

Williams Ridge Technology Park

Water Conservation Plan

January 2012

Prepared for:

**Williams Ridge Technology Park
PO Box 1500
Gardnerville, NV 89410
775-782-0100**

Prepared by:



**363 Fairview Drive
Carson City, NV 89701-3503
(775) 841-4222**

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Introduction

The water supply in Nevada is a precious commodity and plays an important role in determining Nevada's future. Nevada is the one of the driest states in the nation as well as one of the fastest growing. Nevada's future, both from an economic and a quality of life view, depends heavily upon the wise management of the water supply.

Groundwater, in general, provides about 40 percent of the total water supply used in Nevada. In some areas, groundwater provides the entire water supply. Groundwater usage may vary considerably from year-to-year as it is sometimes pumped to supplement surface water sources.

Water use in Nevada can be classified as:

- Domestic (household, both indoor and outdoor) – Met by public supply or private supply (e.g. wells).
- Commercial (businesses) – Met by public supply or private supply (e.g. non-community systems).
- Industrial (manufacturing/construction) – Met by public supply or private supply (e.g. non-community systems).
- Thermoelectric (electric/fossil fuel/geothermal power generation) – Met by public supply in a minor fraction.
- Mining (mining processes) – Supply source varies widely from operation to operation and is dependent upon the mineral being recovered and the recovery process employed.
- Irrigation (land use) – Met by self-supplied or supplied by irrigation companies or districts.
- Livestock (farm needs) – Supply source varies.

While all classifications of water usages have shown an increase over the years, it has historically been irrigation water use which has accounted for the majority of the water use in Nevada.

It has been estimated that the domestic water use accounts for less than 15 percent of the water used in Nevada, but this is expected to rise to nearly 25 percent as the population increases (based upon existing water use patterns and conservation measures). It is expected that Nevada's population will become increasingly concentrated in its primary urban areas of Las Vegas (Clark County), Reno/Sparks (Washoe County) and Carson City, with varied spillover effects on neighboring counties.

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It is vitally important that all employees understand the fundamental science of water, how it is managed in the state, and the issues affecting its management. Water education must become a priority.

Because Nevada does not have a comprehensive state-wide conservation program, it is reliant upon the individual water suppliers for developing their own conservation programs. In 1991, Nevada enacted a law requiring adoption of conservation plans by water suppliers. Minimum standards for plumbing fixtures were adopted in 1991 (Assembly Bill 359) by Nevada and in 1992 minimum flow standards for plumbing fixtures were adopted by the federal government (National Energy and Policy Conservation Act).

Conservation is an essential part of ensuring adequate water supply as it is no longer feasible to develop new sources. It has proven to be a cost-effective way to reduce demands and/or to extend a given water supply. It can easily be pursued by all water users regardless of the water system type. Key to evaluating the program's effectiveness is by measuring water use through meters and other measurement devices. Goals can be set and various conservation measures established to reach these goals. This is vital to balancing expected increases in water usage.

Statutory Requirements

This water conservation plan was prepared for the **Williams Ridge Technology Park** in accordance with Nevada Revised Statute (NRS) 540. As outlined in NRS 540.141, the provisions of this plan must include:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan
- e. Schedule
- f. Evaluation Measurements
- g. Conservation Estimates

This plan is being submitted to the Nevada Department of Conservation and Natural Resources (DCNR), Division of Water Resources (DWR) for review and approval prior to its adoption by **Williams Ridge Technology Park**, as required by NRS 540.131.

This plan is available for inspection during normal business hours at **1100 Mark Circle Gardnerville, NV 89423**.

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This original Water Conservation Plan for the **Williams Ridge Technology Park** was developed in **December 2011**.

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, January 2017 (five years from the original submittal).

System Description

The **Williams Ridge Technology Park** is a privately owned Industrial/Agricultural Non-Transient, Non-Community water system and has a current water operation permit, NV 0000816. The **Williams Ridge Technology Park** serves water to six (6) unmetered connections in its service area in Gardnerville, NV located in Douglas County. The service area boundaries are Saw Mill Road to the west, Fish Springs Road to the north, East Valley Road to the east, and the row of trees to the south slightly north of Crocket Lane. The property covers approximately 40 acres of which the terrain is a flat valley.

