

# 2023 WATER EFFICIENCY PLAN



**CENTENNIAL**  
WATER AND SANITATION DISTRICT

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## Acronyms

AF	Acre-Feet
ASR	Aquifer Storage and Recovery
AWC	Average Winter Consumption
AWWA	American Water Works Association
CWCB	Colorado Water Conservation Board
ET	Evapotranspiration
gpcd	gallons per capita per day
HOA	Home Owners Association
mgd	million gallons per day
NDC	Northern Douglas County Water & Sanitation District
PSI	Pounds per Square Inch
SWSI	Statewide Water Supply Initiative
WISE	Water Infrastructure and Supply Efficiency

## Definitions

**Acre-foot:** A volume of water equal to one foot of depth covering an area of one acre. One acre-foot is 325,851 gallons.

**American Water Works Association (AWWA):** The American Water Works Association is the largest nonprofit, scientific and educational association dedicated to managing and treating water. The AWWA provides solutions to improve public health, protect the environment, strengthen the economy and enhance our quality of life.

**Aquifer:** An underground deposit of sand, gravel or rock through which water can pass or is stored. Aquifers supply the water for wells and springs.

**Aquifer Storage and Recovery (ASR):** The process of pumping treated surface water into the aquifer for storage so that it can be used at a later time. Water stored in the aquifer is not susceptible to evaporation loss.

**Audit (end-use):** A systematic accounting of water uses by end users (residential, commercial or industrial), often used to identify potential areas for water reduction, conservation or efficiency improvement.

**Audit (system):** A systematic accounting of water throughout the production, transmission and distribution facilities of the system.

**Average winter consumption:** The average amount of water used during the winter months of November, December, January and February. Average winter consumption is used to estimate indoor and outdoor water use for residential customers.

**Colorado Water Conservation Board (CWCB):** A division of the Colorado Department of Natural Resources, the CWCB was created in 1937 for the purpose of aiding in the protection and development of the waters of the state. The mission statement of the CWCB is to conserve, develop, protect and manage Colorado's water for present and future generations.

**ColoradoScape:** A natural landscape, comprised of low to very-low water use plant material, which blends in with the native Colorado landscape. Plant material must be maintained in its natural,

native form. This landscaping utilizes a combination of hardscape and landscape materials, providing a variety of colors, textures, sizes, shapes, and seasonal interest.

**Evapotranspiration:** A measurement of the amount of water lost from evaporation and plant transpiration. Weather factors used to calculate ET are temperature, wind, humidity and solar radiation.

**Groundwater:** Water found below the earth's surface, in the pore spaces of saturated soil and rock that supplies wells and springs.

**Loss (apparent):** Apparent losses consist of unauthorized consumption, meter inaccuracies and possible data handling errors.

**Loss (real):** Real losses consist of leaks in the distribution system that does not reach the end user. While the water is lost from the distribution system, the water does eventually return to the South Platte River.

**Low water-use landscaping:** Use of landscape designs and plant materials that are appropriate for the climate and growing conditions. Usually utilizes the principles of xeriscape.

**Non-revenue water:** Also referred to as unaccounted for water, non-revenue water consists of unbilled authorized uses (line flushing, new home construction), and system losses. It's important to note that while these items are not directly billed, they are included in rates based on rolling 5-year averages.

**Rain sensor:** A device connected to an automatic irrigation system that causes the system to shut down in the event of rainfall.

**Raw water:** Untreated water; water demand prior to system loss and evapotranspiration

**Renewable:** A resource that is replaced naturally and can be used again.

**Reuse (water):** The reclamation and recycling of water for a beneficial use.

**Statewide Water Supply Initiative (SWSI):** First produced in 2004 SWSI is a comprehensive study, implemented by the CWCB, of how Colorado will meet its future water supply needs. The SWSI study was most recently updated in 2010.

**Surface water:** Water present on the earth's surface in lakes, reservoirs, and rivers.

**System (distribution):** A series of interconnected conveyance and treatment facilities owned and operated by a water supplier.

**System loss:** An amount of water, usually expressed as a percentage, lost from the distribution system due to real and apparent losses. Water loss from leaks and line flushing is not truly lost, it eventually returns to the South Platte River.

**Water conservation:** Improved water management practices that reduce or enhance the beneficial use of water.

**Water efficiency:** Accomplishment of a function, task, process, or result with the minimal amount of water feasible. For the purposes of this plan, water efficiency is inclusive of water conservation and is used instead of “water conservation”.

**Water Infrastructure and Supply Efficiency (WISE):** A regional partnership between Aurora Water, Denver Water and the South Metro Water Supply Authority. The agreement will allow for the parties to share available water supplies and infrastructure to deliver renewable water to members of the South Metro Water Supply Authority.

**Wholesale water:** Water purchased or sold for resale purposes.

**Xeriscape:** Landscaping that involves seven principles: proper planning and design; soil analysis and improvement; practical turf areas; appropriate plant selection; efficient irrigation; mulching; and appropriate maintenance.

## Introduction

The Water Conservation Act of 1991 established a requirement that water providers develop, adopt, make publicly available, and implement a plan to encourage their customers to use water more efficiently. In 1995 Centennial Water and Sanitation District (District) developed a water management plan to comply with the 1991 Act's requirements.

In 2004 the State of Colorado revised the minimum planning requirements established in 1991 under the new Water Conservation Act of 2004. To comply with the new requirements, the District developed a new Water Conservation Plan that was submitted and approved by the Colorado Water Conservation Board's (CWCB) Office of Water Conservation and Drought Planning in 2009.

The 2004 law requires that water conservation plans be updated and submitted to the CWCB every seven years. In 2016 the District submitted a plan, now called the Water Efficiency Plan, to satisfy this requirement. This document is an update to the 2016 plan which established the following goals:

- Reduce District annual build-out demand by an additional 750 AF
- Implement water efficiency activities that target high water uses; customers or customer categories who consistently exceed the water budget
- Implement publicly acceptable water efficiency activities
- Maintain average system loss below 6%
- Implement a cost-effective water efficiency program that achieves targeted water savings

This plan follows the format of the *Municipal Water Efficiency Plan Guidance Document* introduced by the CWCB in July 2012, with additions regarding land use efforts as required by the CWCB's *Addendum* introduced in January 2019. It describes activities to reduce the overall water demand of the District, assesses whether the District remains on track to achieve the goals set by the 2016 plan, and what adjustments, if any, need to be made. This plan also includes an overview of the District's water supply system, a profile of water demands and demand management, a discussion of the role that water efficiency plays in water supply planning, a delineation of the District's water efficiency goals, a description of water efficiency activities, and a description of how the plan will be implemented and monitored over the course of the seven-year planning period.

The plan provides a path for making sound decisions about the water efficiency activities that will be funded by the District. The plan is meant to operate in conjunction with other District plans, such as the Drought Response Plan, Capital Improvement Plan, and Integrated Resources Plan. The water efficiency activities described in this plan may evolve as necessary to ensure that goals and objectives are met. The water efficiency plan does not describe in detail how each water efficiency activity will be implemented. Those details will be determined as implementation of each activity or group of activities takes place.

## **Section 1     Profile of Existing Water Supply System**

### **1.1     Overview of Existing Water Supply System**

The District provides water and wastewater services to the communities of Highlands Ranch, Solstice, and other neighboring residential areas in northwest Douglas County through intergovernmental agreements with the Highlands Ranch Metro District (Metro District), Mirabelle Metropolitan Districts, and the Northern Douglas County Water and Sanitation District (NDC).

Douglas County (County) is the agency with land use authority for the District's service area. A Planned Community District Development Guide for Highlands Ranch (Development Guide) was approved by the Board of County Commissioners of Douglas County in 1979. While the County has no specific water efficiency regulations, the Metro District, on behalf of the District, reviews all projects within Highlands Ranch for impacts on the public water and sewer systems. District approvals are required by the County before they will issue building permits. The Highlands Ranch Community Association (HRCA) is also the approving body for all changes to resident landscape, as defined in their Residential Improvement Guidelines.

The District's water-supply portfolio is comprised of renewable surface water from the South Platte River, including tributary alluvial groundwater, and non-tributary Denver Basin groundwater. The water supply for Highlands Ranch is predominantly renewable surface water from the South Platte River Basin. As needed, the surface water supply is supplemented with nonrenewable, reusable deep groundwater from three Denver Basin aquifers beneath Highlands Ranch. Over the past 30 plus years, surface water has comprised an average of 85 percent of the District's water supply.

Surface water sources are provided from several water court decrees and water leases that the District acquired over the past 43 years. Surface water is stored in one of four reservoirs. Chatfield Reservoir is located in Chatfield State Park, immediately west of the District service area. McLellan Reservoir and South Platte Reservoir are both located near the South Platte River downstream of the Chatfield Reservoir and northwest of the District service area. James Tingle Reservoir is situated near Michigan Creek in Park County.

- Chatfield Reservoir is owned by the U.S. Army Corps of Engineers. As a result of the Chatfield Storage Reallocation Project, authorized in 2020, the District owns 6,922 acre-feet (AF) of surface water storage capacity in this reservoir shared among ten water providers in the Denver metropolitan area and northeast Colorado.
- McLellan Reservoir is a 6,400 AF reservoir owned by the City of Englewood. The District leases 3,885 AF of space in the reservoir for surface water storage on a long-term basis.
- South Platte Reservoir is owned by the District. The reservoir provides an additional 6,400 AF of surface water storage capacity.
- James Tingle Reservoir is jointly owned by the District and Center of Colorado Water Conservancy District. The District owns 205 AF of surface water storage capacity in this 400 AF reservoir.

Surface water is treated in the Joseph B. Blake Water Treatment Plant, which has a designed peak day operating capacity of about 40 million gallons per day (mgd). However, due to seasonal water quality constraints, the peak-day treatment capacity is reduced to about 26 mgd.

The District's non-tributary Denver Basin groundwater is supplied by 38 deep municipal wells completed in the Denver, Arapahoe, and Laramie-Fox Hills aquifers. Currently, 29 of these wells are

connected to two groundwater treatment plants that have a combined capacity of 8 mgd. Treated water is either delivered directly into the distribution system, or stored in one of eight treated water storage tanks situated throughout Highlands Ranch. The water delivery system includes 14 pump stations and 454 miles of water transmission and distribution mains.

Municipal wastewater in the Highlands Ranch community is conveyed to the Marcy Gulch Wastewater Treatment Plant where it is then treated and discharged into Marcy Gulch in accordance with stringent water-quality standards and National Pollutant Discharge Elimination System (NPDES) permit conditions. Marcy Gulch is a tributary of the South Platte River just downstream of Chatfield Reservoir. The wastewater treatment plant has a design treatment capacity of 8.48 mgd.

## 1.2 Water Supply Reliability

The District operates a conjunctive use water supply system that enables the use of surface water and/or groundwater sources to reliably provide water to our customers. Surface water sources are decreed water rights, and both long-term and short-term leases of water owned by others. The short-term leases of water are contracts that may be cancelled with 90 days or less notice to the District. The District’s Denver Basin decrees allow for groundwater to be pumped from three of the bedrock aquifers beneath Highlands Ranch up to a specified maximum annual appropriation amount for each well. The combination of available surface and groundwater supplies exceed the expected build-out demand for the District service area. In general, renewable surface water is used to the extent available, but is supplemented with the nonrenewable non-tributary groundwater and, if necessary, reusable treated water stored in the aquifers, by means of the District’s aquifer storage and recovery (ASR) system, resulting in an overall reliable water supply for the District’s customers.

