



Little Thompson Water District

WATER EFFICIENCY MANAGEMENT PLAN

February 2020

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Executive Summary

Profile

The Little Thompson Water District (District) was formed as a Colorado Special District in 1960 and began serving domestic water to a 300 square-mile area in Larimer, Weld and Boulder counties, Colorado in 1962. The District, a registered Colorado Public Water System, PWSID # CO0135477 provides potable and fire protection water to a service area that now encompasses nearly 300 square miles. The service area is generally bounded by the City of Loveland on the north, the City of Longmont on the south, the City of Greeley, the South Platte River and the St. Vrain River on the east and the foothills of the Front Range on the west. The District serves approximately 21,000 customers in and around ten municipalities, nine fire districts and three counties.

Currently the District relies solely on Colorado-Big Thompson (C-BT) water but it also owns Windy Gap water and native water rights. These other water rights will provide additional water supplies as they are brought online. The District also owns approximately 5,000 acre-feet of storage in Dry Creek Reservoir located west of Berthoud, Colorado. Dry Creek Reservoir is currently used for drought and Windy Gap water storage.

Population

There are approximately 21,000 customers in the District and 8,268 total taps. Total taps are all active and inactive taps in the District. Since the completion of the 2012 Water Efficiency Management Plan, the number of active total taps increased from 6,249 in 2012 to 7,929 taps in 2018, as shown in Table 1. Active taps are those that have water use every month of the year. The tap requests, infrastructure improvements and development activity have also accelerated in recent years, due to the economic activity in the communities served by the District. According to the Department of Local Affairs (DOLA), the population in towns near Interstate 25 have experienced growth in excess of five percent in recent years. This report summarizes these changing conditions and outlines efficiency measures and programs the District will incorporate to help meet the future water demands. Technical and legal issues connected with water rights and water storage are not addressed in this report.

Table 1: Annual Active Taps Count

Tap Category	2012	2013	2014	2015	2016	2017	2018
Residential	6,027	7,409	7,474	7,413	7,516	7,452	7,621
Non-Residential	220	301	304	316	322	299	296
Wholesale	2	16	4	16	17	13	12
Total:	6,249	7,726	7,782	7,746	7,855	7,764	7,929

Future Demand

In 2018, the District completed a Raw Water Master Plan (Master Plan), (see Appendix A). In the Master Plan the projected treated water demand was estimated based on historical deliveries and anticipated known and approved subdivisions. The District's 2012 to 2018 water year demands were relatively stable, affected primarily by seasonal weather conditions, as shown in Table 2 below.

Table 2: Historic District Water Year Usage

Year	Usage (acre-feet)
2012	6,287
2013	5,541
2014	5,304
2015	5,502
2016	6,134
2017	5,995
2018	5,943

As the District encompasses a wide range of cities, towns and counties, it used the DOLA standard of 2.6 persons per household, or residential taps in anticipated subdivisions within the District to estimate future demand. The District's Master Plan estimated that the water demand from 2019 to 2025 will increase by 1,100 acre-feet to approximately 7,600 acre-feet. The estimated demand by 2040 is anticipated to be approximately 10,400 acre-feet. Conserved water was not included in these projections.

Efficiency Goals

The goals established for the 2012 Water Efficiency Management Plan were based on discussions with District Staff and Board. The goals were to reduce system losses by 25%, residential demand by 5%, and non-residential demand by 1%. The quantifiable goal for the 2012 water efficiency programs was to reduce the total water supply by over 480 acre-feet of water annually. Although it is unknown if the quantifiable goal for 2012 was met, steps were taken towards reducing water demand. The goals for the 2019 Water Efficiency Plan are:

- Keep water losses under 600 acre-feet annually,
- Reduce real losses by 200 acre-feet, or 10 percent,
- Reduce residential use by 150 acre-feet, or 5 percent,
- Reduce non-residential use by 25 acre-feet, or 2 percent.

Efficiency Programs

In 2015, the District received a grant from the Colorado Water Conservation Board to complete and implement the American Water Works Association (AWWA) M36 Water Audit and Loss Control Program. The District hired a consultant to assist the District in

understanding the audit process and software, and to identify the highest priority programs which identify and reduce apparent water losses. The District continues to perform a water loss audit annually and adjusts its water loss program as needed. As part of its water loss program, the District is incrementally replacing existing customer meters with Automatic Meter Reading (AMR) meters to reduce water loss in customer service lines and facilitate water efficiency education.

The District hired a Water Conservation Coordinator in 2018 as part of the Water Resources team to manage and promote its existing water efficiency programs, and to establish an education and outreach program.

The District offers two different types of residential taps, a standard tap and an urban tap. The Cash-In Lieu fee, or raw water obligation, is less for an urban tap, but the rates are structured to send a significant price signal for high water use.

Efficiency Planning Process

The District Staff hosted a Water Conservation Work Session in April of 2019. Water conservation professionals discussed the need and pressure to conserve water and suggested programs and policies that could be implemented to conserve water in the District. Representatives from the Colorado Water Conservation Board, Western Resource Advocates, Water Demand Management and Northern Water, as well as District staff all contributed to the discussion. After the Conservation Work Session, the District Board discussed water efficiency programs, focusing on efficiency measures such as price signaling for high water users, education and outreach, fixture change out programs, and expanding the water-saving plants and soil amendment rebate programs to customers with existing landscaping. The Board also expressed interest in a photovoltaic system for Dry Creek Reservoir evaporation mitigation.

In the May 2019 Board meeting, the Board discussed water conservation. District Staff provided Board Members with a list of the Colorado WaterWise Guidebook Best Practices with staff recommendations for fiscal year 2020 along with highlights from the work session (Appendix B). The Board agreed to finance existing water efficiency programs including some expansion but tabled the larger water conservation discussion with plans to revisit it in the future.

Introduction

1.0 Profile of Existing Water Supply System

1.1 Overview of Existing Water Supply System

In the past the District served rural acreages, low-density subdivisions, dairies and feedlots, farmsteads, mobile home parks and a few small industrial parks. But its proximity to growth areas for ten municipalities including Berthoud, Evans, Firestone, Greeley, Johnstown, Longmont, Loveland, Mead, Milliken and Windsor and the Interstate 25 corridor has changed the nature of the District. It is becoming more of an urban water provider serving low, medium and high-density subdivisions as well as more retail and service oriented commercial customers.

The District currently provides service to approximately 8,268 total water taps in and around the ten municipalities, nine fire districts and three counties. To provide potable water service, the District jointly owns and operates the Carter Lake Filter Plant (CLFP) and Dry Creek Reservoir with the Central Weld County Water District (CWCWD). The water treatment plant and reservoir are both located west of Berthoud, Colorado. CWCWD and the District also jointly own transmission pipelines that originate at the CLFP.

This joint ownership allows the District to participate in cooperative water system projects, which lowers the incremental cost for both participants through economies of scale. The CLFP has a combined capacity of approximately 50 million gallons of water per day. The District also owns and maintains multiple treated water storage tanks and pumping stations, as well as over 600 miles of transmission and distribution pipelines throughout its large service area (Table 1.1). There are approximately 50 pressure zones in the District ranging from 35 pounds per square inch (PSI) to 165 psi.

Table 1.1: District Pipelines

Pipe Size	Length of Pipe (Feet)	Length of Pipe (Miles)
0.75	12	0.0
1	59,396	11.2
1.25	47,941	9.1
1.5	77,031	14.6
2	287,951	54.5
2.5	92,198	17.5
3	80,436	15.2
4	198,785	37.6
6	1,129,135	213.9
8	565,273	107.1
10	94,434	17.9
12	242,563	45.9
16	36,016	6.8
18	27,467	5.2
20	14,654	2.8
24	126,490	24.0
30	1,103	0.2
36	1,725	0.3
42	88,324	16.7
Total:	3,170,935	601

Through the partnership between the District and CWCWD, Dry Creek Reservoir was constructed in 2007. Dry Creek Reservoir has a storage capacity of approximately 10,000 acre-feet. Each District owns one half (or approximately 5,000 acre-feet of storage in the reservoir). Dry Creek Reservoir has an average annual evaporation of 500 acre-feet. Dry Creek Reservoir is primarily used for drought storage.

Currently the District relies on Colorado-Big Thompson (C-BT) water as its main water supply source. The C-BT system is managed by the Northern Colorado Water Conservancy District (Northern Water). Colorado River Basin water is diverted and stored in Granby Reservoir and delivered to the east side of the continental divide through the Adam's Tunnel to the Front Range and stored in several reservoirs including Carter Lake west of Berthoud. The District's C-BT water can then be delivered to CLFP or Dry Creek Reservoir from Carter Lake.

The District also owns 19 units of Windy Gap water, which are based upon a moderately junior water right on the Fraser and Upper Colorado Rivers. Currently, Windy Gap water can be stored at Granby Reservoir (subject to spill) and / or be

delivered to CLFP or Dry Creek Reservoir through the C-BT system. Water attributable to 12 of the 19 Windy Gap units will be stored in the Windy Gap Firming Project at Chimney Hollow Reservoir upon completion. Brookfield LLC met its raw water obligation by funding the purchase of the 12 Windy Gap units¹. The District owns the units, but the Windy Gap water will be served to Brookfield's development. In 2017 and 2018 the District acquired the additional seven Windy Gap units. The District is not directly participating in the Windy Gap Firming Project, so it plans use Dry Creek Reservoir storage to provide a firm yield for these Windy Gap units. A small volume of Windy Gap water was delivered into Dry Creek Reservoir during 2018.

The District also owns shares in local ditch companies but currently cannot use this supply as they are decreed for agricultural use. The District is planning to file a change of use application to the Water Court within the next year so it can use some of the ditch shares to meet future potable demands. Until then, the ditch shares are rented for agricultural use.

¹ The District entered into a contract with the City of Greeley to purchase the 12 Windy Gap units in 2005. The 12 units were formally transferred to the District in 2017 once the debt for the project was retired.

