

Water Use, Water Conservation, Water Development & the Home Building Industry

For a better quality of life.



HOME BUILDERS
ASSOCIATION
— of —
METRO DENVER

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ABOUT THIS WHITE PAPER...

The historic drought of 2002 and the subsequent dry years reinforced the fact that the responsible management and development of our water resources are critical to sustaining the quality of life that makes Colorado one of the most desirable places to live, work and raise a family.

The Home Builders Association of Metro Denver (HBA) prepared this white paper to assist in informing elected officials throughout the Denver metro area about the facts and also the myths of water use in residential settings by the home building industry. The facts and figures used in this paper were obtained from a variety of public and private sources, including the Denver Water Department, Colorado State University, the Office of the State Engineer and other divisions within the Department of Natural Resources.

While residential use constitutes a small percentage of water used in Colorado, the home building industry is committed to working with other industries and public officials to strive for the responsible conservation and development of Colorado water. Our future depends on it.

For a better quality of life.



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Joe Knopinski, 2006 HBA government affairs committee member

Don Barnes, 2006 HBA member

Yvonne Seamen, 2006 government affairs committee member

David Hansen, 2006 government affairs committee member

Dick Geiermann, 2006 HBA board of directors

Erik Eckberg, 2006 HBA board of directors

Gene Myers, 2006 HBA government affairs committee, chair

HOME BUILDERS ASSOCIATION OF METRO DENVER WATER POLICY

The Home Builders Association of Metro Denver (HBA) acknowledges that water is a precious resource in Colorado. In recognition of this, the HBA will be pro-active in developing both short- and long-term strategies to address the on-going need for efficient water resource management and the development of new water resources.

The HBA will examine its industry's area of direct impact and develop programs and strategies for efficient use of water in residential land development and construction. The HBA will promote the most effective water wise practices and latest water efficient technologies to its members and to the public.

The HBA will promote the need for water conservation and encourage local jurisdictions to develop or amend existing regulations to be consistent with recognized and evolving water-wise practices. The HBA, in conjunction with the Colorado Association of Home Builders and a broad-based coalition, will actively support the improvement of existing and development of new water resources.

Adopted by the HBA Board of Directors, October 2002.

OVERVIEW OF COLORADO'S WATER SITUATION

Putting residential water use in perspective

Colorado's climate, weather patterns and geography pose a series of unique challenges for water conservation and development. Even though the state experienced nearly 20 years of above-average precipitation during the 1980s and 1990s, Colorado is classified as a semi-arid climate, averaging about 14 inches of annual rainfall in a normal year. The lack of precipitation combined with the fact that Colorado is a headwaters state creates a situation in which it is absolutely essential that we store our excess water for use during dry years.

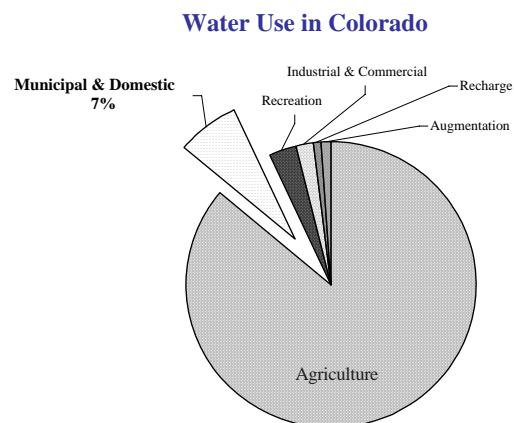
According to the Denver Water Department, 80 percent of the water used by Coloradans each year comes from snowmelt, the runoff from which is captured in storage facilities across the state.

For generations, Coloradans have attempted to balance the reality that more than two-thirds of the state's water supplies originate west of the Continental Divide while more than two-thirds of the state's population resides, and water uses required by irrigated agriculture take place, on the front range and eastern plains. Each year, Denver Water customers use about 105,000 acre feet of water that started on the west slope. A total

of about 475,000 acre feet of water is transferred annually from the Colorado River Basin to the east slope.

