



Town of Buckeye

Water Resources Department

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1.0 TOWN OF BUCKEYE WATER CONSERVATION PLAN

The Town of Buckeye is dedicated to supplying its citizens with safe, reliable, high-quality water. Water conservation is one of the most powerful and least expensive tools available to ensure that the Town has adequate water resources to meet the needs of a growing population. The Town has developed the following water conservation (water efficiency) plan to:

- (1) Increase water system efficiency;
- (2) Reduce waste; and,
- (3) Encourage consumer water conservation.

This water conservation plan applies only to the Town of Buckeye water service area, water customers of the Town of Buckeye, and Town of Buckeye employees, officials and facilities.

The Town of Buckeye is a large municipal water provider located within the Phoenix Active Management Area (AMA). Such providers located within AMAs are required by the Arizona Department of Water Resources (ADWR) Non-Per Capita Conservation Program to develop and implement water conservation programs including:

- (1) A water conservation public education program; and,
- (2) At least five additional water conservation measures.

Please refer to Section 5.0 for further details of the water conservation public education program. Please refer to Sections 6.0 and 7.0 for descriptions of additional water conservation measures.

This water conservation plan will be reviewed annually by the Town and revised as necessary. A revised version of this water conservation plan will be submitted to ADWR at least once every five years.

This water conservation plan provides both demand and supply management measures including:

- A. Steps to detect and control lost and unaccounted for water;
- B. A tiered water rate structure to encourage efficient use of water; and,
- C. A continuing water conservation education program that stresses the importance of water conservation, provides information regarding current and potential future drought conditions and informs the public of water conservation measures to reduce vulnerability to drought conditions. The water conservation measures include:

- Curtailment of nonessential water uses;
- Affordable water reduction technologies for indoor and outdoor uses;
- Credit or rebate and retrofit programs for indoor and outdoor uses; and,
- Reuse and recycling programs.

Definitions:

Artificial turf – An artificial surface made of synthetic material which resembles grass.

Drip irrigation system – A method of providing water to plants through small-diameter tubes and emitters to minimize evaporation losses and runoff. The tubing is installed underground.

Dual flush toilet – Dual-flush toilets have two buttons for flushing, a half flush and full flush. The half flush, for liquid, uses 0.8 gallons per flush. The full flush, for solids, uses 1.28-1.6 gallons per flush depending on the model.

Effluent – Sewage or wastewater after it has been treated at a sewage treatment plant.

Gray water – Wastewater in the home from bathroom sinks, bathtubs, showers, and washing machines. Does not include wastewater from toilets, dishwashers, and kitchen sinks.

Irrigation – Watering landscaping and crops by artificial means to foster plant growth.

Over-seeding – Spreading seeds of winter grass (such as rye grass) over a warm weather grass lawn (such as bermuda grass) to maintain green grass throughout late fall and winter months. Over-seeding is discouraged because water can be conserved (and mowing reduced) by allowing warm weather grass to go dormant and turn brown during winter months. Bermuda grass is dormant in winter and only requires water once every three to four weeks (less if it rains).

Runoff – Water which does not soak into the soil or landscape but flows off of it. Runoff occurs if the water is applied too quickly, for too long a duration, or on too steep a slope. In this document the word runoff does not refer to natural stormwater runoff.

Smart irrigation controller – Smart irrigation controllers use daily local weather data along with historical evapotranspiration data to adjust irrigation system runtimes to meet the water requirements of the landscape. In addition, a smart irrigation controller may be supplied with a combination rain shut-off/temperature sensor which allows the controller to adjust the landscape irrigation based on the local temperature and also to disable irrigation when it rains.

Turf – Grass, its roots, and the upper soil bound by grass roots. A lawn composed of grass.

Xeriscape – Landscaping using drought-resistant plants in an effort to conserve water. Water-conserving landscaping that emphasizes plants whose natural requirements are appropriate for the local climate. The word xeriscape was formed by combining *xeros* (Greek for "dry") with *landscape*.

2.0 EFFLUENT REUSE, RECHARGE, AND IRRIGATION DISTRICT WATER

In addition to the water conservation measures discussed throughout this plan, groundwater and Central Arizona Project (CAP) water can be conserved by reusing effluent, recharging effluent, and using irrigation district water which includes water sources other than groundwater. During calendar year 2008 approximately 55% of the potable water used by residences and commercial facilities in the Town of Buckeye returned to the sanitary sewer system and was treated by the Town's water reclamation facilities to produce Class A+ effluent. Class A+ effluent is suitable for uses including but not limited to recharging the aquifer, landscape irrigation, construction water, dust control, and numerous industrial uses. In addition, during calendar year 2007 Buckeye Irrigation Company and Roosevelt Irrigation District provided about 27% of the total water used by the Town. About 79% of the water provided by Buckeye Irrigation Company and some of the water provided by Roosevelt Irrigation District consisted of effluent and water other than groundwater. In order to conserve groundwater and CAP water the Town is committed to reusing and recharging effluent, and using irrigation district water.

2.1 Effluent Reuse

Effluent reuse (recycling) can significantly reduce the use of groundwater and CAP water. One of the Town's priorities will be to reuse effluent for irrigation of parks and athletic fields, golf courses, and landscaping in right-of-ways and medians. Currently, effluent is reused to irrigate the Sundance golf course, the Festival Ranch golf course, and Earl Edgar Park. Plans are underway to irrigate other parks and recreation areas with effluent. Effluent is also used as the process water at the Town's Central Wastewater Treatment Plant. The Town installed an effluent (reclaimed water) fill station at the Central Wastewater Treatment Plant to enable effluent to be used for dust control, street sweeping, and construction water. Effluent from the Central Wastewater Treatment Plant is also used by the Town of Buckeye Fire Department for fire suppression training activities at the nearby fire department training facility. The Town also intends to install reclaimed water fill stations at each Town-owned wastewater treatment plant. Work is in-progress on the Town's Water Resource Master Plan. The plan, which should be completed within the next 12 months, will address a reclaimed water piping network to convey effluent throughout the Town. In addition to using effluent for landscape irrigation, construction water and dust control, the feasibility and benefits of using effluent for fire protection in new developments will also be examined.

