City of Chandler

Background

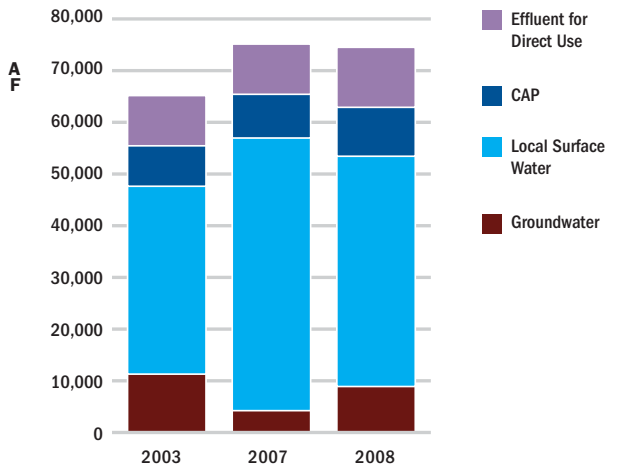
The city of Chandler has an estimated population of 245,087 living within an incorporated area of 70 square miles.* The city is located in Maricopa County, less than five miles south of the Salt River, nestled in an open valley between the San Tan Mountain Regional Park (to the south), the Phoenix South Mountain Park (to the west), and the Tonto National Forest mountains (to the east).

Chandler is located in the Basin and Range physiographical province. The city has an average annual precipitation of 9.2 inches, and average high and low temperatures of 100 and 40.5 degrees (ºF), respectively.†

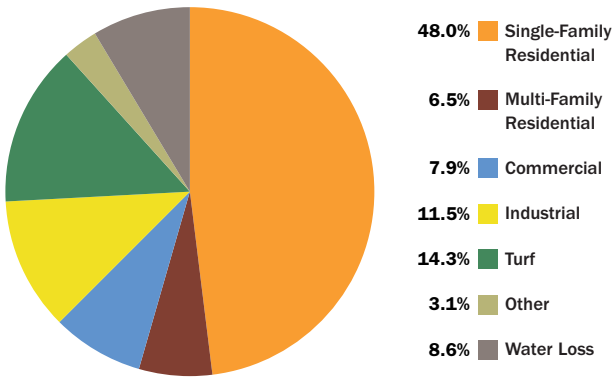
Water Supply and Deliveries

The city of Chandler relies heavily on local surface water supplies, with water delivered via the Salt River Project originating from the Salt and Verde Rivers comprising the vast majority of total water supply. Notably, the city supplied more effluent for direct use (20,956 AF) in 2008 than it did in Central Arizona Project water (9,448 AF) and groundwater water (9,081 AF), combined. The single-family residential sector received almost half (48%) of the total water deliveries in 2008 and turf (at 14.3%) is the second-highest water consumer in the city.

SOURCES OF WATER FOR CHANDLER



2008 WATER USE IN CHANDLER



* Arizona Department of Commerce. 2009. *Arizona population estimates, 2009. Available at:* http://www.azcommerce.com/econinfo/demographics/ Population+Estimates.html (accessed May 5, 2010).

† IDcide Local Information Data Server. Chandler, AZ weather. http://www.idcide.com/weather/az/chandler.htm (accessed April 12, 2010).

Per Capita

The city of Chandler has reduced its gallons per capita per day (GPCD) water use from 2003-2008 across all metrics: single-family residential (-4.3% change), system-wide potable (-9.5% change), and system-wide total (-7.1% change). From 2003-2008, system-wide water consumption was reduced by an average of 20 gallons per person per day.

Chandler GPCD

Per Capita Water Use	2003	2007	2008
Single-Family Residential [a]	148	153	142
System-Wide Potable [b]	222	213	201
System-Wide Total [c]	281	266	261

a Treated water deliveries to single-family accounts ÷ single-family residential population

b Total treated water delivered ÷ service area population

c Total raw water from all supply sources + direct effluent use ÷ service area population

Rate Structure

The city of Chandler uses two four-tier inclining block rates for individual residential water accounts inside the city (one for the summer season, one for the winter).

Summer

Usage Per Dwelling Unit	Cost
0–10,000 gallons	$1.48 per 1,000 gallons
10,001–20,000 gallons	$1.99 per 1,000 gallons
20,001–60,000 gallons	$2.49 per 1,000 gallons
Over 60,000 gallons	$3.11 per 1,000 gallons

Winter

Usage Per Dwelling Unit	Cost
0–10,000 gallons	$1.48 per 1,000 gallons
10,001–20,000 gallons	$1.83 per 1,000 gallons
20,001–60,000 gallons	$2.29 per 1,000 gallons
Over 60,000 gallons	$2.86 per 1,000 gallons

Residential accounts have a base service fee of $8.21 for both the high and low seasons, which represents 36% of an average customer's monthly bill for 10,000 gallons. For the low season (winter), the slope of the city's average price curve is 0.0015, indicating that the average price of water remains relatively constant as consumption increases. The slope for the high season (summer) is 0.0044, indicating that the average price of water during the high season also remains relatively constant.