The District has made projections of both average-year and dry-year yields of its water supply portfolio. Dry-year yields are based on the drought periods of 2002, 2003, and 2004. Average-year yields are based on historical records beginning in 1990. With average annual raw water demands projected to be 20,000 AF at buildout, Table 1 shows how future water demands will be met with average and dry-year yields. The average annual raw water demand figure includes a projected calculation for evaporation which totals 1,500 AF, or a projection of 18,500 in annual raw water demand through the District’s system, which is the reference figure used for statistical analysis in this report. From 2012 to 2022, the District averaged an annual raw water demand of 16,000 AF.

**Table 1 - Average and Dry-Year Yields**

Yield	Decreed Surface Water Rights and Long-Term Leases (AF)	Surface Water Short-Term Leases (AF)	Decreed Groundwater Rights (AF)	Total (AF)
Average-Year	17,000	1,045	9,000 <sup>1</sup>	27,045
Dry-Year	9,200	0	9,000 <sup>1</sup>	18,200

<sup>1</sup>Total groundwater adjudication is 17,864 AF. Current well field production is limited to 9,000 AF.

The District’s ASR system was initiated in 1993. To date, the total volume of water stored in the Denver Basin aquifers beneath Highlands Ranch is approximately 15,357 AF. Unlike a surface storage reservoir, ASR water is not susceptible to evaporation loss. Recovery of stored ASR water was done in 2002 in the amount of 500 AF and 2013 in the amount of 40 AF. Recovery of this stored water is not booked against the District’s decreed groundwater rights.

### 1.3 Supply-Side Limitations and Future Needs

While the District has a reliable water supply to provide safe drinking water to its customers during dry periods, operationally, the District does not want to rely more heavily on nonrenewable non-tributary Denver Basin groundwater than it needs to as a supply source. Surface water is preferred to groundwater because it is a renewable resource, meaning that it is replenished annually through precipitation. In contrast, pumping non-tributary groundwater from the Denver Basin aquifers gradually decreases the amount of water available from this resource (unless it is replenished by ASR).

The following table, which is based on Worksheet A of the CWCB Guidance Document, summarizes the water supply limitations and future needs of the District. More information on these issues can be found in later sections of this plan.

**Table 2 - Water Supply Limitations and Future Needs**

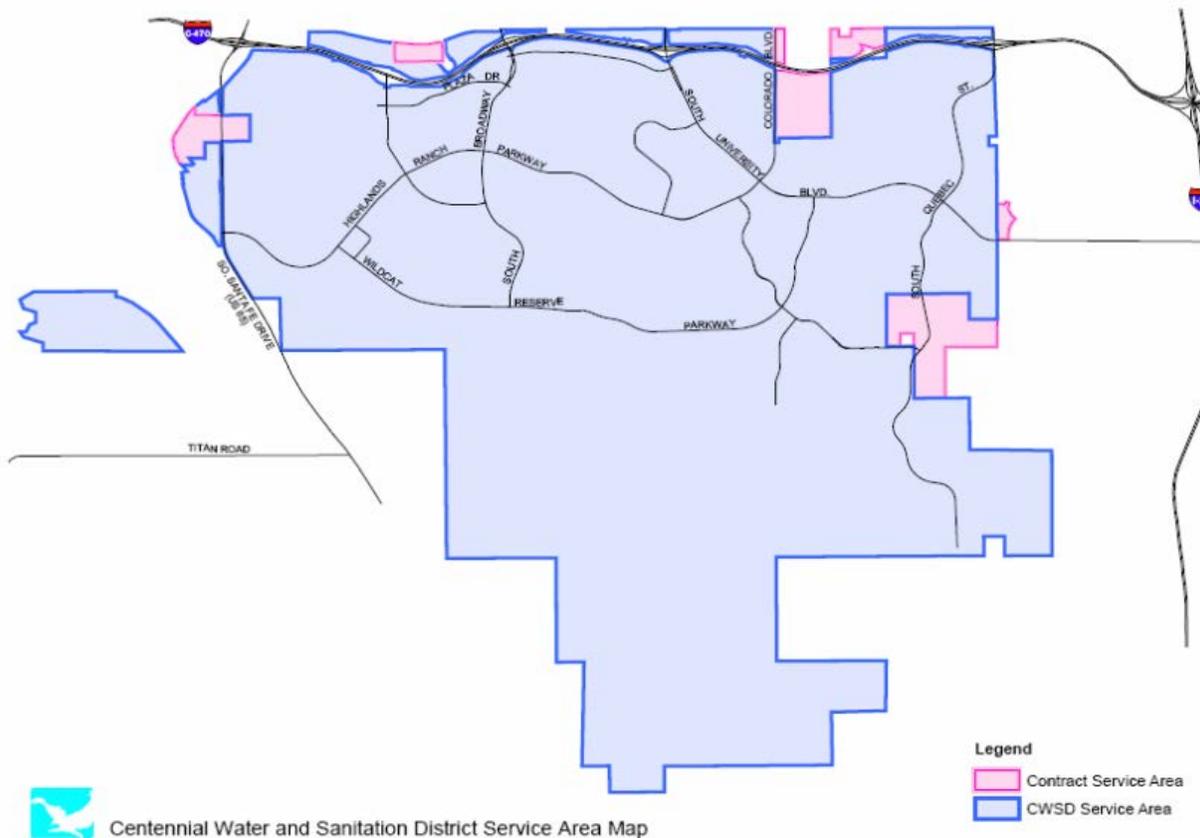
<b>Limitation and/or Future Need</b>	<b>Yes</b>	<b>No</b>	<b>Comments on Limitation or Future Need</b>	<b>How is Limitation or Future Need Being Addressed</b>
System is in a designated critical water supply shortage area	X		South Platte Basin, which encompasses the Denver Metro Area, is identified in SWSI and State Water Plan as area with supply and storage gap	Increase supply through water acquisitions, leases, reuse, WISE, Chatfield Reallocation Project, demand reductions, ASR, and regional cooperation
System experiences frequent water supply shortages and/or emergencies		X		
System has substantial non-revenue water		X		
Experiencing high rates of population and demand growth		X	Community buildout anticipated by 2025	
Planning substantial improvements or additions	X		Ongoing efforts to increase water supply, storage, treatment capacity, and water distribution capacity	WTP capacity upgrade; water efficiency; regional ASR study; alluvial well field expansion study
Increases to wastewater system capacity anticipated		X		
Need additional drought reserves		X		
Drinking water quality issues		X		
Aging infrastructure in need of repair	X		Selected wells, pumping equipment, treatment systems, and conveyance systems	Old wells, pumps, valves, lines, meters, and treatment systems are being upgraded and replaced as necessary
Issues with water pressure in portions of distribution system		X		

## Section 2 Profile of Water Demands and Historical Demand Management

### 2.1 Demographics and Key Characteristics of the Service Area

The District provides water and wastewater services to the unincorporated communities of Highlands Ranch and Solstice through an intergovernmental wholesale agreement with the Highlands Ranch Metropolitan District. Highlands Ranch is located in northwest Douglas County approximately 12 miles south of Denver. It extends from about one mile west of Interstate 25 (I-25) to just east of the Chatfield Reservoir. The District's service area includes the entire Highlands Ranch community, the Solstice community, and a number of small adjacent communities that are served by NDC (a wholesale customer of the District). The District's entire service area is approximately 21.9 square miles and is shown in Figure 1. The District also has intergovernmental agreements to transfer potable water outside of the District's service area to Castle Pines North Metro District and to Roxborough Water and Sanitation District using water owned by those water providers.

**Figure 1 - Centennial Water & Sanitation District Service Area**



The Highlands Ranch Development Guide laid the foundation for a community designed to provide a variety of land use types. Within the 22,000-acre development of Highlands Ranch and Solstice, 61 percent of the land is designated for non-urban uses including open space and recreation. Thirty one percent of the land is residential, while the remaining eight percent is commercial property.

Highlands Ranch and Solstice are served by two quasi-municipal agencies, Centennial Water and Sanitation District and Highlands Ranch Metropolitan District. The Metro District provides recreation services and is responsible for the management of approximately 26 parks, more than 2,600 acres of open space and landscapes along the community's roadways. Fire services are provided by South

Metro Fire Rescue. Other services are provided by Douglas County as Highlands Ranch and Solstice are part of unincorporated Douglas County.

Construction in Highlands Ranch began in 1981 with the largest period of growth occurring with in excess of 1,300 single family equivalents annually from 1993 through 2000. The 2022 District service area and contract service area population is approximately 100,000. Complete buildout of the community is expected by 2025, with an anticipated population of 111,300.

To facilitate monitoring and analyzing water use data and trends, customers are assigned to one of the following customer categories defined below:

- *Residential* customers are detached single family homes and make up the largest customer category. Residential water use is comprised of both indoor and outdoor uses.
- *Multi-Family* customers are attached and detached residential housing units containing 2 or more units. Water use is indoor use only.
- *Indoor Commercial* customers are made up of non-residential users such as schools, restaurants, office buildings and car washes. Water use is indoor use only with few exceptions. In 2003, the District eliminated the option of a combined meter for commercial customers. Prior to 2003, commercial customers were encouraged to have a separate meter for indoor and outdoor uses. Currently, only 6 percent of commercial customers have combination meters.
- *Outdoor Commercial* customers consist of irrigation meters for the non-residential customers described above, as well as, the common area landscapes of home owners' associations and multi-family complexes.
- *Government Irrigation* is irrigation service for the District and the Highlands Ranch Metro District's park and parkway landscape areas.
- *Raw/Reuse* water users are comprised of customers who receive raw water or reuse water for irrigation. Raw water can be delivered from either surface or groundwater sources.

As part of the wholesale agreement with NDC, NDC is required to follow the District's rate structure, rules and regulations. However, billing, compliance and water efficiency efforts are NDC's responsibility.