2.2 Effluent Recharge

The Town is committed to maximizing effluent recharge to sustain the aquifer and to conserve CAP water. Currently, the Town has one permitted recharge facility, the Tartesso Underground Storage Facility (USF), located at the Tartesso West Water Reclamation Facility. All of the effluent generated at the Tartesso West Water Reclamation Facility is recharged at the Tartesso USF. The Town and its developers plan to obtain ADWR USF permits to enable the construction of additional recharge facilities in the future. The Town's Water Resource Master Plan will recommend strategic locations which are favorable for future recharge facilities.

Landscape watering demands usually decrease in the winter and increase in the summer. Reduced winter landscape watering demands result in excess effluent which must be recharged. Therefore, the Town and its developers plan to construct recharge facilities which can accommodate year-round, as well as seasonal recharge.

2.3 Irrigation District Water

Effluent and other water provided by Buckeye Irrigation Company and Roosevelt Irrigation District reduces groundwater pumping and can conserve future CAP water supplies. Residences and parks in the historical area of the Town, and the Town cemetery are irrigated by water provided by the irrigation companies. As agricultural lands in the Town are retired the agricultural demand for water from the irrigation companies will decrease. However, the Town is committed to continue and expand the use of water provided by the irrigation companies. The Town is also committed to expand the use of water provided by the irrigation companies for construction water, in order to conserve potable groundwater and CAP water.

2.4 Buckeye Waterlogged Area

As much as 30,000 acre-feet of groundwater per year is pumped by Buckeye Irrigation Company from dewatering wells located in the Buckeye Waterlogged Area to allow crops to be grown. Without this pumping, the groundwater table would rise to within a few feet of the ground surface, fields would not drain, and traditional crops could not be grown.

Water pumped from the dewatering wells is currently discharged and not used for beneficial purposes because it is high in total dissolved solid (TDS) concentrations and unsuitable for potable uses or landscape irrigation. The treatment of high TDS water wastes about 25% of the water and produces a brine concentrate which must be disposed of. Future technological advances are expected to provide a cost effective method to reduce TDS while also reducing water waste and brine disposal challenges (one brine disposal option could include irrigation of a variety of turfgrass which can tolerate TDS concentrations up to 15,000 parts per million).

If the high TDS dewatering water can be treated at a reasonable cost it could provide an additional water source to be reduce the use of groundwater and CAP water. The Town is committed to working with Buckeye Irrigation Company to explore how the dewatering water can be acquired by the Town and utilized as a new source of water to reduce the use of groundwater and CAP water.

3.0 LEAK DETECTION, AND REDUCING LOST & UNACCOUNTED FOR WATER

Utility workers with the Town's Water Resources Department are on call 24 hours per day, 7 days per week and are trained to find and repair obvious and hard-to-detect water leaks. Currently, the public can report water leaks at the following 24-hour leak reporting hot-line: (623) 764-4848. During the hours of 7 AM to 6 PM Monday through Thursday water leaks may also be reported at (623) 349-6800.

Cities and other water providers have determined that many distribution system leaks continue undetected underground for long periods of time resulting in large losses of water. To remedy this, the Town is committed to developing and implementing a comprehensive and aggressive leak detection and correction program over the next two years. The program may include water system audits, flow testing, and the operation of specialized leak detection equipment. The Town intends to purchase specialized leak detection equipment and train personnel to operate the equipment over the next two years. The Town is committed to developing and implementing a systematic program to detect and correct distribution system leaks.

The Town is also considering instituting a reward system to encourage the public to report water leaks and irrigation systems that fail to shut off or continue watering during rainfall or high soil moisture conditions. The reward system could offer water bill credits. As another option, the Town could solicit local restaurants and commercial businesses to voluntarily offer vouchers or coupons that provide discounts for services or merchandise as a reward. In return, the local restaurants and commercial businesses would receive recognition for partnering with the Town to reduce water leaks and water waste.

Utility billing personnel will review water billing accounts and use software to alert them to unusually large or small water uses. Water meter service technicians will then be notified to re-read the meter. If they verify the large water use and notice evidence of a leak the customer will be notified. Water meter service technicians and utility workers are available to help customers check for obvious leaks and will offer advice to help customers check for leaks upon request.

The Water Resources Department water meter service technicians are alert to test and replace faulty water meters which fail to properly record water use. In addition, the technicians respond within 48 hours to user complaints about higher than anticipated water bills in order to help users detect and correct leaks and excessive water use. The technicians complete a High Consumption Investigation Check List (Appendix A) when visiting residences or businesses in response to higher than anticipated water usage. In addition, the technicians employ flow meters and dataloggers upon request to assist users in determining whether or not they have a leak. The technicians also make recommendations to assist users with repairing and adjusting their irrigation systems to reduce water losses and excessive watering.

Water meters lose accuracy as they age. Older, worn meters may allow water to pass through them at lower flows without recording the flows. Consequently, customers may not realize how much water they are actually using. In addition, customers may be unaware of low flow water leaks. Low flow (0.5 gallons per minute or less) leaks at a property can result in the loss of 720 gallons of water per day. Therefore, the Town is committed to replacing older meters on a regular schedule, to enable customers to accurately assess their water use, and to make them aware of low flow water leaks.

The Town requires the installation of hydrant water meters on construction sites where hydrant water is used, on dust control water fill-up sites, and at street sweeper fill-up sites.

4.0 WATER RATE STRUCTURE ENCOURAGES CONSERVATION

The Town has implemented a tiered water rate structure to encourage water user conservation. The residential rate structure includes a base rate, a relatively low rate per thousand gallons for the first 6,000 gallons, and three progressively increasing water rate steps which increase the rate per 1,000 gallons for higher water use. The rate structure is designed to encourage conservation by charging residential water customers who use more water a higher rate than those who use less water. The rate structure is also intended to inform higher volume residential water users that their water usage is higher than the typical residential water customer. Typical residential water customers in the Sundance Development and the historical portion of Buckeye use approximately 6,000 gallons of water or less per month.