The estimated population served in 2011 was 60, which varies yearly depending on business. **Williams Ridge Technology Park** currently consists of one developed loop, Mark Circle, and has the potential for the additional development of two more loops. Once these loops are developed the population could potentially triple. The State of Nevada, through its State Water Plan, estimates the population growth for Douglas County through 2020 to 2.15% annually.

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Water is supplied from groundwater pumped from wells located in the Carson Valley Designated Basin (#105) within the Carson River Basin Hydrographic Region (#8). Water to all buildings is supplied by one 8-inch diameter well, and water for irrigation purposes is supplied by two additional wells. The water system also includes two (2) storage tanks and one (1) pressure tank. Each of these is identified in the tables below (Table 1 and Table 2).

The well used to supply buildings with the means for fire suppression, industrial use, and drinking water (log # 24346) was drilled in 1982 to a depth of 302 feet, below ground surface (ft, bgs) by Kavchack Drilling out of Gardnerville, NV. The casing is perforated in intervals from 124 to 202 ft, bgs, 240 to 260 ft, bgs, and 278 to 300 ft, bgs. The static water level when the well was completed was 78 ft, bgs with flow measured at 75 gallons per minute. No pumping test information is available for this well.

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The well logs pertaining to the wells used predominantly for irrigation are labeled as Well #1 (log #31401) and Well #2 (log #31400) (**Appendix D**). Well #1 was drilled in 1989 by Humboldt Drilling & Pump Company, Inc. to a depth of 400 ft, bgs at a 14 ¾-inch width. The well is cased with 10-inch casing from zero to 400 ft, bgs, has a concrete sanitary seal from zero to 50 ft, bgs, and has gravel pack from 0 to 400 ft, bgs. The casing is perforated with 1/8-inch x 2 ½" perforations from 50 to 400 ft, bgs. The static water level when the well was completed was 93.96 ft, bgs. The well was pump tested at 700 gallons per minute and showed drawdown of 126 feet after 24 hours of pumping displaying a specific capacity of 5.56 gallons/minute/foot (specific capacity = 700gpm / 126 feet).

Well #2 (log #31400) was drilled in 1989 by Humboldt Drilling & Pump Company, Inc. to a depth of 450 ft, bgs at a 14 ¾-inch width. The well is cased with 10-inch casing from zero to 450 ft, bgs, has a concrete sanitary seal from zero to 50 ft, bgs, and has gravel pack from 0 to 450 ft, bgs. The casing is perforated with 1/8-inch x 3" perforations from 100 to 450 ft, bgs. The static water level when the well was completed was 52.6 ft, bgs. The well was tested at 700 gallons per minute and showed drawdown of 70 feet after 24 hours of pumping displaying a specific capacity of 10 gallons/minute/foot (specific capacity = 700gpm / 70 feet).

Both irrigation wells are used approximately 35 hours a week from May through September.

Well logs can be found in the Appendix.

Table 1 – Source of Supply

Well No.	Depth (feet)	Production (gpm)
Municipal Well	300	70
Irrigation Well #1	400	20
Irrigation Well #2	450	20

Table 2 – Storage Tanks

Tank No.	Volume (gallons)
1 (pressure tank)	1000
2	204,000
3	33,000

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The **Williams Ridge Technology Park** has been granted water rights in the total amount of 291.7857 acre-feet per year. Application #63132 has been certified, and application #'s 63094, 63095, 63096, 63128, 63129, 63130, 63131, and 74279 have been permitted. The current water rights are listed in the table below (Table 3).

Table 3 – Water Rights

Application # (Status)	Well Log No.	Annual Use (acre-feet)
63094 (Permit)	31400	70
63095 (Permit)	31401	70
63096 (Permit)	31400	70
63128 (Permit)	N/A	19.794405
63129 (Permit)	N/A	19.794405
63130 (Permit)	N/A	19.794405
63131 (Permit)	N/A	1.201
63132 (Certificate #16585)	24346	11.201485
74279 (Permit)	24346	10

To supply the buildings with water, water is pumped from the Municipal Well into a vault where it is chlorinated using sodium hypochlorite (12.5%) and then “T’s” to either flow into the two storage tanks (which are inter-tied to fill equally) or into the pump house. Inside the pump house water either flows into the fire supply system or to the 1000 gallon pressure tank which supplies domestic-use water to buildings 1181, 1191, and 1161. From the storage tanks water is distributed to customers through a combination of 10-inch and 8-inch PVC mains. The area around the wells, vault and the storage tanks is curbed with an 8-inch curb and the area has been graded down away from the well area.