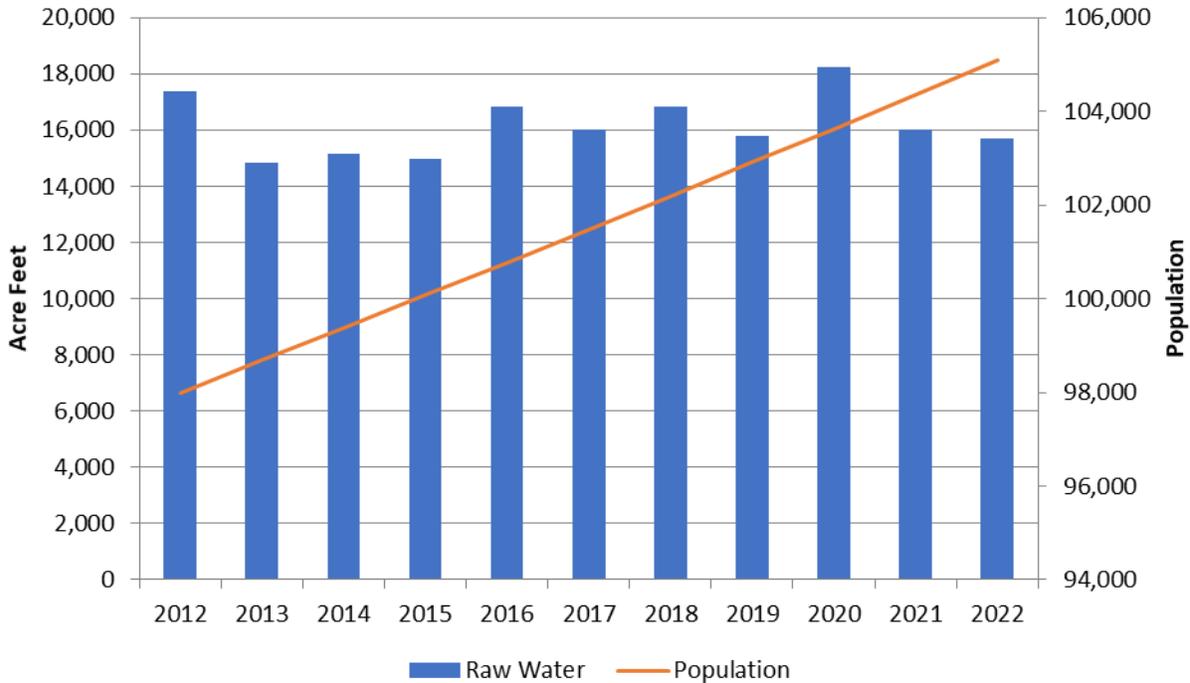
## **2.2 Historical Water Demands**

In response to the 2002 drought, the District implemented a water budget rate structure in 2003 that helped slow demand increases to a rate less than that of the population growth. Average annual billed water demand for the District remained relatively stable from 2012 to 2022, while the population has increased by 8 percent over the same period of time. Figure 2 shows annual billed demand and population since 2012.

Since 2003, the annual water demand has fluctuated from year to year largely due to varying weather conditions. There were two comparatively wet years in 2004 and 2009, during which rainfall was 128 percent of the 10-year average. In those years, the demand for landscape irrigation water was considerably less than during the preceding and following years. Conversely, in 2008 and 2012

the total rainfall was 82 percent and 62 percent of the 10-year average, respectively. Demand increased in response to the comparatively dry conditions those years.

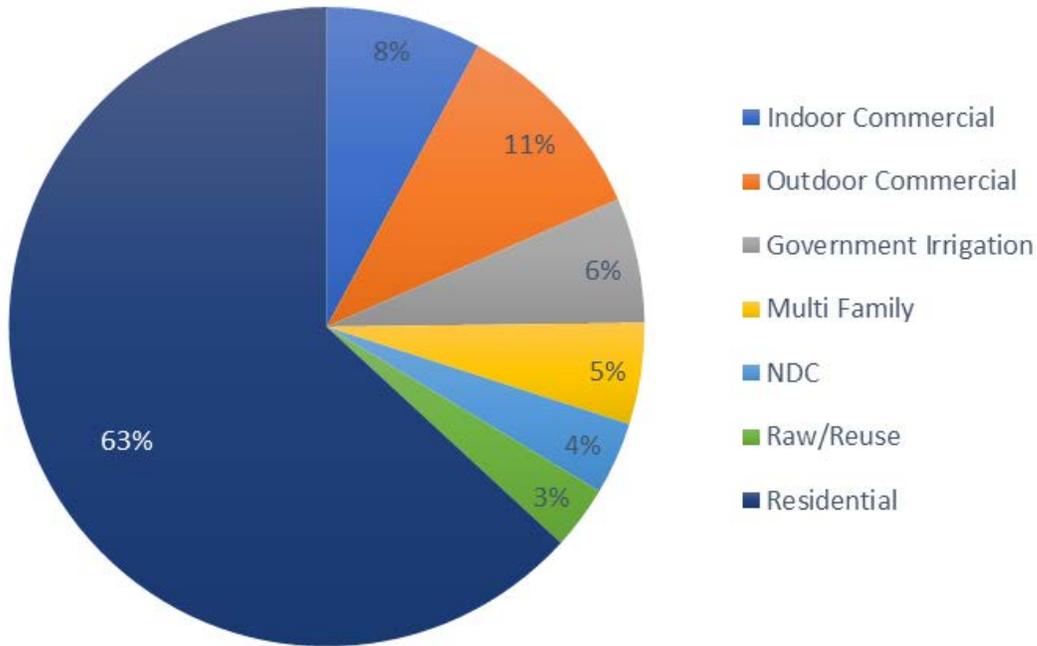
**Figure 2 - Annual Raw Water Demand and Population**



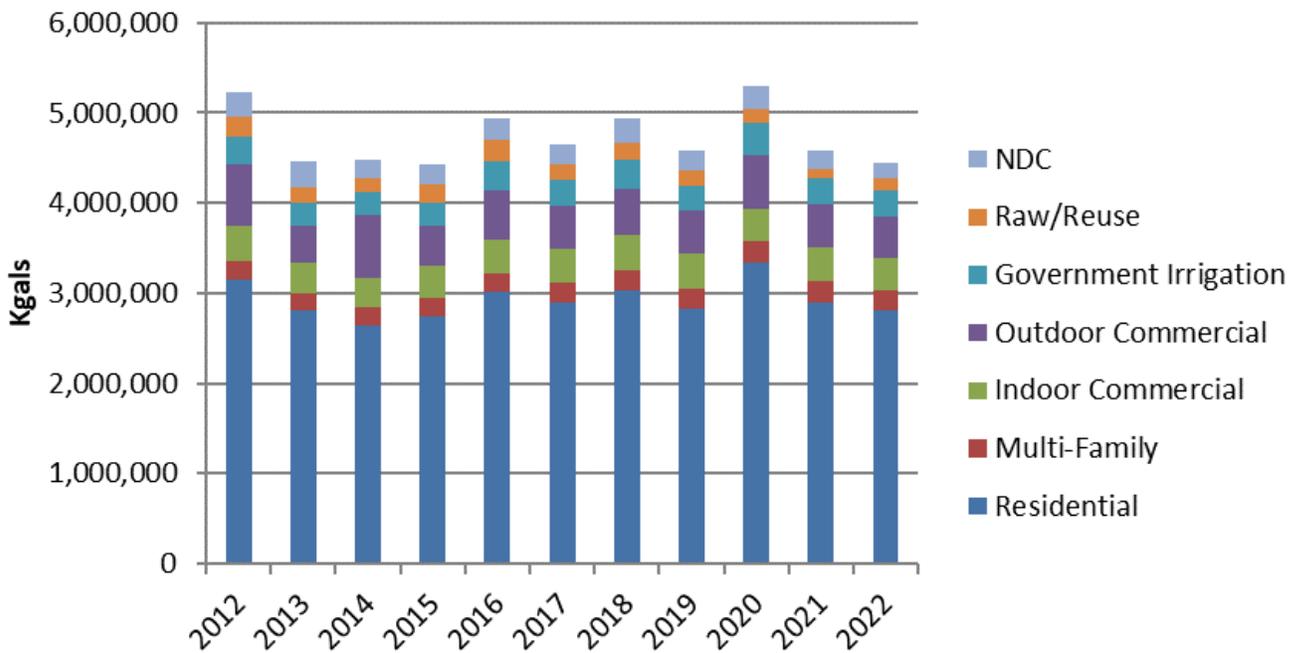
Over the past 5 years Colorado has experienced increasingly dry summers, with 2020 being the second driest summer in the state’s history on record. During May and June of 2022, the District’s daily demand for water approached levels normally associated with the hotter months of July and August. Reservoir levels were 30 percent below average for June, water rights on the South Platte River for the District and Englewood were called out, and hotter weather was projected to continue. The District’s Board of Directors approved Stage 1 Drought Restrictions to go into effect July 20<sup>th</sup>, 2022. Customers were asked to limit outdoor watering to two days per week. The Highlands Ranch Metro District reduced water use in parks and parkways by 30 percent, and the Highlands Ranch Community Association waived fees for residents to convert high-water use turf to drought tolerant landscapes. Overall, the District service area reduced water use by 15 percent during the summer of 2022. The District’s Drought Response Committee meets regularly to assess indicators and actions to best serve its customers.

Residential water users are the largest customer group that the District serves. Figure 3 shows water use by customer category as a percent of total use. Residential water use, which is comprised of single-family homes, accounts for over half of the water demand in Highlands Ranch. Outdoor Commercial is the next largest user group, which consists of dedicated irrigation accounts. Figure 4 shows annual water use by user category in thousands of gallons.

**Figure 3 - 2022 Percent of Water Use by Customer Category**



**Figure 4 - Annual Water Use by Customer Category**



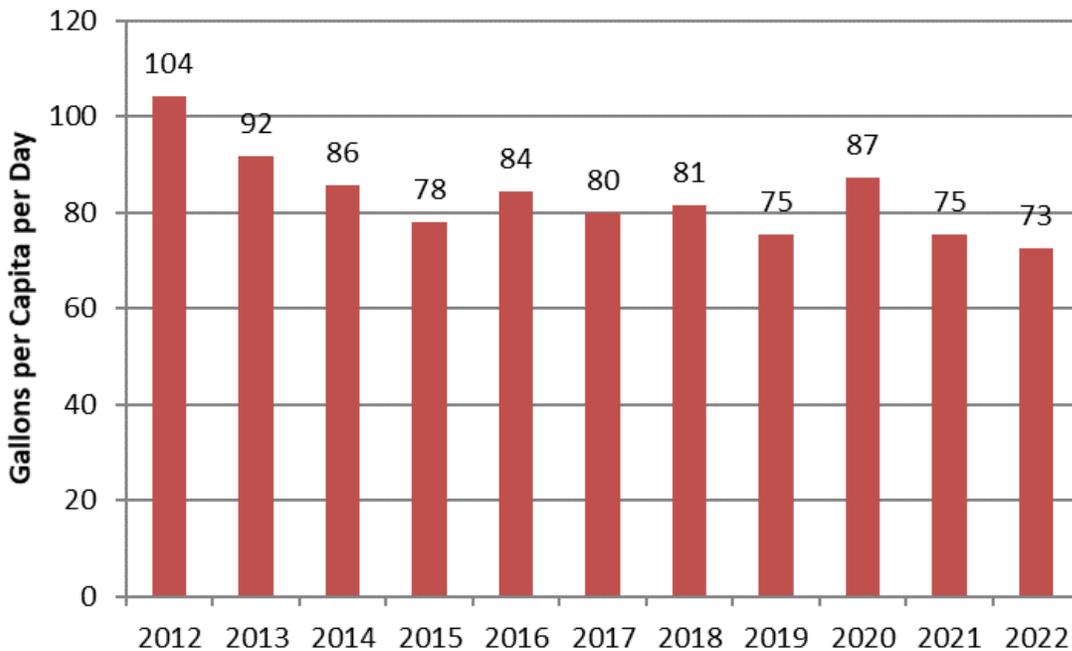
*Per Capita-Day Water Use*

Per capita-day water use, expressed as gallons per capita-day (gpcd), also called gallons per capita per day, is a common way to normalize municipal water use data and can be a useful way to measure the success of water efficiency measures. Due to the complexity of the District’s water use, per capita per day water use is calculated for only the residential class of users:

$$\text{Residential per capita per day water use} = \frac{\text{Billed Residential Consumption}}{\text{Population} \times \text{Number of Days}}$$

Residential per capita-day water use can provide a more “apples-to-apples” type of comparison, but it too can vary based on how a community calculates population. The District estimates population based on the number of residential and multi-family taps in Highlands Ranch and Northern Douglas County multiplied by household population and occupancy rates. Household population and occupancy rates are taken from the most recent Community Survey and U.S. Census data. Figure 5 shows annual residential per capita-day water use from 2012 through 2022.

