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City of Fort Lupton

130 S. McKinley Avenue
Fort Lupton, Colorado 80621
www.fortluptonco.gov

Office: 303-857-6694
Fax: 303-857-6090

February 24, 2020

Mr. Ben Wade, CWCB
1313 Sherman Street, Room 721
Denver, CO 80203

RE: City of Fort Lupton Municipal Water Efficiency Plan Update

Dear Mr. Wade:

The City of Fort Lupton (City) would like to submit a locally adopted Municipal Water Efficiency Plan Update for review and approval by the Colorado Water Conservation Board's Office of Water Conservation and Drought Planning. This letter is also intended to meet the Cover Letter Submittal Requirements for CWCB review.

Name and contact information:

City of Fort Lupton
Attn: Chris Cross, City Administrator
130 S. McKinley
Fort Lupton, CO 80621
T: (303) 857-6694
ccross@fortluptonco.gov

List of organizations and individuals that assisted in plan development:

Clear Water Solutions, Inc.
Michelle Hatcher, Sira Sartori and Steve Nguyen

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Quantity of retail water delivery and population for past five years:

Table 1: Water Demand by Customer Category

Year	Total Treated Water (AF)	Total Water Usage (Billed to Customers) (AF)	Annual Non-Revenue Water (AF)	Percentage of Non-Revenue Water
2012	1,318	1,154	164	12%
2013	1,246	866	380	30%
2014	1,193	1,026	167	14%
2015	1,001	958	43	4%
2016	1,144	919	225	20%
2017	-	1,045	-	-
Average	1,180	995	196	16%

Notes: The averages exclude missing data.

Table 2: City of Fort Lupton Current and Projected Populations

Year	Projected City Population	Change in Population (2-yr increments)	Projected Population Growth
2018	8,586	426	5%
2020	9,507	472	10%
2022	10,527	523	10%
2024	11,655	579	10%
2026	12,905	641	10%
2028	14,289	710	10%
2030	15,336	301	7%
2032	15,956	313	4%
2034	16,600	325	4%
2036	17,271	339	4%
2038	17,969	352	4%

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Public review and comment information:

The City held its public review period from September 20, 2019, to November 19, 2019. Notification was posted in the Fort Lupton Press on September 18, 2019, announcing the public review timeframe and that a draft Plan would be available for the public to review at City Hall. The draft Plan was also posted on the City's website. During the public review period, the City received no comments on the Water Efficiency Plan.

The City is pleased with the Water Efficiency Plan that has been developed and will commit the resources necessary, as they become available, for the implementation of the Plan.

Please let me know if you have any further requirements.

Sincerely,

Chris Cross,
City Administrator

CITY OF FORT LUPTON

2018 MUNICIPAL WATER EFFICIENCY PLAN

clearWATERsolutions
water rights • planning • engineering

1625 Foxtrail Drive, Ste. 290 Loveland, Colorado 80538
(T) 970.223.3706 (F) 970.223.3763
www.clearwatercolorado.com

TABLE OF CONTENTS

TABLES AND FIGURES

LIST OF TABLES

LIST OF FIGURES

APPENDICES

EXECUTIVE SUMMARY

The City of Fort Lupton (City or Fort Lupton) is a business and family friendly municipality located at the intersection of Highway 85 and Highway 52 in Weld County. The City lies on the quieter eastern plains but is in close proximity to the main throughway of Interstate 25, with easy access to the Cities of Boulder, Greeley and the Denver metropolis. The South Platte River flows through the west side of the City, originating from snowmelt in the high-altitude areas of the Colorado Rockies. Fort Lupton residents enjoy a panoramic view of the scenic Rocky Mountains while being located only 30 minutes from the Denver International Airport. Fort Lupton provides water to its growing number of residents, commercial businesses, industries and agricultural water users and serves a population of approximately 8,160 people.

The purpose of this Municipal Water Efficiency Plan (MWEP *or* Plan) is to guide Fort Lupton in the process of water efficiency planning and implementation as it continues to grow and develop. This Plan will aid the City in water conservation to complement its existing comprehensive master planning activities and community goals. The benefits of water efficiency activities may include delaying the purchase of costly water supplies and infrastructure upgrades; reducing wastewater flows and treatment and associated costs; and improved water management and stewardship. Fort Lupton's goal is to optimize its existing water supplies and system through practical conservation measures while maintaining its high quality of life for residents.

The City's current water resources portfolio is comprised of treated (or potable) and non-potable water supplies. Fort Lupton's treated supplies include Colorado-Big Thompson Project (C-BT) water units and Windy Gap water. Fulton Ditch water rights and alluvial wells in the City provide non-potable water for irrigation of outdoor spaces. The City is also a participant in the future Northern Integrated Supply Project (NISP).

In this Plan, the City will perform five steps of municipal water efficiency planning as outlined in the Colorado Water Conservation Board's (CWCB) *Municipal Water Efficiency Plan Guidance Document* (Guidance Document); 1) profile of existing water supply system, 2) profile of water demands and historical demand management, 3) integrated planning and water efficiency benefits and goals, 4) selection of water efficiency activities, and 5) implementation and monitoring plan. The City has made proactive conservation efforts and will continue this commitment into the future.

This MWEP documents Fort Lupton's water system, past and future water use, and the water efficiency planning process used in accordance with the Guidance Document. This Plan evaluates a ten-year planning horizon from 2018 through 2027.

The City serves treated water to various customers including apartments, commercial users, hotels and motels, industrial users, multi-family units, residential homes, schools and hydrant meters (which includes construction project water). The customer category with the largest treated water use in the City is residential at nearly half the treated water use. The City also serves non-potable water to schools, the golf course, industrial users and the city parks. The largest non-potable use is industrial at 72% of the total non-potable water use.

The average annual treated water use by customers averaged 1,078 acre-feet per year (AFY) from 2010 through 2017 with non-revenue water averaging 244 AFY. The treated water demand for customer use and non-revenue water is projected to increase to 1,916 AFY by the end of the ten-year planning period. Water efficiency activities outlined in this planning effort have the potential to save up to 14% of annual treated water use. Additional savings can be expected from implementation of water efficiency activities targeting non-potable water use.

Past and Current Water Efficiency Activities

The City implemented several water efficiency activities; a summary is included in **Table ES-1**.

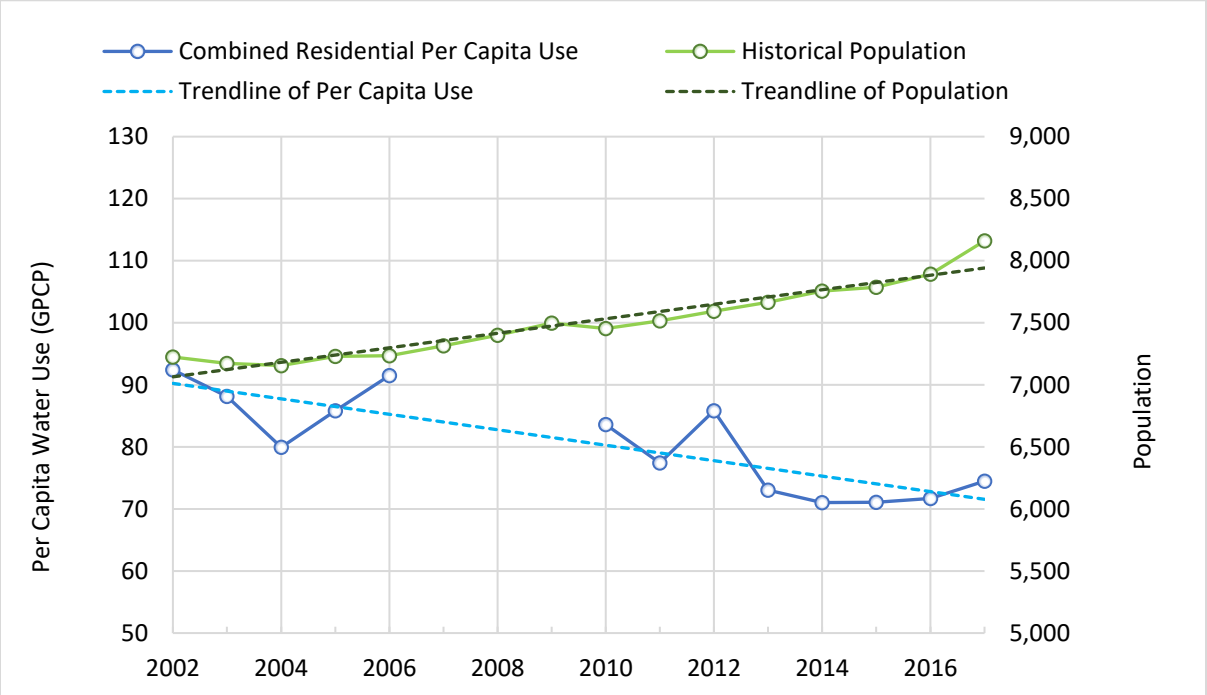
Table ES-1: Fort Lupton's Existing and Ongoing Water Efficiency Activities

Water Efficiency Activities	Approx. Date of Implementation
Foundational Activities	
Advanced Metering Infrastructure Installation and Operations	2019 and ongoing
Water Rate Study - Water Efficient Rate Structure with Regular Updates	Ongoing; 2007 and before
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	2016 and ongoing
Non-Potable Tiered Rates	Ongoing; 2007 and before
Increase WTP Efficiency	2017 and ongoing
Leak Detection and Water Line Replacement Program	Approx. 2008
Comprehensive Plans/Capital Improvement Plans	Ongoing; 2007 and before
General Monitoring and Verification Activities and General Water Rates and Billing	Ongoing; 2007 and before
Targeted Technical Assistance and Incentives	
Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses	2018 and ongoing
Ordinances and Regulations	
Weekly and Time of Day Outdoor Watering Restrictions	Ongoing; 2007 and before
Water Waste Ordinance	Ongoing; 2007 and before

Water Efficiency Activities	Approx. Date of Implementation
Landscape Design Ordinances and Restrictions	Ongoing; 2007 and before
Education Activities	
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	Ongoing; 2007 and before
Social Networking (Facebook & Twitter)	Approx. 2012
Water Facility Tours (Xeriscape Demonstration Garden Tours not included)	Ongoing; 2007 and before

The water savings from implemented water efficiency activities are challenging to quantify, especially the savings from activities related to human behavior (e.g. public education programs). A simple way to evaluate water savings is to calculate the per capita water usage and observe the trends over time. In general, there has been a downward trend in per capita treated water usage for Fort Lupton since 2002 as shown in **Figure ES-1**. Some of the variability in the per capita water usage is likely linked to the yearly fluctuations in temperature and precipitation. For example, 2000 through 2003, 2006 and 2012 were dry years which may explain the spikes in per capita water usage. This is linked to increases in outdoor water usage during dry years.

Figure ES-1: Residential Treated Water Use and Population Trends



Notes: Data is missing for the combined residential per capita use from 2007 through 2009. Combined residential per capita water usage includes the following customer categories: residential, apartment, multi-family.

A preliminary set of water savings goals were developed prior to the selection of the water efficiency activities for implementation to provide a means to screen and evaluate potential activities. The following preliminary goals were established:

- The targeted water savings goal for this Plan will be to lower the total treated water use by 10% over the ten-year planning period.
- The targeted ten-year water reduction goals for the following customer categories are as follows:
    - Apartment: 15.0%
    - Commercial: 5.0%
    - Hotels and Motels: 5.0%
    - Industrial: 5.0%
    - Multi-Family: 15.0%
    - Residential: 15.0%
    - School: 5.0%
    - Hydrant Meters: 5.0%
    - Non-Revenue Water: 3.0%
- To develop a water efficiency program that can be implemented within City staffing constraints and with City Council approval.
- To implement water efficiency activities that are compatible with the community.

The success of the stated goals are measured through monitoring of billing data, screening and evaluating activities that are acceptable to City Staff, and soliciting City Council and community feedback on water efficiency activities. After the preliminary set of goals were established, Fort Lupton used a four-phase process for selecting and fully evaluating water efficiency activities. The four phases include: 1) assessment; 2) identification; 3) qualitative screening; and 4) evaluation and selection. The stated goals were then reevaluated based on the City's selected water efficiency activities.

As part of the qualitative screening process, City Staff used the following criteria to evaluate the preliminary list of activities: 1) High benefit to cost of implementation; 2) Public acceptance; 3) Staff and Council Approval. Activities not meeting the screening criteria were eliminated. The following activities were chosen by the City for implementation:

Foundational Activities

- System Wide Water Audits
- Advanced Metering Infrastructure Installation and Operations
- Water Rate Study – Water Efficient Rate Structures with Regular Updates
- Tap Fees with Water Use Efficiency Incentives
- Non-Potable Tiered Rates
- Increase Water Treatment Plant Efficiency
- Leak Detection and Water Line Replacement Program
- Comprehensive Plans/Capital Improvement Plans
- General Monitoring and Verification Activities and General Water Rates and Billing

Targeted Technical Assistance and Incentives

- Slow the Flow Commercial Irrigation Audits
- Slow the Flow Residential Irrigation Audits
- Xeriscape Incentives – Garden in a Box
- Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses
- Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses
- Inject Wetting Agent at Golf Course
- Rain Barrels

Ordinances and Regulations

- Weekly and Time of Day Outdoor Watering Restrictions
- Water Waste Ordinance
- Landscape Design Ordinances and Restrictions
- City Facility Requirements
- Commercial Water Wise Use Regulations

Education Activities

- Paper Education Campaigns
- Interactive Webpages and Website Updates
- Social Networking
- K-12 Education Program
- Water Facility Tours and Demonstration Garden Tours
- Children's Water Fair or Festival
- Post or Distribute ET Irrigation Scheduling

Table ES-2 compares the initial water savings goals at the beginning of this planning effort (10% in ten years) to the final water savings goals projected for the City's selected activities. Over a ten-year period, the selected water efficiency activities could provide an overall water savings of up to 2,679 AF[1] or 264 AF annually. This represents an overall reduction from Fort Lupton's forecasted treated water demand of up to 14% annually or up to nearly 17% (see footnote 1) if the selected activities are implemented over a ten-year period.

[1] This volume includes the compounding effects of certain activities over a ten-year period so it's higher than the annual water savings.

Table ES-2: Water Efficiency Goals Comparison

Water Use Categories:	Total Projected Water Use (2018 to 2027)	Reduction Goals for Planning Horizon		Adjusted Reduction Goals for Planning Horizon	
				Total Water Savings from Activities	Resulting Reduction
	(AF)	(%)	(AF)	(AF)	(%)
Apartment	709	15%	106	139	20%
Commercial	2,468	5%	123	340	14%
Hotels & Motels	67	5%	3	9	14%
Industrial	860	5%	43	114	13%
Multi-Family	1,164	15%	175	226	19%
Residential	7,236	15%	1,085	1,447	20%
School	458	5%	23	51	11%
Hydrant Meters	212	5%	11	14	7%
Non-Revenue Water	2,830	3%	85	340	12%
Total	16,004		1,654	2,679	

Implementation and Monitoring Plan

The implementation plan defines the process necessary to carry out the selected water efficiency activities. The City Administrator and Assistant City Administrator will be chiefly responsible for coordinating and delegating tasks to City Staff. Other departments will have roles in implementing some of the selected activities in this Plan including: Public Works, Finance, Utility Billing, Parks/Golf Course, Facilities and Planning Departments. For some activities, the City Staff may partner with other organizations.

The City intends to implement new Foundational Activities in the next seven years, Targeted Technical Assistance and Incentives activities in the next five years, Ordinances and Regulations in the next ten years and the Education Activities in the next three years.

A monitoring plan outlines the City's process to monitor the progression of the implementation plan. Monitoring various types of data is beneficial in tracking the water savings generated from implementing an MWEP. The demand data, which will be collected during the monitoring period of the Plan, is presented in **Table ES-3**. Fort Lupton currently monitors the data outlined in Table ES-3.

