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CHURCHILL COUNTY Water Conservation Plan

OVERVIEW

In August 2006, Churchill County became responsible for taking over the operation, maintenance, and administration of the Pine Grove Water System which had been County owned, but operated and maintained by another entity since 1994. In October 2007, the Pine Grove Water System was replaced by a County owned and operated municipal system. The County has contracted with SPB Utilities to operate the system and manage billing. Currently, there are 262 connections served including 2 mobile home parks (Oasis Mobile Home Park Fallon LLC & West Star Mobile Home Park LLC) and several commercial accounts. In 2013, the system supplied 45.1 million gallons.

The purpose of this plan is to document current conservation efforts and provide a strategy for future water saving measures and incentives. This plan is mandated by Nevada Revised Statute (NRS) 540.131 and is compliant with NRS 540.121 through 540.151. The Water Conservation Plan will be posted on the County web page <http://www.churchillcounty.org/index.aspx?nid=565> and copies are also available in the Planning Department in the County Administration offices at 155 N Taylor South, Suite 194, Fallon, NV 89406.

Physical Setting

Churchill County is located approximately 63 miles east of Reno and 30 miles east of the City of Fernley. The majority of the population within Churchill County lives within the Carson Desert Hydrographic Basin (Basin 101), and the Churchill Valley Hydrographic Basin (Basin 102). (See attached map #1).

Climate

Churchill County experiences a high desert climate with hot summers, cold winters, and an average annual precipitation of less than 5 inches. Average temperatures: summer 85 degrees; winter 39 degrees; and an average diurnal temperature variation of about 35 degrees.

Water Sources and Allotment:

Churchill County adopted a Water Resources Plan in 2000 and completed an update in 2007. The Water Resources Plan identifies all potential water sources and water rights owned by Churchill County. The plan is available on the Churchill County web page, in the Planning



Department section: <http://www.churchillcounty.org/index.aspx?nid=565>. Churchill County currently owns 5,775 afa (acre-feet annually) of underground water rights. The total duty of Churchill County owned underground water rights which are transferred to County Well No 1 (Sand Creek) is 1,337 afa. Churchill County also owns a significant quantity of surface water rights and continues to accumulate surface water rights for recharge and potential future surface water treatment through various programs.

Water System

The first phase of the Churchill County water system provides service to a limited number of subdivisions and individual parcels lying west of the Fallon City limits and east of Gummow Drive (see attached map # 2).

The primary production well for the County water system is the "Sand Creek" well drilled to approximately 500 feet and capable of pumping between 750 and 1,000 gallons per minute (gpm). The existing "Pine Grove" well acts as the emergency back up well for the system. The Churchill County water system meets all water quality, fire flow, and storage standards. An on-site treatment facility treats for Manganese and Arsenic and the water storage tank provides 1,000,000 gallon capacity. All services are metered and a tiered meter rate was codified under Churchill County Code (CCC) 13.04.300 to encourage conservation (*See Appendix A*).

The Churchill County municipal system is relatively new and all connections are metered so any system losses should be minimal; the system is generally well below 5 percent unaccounted for water loss, which is well below the industry average of 10 – 15 percent. Additionally, customer and system usage history is available upon request through SPB Utilities. Unusual or unaccounted for use could show a problem with a meter. If a customer has unusual water use for their property, a report is run to gather information from the meter which could show if there is a leak. If there are any suspected problems with a meter or transponder, it will be replaced. Meters have been, and will continue to be, tested periodically to ensure accuracy and the County will maintain water pumpage and consumption records for the water system.

Planning for the second phase of the water system was underway until the recent slowdown in growth and the economy and is on hold until sometime in the future. The proposed service area, north of the Reno Highway includes several subdivisions that were approved in 2005 but to date remain undeveloped.

