WATER CONNECTION CHARGES: A TOOL FOR ENCOURAGING WATER-EFFICIENT GROWTH

Case Study on Aurora, Colorado

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Authored by
Amelia Nuding, WRA
Sharlene Leurig, Ceres
Jeff Hughes, UNC
Aurora is the third-largest city in Colorado, with a population of more than 345,000 people.1 About one-third of the land within its boundaries has been developed,2 with more growth projected, and new water supplies are increasingly difficult and expensive to obtain. In 2014 the city adopted a new connection charge schedule that directly correlates water fees with the expected water demand (indoor and out) for each customer class. The schedule also incentivizes low-water-using landscaping through lower fees, including one particularly innovative program called the “z-zone” in which no fee is charged if the landscape requires no water after plant establishment.

New Connection Charges Designed to Cover Costs and Reduce Water Demands

The charges assessed under the previous schedule were not adequately covering the City’s costs for infrastructure and water. Changes in water demand and growth patterns had shifted the balance of water use between customer classes, such that residential fees were effectively subsidizing larger water users’ (e.g., irrigation, commercial) fees. In addition, there were requests from the building community to lower the fees. New leadership at the utility initiated a process to develop a connection charge structure that would better align the fees with water utility costs and provide an incentive to builders to construct more water-efficient developments.

Connection Charges Are Based on Robust Analysis

Aurora’s connection charges help to pay for past and future capital investments in the water system, in five categories:3

1) Water resources (the market cost of water in the region)
2) Source of supply (the existing and projected assets required to move and store water)
3) Treatment and distribution (the existing and projected assets)
4) Carrying costs (the financial costs incurred to obtain water)
5) Water losses in the system

The cost of a gallon of water per day was calculated for each of these categories and then summed, totaling $57.45 per gallon per day. This cost is then multiplied by the projected average daily demand of each new development type (residential, multi-family, commercial), to determine the connection fee. Six years’ worth of billing data were analyzed to determine projected average daily demands.

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Residential Connection Charges for Indoor and Outdoor Use, and Xeric Landscaping Credit

New detached single-family residential homes are charged a two-part water service connection charge: one for indoor use and one for outdoor use. The indoor use charge is either $5,509, $8,901, or $15,425, depending on the number of bathrooms in a home (1-2, 3-4, 5+, respectively). The number of bathrooms was found to be a reasonable proxy for the volume of indoor water use, based on billing data analysis.

<table>
<thead>
<tr>
<th>Number of Bathrooms</th>
<th>Fee</th>
<th>Indoor Use Charge</th>
<th>Outdoor Use Charge</th>
</tr>
</thead>
<tbody>
<tr>
<td>1-2</td>
<td>$5,509</td>
<td>$0.941 / sq. ft. of lot size</td>
<td></td>
</tr>
<tr>
<td>3-4</td>
<td>$8,901</td>
<td>-$1,000 for 100% front yard xeriscaping</td>
<td></td>
</tr>
<tr>
<td>5+</td>
<td>$15,425</td>
<td></td>
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</table>

The outdoor water use charge is $0.941/sq. ft. and is applied to the total area of the lot. In addition, if 100% of the front yard is xeric landscaping, then a $1,000 credit is given. Xeric landscapes are designed to be drought-tolerant, using low-water plants and specific techniques, such as soil amendment, mulch, and grouping of plants with similar water needs, to maximize water efficiency. The City provides a list of xeric plant species that are suited to the semi-arid environment, using no more than 15” of water per year and as little as no water after the initial plant establishment period. Establishment of landscape requires higher amounts of water during the first few months or years, until the plant is established in the soil. Once established, less water is required to maintain optimal health.

Irrigation Connection Charges Are Tiered for Different Landscape Types

Irrigation meters are used for irrigation water in commercial or residential common areas. They are assessed in three tiers: $2.75/sq. ft. for non-water-conserving landscape (e.g., bluegrass), $1.47/sq. ft. for water-conserving landscape, and $0/sq. ft for “z-zone” landscapes that use zero water after establishment. More than 50 plants currently meet the z-zone requirement in Aurora.