Table ES-3: Selection of Demand Data for Efficiency Plan Monitoring

Monitoring Data	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily
Total Water Use								
Total treated water produced (metered at WTP discharge)					X	X		
Total treated water delivered (sum of customer meters)	√				X	X		
Raw non-potable deliveries					X	X		
Per capita water use					X			
Indoor and outdoor treated water deliveries					X	X		
Non-revenue water	√				X			
Water Use by Customer Type								
Treated water delivered		√			X	X		
Raw non-potable deliveries					X	X		
Residential per capita water use					X			
Unit water use (AF/account)					X			
Indoor and outdoor treated water deliveries					X	X		
Large users					X	X		
Other Demand Related Data								
Population					X			
New taps					X	X		

Water efficiency planning is the most successful at creating long-term water savings when the conservation efforts are reevaluated on an ongoing basis instead of a "one-time" planning effort. The next Plan Update is scheduled to be completed in seven years or 2024.

INTRODUCTION

The City of Fort Lupton (City *or* Fort Lupton) is a business and family friendly municipality located at the intersection of Highway 85 and Highway 52 in Weld County. The City lies on the quieter eastern plains but is in close proximity to the main throughway of Interstate 25, with easy access to the Cities of Boulder, Greeley and the Denver metropolis. The South Platte River flows through the west side of the City, originating from snowmelt in the high-altitude areas of the Colorado Rockies. Fort Lupton residents enjoy a panoramic view of the scenic Rocky Mountains while being located only 30 minutes from the Denver International Airport.

Lieutenant Lancaster Lupton established Fort Lupton as a trading post in 1836, and it soon became a crossroads for exchanging animal pelts with agricultural goods and manufactured items. In 1870, the Denver Pacific Railroad was constructed through Fort Lupton and connected Denver to Cheyenne. New residents and commercial businesses settled in Fort Lupton, and the City was later incorporated in 1889. Agriculture grew in the late 1800s, and industry began to develop in the 1900s. The rich historical background helps to shape the City today, with several historic buildings from the 20th century lining the main street. Today, the City prides itself on its numerous parks, beautifully maintained 18-hole golf course, modern community recreation center and the historic main street.

The purpose of this Municipal Water Efficiency Plan (MWEP *or* Plan) is to guide Fort Lupton in the process of water efficiency planning and implementation as it continues to grow and develop. This Plan will aid the City in water conservation to complement its existing comprehensive master planning activities and community goals. The benefits of water efficiency activities may include delaying the purchase of costly water supplies and infrastructure upgrades; reducing wastewater flows and treatment and associated costs; and improved water management and stewardship. Fort Lupton's goal is to optimize its existing water supplies and system through practical conservation measures while maintaining its high quality of life for residents.

The City's current water resources portfolio is comprised of both treated (potable) and non-potable water supplies. Fort Lupton's treated supplies include Colorado-Big Thompson Project (C-BT) water and Windy Gap water. Fulton Ditch water rights and alluvial wells in the City provide non-potable water for irrigation of outdoor spaces. The City is also a participant in the future Northern Integrated Supply Project (NISP).

In this Plan, the City will perform five steps of municipal water efficiency planning as outlined in the Colorado Water Conservation Board's (CWCB) *Municipal*

Water Efficiency Plan Guidance Document (*Guidance Document*): 1) profile of existing water supply system, 2) profile of water demands and historical demand management, 3) integrated planning and water efficiency benefits and goals, 4) selection of water efficiency activities, and 5) implementation and monitoring plan. The City has made many proactive conservation efforts to-date and will continue this commitment into the future.

Several documents and sources were reviewed and utilized to develop the recommended water efficiency activities. The *Guidance Document* was used as a guide to develop this Plan. The City's *Picture Fort Lupton: 2018 Comprehensive Plan*, *2018 Parks and Trails Master Plan*, design standards, water usage data, contract and water rights information were used as resources. Fort Lupton's website and other web pages were also used as additional resources to help in this planning effort. There are many acronyms, terms, and terminology that are commonly used in water efficiency and water planning, and some additional terms are common in this geographical area. A list of terms and their meanings is included in **Appendix A**.

City of Fort Lupton. Photo credit: Fort Lupton's Facebook page.

SECTION 1.0 – PROFILE OF EXISTING WATER SUPPLY SYSTEM

1.1 Overview of Existing Water Supply System

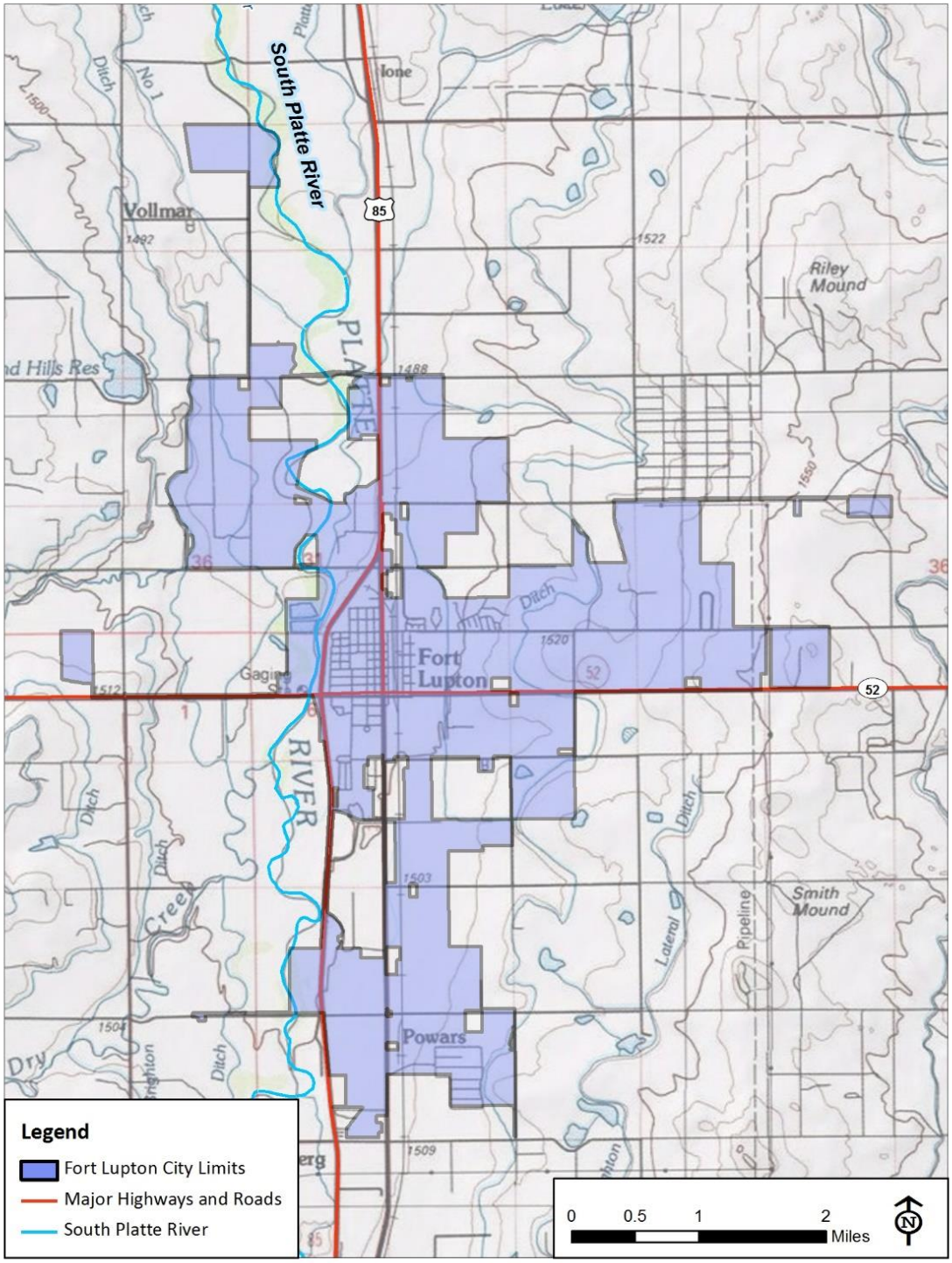
Service Area

The City of Fort Lupton is approximately 24 miles east of Boulder, 23 miles south of Greeley and 26 miles north of Denver with easy access to Interstate 25 and Interstate 76. Fort Lupton is located in the scenic South Platte River Basin. The South Platte River Basin is considered over-appropriated, meaning the natural streamflow is not sufficient to meet all the needs of water rights holders in the basin. The City recognizes water conservation as part of its overall plan for smart growth and development.

The City serves treated water to various customers including apartments, commercial users, hotels and motels, industrial users, multi-family units, residential homes, schools and hydrant meters (which includes construction project water). The customer category with the largest treated water use in the City is residential at nearly half the treated water use. The City also serves non-potable water to schools, the golf course, industrial users and the city parks. The largest non-potable use is industrial at 72% of the total non-potable water use.

The water service area boundary is nearly 11.2 square miles (7,141 acres) and is the same as the City limits. Much of the City's residential homes and commercial businesses are located at the intersection of Highway 85 and Highway 52. **Figure 1** shows the City limits which is also the water service area boundaries.

Figure 1: City of Fort Lupton and its Water Service Area



Water Supply

Fort Lupton's treated water supply portfolio consists of C-BT and Windy Gap water, and its non-potable supplies consists of Fulton Ditch shares and alluvial wells. The estimated annual yields of the City's water supplies are shown in **Table 1**.

Table 1: Summary of Fort Lupton's Water Supply

Water Source	No. of Shares or Units	Yield per Share or Unit (AFY)	Total Yield (AFY)
Potable Sources			
Colorado-Big Thompson (C-BT) Units	3,115	0.7	2,181
Windy Gap	13	100	1,300
Non-Potable Sources			
Fulton Ditch Shares	211.9	3.8	805
Alluvial Wells	n/a	n/a	Per Augmentation Plan

Note: AFY is acre-feet per year. One acre-foot is the equivalent of covering one acre of land with one foot of water, or 325,851 gallons.

C-BT Project Water and Windy Gap Water

The Northern Colorado Water Conservancy District (Northern Water) manages the C-BT Project, which imports an average of 213,000 acre-feet (AF) of water from the Western Slope to the Eastern Slope of Colorado across the Continental Divide. It captures melting snow in the upper Colorado River Basin for use in the South Platte River Basin. It is the largest trans-mountain water diversion project in Colorado and was constructed by the Bureau of Reclamation between 1938 and 1957. The C-BT water consists of 310,000 units. The yield of each C-BT unit is established by quota each year by the Northern Water Board. The quota ranges from 50% (or 0.5 AF per unit) to 100% (or 1.0 AF per unit). The City has 3,115 C-BT units.

The Windy Gap Project uses many of the same structures as the C-BT Project. It was constructed in 1985 and diverts water from the Colorado River to Lake Granby and is delivered through the Adams Tunnel to the Eastern Slope. The City has 13 shares of the Windy Gap project.

Because the C-BT system has reservoirs to store water throughout the year, both C-BT and Windy Gap water can be delivered year-round. Fort Lupton uses its C-BT units

primarily in the summer months, and its Windy Gap Project water primarily in the winter months.

Fulton Ditch Shares

Currently, the City has a total of 211.9 shares of the Fulton Ditch, which diverts from the South Platte River. The City purchased additional shares since *the 2007 Water Conservation Plan*. This water right is seasonal and typically delivers water from April to October when the water right is in-priority in the Colorado water rights system. Ditches along the Front Range begin diverting water during the spring runoff period when snowpack in the Rocky Mountains east of the Continental Divide melts and supplies the South Platte River. The Fulton Ditch water is used for augmentation of the City's wells by routing the water back to the South Platte River.

Alluvial Well Water

The City owns several wells for non-potable irrigation of its parks, schools, open space areas and its golf course. It also supplies a local power plant operated by Tri-State Generation and Transmission Association (Tri-State) as a back-up supply of 70 AF per year. The natural gas-fired power plant provides electric power through Public Service throughout the State of Colorado and uses the City's well water for cooling of its electric generators. A portion of the water is also delivered to the Olsson's Greenhouse facility to grow vegetables. The water source of the wells is the South Platte River alluvium. Since the *2007 Water Conservation Plan*, the City lost Well No. 1 to a sinkhole but intend to bring another well into the system. A list of the wells is provided in **Table 2**.

Table 2: Well Information

Well No.	Permit No.	Legal Description
1*	19493-1/RF-151	NE1/4, SE1/4, Sec 6, T1N, R66W
3	19493-3/RF-545	NE1/4, NE1/4, Sec 6, T1N, R66W
4	12626-R	NW1/4, NE1/4, Sec 6, T1N, R66W
5	20026-R-R	SE1/4, SE1/4, Sec 6, T1N, R66W
13	15273-R-R	SE1/4, SW1/4, Sec 32, T2N, R66W
18	6588-RF/34329-F	SE1/4, NW1/4, Sec 6, T1N, R66W

*Note: Well No. 1 was lost in a sinkhole and is no longer active.

Water Reuse

Fort Lupton's water supplies are not reclaimed and reused by the City. The C-BT Project water supply is a one-time use supply. The Windy Gap water supply may be used to extinction, and the City uses the reusable portion after initial potable use for well augmentation and return flow obligations. The non-potable supplies are used for irrigation and/or augmentation. The City's supplies are used for potable use, augmentation or needed to maintain return flows, which limits the City's ability to reuse supplies.

Key Existing Facilities

Treated Water System

The City of Fort Lupton receives its C-BT and Windy Gap Project water from Carter Lake through a 20-inch pipeline that flows south from the Town of Platteville. Water from the C-BT system is treated at the City's Water Treatment Plant (WTP) that is shared with the Town of Hudson. There is a storage reservoir located at the WTP with a capacity of 250 AF that is shared with Tri-State. In early 1997, the City shifted its water supply from well water to C-BT water when it constructed a 3-million-gallon (MG) per-day WTP. The Town of Hudson participated in 1/6th of this WTP construction. In 2001, the City expanded the WTP to a capacity of 5 MGD. Hudson did not participate in the enlargement. After treatment, the water is delivered to both the City of Fort Lupton and the Town of Hudson. Fort Lupton's residents are served treated water via a 3-MG storage tank and subsequently two 1-MG water tanks (also referred to as the Tank Farm) located on College Avenue, just west of Aims Community College. The water is distributed from this Tank Farm to the City's customers.

Non-Potable Water System

The City uses alluvial wells connected through a manifold system to irrigate the golf course and to fill a 1-MG tank at the Tank Farm. Water from this 1-MG tank is used to irrigate City open spaces, and to deliver water to the Tri-State Power Plant and Olsson's Greenhouse. One well owned by the City (located on the west side of the river) is used to irrigate the Pearson Park and for minor water uses within the Wastewater Treatment Plant (WWTP). This well operates separately from the wells on the manifold.

The Fulton Ditch diverts water from the South Platte River near Thornton, Colorado and flows north through the City of Fort Lupton east of Highway US-85. Currently, Fulton Ditch supplies water to irrigate the golf course and the Coyote Creek development through metered irrigation taps. The City's Fulton Ditch water is also routed back to the South Platte River for augmentation of the City's well use. Effluent from the WWTP is also used for augmentation.

1.2 Water Supply Reliability

Water Supply Gap

Water supply reliability is the ability of the City's water supplies to meet the needs of its customers during times of stress and to sustain future growth. In 2003, the Colorado General Assembly authorized the CWCB to implement the Statewide Water Supply Initiative (SWSI) as a result of growing pressure on water supplies in Colorado and the 2002 drought. The study identified current and future water demands, available water supplies, and existing and planned water supply projects in eight major river basins in the State of Colorado. SWSI was updated to SWSI 2010, which projects demands to 2050 and includes passive water conservation savings. Passive savings includes such things as future development using more efficient water fixtures in the building process.

The SWSI 2010 report identified a 58% gap between water needs and water supplies in the South Platte River Basin by 2050. Water efficiency is one method the SWSI report identified for meeting this gap. Similarly, Colorado's Water Plan 2015 also identified water conservation as a key part of meeting the gap between supply and demand. Lowering the per capita water demand through conservation helps efficiently manage and maximize the water supply.