Since a vast majority of Colorado citizens live in urban areas, it may come as a surprise to many that agriculture, as opposed to home owners, parks and golf courses, uses more than 85 percent of the state's water supply. While single family homes account for 48 percent of water use by customers of the Denver Water Department, it is important to remember that Denver Water provides only two percent of all water (treated and untreated) used in Colorado – an amount that totals about 265,000 acre feet of water per year.

Figure 1.0 Water Use in Colorado by Category



Source: Colorado Department of Natural Resources

RESIDENTIAL WATER USE

In the average single-family home (averaging new homes and older homes) water use is typically distributed among the following uses:

- Landscaping 54%
- Toilets 13%
- Laundry 11%
- Showers & Baths 10%
- Faucets 6%
- Leaks 5%
- Dishwashers 1%

Source: Denver Water Department
www.denverwater.org

New construction uses water fixtures and appliances that are much more efficient than those in older homes.

Ultra-low volume (ULV) toilet: 8 gallons per day
Conventional toilets: 17.5-35 gallons per day

Low-flow showerhead: 20 gallons per use
Conventional showerhead: 24-64 gallons per use

Water wise dishwasher: 4.5-7 gallons per use
Standard dishwasher: 10-14 gallons per use

Source: Denver Water Department
www.denverwater.org

WATER CONSERVATION & THE HOME BUILDING INDUSTRY

Leading conservation efforts to stretch existing water supplies

Water users must maximize the current water supply as we look to develop additional supplies. The home building industry has been actively working for many years to institute cost effective and responsible water conservation measures. A number of water conservation measures have been in place for years, while industry experts continue to take advantage of technological advances as on-going research provides us with a greater understanding of how to maximize residential water use.

Through voluntary programs initiated by home builders, such as Built Green® Colorado, builders are working to design and construct homes that offer cost effective water efficiencies to home buyers. Built Green® advocates the use of low-water use faucets, low-flow toilets and water efficient appliances, such as washing machines and dishwashers, to maximize indoor water conservation. These water conservation measures inside a single home help to stretch existing water supplies and translate into lower utility bills for the home buyer.

Home builders and developers, however, are not just focused on saving water inside a home. Water conservation measures outside the home play a critical role in reducing residential water use. More than half (54 percent) of all water used by a residential customer is used for outdoor landscaping – lawn irrigation, plant watering, etc.

WATER WISE LANDSCAPE DESIGN

For developers and home builders, efficient water use begins with developing landscape plans that conserve water and protect water quality. Home builders and their design professionals take into account a number of factors, including exposure to man-made and natural elements, soils, slope, availability of natural precipitation and additional water supplies, and drainage when shaping the overall “look and feel” of a community. Home builders work to blend a community with existing topography to

preserve the natural major drainage pathways.

Time and resources spent on a water-wise landscaping plan can result in significant savings over the lifetime of a community. Common areas are designed to avoid losing runoff, especially around a parking lot. Landscape grading is designed so that infiltration is maximized and runoff and “ponding” are minimized. As alternatives to sod, builders use decorative berms and buffer zones to direct water flow to cultivated areas.

BUILT GREEN® COLORADO

In 1995, the Home Builders Association of Metro Denver (HBA) joined forces with the Governor’s Office of Energy Management and Conservation (OEMC), Xcel Energy and E-Star Colorado to create what, today, is the largest green building program in the nation – approximately 25,000 homes have been registered under the program from 1996 to 2004.

In addition to providing greater energy efficiency and providing healthier indoor air, Built Green® Colorado encourages home builders to use technologies, products and practices to reduce water usage both inside and outside the home.

Builders who participate in the Built Green® program employ a number of techniques to save water including low-water use fixtures and appliances and state-of-the-art irrigation systems for outdoor landscaping.

By reducing residential water usage, the home building industry is not only doing its part to conserve Colorado’s most valuable natural resource but also saving home owners on water utility bills – a tremendous benefit in light of increased user fees and surcharges brought on by the recent drought.

