

CONSERVATION TECHNICAL PAPER FOLLOW UP

Follow-up Items

1. **Correct page 6 of the report regarding the role of the Pima County Planning and Zoning Commission.**

RESPONSE: Staff has made this correction in on-line version.

2. **Clarify what is meant by water efficiency goals**

REPSONSE: **Water efficiency** can be defined as:

1. The accomplishment of a function, task, process, or result with the minimal amount of water feasible;
2. An indicator of the relationship between the amount of water required for a particular purpose and the amount of water used or delivered.
http://en.wikipedia.org/wiki/Water_efficiency_-_cite_note-0#cite_note-0 (Wikipedia).
3. Water efficiency differs from water conservation in that it focuses on reducing waste, as opposed to restricting use.

Examples of water efficiency measures – i.e. actions that use less water for the same or better result - include running full loads of laundry and installing displacement devices inside toilets. Water harvesting, which includes the passive detention of rainwater or the stored use of rainwater for later use, increases the potential for beneficial use of that water and is therefore a water efficiency measure.

Examples of water conservation measures include restricting the installation of water fountains or front yard lawns since these actions result in reduced water use but the end use or product is also reduced or eliminated.

Establishing shared measurable water efficiency goals promotes development and implementation of appropriate and consistent strategies across jurisdictions and agencies. It also enhances the ability of the many professionals from different agencies, jurisdictions and departments, all with a role in water conservation, to develop consistent education and information programs. Lastly, the ability to measure and report progress towards goals is key to achieving results. The often repeated phrase in the field of performance improvement is “what gets measured gets done”.

Additionally, public perceptions that water conservation could negatively impact their quality of life and encourage future growth are a disincentive for people to conserve water. Efficiency goals and measures, when understood and effectively implemented, have the capacity to address these public perceptions, enhance quality of life benefits in the community, and contribute to water use reductions.

Different goals may be established for different scales of development: the building or lot scale; the subdivision or neighborhood scale; and the community scale. Examples include:

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Building / lot scale efficiency goal

- All interior residential structures achieve a 30 percent reduction over baseline water use consistent with LEED standards by 2014

Neighborhood scale efficiency goal

- 50 percent of required landscaping in new subdivisions is irrigated with a locally generated water source by 2014

Community-scale efficiency goal

- Achieve a 10% Increase in irrigation efficiencies of existing turf facilities community-wide by 2014

3. The paper does not focus enough on conservation in the existing built environment. We need to set standards for redevelopment and infill that include requirements, incentives and rebates in the permitting process. We also need to address barriers in the current code that prevent people from redeveloping.

RESPONSE: All City of Tucson and Pima County ordinances with water conservation requirements apply to in-fill new construction. In re-development projects there are opportunities to require water efficient plumbing and irrigation with renovations and remodeling of existing buildings. However, opportunities to address water conservation through ordinances and standards are limited in re-development because most building uses are “grandfathered” as they precede the adoption of new regulation. Regulations such as Proposition 207 that effectively grandfather most existing uses of land or property make it difficult to retroactively impose new standards on existing construction.

Of greater importance for conservation in the existing built environment are education, water pricing, incentives and rebates, leak detection and use of reclaimed water.

More information on opportunities for water conservation in the existing built environment is provided below.

Standards for re-development and infill:

City of Tucson

The City of Tucson has more opportunities for infill new construction and re-development projects than Pima County. Any project that would require a new plan would be subject to the ordinance. If construction occurs inside the building (a Tenant Improvement a.k.a. a TI permit) and is not an expansion, the ordinance would not apply.

City of Tucson ordinances with water conservation requirements are listed below.

- Ordinance 7178 – Plumbing Codes (1989 concurrent with Pima County - Requires the use of water-efficient plumbing fixtures including 1.6 gallon per flush toilets, 2.5 gallon per minute showerheads and faucets.
- Ordinance 7522 – Xeriscape Landscaping and Screening Regulations (1991) - Affects all commercial and multi-family construction projects. The ordinance requires adherence to Xeriscape principles, including limitation on high water-use plantings/features, low water-use plant requirements, and appropriate irrigations system design.