Conservation

Conservation incentives are measures that increase awareness and encourage conservation. The County has long supported water conservation practices due to the desert environment and the reliance upon surface water inflow from the Carson River and the Newlands Project which is the primary source of groundwater recharge. County building codes require low flow fixtures; the landscape ordinance encourages use of desert tolerant plants and promotes xeriscaping (CCC16.16.020.4) (*See Appendix A*). In addition water conservation measures will continue to be promoted through the following codes and programs:



- 100% metering of connections equipped with a transponder that records current meter history and a report can be run that will show any possible leaks on a property such as a continuous slow flow from a toilet, sink, etc.,
- A tiered rate structure to promote water conservation (CCC 13.04.300) *Appendix A*
- The wasting of water is prohibited by Ordinance: Churchill County Code (CCC) 13.04.190
- Reuse of effluent from County Waste Water Treatment Plants,
- Continued support of Truckee Carson Irrigation District (TCID) and agricultural efficiency programs,
- Periodic review of conservation program effectiveness, and
- Support of water conservation education through:
 - Funding of the Churchill County Museum's water conservation exhibits,
 - Support of the Newlands Water Protection Association
 - Billing inserts promoting conservation during warmer months are included in monthly bills encouraging customers to be mindful of where and how their water is being used,
 - Public school outreach,
 - Educational outreach through various organizations such as Future Farmers of America, Conservation Districts, and Cooperative Extension

Water resource planning and conservation

Effective water resources protection and planning is essential to the long-term sustainability of our community. To this end the County has implemented several measures, including adoption of water resource protection policies in both the Master Plan (Goal PSF 2 & Goal CNR 2), and the Churchill County Water Resource Plan to ensure continued recharge to the aquifers and protection of vital resources. The County has worked closely with Carson Water Subconservancy District (CWSD), United States Geological Survey (USGS), the State Engineer's office, and legislators in support of a statewide water inventory, water table monitoring, and a Basin 101 pumping inventory. In addition, Churchill County has joined with United States Geological Survey (USGS), United States Fish & Wildlife Service (USFWS), Carson Water Subconservancy District (CWSD) and Truckee-Carson Irrigation District (TCID) to sponsor a study of water usage in the Carson River Basin above Lahontan Reservoir. This study is expected to be completed at the end of 2014. In the meantime the county's requirement for water dedication to match any new pumping ensures conservation of groundwater resources. These measures will be reviewed and evaluated regularly to ensure long-term sustainability.

Water Shortage Contingency Plan

The majority of Churchill County's residents live in the Carson Desert Hydro-basin 101, or the Churchill Valley Hydro-basin 102. Ninety-eight percent of Basin 101's recharge comes from infiltration of waters from the Carson and Truckee Rivers through the Truckee Carson Irrigation District canal system. Therefore sustainment of their flows and of existing decrees and agreements is vital to water storage, recharge and contingency planning in Churchill County.

In addition, land and water conservation programs and support for agriculture, wetlands and improved agricultural practices creates and sustains recharge and storage.



Existing water right dedication requirements for all development ensures an appropriate drought reserve or contingency buffer.

Water resources in nearby Dixie Valley have been applied for and incorporated into future plans. These waters could be accessed and imported via various methods if pending shortages were forecast. Dixie Valley has been identified as a critical component of Churchill County's future growth and future drought contingency planning. As such, Churchill County has submitted applications for all identified ground waters in Dixie Valley and is working with the U.S. Navy, Bureau of Land Management, U.S. Fish & Wildlife Service and others to protect this valuable resource.

Use of Effluent Water

As Churchill County's population grows, uses for reclaimed wastewater will be identified to reduce the demand for groundwater. Currently, Churchill County has a discharge permit from the sewer plant to the Soda Lake Drain—this is "counted/credited" as water to the Stillwater Wildlife Refuge.

Educational Materials to Promote Conservation

Landscape guides are useful to water customers who need information regarding water friendly landscapes. There are excellent landscape guides available online which are well suited to the Churchill County area. One guide created by Truckee Meadows Water Authority (TMWA), can be found at: http://www.tmwandscapeguide.com/landscape_guide/interactive/index.php.