Figure 1.1: LTWD District Service Area



1.2 Water Supply Reliability

The District's water supply was tested during the 2002 drought. The District had to put restrictions on outdoor watering with staff enforcement. Record water demand caused by the hot, dry summer, coupled with projections of limited supplies for 2003 caused the District to ban all outdoor use in the late summer of 2002. In response to the 2002 drought the District began to diversify its water rights portfolio in 2005 to make it more resilient during these conditions. The District started accepting local ditch shares for water dedication and acquiring Windy Gap units, which are a wholly consumable water supply. In more recent years, scarcity of water supplies and the cost of water has been a driving factor in diversifying the District' portfolio. Tables 1.2 and 1.3 show water owned by the District and firm yield, or yield during a drought year, of each water supply.

Also in response to the 2002 drought, the District developed a Water Shortage Contingency Plan (see Appendix C). This plan is to ensure if a drought were to occur, water shortage criteria and responses were well defined. There are five drought stages and each stage have criteria for severity and the resulting responses the District will require from itself and tap holders.

With diversification of the District's water rights portfolio, the District also planned for making these water rights usable. Native water shares cannot be used for municipal use until changed through Water Court, which can take as long as three years after applying. Windy Gap water also has its challenges being a junior water right and having limited storage to ensure a yield at all. With the firm yields in Tables 1.2 and 1.3, the District estimated in its Master Plan that there would be sufficient yield to meet estimated demands until approximately 2021.

Table 1.2: Water Deliverable to Carter Lake Filter Plant

Source	Quantity	Firm Yield Per Unit (ac-ft)	Total Firm Yield (ac-ft)	2018 Yield (ac-ft)
C-BT Class C Fixed Quota Units	5,274	0.5	2,637	3,692
C-BT Class C Variable Quota Units	4,971	0.7	3,480	3,977
C-BT Class D Griep Farm Units	100	0.5	50	80
Windy Gap Units	19	0	0	50
			Total (ac-ft):	7,798.6

Table 1.3: Native Water Shares owned by the District

Source	Quantity	Firm Yield Per Unit (ac-ft)	Total Firm Yield (ac-ft)
Big Thompson Ditch and Manufacturing Company	0.33	70.6	23.5
Consolidated Home Supply Ditch Company	58.75	3.5	205.6
Handy Ditch Company	39.9	2.5	99.8
Boulder and Larimer Ditch (Old Ish)	30	1.0	30.0
		Total (ac-ft):	358.9

1.3 Supply-Side Limitations and Future Needs

As the District continues to experience the high growth, and no slowdown is expected, its water demands will continue to increase. To meet the expected water demand, the District requires that developers of multi-lot subdivision and commercial properties dedicate water rights in exchange for water taps.

Supply limitations for native shares include getting the water somewhere it can be treated. Other limitations for native shares and Windy Gap units include long-term storage. The CLFP will also need to be enlarged when total capacity is close to being

met. Additional demand will also require additional distribution capacity throughout the District. There are no pressure issues the District is aware of at this time.

2.0 Profile of Water Demands and Historical Demand Management

2.1 Demographics and Key Characteristics of the Service Area

Within the nearly 300 square mile service area, the District provides water to a population of approximately 21,000 people in and around portions of Berthoud, Evans, Firestone, Greeley, Johnstown, Longmont, Loveland, Milliken, Windsor and all of the Town of Mead. In addition, the District delivers water to rural Boulder, Larimer and Weld County residences, businesses, agricultural, and livestock operations.

The District population is difficult to determine precisely because it provides service to many different governing entities. Census data can be obtained for counties, municipalities, and even regions, but not specifically for special districts. In an effort to estimate the household and total population for the District, 2013 to 2017 the District used estimate of persons per household data from the U.S. Census Bureau. The average persons per household in Colorado is 2.6. This was multiplied by the number of total urban and standard residential taps (7,917) in the District to get the approximate population of the District.

The District's utility billing system is used to account for five tap groups; standard residential, urban residential, urban non-residential, non-residential, and wholesale. Standard residential use includes single family homes with outdoor irrigation. The urban tap is for customers who have smaller lots, recommended for lots with less than 8,000 square feet, with little to no outdoor irrigation. This tap has an annual allotment of 114,000 gallons per year. If or when a customer's water usage gets above that annual allotment, a surcharge is applied is currently at \$8 per 1,000 gallons. Urban non-residential taps are also available for commercial properties that will have little to no outdoor irrigation and minimum indoor use such as retail space. Non-residential taps represent a wide range of use such as irrigation of large greenways in developments, dairies, commercial taps for light industrial. Wholesale customers include other water providers in and around the District. These wholesale customers, including the Town of Berthoud, Longs Peak Water District (LPWD) and North Carter Lake Water District (NCLWD), transfer raw water to the District monthly for treatment and delivery. The District does not retain authority over the customers living within the wholesale service areas.

2.2 Historical Water Demands

The District was originally formed to help meet water supply needs for rural customers struggling with local groundwater quality and quantity issues. The majority of early customers included agricultural users that needed water for operations including

feedlots and dairies. The District added residential and non-residential accounts starting in the 1960s and continuing into the 1980s. In the early 1990s the District began providing water to a growing residential community of large country estates. During this period the average, annual and peak water demands grew and changed significantly. In the 2000s the District is now experiencing another shift in demand toward smaller, more urban-sized residential lots with shared parks and open space. Although the majority of the District's service area is still zoned for agriculture, the trend of increasing residential and commercial zoning is expected to continue.

Table 2.1 shows the majority of the District's water demands are from residential customers. The non-residential category has the top five highest water users. All five water users are dairies. These dairies have had to upgrade waterlines and fix water leaks in the system in order to deliver the amount of water needed. Currently, there are no other water efficiency measures taken by these customers.

Table 2.1: 2012 to 2018 Average Water Demand by Tap Group

Category	Demand (acre-feet)	Percent of Total Annual Deliveries
Residential	3,782	56.4 percent
Non-Residential	1,148	17.1 percent
Bulk Water	166	2.5 percent
Wholesale	847	12.6 percent
Real Losses	757	11.3 percent
Total:	6,700	100 percent

*Only average of real water loss data from 2014 to 2018

Figure 2.1 illustrates the District's monthly water use demand from 2012 to 2018. The District's demand for this time period varies from a low of 200 acre-feet per month, to highs of nearly 1,100 acre-feet per month. This difference in the range of seasonal use is the result of the increasing sector of urban residential customers and the demand for landscape irrigation in the summer.

Figure 2.1: District Monthly Water Use 2012 to 2018

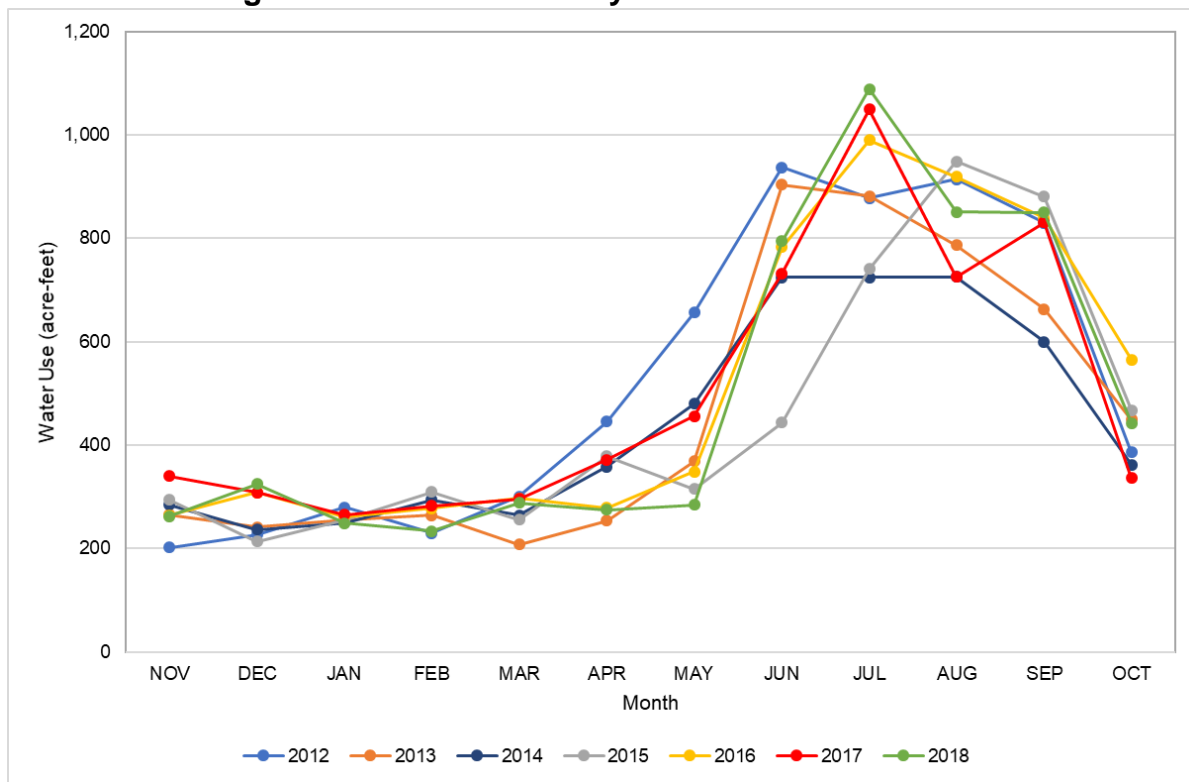


Figure 2.2 and Table 2.2 show the District's annual calendar year water demand broken out into the different tap groups. In 2013, wholesale water spiked due to the September 2013 floods where the District assisted other water utilities so customers would not be without water. The real losses are only illustrated from 2014 to 2018 because the District completed its first AWWA M36 water audit. A spike in real losses in 2018 is likely due to master meter and residential change outs and upgrades and getting them dialed in to read correctly.

Figure 2.2: LTWD Annual Water Demand Distribution



Table 2.2: LTWD Annual Water Demand Distribution (ac-ft)

Tap Category	2012	2013	2014	2015	2016	2017	2018
Residential	4,011	3,565	3,438	3,579	4,020	3,865	3,996
Non-Residential	1,026	894	1,030	1,150	1,244	1,324	1,370
Bulk Water	0	0	487	225	67	92	289
Wholesale	109	1,792	678	571	782	922	1,073
Real Losses	N/A	N/A	754	751	307	824	1,152

2.3 Past and Current Demand Management Activities and Impact to Demands

The District supplied 5,366 acre-feet (1,748.5 million gallons) of potable water during the 2018 water year to 7,929 active customer taps within its residential and non-residential categories.