The two irrigation wells are located west of East Valley Road in areas of the property that have not been developed. Well #2 is located on the far west side of the property (latitude 38.928046 N, longitude -119.70442 W, and Well #3 is located in the northeast corner of the property (latitude 38.931848 N, longitude 119.696184 W). Water is pumped directly from the wells into the irrigation supply lines.

The **Williams Ridge Technology Park** requires, at a minimum, a Grade 1 distribution operator. **Williams Ridge Technology Park** contracts operations out to SPB Utility Services out of Reno, NV. Kenneth Kanoff of SPB Utility Services is the Certified Operator of record (Grade 2 Distribution, Grade 2 Treatment and Grade 4 Wastewater).

The plant operator is required to perform quarterly monitoring and testing of water quality for total Coliform. Annually, water quality is tested for nitrate. Every three years samples are

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collected for disinfection byproducts, arsenic, nitrites, secondary inorganic compounds (IOCs), fluoride, and volatile organic compounds (VOCs) phases 2&5. Every nine years samples are collected for lead & copper, IOCs phases 2&5, cyanide and secondary organic compounds (SOCs) phases 2&5. Since January 2006 the system has also been testing for 2964-Dichloromethane on an annual basis as a requirement for their water permit.

The last sanitary survey performed by the Nevada Department of Environmental Protection (NDEP) was completed on December 20, 2010 and shows there were no significant deficiencies with the system and other deficiencies were all corrected with evidence provided to the NDEP by February 2, 2011.

Williams Ridge Technology Park, all associated businesses and the water system are owned by one individual. Because of this no water rates are charged. The production well is equipped with a meter and a meter is placed on the fire supply line. Meters are also located on the supply lines to 1161, 1181 and 1191 Mark Circle. All other buildings are supplied with water coming off the fire system and are also equipped with meters.

Wastewater collected from the service area is handled with septic systems.

Plan Provisions

In accordance with NRS 540.131, this plan will be reviewed from time-to-time to reflect changes and must be updated every five (5) years to comply with NRS 540.131 and NRS 540.141. The next update of this plan is to be on, or before, January 2017 (five years from the original submittal).

The **Williams Ridge Technology Park** Maintenance Manager and Safety and Regulatory Engineer will collaborate to review /revise the conservation plan annually with updates occurring at least every 5 years.

In an effort to promote voluntary conservation and aid in Nevada's future, **Williams Ridge Technology Park** will enact the voluntary conservation measures found in the **Conservation Measures** section. When more stringent measures are needed, **Williams Ridge Technology Park** will enact the measures found in the **Contingency Measures** section. All measures can be found in Appendix A.

As required by NRS 540.141, the water conservation plan must include the following provisions:

- a. Public Education
- b. Conservation Measures
- c. Water Management
- d. Contingency Plan

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- e. Schedule
- f. Evaluation Measures
- g. Conservation Estimates

Each provision is discussed below.

Public Education

Public education is a key for cooperation with conservation efforts. **Williams Ridge Technology Park** will continue to encourage communication with all facilities and employees to promote conservation and education.

It is the goal of **Williams Ridge Technology Park** to increase public awareness to conserve water and encourage conscious decisions for water use. Public Education will be conducted by the **Williams Ridge Technology Park** Maintenance Manager and Safety and Regulatory Engineer.

Conservation Measures

In an effort to promote conservation and voluntarily conserve water, **Williams Ridge Technology Park** is adopting water-use regulations to promote water conservation during non-emergency situations. These regulations include the following non-essential water use:

- 1) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets is discouraged.
- 2) Use of water for washing aircraft, cars, buses, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
- 3) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 4) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
- 5) Use of water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.
- 6) Use of water for more than minimal landscaping in connection with any new construction.

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- 7) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 8) Use of water in the irrigation system if a leak has been identified and has not been addressed within 24- hours. It is the goal of **Williams Ridge Technology Park** to address all leaks within 24-hours.