**Figure 5 - Residential Gallons per Capita-Day**



## 2.3 Past and Current Demand Management Activities

Water efficiency has been an important part of the District’s management plan since its inception in 1980. A water management plan was completed in 1995 in compliance with the Water Conservation Act of 1991, which helped identify demand management potential in the District and focus the District’s water efficiency efforts. The updated requirements of the Water Conservation Act of 2004 prompted the creation of the District’s 2009 efficiency plan, and the currently approved 2016 efficiency plan. This efficiency plan is the District’s third submission to the state since the 2004 Act.

Water efficiency activities that are currently in use by the District are described in the following sections, categorized by the SWSI levels framework: foundational activities, targeted technical assistance and incentives, rules and regulation, and educational activities. Please note that the term “rules” is used in place of “ordinances”, as the District does not have the authority to implement an ordinance.

### 2.3.1 Foundational Activities

#### *Water Efficiency Oriented Rates*

One of the District’s most effective methods of demand management has been the water budget rate structure implemented in 2003. After the drought of 2002, the District implemented a water budget rate structure. The rate structure has two key components: A fixed water service availability fee and a variable water consumption rate. The fixed water service availability fee helps to assure revenue stability to meet on-going debt service and customer service staff obligations. The variable consumption component consists of a four-tier rate structure where the break point between tiers is based on a percentage of water budget assigned to each customer. Table 3 shows the 2023 water rates and tiers.

**Table 3 - 2023 Water Rates**

Percent of Budget	Residential		Nonresidential	
	Summer	Winter	Indoor	Irrigation
0 – 100%	\$4.52	\$4.52	\$4.18	\$4.62
101 – 120%	\$6.08	\$6.08	\$5.66	\$6.20
121 – 140%	\$9.23	\$6.08	\$5.66	\$10.90
> 140%	\$13.97	\$10.06	\$9.85	\$18.50

Residential water budgets are formulated from an indoor and an outdoor component. The indoor component is 12,000 gallons every two months based on an assumed 65 gpcd for a family of three. Customers can sign an affidavit to receive an additional indoor allowance for larger families. The outdoor component is based on the customer’s actual lot size multiplied by an irrigable area factor of 45 percent. An allowance of 27 inches of water based on historical evapotranspiration (ET) rates for the area, minus average annual measurable rainfall, is provided. These budgeted outdoor amounts are then based on historical ET for the weeks within each billing cycle. Billing data collected over the last several years indicates that on average, single family homes are only using about 78 percent of their overall water budget.

Commercial indoor water budgets are calculated based on the size of the meter servicing the business. Each customer is allotted 189,000 gallons per ¾” equivalent. Outdoor budgets are based on actual irrigated areas for the customer. The customer is responsible for supplying the landscape area data to the District. Upon notification of changes to landscape area, the District’s Public Works Department will review the documentation verifying the changes and notify the District’s Billing Department to update the landscaped area if approved.

The flexibility of the water budget rate system allows the District to adapt to different issues as they arise. Some of the more notable changes that have been made over the years are:

- Adding a permit program to allow extra budget once per year for customers wanting to add new sod in April, May, September or October discourages planting during the heat of the summer.
- A variance for households with a population greater than three persons supports demographic fairness throughout the service area.
- Water budgets were increased by 1,000 gallons per month during the winter to accommodate winter watering of trees and shrubs, enabling customers to care for their landscape during the winter months.
- In 2007 the commercial irrigation water rates were increased in order to help encourage more efficient water use in that customer sector.
- In December 2007 commercial indoor water budgets were changed from allotments based on historical usage to an allotment based on meter size as stated above. Budgets based upon historical usage were not effective in promoting water efficiency.
- In 2009 a new customer category was created for Sports Fields. Since some sports don't coincide with the traditional water budget season, a Sports Field customer can apply for an annual water budget which allows them to apply water at any time during the year to help manage the stress of athletics on the turfgrass. The allocation of 27 inches per year remains the same.

The water budget rate structure has been well received by customers of the District, and has been successful at promoting water efficiency.

#### *Metering and Data Collection*

Since construction began in 1981, the District has metered every water user category. Water meters provide indirect water savings as they allow the District to measure water use and collect data to monitor the effectiveness of water efficiency efforts. Meters also help to identify possible leaks and losses through the distribution system. Separate commercial irrigation meters have been encouraged since 1981, and in 2003 commercial combination indoor and irrigation meters were no longer allowed. In 2021 all commercial irrigation customers were switched to an Advanced Metering Infrastructure (AMI). There is currently a program in process to transition residential meters to AMI technology, with 10 percent of residential customers successfully transitioned at this time.

#### *System Water Loss Management and Control*

Rigorous system-wide water audits are conducted by the District annually to determine the efficiency of the water distribution system. The volume of water produced and authorized consumption (total water billed and accounted for/not billed) is tracked on a monthly basis to determine a rolling 12-month average system loss. Water that is accounted for but not billed includes water-distribution system development, maintenance, and system failures. System water loss includes unauthorized water use, inherent water meter inaccuracies, distribution system leakage, and new home construction water use. The AWWA guidelines consider up to 10 percent system loss to be acceptable. The average system water loss for the District over the past five years from 2022 was 7 percent of the total water production. At this time, the District has no plans to use the AWWA M36 software for its future water-audit reporting, but will consider incorporating elements of M36 into the District's water audit system, as deemed useful and appropriate for the District's needs.

When a leak is suspected within the distribution system it is located and repaired immediately. Estimates of the number of gallons lost by each repaired leak are recorded in a log book once the repairs are made. Customers are responsible for leaks that occur after the service connection. When

a meter is read, and the use is high, a work order is generated to tag the home for leak detection and high use. The District's customer service team explains how to read meters to customers, and upon request technicians will perform a leak check if a customer has concerns about their billed consumption.

The District's distribution system contains six different pressure zones that are monitored at the water treatment plant for safety and optimal service. In addition, service pressure regulation is mandated by the District on domestic water service lines and irrigation service lines. The pressure is restricted to 65 PSI on residential lines and 80 PSI on irrigation service lines. This pressure regulation has been shown to save an average of 6 percent when compared to unregulated service pressure.

### **2.3.2 Targeted Technical Assistance and Incentives**

#### *Level 1: Utility Facility Water Efficiency*

The District has three major facilities where they are responsible for the water use. They include the John D. Hendrick Office Building, Joseph B. Blake Water Treatment Plant and Marcy Gulch Wastewater Treatment Plant.

The John D. Hendrick Office Building houses staff from both the District and Highlands Ranch Metropolitan District. In 2010 all bathrooms were remodeled and fixtures were replaced with high efficiency models. In 2005 several changes were made to a portion of the landscape to include low water use plant varieties and improved efficient irrigation equipment. In 2014 a detailed landscape irrigation audit was performed by a third party to identify inefficiencies and make recommended improvements. As a result, a renovation of the landscape took place in 2016, including the addition of a xeriscape demonstration garden. Updates to the garden are planned for the summer of 2023. One goal of this demonstration space beyond water conservation is to show the diversity of low-water plant selections available to the public.

The Joseph B. Blake Water Treatment Plant has separate meters for indoor and outdoor water use. The plant received an irrigation audit in 2012 which provided detailed information about potential improvements to increase water efficiency. As a result, changes to the scheduling of the irrigation system and changes in irrigation equipment have been made in order to improve efficiency. The average outdoor water use has decreased by over 50 percent since the audit was performed. The District is considering the possibility of installing a ColoradoScape demonstration garden at the entrance of the treatment facility's offices, as construction is expected to take place on the grounds during the fall of 2023.

The Marcy Gulch Wastewater Treatment Plant utilizes reuse water for landscape irrigation. An audit was performed in 2012 in an effort to identify where efficiency can be improved. As part of construction projects taking place at the wastewater treatment plant, staff has been examining how the landscape and irrigation system can be overhauled as part of the facility improvements. A preliminary design has been developed, which would drastically reduce the amount of high-water use turf that existed at the plant prior to construction. Much of what was once turf will be replaced with varying sizes of stone mulch and native grass seed.

The District also manages landscape water use at several well sites that are located throughout the community. In 2015 management of the maintenance contracts for all District facilities was turned over to the Water Efficiency Coordinator to oversee water use and verify that efficiency maintenance

practices are implemented. At one of the well sites a test plot for Tahoma 31 bermuda grass was installed during the spring of 2022. This is expected to reduce the District's water use at this site, as well as serve as an example for District customers who want to participate in the turf replacement rebate program. Other well sites are currently being surveyed for potential conversions.

### *Level 2: Management of Largest Customer Demands*

The five largest volume water users in Highlands Ranch for 2021 were:

1. Highlands Ranch Metro District – irrigation for the parks and parkway landscapes.
2. Douglas County School District – indoor and outdoor water use for all schools.
3. Windcrest Senior Living – indoor and outdoor use for a retirement community. Raw and reuse water is used for irrigation.
4. Highlands Ranch Golf Club – an 18-hole golf course that receives raw and reuse water for irrigation.
5. Children's Hospital Colorado, South Campus – indoor and outdoor hospital use.

Highlands Ranch Metro District is the largest water customer and accounts for approximately 6 percent of the water use in Highlands Ranch. The Metro District irrigates almost 450 acres of landscape in parks and along roadways (often referred to as "parkways"). The District has and will continue to partner with Metro District in an effort to help improve water efficiency. In 2015 the Highlands Ranch Metro District created a Parkways Action Plan to review the current conditions and maintenance practices of the 285-acre parkway system. In August of 2018 an extension of that plan was adopted, known as the Conversion Action Plan. The main objective of this program is to reduce overall water and maintenance needs by providing a more sustainable landscape and irrigation system. Over the past four years the Parks, Recreation and Open Space (PROS) staff have successfully converted 3 acres of high-water use turf to low or no-water use landscapes. The areas that have been converted will reduce water needs from 27 inches per year to 10-15 inches per year. The project is challenging at times due to irregular shaped landscapes, accessibility, irrigation re-design, and public opinion. PROS staff will continue with the Conversion Action Plan each year, selecting 4 to 5 locations for conversion. While this program is still young, more savings can be expected as converted areas establish. Estimates indicate a savings of roughly 73 gallons of water per square foot can be achieved over the life of low-water use plant materials compared to high-water use turfgrass.

The Wind Crest Retirement Community remains one of the District's highest water users. Over the past few years, Water Conservation staff have regularly engaged with the Wind Crest community, providing educational presentations, a third-party irrigation audit, and Colorado-appropriate landscape designs in partnership with the Denver Botanic Gardens. They reduced their outdoor water use by almost 60 AF from 2020 to 2021.