Residential Water Use

The majority of the District's water use is for residential customers within the growth management areas of the surrounding communities. Residential customers make up approximately 96 percent (7,273) of the total customers served from 2012 to 2018. This results in higher summertime demand for landscape irrigation on individual lots as well as in neighborhood open spaces. The residential water use average from 2012 to 2018 was 56.4 percent (3,782 acre-feet) of the total water delivered to customers by the District. The residential customer water use per tap was 0.52 acre-feet, or 170,857 gallons per tap, in 2018. In Table 2.3 below are past and current demand management activities for the residential tap category.

Landscape Efficiency Rebates

The District currently offers rebates and water efficiency programs to encourage a more water efficient landscape. The rebate programs allow customers of a new home to receive a Water-Saving Plant Rebate of \$250 and a Soil Amendment Rebate of \$500. Customers must provide receipts to receive the rebates. The District also partners with Resource Central to provide sprinkler audits. This program is free to all customers. A summary of the customers using these services is summarized below.

Table 2.3: Annual Water Conservation Participants Count

Year	Slow the Flow	Soil Amendment Rebate*	Water-Saving Plants Rebate*
2014	2	0	0
2015	13	0	0
2016	60	2	1
2017	56	3	2
2018	62	4	2

*Rebates were not implemented until 2016.

Water Loss Audit

In 2015, the District received a grant from the Colorado Water Conservation Board to promote the use of the American Water Works Association (AWWA) M36 Water Audit and Loss Control Program software. The District hired Peter Mayer of Water Demand Management to demonstrate to staff how the M36 software is to be used, the underlying assumptions, the importance of its data validity score and how to identify the highest priority projects to reduce its apparent water loss. The District has independently completed the audit every year since the grant. On average, water loss has been 11 percent from 2014 to 2018. Water loss was as low as 5 percent in 2016 and about 15 percent in 2018.

Increase in water loss in 2018 is likely due to master meter and residential change outs and getting them setup correctly.

Customer Meter Replacement

The District is incrementally replacing all the customer meters with AMR meters. By allowing customers to have access to daily water usage through an app on their phone, leaks in the service lines can be identified and repaired in a timely manner reducing water loss. Additionally, the AMR platform allows the District to educate customers about water efficiency.

Water Conservation Coordinator

In 2018, the District hired a Water Conservation Coordinator. The most visible portion of the job is to work within the water conservation community to learn about water saving programs and ideas to educate the District's customers and Board. The coordinator is also responsible for data management and complex technical analyses such as the AWWA M36 Water Audit.

Urban Tap

The District has two residential taps: a standard tap and an urban tap. The standard tap is appropriate for larger and estate lots and rates are based on an inclining tiered structure. In 2016, the District created an urban tap. The Cash-in-lieu or raw water requirement for the urban tap is one half of that of a standard tap but the billing structure is designed to send a strong price signal to urban tap customers using with high water use. Customers with an urban tap are given an annual allotment of 114,000 gallons. If this allotment is exceeded, the customer is assessed a surcharge of \$8.00 per 1,000 gallons for the rest of the year. This is different than the Conservation Tap in the 2012 Water Efficiency Management Plan where the allotment was based on a monthly allotment. The urban tap is recommended for lot sizes of 8,000 square feet or less.

The urban tap is being requested more frequently by developers due to the high cost and limited raw water for dedication. Many developers constructing multi-lot subdivisions are reducing lot sizes.

Non-Residential Water Use

Non-Residential water users in the District include office buildings, schools, tree farms or nurseries, manufacturing and light industrial facilities, agricultural operations including dairies and feedlots, and some large irrigation taps. Non-Residential customers make up approximately 4 percent (294) of the total customers served from 2012 to 2018. Non-Residential water use is the second largest water use category in the District at 17.1 percent (1,148 acre-feet) of average water delivered to customers from 2012 to

2018. The non-residential customer water use per tap was 4.63 acre-feet, or 1,509,437 gallons per tap, in 2018.

Wholesale Water Use

The District has multiple master meter accounts with adjoining water providers. It is a wholesale water provider for Longs Peak Water District, North Carter Lake Water District, and Town of Berthoud. In addition, the District has master meter connections with CWCWD, Fort Collins-Loveland Water District, Johnstown, Loveland, and Milliken. Wholesale customers account for 0.2 percent (12) of the total customers served from 2012 to 2018. Wholesale water use was 12.6 percent (847 acre-feet) of water delivered on average from 2012 to 2018. Total wholesale water use in 2018 was 1,073 acre-feet, or 349,566,632 gallons.

Bulk Water Use

The District supplies water for firefighting and other temporary uses from hydrants such as construction or for oil and gas production. The District also operates hydrants as part of its active distribution system flushing program. The volume of bulk water is variable year to year, depending primarily on demand for temporary use of water.

The District meters distribution system hydrant flushing, and water delivered from fire hydrants to more accurately track previously unaccounted for use. Bulk water use was 2.5 percent (166 acre-feet), or 54,091,266 gallons, on average from 2012 to 2018. Total bulk water use in 2018 was 289 acre-feet, or 94,170,939. The increase use in bulk water from 2010 (6.7 acre-feet) to present is likely due to the influx of oil and gas and construction activity in the area.

Real Losses

Water production is typically slightly higher than the amount of water billed due to system losses. System losses can be attributed to all unmetered uses including fire flows, flushing lines, illegal taps, pipe leaks, and theft. On average over the last seven years, 11 percent of all water delivered into the distribution system were real losses. In 2018, the estimated real losses in the District's system was 1,152 acre-feet (15 percent). Real losses are summarized in Table 2.4.

Table 2.4: District Real Water Loss

Year	Real Loss (ac-ft)	Percent of Total Water Demand
2014	754	12 percent
2015	751	12 percent
2016	307	5 percent
2017	824	12 percent
2018	1,152	15 percent
Average:	757	11 percent

The District has been working for many years to reduce the real system losses. Regular valve maintenance, pipeline upgrades and prompt leak repair are standard operating procedures. The entire system is metered, and the water users are monitored monthly for high water use and contacted when identified. High water users have been evaluated and updated for correct meter sizing to avoid meter slippage, or the volume of water that is not registered by the meter at the correct flow rate. Several master meters have been installed in the system in strategic locations to create smaller areas to monitor for possible leaks. A SCADA system has been installed throughout the system and is used for real time monitoring.

Even with all of these measures the District has continued to experience high variability in annual losses. Therefore, the District has recently taken steps to better account for the system efficiency. One step has been upgrading meters in the District to the Badger Automatic Meter Readings (AMR). Another step included incorporating distribution system efficiency accounting tools provided by the American Water Works Association (AWWA) in their Water Audit and Loss Control Program M-36 manual and software. The water loss has been completed on an annual basis since 2014. District Staff is currently participating in the Colorado Water Loss Initiative, which will lead to two years of certified AWWA M36 Water Audits.

Non-Potable Water Use

The District has been meeting with developers who are interested in non-potable systems but no specific plans for a non-potable system have been presented.

Water Use Trends

Figure 2.4 shows the average annual water use by average active taps from 2006 to 2018 in the two retail categories served by the District: 1) Residential, and 2) Non-residential. Figure 2.5 shows per-capita water use for residential taps from 2006 to 2018. Annual variations in both figures are due to weather, having dry or wet years. The year 2012 was a particularly dry year, which can be seen as high peaks in both the average water use per tap and GPCD. 2013 was a wet year where a dip in the both Figure 2.4 and 2.5 can be seen. This is due to the September 2013 floods. As illustrated in the figures below, there has been little to no water savings through previous demand management efforts. Most of the saving is through weather variations. It should be noted that the District has significantly increased in growth from 6,249 taps in 2012 to 7,929 taps in 2018.