Williams Ridge Technology Park promotes the development of water conserving principles into the planning, development, and management of new landscape projects as well as in their industrial facilities. The Park already uses drip irrigation to maintain landscaping and has equipped facilities' water supply lines with automatic timers instead of manual shut-offs to reduce overuse of water.

In the event the voluntary conservation measures are insufficient to control the water shortage, **Williams Ridge Technology Park** may wish to implement the mandatory measures discussed in the *Contingency Plan* section below.

At present, it is not viable to offer any water conservation incentives because the owner of the facility is the same as the consumer no water rates are charged. However, any water conservation measures the owner and **Williams Ridge Technology Park** employees implement will likely result in cost savings via a reduction in energy and treatment supplies such as sodium chloride.

Water Management

Williams Ridge Technology Park monitors and records water levels at the tank sites. Water levels on the tanks are recorded daily and compiled into monthly reports. Because the system provides fire suppression services as well as water for daily use it is monitored closely. If water levels are dropping the maintenance staff begins troubleshooting to see if the cause is leakage or supply.

Working relationships are not maintained with nearby water systems, but there is potential to collaborate with Douglas County in the future.

Williams Ridge Technology Park actively monitors for unaccounted for water. Meters are read on a daily basis and recorded in a log book. This daily practice identifies leaks quickly and leaks are fixed as soon as possible. Maintenance personnel review historical meter readings to decide when meter replacement or calibration is necessary. Current-to-historical comparisons are examined to identify significant differences and locate leaks.

Williams Ridge Technology Park has a formal leak detection program. All large leaks are repaired immediately and small leaks (less than 1 gallon per minute) are repaired within 24-

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hours. Because maintenance staff reads meters frequently, leaks are identified quickly. In addition, external leaks surface and become obvious in the park.

The fire system is mandatorily maintained at a minimum pressure of 90 psi and all connections are equipped with pressure reducers to reduce pressure to buildings between 40 and 60 psi.

Williams Ridge Technology Park does not have a formal wellhead protection program, but care is taken to keep all solvents and materials a minimum of 100 feet away from the municipal use wellhead. The 8-inch curb and grading away from the well inhibits spills from entering the well. The facility is fenced from public access, and the well is secured with a bolted well cap.

A capital improvement plan is not in place. All improvements are funded directly by the owner. **Williams Ridge Technology Park** is proactive in improving and maintaining all facility assets, and safety has always been a priority.

Williams Ridge Technology Park does not have a system for reusing of effluent. Effluent is handled by onsite septic systems.

Douglas County has adopted a Water Conservation Plan that is voluntary for county water users. The county has not adopted any water conservation ordinances. Their plan can be accessed <http://cltr.co.douglas.nv.us/Utilities/Waterplan.pdf>.

Contingency Plan

The objective of the contingency plan would be to manage the available resources to ensure continued supply of potable water during periods of drought or extended drought.

It is envisioned that voluntary conservation will be sufficient to ensure an adequate supply of water and reduce water usage. However, if a sustained drought (lack of precipitation) is encountered, it may be necessary to implement mandatory restrictions in order to ensure an adequate supply of water to meet essential needs.

Williams Ridge Technology Park plans for drought response would be three (3) stages of drought response: (1) warning stage, (2) alert stage, and (3) emergency stage. The stages are describes as follows:

In Stage 1, the warning stage, **Williams Ridge Technology Park** would increase monitoring of its water supplies and would begin creating public awareness of the water supply situation and the need to conserve. Conservation measures at this stage would be voluntary.

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In Stage 2, the alert stage, **Williams Ridge Technology Park** would call for wide-based community support to achieve conservation, limit the use of fire hydrants to fire protection uses (by requiring effluent for construction and dust control purposes), and implement water use restrictions. Conservation measures at this stage would be mandatory.

In Stage 3, the emergency stage, **Williams Ridge Technology Park** would declare a drought and water shortage emergency, would enforce water use restrictions, implement allocation of water (rationing). Conservation measures at this stage would be mandatory and rationing would be imposed.

When a drought is declared over, voluntary conservation measures (see **Conservation Measures** section) will be reinstated and water supplies would continue to be monitored.