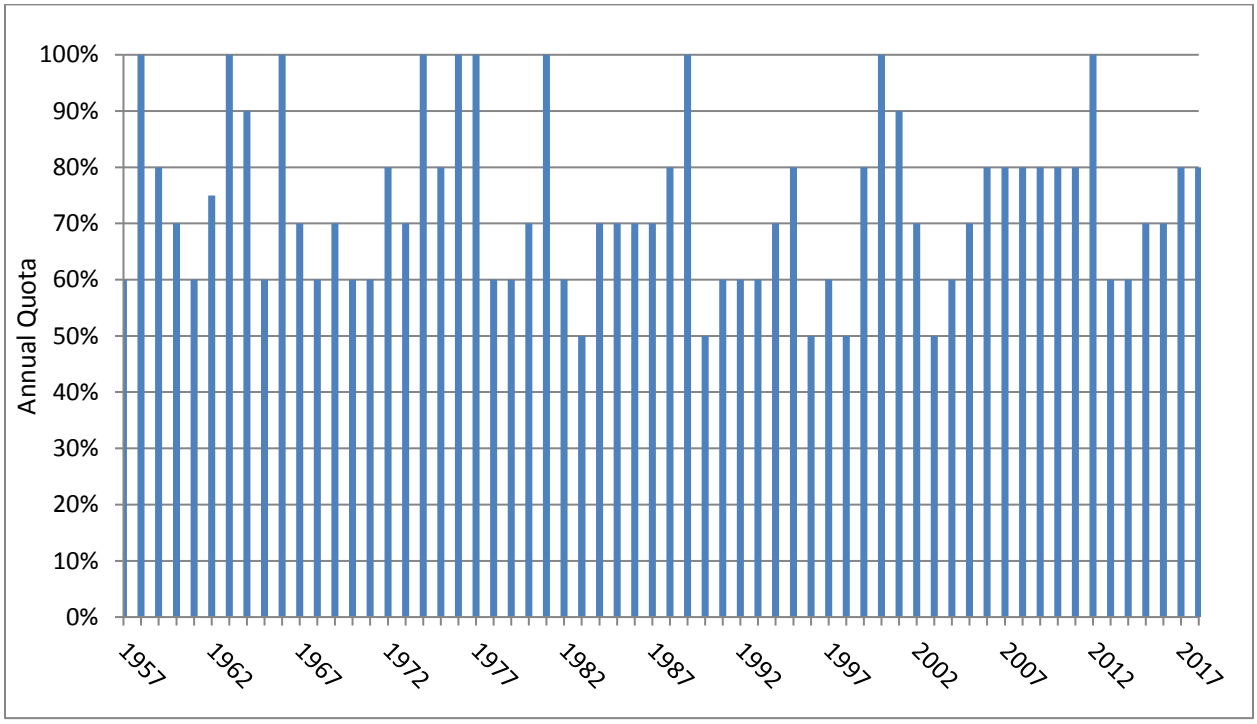
Current Water Supply Reliability

C-BT Project Water Reliability

The Northern Water Board examines the region's native supplies and local storage before declaring a quota that meets the supplemental need of the region as a whole. As a result, the quota is typically lower in wet years because native supplies are plentiful and local reservoirs are full, so less C-BT water is required to satisfy water demands. In dry years, the quota is typically higher to meet the higher demand for water. As C-BT continues to transfer from agricultural to municipal use, the landscape of using C-BT units as a supplemental supply is changing.

The C-BT Project system has approximately 740,000 AF of reservoir storage. There is over two times the storage than would be needed to deliver a 100% quota. This gives the C-BT system some drought reliability. In over 50 years of C-BT Project operation, the average yield has been 0.7 AF per unit, and the commonly used average quota is 70%. The yield has never been less than 0.5 AF per unit (50% quota) or more than 1.0 AF per unit (100% quota). Most providers use a 50% quota to estimate the firm yield for C-BT units. The City has a firm yield of 1,558 AF per year for its C-BT units assuming a 50% quota. The average yield assuming a 70% quota is 2,181 AFY as shown in **Table 1**. The historical annual quota established by the Northern Water Board is shown on the following **Figure 2**.

Figure 2: Historical C-BT Quotas (1957 – 2017)



Windy Gap Water Supply Reliability

The Windy Gap Project is located on the West Slope of the Rocky Mountains near Granby. The permits and Water Court decrees for the Windy Gap Project allow diversions up to 90,000 AFY or a ten-year running average of 65,000 AFY. The project yields closer to 48,000 AFY and provides a trans-mountain water supply for several municipalities along the Front Range of Colorado. Windy Gap is junior to C-BT. If Lake Granby spills, the Windy Gap account spills first. Chimney Hollow Reservoir, currently in permitting phase, will be constructed to firm Windy Gap water (i.e., Windy Gap will be diverted and stored in Chimney Hollow prior to Lake Granby spilling). Eventually with firming storage, the Windy Gap Project is estimated to yield 100 AFY per share on average, or 1,300 AFY for the City's 13 shares.

Fulton Ditch Share Reliability

Each share of Fulton Ditch water delivers approximately 3.8 AF and has an estimated historical consumptive use value of 1.75 AF per year. Ditch water right yields in Colorado are dependent on weather conditions such as snowpack, precipitation and temperature.

1.3 Supply-Side Limitations and Future Needs

Water Supply Limitations

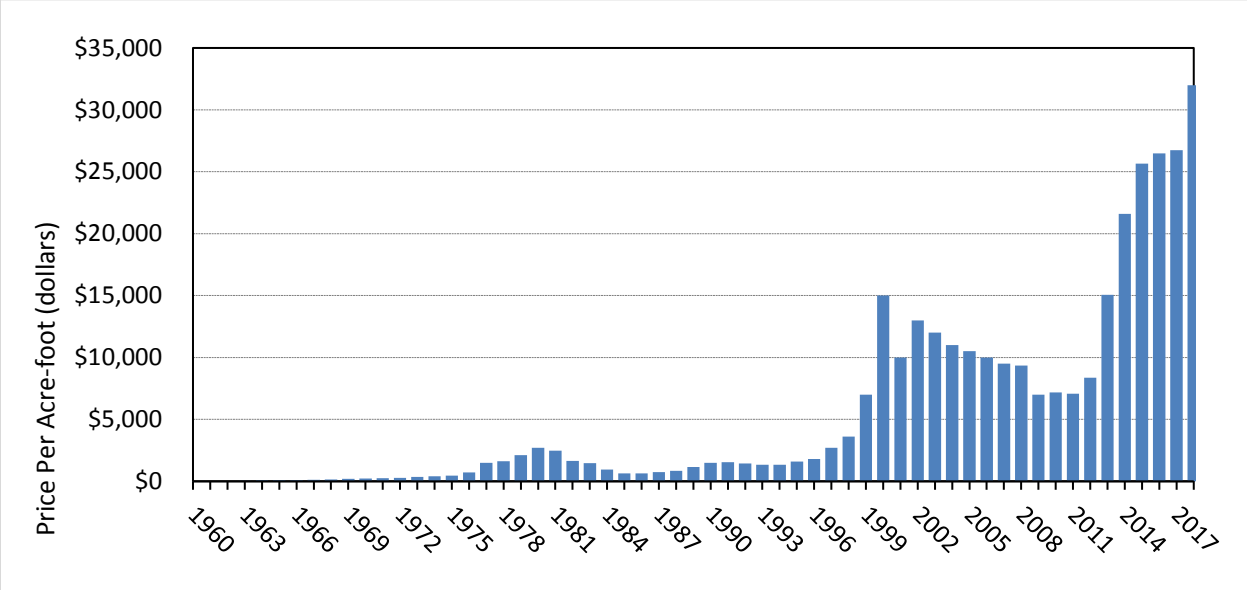
General water supply limitations are summarized in *Worksheet A* of **Appendix B**. Worksheet A is from the *Guidance Document* and provides an overview of limitations and how limitations will be addressed in the future.

C-BT Water Limitations

One water supply limitation is the physical supply of the City's C-BT water. C-BT units are stored in Lake Granby on the Western Slope of Colorado. Should a fire ever occur in that area, water quality would be a major issue for C-BT Allottees. There is a large amount of beetle kill to trees surrounding Lake Granby, Grand Lake, and other C-BT Reservoirs. This beetle kill poses a potential increase risk of fire. Fort Lupton would have to treat large quantities of water degraded from ash and soot runoff. This has been an ongoing issue for other water treatment facilities when fire has been present in a basin used for raw water supply. In addition, East Slope C-BT storage, once segregated from the system to avoid contamination, is not enough storage to meet demands, particularly in a drought.

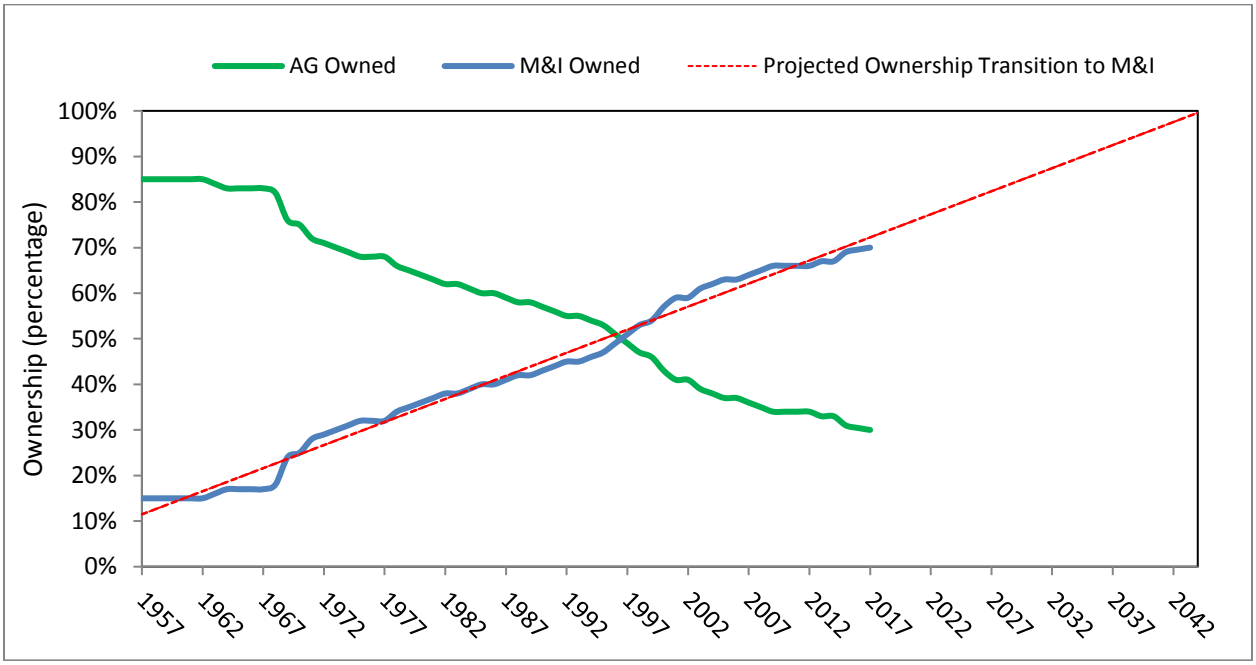
Another key limitation in developing Fort Lupton's water portfolio is the significant price increase for municipal water along the Front Range of Colorado. This is evident in the price of CB-T units. In 1965, C-BT water could be purchased for $100 per AF while a recent acquisition of C-BT units was approximately $42,000 per unit. This equates to $84,000 per AF at a 50% firm yield. Since C-BT water is so versatile, the market value of its units has increased and is a good indication of the price for municipal water. **Figure 3** shows how the price of C-BT units has varied from 1960 to 2018. The price per AF was driven up significantly in the early 2000s and then again in 2013 when the value nearly doubled following the 2012 drought.

Figure 3: Historical Market Price of C-BT Units



As reflected in the price increases, C-BT units are in great demand and are converting from agricultural use to municipal and industrial use rapidly. At the current rate of acquisition, it is projected that minimal (if any) C-BT units will be available by the year 2045. The transition is illustrated in **Figure 4**.

Figure 4: C-BT Unit Ownership Transition over Time



Notes: AG stands for agricultural; M&I stands for municipal and industrial.

Windy Gap Water Limitations

The Windy Gap Project water supply limitations are similar to those of the C-BT project water since this project shares many of the same structures in the system. In addition, when Lake Granby is at its capacity, there isn't storage space to hold Windy Gap Project water and the yield per share is limited. This typically happens in wet years. To make this water supply more reliable, the Windy Gap Firming Project is in development and will add an additional storage reservoir to the system, the 90,000 AF Chimney-Hollow Reservoir on the East Slope. Ultimately, Windy Gap Reservoir was constructed to act as a forebay to store water short-term before it goes into Lake Granby so the addition of the Chimney-Hollow Reservoir will improve the project yield by storing captured water under the original Windy Gap Project water rights. Construction of this reservoir is anticipated to be complete with water storage in 2023. Fort Lupton is one of the 12 participants in the Windy Gap Firming Project.

Fulton Ditch Water Limitations

The Fulton Ditch water owned by the City is used for irrigation of the golf course and augmentation of its well usage. The City's shares are sufficient to meet current needs. The City will continue to need additional Fulton Ditch water or other augmentation water sources as it grows. The primary concerns with Fulton Ditch water is its cost due to increased demand for the water. Also, if it is used for any use other than irrigation, i.e. augmentation, the winter return flow component must be maintained at the South Platte River. Although the Fulton water delivers seasonally from April through October, use of the water for augmentation requires replacements year-round. The City must manage its water supplies to maintain these year-round replacements. In addition, the water supply is based on streamflow conditions per year which vary. There have been several severe drought years since 2000.

Well Water Limitations

The well water is available year-round and is generally reliable as the alluvial aquifer is replenished each year. The wells were constructed many years ago but on-going maintenance and repair have extended the life of these wells. One drawback to well water is the groundwater is high in total dissolved solids and nitrates. Another drawback is the use of the water requires augmentation. Since the City will continue to operate its wells for irrigation and industrial uses, it must plan on addressing augmentation now and into the future.

City System Limitations

Infrastructure

The City water system currently consists of a "High Pressure Zone" and a "Low Pressure Zone" to provide water to its residents. These zones refer to the location of the zone with respect to geographic location and elevation, not the actual pressure supplied to residents. To accommodate future growth, the City will need new infrastructure to serve areas outside of the existing pressure zones.

In terms of factors that affect the long-term reliability and adequacy of the piping system, the water mains can be categorized into two types – waterlines constructed prior to the mid-1970's and waterlines installed subsequent to the mid-1970's. The older waterlines have shown significant problems with tuberculation or deposition of minerals from the pre-1997 well water system. In practice, these waterlines will eventually need to be replaced to recapture the capacity of the distribution system. The City has rehabilitated some waterlines to-date and continues to budget for replacements of waterlines, valves and other system parts.

Water Quality

The City encountered a unique water quality problem when it transitioned to C-BT water. The well water that was historically delivered through the pipe distribution system had high hardness levels. As a result, this caused a build-up of minerals along the pipe walls. When the City changed to the much softer C-BT supply in 1997, the softer mountain water caused the historic build-up of mineral deposits to begin to permeate back into the water supply, thus impacting water quality. From 1997 through the summer of 2005, the City blended sufficient well water with the C-BT to maintain an acceptable level of hardness in the finished water supply to prevent this from occurring. The City performed a water quality study in 2005 and ceased the use of groundwater for blending in June 2005. The City is now adding minimal levels of Zinc Phosphate into the mountain water supply to keep the build-up intact while providing an improved water supply to its constituents. As the City replaces outdated infrastructure within its distribution system in the future, the use of Zinc Phosphate will reduce and eventually be eliminated.