Figure 2.4: District Average Water Use per Tap

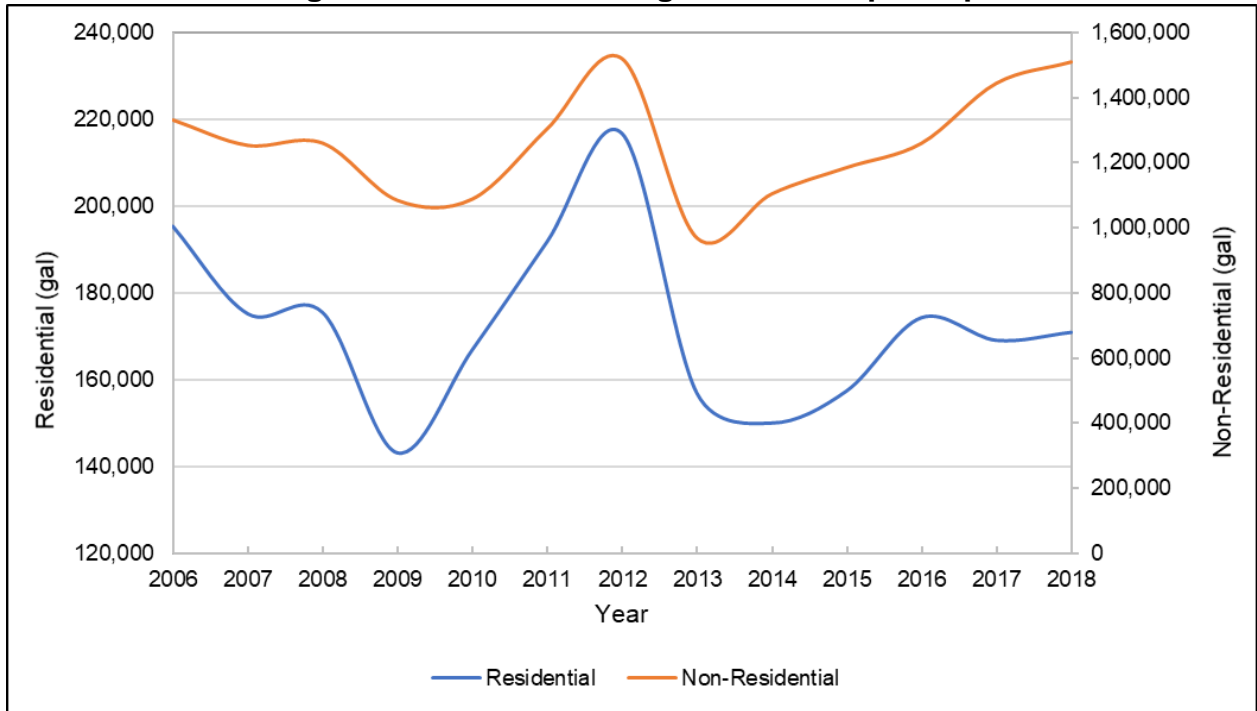
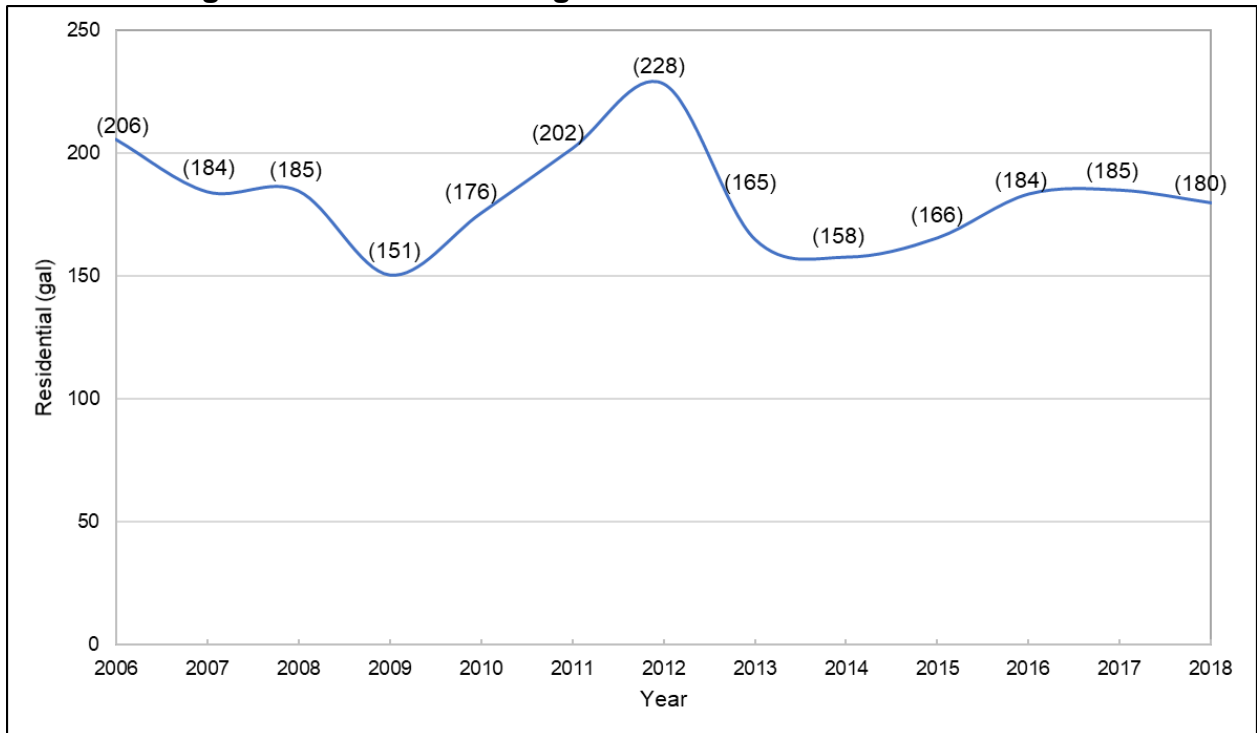


Figure 2.5: District Average Residential Water Use for GPCD



2.4 Demand Forecasts

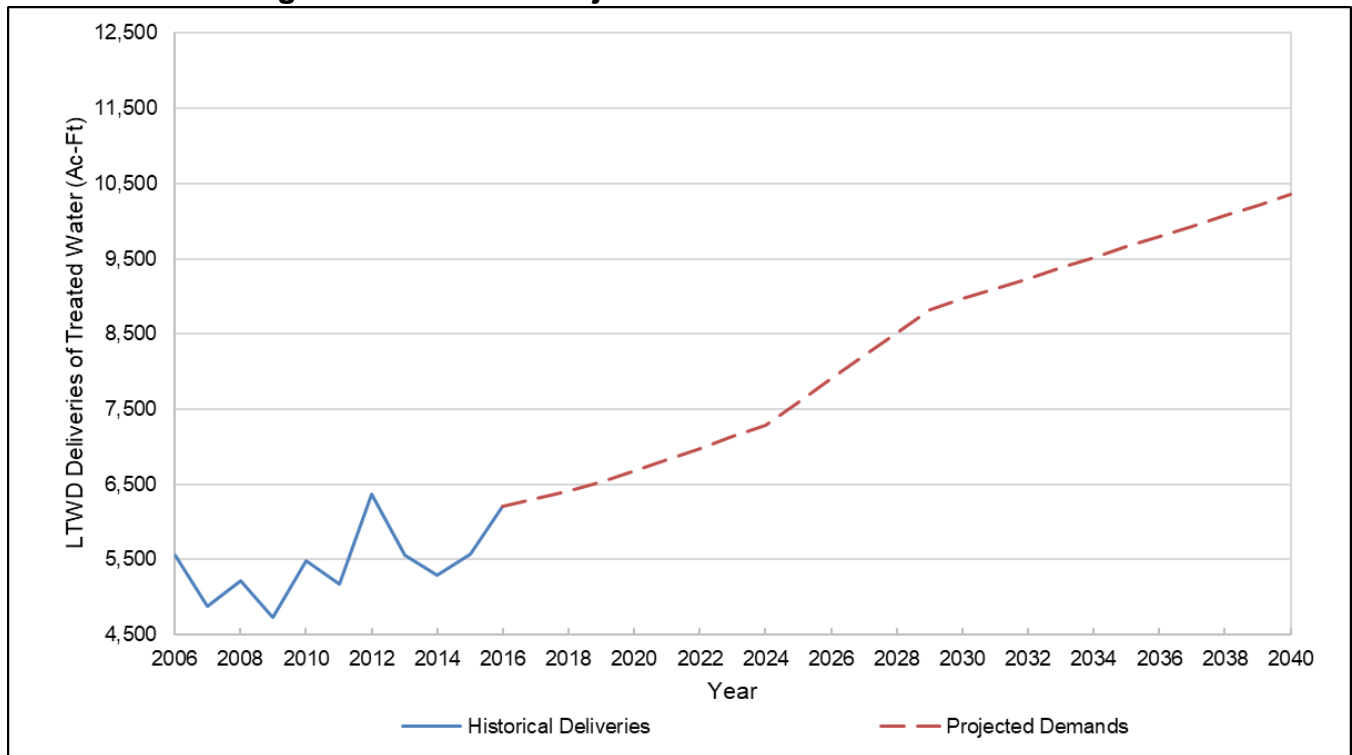
In the Master Plan, developments within the District service area were identified and ranked based on their approval status within local jurisdictions to estimate future growth rate and location within the District. The list included 33 primary developments and 27 smaller developments with 3,171 standard residential, 3,147 urban, 2,576 multi-family, 1,037 commercial and 136 irrigation/other taps by 2040. Assumptions were based on approved plans, phases of plans, commitment to serve letters, and timing of developments coming online.

A ranking system was assigned to the developments in order to set forth a schedule for construction and tap sales that the District may anticipate. The developments were further adjusted in their growth rates based upon four other weighting factors; location, the planning and zoning entity, the developer, and the availability of existing infrastructure. The sum of the weighting factors set forth the adjustment for development speed. Projections are intended to be approximate forecasts that demonstrate general trends and not to be interpreted as exact targets or absolute predictions of what will occur. Table 2.5 and Figure 2.6 show the District's projected demands through 2040, which were taken from the 2018 Raw Water Master Plan (Appendix A).

Table 2.5: District Projected Growth and Water Demand

Year	2020	2025	2030	2040
Average Annual Percent Growth	2.00 percent	2.60 percent	3.40 percent	1.40 percent
Total Taps at Period End	8,449	9,687	11,543	13,415
Total Demand at Period End	6,675 acre-feet	7,591 acre-feet	8,964 acre-feet	10,350 acre-feet

Figure 2.6: District Projected Retail Water Demand



3.0 Integrated Planning and Water Efficiency Benefits and Goals

The District currently does not include Water Efficiency in future water supply planning. The District's Board is evaluating the best use of conserved water. Until that decision is made, the Board will not start an Integrated Resource Plan. The District requires any development over two taps to dedicate raw water to it; therefore, the Board does not see conservation as key to maintaining an adequate future water supply.

3.1 Water Efficiency and Water Supply Planning

Water supplies along the Front Range are scarce and expensive. Developers are looking for alternative ways to meet or reduce the raw water dedication obligation.

Water conservation could reduce daily water usage peaks, reducing stress on CLFP and transmission lines. This would extend the life of the infrastructure and reduce or delay significant capital expenditures.

One of the conclusions of the 2018 Raw Water Master Plan was the need for more raw water storage. Additional storage would allow the District to retain water not needed in one year for use in a drought year. Conservation would increase the volume of water available for drought. Additional storage would increase the yield of the District's other water supplies, which would allow the District to be more prepared for drought years.

3.2 Water Efficiency Goals

The District's objective is to implement a Water Efficiency Management Plan that will increase water use efficiency and thereby reduce water demands. The District will attempt to accomplish this without infringing upon people's right to use water and develop their land. The District's goals include reducing the loss and waste of water, improving efficiency in the use of water, extending the life of current water supplies, and identifying means to support water reuse.

Establishing water conservation goals is an iterative process that begins with quantifying the future demand for water based on current water-use habits and identifying areas water use can feasibly and effectively be reduced. Reduction of future water demand through water conservation will potentially delay planned water supply acquisition and the need for infrastructure improvements.

Residential Goals

The District goal's is to reduce residential water use by 200 acre-feet, or approximately 5 percent, of the average residential water use for the past seven-years (Table 2.1). A 200 acre-foot reduction in residential water is an 11 GPCD reduction. This would be a reduction from the current 180 GPCD (see Figure 2.5) to 169 GPCD. This reduction will come from the District's largest water-use category. Much of the water reduction is anticipated to come from increased communication and promotion of the existing measures and smaller lot sizes in new developments attributable to urban taps (and associated penalty rates for high usage).