For more information contact:

Kim Calomino, Director
Built Green® Colorado
(303) 778-1400

In communities where home buyers install their own landscaping, home builders work to educate home buyers about landscaping techniques that conserve water. Builders provide a number of resources, such as information on drought-tolerant vegetation as well as water-wise landscaping plans and irrigation sketch plans.

Belle Creek and Reunion (both in Adams County) are two of the most recent examples of planned communities where water conservation is an integral part of the planning and design. Both of these communities coordinate their efforts with the builders and home buyers as well as local water providers and jurisdictions.

SOIL IMPROVEMENTS & “HYDROZONING”

Evaluating and improving soil *before* irrigation systems are installed promotes better absorption of water, retention of water and drainage of soils. A home builder's work to improve the soil increases landscape viability.

When appropriate, home builders incorporate plants with lower water requirements, using “native species” that have adapted to

Colorado's arid climate. The process of grouping plants according to their water needs, known as “hydrozoning”, is a critical component of Xeriscape® designs.

For instance, when Village Homes builds a new community, site topsoil is saved and stock-piled for reuse when soil analysis determines it is valuable to do so. In addition to protecting existing trees and natural features during construction, native grasses and shrubs are planted throughout community areas and open space.

INSTALLING WATER WISE IRRIGATION SYSTEMS

State-of-the-art irrigation systems can be one of the most effective ways for a home builder and a home buyer to conserve water resources. Depending on the type of technology employed, water efficiency use can improve anywhere from 20 to 50 percent for pre-programmed sprinkler systems to as great as 95 percent for real-time weather-based controllers, soil moisture and rain sensors. Microirrigation (drip or micro-sprinkler) systems can increase efficiency by 95 percent. Many new technologies are costly, however. Local governments and utilities should consider incentives to affect market acceptance, increased usage, and in turn reduced costs.

Automatic irrigation controls must be properly set and calibrated in order to achieve the intended water conservation goals. When these controls are properly used and maintained, they can increase efficiency by as much as 50 percent. Once the system is installed, it is imperative that home owners (for individual lots) and landscaping professionals (for common areas) inspect, maintain and repair any leaks or malfunctioning components.

Builders are increasingly using rain or soil moisture sensors that override programmed watering schedules and shut off an irrigation system during or after rainfall.

Study finds over-watering does more than “just waste water”

A recent study conducted by Wright Water found that “gross over-watering” in three case studies contributed to not only inefficient water use but also was a “key cause” to structural damage, wet basements and poor drainage.

Home owners applied anywhere from 217 to 276 percent the amount of water required to irrigate the outside landscaping at each of the sites (two in Colorado Springs and one in Arvada).

Another report, “Working Together to Promote Landscape Water Conservation” issued in May 2004 by the Governor's Office of Energy Management and Conservation on behalf of HBA and GreenCO, reinforced for Colorado home builders the importance of consumer education and cooperative conservation efforts.

Automatic irrigation timers that are properly set as well as rain sensors and real-time weather-based irrigation controls not only conserve water resources but also prevent unnecessary water damage to the home.

BUILDERS & DEVELOPERS TAKE LEAD ON CONSERVATION

Development designs and education top priority list for industry

DEVELOPMENT DESIGNS

Forest City, in its redevelopment of the old Stapleton airport, began with a set of sustainability principles that included an aggressive approach to reducing water consumption. In designing a development of compact urban neighborhoods where lots are as small as 3,600 square feet Forest City achieved an estimated reduction in per household water use of 40 percent. The amount of private lot landscaping and the attendant irrigation was greatly reduced, while ample and water-wise recreational and open spaces provided the aesthetic and gathering place amenities.

Belle Creek, a planned community in Adams County, uses “pocket parks” to create manageable open spaces and limit the irrigation requirements by using native vegetation and drought-resistant plants and sods.

EDUCATING HOME BUYERS

While builders design and construct homes and landscapes that are water conserving, home builders also recognize that the end-user – the home buyer – will have the most impact on the water use. Builders throughout the Denver metro area have implemented a variety of programs and techniques to educate home buyers about water conservation measures they can employ inside and outside their homes.