Further information can be found on the following sites:

Water

<http://www.awwa.org/>

<http://www.unce.unr.edu/>

Drought

<http://drought.unl.edu/>

http://www.usda.gov/wps/portal/usda/usdahome?navid=DISASTER_ASSISTANCE

Landscape

<http://www.usda.gov/wps/portal/usda/usdahome>

http://www.tmwandscapeguide.com/landscape_guide/interactive/index.php

<http://www.unce.unr.edu/publications/files/nr/2006/eb0601.pdf>

Education

www.wateruseitwisely.com

www.washoet.dri.edu/

<http://environment.nationalgeographic.com/environment/freshwater/water-conservation-tips/>

<http://water.epa.gov/polwaste/nps/chap3.cfm>

Institutional

www.lvvwd.com

www.snwa.com

<http://www.washoecounty.us/water>

<http://tmwa.com/>

<http://phoenix.gov/waterservices/index.html>

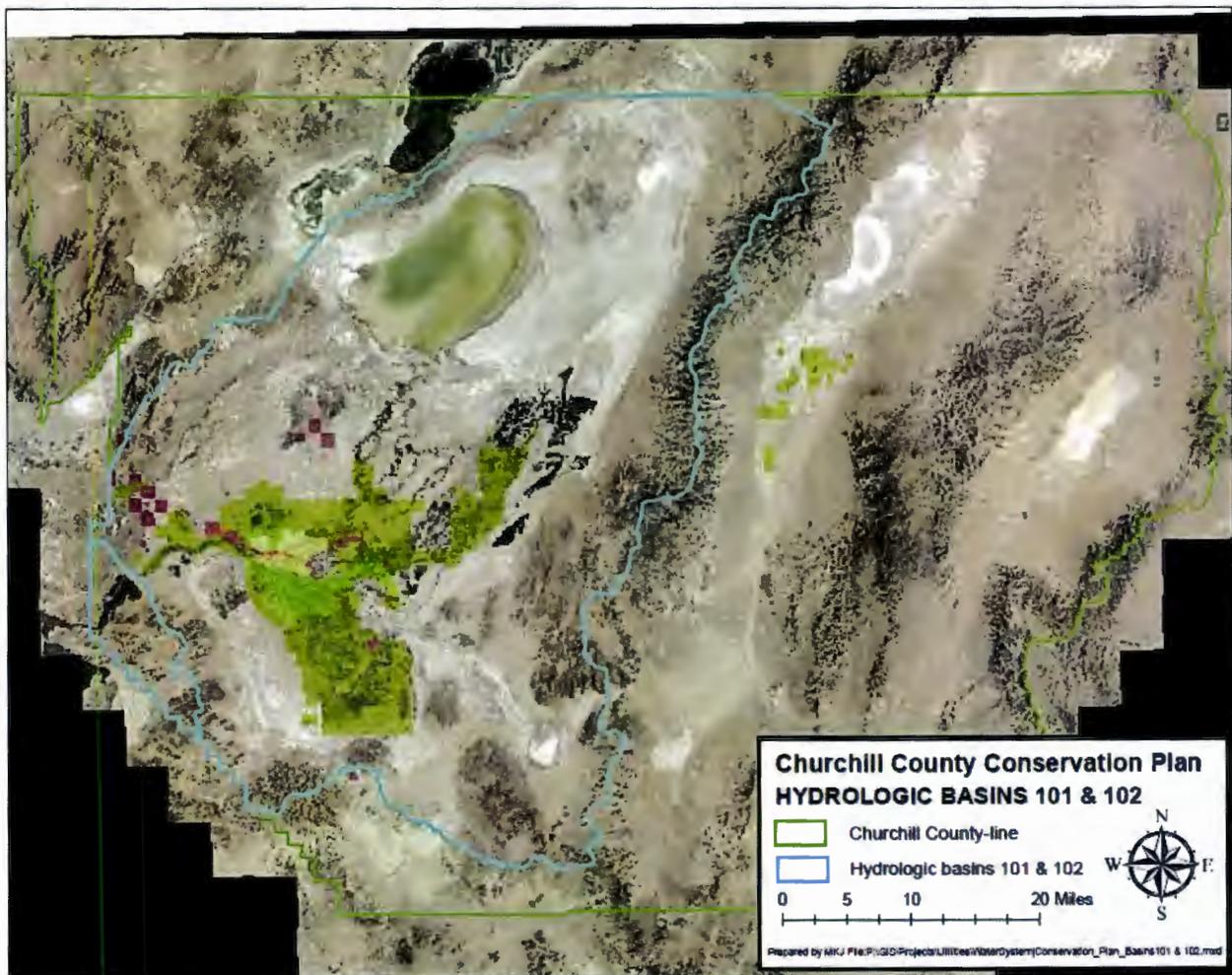


<http://www.water.ca.gov/>

Public Notice

As required by NRS 540.131, the updated Conservation Plan was presented to the Board of County Commissioners at their May 21, 2014 meeting. The Plan was made available to the public for inspection and comment on the County web page from April 29 through May 21, 2014, in the Planning Department office, and at the County Library. During that time, no written comments were received.