Non-Residential Goals

The non-residential category includes office buildings, hotels, schools, retail stores, restaurants, car washes, tree farms or nurseries, manufacturing and light industrial facilities, agricultural operations including dairies and feedlots, and some large irrigation taps. The Non-Residential water demand is projected to increase due to growing commercial development and number of services within the I-25 corridor. The growth in this area may also bring higher water-use industries than there have been in the past.

The District's goal is to reduce non-residential water usage reduction by 2 percent or 25 acre-feet over the next seven-years. The goal is based on the average non-residential water usage (Table 2.1). The District will use this planning period to continue to audit high usage. The District needs to establish additional water use categories to better track the water use of these non-residential categories in its billing system. The District will increase the water usage categories to increase the effectiveness of future water efficiency planning and programs.

Master Meter Goals

The contracts that the District has with its wholesale and master meter customers limits the District's ability to impose conservation measures on those entities and relieves the

District of the responsibility for obtaining water rights for those customers. The District's wholesale customers transfer their own water rights to the District to meet their water demands. Without authority to enforce conservation measures within the service areas of its wholesale customers, and no obligation to secure water rights for them, the water use of the District's master meters is excluded from analysis in this report.

Real Loss Goals

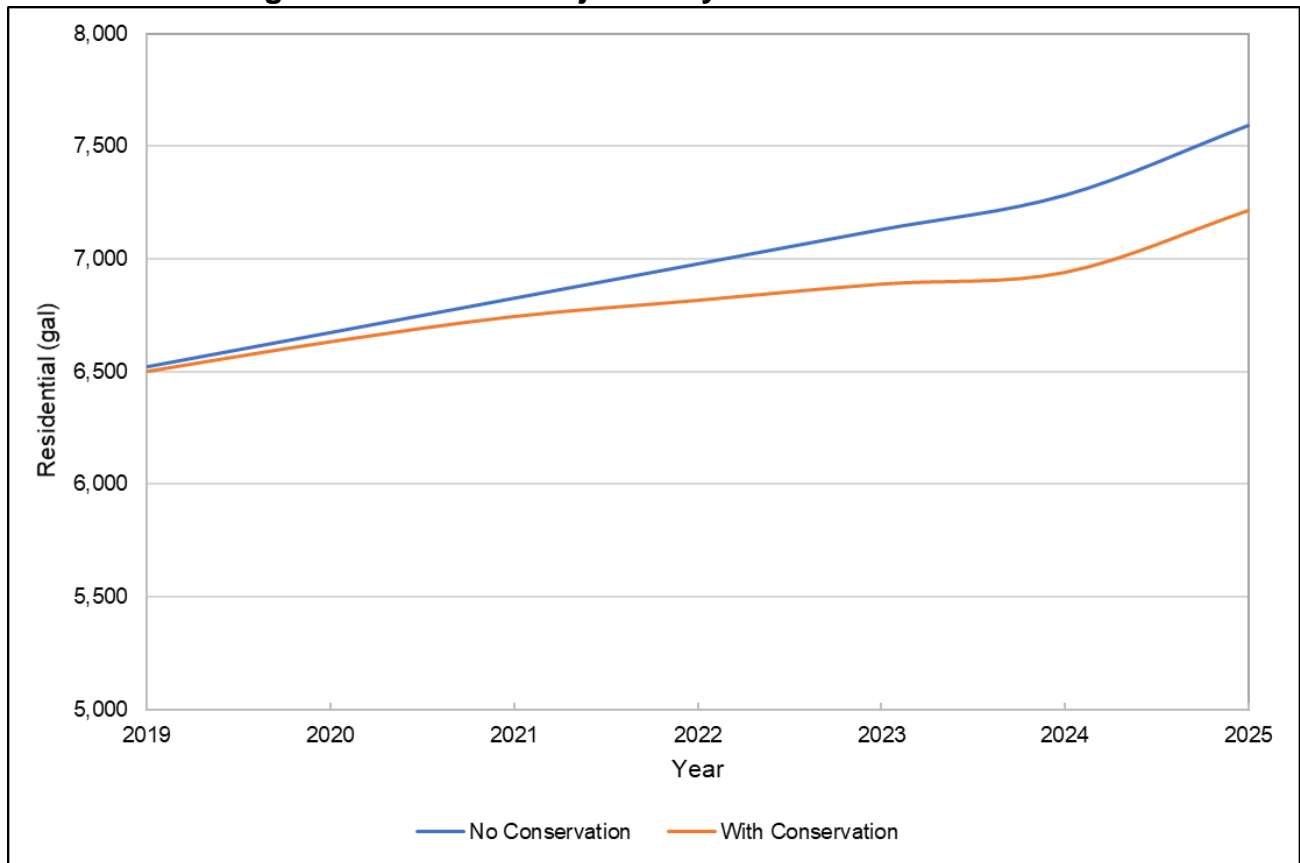
Since 2014, Real Loss is calculated using the AWWA M36 Water Audit method. Real losses have been a focus for the District in the last ten years. Meters have been installed and updated on all taps and pressure reducing valves along with a SCADA system are in place to monitor pressures that could lead to leakage. Leaks are monitored and repaired in a timely manner.

To improve system water loss, the District started changing out master meters and customer meters in 2018 to Automatic Meter Readings (AMR), where customers can access their water usage on a daily basis through an app on their smart phones. The District's real water loss was 15 percent in 2018. Without more metering in the joint sections of the District and CWCWD distribution system, it is unknown if this real loss is a higher or lower percent for the District. The District will strive to keep annual water loss under 600 acre-feet per year, or approximately under 10 percent. This was based on the average water use demand over the past seven years (5,815 acre-feet) in Table 1. The District's goal is to reduce system loss by 150 acre-feet based on the average system real losses from 2014 to 2018, Table 2.2, and the difference between the average seven-year water demand, Table 1.

Total Water Efficiency Goals

Figure 3.1 shows the District's projected total system water demand from 2019 to 2025, both with and without the stated efficiency goals. By the time the Water Efficiency Management Plan is fully implemented in 2025, it is estimated that the projected annual system water demand will be reduced by a total of 375 acre-feet due to District and customer efficiency improvements.

Figure 3.1: District Projected System Water Demand



4.0 Selection of Water Efficiency Activities

4.1 Summary of Selection Process

District Staff reviewed numerous resources to develop a list of water efficiency measures and programs that could be considered for implementation in order to reach the efficiency goals established in the Water Efficiency Management Plan. After attending several water conservation workshops, including the District's Water Conservation Work Session, reviewing several templates, CWCB guidance documents, and approved plans, Staff determined that the Colorado WaterWise document, "Guidebook of Best Practices for Municipal Water Conservation in Colorado", provided the best and most current review of water efficiency measures and programs to consider.

Screening Criteria

The District relied on the Guidebook for an initial screening of the measures, programs, and practices that exist and have been tested. Even the 226-page Guidebook only presented 14 Best Practices for initial consideration.

The Guidebook incorporated the Best Practices into several categories for consideration including:

1. Water System and Utility Best Practices (BP 1 – 6)
2. Outdoor Landscape and Irrigation Best Practices (BP 7 – 10) and
3. Indoor Residential and Non-Residential Best Practices (BP 11 – 14)

The measures were also evaluated to determine if the CWCB minimum required water conservation plan elements were addressed. The CRS§37-60-126(4) required CWCB elements include:

1. Water-efficient fixtures and appliances, including toilets, showerheads, and faucets.
2. Low water use landscapes, drought resistant vegetation, removal of phreatophytes, and efficient irrigation.
3. Water-efficient industrial and commercial water use processes.
4. Water reuse systems.
5. Distribution system leak identification and repair.
6. Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations.
7. Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner.
8. Regulatory measures designed to encourage water conservation.
9. Incentives to implement water conservation techniques, including rebates to customers.

The Guidebook was an invaluable tool to help evaluate and rank the initial list of Best Practices. The District thoroughly reviewed and considered each of the foundational, informational, and operational measures. The District also applied additional screening criteria based on Board and Staff input. Each Best Practice was further evaluated using the following criteria:

1. Statutory requirement - Several water conservation measures noted as Best Practices in the Guidebook are programs that are already mandated by Colorado State statute or are now required to be implemented for this plan to be approved. While Colorado's Water Conservation Planning requirement (CRS§37-60-126) does mention several plan elements that are to be considered, not all of them are required to be implemented. The District identified in the screening which of the Best Practices are required to be implemented.
2. System Applicability – The District is a very unique water system. The nature of the service area, the historical layout of the infrastructure, the water resources currently used, and the makeup of the customers all

provide obstacles to the direct implementation of some of the recommended Best Practices, including land use best practices. The District has no land use authority. Even though the District has no land use authority, the District hopes to collaborate with land use authorities within the District to work towards more water efficient landscapes.

3. Board Direction - The District Board of Directors provided input and guidance for the implementation of this Water Efficiency Management Plan. In general, direction was given to meet statutory conservation requirements while continuing to meet the needs of our customers by increasing District operational efficiencies, continuing public outreach, and implementing some new targeted conservation programs.
4. Financial Impacts – Providing quality water to customers at a fair and reasonable price is the District's reason for existence. All of the measures, or Best Practices considered are evaluated not only by the cost of implementation but also for the potential for lost revenue. Any decrease in water usage correlates directly to a reduction in revenue and will likely lead to increased rates.

List of Measures and Programs Considered

Each of the 14 Best Practices was screened with the above criteria in mind and the results are presented below in Table 4.1.