Future Water Supplies

The City's proposed participation in NISP will help bolster Fort Lupton's water supply for future growth. NISP is a regional project that is being financed and will be owned by fifteen municipalities and water districts in Northern Colorado. It includes two reservoirs, water rights on the Cache la Poudre River, and an exchange with two local ditch companies. NISP is currently in the National Environmental Policy Act (NEPA) permitting process; the Final Environmental Impact Statement was released by the U.S. Army Corps of Engineers in July 2018. Northern Water is the entity pursuing the permitting and construction of NISP on behalf of the participants. Northern Water anticipates the permit decision and final Record of Decision by the Army Corps of Engineers in 2019. Construction of this project will occur only if permits are obtained from the federal government and all NEPA requirements are satisfied. This will involve a large capital outlay from participating entities in the short-term but will provide water supply well past 2025. NISP participants are strongly recommended by Northern Water to have current MWEPs to demonstrate efficient water use of each participant's water supplies. Fort Lupton is currently participating in 2,050 AF of the project.

SECTION 2.0 – PROFILE OF WATER DEMANDS AND HISTORICAL WATER EFFICIENCY ACTIVIES

2.1 Demographics and Key Characteristics of the Water Service Area

Population and Demographics

Fort Lupton's water service area is the same as its City limits and serves its residential population. According to the State Demography Office, the population in 2017 was 8,160 people, which is a 3.4% increase from 2016. Since the *2007 Water Conservation Plan*, the City has grown by 845 people for an average increase of 1.1% per year over the 10-year period and an average increase of 1.5% over the last 5 years. **Table 3** provides a summary of the population for the City and its water service area since 2008.

Table 3: City and Water Service Area Population (2008 - 2017)

Year	Total City Population	Change in Population	Population Growth
2008	7,400	85	1.2%
2009	7,498	98	1.3%
2010	7,454	-44	-0.6%
2011	7,516	62	0.8%
2012	7,593	77	1.0%
2013	7,665	72	0.9%
2014	7,755	90	1.2%
2015	7,787	32	0.4%
2016	7,892	105	1.3%
2017	8,160	268	3.4%

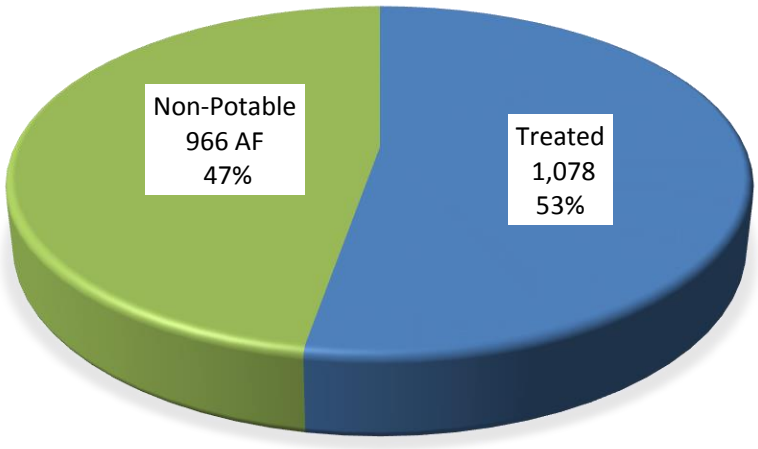
The median age of Fort Lupton's residents is 32 with an average household income of $55,000. The City is evenly divided with a population ratio of 50.4% female to 49.6% male and has a diverse population of ethnicities from around the globe. Approximately 55% of the City's population identifies as Hispanic. The population also includes residents of African American, English, Japanese, German, Italian, Mexican, Native American, and Russian heritages. The most prominent industries for employment include mining, quarrying, oil and gas, manufacturing and education. According to the City's *2018 Comprehensive Plan*, there are 291 businesses in Fort Lupton.

Utility Billing System and Water Rates

The City's water billing system categorizes the treated water use into the following customer classes: apartment, commercial, hotels and motels, industrial, multi-family, residential, school and hydrant meter. Non-potable water is divided into the following uses: school, golf course, industrial and parks. Non-

Potable water use is nearly as much as treated water use at 47% of the total water use, as shown in **Figure 5**.

Figure 5: Average Treated and Non-Potable Water Use



Fort Lupton has a three-tiered water rate structure by total water used per month. The current potable water rates are provided in **Table 4**.

Table 4: Current (2018) Water Rates

Monthly Service Charge	Volume Charge per $1,000 Gallons	Volume of Water Used
$31.50	$4.53	1,000 - 12,000 gallons
	$5.28	12,001 - 20,000 gallons
	$7.11	Over 20,000 gallons

2.2 Historical Water Demands

Water Use Data

Historical treated water production from the WTP and customer water demands are compiled from the WTP facility meter and the City's billing system reports, respectively. The difference between the total treated water at the WTP and the water billed is considered non-revenue water. Non-revenue water consists of unbilled uses (such as hydrant flushing) or unaccounted for water in the system (such as errors in meter readings). Non-revenue water also consists of apparent and real losses. Apparent losses are typically errors in data or unauthorized water use. Real losses are undetected leaks in the distribution system that are lost before reaching customers.

Demand Data Limitations

The City's billing system doesn't keep long-term historical data, so the City couldn't obtain water use data before 2010 unless it was already compiled in the *2007 Water Conservation Plan*. This leaves a data gap between the *2007 Water Conservation Plan* and this MWEP Plan as 2007, 2008 and 2009 water use data was no longer available. Fort Lupton doesn't have other major demand data limitations.

Total Annual Treated Water

Total Treated Water and Billed Water

The total annual treated water use was calculated from data collected at the City's WTP facility. The total treated water produced at the WTP averaged 1,327 AFY from 2010 through 2016. The average volume of water distributed and billed to customers averaged 1,078 AFY from 2010 through 2017. **Table 5** shows the total annual treated water produced since 2010.

Table 5: Total Treated Water Delivery Summary

Year	Total Treated Water (AF)	Total Water Usage (Billed to Customers) (AF)	Annual Non-Revenue Water (AF)	Percentage of Non-Revenue Water
2010	1,617	1,308	309	19%
2011	1,771	1,350	421	24%
2012	1,318	1,154	164	12%
2013	1,246	866	380	30%
2014	1,193	1,026	167	14%
2015	1,001	958	43	4%
2016	1,144	919	225	20%
2017	-	1,045	-	-
Average	1,327	1,078	244	18%

Notes: The averages exclude missing data.

Non-Revenue Water

The City's system losses from the WTP to its customers is an average of 18% per year, which is 244 AFY (as shown in Table 5). Typically, 10% is considered good by industry standards. There are two types of water losses that occur in municipalities, apparent losses and real losses. Apparent losses are "paper" losses that can be caused by customer meter inaccuracies, billing system data errors or unauthorized consumptions. Real losses are those that are physically lost within the distribution system, including the water treatment process.

Annual and Monthly Treated Water Use by Customer Category

Treated Water by Customer Category

The City's largest treated water use is residential, which equates to 49% of the total treated water use. The second largest water use is commercial at 16%. This is helpful to consider when selecting conservation measures and programs to prioritize. The hydrant meter usage was significantly higher during the 2010 through 2012 period than its usage in more recent years. The hydrant meters were used as a bulk water station for construction projects during the earlier years which explains the high water use. **Table 6** shows the breakdown of treated water use by customer category. The average water use by customer category over the 2010 through 2017 period is provided in **Figure 6**.

Table 6: Annual Treated Water Use by Customer Category

Year	Apartment	Commercial	Hotels & Motels	Industrial	Multi-Family	Residential	School	Hydrant Meters	Total
2010	30	145	6	0	104	564	44	415	1,308
2011	27	146	5	6	92	533	76	465	1,350
2012	36	167	6	2	110	584	101	148	1,154
2013	25	162	7	24	95	507	21	25	866
2014	24	189	6	82	95	498	102	30	1,026
2015	25	186	6	87	89	506	36	23	958
2016	27	187	7	51	88	519	40	0	919
2017	53	221	6	77	87	541	41	19	1,045
Avg.	31	175	6	41	95	532	58	141	1,078

Figure 6: Total Treated Water Use by Customer Category

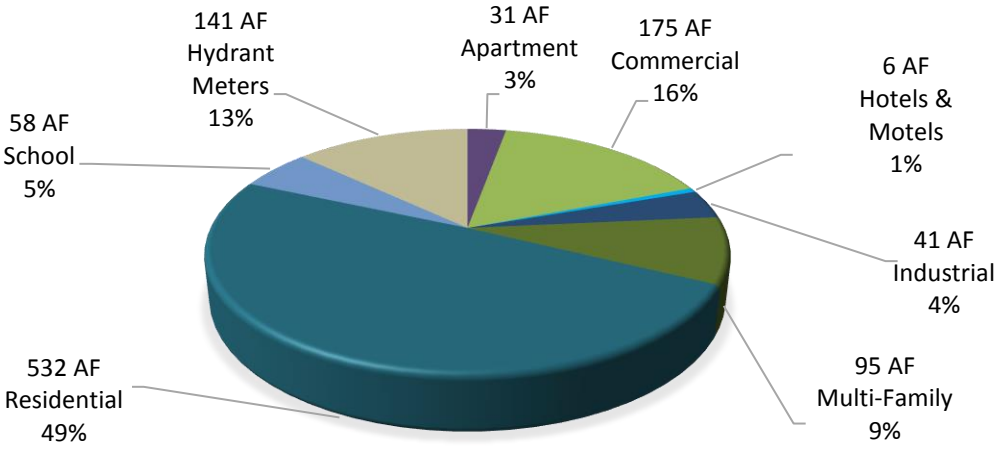
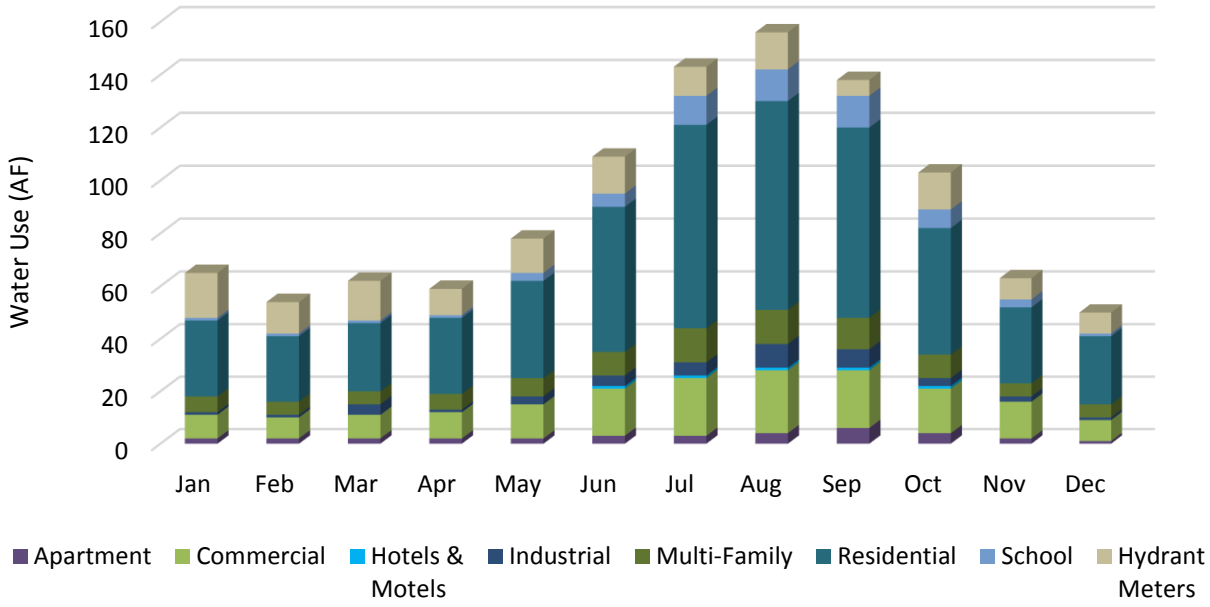


Figure 7 shows the annual treated water by customer category distributed monthly. The treated water use in the summer months is significantly higher than in the winter months, which is attributed to outdoor uses such as garden watering and lawn irrigation.

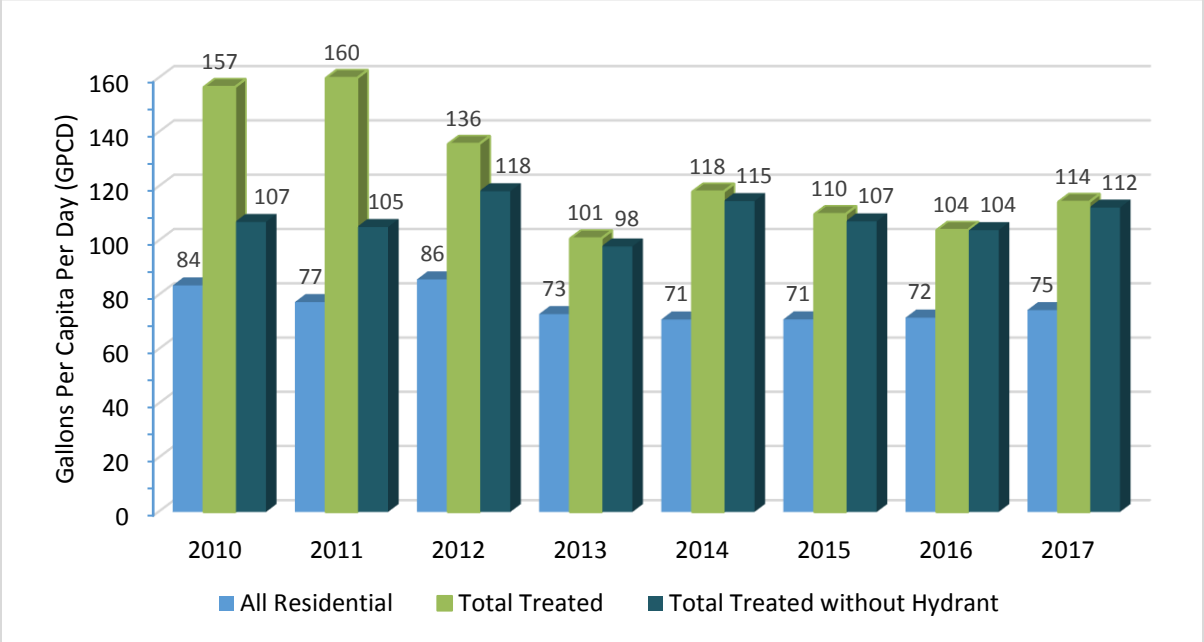
Figure 7: Average Monthly Water Use by Customer Category



Per Capita Water Use

From 2010 through 2017, Fort Lupton averaged 125 gallons per capita per day (GPCD) system-wide (including hydrant-meter usage). Hydrant meter usage during 2010 through 2012 was abnormally high due to construction projects; therefore, the per capita water usage system-wide was also calculated without hydrant meters for comparison. The system-wide per capita excluding the hydrant meter category totaled 108 GPCD. All residential-related categories (apartments, multi-family, residential) used an average of 76 GPCD. Annual per capita usage is presented in **Figure 8**.

Figure 8: Annual Per Capita Water Use

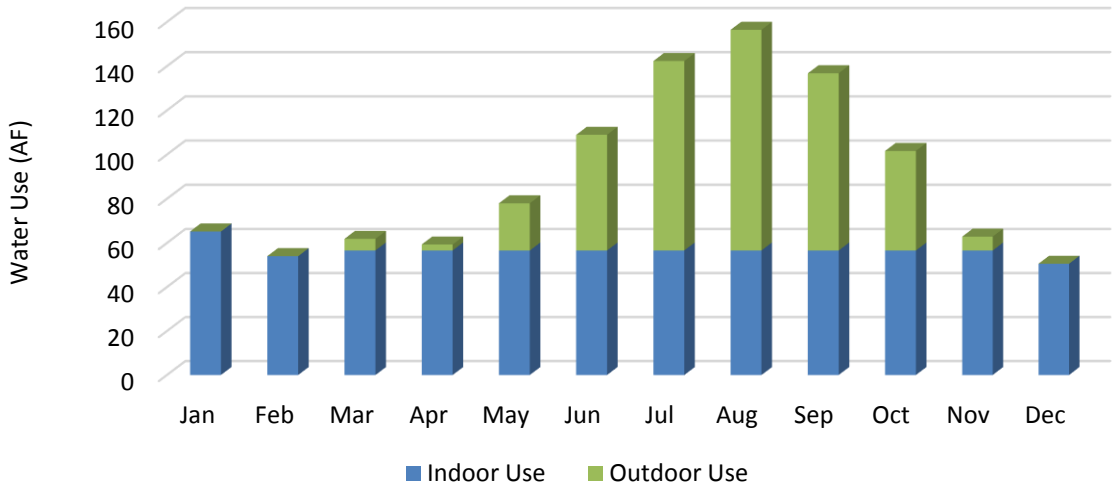


Notes: The all residential per-capita water use includes apartments, multi-family and single-family residential customers.