Schedule

All provision will be enacted immediately once this plan is approved. All of the provisions listed will be placed after the approval of this plan.

Evaluation Measurements

If there is a decrease in production as a result of a particular measure/incentive, that measure/incentive can be expanded or improved upon, if possible. If it is discovered that a particular measure/incentive is ineffective, it will be discontinued and a new one can then be implemented to take its place.

An audit comparing water production with metered amounts will be performed prior to the implementation of measures/incentives. Additional audits will then be done every year, at a minimum, thereafter. Results from the initial audit will be compared with those of the subsequent annual audits in order to determine the effectiveness of the measures/incentives.

As a plan element is activated (e.g. declaring a drought stage), production figures will be compared to same-month historical data to estimate the plan element's effectiveness. This information will be utilized as a basis for any future water conservation plan revision and plan elements.

Usage amounts measured will include summer use, average use per connection, and per capita use. If there is a decrease in usage as a result of a particular measure/incentive, that measure/incentive can be expanded or improved upon, if possible. If it is discovered that a particular measure/incentive is ineffective, it will be discontinued and a new one can then be implemented to take its place.

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In addition to changes resulting from audits, updates, and modifications to conservation measures/incentives there will be changes made to meet changing conditions (e.g. customer growth and demand, changing use, new technologies, etc.).

Conservation Estimates

During the Stage 1 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 5% reduction in water use, or 300 gallons per day.

During the Stage 2 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 7.5% reduction in water use, or 450 gallons per day.

During the Stage 3 phase of the conservation plan, it is estimated that conservation measures could be expected to provide a 10% reduction in water use, or 600 gallons per day.

The estimated water savings for various end-user efforts can be found in Appendix C.

Rate Analysis

The owner of **Williams Ridge Technology Park** water system does not charge for water use because the owner and the consumer are one in the same. Implementing water conservation measures will provide the owner with savings in electricity and treatment supplies which is incentive to conserve. Because no water rates are charged, a rate analysis is not included in this plan.

APPENDICES

APPENDIX A: CONSERVATION MEASURES

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Stage 1 – Warning Stage

1. The **Williams Ridge Technology Park** would increase monitoring of water supplies.
2. The **Williams Ridge Technology Park** would begin creating public awareness of the water supply situation and the need to conserve.
3. The **Williams Ridge Technology Park** would inform customers of voluntary conservation measures (non-essential water uses, listed below).

Non-essential water uses are:

- 1) Use of water which results in flooding or run-off in gutters, waterways, patios, driveway, or streets.
- 2) Use of water for washing aircraft, cars, buses, boats, trailers or other vehicles without a positive shut-off nozzle on the outlet end of the hose. Exceptions include washing vehicles at commercial or fleet vehicle washing facilities operated at fixed locations where equipment using water is properly maintained to avoid wasteful use.
- 3) Use of water through a hose for washing buildings, structures, sidewalks, walkways, driveways, patios, parking lots, tennis courts, or other hard-surfaced areas in a manner which results in excessive run-off or waste.
- 4) Use of water for watering streets with trucks, except for initial wash-down for construction purposes (if street sweeping is not feasible), or to protect the health and safety of the public.
- 5) Use of water for construction purposes, such as consolidation of backfill, dust control, or other uses unless no other source of water or other method can be used.
- 6) Use of water for more than minimal landscaping in connection with any new construction.
- 7) Use of water for watering outside plants and turf areas using a hand-held hose without a positive shut-off valve.
- 8) Use of water in the irrigation system if a leak has been identified and has not been addressed within 24- hours. It is the goal of **Williams Ridge Technology Park** to address all leaks within 24-hours.

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Stage 2 – Alert Stage

1. **Williams Ridge Technology Park** would set conservation goals and call for wide-based support to achieve those goals.
2. **Williams Ridge Technology Park** would inform facilities of mandatory conservation measures (non-essential water uses, listed in Stage 1 are now mandatory).
3. **Williams Ridge Technology Park** limit the use of fire hydrants to fire protection uses only.