Map # 1 shows the extent of Hydrologic sub-basins 101 & 102 within Churchill County





Map 2 shows the extent of the current water system as on 2014



- State Rd's
- Navy Rd's
- Tribe Rd's
- City Rd's
- County Rd's
- Private/Other Rd's
- Property Lines
- Current Service
- Potential Service
- City of Fallon

CC Conservation Plan Churchill Water System



Prepared By: Preston Denny
Churchill County Planning Department
Last saved by: Preston on 2/12/2014 at 10:58:36 AM
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APPENDIX A

13.04.300: RATES AND CHARGES FOR DOMESTIC, COMMERCIAL, INDUSTRIAL, AND IRRIGATION SERVICE:

A. Schedule A: This schedule applies to all metered residential or irrigation services. Service sizes three-fourths inch (3/4") and one inch (1") are considered small domestic (residential) services and service sizes one and one-half inches (1 1/2") and above are considered large domestic services. Services not listed in the following table shall be charged the monthly customer service charge of the next larger service size.

1. Small Domestic (Residential) Water Usage Charge: A monthly base rate charge of forty-five dollars (\$45.00) per month plus a water use charge per month.

Monthly water use charge:

\$2.10 per 1,000 gallons of water used each month between 0 gallons and 6,000 gallons

\$2.60 per 1,000 gallons of water used each month between 6,000 gallons and 20,000 gallons

\$3.15 per 1,000 gallons of water used each month for more than 20,000 gallons

2. Large Domestic Water Usage Charges:

<u>Meter Size</u>	<u>Meter Charge Per Month</u>	<u>Water Use Charge Per Month</u>
1.5	\$67.50	Same as small domestic customer
2.0	\$105.00	
3.0	\$220.00	
4.0	\$320.00	
6.0	\$640.00	

Large multi-residential domestic customers will pay the monthly meter charge, a service charge of thirty-four dollars (\$34.00) per month per unit served, and a water use charge per month that is the same as a small domestic customer.

Water user rates for large and small domestic users shall be reviewed periodically to ensure rates provide sufficient revenues for operating, maintenance, administration, and replacement expenditures associated with County owned water operations.

B. Schedule B: This schedule applies to all metered commercial and industrial services under County jurisdiction after the effective date hereof. The monthly customer service charge depends on service size. Service sizes three-fourths inch (3/4") and one inch (1") are considered small commercial and industrial services and service sizes one and one-half inches (1 1/2") and above are considered large commercial and industrial services. Service sizes not listed shall be charged the monthly customer service charge of the next larger service size.

1. Small Commercial And Industrial Water Usage Charge: A monthly base rate of sixty-five dollars (\$65.00) per month plus a water use charge per month based upon the following schedule:

Water use charge:

\$2.10 per 1,000 gallons of water used each month between 0 and 6,000 gallons



- \$2.60 per 1,000 gallons of water used each month between 6,000 and 20,000 gallons
- \$3.15 per 1,000 gallons of water used each month for more than 20,000 gallons
- 2. Large Commercial And Industrial Water Usage Charge:

<u>Meter Size</u>	<u>Meter Charge Per Month</u>	<u>Water Use Charge Per Month - All Meter Sizes</u>
1.5	\$67.50	\$0.0025 per gallon used each month between 0-20,000 gallons
2.0	\$105.00	\$0.0030 per gallon used each month between 20,000-40,000 gallons
3.0	\$220.00	\$0.0035 per gallon used each month between 40,000-60,000 gallons
4.0	\$320.00	\$0.0040 per gallon used each month for more than 60,000 gallons
6.0 or larger	\$640.00	

Large commercial and industrial customers will pay the meter charge and monthly water use charge.