Treated Indoor and Outdoor Demands

In Colorado, a significant portion of annual water use occurs outdoors for irrigation. To determine Fort Lupton's average outdoor use, the average water use was examined during the winter months (December through February) and the average use during the summer months (March through November) for 2010 through 2017. The winter average usage was used as an estimate of indoor usage in the summer months. Approximately 37% of the total treated water is used outdoors for irrigation (**Figure 9**).

Figure 9: Average Indoor and Outdoor Water Use



Annual and Monthly Raw Distributed Non-Potable Water

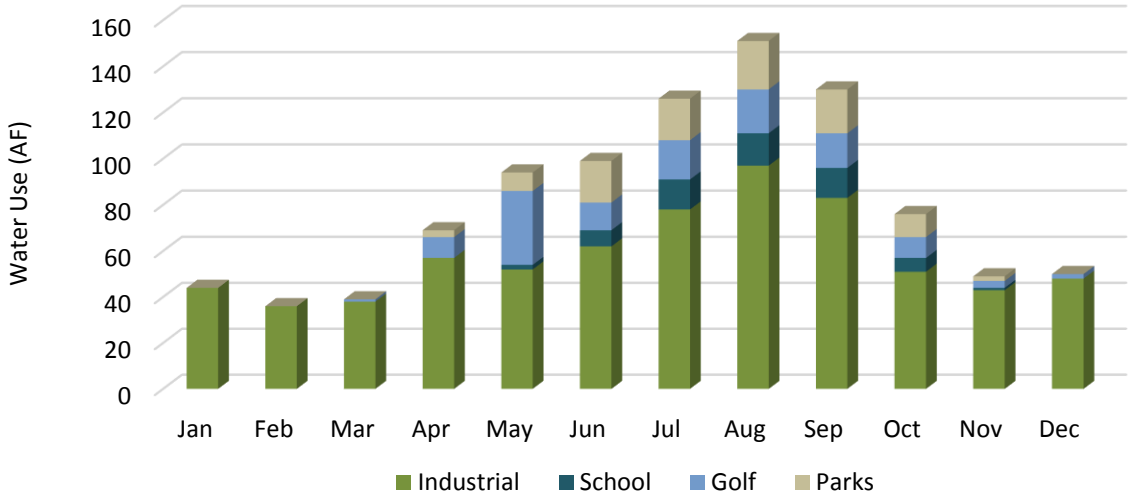
Non-potable water used in the City nearly equals the treated water use. The customer categories using non-potable water include schools, golf course, industrial water users and parks in the City. Fort Lupton has 12 parks with 280 acres of recreational parks and open spaces. The City intends to build new parks for its community as part of its future planning in the *2018 Comprehensive Master Plan*. One of the City's goals is to add more smart meters to efficiently manage parks and open space irrigation. **Table 7** shows an average non-potable water use of 966 AFY from 2010 through 2017.

Table 7: Annual Non-Potable Water Use

Year	Non-Potable Water Use (AF)
2010	1,102
2011	937
2012	1,066
2013	829
2014	859
2015	1,179
2016	967
2017	792
Average	966

The highest water use is from the industrial customer category at 72% of the total non-potable water use or 691 AFY (**Figure 10**).

Figure 10: Average Monthly Non-Potable Water Use by Customer Category



2.3 Past and Current Water Efficient Activities and Impact to Demands

Current Water Efficiency Measures

The City has successfully implemented several water efficiency measures since its *2007 Water Conservation Plan.* **Table 8** lists the water efficiency activities currently implemented in the City. Additional information regarding the specific activities is included in Section 4.3.

Table 8: Fort Lupton's Implemented Water Efficiency Activities

Water Efficiency Activities	Approx. Date of Implementation
Foundational Activities	
Advanced Metering Infrastructure Installation and Operations	2019 and ongoing
Water Rate Study - Water Efficient Rate Structure with Regular Updates	Ongoing; 2007 and before
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	2016 and ongoing
Non-Potable Tiered Rates	Ongoing; 2007 and before
Increase WTP Efficiency	2017 and ongoing
Leak Detection and Water Line Replacement Program	Approx. 2008
Comprehensive Plans/Capital Improvement Plans	Ongoing; 2007 and before
General Monitoring and Verification Activities and General Water Rates and Billing	Ongoing; 2007 and before
Targeted Technical Assistance and Incentives	
Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses	2018 and ongoing
Ordinances and Regulations	
Weekly and Time of Day Outdoor Watering Restrictions	Ongoing; 2007 and before
Water Waste Ordinance	Ongoing; 2007 and before
Landscape Design Ordinances and Restrictions	Ongoing; 2007 and before
Education Activities	
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	Ongoing; 2007 and before
Social Networking (Facebook & Twitter)	Approx. 2012
Water Facility Tours (Xeriscape Demonstration Garden Tours not included)	Ongoing; 2007 and before

Land Use Activities and Efforts

Some of the City's implemented activities integrate water and land use planning. These activities include:

- ***Tap Fees with Water Use Efficiency Incentives.*** The City has conservation-oriented tap fees but may establish a more robust program per the *2018 Comprehensive Plan* that, "provides regulatory incentives for developers who incorporate sustainable practices and green infrastructure within future investment, particularly practices that address water scarcity".

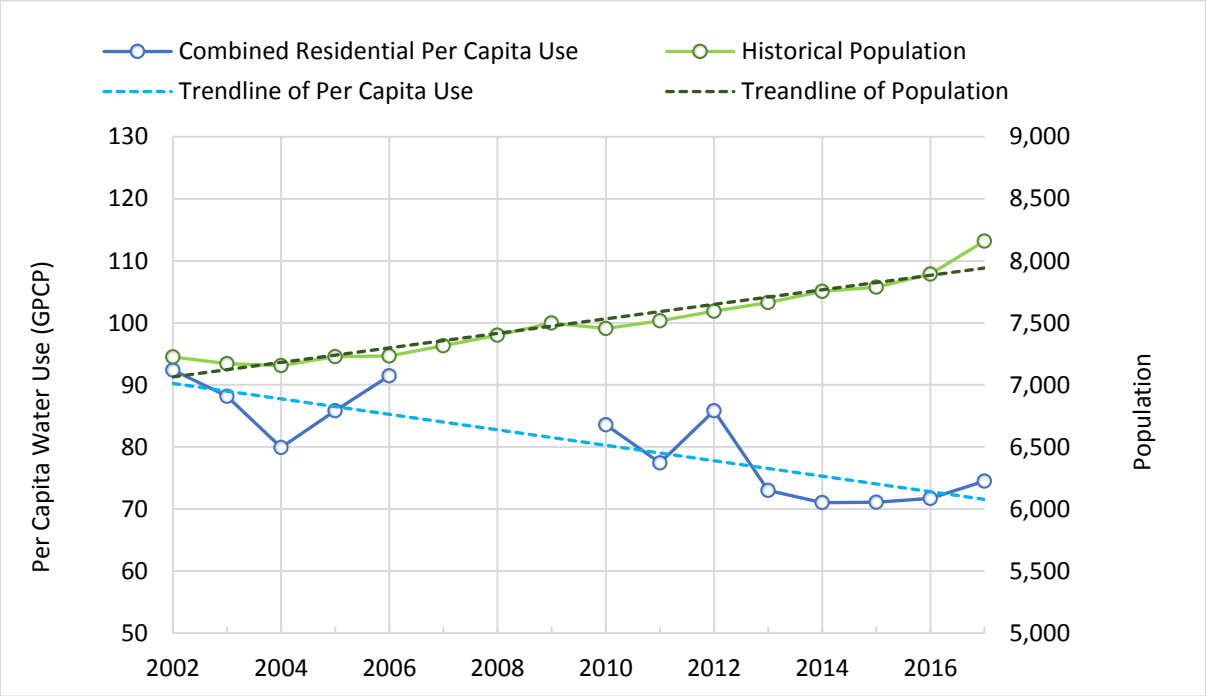
- ***Comprehensive Plans.*** These plans help to bridge the gap between the City's future planning of land development and water demands. The City's *2018 Comprehensive Plan* guides the City in development over the next ten to 20 years and encourages, "xeriscaping to reduce water consumption and establish an image that is reminiscent of the region's national landscape" in its design guidelines for various subareas in the City including residential, industrial and municipal. The proposed guidelines also describe adjusting watering schedules, designing parking areas that support water infiltration and choosing landscape options that reduce water requirements. The comprehensive plan recommends the City review and update development regulations to require xeriscaping and provide brochures to customers with information on reducing water costs and promoting conservation. Various water- and energy-sustainability recommendations are also provided in the comprehensive plan. The City also has a *Three Mile Plan Area (2018)* that provides direction on desirable areas for future annexation into the City of Fort Lupton and evaluates the land use, services, transportation and utility provisions in the surrounding areas of the City.
- ***Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses.*** The City installed smart meters and remote sensors at Pearson Park and intends to continue upgrading its irrigation equipment at other parks, schools, open spaces and the golf course. One of the objectives in the *2018 Comprehensive Plan* is to develop new parks and enhance existing recreation areas. As the City develops new parks, it also recognizes water scarcity is an issue and looks to minimize water consumption, eliminate unnecessary water demand and reduce turf grass areas.
- ***Weekly and Time of Day Outdoor Watering Restrictions*** *and* ***Water Waste Ordinance.*** Both of these restrictions/ordinances were established prior to the *2007 Water Conservation Plan* and impact existing water users in the City as well as future developments.
- ***Landscape Design Ordinances and Restrictions.*** The *City of Fort Lupton Commercial and Industrial Design Standards (2008)* provide guidelines on xeriscape design principles to promote water conservation in landscape plans such as: appropriate turf selection to minimize the use of bluegrass, use of mulch to maintain soil moisture and reduce evaporation, improve soil with organic matter, and provide efficient irrigation and schedules. The guidelines describe that drought tolerant plant specious native to the region, or suitable to the climate, should be used at commercial and industrial areas.

Water Savings Estimates Using Demand Data

Water efficiency can occur from both passive savings and active programs. Passive savings are those correlated with changes made by customers without any utility incentive; examples of these could be replacing old inefficient fixtures with newer more efficient models or moderating sprinkler irrigation to the minimum needs of the landscape. Active programs are programs that have been initiated by the water utility. Water savings from certain activities, such as those that are highly dependent on human behavior (e.g. public education programs) are much more difficult to quantify

and, in many cases, cannot be estimated with reasonable accuracy. Additionally, specific data was not collected for many of the water efficiency activities implemented in Fort Lupton. Instead, the per capita water use can give an indication of savings due to either passive or active programs. **Figure 11** indicates a general decreasing trend in the per capita water usage for residential-related customers even though the population has increased over time. Some of the variability in the per capita water usage is likely linked to the yearly fluctuations in temperature and precipitation. For example, 2000 through 2003, 2006 and 2012 were dry years which explains the spikes in per capita water usage. This is linked to increases in outdoor water usage during dry years.

Figure 11: Per Capita Water Use Compared to Population



Note: Data is missing for the combined residential per capita use from 2007 through 2009.

2.4 Demand Forecasts

Forecasting future growth and resulting water demands for the City is crucial in understanding the reliability of the water supply to meet future demand. The demand forecast in this Plan uses a ten-year planning horizon and assumes an MWEP Update will occur in seven years or 2024.

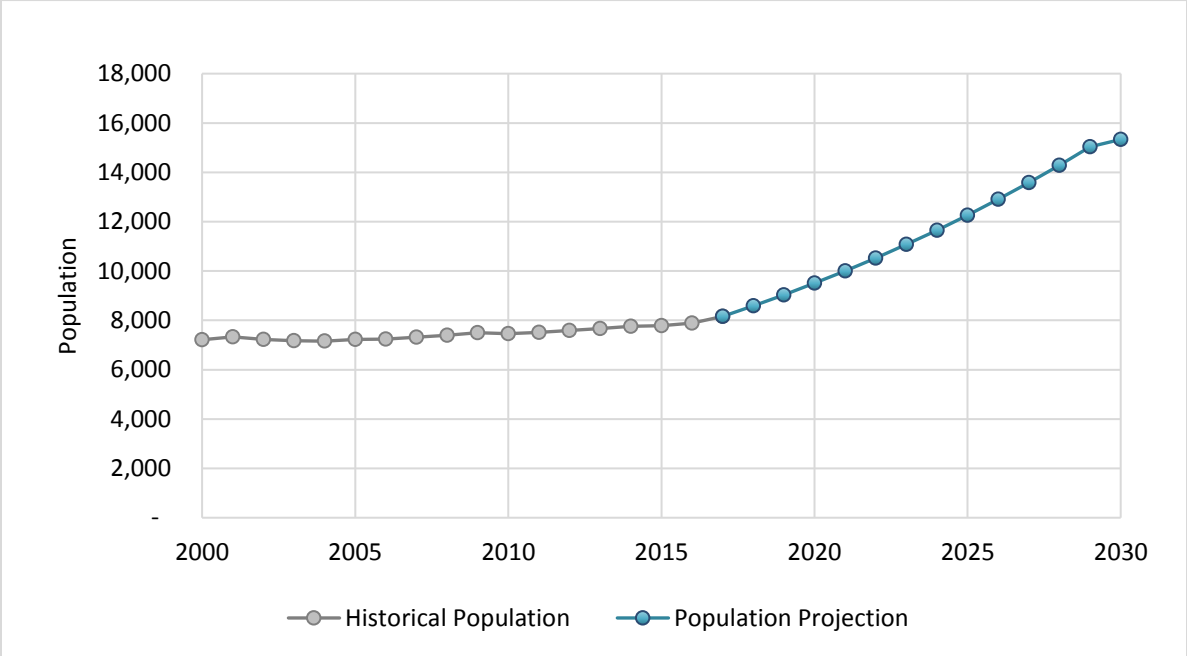
This Plan includes an "unmodified" baseline demand forecast that does not include any impacts from future planned conservation activities selected in Section 4.0 of this Plan. Unmodified baseline demands assume a water provider will continue its existing conservation activities. This forecast shows demand starting in 2018 and going through the ten-year planning horizon (2027). The population growth forecast is based on a combination of anticipated growth in the existing City limits, proposed new

developments and potential annexations. The City estimates the population will increase to 15,035 in 2029 with the proposed growth. In the baseline forecast, all residential category demands increase proportionally with the population at 5.2%. All other non-residential categories increase at 2.0% per year. Population estimates shown in five year increments since 2000 are presented in **Table 9** and illustrated in **Figure 12.**

Table 9: Observed and Projected Population Growth in Five-Year Increments

Year	Population	Average Yearly Growth Rate
2000	7,218	-
2005	7,229	0%
2010	7,454	1%
2015	7,787	1%
2020	9,507	4%
2025	12,264	6%
2030	15,336	5%

Figure 12: Historical and Projected Population Growth



The projected water demands for Fort Lupton's customers are depicted in **Figure 13**. The treated water demand for customers (excluding non-revenue water) is projected to increase to 1,577 AF by 2027. **Table 10** shows the total treated water demand projection through 2027 including both customer demands and non-revenue demands.

The total treated water demand including non-revenue water is projected to increase to 1,916 AFY in the ten-year planning horizon.