The commercial water rate structure includes progressively increasing base rates for larger, higher volume water meter sizes.

BUCKEYE 2008 WATER RATES

RESIDENTIAL WATER RATES	Residential All Areas Except Sunora	Base		\$ 12.70	Sunora Incorporated and Sunora Unincorporated	Base		\$ 6.35
		Charge for each 1,000 Gals	1,000-6,000	\$ 2.20		Charge for each 1,000 Gals	1,000-4,000	\$ 1.33
			7,000-10,000	\$ 3.10			5,000-8,000	\$ 1.77
			11,000-15,000	\$ 5.30			9,000-12,000	\$ 2.65
			16,000+	\$ 7.95			13,000+	\$ 3.98

COMMERCIAL WATER RATES	Meter Size 3/4"	Base	\$ 12.70	Charge for each 1,000 Gallons	\$3.53
	1"	Base	\$ 38.10		
	1.5"	Base	\$ 38.10		
	2"	Base	\$ 101.61		
	4"	Base	\$ 190.51		
	6"	Base	\$ 317.52		
	8"	Base	\$ 635.04		

5.0 WATER CONSERVATION EDUCATION AND OUTREACH

Water conservation is a shared responsibility between the Town government, developers, citizens and other water users. Citizen water conservation education and citizen participation are essential to a successful water conservation program. Education of water users in workplaces and hospitality establishments is also vital to foster their participation.

One of the first goals of our water conservation education program will be to change the perception that water conservation requires deprivation. Instead of giving up comfort and convenience, water conservation requires making minor habit changes to reduce water waste, incorporating improved efficiency devices and appliances into the home or business, and selecting colorful and diverse water-efficient plants. This water conservation plan promotes a lifestyle well-suited to our climate, and it will help customers reduce water bills.

The Town has acquired the Arizona Conserve Water Educator's Guide (Project WET [Water Education for Teachers], 2007). This guide contains K-12 activities designed to help teachers introduce water conservation education into the classroom. The activities and instructional materials in the guide may also be appropriate for Town-sponsored water conservation education events in the library and during summer recreation programs.

The Town will work to educate residents and businesses about the importance and advantages of practicing water conservation. Education will be instituted through methods, materials and activities such as:

- School programs;
- Materials to be used and distributed in schools;
- Messages on water bills;
- Water bill inserts;
- Articles or messages in local newspapers;
- Newsletters;
- Town website;
- Developing partnerships with other local city governments in order to disseminate information;
- Creating rewards and incentives for residential and business conservation;
- Gardening workshops encouraging xeriscape techniques; and,
- Public outreach events and workshops.

The Town has developed a water conservation web page which can be accessed at the following web address: <http://www.buckeyeaz.gov/index.asp?nid=703>. The web page lists water conservation measures from Water Use It Wisely's website for water saving tips, and adapts them to Buckeye's arid climate. The web page also lists water saving devices from the U.S. Environmental Protection Agency's (EPA's) WaterSense website. In addition, the web page directs readers to H₂Ouse's website which points out opportunities to save water in and around the home, and SAHRA's (Sustainability of Semi-Arid Hydrology and Riparian Areas) website which provides water resource management information and advice. The Town's web page

provides links to the websites mentioned above: WaterSense, Water Use It Wisely, H2Ouse and SAHARA

Over the next year the Town will develop partnerships and work with local school districts, community centers, local developers, and businesses to distribute water conservation educational information and expand public outreach. The Town may also begin to hold local water conservation and xeriscape gardening workshops. In addition, the Town will request recommendations from the public for improved water conservations measures.

The Town became a WaterSense promotional partner in July 2008. WaterSense is an EPA program that promotes water-efficient products, services, and practices. WaterSense labels products that are at least 20 percent more water efficient than similar products in the marketplace. The WaterSense label will help customers easily identify water-efficient products and services. WaterSense will provide the following water conservation materials for the Town to distribute:

- Utility bill stuffers;
- Artwork for promotional items (e.g., stickers, magnets);
- Public service announcement templates;
- WaterSense partner logo artwork;
- Press release templates;
- Fact sheets; and,
- Brochures.

At least twice a year the Town will communicate to customers the importance of water conservation and inform customers how to obtain water conservation information from the Town. Communication channels will include the following: messages on water bills, water bill inserts, messages on the Town's web page, newsletters, and articles or messages in local newspapers. The Town will also set up a booth to display and distribute water conservation information during two or more annual public events held in the Town.

The Town will provide customers with free pamphlets and brochures on water conservation. The information will be available at the Water Resources Department, other Town offices, the library, other public offices, and will be sent to customers upon request.

The Town has posted the "Do it Yourself" Landscape Guide (ADWR, 2006) on the Town's water conservation web page and will distribute copies to developers and homeowners upon request. Copies are available at the Water Resources Department. The guide provides color photographs, landscape and irrigation design plans, and a recommended plant list for 18 different landscape plans for single-family homes. The landscape plans provide a variety of options, ranging from xeriscape to turf areas, to meet individual needs and preferences.

6.0 WATER SAVING HABIT CHANGES

The Town will continually expand wise and practical conservation measures. Students, residents, business owners, and tourists will be educated and encouraged to practice water-saving measures and establish more conservation-minded habits with emphasis on the following areas:

- Bathroom, kitchen, laundry room water use;
- Household water-system maintenance;
- Landscaping;
- Pool maintenance; and,
- Car washing and cleaning of driveways, patios or sidewalks.