16.16.020.4: LANDSCAPE REQUIREMENTS:

- A. Purpose: The purpose of this section is to establish standards for the placement, amount and type of landscape materials and other buffers installed in order to:
 1. Enhance the aesthetics of the community;
 2. Encourage the use of xeriscape and hardscape, where appropriate, in order to conserve water resources;
 3. Provide environmental enhancements such as, but not limited to, the reduction of noise, dust and erosion;
 4. Reduce visual pollution which might otherwise occur within an urbanized area; and
 5. Establish a greater sense of privacy from visual and physical intrusion.

ADOPTED by the Board of County Commissioners on the 21st day of May, 2014.

THOSE VOTING AYE:

Harry Scharmann

Pete Olsen

Carl Erquiaga

THOSE VOTING NAY:

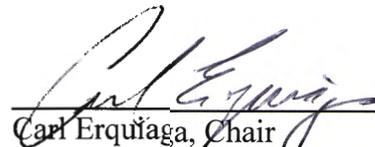
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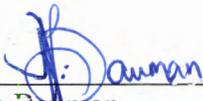
APPROVED:



Carl Erquiaga, Chair
Board of County Commissioners

ATTEST:

Kelly G. Helton, Clerk/Treasurer



Jackie Bateman,
Deputy Clerk of the Board



APPENDIX B

BENCHMARKS USED IN CONSERVATION PLANNING

Table B-1: Recent Estimates of Indoor Water Use With and Without Conservation

Type of Use	Without conservation		With conservation		Savings
	Amount (gpcd)	Percent of total	Amount (gpcd)	Percent of total	
Toilets	18.3	28.4%	10.4	23.2%	44%
Clothes washers	14.9	23.1%	10.5	23.4%	30%
Showers	12.2	18.8%	10.0	22.4%	18%
Faucets	10.3	16.0%	10.0	22.5%	2%
Leaks	6.6	10.2%	1.5	3.4%	77%
Baths	1.2	1.9%	1.2	2.7%	0%
Dish washers	1.1	1.6%	1.1	2.4%	0%
Total indoor water use	64.6	100%	44.7	100%	31%

Source: AWWA WaterWiser, "Household End Use of Water Without and With Conservation," 1997 *Residential Water Use Summary - Typical Single Family Home* (<http://www.waterwiser.org/wateruse/tables.html>).

gpcd = gallons per capita per day

Note: These data are provided for illustrative purposes only and may not be applicable to a given situation. To the extent practical, planners use system-specific assumptions and estimates.

**Table B-2: Benchmarks for Estimating Residential End Uses of Water**

Type of use	Units	Likely range of average values
INDOOR USES		
Average household size	Persons	2.0-3.0
Frequency of toilet flushing	Flushes/person/day	4.0-6.0
Flushing volumes	Gallons/flush	1.6-8.0
Fraction of leaking toilets	Percent	0-30
Showering frequency	Showers/person/day	0-1.0
Duration of average shower	Minutes	5-15
Shower flow rates	Gallons/minute	1.5-5.0
Bathing frequency	Baths/person/day	0-0.2
Volume of water	Gallons/cycle	30-50
Washing machine use	Loads/person/day	0.2-0.5
Volume of water	Gallons/cycle	45-50
Dishwasher use	Loads/person/day	0.1-0.3
Volume of water	Gallons/cycle	10-15
Kitchen faucet use	Minutes/person/day	0.5-5.0
Faucet flow rates	Gallons/minute	2.0-3.0
Bathroom faucet use	Minutes/person/day	0.5-3.0
Faucet flow rates	Gallons/minute	2.0-3.0
OUTDOOR USES		
Average lot size[a]	Square feet	5000-8000
Average house size[a]	Square feet	1200-2500
Landscape area[a]	Square feet	4000-5000
Fraction of lot size in turf[a]	Percent	30-50
Water application rates[a]	Feet/year	1-5
Percent of homes with pools	Percent	10-25
Pool evaporation losses	Feet/year	3-7
Frequency of refilling pools	Times per year	1-2
Frequency of car washing	Times/month	1-2

Source: Duane D. Baumann, John J. Boland, and W. Michael Hanemann, *Urban Water Demand Management and Planning* (New York: McGraw Hill, 1998), 254.