Conservation Measures

The city of Chandler is currently regulated in the Phoenix Active Management Area as a large municipal provider under the Non-Per Capita Conservation Program (NPCCP). As part of this program, Chandler reports on 12 Reasonable Conservation Measures to ADWR. The city recently applied for the MNPCCP and has selected the following best management practices* — based on an evaluation of gallons saved per dollar spent — which have been approved by the city council.

- 1.1 – Local and/or Regional Messaging Program
- 2.1 – Adult Education and Training Programs
- 2.2 – Youth Conservation Education Programs
- 3.1 – Residential Audit Program
- 3.2 – Landscape Consultations (Residential and/or Non-Residential)
- 3.7 – Customer High-Water-Use Notification
- 4.1 – Leak Detection Program
- 6.9 – Landscape Conversion Rebate/Incentive
- 6.10 – Xeriscape Installation Rebate in New Landscapes
- 7.5 – Implementation of Smart Irrigation Technology

Customer Rebates

The city of Chandler offers several financial incentive programs to its customers, which focus primarily on outdoor water use:†

- *Faucet aerators and low-flow showerheads* – Free to homes built prior to 1992.
- *Clothes washer* – $100 for a qualifying machine with a water factor of 6 or less.
- *Irrigation controller* – $50 for the timer, plus a $22 reimbursement of the permit fee.
- *Landscape conversion* – $600 for removing turf and replacing with low-water-use plants.

* ADWR List of Best Management Practices (adapted from the 2nd Modification to the Third Management Plan Chapter 5, May 2008).

† City of Chandler, Arizona. Rebate programs. http://www.chandleraz.gov/default.aspx?pageid=746 (accessed June 1, 2010).

- *New landscapes* – $200 for installing front and back yard landscaping with a minimum of 50% of the area with non-grass elements.
- *HOA irrigation controllers* – $200 for each evapotranspiration-based irrigation controller for use on turf areas greater than 5,000 sq. ft.
- *HOA landscape conversion* – $200 per 1,000 sq. ft. (maximum $3,000) to remove turf and replace with low-water-use landscaping.

Ordinances/Rules

International Code Adoption[*,†] – Chandler has adopted the International Plumbing Code and International Energy Conservation Code. These codes set standards for water- and energy-efficient appliances, fixtures, and building techniques.

Waste of Water[‡] – It is unlawful to willfully or negligently permit or cause the escape or flow of water in such quantity as to cause flooding, impede vehicular or pedestrian traffic, create a hazardous condition, or cause damage to the public streets.

Tampering Forbidden[§] – It is unlawful for any person to start or stop the pumping plants, operate control switches on water storage facilities, open or close any fire hydrant, remove the covers of gate valves, or in any fashion otherwise tamper with the city water system without the permission of the city.

Requirements for New Nonresidential Water Users[¶] – New users of 9,000 gallons or more per day must submit a "water use plan" sealed by an Arizona registered architect or engineer that should contain, at a minimum, a description of any available water conservation training programs offered to employees; whether alternative water sources will be used; whether the user will use the best available conservation technologies in accordance with existing process uses; any plans for the reuse of wastewater or process water at the facility; and the type of landscaping and irrigation system planned.

Xeriscape Landscapes for New Developments[**] – Landscapes must be designed, installed and maintained in accordance with the seven detailed basic principles of Xeriscape: water conservation design, limited turf areas, utilization of the most efficient irrigation system, soil improvements, mulching, use of only approved lower-water-demand plants, and appropriate maintenance. Single- and two-family dwellings are exempt.

Landscape Standards[††] – Additional landscape standards include:

- Turf areas greater than five acres must be watered with reclaimed water if available.
- Unless watered with reclaimed water, turf must be limited to 20% of landscaped area in model homes; 10% in nonresidential, commercial/institutional, and industrial land uses; and 40% in multifamily housing and open space/retention basins.
- Decorative water features should use reclaimed water when possible and shall be allowed only within small-scale, pedestrian-oriented places.
- Model homes shall use plants contained on the city-approved low-water-use plant list and shall have a literature package describing water-conserving landscaping on display within all model sales offices.

Education

Efficiency Program for Targeted Neighborhoods – Neighborhoods identified to have higher-than-average water use receive retrofit kits, water audits, irrigation system improvements, and efficient fixtures at no charge.

Landscape Information Packets – These packets are delivered to all owners of newly constructed houses, and information about available programs is mailed to all new owners of existing homes.

On-Site Consultations on Low-Water-Use Landscaping and Efficient Watering Practices – The city offers irrigation advice and a landscape assistance program to either establish Xeriscapes or convert high-water landscapes into ones with low water usage.

* Chandler, Ariz., Code § 29-4 (2010).
† *Id. § 29-8.*
‡ *Id. § 30-5(A)(12).*
§ *Id. § 52-9.*
¶ *Id. § 35-1902(9).*

** *Id. § 35-1903.*
†† *Id. § 35-1903.*

High-Water-Use Notification – Chandler initiated a proactive high-water-use notification program in 2001.