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- Ordinance 10597 – Rainwater Collection and Distribution Requirements (2008) - To be effective July, 2010; Mandates that 50% of new commercial construction landscape water demand be met through the use of water harvesting practices and technologies.
- Ordinance 10579 – Residential GreyWater (2008) - To be effective July 2010; Mandates all new residential construction include the installation of stub-outs for greywater systems at a later date.
- Ordinance 6096 – Water Waste and Tampering (1984, updated 1989 and 2000). Initial penalty established at minimum of \$250; \$500 for subsequent penalty within three year period. Penalties can be waived through attendance of Water Waste Diversion Program. Violations currently defined as:
 1. Allowing water to escape property
 2. Allowing water to pond greater than ¼ inch, or greater than 150 square feet on any street or parking lot
 3. Washing driveways, sidewalks, parking areas with an open hose/under normal system pressure
 4. Operating misting systems in unoccupied non-residential areas
 5. Operating a permanently installed irrigation system with a broken head or emitter, or a head spraying more than 10% of the spray onto a street or parking lot
 6. Failing to repair a controllable leak.
- Ordinance 8461 - Emergency Water Conservation (1995) - Allows prohibitions or limitations on certain types of uses of water under emergency conditions. Restricted uses include car washing, landscape watering, filling/refilling of swimming pools.
- Ordinance 10380 – Drought Preparedness and Response (2006) - Provides for a phased, coordinated response to ongoing drought conditions. Allows prohibitions or limitations on certain types of uses of water under varying drought conditions.

Pima County

Pima County in-fill and re-development areas surround the City of Tucson and include older mixed use areas such as Dodge and Alvernon, Benson Highway and the Flowing Wells neighborhood.

Infill new construction on a vacant lot surrounded by other development would typically be coming in with a development plan that would be required to meet current standards. All Pima County ordinances with water conservation requirements would apply to those projects. In re-development in which someone is taking down existing structures and re-building to a different use, the ordinances and standards would also apply in some cases. However, for many re-development projects, existing standards (other than the plumbing code) do not apply. For example, expansions of 25% or less do not trigger regulatory requirements. If the expansion is greater than 25% the property owner may have to bring the site up to code.

The following ordinances have requirements that apply to new construction infill in the County and to re-development projects where there is a change of use.

- Ordinance 18.59 - The Golf Course Zone Ordinance: Prohibits the use of groundwater for newly zoned golf courses.

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- Chapter 18.73 of the Zoning Code (Title 18 of the Pima County Code) - is the Landscape Section provides general standards for buffer yards, landscape designs and landscape plans. Preservation of native, on-site vegetation is a primary objective of site planning. The code specifies the use of reclaimed water, effluent or CAP water on turf applications over ten acres and turf use shall be for functional uses only, such as play or picnic areas. Landscaped areas will use a separate reclaimed ready irrigation system to promote the use of effluent. Water conserving irrigation systems will incorporate rain sensors and be capable of seasonal adjustments. Large water fountains and water features are restricted.¹
- Title 15 of the Pima County Code governing Building and Construction gives Pima County authority to adopt and update building codes. The International Plumbing Code (2007-106) and International Residential Code (2006-91) apply equally to redevelopment and infill at the building level. Water conservation requirements include: automatic faucets in commercial buildings and common use buildings, waterless urinals in commercial buildings, individual metering in new multi-family residential units and new and remodeled pools, spas and hot tubs to have covers to reduce evaporation.²
- Ordinance 8.70 - Water Wasting. Was approved in conjunction with Pima County's Drought Response plan. Prohibits wasteful use of water and Civil penalties for violations. Violations are reported by the public and are investigated by staff at the Health Department.
- Ordinance 18.72.010 - Native Plant Preservation. Promotes water conservation by retaining established, existing drought tolerant vegetation that requires no supplemental irrigation and minimal maintenance after plant establishment. The ordinance requires that a plan be submitted whenever the area of grading for a project is at or exceeds 14,000 square feet and the total lot area is 36,000 square feet or greater, or when the subdivision plat requires it.