Figure 13: Treated Water Demand Projections by Customer Category

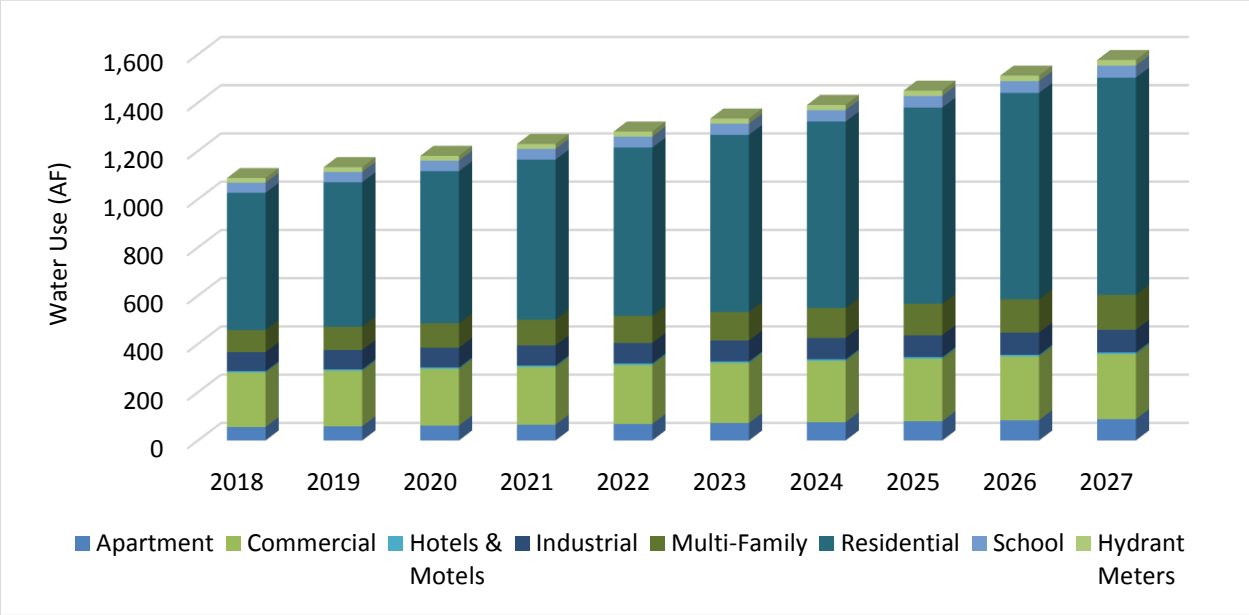


Table 10: Total Treated Water Demand Projections (Values in AF)

Year	Apartment	Commercial	Hotels & Motels	Industrial	Multi-Family	Residential	School	Hydrant Meters	Total Customer	Non-Revenue Water	Total Treated Water Demand
2018	56	225	6	79	92	569	42	19	1,088	234	1,322
2019	59	230	6	80	96	599	43	20	1,133	243	1,376
2020	62	235	6	82	101	630	44	20	1,180	253	1,433
2021	65	239	6	83	107	663	44	21	1,229	264	1,493
2022	68	244	7	85	112	698	45	21	1,280	275	1,555
2023	72	249	7	87	118	734	46	21	1,334	287	1,621
2024	76	254	7	88	124	773	47	22	1,391	299	1,690
2025	80	259	7	90	131	813	48	22	1,450	311	1,762
2026	84	264	7	92	138	856	49	23	1,512	325	1,837
2027	88	269	7	94	145	900	50	23	1,577	339	1,916

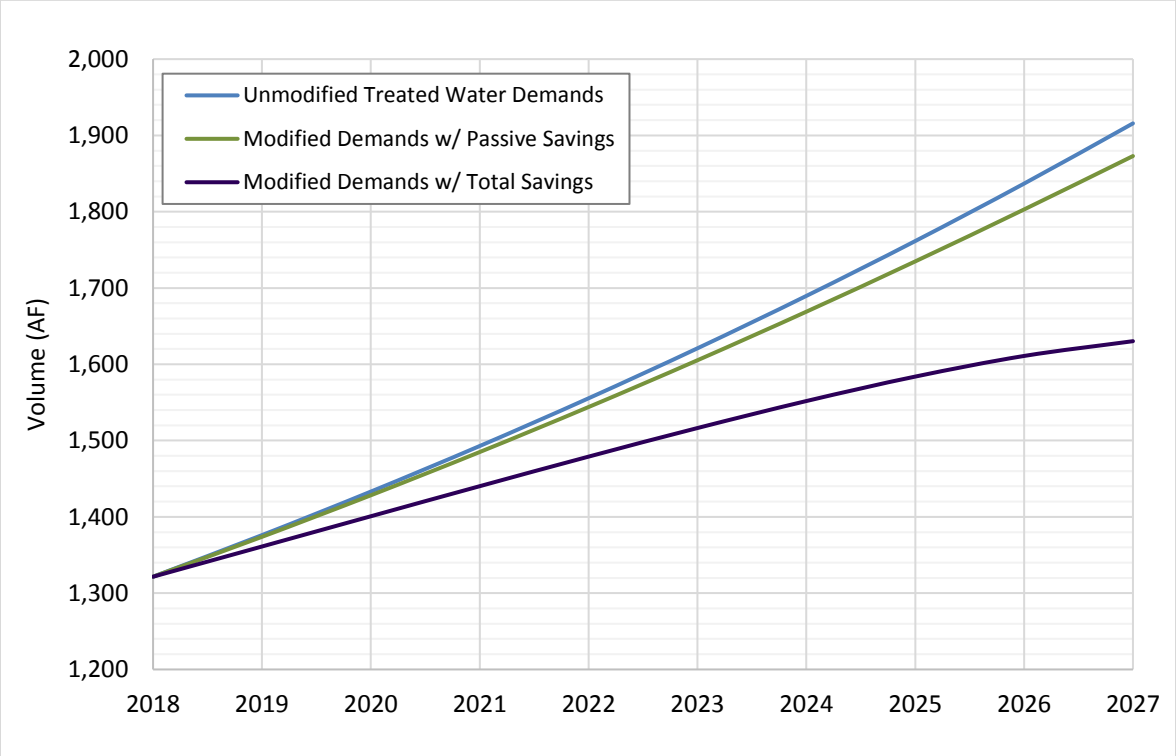
SECTION 3.0 – INTEGRATED PLANNING AND WATER EFFICIENCY BENEFITS AND GOALS

3.1 Water Efficiency and Water Supply Planning

Forecasted Modified Water Demands

A "modified" demand forecast was developed to estimate the total treated water demands for Fort Lupton at the end of the planning horizon in 2027 assuming the existing water efficiency activities and proposed activities in Section 4.0 are implemented. Under the modified forecast, it is estimated that total annual demand in 2027 will be 1,630 AF which includes non-revenue water. This equates to an annual treated water demand savings of up to 264 AF (or 14%) in comparison to the unmodified baseline forecast. The total water savings in a ten-year planning period is estimated to be up to 2,679 AF (17%) if all the selected water efficiency activities are implemented[1]. The modified demand forecast is illustrated in **Figure 14** and shows the anticipated water savings from both passive and active water savings**.**

Figure 14: Demand Projections with Modified Demands



[1] The ten-year volume includes the compounding effects of certain activities over a ten-year period so it is higher than the annual water savings.

Table 11 compares the City's projected total treated unmodified and modified water demands.

Table 11: Demand Projections - Unmodified and Modified

Year	Unmodified Treated Water Demand (AF)	Modified Treated Water Demand with Passive Savings (AF)	Modified Treated Water Demand with Total Savings (AF)
2018	1,322	1,322	1,322
2019	1,376	1,374	1,361
2020	1,433	1,428	1,401
2021	1,493	1,485	1,440
2022	1,555	1,544	1,479
2023	1,621	1,605	1,516
2024	1,690	1,669	1,552
2025	1,762	1,735	1,584
2026	1,837	1,803	1,611
2027	1,916	1,873	1,630

Note: Projections include non-revenue water.

Impacts to Future Water Facilities and Supply Acquisitions

The benefits of this water efficiency planning effort for Fort Lupton may include:

- Freeing up water supplies for increased growth and development
- Additional water to cover shortages in droughts or other emergency situations
- Delaying the purchase of additional costly water supplies

3.2 Water Efficiency Goals

Water efficiency goals are intended to lay out a set of targeted objectives that will result in the identified benefits in Section 3.1. Establishing goals is an iterative process that begins by evaluating the future demand for water based on current water-use habits and identifying areas water use can feasibly and effectively be reduced.

A preliminary set of goals was been developed prior to the selection of the water efficiency activities to provide a means to screen and evaluate activities. A meeting was initially held with City Staff to discuss water efficiency goals appropriate for Fort Lupton. The following preliminary goals were established:

- The targeted water savings goal for this Plan will be to lower the total treated water use by 10% over the ten-year planning period.
- The targeted ten-year water reduction goals for the following customer categories were as follows:

    - Apartment: 15.0%
    - Commercial: 5.0%
    - Hotels and Motels: 5.0%
    - Industrial: 5.0%
    - Multi-Family: 15.0%
    - Residential: 15.0%
    - School: 5.0%
    - Hydrant Meters: 5.0%
    - Non-Revenue Water: 3.0%
- To develop a water efficiency program that can be implemented within City staffing constraints and with City Council approval.
- To implement water efficiency activities that are compatible with the community and their City Council representatives.

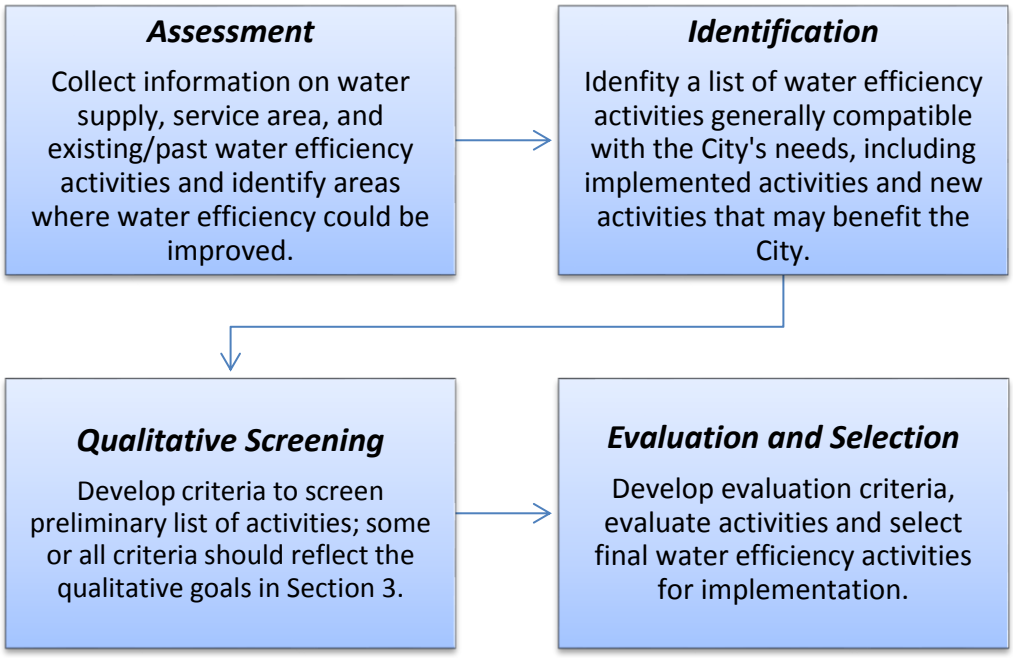
The success of the stated goals will be measured through monitoring of billing data, screening and evaluating activities that are acceptable to City Staff, and soliciting City Council and community feedback on water efficiency activities. During the initial meeting, City Staff expressed interest in evaluating 29 different water efficiency activities.

SECTION 4.0 – SELECTION OF WATER EFFICIENCY ACTIVITIES

4.1 Summary of Selection Process

Fort Lupton used a four-phase process for selecting and fully evaluating water efficiency activities for implementation in this Plan, shown in **Figure 15**. This process is recommended in the *Guidance Document*.

Figure 15: Four-Phase Process for Selecting Water Efficiency Activities



Assessment, Identification, and Qualitative Screening

Using the analysis performed and presented in Sections 2.2 and 2.3, the City assessed its water supply portfolio and customer demands and identified areas where water efficiency could be improved. *Worksheets D-G* from the *MWEP Guidance Document* were used to identify a list of water efficiency activities that are compatible with the City's goals. A copy of *Worksheets D-G* can be found in **Appendix B** of this report.

The list of activities evaluated are organized according to the SWSI Levels Framework. The SWSI Levels Framework was developed as a component of SWSI 2010 to organize water efficiency activities into a model that assists municipalities in prioritizing and selecting activities. The framework consists of the following categories:

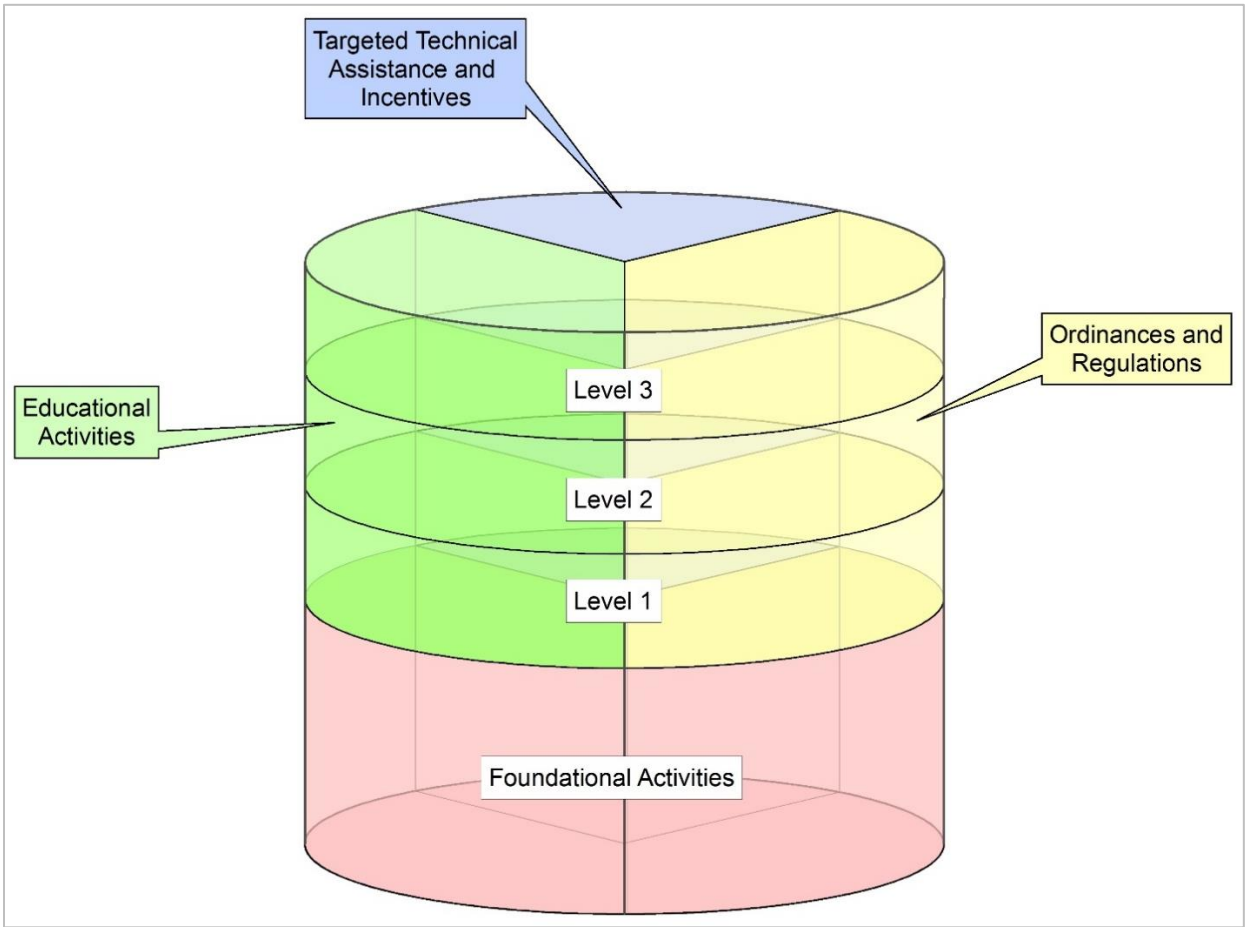
- **Foundational Activities** – These activities focus on system operations and water efficiencies that are under Fort Lupton's direct control and can improve

the effectiveness of the planning efforts by ensuring sufficient metering and data tracking.