There are several industry examples of proactive conservation efforts. Village Homes provides its home buyers with educational materials developed jointly with the City of Arvada regarding water-wise landscaping and the steps homeowners can take to improve and protect water quality.

Forest City has worked with Denver Water and the Denver Botanic Gardens to create and distribute educational materials and provide interactive workshops about water conservation and landscaping. Engle Homes in its Water-Wise Program provides buyers with information regarding Xeriscape®, soil preparation, hydrozoning, efficient irrigation, mulching and drought-tolerant plants. The program also includes five alternative backyard Xeriscape® designs that buyers can use.

Built Green® encourages builders to demonstrate water wise landscaping on sales models and, when landscaping is not installed at new homes, to provide home buyers with information on drought-tolerant plants and at least three sample water wise landscaping and irrigation plans.

THE VALUE-ADDED BENEFITS OF WATER WISE LANDSCAPING

Landscaping provides more than aesthetic improvement to a community. Appropriate and well-designed landscaping improves a community’s environment, protects water quality, prevents erosion of top soils and provides wildlife habitat.

Here are just some of the benefits of water-wise landscaping:

- Trees, sod and other vegetation work to clean air;
- Native grasses, and more traditional sod, slow water run-off and serve as a natural filter for the water as it recharges the soil and percolates back to the water system;
- Trees and shrubs shelter homes and hardscapes (streets, sidewalks, driveways, etc.) to reduce unwanted heat gain;
- Landscaping provides open space and recreational opportunities; and
- Property values are enhanced by attractive landscaping, resulting in greater tax base and support for county services and schools.

COUNTERPRODUCTIVE REGULATION

When regulations undermine conservation efforts

Government regulations should encourage water conservation by home builders and home owners. However, as developers have experienced, some regulations can be counter-productive to water conservation efforts.

OPEN SPACE LANDSCAPING

Regulations and ordinances for both single-family and multi-family developments throughout the metropolitan area continue to require a significant amount of the development to be dedicated to open space and recreational areas, the maintenance of which requires irrigation.

Builders often find themselves caught between government land use regulations and the demands of new home buyers and neighbors who may not like the aesthetics of drought-tolerant vegetation and native grasses. In instances where developers re-vegetate using native grasses (per agreement with the local government and in accordance with best management practices for water wise landscaping), it is not unusual to have community members complain to home owners associations that areas look “brown” or un-kept. If local governments do not assist in educating community members about the merits of naturalized drought-tolerant landscaping, home owner complaints can become frequent enough that builders and home owners associations convert open space and buffer areas to sod, which requires more irrigation than native landscaping.

Local governments also have control over the extent to which landscaping in common areas is water wise. When regulations require turf in disconnected areas, such as tree lawns and medians, where it is neither a practical use of turf nor an area that can be efficiently maintained and irrigated, conservation efforts elsewhere are undercut. Over-vegetation of common areas with plant choices inappropriate to Colorado’s arid climate is also often a symptom of water-wasting landscaping requirements. Such

counter-productive regulation saddles the community with high water costs for the long-term and undermines conservation efforts.

The goal for both home building industry and local government should be the same: provide attractive, colorful, and livable landscaped areas in our communities without unnecessarily expending precious water resources. Many local governments have reviewed and revised their open space and common area landscaping regulations – often with the collaboration of the HBA and its members - with the goal of improved water conservation. Some local governments, even after such review and revision, could yet improve the water efficiency of their regulations; other local governments have yet to undertake this vital task. Local governments are encouraged to develop or amend existing regulation to be consistent with recognized water wise practices and engage in regular reviews to ensure that they stay current with evolving strategies.

RESIDENTIAL LANDSCAPING

Not all builders install landscaping in the yards of new homes, and when they do it is typical that only front yard landscaping is provided. While the home building industry has been innovative and proactive in the area of water wise landscaping, here again local regulation is the primary driver. Home builders have worked with many municipalities to both improve water conservation in residential yard landscaping requirements and to educate the home buyer who will in all likelihood landscape the rear yard. Yet without strong leadership by local government in developing and promoting a new vision of how our communities can have healthy, colorful and water wise landscapes, it cannot become a reality. Home owner education, water-wise landscaping requirements and a cooperative partnership with the home building industry and the local government are critical to proactive water conservation.