Some of the basic water conservation habit changes recommended by ADWR include:

- Reducing discretionary outdoor water uses such as car, patio, sidewalk or driveway washing;
- Reducing evaporation losses by avoiding landscape watering during the heat of the day;
- Using smart irrigation controllers;
- Limiting showers to 5 minutes or less;
- Selectively replacing turf with xeriscape or lower water-use landscaping;
- Discouraging winter over-seeding;
- Washing only full loads of laundry or dishes;
- Adjusting sprinklers to reduce overspray and run-off into streets; and,
- Using pool covers to reduce evaporation (pool covers must be compliant with American Standard for Testing and Materials [ASTM] F1346-91 for child safety, in addition to being designed to prevent evaporation losses).

Some of the above water saving habit changes are addressed in Section 9.0, which presents recommended water conservation policies, including water conservation practices and goals.

The Town's water conservation program will also allow flexibility for local developments, residents, businesses and Town employees to implement their own water conservation measures.

7.0 VOLUNTARY WATER SAVING MEASURES

The following voluntary water saving devices and practices are encouraged because they are effective, affordable, and relatively easy to implement.

7.1 Bathroom, Kitchen, and Laundry Room Water Efficiency

7.1.1 High efficiency or dual-flush toilets

Toilets are by far the main source of water use in the home, accounting for nearly 30% of residential indoor water consumption. Over the course of a lifetime an individual will likely flush the toilet nearly 140,000 times (WaterSense, 2008). Recent advancements have resulted in toilets using 20% less water than the federal standard of 1.6 gallons per flush (gpf), while providing equal or improved performance. The improved low water use toilets include high efficiency toilets and dual-flush toilets. High efficiency toilets use less than 1.3 gallons (typically 1.28 gallons) per flush. Dual-flush toilets have two buttons for flushing, a half flush and full flush. The half flush, for liquid, uses 0.8 gallons per flush. The full flush, for solids, uses 1.28-1.6 gallons per flush depending on the model.

A voluntary replacement of a standard 1.6 gallon per flush toilet with a high efficiency or dual-flush toilet can save 584 gallons of water per person per year or 1,752 gallons per year for a family of three. Many traditional toilets use 2.9 gallons of water in a single flush. Older, pre-1994 toilets use 3.5 gallons of water or more in a single flush. If older pre-1994 toilets are replaced with high efficiency or dual-flush toilets, 4,000 gallons per person per year or 12,000 gallons per year for a family of three can be saved. Please refer to Section 8.1 for a potential water bill credit for the replacement of pre-1994 toilets. Please refer to Section 8.2 for a potential water bill credit for the replacement of post-1994 toilets which use between 1.6 and 3.4 gallons of water per flush, with high efficiency or dual-flush toilets which use 1.3 gallons per flush or less.

The Town of Buckeye Water Resources Department can provide a list of WaterSense approved high efficiency or dual-flush toilets. WaterSense labeled toilets are certified by independent laboratory testing to meet rigorous criteria for both performance and efficiency.

7.1.2 Leaky Toilets and Toilet Water Waste

Toilet leaks should be promptly repaired as they can result in thousands of gallons of water waste per year. Leaky toilet flappers should be promptly replaced. Toilet flappers are inexpensive and easy to replace. Food coloring or dye tablets can be used to check if a flapper needs to be replaced. To test for a leaky flapper, place two dye tablets or 10 drops of food coloring in a full toilet tank. Wait 10 minutes and if coloring appears in the toilet bowl water the flapper should be replaced.

Water can be saved by not using a toilet as a trash basket to flush used facial tissue or other items. In addition, a toilet or sink should not be used to discard unused prescription drugs, non-biodegradable material, or personal care products (such as nail polish remover or antibacterial soap/hand cleaner). Unused prescription drugs or personal care products that are flushed down a

toilet or sink cannot be treated by a sewage treatment plant and will return to the environment to contaminate future water supplies. Unused prescription drugs or personal care products may be disposed during household hazardous waste drop-off events.

7.1.3 Shower Efficiency

Shower water savings can be realized by limiting showers to five minutes or less and also by voluntarily replacing less efficient showerheads with reduced-output showerheads. Federal regulations limit the flow for each showerhead to 2.5 gallons per minute (gpm). However, some showerheads produce 1.5 gpm or less with no performance reduction. Replacement of 2.5 gpm showerheads with 1.5 gpm showerheads can reduce shower water usage by 40%. This could amount to a savings of approximately 1,825 gallons per person per year. In addition, plumbing codes do not limit the number of showerheads for each shower nor specify the maximum flow rate for other water-emitting showering devices. It is recommended that voluntary plumbing designs limit the number of showering devices to one per shower (for individual home showers) and set a maximum flow per square foot for all water emitters combined. A maximum flow rate of 1.5 gpm is recommended for each individual water-emitting showering device. In addition, dripping showerheads should be promptly repaired.

7.1.4 Bathroom Sink Efficiency

Bathroom sink water efficiency can be improved by turning off the faucet while brushing teeth. In addition, a mug or small cup can be filled with water to clean a razor instead of allowing the faucet to run while shaving. Installing reduced-output faucet aeration devices can also save water. In addition, dripping faucets should be promptly repaired.

7.1.5 Public or Commercial Restrooms

Automatic toilets, activated by motion sensors, are recommended for all public or commercial restrooms. High efficiency (<0.5 gallons per flush) or waterless urinals are also recommended for all public and commercial restrooms. Urinals which use water to flush should be automatically activated by motion sensors. Sink faucets in all public or commercial restrooms should be metered or automatically activated by motion sensors. Such faucets should not deliver more than 0.25 gallons (1.0 liters) of water per use. In addition, dripping faucets should be promptly repaired.

7.1.6 Kitchen Water Efficiency

Water can be saved in the kitchen by installing low-flow sink aerator devices on kitchen sink faucets. Water can also be saved by installing high efficiency dishwashers which use less water than conventional models and do not require pre-rinsing before washing. In addition, water can be saved by filling a jug of water and placing it in the refrigerator instead of allowing the faucet to run while waiting for the water to cool when filling a glass of drinking water. In addition, dripping faucets should be promptly repaired.