Additionally, Pima County offers LEED services to Arizona, New Mexico and California. Residential applicants may submit their sites for LEED certification and Pima County will award points towards their LEED certification for use of water conservation measures such as rainwater harvesting, greywater, drought tolerant landscaping, and water efficient irrigation systems.

The primary tools for achieving water conservation in existing structures is through incentives and education, rather than regulations and a summary of key opportunities in these areas is provided below.

Incentives

In 2006, The Tucson Water Conservation Task Force issued a report titled "Water Efficiency: Water Conservation Program recommendations for Tucson's Water Future" which recommends a number of incentive-based conservation measures. The CCTF recommendations were based on qualitative analysis relative to customer acceptability factors and rigorous cost-benefit

¹ See <http://municipalcodes.lexisnexis.com/codes/pima/> Title 18-Zoning.

² See <http://www.pimaxpress.com/Building/PDFs/2007/2006%20International%20Plumbing%20Code.pdf> and Appendix G of <http://www.pimaxpress.com/Building/PDFs/2007/2006%20International%20Residential%20Code.pdf>

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analysis. The CCTF recommended incentive measures that have been implemented or are under development include:

- Single Family targeted Ultra Low Flow (ULF) toilet rebate
- Multi-family irrigation system upgrade rebate
- Multi-family high efficiency toilet rebate
- Commercial Industrial targeted ULF toilet rebate
- Commercial/Industrial pre-rinse spray valve rebate
- Commercial/Industrial waterless urinal rebate

Other recommended measures that have yet to be implemented include:

- Commercial/Industrial sub-metering (indoor/outdoor) incentive
- Single Family greywater incentive

In addition to the above list of relatively new incentive-based conservation measures, prior to the CCTF recommendations, Tucson Water had a number of pre-existing incentive programs which are summarized below:

- **Rates** - ¢. 25 buys:
 - 1 gallon from vending machine
 - 125 gallons from Tucson Water
- **Rebate Programs/ Tucson Water currently offers the following:**
 - 1. Residential HET Rebate Program** – 50% of purchase price of approved HET fixture, maximum \$120. Maximum \$200 rebate per household.
 - 2. Multi family HET Rebate Program** – 50% of purchase price of qualifying HET fixture, maximum \$100 per fixture.
 - 3. Commercial Industrial HET Rebate Program** – 50% of purchase price of qualifying HET fixture, maximum \$100 per fixture.
- **Commercial Irrigation System Upgrade Rebate** – One third the cost up to \$5,000 per location to improve system with irrigation audits, sub-meter, weather-based or soil sensor-based controller.
- **Other Incentives**
 1. RinseSmart Program – Free high pressure pre-rinse sprayer installs for restaurants or commercial kitchens
 2. Restaurant Table Tents/Menu Stickers – “Want a Glass of Water? Just Ask” free and distributed through AZ Restaurant Association
 3. WaterSmart Business Program – Incentives to encourage business water efficiency. Similar to LEED for water efficiency practices and certification at Copper, Gold, Silver and Platinum level. Program launch - Spring 2009.

Education

Interest in water conserving landscape practices, including residential water harvesting, stormwater harvesting, and greywater is growing among residential customers in the Tucson area. Continued emphasis on education, training and direct assistance to foster voluntary actions to implement these and other water efficient practices among individuals and within neighborhoods has significant potential to increase water conservation in the built environment.

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There are many opportunities in the community to learn about these techniques through the University of Arizona, non-profits and the City of Tucson. The City and County also partner with these groups in providing education and training in water conservation measures and in implementing demonstration projects. Continued collaborations also have significant potential to advance water conserving practices.