Table 4.1: Colorado Waterwise Best Practices

			Reasons for Inclusion or Exclusion					
	Best Practices Considered	Existing	Statutory requirement	System applicability	Board direction	Financial impacts	Further Evaluation	Comments
1	Metering	Yes	Yes				Yes	100 percent metered connections, CRS§37-97-103.
	Conservation-oriented rates	Yes	Yes				Yes	Increasing block rate, CRS§37-60-126 (4) (a)(VII). Increased; effective Jan. 1, 2019.
	Tap fees	Yes	No				Yes	Based on water demand and meter size.
	Customer categorization within billing system	Yes	No				Yes	Updated billing system in 2013 has better capability to track customer classes. Not NAICS compliant, some potential billing system limitations.
2	Integrated resources planning	No	Yes		Exclude		No	Required for this plan, CRS§37-60-126.
	Goal setting	Yes	Yes		Exclude		Yes	Required for this plan, establish both supply and demand side efficiency goals.
	Demand monitoring	Yes	Yes				Yes	Currently monitor demand, will use to track efficiency gains from implementing this plan.
3	System water loss control	Yes	Yes		Include		Yes	Currently monitor water balance, and repair leaks, CRS§37-60-126 (4) (a)(V).
4	Conservation coordinator	Yes	No					Currently a shared staff responsibility with a designated contact point, small system high cost.
5	Water waste ordinance	No	No		Exclude		No	Water Shortage Contingency Plan covers forced restrictions. Best handled by local building Codes, City and/or County implementation.
6	Public information and education	Yes	Yes		Include		Yes	CWCB AWWA M36 Water Audit grant, bill stuffers, newsletters, website, seminars, conservation fair.

		Reasons for Inclusion or Exclusion						
	Best Practices Considered	Existing	Statutory requirement	System applicability	Board direction	Financial impacts	Further Evaluation	Comments
9	Water efficient design, installation, and maintenance practices for new and existing Landscapes	No	Yes	Exclude	Exclude		No	Best handled by local building Codes, City and/or County implementation. No land use regulation authority.
10	Irrigation efficiency evaluations	Yes	No			Include	Yes	Free sprinkler audit program through Resource Central for all customers.
11	Rules for new construction, residential and non-residential	No	No	Exclude			No	Best handled by local building Codes, City and/or County implementation. No land use regulation authority.
12	High-efficiency fixture and appliance replacement for residential and non-residential sector	No	No		Exclude		Yes	Discussion of potential rebates to replace fixtures in the future.
13	Residential water surveys and evaluations, targeted at high demand customers	No	No			Include	Yes	May include links to audit tools in public information. No staff or funds to implement this program or regulate the professionals and / or designs.
14	Specialized nonresidential surveys, audits, and equipment efficiency Improvements	No	No			Include	Yes	May include links to audit tools in public information. No staff or funds to implement this program or regulate the professionals and / or <u>designs</u> .

Initial Screening of Efficiency Measures and Programs

Based upon the initial screening criteria the following Best Practices Guide were evaluated further for consideration and implementation the District:

Table 4.2: Best Practices Evaluated

Guidebook Best Practice	Best Practice Description
1	Metering
1	Tap fees
1	Customer categorization within billing system
2	Goal setting
2	Demand monitoring
3	System water loss control
6	Public information and education
12	High-efficiency fixture and appliance replacement for residential and non-residential sectors
13	Targeted high demand water efficiency surveys and evaluations for residential and non-residential sectors

4.2 Demand Management Activities

4.2.1 Foundational Activities

Additional SCADA / Telemetry Sites

The District currently has 56 radio telemetry sites spread out over the nearly 300 square mile service area. The telemetry sites have been installed in each new or upgraded master meter vault, pressure regulating valve vault or pump station over the past 25 years. The District has other sites that do not have telemetry. Installation of telemetry at these additional sites will provide more timely information and notification of distribution system problems or failures. This information will lead to better service for customers and more responsive leak identification and repair.

Demand Monitoring

The Colorado WaterWise “Guidebook of Best Practices” said it best, “Demand monitoring provides regular feedback on consumption patterns in a utility. Tracking demands over time is essential for determining if a conservation program is achieving the desired results. Without demand monitoring there is no way to determine if a conservation goal has been achieved.” The District will review changes to the demand patterns annually in order to monitor the effectiveness of the water efficiency programs and determine if goals need to be revised.

Tap Connection Fees

The District charges a tap connection fee that is based on a volume of deliverable water and the size of the connection and metering equipment, see Table 4.3. Water rates are based on the tap size and corresponding volume of water delivered. The fees charged for a tap are directly related to the use of system infrastructure and the raw water resources needed to meet the water demand. The District offers several different size taps from the standard 5/8-inch residential size tap up to a 4-inch non-residential tap. The District works with new customers to help guide them to the correct size tap in order to suit their water needs.

In 2016, the District developed and began offering an Urban Tap to provide a water service alternative for customers who are committed to efficient outdoor water use. In the 2012 Water Efficiency Management Plan, this tap was referred to as the Conservation Water Tap. Water dedication and water rates for the Urban Tap reflect normal inside water use but encourage significantly lower outside use as compared to the standard residential customer. Customers who choose this option are rewarded with a significant upfront cost savings on the tap connection fee but will have water rates that discourages high use. Currently, there is an \$8 per one-thousand-gallon surcharge added to the cost if the customer exceeds an annual allotment of 114,000 gallons. The District will continue tracking water use by Urban Tap customers to evaluate the cost and resource savings this tap option provides.

Table 4.3: District Water Tap Fees

Meter Size	Plant Invest Fee	Install Fee	Water Rights Acre-Feet	Current Water Rights Value	Total Cost
5/8-inch Urban	\$7,000	\$3,000	0.35	\$23,880	\$33,880
5/8-inch	\$11,000	\$3,000	0.70	\$47,600	\$61,600
3/4-inch	\$16,500	\$3,500	1.10	Must bring raw water	\$20,000 plus Raw Water
1-inch	\$27,500	\$4,000	1.80	Must bring raw water	\$31,500 plus Raw Water
1 1/2-inch	\$55,000	*\$1,825	3.50	Must bring raw water	\$56,825 plus Raw Water
2-inch	\$88,000	*\$2,920	5.60	Must bring raw water	\$90,920 plus Raw Water

*Developer must install. Fee is for materials.

Billing System Customer Categorization

The District finalized a new customer billing program in 2013. The new billing system will provide additional customer classifications that will be used for water usage

tracking. Better tracking information will also provide the District with a way to monitor progress toward meeting the water efficiency goals outlined in this plan.

High Efficiency Fixture and Appliance Replacement

District staff and Board discussed a rebate program to replace fixtures and appliances, specifically toilets and clothes washers with water efficient models.

Water Rates

The District's increasing block water rate structure encourages efficient water use. The inclining rate structure is utilized for all customers. Residential customers have a variable demand. However, some non-residential customers have high and fairly constant demands. The District has worked to set commodity rates at levels to encourage the residential customers to be more efficient summer irrigators without penalizing the non-residential customers. The District had a rate hearing in 2018 and approved a 3 percent increase for all tiers effective beginning January 1, 2019 (Table 4.4). The District's water rates have proved to be the most effective conservation tool and have helped reduce the need to impose and enforce strict outdoor watering schedules or monthly water use budgets.

The District will continue to evaluate the base fee, usage tiers and commodity rates as a part of the annual budgeting process. The District will continue to ensure that water rates are designed for cost stabilization, building reserve funds, promoting conservation, and providing equity between customer classes for funding new construction and replacement programs.

Table 4.4: District Monthly Water Usage Rates

Tap Size	Monthly Base Charge	Gallons Used	Rate per
			Thousand Gallons
*5/8-inch Urban	\$26.86	0 to 6,000	\$2.44
		6,001 to 15,000	\$3.07
		Greater Than 15,000	\$4.15
5/8-inch Standard	\$26.86	0 to 6,000	\$2.44
		6,001 to 25,000	\$3.07
		25,001 to 50,000	\$3.61
		Greater Than 50,000	\$4.15
3/4-inch Standard	\$29.10	0 to 9,000	\$2.44
		9,000 to 45,000	\$3.07
		45,000 to 90,000	\$3.61
		Greater Than 90,000	\$4.15
5/8-inch Non-Residential	\$26.86	0 to 6,000	\$2.44
		6,000 to 30,000	\$3.07
		30,000 to 60,000	\$3.38
		Greater Than 60,000	\$3.70
3/4-inch Non-Residential	\$29.10	0 to 9,000	\$2.44
		9,000 to 45,000	\$3.07
		45,000 to 90,000	\$3.38
		Greater Than 90,000	\$3.70
1-inch Non-Residential	\$37.15	0 to 15,000	\$2.44
		15,000 to 75,000	\$3.07
		75,000 to 150,000	\$3.38
		Greater Than 150,000	\$3.70
1 1/2-inch Non-Residential	\$69.89	0 to 30,000	\$2.44
		30,000 to 150,000	\$3.07
		150,000 to 300,000	\$3.38
		Greater Than 300,000	\$3.70
2-inch Non-Residential	\$84.63	0 to 48,000	\$2.44
		48,000 to 240,000	\$3.07
		240,000 to 480,000	\$3.38
		Greater Than 480,000	\$3.70
3-inch Non-Residential	\$157.00	0 to 105,000	\$2.44
		105,000 to 525,000	\$3.07
		525,000 to 1,050,000	\$3.38
		Greater Than 1,050,000	\$3.70
4-inch Non-Residential	\$229.44	0 to 189,000	\$2.44
		189,000 to 945,000	\$3.07
		945,000 to 1,890,000	\$3.38
		Greater Than 1,890,000	\$3.70

*The 5/8-inch Urban Tap rate allows for 114,000 gallons of usage per year. Usage overage results in a surcharge of \$8.00 per thousand gallons. Vacant Lot Base Fee = \$8.35

System Water Loss Control

The District's current leak detection program uses customer meters, pressure reducing valves, Supervisory Control and Data Acquisition (SCADA) communications and the billing database to track water use and leaks in the system. All known leaks in distribution lines are repaired in a timely manner and any leaks found on customer service lines are promptly reported to the customer. All leaks are recorded into the District's Geographic Information System (GIS) through Global Positioning Systems (GPS) and evaluated annually to assist in identifying what distribution areas of the District need to be addressed and upgraded.

In 2015, the District received a grant through CWCB that allowed the District to hire Peter Mayer from Water Demand Management to teach staff how to use the AWWA M36 water audit methodology and software to evaluate real and apparent losses from its distribution system and identify projects and policies that could reduce system water loss. District personnel from operations, engineering, management and customer service have worked on water accounting issues that may contribute to undocumented losses every year since Peter's engagement. Using the M36 Audit, the District identified several cost-effective projects to reduce system water loss. For example, it upgraded its master meters. In 2018, the District also started to replace residential and non-residential with AMR meters that can alert customers of high-water use through the smart phone.