- **Targeted Technical Assistance and Incentives** – These measures cover activities that the City and its customers can do to improve existing water efficiency.
- **Ordinances and Regulations** – These measures include regulatory activities designed to encourage water efficiency.
- **Education Activities** – These efforts educate the public on the benefits of water efficiency, inform customers on how they can reduce their water usage, and publicize water efficiency activities that Fort Lupton is implementing.

Figure 16 depicts the framework provided in SWSI 2010 to help municipalities organize and prioritize water efficiency activities by "activity type" and then by "level" within each type.

Figure 16: SWSI Levels Framework



The City Staff developed qualitative screening criteria used to evaluate the preliminary list of activities. The screening criteria include: 1) High benefit to cost of implementation; 2) Public acceptance; 3) Staff and Council Approval. Activities not meeting the

screening criteria were eliminated. The specific reason for elimination of activities can be found in *Worksheets D-G*, located in **Appendix B**.

Evaluation and Selection

The evaluation and selection phase of the selection process involved development of evaluation criteria, evaluation of the activities, and selection of the final activities for implementation. Some of the general evaluation criteria included:

- Applicability to the City
- Moderate to high potential reduction of water use
- High benefit to cost of implementation
- Public acceptance
- Staff and City Council and approval

4.2 Water Efficiency Activities

The second screening of potential water efficiency activities with City Staff resulted in the selection of 28 candidate activities for implementation. Only the Slow the Flow Residential Indoor Audits activity was eliminated. This activity may be evaluated with future planning efforts. Some of the activities were combined within their SWSI Levels Framework to assist in evaluation and avoid double counting savings. The analysis of costs and benefits of the selected measures and programs are shown in **Table C1, Appendix C**. Details about the cost/benefit evaluation and information about each measure can be found in the following section with further detail is available in **Appendix D.**

4.3 Selection of Activities for Implementation

Foundational Activities

- **System Wide Water Audits**
  Implementing System Wide Water Audits can help the City identify unmetered and unbilled treated water uses in order to assess where losses are occurring and how losses can be addressed. These losses are considered Non-Revenue water. The City may utilize the IWA/AWWA Water Audit Method published in the AWWA Manual of Practice M36 to conduct a "top down approach."
- **Advanced Meter Reading Installation and Operations**
  Advanced Metering Infrastructure (AMI) is a metering system that records customer consumption and provides frequent transmittal of measurements over a communication network to a central collection point. AMI systems have the capability to offer customers an interactive portal where they would get usage alerts and be able to view billing and metering data.

- **Water Rate Study – Water Efficient Rate Structures with Regular Updates**
  Based on many studies, water rates (e.g., inclining and/or tiered rates) are one of the most effective ways to encourage efficient water use. A rate study is necessary to ensure maximum water savings. Because they are very interrelated, this measure also includes Volumetric Billing and Tiered Rates within it. The City Staff complete annual rate studies internally. The City's current water rate structure includes three tiers.
- **Non-Potable Tiered Rates**
  The City currently has tiered rates for non-potable customers and City Staff evaluate and adjust the rates annually.
- **Tap Fees with Water Use Efficiency Incentives**
  Fort Lupton would encourage smaller lot design and construction by charging reduced fees for smaller lot sizes. For example, this might include a discount on tap fees for turf areas of less than 3,000 square feet or a discount for a smaller percentage of irrigated areas. Typically, an irrigated area of less than 30% is considered conservative in nature. On the opposite end, an additional fee may be charged for larger lots with greater irrigated area. This provides incentives for reduced irrigation. Fort Lupton already participates in this water efficiency activity but may add greater water use efficiency incentives.
- **Increase Water Treatment Plant Efficiency**
  The City's previous WTP did not recover 7.5% to 8.0% of the raw water entering the plant. In simpler terms, 92.0 to 92.5 out of every 100 gallons delivered to the WTP was delivered to customers and the remainder was lost to the system. The City upgraded its WTP and continues to improve its system.
- **Leak Detection and Water Line Replacement Program**
  For this activity, Fort Lupton could perform a Leak Detection Program in-house or use an outside consultant (e.g., American Leak Detection). The City completed a leak detection and repair program previously using an outside consultant. The City has replaced a portion of its water and sewer line systems with new pipes. Fort Lupton continues to replace valves and waterlines each year.
- **Comprehensive Plans/Capital Improvement Plan**
  Fort Lupton will continue developing, updating, and evaluating its Comprehensive and Capital Improvement Plans that will address overall water efficiency and help plan for future use. These plans also help to identify and integrate long-term land use and water planning. The City recently completed a Comprehensive Plan in 2018.
- **General Monitoring and Verification Activities**
  Water savings is evident from Fort Lupton's existing water monitoring and verification activities, which include frequent meter reading and tracking of use for large water customers. Additionally, Fort Lupton's water rates and billing encourage citizens to conserve water through volumetric billing with inclining/tiered rates, frequent billing and providing water budgets for certain large water users.

Targeted Technical Assistance and Incentives

- **Slow the Flow Commercial Irrigation Audits**
  The City may partner with Resource Central (ReCen) for irrigation audits for HOAs and businesses through the "Slow the Flow" program. "Slow the Flow's trained technicians perform a detailed analysis of your existing sprinkler system and will provide a comprehensive report detailing findings and recommendations to improve efficiency. The service will provide suggestions that will deliver measurable improvements in water use reduction, saving your business money, and supporting community conservation goals." -ReCen
- **Slow the Flow Residential Irrigation Audits**
  The City may partner with ReCen for residential irrigation audits. ReCen offers the Slow the Flow program, which provides outdoor sprinkler consultations to residential customers. "The service usually takes 90 minutes and involves a visual inspection, data collection, and in-depth evaluation. Our technicians will deliver a clear and actionable list of suggestions to reduce water use and runoff at each property, while keeping landscapes and lawns healthy." -ReCen
- **Xeriscape Incentives – Garden in a Box**
  Each year, ReCen offers an array of do-it-yourself Xeric garden kits, created by professional landscape designers for sun, shade, and everything in-between. These plant-by-number gardens can have a significant conservation impact and are perfect for anyone who wants to beautify their yard while using less water than standard turf.
- **Install Wind and Rain Sensors for Irrigation**
  Wind and Rain Sensors are due to be installed at the City's parks, schools, open space areas and golf course to save non-potable irrigation water. These sensors, combined with Irrigation Controllers, are used to automatically shut off sprinklers during rain events or windy conditions when irrigation efficiency is reduced. Irrigation Controllers allow a user to program automatic irrigation schedules for different irrigation zones.
- **Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses**
  The City may purchase and install new irrigation equipment, such as updated sprinkler systems, to reduce water use through improved irrigation efficiency. The City has installed new equipment at Pearson Park and would like to continue improving equipment at other locations.
- **Inject Wetting Agent at Golf Course**
  A wetting agent reduces the surface tension of water and allows it to spread more easily. This improves the irrigation efficiency and reduces water runoff and water lost to evaporation. It also creates uniform turf areas.
- **Rain Barrels**
  Colorado residents may collect up to two 110-gallon barrels of rooftop rainwater. The collected rainwater can be used for outdoor irrigation on gardens or lawns. Rainwater reuse reduces the City's residential treated water demand and reduces participating customers' water bills. This water efficiency activity assumes the City will purchase and giveaway five Rain Barrel systems to customers and will provide bill stuffers with information on rain barrel water and

cost-savings to encourage residential customers to purchase their own Rain Barrel systems.

Ordinances and Regulations

- **Weekly and Time of Day Outdoor Watering Restrictions**
  Fort Lupton's Municipal Code states the use of water for lawn sprinkling may be prohibited or restricted as determined by the Fort Lupton Utility Enterprise Board. It also states the setting of sprinklers or nozzles that interfere with traffic or sidewalks is prohibited.
- **Water Waste Ordinance**
  Fort Lupton's Municipal Code has a waste water ordinance that prohibits the waste of water stating; "Consumers shall prevent unnecessary waste of water in all uses of water and keep all hydrants, appliances and fixtures in good repair."
- **Landscape Design Ordinances and Restrictions**
  Landscape design ordinances include rules and regulations for landscape design/installation, soil amendment requirements, turf restrictions, and irrigation equipment requirements. The *City of Fort Lupton Commercial and Industrial Design Standards (2008)* provide landscape guidelines including xeriscape design principles to promote water conservation. The guidelines also provide a list with various xeric plants.
- **City Facility Requirements**
  Fort Lupton is evaluating replacing its City facility indoor fixtures to high efficiency fixtures, such as faucets. The water savings estimate is based on six City buildings receiving upgraded fixtures and based off of an estimated 35 employees. This is a way for the City to lead by example and show its citizens the City is proactively participating in water conservation efforts.
- **Commercial Water Wise Use Regulations**
  These types of regulations are applicable at carwashes, restaurants and other commercial facilities. The following policies may be considered: providing water to restaurant customers only upon request; requiring shutoff valves for hoses used to clean vehicles at carwashes; establishing water-use standards for fixtures in new commercial developments.

Educational Activities

- **Public Education Activities**
  The City Staff may provide educational materials on water efficiency to its citizens through one or a combination of: newsletters, newspaper articles, mass mailings, customer surveys, interactive webpages, website updates and social networking. The City will strive to provide consistent online information throughout its website and social media platforms.
- **K-12 Education Program**
  The City can develop a K-12 Teacher and Classroom Education Program and/or potentially partner with Aims Community College or its students.
- **Water Facility Tours and Demonstration Garden Tours**
  The City has an on-going program to provide water facility tours to the public to inform how water is treated and delivered and provide a concept of the costs

associated with water treatment and delivery. The City provides these tours every two years. In addition, the City is considering organizing tours to Northern Water's xeriscape demonstration garden in Berthoud, CO.

- **Children's Water Fair or Festival**
  Fort Lupton would like to participate in Children's Water Fairs or Festivals and provide educational materials and information to students about water efficiency and conservation. Northern Water typically organizes an annual water fair that the City could participate in by sending one or two grade levels of students. Fort Lupton could also set up a booth at a local event in the City.
- **Post or Distribute ET Irrigation Scheduling**
  ET irrigation schedules using historical averages of weather data can be prepared by the City prior to the irrigation season and sent out to all customer categories to reference when programming their irrigation systems. Northern Water has tools on their website that can aid with this calculation. The schedule could be printed on the bill or posted on the web at the beginning or for the duration of the irrigation season.

Comparison of Costs and Benefits

As shown in **Table C-1 in Appendix C**, the cost for the evaluated treated water efficiency activities ranged from $0.72 per 1,000 gallons saved for the Water Rate Study - Water Efficient Rate Structure with Regular Updates to $98.79 per 1,000 gallons saved for the Leak Detection and Water Line Replacement Program. The Non-Potable Tiered Rates is the lowest cost of all the activities at approximately $0.64 per 1,000 gallons of water saved. The 28 selected water efficiency activities and the associated water savings were arranged within the targeted customer categories to more easily compare the anticipated savings to the original goals. Some of the measures contribute savings to more than one category. **Table 12** shows the water savings for the selected activities, sub-totaled for each customer category.

Table 12: Combined Water Savings of Selected Water Efficiency Activities

Water Efficiency Activities **yellow rows are existing activities*	Estimated Annual Water Savings (MG/yr)	Estimated Total Ten-Year Water Savings (MG)
Non-Revenue Water		
System Wide Water Audits	0.46	4.61
Advanced Metering Infrastructure Installation and Operations	0.92	9.22
Increase WTP Efficiency	4.61	46.11
Leak Detection and Water Line Replacement Program	4.61	46.11
Comprehensive Plans/Capital Improvement Plans	0.23	2.31
General Monitoring and Verification Activities and General Water Rates and Billing	0.23	2.31
Subtotal - MG	**11.1**	**110.7**
Acre-Feet	***34.0***	***340***
Apartment		
Advanced Metering Infrastructure Installation and Operations	1.39	13.86
Water Rate Study - Water Efficient Rate Structure with Regular Updates	1.15	11.55
Increase WTP Efficiency	1.15	11.55
Comprehensive Plans/Capital Improvement Plans	0.06	0.58
General Monitoring and Verification Activities and General Water Rates and Billing	0.06	0.58
Weekly and Time of Day Outdoor Watering Restrictions	0.02	0.18
Water Waste Ordinance	0.01	0.09
Landscape Design Ordinances and Restrictions	0.05	0.46
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.46	4.62
Post or Distribute ET Irrigation Scheduling	0.18	1.82
Subtotal - MG	**4.5**	**45.3**
Acre-Feet	***13.9***	***139***
Commercial		
Advanced Metering Infrastructure Installation and Operations	2.41	24.13
Water Rate Study - Water Efficient Rate Structure with Regular Updates	1.61	16.09
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	0.08	0.80
Increase WTP Efficiency	4.02	40.21
Comprehensive Plans/Capital Improvement Plans	0.20	2.01
General Monitoring and Verification Activities and General Water Rates and Billing	0.20	2.01
Slow the Flow Commercial Irrigation Audits	0.16	8.81
Weekly and Time of Day Outdoor Watering Restrictions	0.07	0.68
Water Waste Ordinance	0.03	0.34

Water Efficiency Activities **yellow rows are existing activities*	Estimated Annual Water Savings (MG/yr)	Estimated Total Ten-Year Water Savings (MG)
Landscape Design Ordinances and Restrictions	0.17	1.72
City Facility Requirements	0.03	0.33
Commercial Water Wise Use Regulations	0.08	0.80
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.60	6.03
Post or Distribute ET Irrigation Scheduling	0.68	6.82
Subtotal - MG	**10.4**	**110.8**
Acre-Feet	***31.8***	***340***
Hotels and Motels		
Advanced Metering Infrastructure Installation and Operations	0.07	0.66
Water Rate Study - Water Efficient Rate Structure with Regular Updates	0.04	0.44
Increase WTP Efficiency	0.11	1.09
Comprehensive Plans/Capital Improvement Plans	0.01	0.05
General Monitoring and Verification Activities and General Water Rates and Billing	0.01	0.05
Weekly and Time of Day Outdoor Watering Restrictions	0.00	0.04
Water Waste Ordinance	0.00	0.02
Landscape Design Ordinances and Restrictions	0.01	0.11
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.02	0.16
Post or Distribute ET Irrigation Scheduling	0.04	0.40
Subtotal - MG	**0.3**	**3.0**
Acre-Feet	***0.9***	***9***
Industrial		
Advanced Metering Infrastructure Installation and Operations	0.84	8.41
Water Rate Study - Water Efficient Rate Structure with Regular Updates	0.56	5.60
Increase WTP Efficiency	1.40	14.01
Comprehensive Plans/Capital Improvement Plans	0.07	0.70
General Monitoring and Verification Activities and General Water Rates and Billing	0.07	0.70
Weekly and Time of Day Outdoor Watering Restrictions	0.04	0.40
Water Waste Ordinance	0.02	0.20
Landscape Design Ordinances and Restrictions	0.10	1.00
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.21	2.10
Post or Distribute ET Irrigation Scheduling	0.39	3.91
Subtotal - MG	**3.7**	**37.0**
Acre-Feet	***11.4***	***114***