[a] Reflects single-family averages.

Note: These data are provided for illustrative purposes only and may not be current or applicable. To the extent practical, planners should regionally appropriate or system-specific assumptions and estimates.



Table B-3: Sample Calculation of Water Savings from Showerhead Replacement

The following calculations represent the water savings expected as the result of a showerhead retrofit program. The savings rate represents a difference in average winter water use between homes with low-flow showerheads and homes without low-flow showerheads.

- Nonconserving showerhead flow rate = 3.4 gallons/minute
- Low-flow showerhead flow rate = 1.9 gallons/minute
- Estimated showering time = 4.8 minutes/person/day
- Average winter household water use = 200 gallons per household per day
- Average household size = 2.5 persons
- Water use with nonconserving showerhead = (3.4 gal/min) x (4.8 min/person/day) = 16.3 gpcd
- Water use with low-flow showerhead = (1.9 gal/min) x (4.8 min/person/day) = 9.1 gpcd
- Water savings = 16.3 gpcd - 9.1 gpcd = 7.2 gpcd

At an average household size of 2.5 persons, the savings rate would be 18.0 gallons per household per day (2.5 persons x 7.2 GPCD). The formula for calculating the reduction factors representing the fraction of, for example, single-family winter water use is

$$R = (18.0 \text{ GPHD}) / (200 \text{ GPHD during winter}) = 0.09 \text{ (or 9 percent)}$$

Source: Duane D. Baumann, John J. Boland, and W. Michael Hanemann, *Urban Water Demand Management and Planning* (New York: McGraw Hill, 1998): 255.

Note: These data are provided for illustrative purposes only and may not be current or applicable. To the extent practical, planners should regionally appropriate or system-specific assumptions and estimates.



Table B-4: Benchmarks for Savings from Selected Conservation Measures

Category	Measure	Reduction in end use	Life span (years)	
LEVEL 1 MEASURES				
Universal metering	Connection metering	20 percent	8 to 20	
	Submetering	20 to 40 percent	8 to 20	
Water accounting and loss control	System audits and leak detection	Based on system	na	
Costing and pricing	10% increase in residential prices	2 to 4 percent	na	
	10% increase in nonresidential prices	5 to 8 percent	na	
	Increasing-block rate	5 percent	na	
Information and education	Public education and behavior changes	2 to 5 percent	na	
LEVEL 2 MEASURES				
End-use audits	General industrial water conservation	10 to 20 percent	na	
	Outdoor residential use	5 to 10 percent	na	
	Large landscape water audits	10 to 20 percent	na	
Retrofits	Toilet tank displacement devices (for toilets using > 3.5 gallons/flush)	2 to 3 gpcd	1.5	
	Toilet retrofit	8 to 14 gpcd	1.5	
	Showerhead retrofit (aerator)	4 gpcd	1 to 3	
	Faucet retrofit (aerator)	5 gpcd	1 to 3	
	Fixture leak repair	0.5 gpcd	1	
	Governmental buildings (indoors)	5 percent	na	
	Pressure management	Pressure reduction, system	3 to 6 percent of total production	na
Outdoor water-use efficiency	Pressure-reducing valves, residential	5 to 30 percent	na	
	Low water-use plants	7.5 percent	10	
	Lawn watering guides	15 to 20 percent	na	
	Large landscape management	10 to 25 percent	na	
Irrigation timer	Irrigation timer	10 gpcd	4	
	LEVEL 3 MEASURES			
	Replacements and promotions	Toilet replacement, residential	16 to 20 gpcd	15 to 25
		Toilet replacement, commercial	16 to 20 gpcd	10 to 20
Showerhead replacement		8.1 gpcd	2 to 10	
Faucet replacement		6.4 gpcd	10 to 20	
Clothes washers, residential		4 to 12 gpcd	12	
Dishwashers, residential		1 gpcd	12	
Hot water demand units		10 gpcd	na	
Reuse and recycling	Cooling tower program	Up to 90 percent	na	
Water-use regulation	Landscape requirements for new developments	10 to 20 percent in sector	na	
	Graywater reuse, residential	20 to 30 gpcd	na	
Integrated resource management	Planning and management	Energy, chemical, and wastewater treatment costs	na	