The District has no current plans to address water consumption at Children's Hospital Colorado, South Campus as this customer has static indoor use, in addition to providing critical services to the community, and therefore their water usage has been determined as relative low priority for the present.

### *Level 3: Management of Remaining Customer Demands*

#### *Targeted Non-Residential Irrigation Audits*

Targeted irrigation audits for commercial irrigation customers have been implemented since 2007. Commercial irrigators who either continuously exceed the water budget or exceed it by a large percentage are identified through billing data and are contacted to receive an audit. Using billing system data, the District estimates these customers have saved 68-acre feet of water over the past five years. The success and continued implementation of these audits is currently being assessed.

#### *Resource Central Partnership*

In 2007, the District established a partnership with Resource Central to provide irrigation audits to residential customers. The audits, now referred to as Slow the Flow (STF), identify areas where residents can improve how they manage their landscape water use. This includes scheduling and irrigation system improvements. The District has provided more than 1,700 audits to residential customers since the partnership began, saving an estimated 8.5 million gallons of water.

The District and Resource Central came together again in 2015 to implement the Garden In A Box (GIAB) program. The GIAB program provides customers with a professionally designed low water use landscape plan and the accompanying plant materials. The program overcomes a perceived barrier to low-water use landscapes by providing a "Plant by Number" approach that is easy to follow. The program also provides District customers with a discount on the garden of their choice. The program was popular in the first year and the District monitors water use for those customers who have participated. As of 2022, this program continues to be a success with over 750 water efficient gardens purchased since its implementation.

#### *Irrigation Equipment Rebates*

In 2010 the District implemented a rain sensor rebate program for both residential and commercial customers. Participants may provide a receipt for proof of purchase and receive a \$25 rebate per rain sensor. The District also offers a rebate for high-efficiency irrigation nozzles, increased to \$3 per nozzle as of 2023.

#### *Turf Replacement Rebate*

In 2018 the District began offering a rebate program for residential and non-residential customers willing to convert healthy, irrigated high-water use turf grass to a low-water use option. Residential participants are given \$1 per square foot of turf replaced, with a maximum rebate of \$1,000. During the summer of 2022 the program saw a large increase in interest from the public. Over \$24,000 in rebates were given out to single family homes, and more than 25,000 square feet of turf was converted to low or no-water use alternatives.

Since 2020, seven HOAs have participated in the non-residential turf replacement program, with an average of 2 participants per year. Approximately 42,878 square feet of turf has been converted over the last 3 years. It is the District's hope that through continued outreach and funding support that these numbers will grow. Updates to the turf replacement program for 2023 can be found in section 4.2.1.

### **2.3.3 Rules and Regulations**

As Douglas County and Highlands Ranch Community Association are the agencies with land use authority for Highlands Ranch, landscape regulations such as sod limitations and plant materials cannot be regulated directly. The District does however, have several requirements governing the direct use of water in its service area. Rules and regulations are enforced by seasonal Water

Monitors who patrol the District during the summer months. Table 4 shows the penalties that the District imposes if customers violate the rules and regulations.

*Water Waste Restriction*

Water waste is prohibited at all times. Water waste includes allowing excess water flow across sidewalks and down curb gutters. Neglecting to repair leaks is another example of water waste.

*Time of Day Restriction*

Beginning in 2004, no outdoor watering can occur between the hours of 10 a.m. and 6 p.m. to minimize the loss of water due to wind and evaporation. Hand watering and car washing is allowed, but hoses must be equipped with a shut-off device to prevent a constant flow of water.

*Non-Residential Rain Sensor Requirement*

Since 2009, all commercial irrigation systems are required to have a functioning rain sensor installed.

*Landscaper Certifications and Landscape Design Requirements*

The previous update of this plan had aspired to impose requirements for commercial landscapers with regard to the installation of new irrigation equipment as well as industry certifications. Unfortunately, without land use authority these water efficiency regulations could not come to fruition. Collaboration with Douglas County and Highlands Ranch Community Association is being examined for potential future implementation.

**Table 4 - Charges for Violation of Rules and Regulations**

Meter Type/Size	First	Second	Third	Fourth	Fifth	Subsequent
Residential	Warning	\$50	\$100	\$250	\$500	Shut off
Commercial						
1" or less	Warning	\$100	\$200	\$500	\$1,000	Shut off
1-1/2" or greater	Warning	\$600	\$1,200	\$3,000	\$6,000	Shut off

**2.3.4 Education Activities**

The District considers public education to be a vital component of the water efficiency plan. Even though it is virtually impossible to measure actual water savings achieved through public education, the District has a continuous public education program to help inform its customers of ways to conserve water both indoors and outdoors.

*Information Dissemination*

The District strives to reach its customers throughout the year with information about water efficiency practices and programs. Customers are reached in a variety of ways that include:

- Bill Stuffers/Messages
- Direct Mail
- Website
- Social Media (Facebook, Twitter, LinkedIn, Nextdoor)
- Monthly eNewsletters
- Quarterly Messenger magazine articles

### *K-12 Education Programs*

The Water Ambassador Program is a partnership with South Metro Water Supply Authority designed to educate both high school and elementary school students about water issues, including water efficiency, in northern Douglas County and southern Arapahoe County. Presentations are free and can be customized to fit classroom learning goals.

### *Technical Assistance*

Technical assistance in the way of community workshops, presentations and direct consultation are available to all customers free of charge. The District has a full-time Water Efficiency Coordinator who assists customers by request and actively seeks groups for presentations and workshops.

### *Community Events*

The District's Community Relations department is present at a variety of events in Highlands Ranch throughout the year, along with being the permanent water sponsor for the Highlands Ranch Community Association race series. These events serve as a platform to develop presence in the community, educate customers on where their water comes from, and promote water conservation behaviors, as well as available incentives.

### *ColoradoScape Demonstration Gardens*

ColoradoScape is defined as "a natural landscape, comprised of low to very-low water use plant material, which blends in with the native Colorado landscape. Plant material must be maintained in its natural, native form. This landscaping utilizes a combination of hardscape and landscape materials, providing a variety of colors, textures, sizes, shapes, and seasonal interest." Fellow water conservation professionals in Douglas County and the Denver Metro area have begun using this term with residents and commercial landscapers as opposed to the traditional "xeriscape". The term xeriscape has become misunderstood over the years by the general public, often bringing to mind the visual of excessive rock and a few cacti. It is our hope that ColoradoScape can create a more colorful, inclusive picture. The intent of a ColoradoScape demonstration garden is to promote the use of water efficient plant materials. The demonstration garden also provides customers with ideas for the types of plants they can use in their own landscapes. A demonstration garden won't have any direct water savings unless it replaces an area of turf, but it does supplement programs like the turf replacement rebates and Garden in a Box. The District constructed a demonstration garden at the entrance of the John D. Hendrick Office Building in 2016, and intends to build on this program with additional gardens at the Joseph B. Blake Water Treatment Plant and selected well sites.

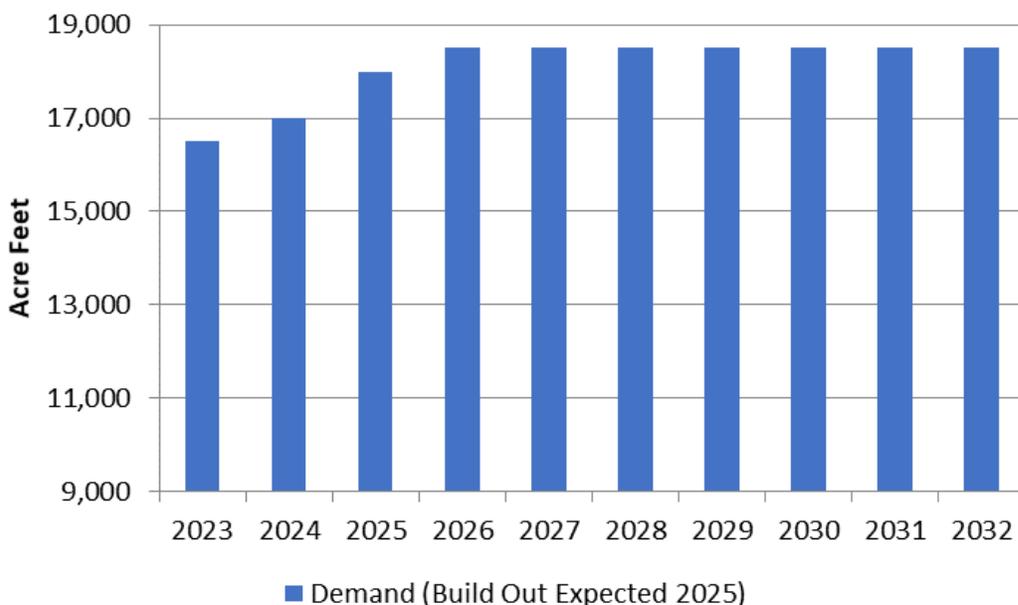
## 2.4 Demand Forecasts

An important part of developing the water efficiency plan is determining how much water the District will need to supply as the service area nears build-out. Since this plan will be renewed every seven years, the District has forecasted water demand over the next 10 years. This initial baseline demand forecast is based on the number and type of development that will occur over the planning period. The remaining development in Highlands Ranch will be a mix of residential and multi-family housing along with some commercial office and retail space.

The baseline demand forecast in Figure 6 shows that estimated annual raw water demand in the year 2025 will be 18,500 AF. Raw water demands include metered customer demand as well as distribution system water loss, but not evaporation loss. Including evaporation loss, estimated total water demand in the year 2025 will be 20,000 AF.

The baseline forecast does not include any impacts that are expected from efficiency activities identified for implementation later in this plan.

**Figure 6 – Baseline Demand Forecast**



## Section 3 Integrated Planning and Water Efficiency Benefits and Goals

The District has included water use efficiency as part of its water supply planning for many years. Water use data collected from the billing system has enabled the District to understand the impacts water efficiency activities have on water demand. The information enables the District to forecast water efficiency savings into the future.

### 3.1 Water Efficiency and Water Supply Planning

The District's water supply is largely surface water from the South Platte River, supplemented with deep groundwater from Denver Basin aquifers. While the conjunctive use of surface water and deep groundwater provides the District with the ability to support the District's needs for the foreseeable

future, the District strives to meet the majority of demand at build-out with renewable surface water.

In 2015, the District conducted an internal water resources workshop to examine total build-out demand and how the District would meet that demand using predominately surface water sources. Multiple strategies were identified to maximize the amount of surface water provided to customers. One strategy is that the District will continue to pursue existing and future opportunities to add to its permanent and long-term surface water supply sources. During the previous planning period, the Chatfield Reallocation Project and the Water Infrastructure and Supply Efficiency (WISE) Partnership both came into being. The Chatfield Reallocation Project has allowed the District to obtain the right to store 6,922 AF of water for subsequent municipal use, and through the WISE Partnership the District receives 1,000 AF per year of new reusable (but sometimes interruptible) yield through the project agreements with Denver Water and Aurora Water. The District continues to utilize aquifer storage and recovery with available water when applicable, and various cooperative initiatives through the South Metro Water Supply Authority.