Demonstration Gardens – Chandler maintains three demonstration gardens—Hummingbird Habitat, Arrowhead Xeriscape Garden, and the Main Library—which provide visitors with a visual representation of low-water-use landscape techniques, plus interpretive signs and displays featuring low-water-use plants and desert landscape techniques.

Free Indoor and Outdoor Water Audits – Chandler provides free residential water audits that include site inspection and information on efficient water use, both in the landscape and in the home. In addition, the city provides a free self-water-audit guide and kit to homeowners.

Customized Landscape Water Budget – A customized water budget based on landscaped area and plant material is provided on request to help HOAs and multifamily customers manage their water application.

AMWUA Membership – As a member of Arizona Municipal Water Users Association, Chandler participates in the "Water—Use It Wisely" messaging campaign, SmartScape Training Program, outreach at tradeshows and conferences, and distribution of AMWUA brochures, such as "Landscape Plants for the Arizona Desert" and "Watering by the Numbers."

Public Outreach – The city is involved in several general education campaigns, including media outreach through television and radio commercials, webpages, brochures, and magnets; educational/promotional events staffed by conservation staff; and landscaping and water conservation workshops, conferences, and lectures.

EPA WaterSense Program – Chandler is a WaterSense promotional partner and promotes WaterSense through its website and via special campaigns, such as "Fix a Leak Week."

Annual Art and Calendar Contest – The utility partners with Chandler public schools to sponsor the Environmental Art Contest. Winners have artwork displayed in a calendar that is distributed to 15,000 Chandler residents. The utility typically receives 800-1,200 entries each year from Chandler fourth-grade students.

Classroom Education – Chandler uses Project WET curriculum materials to provide customized conservation activities to classrooms on request and provides free water conservation assemblies and workbooks for more than 10,000 elementary school students each year.

Implementation of Conservation Measures

Chandler reports the following successes with its ongoing water conservation programs:

- 1,172 water audits have resulted in 43.8 million gallons of water savings.
- 8 HOA customized landscape budgets were implemented, saving 2.13 million gallons.
- 4,428 adults were reached through education classes.

Rebate Program	No. of Rebates 2003–2009	Funds Distributed 2003–2009	Water Savings (gallons)	Notes
Residential irrigation controller	1,430	102,960	na	
Residential Xeriscape installation at new homes	2,308	461,600	na	
Residential turf removal	599	220,855	12,302,000	1,119,454 sq. ft. of turf removed
Clothes washer	3,537	353,700	37,654,902	Started April 2008
Smart irrigation timers for HOAs	12	2,400	7,976,000	Started April 2008
HOA landscape conversion	11	23,300	3,322,648	Started April 2008
Retrofit kits	616	na	1,862,000	2003-2008, free for customers
	Total Funds	**$1,164,815**		

- 154 teachers have been trained in Project WET conservation activities.
- 79,351 K-12 students have been reached in classroom education programs.

In addition to these measures, Chandler has achieved significant additional savings through its rebate program, as shown below:

Surveys – In a 2007 report prepared by BBC Research, Chandler consistently ranks first or second in conservation awareness programs, compared to other AMWUA cities.

Monitoring of Weather-Based Irrigation Controllers – Chandler has installed 41 new controllers since 2008, saving approximately 1.25 million gallons per year at a rate of 30,500 gallons per year per controller.

Monitoring Use of ET Controllers – Chandler has been monitoring the use of ET controllers in several of its HOA common-area landscapes. Results show significant water savings, on the order of eight million gallons per year for controllers installed during 2008 and 2009.

Funding for Conservation

Water conservation is housed within Chandler's Environmental Resources section of the Municipal Utilities Department. In FY 08/09, Environmental Resources had a budget of $1,964,000, 7.1% of the total water utility's budget. Two and a half full-time-equivalent employees work in water conservation, and each year the city spends about $1.77 per customer on water conservation programs.

Water Loss

In 2008, the city recorded 5,437 AF (1.77 million gallons) of water loss, representing 8.6% of total supplies. Water loss in Chandler appears to remain relatively constant over the years of data collection, between 7% and 8%.

Supply-Side Efficiency Measures

As part of Chandler's water loss program, it has checked over 400 miles of pipe in the last six years, saving an estimated 8,825,700 gallons of water.

Each year the water conservation office funds the replacement of over 200 meters sized 2" or larger. Over the past three years, Chandler has also replaced over 27,000 residential meters, and will continue replacing about 3,000 per year going forward.

The city uses leak detection and meter maintenance to ensure accuracy of its meters. An asset management program is in place that monitors the age and life cycle of all water distribution components. Over 27,000 AMR meters with data-logging capability have been installed that can track water use down to one-hour increments.

Effluent Use

The city reused all of the 20,956 AF of effluent it generated in 2008. Approximately 55% (11,542 AF) of the effluent was for direct use, and the remainder evenly split between recharge and an exchange program.

Additional Information

The water resources department considers energy costs when determining which wells are used to supply groundwater. Energy use and efficiency is calculated for each well, and operations are coordinated to ensure the least amount of energy is used during pumping.