7.1.7 Restaurant Water Efficiency

Water can be saved in restaurant kitchens by installing pre-rinse power rinse devices on kitchen sink faucets. These devices reduce flow to 1.28 gpm but supply a pressure of 60 pounds per square inch (psi) to remove food from dishes. Air-cooled ice machines can be installed to save water in restaurants. Connectionless vegetable steamers, which must be manually filled, can also

save water in restaurants. Water can also be saved if glasses of water are provided only upon request.

7.1.8 Home Laundry Room Water Efficiency

Efficient (front-load) washing machines can reduce laundry-room water use by 60% over conventional top-load washing machines. Washing only full loads can also save water.

7.1.9 Hotel Laundry Room Water Efficiency

Hotel laundry rooms can save water by reusing the final washing machine rinse water for the next load. Water can also be saved by asking guests to reuse towels for multiple days instead of washing towels after each use.

7.1.10 Hot Water Efficiency

Allowing the water to run while waiting for it to heat-up wastes water. Reducing hot water use is one way to save water and the time spent waiting. In addition, installing on-demand hot water recirculators with a sensor, so the devices run only when needed, can potentially save an average of 4 gallons of water every time hot water is used. Furthermore, voluntary plumbing designs should limit the diameter and length of hot water pipes to 40 feet or less and require insulation for the full length of hot water pipes. Voluntary plumbing designs should also differentiate the pipe diameter requirements between cold and hot water pipes and specify a maximum hot water pipe diameter of ½-inch. With the exception of green building codes, current plumbing codes specify only the minimum but not the maximum pipe diameter.

7.1.11 Water Softeners and Home Reverse Osmosis Water Treatment Units

Water softeners and home reverse osmosis water treatment units can waste water, depending on their design and whether or not they are properly set for the local hardness.

A water softener may not be necessary, depending on the local hardness of the water. If a water softener is necessary, water can be saved by purchasing one that does not use salt. Salt-based water softeners waste water during backwashing. In addition, salt-based water softeners discharge salts into the sanitary sewer system and can reduce the suitability of the recycled water for irrigation and industrial uses (potable water must be used if the recycled water can't be used). Treated wastewater is often used to recharge the aquifer to increase groundwater supplies. However, the salt from water softeners is not removed by the wastewater treatment process, and may result in groundwater which requires treatment to remove salts. Treatment to remove salts typically wastes 25% of the water. Setting a water softener to the proper hardness for the area will use less salt and discharge less salt into the sanitary sewer system (the Water Resources Department can be contacted at 623-349-6800 to obtain the local water hardness). If a home already has a salt-based water softener and the softener can use either sodium-based or potassium-based salt, switching to potassium-based salt is a better alternative because the recycled wastewater will be more suitable for the irrigation of plants.

Home reverse osmosis (RO) water treatment units concentrate undesirable elements and salts into wastewater and discharge the wastewater to the sanitary sewer system. In order to produce one gallon of treated water 3 gallons of water are wasted. Setting an RO unit to the proper hardness for the area can reduce water waste. Setting it too high will waste more water.

7.2 Buckeye Single Family Residence Green Building Code

In order to encourage energy and water efficiency the Town has established a voluntary Green Building Code for single family residences. The Town's Green Building Code sets mandatory standards and also allows the selection of options to achieve the "green building rating" for a single family residence.

The mandatory Green Building standards require items including, but not limited to: (a) fully insulated hot water lines; (b) a hot water demand controlled recirculation pump for hot water heaters located more than 20 feet from the farthest fixture served, and a manual control or occupant sensor switch to operate the recirculation pump, with an automatic temperature sensor shut off; and, (c) toilets that are high efficiency (maximum 1.3 gallons per flush or less) and/or dual flush operated (average 1.2 gallons per flush).

Green Building options which may be selected include, but are not limited to: (a) hot water branch lines from the manifold to each fixture which are a maximum of ½-inch in diameter; (b) bathroom faucets or showerheads which are high efficiency (2.0 gpm or less); (c) a two-pipe drain system for a future gray water recovery system; and, (d) the installation of a complete gray water system with landscape irrigation (this option may be installed for additional points).

Caution should be exercised whenever installing a gray water system or gray water features to ensure that gray water supplies do not contaminate potable water supplies. Therefore, only a licensed plumber or properly trained individual should install any gray water system or feature.

7.3 Swimming Pool Water Efficiency

Swimming pools seldom need to be drained. A typical 16-foot x 32-foot swimming pool loses more than 16,000 gallons of water per year due to evaporation. A pool cover can reduce evaporation losses by 90-95% (SAHRA, 2008). Proper swimming pool covers must be compliant with ASTM F1346-91 for child safety, in addition to being designed to prevent evaporation losses. Pools covers can also keep debris out, reduce cleaning, serve as an added barrier for children or pets, extend the life of chemicals, and keep the water warmer at night to extend the swimming season. Keeping the water below the top of the pool can reduce losses caused by splashing. Manually cleaning pool filters and reducing pool back-washing can also save water.

7.4 Outdoor Water Efficiency

7.4.1 Reducing Outdoor Water Usage

Outdoor water uses, including landscape watering, make up approximately 60% of home water usage. Numerous steps can be taken to reduce outdoor water use, such as:

- Reducing discretionary outdoor water uses such as car washing;
- Washing vehicles at a car wash which recycles the water or at least one that discharges water to the sanitary sewer (where it can be treated and reused to water landscaping) is preferred to washing a vehicle at home;

- Using a broom instead of a hose to clean patios, sidewalks or driveways;
- Reducing evaporation losses by avoiding landscape watering during the heat of the day;
- Adjusting sprinklers to reduce overspray and runoff into streets;
- Installing smart irrigation controllers and rain-shut-off devices on irrigation timers;
- Selectively replacing turf with xeriscape or lower water-use landscaping;
- Discouraging winter over-seeding;
- Promoting preservation of natural desert landscaping; and,
- Setting timers on decorative fountains to run only certain hours of the day and shutting off fountains when windy or rainy.