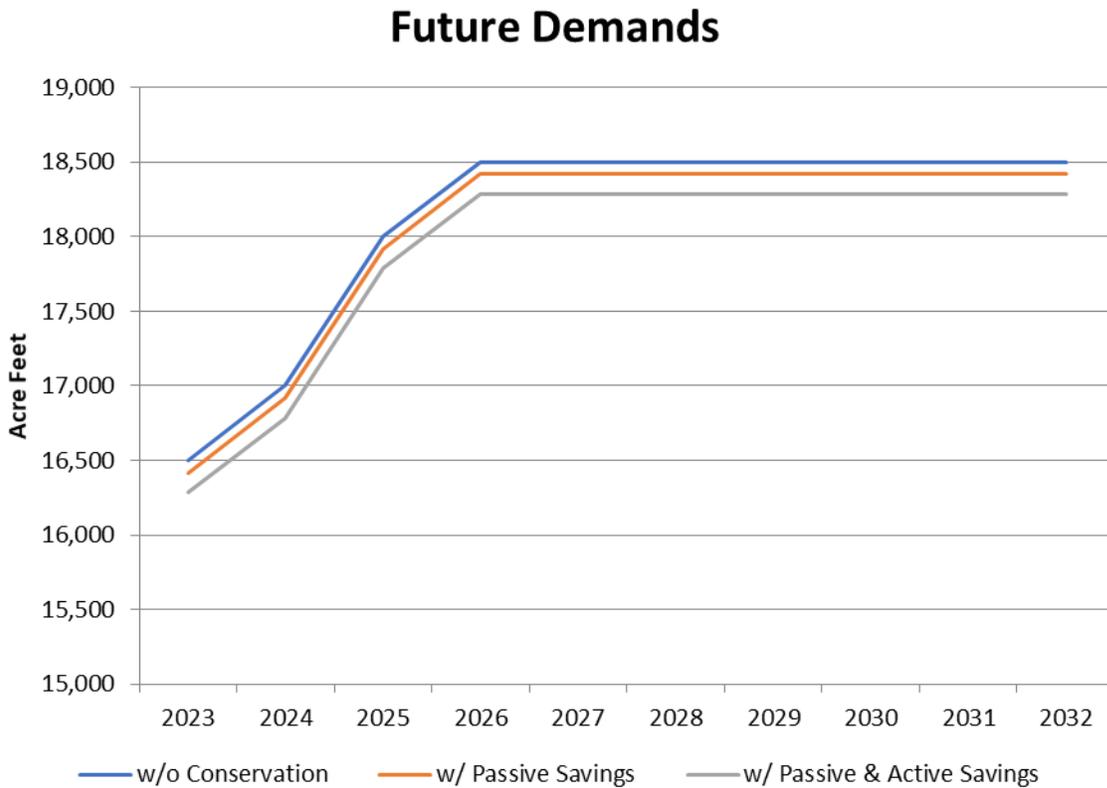
The District also aggressively protects its decreed and leased water rights against other water rights applications that would cause injury to the District's rights.

As water remains a scarce resource in the west, the District is adamant that water efficiency activities will play a key role in reducing the amount of new water supply needed to meet future demands. In order for the District to provide its customers with a long-term, reliable, high-quality product, the District has implemented an approach that combines improving treatment capacity and managing customer demand. An evolving and proactive water efficiency plan helps to reduce total demand, enabling the District to achieve the objectives of a high quality, renewable surface water supply without compromising desired water services.

#### *Modified Demand Forecast*

After the evaluation and selection of water efficiency activities described in Section 4, a modified demand forecast was created. Figure 7 shows demand forecasts with and without future water savings.

**Figure 7 – Modified Baseline Demand Forecast**



### 3.2 Water Efficiency Benefits and Goals

Setting goals is an important step in developing a successful water efficiency plan. Most importantly, it allows the District to measure the overall success of the plan. The effectiveness of the water efficiency plan is enhanced if the goals are measurable.

The District’s 2023 Water Efficiency Plan establishes the following goals:

- Reduce District water demand by 800 AF over the seven year period from 2023 to 2030
- Implement water efficiency activities that target high water uses; customers or customer categories who consistently exceed the water budget
- Implement publicly acceptable water efficiency activities
- Maintain average system loss below 6%
- Implement a cost-effective water efficiency program that achieves targeted water savings

This plan will continue with the same goals as the previous planning period, while the approach to reach success has and will continue to evolve. The District monitors the savings achieved by all implemented water efficiency activities through billing data and adapts as necessary.

## Section 4 Selection of Water Efficiency Activities

### 4.1 Summary of Evaluation and Selection Process

The District's 2016 water efficiency plan selected water efficiency activities based on the four-phase approach recommended by the CWCB Guidance Document. This resulted in the selection of 11 new efficiency activities to be implemented during the previous planning period. Due to funding limitations, staff changeover, and a lack of regulatory authority, only four of the previously screened, evaluated and chosen activities were executed. This plan intends to continue with programs that have been historically successful for the District, a few of the previously selected activities that were unable to come to fruition, and a number of selected new activities that complement existing programs. The District also aims to prioritize community connection and education during this next planning period; the most often heard feedback from customers is that they did not know water efficiency rebates and incentives were available to them. Table 5 shows the new and existing activities selected for implementation over the planning period.

### 4.2 Selected Water Efficiency Activities

The selected activities follow the SWSI levels framework: foundational activities, targeted technical assistance and incentives, rules and regulation, and educational activities. All existing programs are described in sections 2.3.1 – 2.3.4. All new programs are described in sections 4.2.1 – 4.2.3.

**Table 5 – New & Existing Water Efficiency Activities**

<b>Selected Water Efficiency Activities</b>	<b>New or Existing Activity</b>	<b>Targeted Customer Category</b>
<b>Foundational Activities</b>		
Water Budget Rate Structure	Existing	All
Water Efficiency Coordinator	Existing	All
Advanced Metering Infrastructure	Existing	All
<b>Targeted Technical Assistance and Incentives</b>		
Garden In A Box	Existing	SF Outdoor
Residential Irrigation Audits (Slow the Flow)	Existing	SF Outdoor
Targeted Non-Residential Irrigation Audits	Existing	Comm, HOA, Muni Outdoor
Residential High Efficiency Nozzle Rebate	Existing	SF Outdoor
Non-Residential High Efficiency Nozzle Rebate	Existing	Comm, HOA Outdoor
Residential Rain Sensor Rebate	Existing	SF Outdoor
Non-Residential Rain Sensor Rebate	Existing	Comm, HOA Outdoor
Residential Turf Replacement Rebate	Existing	SF Outdoor
Non-Residential Turf Replacement Rebate	Existing	Comm, HOA Outdoor
Municipal Turf Replacement Program	Existing	Muni Outdoor
Residential Smart Controller Rebate	New	All Outdoor
Non-Residential Smart Controller Rebate	New	Comm, HOA, Muni Outdoor
Residential Drip Irrigation Conversion Equipment Rebate	New	SF Outdoor

Residential Rain Barrel Rebate	New	SF Outdoor
Residential Soil Test Rebate	New	SF Outdoor
Non-Residential Soil Test Rebate	New	Comm, HOA, Muni Outdoor
<b>Rules and Regulation</b>		
Water Waste Regulation	Existing	All Outdoor
Non-Residential Rain Sensor Requirement	Existing	Comm, HOA, Muni Outdoor
Daytime Watering Restriction	Existing	All Outdoor
Drought Restrictions	Existing	All Outdoor
<b>Education Activities</b>		
Information Dissemination: Bill Stuffers, Direct Mail, Website, Newsletters, Social Media, Community Events	Existing	All
K-12 Education: Water Ambassador Program	Existing	SF Indoor, Outdoor
Technical Assistance: Consultations, Workshops, Presentations	Existing	All
ColoradoScape Demonstration Gardens	Existing	All Outdoor
Video Demonstrations	New	All Outdoor
No Mow May™	New	All Outdoor

#### 4.2.1 Foundational Activities

Foundational Activities outlined in section 2.3.1 will remain the same for the 2023 Water Efficiency Plan.

#### 4.2.2 Targeted Technical Assistance and Incentives

##### *Turf Replacement Rebates Improved*

Upon its initial inception, the turf replacement program had no mandates for the replacement material beyond low or no-water use. In the spring of 2023 the District introduced a new tiered system of rebate levels with the highest level of rebate given for ColoradoScape at \$2.00 per square foot. Low-water use turf such as Dog Tuff Grass and Tahoma 31 garner \$1 per square foot, while artificial turf and hardscape conversions are still compensated at \$.75 per square foot. The maximum area eligible for residential rebates remains 1,000 square feet. Non-residential turf replacements will follow the same tiered-system, though artificial turf will not be eligible for rebate. It is the District's hope that this system will encourage customers to opt for a landscape that not only conserves water, but also considers Colorado's local pollinators, increased biodiversity within our urban forest, and the reduction of both heat islands and maintenance related emissions.

##### *Residential and Non-Residential Smart-Controller Rebates*

A smart-controller uses weather data to determine the irrigation needs of a landscape and is now considered the standard in modern irrigation systems. Customers may purchase any brand of smart-controller they like and submit a receipt to receive a rebate of up to \$75. This rebate is intended for the replacement of existing irrigation controllers, new construction is not eligible. The District also has a partnership with Rachio and the Alliance for Water Efficiency, where customers can purchase discounted Rachio smart-controllers. This incentive was originally intended to be implemented during the last planning period, but was postponed due to funding limitations.

#### *Residential Drip Irrigation Conversion Equipment Rebate*

Drip irrigation is widely considered the most effective and water efficient irrigation system for perennials, shrubs, and trees in Colorado when used correctly. Water loss due to runoff, wind and evaporation is significantly reduced. Drip irrigation systems are also exempt from the District's normal, Drought Watch, and Stage 1 Drought Restrictions. Many garden centers and home improvement stores sell equipment for converting pop-up sprinklers into drip irrigation. Customers may purchase any brand of drip irrigation equipment and submit a receipt to receive a rebate up to \$25. This rebate will compliment many of the District's existing conservation programs, turf replacement in particular, making the transition from high-water use turf to ColoradoScape more accessible.

#### *Residential Rain Barrel Rebate*

Collected rain water can be used to irrigate outdoor landscapes. The state of Colorado currently permits two rain barrels per single family home, with a combined total capacity not to exceed 110 gallons. Customers may purchase any brand of rain barrel or equipment to build a rain barrel, and submit a receipt to receive a rebate up to \$50, limit one per season. This rebate will compliment many of the District's existing conservation programs, and encourages customers to further connect with their environment and natural resources.

#### *Residential and Non-Residential Soil Test Rebate*

The key to drought tolerance for any plant is a strong root system, which requires healthy soil. In the simplest terms, a soil test can reveal plant available nutrients and pH level in the soil, which provides guidance for fertilizer and soil amendments. Results may vary depending on the test. A soil test may also prevent customers from applying fertilizer to a landscape where it is not necessary, reducing the risk of certain nutrients, such as nitrogen and phosphorus, polluting urban waterways. Customers may purchase a soil test from a private company or consult Colorado State University Extension services and submit a receipt to receive a rebate up to \$25. Non-residential customers are limited to 2 rebates per year. This rebate seeks to inspire customers to be more informed about their landscapes and how to care for them, and embrace the fundamental role that everyday behaviors play in the future of Colorado's water supply.