Stage 3 – Emergency Stage

1. **Williams Ridge Technology Park** would declare a drought and water shortage emergency and use media relations to supplement efforts to keep customers informed.
2. **Williams Ridge Technology Park** would set rationing benchmarks for each facility.
3. **Williams Ridge Technology Park** would inform customers of prohibited water uses (non-essential water uses, listed in Stage 1 are now prohibited).
4. **Williams Ridge Technology Park** would limit the use of fire hydrants to fire protection uses only.
5. **Williams Ridge Technology Park** would seek monetary assistance in an effort to mitigate the drought (e.g. federal funding).
6. Irrigation in the Emergency Stage will be dramatically reduced.

If any facility seeks a variance from the provisions of Stage 3, then that customer shall notify **Williams Ridge Technology Park** in writing, explaining in detail the reason for such a variation. **Williams Ridge Technology Park** shall respond to each request.

APPENDIX B: PUBLIC EDUCATION MATERIALS

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There are several publications available for use at U.S. EPA website for general distribution (currently located at <http://epa.gov/watersense/pubs/index.htm#ideas>). These publications include such topics as:

- Simple Steps to Save Water,
- Ideas for Residences,
- Ideas for Commercial,
- Using Water Wisely In the Home,
- Outdoor Water Use in the US,
- Toilet Flush Facts,
- Watering Can Be Efficient,
- Irrigation Timers for the Homeowner, and
- Water Efficient Landscaping,

These publications can be utilized until **Williams Ridge Technology Park** develops system-specific publications.

There are also numerous website that provide tips for conserving water. One of these is: <http://www.wateruseitwisely.com/100-ways-to-conserve/index.php>. Customers can be directed to this website for tips to conserve water.

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Specific tips for landscaping that can be provided to the customers are listed below. During drought conditions outdoor watering restrictions may be imposed, and therefore some of the following tips will not apply.

Tips for Landscaping

Watering:

- Detect and repair all leaks in irrigation systems.
- Use properly treated wastewater for irrigation where available.
- Water the lawn or garden during the coolest part of the day (early morning is best). Do not water on windy days.
- Water trees and shrubs, which have deep root systems, longer and less frequently than shallow-rooted plants which require smaller amounts of water more often. Check with the local nursery for advice on the amount and frequency of watering needed in your area.
- Set sprinklers to water the lawn or garden only—not the street or sidewalk.
- Use soaker hoses and trickle irrigation systems.
- Install moisture sensors on sprinkler systems.

Planting:

- Have your soil tested for nutrient content and add organic matter if needed. Good soil absorbs and retains water better.
- Minimize turf areas and use native grasses.
- Use native plants in your landscape—they require less care and water than ornamental varieties.
- Add compost or peat moss to soil to improve its water-holding capacity.

Maintaining:

- Use mulch around shrubs and garden plants to reduce evaporation from the soil surface and cut down on weed growth.
- Remove thatch and aerate turf to encourage movement of water to the root zone.
- Raise your lawn mower cutting height to cut grass no shorter than three inches—longer grass blades encourages deeper roots, help shade soil, cut down on evaporation, and inhibit weed growth.
- Minimize or eliminate fertilizing which requires additional watering, and promotes new growth which will also need additional watering.

Ornamental Water Features:

- Do not install or use ornamental water features unless they recycle the water. Use signs to indicate that water is recycled. Do not operate during a drought.

Using Water Efficiently: Ideas for Industry

APPENDIX C: END-USER WATER SAVINGS

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Here are just a few of the end-user water savings that could be realized:

Leaky Faucets

Issue: Leaky faucets that drip at the rate of one drip per second can waste more than 3,000 gallons of water each year.

Fix: If you're unsure whether you have a leak, read your water meter before and after a two-hour period when no water is being used. If the meter does not read exactly the same, you probably have a leak.

Leaky Toilets

Issue: A leaky toilet can waste about 200 gallons of water every day.

Fix: To tell if your toilet has a leak, place a drop of food coloring in the tank; if the color shows in the bowl without flushing, you have a leak.

Showering

Issue: A full bath tub requires about 70 gallons of water, while taking a five-minute shower uses 10 to 25 gallons.

Fix: If you take a bath, stopper the drain immediately and adjust the temperature as you fill the tub.

Brushing Teeth Wisely

Issue: The average bathroom faucet flows at a rate of two gallons per minute.