Additional information is provided below regarding smart irrigation controllers.

7.4.2 Smart Irrigation Controllers

Smart irrigation control devices including evapotranspiration controllers, temperature/humidity sensors, and soil moisture sensors can reduce water use. A two-year (August 2004 through July 2006) study conducted by the University of Arizona determined that evapotranspiration controllers reduced median residential total water use by 25%. The study also determined that temperature sensors and soil moisture sensors reduced median residential total water use by 3% and 4%, respectively. Residents reported that the reductions in water use did not adversely affect the appearance or condition of the landscaping. Cost recovery for the retail costs of an evapotranspiration controller can occur in as little as 12 months for high water users. Typical evapotranspiration controllers cost \$265 to \$400, depending on the number of stations controlled.

8.0 WATER BILL CREDITS

Qualifying Town of Buckeye water customers may apply to the Water Resources Department for rebates in the form of water bill credits for the following water use reduction devices or water efficient landscaping purchased and installed on or after January 1, 2010:

- Retrofits to high-efficiency or dual-flush toilets;
- Water efficient front-load clothes washers;
- Smart irrigation controllers;
- Replacement of turf or high water use landscaping with xeriscape or artificial turf;
- Hot water recirculators; and,
- Automatic water shut-off devices which shut off the main water supply to a home or business in the event of a major water leak inside the home or business.

Credits will be deducted from monthly water bills until the credit is paid off. Customers must allow 60 days after the Water Resources Department completes the final inspection and gives final approval for the credit before the credit will be deducted from the water bill. If a customer moves and closes the account, the Town will refund any remaining credit to the customer, as long as the water-saving device remains with the home (water efficient front-load clothes washers do not necessarily have to remain with the home, if the customer moves).

In order to be eligible for a credit, the customer must allow the Water Resources Department to inspect the property before the existing water use device or landscaping is removed (pre-installation inspection) and after the water use reduction device or landscaping is installed (post-installation inspection). Inspections may be scheduled beginning January 2, 2010 by calling the Water Resources Department at (623) 349-6800. The water use reduction device or landscaping must be properly installed to qualify for the credit. The customer must also present a receipt dated January 1, 2010 or later to the Town which verifies the purchase of the water use reduction device or landscaping materials. Table 1 lists eligible water reduction devices and landscaping, the dollar amount of the credit, and the inspection requirements. As an additional incentive the Town of Buckeye building permit inspection fee will be waived or reimbursed after the proper installation of a toilet or hot water recirculator installed under the rebate program. More information on how to obtain the rebates will be posted on the Town of Buckeye Water Conservation web page. Additional information can also be obtained by calling (623) 349-6800.

8.1 Retrofit of Pre-1994 Toilets with High Efficiency or Dual-Flush Toilets

Town of Buckeye water customers may apply for a credit for the retrofit of pre-1994 toilets with high efficiency or dual-flush toilets. Only high efficiency toilets flushing 1.28 gallons per flush or less or dual-flush toilets flushing an average of 1.28 gallons per flush or less qualify. Only single family detached homes built before 1994 with toilets flushing 3.5 gallons per flush or more are eligible for this credit. Qualifying customers may apply for a credit of \$75 per toilet, up to two per home, for the life of the home. The Town will pick up and dispose of discarded pre-1994 toilets (please schedule pick up three working days in advance), if this service is not provided by the customer's plumber. Toilets must be cleaned by the customer before the Town

can pick them up. In order to qualify for the credit, the customer must schedule an inspection by the Town before the pre-1994 toilets are removed and after the high efficiency or dual-flush toilets are installed.

8.2 Retrofit of Post-1994 Toilets with High Efficiency or Dual-Flush Toilets

Town of Buckeye water customers may apply for a credit for the retrofit of toilets installed during or after 1994 with high efficiency or dual-flush toilets. Only high efficiency toilets flushing 1.28 gallons per flush or less or dual-flush toilets flushing an average of 1.28 gallons per flush or less qualify. Qualifying customers may apply for a credit of \$50 per toilet, up to two per home, for the life of the home. The Town will pick up and dispose of discarded pre-1994 toilets (please schedule pick up three working days in advance), if this service is not provided by the customer's plumber. Toilets must be cleaned by the customer before the Town can pick them up. In order to qualify for the credit, the customer must schedule an inspection by the Town before the existing toilets are removed and after the high efficiency or dual-flush toilets are installed.

8.3 Water-Efficient (Front-Load) Clothes Washer

Town of Buckeye residential water customers may apply for a credit for the replacement of an older top-load clothes washer with a water-efficient front-load clothes washer. A list of Town-approved models is available at the Water Resources Department. Only Tier 3 approved washers from the Town-approved list are eligible for the credit. Qualifying customers are eligible for a credit of \$100 per clothes washer with a limit of one washer per customer.

8.4 Smart Irrigation Controllers

Town of Buckeye water customers may apply for a \$100 water bill credit for the purchase and proper installation of a smart irrigation controller. The make and model of the smart irrigation controller must be approved by the Water Resources Department prior to purchase. Qualifying smart irrigation controllers consist of evapotranspiration controllers which use daily local weather data along with historical evapotranspiration data to adjust runtimes to meet the water requirements of the landscape. In addition, the controller must also be supplied with a combination rain shut-off/temperature sensor which allows the controller to adjust the landscape irrigation based on the local temperature and also to disable irrigation when it rains. Only one credit for a smart irrigation controller credit will be allowed per address.

8.5 Replacement of High Water Use Landscaping or Turf with Xeriscape or Artificial Turf

Town of Buckeye water customers can apply for a \$50 - \$100 water bill credit for the removal of high-water use landscaping or turf and the replacement with xeriscape or artificial turf. This credit is not available for properties eligible to receive flood irrigation from the Buckeye Water Conservation and Drainage District or the Roosevelt Irrigation District. The Water Resources Department must inspect the property before the high water use landscaping or turf is removed and after the xeriscape or artificial turf is installed before the credit can be approved. If new

xeriscape landscaping is installed, the credit cannot be approved until a properly operating drip irrigation system is installed to water the new xeriscape.