TAP FEES

Tap fees are typically charged to residential and commercial developers and builders to defray the costs that a utility – either a special district or a municipality – incurs to provide water service to new communities. Tap fees are assessed for residential taps as well as irrigation taps.

Tap fees vary by jurisdiction but are increasing at astronomical rates throughout the Denver metro area. These increased tap fees result in significant economic impacts. Residential tap fees, which are ultimately passed on to consumers, can be as high as \$25,000 per new home and have become one of the factors in rising housing prices.

As tap fees increase at alarming rates and are based “per tap,” builders are forced to control costs on irrigation tap fees by serving as much of an open space or common area as possible with one tap. Working with fewer taps can result in irrigation system designs that are less efficient and don’t conserve as much as designs involving several smaller taps. Water providers must examine their fee structures to identify and correct drivers of inefficiency. Home builders should not be forced to choose between keeping the prices down on their product (which results in more affordable housing) and installing irrigation systems that maximize water conservation.

According to industry estimates, home builders have paid tens of millions of dollars to municipalities and special district water providers. These tap fees should be used for the purpose for which they are assessed and serve as a significant source of funding for new water facilities and improvements to existing infrastructure.

THE HBA TAP FEE POLICY

Adopted January 2005

The HBA recognizes that all metro area water utilities must continue to develop water resources and maintain and expand storage and delivery systems in order to sustain continued growth and economic stability in the metro area. The HBA further recognizes that costs associated with improvements and the value of water itself continues to rise. The boards of directors of all water utilities are charged with diligently planning for future growth and continued service to their current and future customers. It is critical that the boards of directors of water utilities demonstrate diligent financial oversight to ensure that the proper, best and highest use of system development charges are accomplished such that current and future customers can rely on a sufficient and stable source of water.

Water utilities should distinguish between system improvements or expansions that are necessary due directly to growth and those that are necessary to provide service to existing customers. In some cases a proposed improvement or expansion may benefit both new and existing customers such that an equitable plan of cost sharing between new and existing customers should be established.

The following minimum standard of evaluation shall guide the HBA in developing its position on any system development charge increase proposed by any water utility. The HBA will not oppose proposed system development charge increases when it is the case that the water utility:

- Demonstrates diligent management and long range planning including fiscal accountability;
- Demonstrates an appropriate analysis of proposed improvement/expansion projects establishing such projects as necessary either entirely or in part due to new development and where appropriate institutes equitable cost sharing between new and existing customers;
- Demonstrates that the proposed increases are justified and necessary to meet the costs of serving new development;
- Has a means of publicly verifying that collected system development charges are in fact used to develop or expand water resources to serve new development;
- Utilizes a water rate and user service fee structure that accurately reflect the cost of water and the cost to provide service;
- Has a conservation plan impacting all users;
- Demonstrates that collected tap fees have been and will continue to be utilized appropriately according to these basic principles;
- Provides advance notice to the HBA and its affected members adequate for the HBA to conduct a review in relation to these principles;
- Provides an implementation timeline for price increases that avoids unnecessary negative impact on HBA members relative to their existing sales contracts; and
- Through adherence to these principles and standards provides the development community reasonable assurances that new development will not be restricted due to a lack of water resources.

GROWTH & TAP MORATORIA

The costs of delaying economic development

When water is in short supply, local governments often respond by increasing water rates, user fees, and tap fees and implementing surcharges. In some cases, local governments significantly restrict or impose moratoriums on the issuance of new taps.

Home building generates substantial local economic activity, including new income and jobs for residents and additional revenue for local governments. When building is put on hold, the benefits too are put on hold.

While tap restrictions or moratoria may seem to serve as a limited short-term solution, communities will lose out on the economic development resulting from the moratoria. Ironically, due to the fact that new construction is far more water efficient than older homes, the water savings from restrictions does not make up for the economic losses.