The District is relying on guidelines presented in the AWWA Water Audit and Loss Control Program M36 manual and software to effectively manage the water delivery system. The District is currently participating in the Colorado Water Loss Initiative M36 water audit. Using information from leak repairs, meter testing and reading, distribution system flushing, and hydraulic modeling, the District is now more successful evaluating both apparent and real losses including accounting for metered and un-metered, billed and unbilled uses and losses.

Billing and Customer Meter Reading Practices

The District reads meters and sends bills monthly. The District uses automatic meter reading (AMR) to gather monthly usage data from customers. Customer connections have been retrofitted with radio read meters that can be monitored more easily. The District is currently working on a three-year customer change out program that will allow customers to view daily water usage data. Customers also receive a monthly consumption comparison on their bill automatically by the District's billing software and will be flagged for investigation if it falls outside the expected range. The District will alert customers immediately to determine if leaks may exist beyond the customer meter.

Each water bill shows the monthly water use and corresponding charge by tier. The bill also includes a chart depicting the customer's water usage in each of the previous 12 months. This chart helps the customer track their water consumption and compare it to historic practices.

Recycled Filter Backwash

The CLFP uses filters to remove organic solids from water in the treatment process. These filters become less efficient over time because of the solids that collect in them. Therefore, water is flowed backward through the filters periodically to remove the solids and restore the efficiency of the filters. The CLFP collects all of this backwash water in settling ponds adjacent to the plant. After settling, this water is returned to the filter plant for treatment. Approximately 1 percent of the total water production is recycled backwash water that has been treated.

Goal Setting

After a thorough screening of the Best Practices, District staff recommended that it would be in the best interest of the District to also address the following elements: 1). water waste ordinance; 2). allow availability of rebate programs to existing customers; 3). additional education and community outreach; 4). water budgets, information and feedback for high water users by adding price signals to over users after an evaluation of an acceptable amount of water for what the high-water user is trying to accomplish is completed; 5). replacement for high-efficiency fixtures and appliances. After staff presented recommendations, the Board decided to table these elements for discussion until the year 2020.

The District has established goals for the Water Efficiency Management Plan that are supportable, realistic, achievable, and financially sustainable. The goal to keep system losses under 600 acre-feet, or 10 percent (or less), and reduce system losses by 200 acre-feet over the next seven years will help reduce supply side losses. Residential customers will also be encouraged to reduce their water demand by 150 acre-feet and a 169 GPCD over the next seven years, measured by a reduction of the 2019 to 2025 average water usage. Non-Residential customers will be encouraged to reduce their water demand by 25 acre-feet over the same period. The District will evaluate its progress and adjust goals and / or programs to better fit the system as needed.

The District provides water service to properties within the planning areas of three counties and multiple municipalities who make decisions regarding water conservation standards and who can enforce them through the local political agencies where land use decisions are made, and ordinances are enacted. In addition, these agencies have the staff and code enforcement personnel to monitor and enforce these types of standards. The District would like to work towards collaborating more with land use authorities to work together on how water can be used more efficiently with land use decisions these authorities can enforce. The District has already begun taking steps in collaborating. In September 2019, the District attended the Growing Water Smart Workshop in Estes Park, CO with Weld County land use planners. The workshop allowed land use and water resource representatives from overlapping service areas to work together and brainstorm how to integrate the two. The entities discussed goals to work towards as a group including more open communication on what developments

are coming in and educating on raw water requirements. There was a follow up meeting in October 2019 with LTWD, CWCWD and Weld County. It was helpful to hear what other water districts are requiring for water, what steps they follow to deny or allow development in their water district, and what land use enforcement could help other water entities. Lack of communication and understanding of each other's needs was a common problem at this meeting as well. Since the District is only a small portion of Weld County, the county decided to host a Water and Planning Workshop in February 2020 and reached out to other towns, counties and water districts to understand what their water requirements and land use needs are. This has also motivated the District to collaborate with other land use authorities in the District to see if the District can work with them to include land use ordinances that will support more water efficient landscapes in future development.

The District promotes the Conservation Gardens and Landscape Seminars made available through the nearby NCWCD. The District also encourages efficient irrigation practices through progressive tiered water rates, Slow the Flow sprinkler audit program (free for all District customers) and tap fees and products including the Urban Tap.

The District will continue to refine the new billing system to better classify and separate different residential and non-residential accounts in order to establish a baseline for future water efficiency goals.

The selected programs and measures for implementation are based on guidance from the Colorado WaterWise "Guidebook of Best Practices". The District relied upon the Guidebook for the initial high-level elimination of programs that might not be appropriate to consider. The District further evaluated the 14 best practices in "Guidebook of Best Practices" to determine which of the programs made sense for this water system and could be supported politically and financially in the region.

4.2.2 Targeted Technical Assistance and Incentives

Level 1 Utility/Municipal Facility Water Efficiency

Rebates for soil amendment and low water use plants are currently available for customers with new homes as of January 1, 2016. The District did not track addresses of the rebates until 2018. There is not enough data to determine a significant difference in water usage for customers who have participated in these rebates.

Few customers have taken advantage of this program. This District is evaluating if the participation level can be increased by additional marketing or expanding of the program to customers with existing landscaping.

Level 2 Management of Largest Customer Demands

The District uses billing data to identify the largest water users in the District. By contract, some of the larger non-residential users such as dairies must provide

additional raw water if there is a continual exceedance of the initial raw water dedication. The cost of additional raw water should encourage large these entities to become more efficient. HOAs and other high-water users are contacted by the District or Resource Central in an attempt to get them to participate in the free sprinkler audit. The District does not have a non-residential audit program at this time to help agricultural users become more water efficient.

Level 3 Management of Remaining Customer Demands

A majority of master meters in the District have been changed out for more accurate readings and to reduce real loss within the system. These master meters serve other water entities. As previously mentioned, these entities have to transfer water to the District for the master metered water usage. The District has no water conservation authority over these entities. Bulk water is metered through fire hydrants. These users have to transfer water to the District as well.

4.2.3 Ordinances and Regulations

The District currently has no water efficiency ordinances or regulations as it has no land use authority. The responsibility to regulate and enforce water efficiency programs would fall primarily onto the towns and counties within the District. The District's most effective contribution to water efficiency is to encourage developers to limit outdoor use by offering taps that require less raw water to be dedicated such as an urban or indoor tap. The District is also hoping to collaborate more closely with land use authorities to work towards more water efficient landscapes.

4.2.4 Education Activities

New residential customers, before January 1, 2016 can participate in the soil amendment rebate and water saving rebates. New customers receive details about this program in their new customer packet when they purchase a tap. Additionally, the applications and additional information about the rebate programs are posted on the water conservation webpage as well. The soil amendment rebate covers costs up to \$500 and the water saving plant rebate cover up to \$250.

Residential and commercial customers receive bill stuffers at least once a year, if not twice, with information on Slow the Flow sprinkler audits through Resource Central. This service is free to all Little Thompson Water District customers. Additional information on this program can also be found on the District's water conservation webpage.

The District also provides tips to conserve both indoor and outdoor water use. There are instructions on how to look at a customer's water use history on the water conservation web page. District Staff also update the water conservation webpage to display current seminars or classes offered locally on water conservation and are also available to answer any questions customers may have on water conservation.

5.0 Implementation and Monitoring Plan

Each of the Best Practices selected for implementation at the District are expected to either increase District water conveyance efficiency or decrease customer water demand. A description of each of these Best Practices is presented below with some insight in to how each of the measures and programs will work as a part of the overall District Water Efficiency Management Plan. A summary of the selected water efficiency measures is also included in Table 5.1.

5.1 Implementation Plan

All of the proposed water conservation measures and programs will require staff resources for planning and coordination before implementation. Water savings resulting from implementation of this plan will occur gradually as the District has the resources to implement each selected measure and program and the water users respond to that implementation. Details for implementation are included in Chapter 6.

5.2 Monitoring Plan

Monitoring the success of this Water Efficiency Management Plan includes measuring water use as well as money spent on the selected conservation measures and programs.

As shown in Chapter 3, one way to monitor water use is per customer category. District population can be tracked according to tap equivalents and published people per household values. The GPCD can then be tracked from year to year to monitor progress. Per tap or tap equivalent usage can be calculated for each of the categories. Participants in the rebate and audit programs can be recorded and individual accounts tracked for specific water reductions.

Expenditures for conservation will be documented by District staff and reported to the Board on a regular basis. This will be valuable information in evaluating the benefit-cost ratio and to validate the success of implementing the selected conservation measures and programs. Since the programs will be implemented in phases, there will be time to evaluate and establish the appropriate method to monitor success of each program and measure. Table 5.2 identifies the tracking methods for each efficiency measure.