If a z-zone is elected, the developer is required to put down a $20,000 deposit on the temporary irrigation meter, pay an administrative fee, and agree to a “water budget” for the landscaped area during the plant establishment period. A water budget has two parts: a calculated volume of water that the entire landscape should use if watered properly (the budget limit), and a tiered pricing structure that charges a lower rate ($/gallon) for water used up to that budget limit, with a higher rate(s) if that limit is surpassed. After the plants are established, the water utility will remove the irrigation meter and fully refund the deposit.

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Uniform Charges Replaced by Multi-Factor Charges

The fee schedules prior to 2014 had uniform charges for each residential type (single-family attached, single-family detached, and multi-family). For example, a detached single-family home had a flat fee of $24,460, regardless of home or lot size. But under the 2014 schedule, that cost can range from as little as $5,509 (1-2 baths with no lot) to as much as $109,507 (5+ baths and 100,000 sq. ft. lot), as shown in Figure 1. However, those low and high figures are very rare, as the average lot size is about 8,200 sq. ft., and more than 97% of lot sizes are less than 14,000 sq. ft. Thus, a home in 2014 with an 8,000 sq. ft. lot and 3-4 baths would result in a charge of about $16,400 as compared with a $24,460 charge in 2013.

Commercial and multi-family connection charges were also changed to account for projected average daily demand. Irrigation fees were significantly less expensive prior to 2014: $0.71/sq. ft. for non-water-conserving landscape and $0.36/sq. ft. for water-conserving landscape. The 2014 fees are almost four times higher, but also feature tremendous cost saving opportunities through the z-zone program.

Stakeholder Engagement Helped Create Innovative New Program

The new connection charge schedule was developed a little over a year before it was adopted. Several private and public meetings were held with the Homebuilders Association, the Citizens Water Advisory Committee, the City/Development Community Joint Task Force (comprised of developers, landscape professionals, planners, and water utility staff), and the City’s Infrastructure and Operations Committee. There was a high degree of transparency through
this process, especially with respect to how and why the new charges were to be calculated. Transparency throughout the process helped gain the support of various stakeholders — which helped lead to its adoption by City Council.

Once the new schedule was adopted, developers expressed concerns about the new charges for irrigated areas, since those costs increased significantly. The water utility met with the Joint Task Force over the course of several months to try to address this; as a result, the z-zone concept was born. It was a solution that satisfied both parties by reducing costs to developers and reducing water demands on the system.

**Water Utility Is Now More Involved with the Development Approval Process**

The way in which developers and city planners work together has changed a bit as a result of this new schedule. Usually the entire plan would go through the City’s land use planning department, but if any area is intended to be a z-zone, the water utility now also reviews the plan. In addition, developers may choose to have a pre-development meeting with Aurora Water to go over the draft landscape plan. This provides Aurora Water the opportunity to tell them more about how the z-zone works and the other water-efficient landscaping incentives that are built into the fee schedule. There are also ongoing efforts by the utility to educate developers about xeriscape and to promote the $1,000 residential fee credit.

**Multi-Factor Connection Charges Benefit the Utility, Builders, and Home Owners**

The City and Aurora Water benefit from this new connection charge schedule because the charges to new customers are now in line with the costs to the utility incurred by all new customers. The connection charge structure for detached single-family homes also incentivizes the development of smaller lots — which tend to have lower water demands — which in turn reduces the burden on the City to develop additional infrastructure and acquire new water supplies.

The z-zone is a benefit to both developers and the City. A typical irrigation meter for a large landscaped area can cost $200,000 to $300,000, so the z-zone provides developers with a voluntary option to eliminate that large charge entirely. The City benefits because those landscaped areas do not create a permanent water demand; therefore, there is no need for new permanent infrastructure or water supply.

Importantly, the water utility also has a couple of financial safeguards through this program. First, if the landscaped area continues to require water on a permanent basis, then the developer must pay the normal irrigation charge. Second, the developer must agree to a water budget pricing system for the landscaped areas. Thus, in the event that the z-zone plants continue to be watered after the establishment period and after the developer’s deposit is refunded, the City will recover its monthly costs through the water budget pricing structure.