### **4.2.3 Rules and Regulations**

#### *Weekly Use Restriction*

The District is considering limiting the number of days per week customers are allowed to irrigate their outdoor landscape. It is possible this restriction may come into use during the planning period, but there is not enough clarity at this time to definitively include with other new demand management activities listed in Table 6.

### **4.2.4 Education Activities**

#### *Video Demonstrations*

The District would like to offer video PSAs and demonstrations for its customers. Videos may include information about the District's water supply and wastewater treatment processes, as well as how-tos for programming smart controllers, the cycle-and-soak method, and ColoradoScape plant care. Video programming will be a collaborative effort between Communications and Conservation staff, including participation from Communications' summer internship and seasonal Water Monitors.

*No Mow May™*

No Mow May™ is a conservation initiative created by Plantlife, an organization based in the UK, and promoted by the Xerces Society in the United States. The concept is simple: do not mow or reduce mowing lawns during the month of May. This is a movement geared towards pollinator support, however the District will encourage this philosophy in its public communications beginning spring 2023, in partnership with the Highlands Ranch Community Association, as there are potential outcomes that align with water conservation goals. The less frequently a turfgrass lawn is mowed, the less water it requires. Taller turfgrass also develops a stronger root system, better able to withstand drought come summer. As with the soil test rebate, the District aspires to facilitate opportunities for customers to question and evolve their behaviors surrounding water-use activities.

Through the implementation of the new and existing activities described in the plan, the District expects to meet the water savings goal of 800 AF by 2030.

**Table 6 – Targeted Customer Category by Water Efficiency Activity**

<b>Water Efficiency Activities</b>	<b>Targeted Customer Category</b>
<b>Foundational Activities</b>	
Water Budget Rate Structure	All
Water Efficiency Coordinator	All
Advanced Metering Infrastructure	All
Passive Conservation	All
<b>Targeted Technical Assistance and Incentives</b>	
Residential Irrigation Audits (Slow the Flow)	SF Outdoor
Residential Rain Sensor Rebate	SF Outdoor
Residential High Efficiency Nozzle Rebate	SF Outdoor
Residential Smart Controller Rebate	SF Outdoor
Residential Turf Replacement Rebate	SF Outdoor
Residential Drip Irrigation Conversion Equipment Rebate	SF Outdoor
Residential Soil Test Rebate	SF Outdoor
Residential Rain Barrel Rebate	SF Outdoor
Garden in a Box	SF Outdoor
Non-Residential Irrigation Audits	Comm, HOA Outdoor
Non-Residential Rain Sensor Rebate	
Non-Residential High Efficiency Nozzle Rebate	
Non-Residential Smart Controller Rebate	
Non-Residential Turf Replacement Rebate	
Non-Residential Soil Test Rebate	
Municipal Turf Replacement	Muni Outdoor
<b>Rules and Regulation</b>	
Water Waste Restriction	All Outdoor
Time of Day Restriction	All Outdoor
Non-Residential Rain Sensor Requirement	Comm, HOA

	Outdoor
Drought Restrictions	All Outdoor
<b>Educational Activities</b>	
K-12 Education (Water Ambassadors)	SF & MF In/Outdoor
Newsletters, Bill Stuffers, Flyers	All
Video Demonstrations	All
No Mow May™	All Outdoor
Technical Assistance (Consultations, Presentations)	All Outdoor
ColoradoScape Demonstration Gardens	All Outdoor

### 4.3 Estimated Water Savings

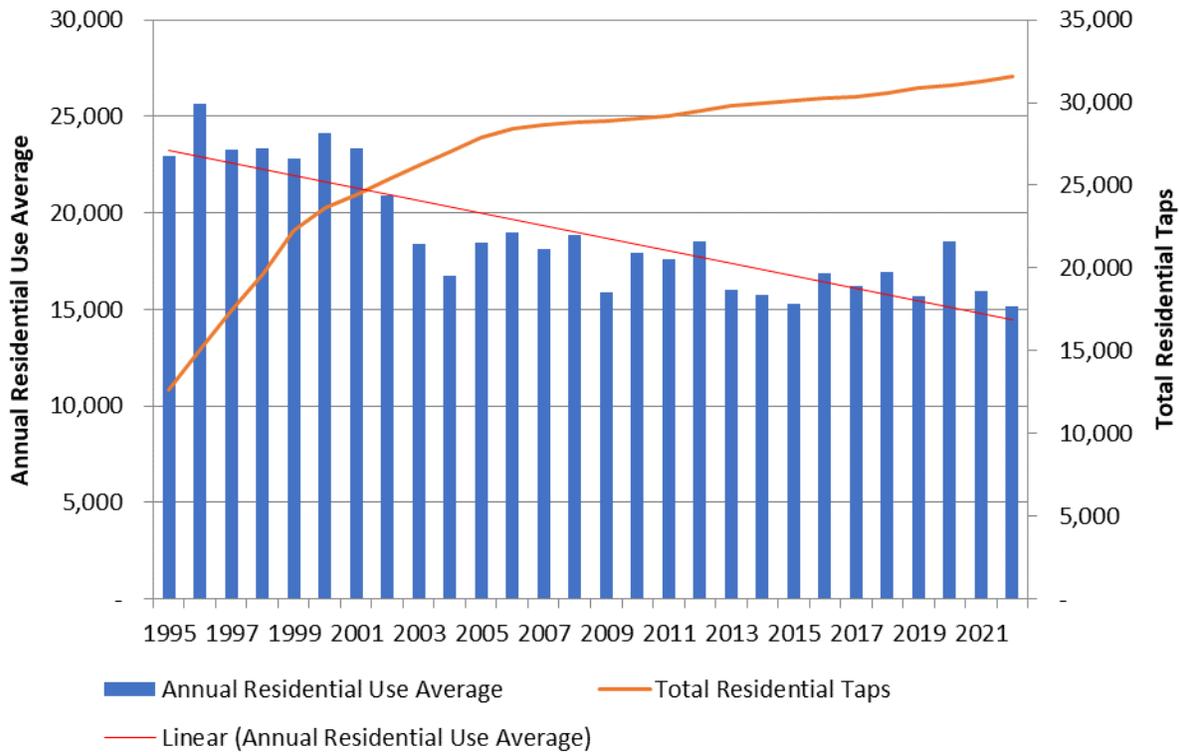
The District has observed declining water use over the twenty-year period since the drought year of 2002. The reduction in water use observed can be attributed to a wide number of factors, but are chiefly attributable to the following:

- The implementation of water budgets for both residential and commercial user accounts beginning in 2003, with an accompany tiered rate structure to encourage conservation.
- Increased rates for commercial irrigation-only users beginning in 2007.
- Passive conservation, such as the now wide-spread availability of low water use plumbing fixtures and appliances. These changes can stem from prior fixtures reaching the end of their useful life, or be brought about indirectly by a home remodel, but are not directly attributable to efforts taken by the District.

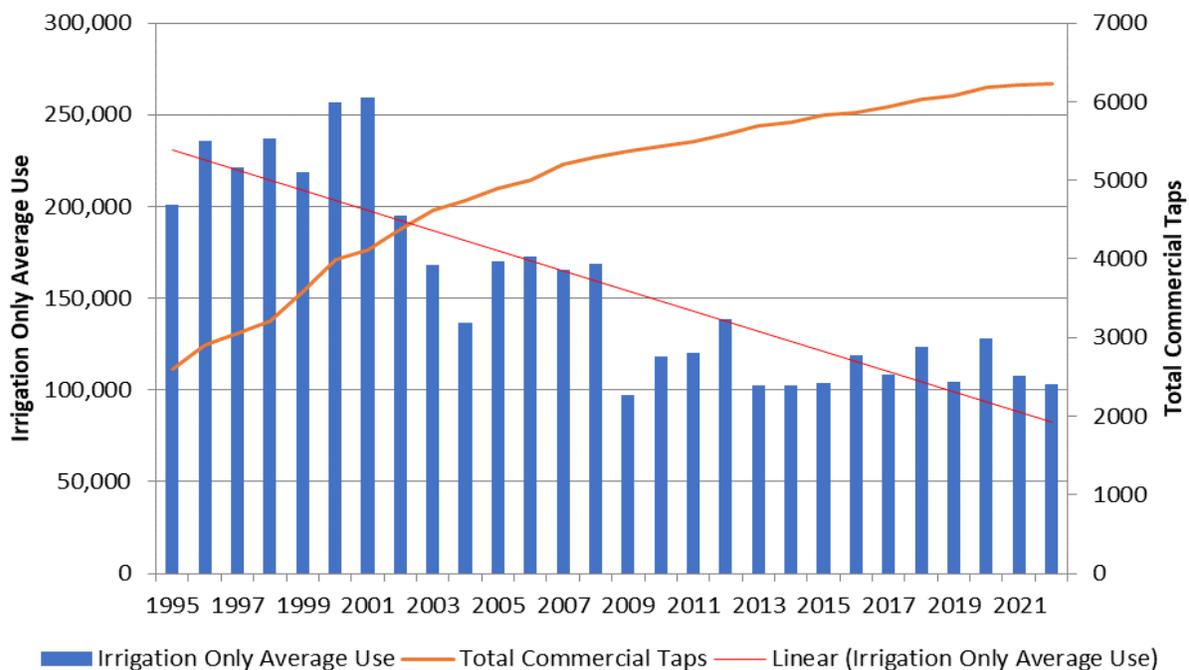
Figures 8 and 9 below both elucidate a declining trend in billed usage beginning with the implementation of water budgets, despite sustained growth in total water taps. Historically, the District has attributed 40 percent of estimated water savings to be the result of the implementation of water budgets, and 34 percent to be the result of passive water conservation. The remaining 26 percent has been attributed to the various technical assistance programs and incentives provided by the District.

The period between 2012 and 2022 shows a distinct plateau developing which represents the maturity of the aforementioned factors. Moving forward, the District is looking to programs and incentives that will continue to decrease outdoor watering behaviors among customers, and expects the rising popularity of replacing traditional landscape with low water use plant materials to be the impetus behind future significant water savings. Current water savings from the District's landscape replacement incentive has totaled 22 AF when monitoring resident consumption before and after participation. It is expected that as the result of significant investment in communication initiatives, as well as statewide efforts to fund landscape changeout in House Bill 1151, that savings will increase and number approximately 800 AF by 2030.

**Figure 8 – Average Annual Residential Use Per Bill with Annual Residential Tap Growth**



**Figure 9 – Average Annual Irrigation Only Use Per Bill with Total Annual Commercial Tap Growth**



## Section 5 Implementation and Monitoring Plan

### 5.1 Implementation Plan

The implementation of the water efficiency plan is the responsibility of the District’s Water Efficiency Coordinator. Implementation of the existing activities has been ongoing and is well under way for 2023. Most of the new activities will be implemented within the next year, beginning in 2023. Table 7 shows the projected implementation schedule for the selected new water efficiency activities.