The National Association of Home Builders (NAHB) conducted a study specifically to examine the contribution that new home construction makes to the Denver metro economy. The NAHB study concluded that for every 100 new single-family detached homes that are built, local communities realize substantial benefits and increased revenues for local governments.

For every 100 new homes built, the Denver metro area realizes the following benefits for one year:

- \$17.5 million in local income;
- \$4.0 million in taxes and other revenue for local governments; and
- 306 local jobs.

The economic growth doesn't end with the first-year impacts. The study also concluded that there are recurring positive benefits of building 100 single-family homes in the Denver metro area, which include:

- \$3.4 million in local income per year;
- \$608,000 in taxes and other revenue for local governments per year; and
- 63 local jobs per year.

The benefits are similar for multi-family construction. For every 100 multi-family units built, the Denver metro area realizes the following benefits for one year:

- \$12.2 million in local income;
- \$3.0 million in taxes and other revenue for local governments; and
- 208 local jobs.

As with single-family home construction, the benefits do not end with the first year. The recurring economic benefits of 100 multi-family units built in the metro area are:

- \$2.9 million in local income per year;
- \$559,000 in taxes and other revenue for local governments per year; and
- 51 local jobs per year.

Developing adequate water storage facilities and infrastructure ensures that the state's economic development will not be delayed during dry years.

INTERRUPTIBLE WATER SUPPLY AGREEMENTS

A win-win approach for cities and rural neighbors

Recent state legislation has made it easier for cities to contract with farmers and ranchers to use agricultural water when city supplies run short.

Initially, interruptible water supply agreements (also known as dry-year leases) were allowed only during times of an emergency drought declaration issued by the Governor. In 2004, the General Assembly expanded the ability of cities to enter into dry-year leases with agricultural users provided that there were protections in place to protect senior water rights owners and ensure that the leases were not circumventing state water courts.

The measure, which was sponsored by Rep. Mary Hodge (D-Brighton) and Sen. Mark Hillman (R-Burlington) will provide another option for thirsty cities while allowing farmers and ranchers to keep water "on the land" and continue to use the water after an IWSA expires.

For more information, contact the Office of State Engineer, Colorado Department of Natural Resources.

CONCLUSION: COLORADO IN 2030

Sustaining economic growth & storing additional water

Conservation is an integral part of the long-term water supply solution but demand-side management alone will not meet our future needs. For instance, according to Colorado Springs Utilities' testimony before state legislative committees, full implementation of a comprehensive conservation plan will meet only about six percent of its future water needs. Results from the Statewide Water Supply Initiative (SWSI) also confirm that conservation alone will meet less than ten percent of the state's future needs.

There are hazards associated with over-reliance on conservation to meet demand. Successful and aggressive water conservation efforts "harden demand." When a municipality hardens demand, it also reduces the relief that can be provided during times of drought if additional conservation efforts are required.

In 2003, Colorado water officials began the first comprehensive study of the state's water demands and supplies. SWSI issued its initial demand numbers in March 2004 that put Colorado water providers on notice that municipal and industrial users will require

"Conservation is an integral part of the long-term water supply solution... but conservation alone will not meet our future needs."

an additional 730,000 acre feet by the year 2030. These figures assume that agricultural use will continue to require more than 85 percent of the water used in the state.

Colorado must take immediate action to develop and store additional water supplies. Water that we are entitled to use by federal interstate compacts simply cannot

"Storing additional water will require increased cooperation among providers on both sides of the Continental Divide."

continue to flow out of the state for lack of storage capacity. As long as Colorado allows water to flow to downstream states because we lack adequate storage facilities, we will continue to deplete non-renewable water resources, such as the Denver Basin Aquifer, and limit economic growth and development.

Storing additional water will require increased cooperation among municipal water providers on both sides on the Continental Divide. In some instances, there may be an opportunity for the residential and commercial building communities to partner with municipal providers, as well as other water users, such as agriculture and industrial.

In order to address short-term needs, water providers and users may find it cost effective to repair, rehabilitate and expand existing water storage facilities. However, in order to address long-term needs, such as those identified by SWSI, Coloradans must work to identify, design and construct new water storage facilities.