To qualify for this credit a minimum 500 square feet of area must be converted. A credit of \$50 will be issued for the conversion of an area of 500 – 999 square feet. A credit of \$75 will be issued for the conversion of an area of 1,000 – 1,499 square feet. A credit of \$100 will be issued for the conversion of an area of 1,500 square feet or more. A Town of Buckeye water customer can apply for an additional credit during a subsequent year if an additional area is converted during the subsequent year. Only one credit for this conversion will be allowed per account per year.

Turning off the water to your lawn, or covering it with black plastic or decomposed granite is not an approved way to kill the grass before replacing it. Please refer to Appendix A for SAHRA's recommended method to kill turf grass.

8.6 Hot Water Recirculators

Town of Buckeye water customers may apply for a \$75 water bill credit for the purchase and proper installation of a hot water recirculator. Only one hot water recirculator credit will be allowed per address for the life of the home or business. The hot water recirculator must be a model that includes a sensor so the device runs only when needed. A copy of the purchase receipt and an inspection by the Town to verify correct installation and operation will be required before the credit can be issued. A pre-installation inspection is not required for this credit.

If the hot water line is in the attic and it is not insulated the Town will require it to be insulated in conjunction with the installation of the hot water recirculator. An additional \$50 credit is available for properly insulating the hot water line. To qualify for the credit the hot water line must be inspected before and after it is insulated. The customer must also present a receipt to the Town dated January 1, 2010 or later which verifies purchase of the insulating material.

8.7 Automatic Water Shut-Off Device

Town of Buckeye water customers can apply for a \$75 water bill credit for the purchase and proper installation of an automatic water shut-off device which shuts-off the main water supply to a home or business in the event of a major water leak such as a rupture in a washing machine hose, hot water heater failure, pipe break or dish washer leak inside of the home or business. Only one credit for an automatic water shut-off device will be allowed per address.

9.0 WATER CONSERVATION POLICIES

Water conservation is in the interests of the Town of Buckeye, its citizens and businesses. The Buckeye Town Council approved Ordinance Number 14-09 on June 2, 2009 to provide water conservation measures and rebates. The ordinance also establishes water conservation levels and steps to reduce water usage during a water shortage. The following goals and practices are encouraged in addition to Ordinance Number 14-09.

9.1 Water Demand Goal

ADWR's Third Management Plan for the Phoenix Active Management Area established a maximum water demand of 147 gallons of water per person per day (GPCD) for the historical portion of Buckeye and a GPCD of approximately 163 gallons per person per day for other areas of Buckeye (the GPCD for other areas of Buckeye varies with the number of occupants per single-family dwelling unit). The Town of Buckeye has a goal of reducing the water demand to 125 gallons per person per day (per single-family dwelling unit) for all portions of the Town's Water Service Area. The Town's actual water demand will be determined by dividing the Town's total water production by the total population within the Town's Water Service Area.

9.2 Outdoor Landscape Irrigation Water Source

In order to conserve potable groundwater and CAP water, the use of effluent and irrigation district water is encouraged for outdoor irrigation.

9.3 Car Washing

The Town encourages car washes to recycle the wash water or to be water efficient. The Town also encourages residents to wash their vehicles at car washes that recycle the wash water or that are water efficient. If it is not practical to wash a vehicle at a water efficient or recycling car wash the Town encourages the washing of vehicles at a car wash which discharges to a sanitary sewer to enable the water to be reused after it is treated.

9.4 Cleaning Hard Surfaces

The use of a broom, instead of a hose and potable water, is encouraged to clean hard surfaces including patios, porches and steps. Section 17-7-14 of Ordinance Number 14-09 restricts (with exemptions) the use of potable water to wash driveways and sidewalks.

9.5 Waterless or High Efficiency Urinals

The installation of high efficiency (<0.5 gallons per flush) urinals or waterless urinals is encouraged in all public buildings. Section 17-7-19 of Ordinance Number 14-09 requires the installation of high efficiency urinals or waterless urinals in Town-owned buildings constructed after January 1, 2010.

9.6 Construction Water or Dust Control Water Sources

The use of effluent, reclaimed water, or irrigation district water, instead of potable water, is encouraged for construction water or dust control.

10.0 REFERENCES

- Arizona Department of Water Resources, 2008, Modified Non-Per Capita Conservation Program.
- City of Chandler, Arizona, 2009, Water Conservation Rebate Program
- City of Peoria, Arizona, 2008, Water Conservation Rebate Program
<http://www.peoriaaz.com/index1.htm>
- City of Prescott, Arizona, 2008, Water Conservation Incentive Program
- City of Scottsdale, Arizona, 2008, Article VII Water Conservation Ordinance
- City of Scottsdale, Arizona, 2009, Water Conservation Rebate Program
- City of Surprise, Arizona, 2007, Water Conservation Ordinance No. 07-03.
- H₂Ouse, 2008, a website which points out opportunities to save water in and around the home.
h2ouse.org
- SAHRA, 2008, (Sustainability of Semi-Arid Hydrology and Riparian Areas), a website which provides water resource management information and advice. sahra.arizona.edu
- Salt River Project, 2009, Smart Irrigation Controller Discount Program
- Town of Buckeye Water Conservation web page, 2008.
<http://www.buckeyeaz.gov/index.asp?nid=703>
- Town of Gilbert, Arizona, 2000, Article VIII Water Conservation, Ordinance No. 1316.
- Town of Payson, Arizona, 2008, Water Conservation Resolution No. 2367.
- University of Arizona, Office of Arid Lands, 2007, “Smart” Irrigation Controller Study in Tucson, Arizona, Submitted to Arizona Department of Water Resources, 41 pages.
- WaterSense, 2008, U.S. Environmental Protection Agency website that promotes water-efficient products, services, and practices. watersense@epa.gov
- Water Use It Wisely, 2008, a website for water saving tips. wateruseitwisely.com