Fix: Turning off the tap while brushing your teeth in the morning and at bedtime can save up to 8 gallons of water per day, which equals 240 gallons a month!

Watering Wisely

Issue: The typical single-family suburban household uses at least 30 percent of their water outdoors for irrigation. Some experts estimate that more than 50 percent of landscape water use goes to waste due to evaporation or runoff caused by overwatering.

Fix: Drip irrigation systems use between 20 to 50 percent less water than conventional in-ground sprinkler systems. They are also much more efficient than conventional sprinklers because no water is lost to wind, runoff, and evaporation. If the in-ground system uses 100,000 gallons annually, you could potentially save more than 200,000 gallons over the lifetime of a drip irrigation system should you choose to install it. That adds up to savings of at least \$1,150!

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Washing Wisely

Issue: The average washing machine uses about 41 gallons of water per load.

Fix: High-efficiency washing machines use less than 28 gallons of water per load. To achieve even greater savings, wash only full loads of laundry or use the appropriate load size selection on the washing machine.

Flushing Wisely

Issue: If your toilet is from 1992 or earlier, you probably have an inefficient model that uses at least 3.5 gallons per flush.

Fix: New and improved high-efficiency models use less than 1.3 gallons per flush—that's at least 60 percent less than their older, less efficient counterparts. Compared to a 3.5 gallons per flush toilet, a WaterSense labeled toilet could save a family of four more than \$90 annually on their water bill, and \$2,000 over the lifetime of the toilet.

Dish Washing Wisely

Issue: Running dishwasher partial full and pre-rinsing dishes before loading the dishwasher.

Fix: Run the dishwasher only when it's full and use the rinse-and-hold dishwasher feature until you're ready to run a full load. Pre-rinsing dishes does not improve cleaning and skipping this step can save you as much as 20 gallons per load, or 6,500 gallons per year. New water-saver dishwashers use only about 4 gallons per wash.

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Estimated water savings from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-1):

Type	Estimated Usage (gpcpd)	Conservation Usage (gpcpd)	Savings (gpcpd)	Savings (%)
Toilet	18.3	10.4	7.9	43 %
Clothes Washers	14.9	10.5	4.4	30 %
Showers	12.2	10.0	2.2	18 %
Faucets	10.3	10.0	.3	3 %
Leaks	6.6	1.5	5.1	77 %

Benchmarks from selected conservation measures from EPA Water Conservation Guidelines 1998 (Appendix B, Table B-4):

Category	Measure	Reduction of End Use (% or gpcpd)
Universal metering	Connection metering	20 %
	Sub metering	20 – 40 %
Costing and pricing	10% increase in residential prices	2 – 4 %
	10% increase in non-residential prices	5 – 8 %
	Increasing-block rate	5 %
Information and education	Public education and behavior changes	2 – 5 %
End-use audits	General industrial water conservation	10 – 20 %
	Outdoor residential use	5 – 10 %
	Large landscape water audit	10 – 20 %
Retrofits	Toilet tank displacement devices (for toilets using > 3.5 gallons/flush)	2 – 3 gpcpd
	Toilet retrofit	8 – 14 gpcpd
	Showerhead retrofit (aerator)	4 gpcpd
	Faucet retrofit (aerator)	5 gpcpd
	Fixture leak repair	0.5 gpcpd
	Governmental building (indoors)	5 %
Pressure management	Pressure reduction, system	3 – 6 % of total production
	Pressure-reducing valves, residential	5 – 30%
Outdoor water use efficiency	Low water-use plants	7.5 %
	Lawn watering guides	15 – 20 %
	Large landscape management	10 – 25%
	Irrigation timer	10 gpcpd
Replacements and promotions	Toilet replacement, residential	16 – 20 gpcpd
	Toilet replacement, commercial	16 – 20 gpcpd
	Showerhead replacement	8.1 gpcpd
	Faucet replacement	6.4 gpcpd
	Clothes washers, residential	4 – 12 gpcpd
	Dishwashers, residential	1 gpcpd
	Hot water demand units	10 gpcpd
Water-use regulation	Landscape requirements for new developments	10 – 20 % in sector
	Greywater reuse, residential	20 – 30 gpcpd

APPENDIX D: WELL LOGS