the heads.	Raise the sprinkler by adding a "riser" or install a taller pop-up head; or trim the grass around the head so it doesn't interfere with water distribution.
Poor overlapping spray pattern.	Check the spray pattern of the sprinklers. Each sprinkler must throw water to the adjacent sprinklers.

**Turf Tip #2 Get to Know Your Grass**

Kentucky Bluegrass forms a dense, tightly-knit turf that withstands wear and has the ability to mend when damaged. The grass blades are narrow and dark green.



Tall Fescue is a grass with wide, coarse blades. The Turf-type Improved Tall Fescue is more desirable because it grows lower, denser, is deep rooted and has finer grass blades.



Perennial Ryegrass is a grass with a medium to fine texture. It is fast germinating and because of tough vetus in the leaf blades, it often has a ragged appearance when mowed. It is often used in a seed mix.



TENTHS OF INCH	AVERAGE WATER DEPTH FROM CAN TEST/SDV'S TD*					
	.25"	.31"	.375"	.44"	.50"	.625"
FRACTION OF INCH	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"
AMOUNT NEEDED PER WEEK	MINUTES TO WATER EACH WATERING DAY (twice a week watering) SDV'S TD*					
April .98"/week	29	23	20	17	15	12
May 1.18"/week	35	28	24	20	18	14
June 1.45"/week	43	35	29	25	22	17
July 1.60"/week	47	38	32	28	24	19
August 1.50"/week	46	37	30	26	23	18
September 1.12"/week	34	27	23	20	17	13
October .96"/week	29	23	19	17	15	12

\*Minutes based on a 15 minute cup test and ET data. If runoff occurs, water more frequently. For example: Water twice for 10 minutes each instead of once for 20 minutes, allowing water to soak in between cycles.

TENTHS OF INCH	AVERAGE WATER DEPTH FROM CAN TEST					
	.25"	.31"	.375"	.44"	.50"	.625"
FRACTION OF INCH	1/4"	5/16"	3/8"	7/16"	1/2"	5/8"
AMOUNT NEEDED PER WEEK	MINUTES TO WATER EACH WATERING DAY (twice a week watering)					
April .98"/week	15	12	10	9	8	7
May 1.18"/week	18	14	12	10	9	8
June 1.45"/week	22	18	15	13	11	10
July 1.60"/week	24	19	16	14	12	11
August 1.50"/week	23	19	16	14	12	10
September 1.12"/week	17	14	12	10	9	8
October .96"/week	15	12	10	9	8	7

\*Minutes based on a 15 minute cup test and ET data. If runoff occurs, water more frequently. For example: Water twice for 10 minutes each instead of once for 20 minutes, allowing water to soak in between cycles.



**Turf Tip #7 Mow Sharp and by the Charts**

Keep your mower blades sharp. Blowing with dull blades or when the grass is wet can result in a ragged-looking lawn and stressed turf. Mowing heights affect water conservation. Mow your lawn according to the chart below. Follow the recommended height to use less water while still keeping a healthy and attractive lawn. Mow when the grass has grown one-third taller, and leave the clippings on the lawn.

Grass Type	Preferred Cut
Bluegrass	2" - 2 1/2"
Tall Fescue	2 1/2" - 3"
Improved Fescue	1 1/2" - 2"
Perennial Ryegrass	1 1/2"
	2" - 2 1/2"

**Finally, Keep an Eye on Your Lawn**

This manual will help you to monitor your lawn's health with more precision. By keeping an eye on your lawn and your sprinklers, you will get a feel for the many components that go into good lawn care. ET helps you water your lawn by its need, using your sprinkler clock, calendar and scientific information to apply water right and life!

If you have any questions about the ET method or lawn care in general, just ask us. We're happy to help. Call: University of Nevada Cooperative Extension—784-6643 (Washoe County) or call The Water Conservation Hotline 693-5005 (Wojcik).

**The Scientific Facts**

If you're wondering how we came up with the figures on the ET charts, they're based on a University of Nevada Cooperative Extension research project—the first study of its kind in northern Nevada.

University scientists use a weather station in the Truckee Meadows to collect the data. The station keeps track of temperature, relative humidity, solar radiation and wind speed.

The information is then fed into a computer. The results? Accurate figures that help you know just how much water to apply to your lawn at any given time during the year.

These figures are provided as a public service to homeowners and commercial turf managers to help everyone water more efficiently.