**Majority of New Plans Are Using the Z-Zone Option**

Within the first few months of the z-zone program being adopted, the City of Aurora saw 5 of 6 plans using the z-zone option. Together, these five plans include more than 730,000 square feet dedicated to z-zone plant material, resulting in a potential water savings of 21 acre-feet per year — enough for 42 families of four people for almost a year. The utility will continue to promote this program, as well as the $1,000 xeriscape rebate program, which has not yet created as much interest as the z-zone, in the coming years.7
Aurora’s Development and Connection Fee schedule has changed some since the publication of the original case study in 2015. Overall, the fees increased slightly to keep up with inflation. The more significant changes, however, are related to the structure and administration of the z-zone program.

“Z-zone” refers to the landscaped areas in new developments that contain low water-using native plants, typically native grasses. It is a landscape option for large, landscaped areas such as those in home owner associations (HOAs) and in office parks. It does not include the yards of single homes. The z-zone program started in 2014, and many program features are the same today as when it started: A landscape and irrigation design must be submitted to and approved by Aurora Water, and z-zones are incentivized by the $0 per square foot fee—as compared with non-conserving landscapes which cost $2.91 per square foot, and conserving landscapes which cost $1.56 per square foot.

The most significant changes to the z-zone program are the way in which an irrigation system is designed, and the way that the program is administered. Originally, z-zones were equipped with a temporary irrigation meter. The meter was place for only three years to enable plants to establish (root permanently) in the soil. After three years, the water meter—and thus the ability to water—was physically removed. Developers paid a $20,000 deposit for the temporary tap, and the money was to be fully refunded once the temporary tap was removed.

Temporary taps now have been eliminated and no refundable deposit is required. A permanent tap now is installed because large landscapes tend to have a mix of z-zone, conserving, and non-conserving landscapes. The permanent water meter initially is used to water all landscape types, but the expectation is that the z-zone areas will not be watered after three years.

The entire landscape has a water allocation which is greater for the first three years to account for the z-zone areas. After three years the allocation for the z-zone areas drops to zero, reducing the overall landscape water allocation.

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1 Non-conserving landscapes are defined by the City of Aurora as landscapes that require more than 15 inches of irrigation water per year. Conserving landscapes use less than 15 inches per year.

The developer must sign an agreement accepting the water allocation for the landscape, and this agreement is tied to the property through a lien filed with the county recorder.

Although the z-zone areas can be watered, the intent is that they will not require watering. Exceeding the annual water allocation (of the conserving and non-conserving landscapes) due to watering of the z-zone, or for any other reason, incurs charges. These include, for example, charges of $11.98 per 1,000 gallons when the annual allocation is exceeded before June 30, and $5.99 per 1,000 gallons when the annual allocation is exceeded after June 30. On January 1 of the subsequent year, however, the annual water allocation resets to the original allocation and the rates return to the original levels.

Since the z-zone’s inception in 2014, 25 new developments have used the z-zone option. Combined, these projects will have installed more than 4,400,000 square feet of z-zone landscapes. This is estimated to result in more than 170 acre-feet of water savings per year—enough to supply nearly 350 families per year! This estimate assumes that the z-zone area otherwise would be a mix of landscape types that are typical in Aurora.

In addition to the z-zone program, a new fee program was developed in 2016 for estate lots (very large residential lots). Aurora Water developed a fee-adjustment mechanism for these lots because the fees for outdoor water use are usually based on lot size, which would result in a very large fees for an estate lot even though much of the lot is not landscaped or irrigated. Aurora Water adjusts the fee such that only the square footage of the landscaped area is considered in the fee calculation, with a minimum fee equal to three-quarters of an acre (32,670 sq ft). Similar to the z-zone arrangement, the developer must sign an agreement committing to a water allocation based on the development plan that is submitted.

For more information, contact
Amelia Nuding: amelia.nuding@westernresources.org
www.westernresourceadvocates.org

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