Following is a brief summary of Tucson Water's extensive Conservation Program:

General public information

Designed to promote water conservation and inform about issues:

1. Pamphlets and Brochures
2. Public Service Announcements
3. Community Events (Civic, trade, neighborhood events, etc.)
4. Beat the Peak

Education and training

Designed to educate and train participants in structured classroom setting:

- **Water Smart Landscape Workshops** – Two-hour workshops targeting residential customers. Workshop topics include:
 1. Drip Irrigation Design, Installation, and Maintenance
 2. Plant Selection and Design
 3. Irrigation Timer use and Irrigation Scheduling
 4. Water Harvesting
- **SmartScape Landscaper Workshops** – Series of workshops designed to teach landscape professionals, property managers, and homeowner associations about water conservation practices in landscape management.
- **Smartscape Program** – (Previously known as the LOW 4 Program) Offers landscape water conservation programs to commercial users, school districts, and general public.
- **Landscape Water Audit Training**
- **Turf Maintenance Workshop**
- **Youth Education Program**

Classroom materials for specific grade levels designed to teach about water supply, conservation, and quality issues.

 1. **'Da Drops – Grade 3** Student Activity book and Supplemental Teacher Guide for classroom use designed to teach about water cycle, groundwater, and water distribution.
 2. **Our Water, Our Future – Grade 5** Classroom Curriculum Packet designed to teach students about water cycle, water supply, and water quality.
 3. **Tucson Toolkit – Grades 7-8** Student Activity Book and Supplemental Teacher Guide designed to teach about water cycle, water quality, and water conservation.
 4. **High School Program** – The program is designed to bring water studies into broader curricular areas by building capacity among teachers and encouraging students to develop water-related projects.

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5. **Teacher Internship Program** – Two-Week paid internship offered to high school teachers. Development of classroom materials and assistance with development of subsequent elements are work products.
6. **Education Outreach** – The Education Outreach program provides classroom presentations and tours, and supports other education related programs.
7. **Wetlands Program** – Tours and classrooms presentations that help students understand about wastewater treatment, recharge, and conservation.
8. **Student Projects** – Regional Science Fair awards, River of Words poetry contest, Water Expo.
9. **Sweetwater Wetlands Guidebook**
10. **Project WET** – Project WET (Water Education for Teachers) is a nationally developed program that provides teachers with training and materials to improve teaching methods about water in the classroom.

Direct assistance programs

These programs are designed to provide direct assistance to customers in helping them reduce their water use.

- **Zanjero Program** – A residential water-auditing program designed to maximize water conservation potential around the home. The service includes leak detection, replacement of showerheads and aerators, and adjustments of toilets. Landscaping is assessed, and appropriate irrigation requirements are determined. Customers are provided a report showing water and dollar savings.
- **WaterSmart Business Program** – Water conservation assistance program targeting commercial and industrial customers. Facility audits are conducted to identify all uses of water and identify conservation potential.

Comments/Recommendations/Themes

1. Mark Stratton cautioned against using GPCD (gallons per capita per day) as the sole benchmark of conservation progress because each water provider has different types of customers and other issues that affect GPCD.
2. We have for a long time had a strong conservation ethic in Tucson. The next increment of improvement in conservation is going to be more expensive to achieve.
3. Conservation requirements have a cost associated with them that someone must pay and we need to be aware of this. We need to consider cost effectiveness of solutions as well as reliability and measurability of these solutions and compare costs to other conservation approaches and the cost to acquire new water. In some cases, retrofitting the built environment would be cheaper than mandating requirements for new development (e.g. toilet replacement is cost-effective and has measurable and reliable results).
4. Price signals are key to conservation. If water is inexpensive, people will not value it.
5. It is important to distinguish what people are paying when they pay their water bill – base rate (energy, infrastructure, etc.) and commodity rate. Only the commodity rate relates to

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usage. We need a new way of structuring our rates that will not link less water used with higher rates and it will likely involve base rates going up.

6. We should acknowledge that at the end of the day, using less water does allow more people to move here. At the same time, we should tie more efficient use of water to improved quality of life.