Table 5.1: District Efficiency Measures and Practices

Best Practice for Implementation	Existing/New Program	Best Practices Guidebook Expected Savings	Efficiency Goal	Comments
Metering and Demand Monitoring				
Customer and Master meter replacement program	New 2019	10 percent to 40 percent range with 15 percent being a recent estimate of the expected reduction in demand.	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Required by Statute, must be maintained for accurate billing and efficiency evaluation.
Master meter / distribution system meter maintenance / replacements program	New 2019	Not addressed directly.	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Maintaining system meters allows the District to effectively monitor usage patterns and identify leaks.
SCADA / telemetry installation program	Existing / Ongoing	Not addressed directly.	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Additional monitoring points will provide opportunities to monitor pressure, flow and usage throughout the system.
System Water Loss Control				
Evaluation of system losses with intermediate metering	Existing/Ongoing	Not addressed directly.	Reduce system losses by 200 acre-feet over a seven-year period.	New program to geographically compare master and system meters with customer meters to identify areas with the highest losses.
Operational SOP's for problematic service line failure	Existing/Ongoing	Not addressed directly.	Reduce system losses by 200 acre-feet over a seven-year period.	Procedures to address failure problems identified with certain types of service lines.
Conservation Oriented Equitable Rates				
Increasing block rate evaluation program	New 2019	10 percent to 30 percent estimate of the expected reduction in demand.	Reduce system demand by 375 acre-feet over a seven-year period.	Evaluate and adjust the increasing block rate structure as necessary to encourage efficient usage by customers.
Tap Connection Fees				
Matching customer demand with the correct tap size	Existing / Ongoing	Correct meter sizing can result in a 30 percent to 70 percent reduction in usage.	Reduce system demand by 375 acre-feet over a seven-year period.	Offer a range of tap sizes with corresponding tap fees to encourage customers to purchase the correct tap for anticipated water usage.
Monitoring use and impact of the urban tap	Existing / Ongoing	Not addressed directly.	Reduce residential customer demand by 150 acre-feet over a seven-year period.	Offer a conservation product to encourage customers to purchase the correct tap for anticipated water usage.
Billing System Customer Categorization				
New billing system customer categorization and tracking	Existing / Ongoing	"does not save water by itself, but enables targeting of water conservation initiatives at the customers that have the greatest potential to save"	Reduce non-residential customer demand by 25 acre-feet over a seven-year period.	Acquire a new billing system that provides tools to evaluate customers usage patterns based upon multiple classifications.
Water Efficiency Goals				
Establishing water efficiency goals	New 2019	Part of the integrated resource planning process and provides the incentive to develop and implement programs.	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	This Water Efficiency Management Plan establishes specific and measurable goals to gauge the effectiveness of conservation efforts on an annual basis.
Demand monitoring	Existing / Ongoing	"Without demand monitoring there is no way to determine if a conservation goal has been achieved".	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Improvements in system metering and billing system over the next few years will enable better monitoring of customer usage.

Best Practice for Implementation	Existing/New Program	Best Practices Guidebook Expected Savings	Efficiency Goal	Comments
Public Information and Education				
General public information disbursement	Existing / Ongoing	"Don't determine the success of a water public outreach campaign based exclusively on measured changes in water use"	Reduce residential customer demand by 150 acre-feet over a seven-year period.	Continue to provide access to water efficiency information through the website, seminars and literature.
Targeted informational campaigns	Existing / Ongoing, New 2019	"Don't determine the success of a water public outreach campaign based exclusively on measured changes in water use"	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Use monthly bills and inserts to communicate with customers. Add social media to get information to customers.
Remote meter reading equipment	New 2019	"Don't determine the success of a water public outreach campaign based exclusively on measured changes in water use"	Reduce system demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Make remote meter reading equipment available to customers for personal water use evaluation.
Soil Amendment and Water-Saving Plant Rebates	Existing / Ongoing	Eliminating inefficient water uses should be able to reduce annual consumption by 10 to 20 percent after implementing the recommendations of a carefully conducted site audit.	Reduce residential customer demand by 150 acre-feet over a seven-year period.	Provides customers an incentive to have a more efficient landscape.
High Efficiency Fixture and Appliance Replacement				
Targeted rebates for high efficiency fixtures	New 2019	"Replacing a 3.5 gpf toilet with a Water Sense labeled toilet can save 40,000 gal / household annually" full retrofit of toilets... been shown to reduce indoor demand by approximately 30 percent to between 35 and 40 gpcd.	Reduce residential customer demand by 150 acre-feet over a seven-year period.	Board discussed as a potential program due to a result of April 2019 Water Conservation Work Session
Targeted Water Efficiency Surveys and Evaluations				
Targeted audits for high use customers	Existing / Ongoing	Eliminating inefficient water uses should be able to reduce annual consumption by 10 to 20 percent after implementing the recommendations of a carefully conducted site audit.	Reduce customer demand by 375 acre-feet over a seven-year period. Keep real loss below 600 acre-feet.	Offer free sprinkler audits through Resource Central to all customers.

Table 5.2: District Efficiency Measures Tracking Matrix

Best Practice for Implementation	Number of Rebates	Individual Customer Water use	Customer Class Water Use	Per Capita Water Use	Unaccounted for Water	Peak and Annual Treated and Total Water Demand
	(A)	(B)	(C)	(D)	(E)	(F)
Metering and Demand Monitoring						
Customer meter maintenance / replacement program		X		X	X	X
Master meter / distribution system meter maintenance / replacements program					X	X
SCADA / telemetry installation program					X	X
System Water Loss Control						
Evaluation of system losses with intermediate metering					X	X
Operational SOP's for problematic service line failure					X	X
Conservation Oriented Equitable Rates						
Increasing block rate evaluation program		X	X	X		X
Tap Connection Fees						
Matching customer demand with the correct tap size		X	X	X		X
Monitoring use and impact of the conservation water tap		X	X	X		X
Billing System Customer Categorization						
New billing system customer categorization and tracking		X	X	X	X	X
Public Information and Education						
General public information disbursement						X
Targeted informational campaigns		X	X			X
Remote meter reading equipment		X	X			X
High Efficiency Fixture and Appliance Replacement						
Targeted rebates for high efficiency toilet retrofits	X	X	X	X		X
Targeted Water Efficiency Surveys and Evaluations						
Targeted audits for high use customers	X	X	X	X		X

- Notes:**
- 1. The number of rebates and / or giveaways will be tracked for those installations that have been verified.
 - 2. Water use prior and post installation will be tracked to determine if savings have occurred.
 - 3. These measures affect specific customer classes that can be tracked to determine savings.
 - 4. A reduction in the Gallons per Capita Water Use will show an overall savings.
 - 5. These measures track uses that are not billed but are supply side related.
 - 6. Reductions in peak and annual water use will show an overall savings.

6.0 Adoption of New Policy, Public Review and Formal Approval

6.1 Adoption of New Policy

On August 15, 2019 the Board was presented the 2018 Water Efficiency Plan for Public Review. Public comments ended October 31, 2019.

6.2 Public Review Process

One of the CWCB requirements for a Water Efficiency Management Plan is to publish a draft plan, give public notice of the plan, make the plan publicly available, and solicit comments from the public for no less than a 60-day period.

Because the District has had a conservation program in place since 1996, the public has become familiar with the conservation concept and activities. The District's public education program has contributed to this level of awareness. For this water planning process, the public was notified of the 71-day comment period from August 20, 2019, to October 31, 2019, and how to submit comments. Notifications were made in public places and in customer water bills. The plan was made available on the District's website and in its office for review. Written comments and responses to those comments are included in Appendix D.

6.3 Local Adoption and State Approval Processes

After the public comment period, the comments will be incorporated into the planning document as well as any additional revisions. The District Board will adopt the Plan and Staff will submit it to the CWCB. The CWCB will provide written notification of approval, conditional approval or disapproval within 90 days of submittal. Conditions for conditional approval or disapproval will be addressed if necessary.

6.4 Periodic Review and Update

The required schedule for updating the Water Efficiency Management Plan is seven years. The progress towards achieving the water savings goals will be monitored on an annual basis. The District will update this plan prior to seven years if implementation and actual water savings deviate too much. This deviation may be caused by several factors including higher than expected growth, less than anticipated participation or the inability to implement the plan due to lack of funding.

Appendix A: 2018 Raw Water Master Plan

Appendix B: Work Session Highlight and Best Practices List

Appendix C: Water Shortage Contingency Plan

Appendix D: Public Comments

For this water planning process, the public was notified of the 71-day comment period from August 20, 2019, to October 31, 2019, and how to submit comments. Notifications

were made in the District newsletter. The plan was available on the District's website and in the office for review.

There were written comments received during the public period. The comments were punctuation and clarification edits. The edits were incorporated into the Water Efficiency Management Plan. The District will continue to make the Water Efficiency Management Plan available and will incorporate comments into the Plan and the District's practices when appropriate.

The following notice was posted for public input:

"The Little Thompson Water District is pleased to announce the availability of the NEW Water Efficiency Management Plan for review and comment by our customers. This Water Efficiency Management Plan is currently available in hardcopy at the District office and online at www.ltwd.org. The Water Efficiency Management Plan will be submitted to the Colorado Water Conservation Board for approval upon completion of the public comment period and incorporation of public input. Your comments, concerns and questions can be directed to Amanda Hoff, District Water Resources Technician, at 970-344-6304 or ahoff@ltwd.org. The public comment period will begin on August 20, 2019, and close on October 31, 2019."

Appendix E: District Board Water Efficiency Management Plan Adoption

**LITTLE THOMPSON WATER DISTRICT: BOARD RESOLUTION 2019-18 FOR THE
ADOPTION OF A WATER EFFICIENCY MANAGEMENT PLAN**

WHEREAS,

the State of Colorado has declared that in view of the increasing competition and demand for water in the State of Colorado, it is the policy of the State to enhance the efficiency with which water is used to meet end uses, with the objective of making water available for all beneficial uses in Colorado; and

WHEREAS,

the State of Colorado enacted House Bill 91-1154 known as the "Water Conservation Act of 1991" and amended the bill through the "Water Conservation Act of 2004", §37-60-126 C.R.S, requiring publicly-owned entities with a legal obligation to supply, distribute or otherwise provide water at retail to domestic, commercial, industrial or public facility customers, and which have a total demand for such customers of two thousand acre-feet of more to develop, adopt, make publicly available and implement a water use efficiency plan; and

WHEREAS,

the Board of Directors of the Little Thompson Water District believes that it is in the best interest of the District and its customers to foster the conservation of the District's water by promotion and implementation of sound measures to enhance water use efficiency in order to serve all the water needs of the District, to assure the availability of adequate supplies for future uses and to assure that necessary water services are provided at a reasonable cost;

THEREFORE,

the Board of Directors of the Little Thompson Water District, Larimer, Weld, and Boulder counties, Colorado, formally adopts the Little Thompson Water District's "Water Efficiency Management Plan":

IN TESTIMONY WHEREOF,

the Board of Directors of the Little Thompson Water District, acting by and through its water activity enterprise, has caused this Water Conservation Plan to be signed by the facsimile signature of the President of the District, sealed with a facsimile of the seal of the District, and attested by the facsimile signature of the Secretary thereof, all as of the _____ day of _____, 2019.

LITTLE THOMPSON WATER DISTRICT
LARIMER, WELD, AND BOULDER COUNTIES
STATE OF COLORADO

*By:*_____

President

ATTESTED:

*By:*_____

Secretary

[SEAL]