**Table 7 - Projected Implementation Schedule**

<b>New Water Efficiency Activities</b>	<b>Projected Implementation</b>
<b>Incentives and Technical Assistance</b>	
Residential Smart Controller Rebate	2023
Non-Residential Smart Controller Rebate	2023
Residential Drip Irrigation Conversion Equipment Rebate	2024
Residential Rain Barrel Rebate	2024
Residential Soil Test Rebate	2024
Non-Residential Soil Test Rebate	2024
<b>Educational Activities</b>	
No Mow May™	2023
Video Demonstrations	2023

### 5.2 Monitoring Plan

The District understands that for water efficiency activities to be successful, they need to be monitored and evaluated for effectiveness. As new water efficiency activities are implemented the District will gather water use data in an effort to quantify water savings attributed to those activities. The following data will be used to evaluate water efficiency activities where appropriate:

- Billed water use before and after implementation of the activity
- Number of participants
- Irrigation application rates
- Daily ET rates from surrounding weather stations
- Measured rainfall
- Implementation costs for each activity including: rebates, administration, data collection, data entry and evaluation
- Billed water use by customer type
- Number of acres irrigated
- Gallons per capita per day
- Annual water use compared to water budget
- Any public feedback from program participants including feedback from public meetings, public events, direct correspondence or surveys

Conclusions drawn from analyzing the above data will be used to help direct future water efficiency efforts by the District. This data will be collected and evaluated on an annual basis. Any additional water efficiency activities implemented by the District in future years will be subject to similar monitoring efforts.

## **Section 6     Public Review and Adoption of Water Efficiency Plan**

The District began a 60-day public comment period on April 3, 2023 that ended June 1, 2023. The purpose was to solicit community input about the water efficiency plan.

### **6.1     Public Review Process**

On April 3, 2023 the Centennial Water and Sanitation District Water Efficiency Plan was posted to the District's website, [www.centennialwater.org](http://www.centennialwater.org), and a copy of the plan was made available at the Hendrick Office Building (62 Plaza Drive, Highlands Ranch, CO 80129). A news release was provided to the Highlands Ranch Herald on April 3, 2023 announcing the opportunity to review and provide comments on the plan. Comments could be submitted in writing through email at [info@centennialwater.org](mailto:info@centennialwater.org) or mailed to the Hendrick Office Building.

Notice was also provided that comments would be heard at the District's regularly scheduled Board of Directors meetings, April 24, 2023 and May 22, 2023. A copy of the public notice announcement is provided in Appendix A.

Three written comments were received by the District during the 60-day public review period, resulting in one change to the plan. In Section 2.3.2, Level 2: Management of Largest Customer Demands, the mention of "130,000 square feet" was corrected to "3 acres" for continuity. Public comments are provided in Appendix B.

### **6.2     Adoption of the Water Efficiency Plan**

After completing the public review process the final plan was presented to the Centennial Water and Sanitation District Board of Directors. On June 26, 2023 the Board of Directors formally adopted the 2023 Water Efficiency Plan. A copy of the meeting agenda and resolution is included in Appendix C.

## Appendices

### Appendix A – Public Announcement



**FOR IMMEDIATE RELEASE**

April 3, 2023

**FOR MORE INFORMATION:**

Kari Larese 720-240-4909

#### **Public invited to comment on Water Efficiency Plan**

Centennial Water & Sanitation District is seeking comment on its Water Efficiency Plan. The document provides information about how Centennial Water encourages customers to use water more efficiently.

According to the Water Conservation Act, water providers are required to have a water management plan approved by the Colorado Water Conservation Board (CWCB). The plan must be updated and approved by the CWCB every seven years. The last time Centennial Water updated its plan was in 2016.

Centennial Water's Water Efficiency Plan describes activities to reduce the overall water demand of the district, assesses whether the district remains on track to achieve the goals set by the 2016 plan, and what adjustments, if any, need to be made. The plan provides a path for making sound decisions about the water efficiency activities that will be funded by the district.

Centennial Water is seeking public comment on the draft plan over a 60-day period beginning April 3 through June 1. The plan is available online at [centennialwater.org](http://centennialwater.org), or a copy of the plan is available at Centennial Water's office at 62 Plaza Dr., Highlands Ranch. Comments can be submitted in writing to [info@centennialwater.org](mailto:info@centennialwater.org) or delivered to the address noted above. Public comments will also be accepted at regularly scheduled board meetings in April and May.

###

*Centennial Water & Sanitation District (Centennial Water) is the water and wastewater provider serving the communities of Highlands Ranch and Solstice. Centennial Water's mission is to provide safe, sustainable and reliable water and wastewater services to customers with superior quality and value. To learn more, visit us online at [centennialwater.org](http://centennialwater.org) or follow us on [Facebook](#), [Twitter](#) or [LinkedIn](#).*

## **Appendix B – Public Comments**

### **Nick Eiten**

Greetings – I did not read the Centennial Water Efficiency Plan, but I believe we have to get to xeriscaping, at a minimum, all front lawns in Colorado (and quite frankly all the western states) asap. Folks don't really utilize front lawns – kids play in the backyard. Grilling and sitting on patio happens there, etc. So front lawns are kind of a waste from a watering standpoint.

I would suggest a tax break to incentivize residents to implement the plan, the sooner, the better. Something like this – the numbers are for example purposes only: Xeriscape your front lawn Year 1 - \$1000 tax credit. Implement Yr 2 - \$500 tax credit. Implement Yr 3 - \$100 tax credit. All lawns have to implement Xeriscape by the end of Yr 3. If not then fines are levied in an escalating manner. The longer it takes to Xeriscape the more punitive the fine.

Bottom line is that we can't continue to have developers throw down green sod on all new homes..... just not sustainable. New homes need to have xeriscaped lawns and for existing homes we all get to xeriscaped lawns in the next 3 years. Thanks.

### **Erik Vaska**

It seems very strange to me that the plan would note 285 acres of parkways being managed, and then switch to sq ft for what has actually been converted to no/low water use. There are 43,560 sq ft per acre. This seems intentional to hide the embarrassing lack of progress on parkway conversions. Since 2015, a total of < 3 acres of parkway have been converted, or 1% of the total parkway system. I see a lot of excuses in the plan but not even a target for actual annual acreage conversion - our elected officials must be held accountable to tangible progress here. 3 acres converted for per ~7 years (since 2015) = .43 acres per year. At this rate it will take ~665 years to complete the conversion of all parkways.

Maintenance of nonfunctional grass on our parkways has to be the single biggest waste of water and tax payer dollars in Highlands Ranch, and gas-powered lawn equipment contributes a disproportionate amount of emissions to our already poor air quality. Grassy parkways only benefit landscaping companies.

Just stop watering - let the grass die and mow the area once a month until it can be converted. Use the savings from not watering and not paying landscapers to accelerate the abysmal conversion pace we've been on.

### **Scott Poppers**

Not sure if this fits in the plan or is better as a separate document, website portion, or mailer addition. For those that have smart irrigation controllers, in particular Rachio, the default settings are incorrect and end up using way too much water. In particular, the crop coefficient and available water need to be changed by the user to a significantly lower value. I found a crop coefficient of 50% and available water of .3-.4 in/in (depending on zone exposure) to be appropriate.

Depending on how many people are using a Rachio, that one change of the crop coefficient might save extreme amounts of water. I experienced about 10,000 gallons less per month than my budget at the peak usage after properly tuning my settings and still had a healthy lawn.

## Appendix C – Board of Directors Approval and Adoption



### BOARD OF DIRECTORS MEETING AGENDA MONDAY, JUNE 26, 2023, 6:30 P.M.

62 Plaza Drive  
Highlands Ranch, CO 80129

#### VIA ZOOM

<https://us02web.zoom.us/j/85061892868>

Telephone: 346-248-7799  
Webinar ID: 850 6189 2868

#### CALL TO ORDER

#### ROLL CALL

#### REAFFIRMATION OF DISCLOSURE

#### INTRODUCTORY COMMENTS

- Board Members
- General Manager

#### PUBLIC COMMENTS/QUESTIONS

(Please use the Q&A feature in Zoom to comment. Provide your full name and address with your comment. If you prefer to keep your address private you can email your full name and address to [finance@highlandsranch.org](mailto:finance@highlandsranch.org) then submit your full name and comment in the Q&A)

#### PRESENTATIONS

- Storm Update – Stephanie Stanley
- Water Supply Update – Rick McLoud

#### DISCUSSION ITEMS

- Website Accessibility Requirements – Kari Larese
- SharePoint Site for the Board – Kari Larese

#### APPROVAL OF MINUTES

- CWSD Study Session June 20, 2023
- CWSD Board Meeting May 22, 2023

#### APPROVAL OF BUSINESS AGENDA

#### CONSENT ITEM

*A single motion may adopt consent business items. Any consent business items may be removed at the request of a director or any elector at the district and heard on its respective place on the agenda.*

**CENTENNIAL WATER AND SANITATION DISTRICT**

Board of Directors Meeting

Agenda

June 26, 2023

Page Two

**CWSD 127**

Adopt Resolution 23-127 approval of an appropriation for \$393,667 for the Water Treatment Plant Improvements – Phase 1B project and authorization for the General Manager to award a Construction Manager At-Risk (CMAR) contract to Garney Construction in an amount not to exceed \$373,667 for preconstruction services.

**CWSD 128**

Adopt Resolution 23-128 appoint Stifel Financial Corp. for a municipal bond debt issuance related to the Joseph Blake Water Treatment Plant Phase 1B Project.

**CWSD 129**

Adopt Resolution 23-129 approval of the Personnel Practices & Guidance Manual.

**CWSD 130**

Adopt Resolution 23-130 approval of an appropriation in the amount of \$85,000 from the Capital and Major Repair Fund and authorize the General Manager to enter into a Purchase Order agreement with Intermountain Sales in an amount not to exceed \$85,000 to purchase a Wachs Hydro Excavation Trailer and necessary components.

**CWSD 131**

Adopt Resolution 23-131 approval of the 2023 Water Efficiency Plan Update.

**CWSD 132**

Ratify May 2023 cash and investment transactions (including expenditures).

**GENERAL BUSINESS**

- No Items

**EXECUTIVE SESSION**

- Pursuant to Section 24-6-402(4)(b), C.R.S. for the purpose of conferring with legal counsel and obtaining legal advice regarding the Verona litigation and other potential litigation.
- Pursuant to Section 24-6-402(4)(f), C.R.S. for personnel matters involving the Public Works Director and the Public Works Director Position.

**ADJOURN**

**CENTENNIAL WATER AND SANITATION DISTRICT**

**RESOLUTION No. 23-131**

WHEREAS, water is one of our most precious resources, and water conservation planning is a vital component of water supply management; and,

WHEREAS, Centennial provides water and wastewater services to the planned community of Highlands Ranch; and,

WHEREAS, a draft of Centennial Water Efficiency Plan was made available to the public, a public meeting was held, and comments were incorporated in the final plan; and

WHEREAS, the 2023 Water Efficiency Plan conforms to Colorado Revised State Statute §37-60-126; and,

NOW, THEREFORE, BE IT RESOLVED, that the 2023 Water Efficiency Plan be approved and adopted as submitted.

Adopted this 26<sup>th</sup> day of June, 2023

Ayes 5 Nays 0 Abstained 0 Absent 0

Certified by , Secretary