Source: Compiled from various sources. Actual water savings can vary substantially according to a number of factors. These data are provided for illustrative purposes only and may not be current or applicable. To the extent practical, planners should regionally appropriate or system-specific assumptions and estimates.
na = not available



Table B-5: Water Efficiency Standards Established by The Energy Policy Act of 1992

Faucets. The maximum water use allowed by any of the following faucets manufactured after January 1, 1994, when measured at a flowing water pressure of 80 pounds per square inch, is as follows:

Faucet type	Maximum flow rate (gallons per minute or per cycle)
Lavatory faucets	2.5 gpm
Lavatory replacement aerators	2.5 gpm
Kitchen faucets	2.5 gpm
Kitchen replacement aerators	2.5 gpm
Metering faucets	0.25 gpc

Showerheads. The maximum water use allowed for any showerhead manufactured after January 1, 1994, is 2.5 gallons per minute when measured at a flowing pressure of 80 pounds per square inch.

Water Closets. (1) The maximum water use allowed in gallons per flush for any of the following water closets manufactured after January 1, 1994, is as follows:

Water closet type	Maximum flush rate (gallons per flush)
Gravity tank-type toilets	1.6 gpf
Flushometer tank toilets	1.6 gpf
Electromechanical hydraulic toilets	1.6 gpf
Blowout toilets	3.5 gpf

(2) The maximum water use allowed for any gravity tank-type white two-piece toilet which bears an adhesive label conspicuous upon installation of the words "Commercial Use Only" manufactured after January 1, 1994 and before January 1, 1997, is 3.5 gallons per flush.

(3) The maximum water use allowed for flushometer valve toilets, other than blowout toilets, manufactured after January 1, 1997, is 1.6 gallons per flush.

Urinals. The maximum water use allowed for any urinals manufactured after January 1, 1994, is 1.0 gallons per flush.

Note: These standards were developed in 1992. New and emerging technologies can increase the cost effectiveness of conservation measures, affect demand forecasts, and eventually lead to the establishment of new standards.



Table B-6: Potential Water Savings From Efficient Fixtures

Fixture [a]	Fixture capacity [b]	Water use (gpd)		Water savings (gpd)	
		Per capita	2.7-person household	Per capita	2.7-person household
Toilets [c]					
Efficient	1.5 gallons/flush	6.0	16.2	na	na
Low-flow	3.5 gallons/flush	14.0	37.8	8.0	21.6
Conventional	5.5 gallons/flush	22.0	59.4	16.0	43.2
Conventional	7.0 gallons/flush	28.0	75.6	22.0	59.4
Showerheads [d]					
Efficient	2.5 [1.7] gal/min	8.2	22.1	na	na
Low-flow	3.0 to 5.0 [2.6] gal/min	12.5	33.8	4.3	11.7
Conventional	5.0 to 8.0 [3.4] gal/min	16.3	44.0	8.1	22.0
Faucets [e]					
Efficient	2.5 [1.7] gal/min	6.8	18.4	na	na
Low-flow	3.0 [2.0] gal/min	8.0	21.6	1.2	3.2
Conventional	3.0 to 7.0 [3.3] gal/min	13.2	36.6	6.4	17.2
Toilets, Showerheads, and Faucets Combined					
Efficient	Not applicable	21.0	56.7	na	na
Low-flow	Not applicable	34.5	93.2	13.4	36.4
Conventional	Not applicable	54.5	147.2	33.5	90.4

Source: Amy Vickers, "Water Use Efficiency Standards for Plumbing Fixtures: Benefits of National Legislation," *American Water Works Association Journal*. Vol. 82 (May 1990): 53.

na = not applicable

[a] Efficient = post-1994

Low-flow = post-1980

Conventional = pre-1980

[b] For showerheads and faucets: maximum rated fixture capacity (measured fixture capacity). Measured fixture capacity equals about two-thirds the maximum.

[c] Assumes four flushes per person per day; does not include losses through leakage.

[d] Assumes 4.8 shower-use-minutes per person per day.

[e] Assumes 4.0 faucet-use-minutes per person per day.