TABLE 1
TOWN OF BUCKEYE
WATER BILL CREDITS

**TABLE 1
TOWN OF BUCKEYE WATER BILL CREDITS**

DESCRIPTION	CREDIT AMOUNT	SUMMARY OF DETAILS
Replace pre-1994 toilets with high efficiency or dual flush toilets	\$75 per toilet, maximum of two	Town inspection required before and after replacement. Receipt required. Town will pick up discarded toilets, if necessary.
Replace post-1994 toilets with high efficiency or dual flush toilets	\$50 per toilet, maximum of two	Town inspection required before and after replacement. Receipt required. Town will pick up discarded toilets, if necessary.
Water Efficient (front-load) Washing Machine	\$100, one per home	Must be selected from Town-approved list available at Water Resources Department. Town inspection required after installation. Receipt required.
Hot Water Recirculator	\$75 one per home or business	Must include built-in timer so device runs only when needed. If hot water piping is in not insulated an additional \$50 credit is available for the insulation of hot water piping in conjunction with the installation of a hot water recirculator - Town inspection required after installation. Receipt required.
Smart Irrigation Controller	\$100 one per home or business	Controller must use daily local weather data & historical evapotranspiration data to adjust runtimes. Must also be supplied with combination rain shut-off/temperature sensor. Town inspection required after installation. Receipt required.
Replacement of High Water Use Landscaping or Turf w/Xeriscape or Artificial Turf	\$50-\$100, once per year	Town must inspect property before high water use landscaping or turf is removed and after xeriscape or artificial turf is installed before credit can be approved. Credit cannot be approved until properly operating drip irrigation system is installed to water xeriscape.
Automatic Water Shut-Off Device	\$75 one per home or business	Town inspection required before and after installation. Receipt required. Device must shut off main water supply to home or business in the event of a major water leak

APPENDIX A
HIGH CONSUMPTION INVESTIGATION CHECK LIST

High Consumption Investigation Check List



Date: _____ Tech: _____
 Current Read: _____ TTL Consumption / # OF DAYS _____
 Location / Address: _____
 Previous Read & Date: _____
 Verified Meter I.D. Yes No
 Is Meter Registering? Yes No
 Is Customer Present? Yes No
 Wet spots observed? Yes No
 Gasket Leals Yes No
 What side was leak on? _____
 If Yes --> Approx. Gal Per Min. ? _____
 If Yes --> Name of Customer Spoen to _____ (In Person / By Phone)
 If Yes --> Where were they observed? _____

Town Side / Customer Side

Has cust. turned off all water in home? Yes No
 Did cust. state any recent repairs? Yes No
 Did cust. state any changes to # of occupants? Yes No
 # of occupants in home state by cust. Yes No

Irrigation: Cust. Stated / Observation by Tech

Is there a timer? Yes No
 Type: Sprinklers Yes No
 Drip Line Yes No
 Setting: _____ Min / Hrs Times per week
 Any heads missing? Yes No
 Did cust. State any changes in irrigation? Yes No
 Did cust. State any recent changes in Indscap? Yes No

Landscape:

Grass Yes No
 Desert Plants Yes No
 Trees Yes No
 Flowers Yes No
 Over Seed Rcnt Yes No

Front yard- observed

Size
 TTL #
 TTL #
 TTL #

Pool: Cust. Stated

Is there a pool? Yes No
 Auto fill Yes No
 Auto fill was checked? Yes No
 Filled/draind recently? Yes No

Water Softener / RO: Cust. Stated

Is one installed? Yes No
 Last date of service _____

Back Yard - Observed

Is backyard viewable? Yes No
 Is backyard landscaped? Yes No

House Fixtures: Cust. Stated

Are toilets running? Yes No
 Are faucets leaking? Yes No

Outcome:

Was cust. Referred to supervisor Yes No
 Does cust. Want follow up? Yes No
 Copy of HC check left? Yes No
 Doortag was left? Yes No

Misc. Notes:

APPENDIX B

**SAHRA'S
RECOMMENDED METHOD
TO REMOVE TURF GRASS**

SAHRA's Recommended Method to Remove Turf Grass

SAHRA (Sustainability of Semi-Arid Hydrology and Riparian Areas, 2008) recommends the following methods to kill turf grass before replacing it:

Before replacing some or all of a turf lawn with more water-efficient landscaping, please be aware turf grass, especially Bermuda grass or similar turf types, cannot be killed by simply not irrigating it. Also, attempting to rip it out or dig it up is unlikely to be successful, because the roots go deep. Covering turf grass with a tarp or plastic sheets to deny it water and light also is very unlikely to work. The most practical way to kill most turf grass is by using an herbicide that kills plants on contact.

If an herbicide is used, please be careful and follow all safety precautions on the label carefully, especially if children, pets or wildlife (including wild birds) could come into contact with the herbicide. Since herbicides may kill any plant they touch, please be careful when applying them. If an herbicide is used, choose one that decomposes rapidly, to allow the planting of water-efficient trees and shrubs where the grass was.

Bermuda grass cannot be killed when it is dormant in the winter. The best seasons to kill Bermuda grass are Spring and late Summer. Prior to application of an herbicide, the grass must be irrigated so that it is green and growing. This will allow the herbicide to move through the entire plant and kill the roots. An herbicide should not be applied if the temperature is below 80°F or if there is a forecast of rain. Please follow the directions that come with the herbicide. Using more herbicide than is recommended will not kill grass any faster. Two days after applying the herbicide, resume irrigating the grass. An herbicide should kill grass in one to two weeks. If the grass still shows signs of life after two weeks a second application of the herbicide may be necessary. Dead turf can be removed by setting a lawn mower very low and "scalping" it, or using a power rake.