Water Efficiency Activities **yellow rows are existing activities*	Estimated Annual Water Savings (MG/yr)	Estimated Total Ten-Year Water Savings (MG)
Multi-Family		
Advanced Metering Infrastructure Installation and Operations	2.27	22.75
Water Rate Study - Water Efficient Rate Structure with Regular Updates	1.90	18.96
Increase WTP Efficiency	1.90	18.96
Comprehensive Plans/Capital Improvement Plans	0.09	0.95
General Monitoring and Verification Activities and General Water Rates and Billing	0.09	0.95
Weekly and Time of Day Outdoor Watering Restrictions	0.03	0.25
Water Waste Ordinance	0.01	0.13
Landscape Design Ordinances and Restrictions	0.06	0.64
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.76	7.58
Post or Distribute ET Irrigation Scheduling	0.25	2.52
Subtotal - MG	**7.4**	**73.7**
Acre-Feet	***22.6***	***226***
Residential		
Advanced Metering Infrastructure Installation and Operations	14.15	141.47
Water Rate Study - Water Efficient Rate Structure with Regular Updates	11.79	117.89
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	0.24	2.36
Increase WTP Efficiency	11.79	117.89
Comprehensive Plans/Capital Improvement Plans	0.59	5.89
General Monitoring and Verification Activities and General Water Rates and Billing	0.59	5.89
Slow the Flow Residential Irrigation Audits	0.04	2.25
Xeriscape Incentives - Garden in a Box	0.00	0.24
Rain Barrels	0.02	0.91
Weekly and Time of Day Outdoor Watering Restrictions	0.19	1.89
Water Waste Ordinance	0.09	0.94
Landscape Design Ordinances and Restrictions	0.48	4.75
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	4.72	47.16
K-12 Education Program	0.03	1.55
Water Facility Tours and Demonstration Garden Tours	0.00	0.14
Children's Water Fair or Festival	0.03	1.41
Post or Distribute ET Irrigation Scheduling	1.89	18.86
Subtotal - MG	**46.6**	**471.5**
Acre-Feet	***143.1***	***1,447***

Water Efficiency Activities **yellow rows are existing activities*	Estimated Annual Water Savings (MG/yr)	Estimated Total Ten-Year Water Savings (MG)
School		
Advanced Metering Infrastructure Installation and Operations	0.45	4.48
Increase WTP Efficiency	0.75	7.46
Comprehensive Plans/Capital Improvement Plans	0.04	0.37
General Monitoring and Verification Activities and General Water Rates and Billing	0.04	0.37
Weekly and Time of Day Outdoor Watering Restrictions	0.02	0.24
Water Waste Ordinance	0.01	0.12
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	0.11	1.12
Post or Distribute ET Irrigation Scheduling	0.24	2.39
Subtotal - MG	**1.7**	**16.6**
Acre-Feet	***5.1***	***51***
Hydrant Meters		
Advanced Metering Infrastructure Installation and Operations	0.07	0.69
Increase WTP Efficiency	0.35	3.46
Comprehensive Plans/Capital Improvement Plans	0.02	0.17
General Monitoring and Verification Activities and General Water Rates and Billing	0.02	0.17
Subtotal - MG	**0.4**	**4.5**
Acre-Feet	***1.4***	***14***
Non-Potable Irrigation		
Non-Potable Tiered Rates	7.04	70.42
Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses	5.03	50.32
Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses	5.03	50.32
Inject Wetting Agent at Golf Course	3.91	39.10
Subtotal - MG	**21.0**	**210.2**
Acre-Feet	***64.5***	***645***
Grand Total (Treated and Non-Potable Water) - (MG)	**107**	**1,083**
Acre-Feet	***329***	***3,324***
Treated Water Grand Total - (MG)	**86**	**873**
Acre-Feet	***264***	***2,679***
Treated Water Grand Total Savings from Existing Measures (Acre-Feet)	***199***	***1,113***

The selected activities provide an overall estimated water savings of up to 2,679 AF[2] over the ten-year planning horizon if all activities were implemented for the full ten years. The water savings per customer category in **Table 12** was compared to the original water savings goals identified in Section 3.0. The adjusted goals reflect the goals the City Staff believe are achievable. **Table 13** compares the anticipated water savings from the selected activities with the original goals in Section 3.2 and then adjusts the water saving goals for this Plan.

Table 13: Water Efficiency Goals Comparison

Water Use Categories:	Total Projected Water Use (2018 to 2027)	Reduction Goals for Planning Horizon		Adjusted Reduction Goals for Planning Horizon	
				Total Water Savings from Activities	Resulting Reduction
	(AF)	(%)	(AF)	(AF)	(%)
Apartment	709	15%	106	139	20%
Commercial	2,468	5%	123	340	14%
Hotels & Motels	67	5%	3	9	14%
Industrial	860	5%	43	114	13%
Multi-Family	1,164	15%	175	226	19%
Residential	7,236	15%	1,085	1,447	20%
School	458	5%	23	51	11%
Hydrant Meters	212	5%	11	14	7%
Non-Revenue Water	2,830	3%	85	340	12%
Total:	16,004		1,654	2,679	

[2] This volume includes the compounding effects of certain activities over a ten-year period so it is higher than the annual water savings.

SECTION 5.0 – IMPLEMENTATION AND MONITORING PLAN

5.1 Implementation Plan

The implementation plan defines the process necessary to carry out the selected water efficiency activities. The City Administrator will be chiefly responsible for coordinating and delegating tasks to City Staff. Other departments will have roles in implementing some of the selected activities in this Plan including: Public Works, Finance, Utility Billing, Parks/Golf Course, Facilities and Planning Departments. Fort Lupton's proposed implementation plan is presented in *Worksheet J*, **Appendix B**. The City plans to budget for water efficiency activities presented in this Plan and intends to pursue CWCB water efficiency implementation grants to fund activities to meet its goals.

5.2 Monitoring Plan

A monitoring plan outlines the City's process to monitor the progression of the implementation plan. The plan outlines the types of water usage data to be collected and the timing of collection and reporting. The City is encouraged to make adaptive changes to the implementation plan and water efficiency activities as necessary. This allows the Plan to evolve over time with the City's water resource planning efforts. MWEPs are most successful when a water provider monitors and adjusts the implementation plan accordingly.

Monitoring water demand data is beneficial in tracking the savings generated from the implementation plan. The City's monitoring plan includes the following recommended components: data collection, evaluation and communication processes, and documentation. The water demand data to be collected during the monitoring period of this Plan is presented in *Worksheet K* in **Appendix B**. An abbreviated table of *Worksheet K* is presented in **Table 14.**

Table 14: Selection of Demand Data for Efficiency Plan Monitoring

Monitoring Data	HB 10-1051 Reporting Requirement				Selection			
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily
Total Water Use								
Total treated water produced (metered at WTP discharge)					X	X		
Total treated water delivered (sum of customer meters)	√				X	X		
Raw non-potable deliveries					X	X		
Per capita water use					X			
Indoor and outdoor treated water deliveries					X	X		
Non-revenue water	√				X			
Water Use by Customer Type								
Treated water delivered		√			X	X		
Raw non-potable deliveries					X	X		
Residential per capita water use					X			
Unit water use (AF/account)					X			
Indoor and outdoor treated water deliveries					X	X		
Large users					X	X		
Other Demand Related Data								
Population					X			
New taps					X	X		

SECTION 6.0 – ADOPTION OF NEW POLICY, PUBLIC REVIEW, AND FORMAL APPROVAL

6.1 Public Review Process

A public review process is required for all State-approved plans. This process helps to capture the values and opinions of the community to improve the quality of the Plan. For this water efficiency planning process, the public was notified of a 60-day comment period from September 2, 2019 to November 19, 2019. The public notification also included instructions on how to review the Plan and submit comments. The Plan was available for download on Fort Lupton's website at www.FortLuptonCo.gov. A hard copy was also available at the City Hall for review by citizens. No public comments were received during the 60-day comment period. Copies of the public notice announcement and the official Plan adoption resolution are provided in **Appendix E**.

6.2 Local Adoption and State Approval Process

The Plan must be formally adopted by the local governing entity. A final copy of the Plan was provided to the Fort Lupton City Council for review and comment and the City Council formally adopted the Plan at the Council Meeting on December 2, 2019. A copy of the Plan was submitted to the CWCB immediately following the Council Meeting for formal approval.

The CWCB provided written notification of a conditional approval with a requested modification. Conditions for approval were addressed, and the official approval was received on June 3, 2020. The cover letter prepared for CWCB, CWCB's Approval Checklist, and CWCB's formal approval letter are included in **Appendix F.** Implementation of the selected water efficiency activities in this Plan will likely begin in the summer of 2020.

6.3 Periodic Review and Update

Water efficiency planning is the most successful at creating long-term water savings when the conservation efforts are reevaluated on an ongoing basis instead of a "one-time" planning effort. MWEPs are required to include the steps necessary to review and revise the Plan over time. Fort Lupton will periodically review and update this Plan with the following three steps:

1. *Assign a department or Staff member responsible for taking the lead in initiating a Plan Update.* Fort Lupton's City Administrator will be the responsible party for this task.
2. *Outline the process of how monitoring results will be incorporated into Plan Updates*. Results collected through Fort Lupton's monitoring plan process will be evaluated and incorporated in future MWEP Updates. This

will be completed by summarizing and comparing monthly and annual data including, but not limited to, total treated water use, treated water use by customer category, and per-capita water. Water use trends and other information discovered through this process, including community feedback, will guide the City's future planned activities and decision-making. The implemented water efficiency activities will be described in future Plan Updates. Any documented changes to the Plan may also be noted.

3. *Complete the next required Plan Update, not to exceed seven years from the date of this Plan.* The City's next update is scheduled to be completed in 2024.

APPENDIX A

Definition of Terms

DEFINITION OF TERMS & TERMINOLOGY

This section provides an overview of many acronyms, terms, and terminology that are commonly used in water efficiency and water planning. Some additional terms are included that are common in this geographical area. Please note that this is not a comprehensive list of all terms and definitions. Other important terminology is reserved for discussion within the document. Not all of the following terms are used within the main body of this document.

AF:	Acre-foot: The amount of water it would take to cover one acre of land to a depth of one foot; approximately 325,851 gallons.
AMI:	AMI stands for Advanced Metering Infrastructure. AMI meters, also known as Smart meters are updated, digital versions of the traditional electrical meter attached to the outside of a home or business. These new meters not only measure how much water (electrical and other meters are also common) is used, but also at what times during the day. More advanced Smart meters are also designed to transmit pricing and water information from the utility company to the consumer (two-way communication). Utility companies who provide their customers with Smart meters are able to implement a variety of water reduction and saving programs, helping reduce the cost of providing water to a community.
AMR:	AMR stands for Automatic Meter Reading. It is an older technology that only collects electrical energy consumption and transfers that data from the electric meter on the home to the utility (one-way communication). Typically AMR meters are a “drive-by” type that require the utility to be in close proximity in order to read the meter. (also see AMI)
Average Day Demand:	Average daily treatment plant production divided by the total tap equivalents served
BMP:	Best Management Practice
Build-out:	Theoretical maximum development of city, City, district, or service area
C-BT:	Colorado Big Thompson Project (see Northern Water)

C-BT Quota:	The percentage set by the Northern Water Board of Directors each water year which determines the amount of ac-ft per unit of C-BT, i.e. 70% quota equals 0.7 ac-ft per C-BT unit.
CWCB:	Colorado Water Conservation Board
Demand management:	The implementation of water efficiency activities to reduce water deliveries (demands) and or improve efficiencies within the distribution system. For purposes of this document, demand management refers to both system and customer water demands. Demand management is used interchangeably with water efficiency.
Demand-side:	The distribution and consumption of treated water supplies for domestic purposes or the delivery and use of reclaimed water or untreated raw (i.e. ditch water, groundwater) for non-potable purposes such as irrigation or industrial processes.
Dual water supply systems:	Water supply systems that use a combination of treated water to meet potable water needs and reclaimed water and/or non-treated water (i.e. untreated ditch water and groundwater) to meet non-potable water needs.
ET:	Evapotranspiration: The rate at which water is removed from the soil by evaporation and from plant surfaces by transpiration.
ET Controllers:	Evapotranspiration controllers adjust the amount of water applied from sprinkler systems based on soil moisture and weather conditions.
GMA:	Growth Management Area
GPCD:	Gallons per capita per day: A measure of efficiency to determine the approximate amount of water that each resident within an area utilizes each day.
MG:	Million gallons
MGD:	Million gallons per day
MWEP:	Municipal Water Efficiency Plan
NCWCD:	Northern Colorado Water Conservancy District. More often referred to as Northern Water (see Northern Water)
NISP:	Northern Integrated Supply Project (see Northern Water) and additional information within the document.

Non-Potable Use:	Water that is not treated and used for irrigation or other uses.
Non-revenue water:	Annual non-revenue water (previously referred to as unaccounted for water) consists of unbilled authorized uses (i.e. hydrant flushing), apparent losses, and real losses. Real losses consist of leaks in the water distribution system that does not reach the end user. Apparent losses consist of unauthorized consumption, customer metering inaccuracies, and data handling errors.
Northern Water	Northern Colorado Water Conservancy District. Operates and manages the C-BT Project and future NISP.
Phreatophytes:	Species of plants and trees that consume groundwater through their root zones below the water table such as Cottonwood and Russian Olive trees.
Potable Use:	Water that is treated to drinking water standards for municipal use, including residential and commercial use. Once treated, the City's C-BT water is used for potable use.
ReCen:	Resource Central: ReCen offers multiple programs including "Garden in a Box", "Slow the Flow", "Toilet Upgrades", and more. ReCen is a non-profit organization that offers many programs that can assist communities with conservation efforts. The benefit for relatively small water providers, such as Fort Lupton, is the ReCen helps to greatly reduce planning efforts, startup costs, and labor that can be associated with getting efficiency activities up and running. ReCen has the programs already set up and in place, so the City will know exactly what the upfront costs will be. Additionally, ReCen hires and trains local technicians to provide the various services they offer, another value added component of ReCen programs.
Supply-side:	Water supply operations and facilities that include the diversion, extraction, storage, and transmission of untreated water.
SWSI:	Statewide Water Supply Initiative
System water demand:	Volume of water necessary to meet customer water needs within a certain period of time. System water demand is typically measured at the point of discharge from the water treatment plant and includes non-revenue water. In dual water supply systems, system water demand may also include the distribution and delivery of non-potable water (i.e.: reclaimed water and untreated ditch and groundwater) to meet irrigation needs.

Tank Farm:	The City's water storage tanks located on College Avenue, just west of Aims Community College.
Thermo:	A local power plant, the Thermo Power Plant, operated by Thermo Cogeneration Partnership that the City supplies with well water for industrial uses.
Water efficiency:	Water efficiency includes the practices, techniques, and technologies that extend water supplies either directly through water savings or through substituting alternative supplies such as reuse. For purposes of this document, water efficiency is inclusive of water conservation and is used instead of "water conservation." The term water efficiency captures the essential objective of a local plan which is to improve the efficiency of a municipal demand and water supply system. Water efficiency includes both system demands and customer water demands. *Note: CWCB's former 2005 Water Conservation Plan Development Guidance Document and other literature on conservation and water use efficiency distinguish supply-side and demand-side water use efficiency. These resources generally characterize demand-side as technical efficiencies (e.g. water efficient toilets) and behaviors (e.g. taking shorter showers) that save water at the end use/water user level. Supply-side refers to water efficiency at the system level such as the repair of pipeline leaks and water reuse. For purposes of this Plan, the distinction between these water efficiency encompasses both supply and demand side efficiencies.*
Water efficiency activities:	Traditionally water efficiency activities have been referred to as water conservation measures and or water conservation programs. For purposes of this document, measures and programs are replaced with water efficiency activities. Water efficiency activities encompass all efforts to either save water or improve efficiencies within a water supply system.
Wind and Rain Sensor:	A device that is connected to the irrigation system controller that will temporarily shut off irrigation when a pre-determined amount of rain or wind is detected.
WTP:	Water treatment plant
WWTP:	Wastewater treatment plant

APPENDIX B

Municipal Water Efficiency Plan Guidance Document Worksheets

WORKSHEET A - WATER SUPPLY LIMITATIONS AND FUTURE NEEDS

Limitation and/or Future Need [1]	[2] Yes	[2] No	Comments on Limitation or Future Need [3]	How is Limitation or Future Need Being Addressed [4]
System is in a designated critical water supply shortage area	X		SWSI 2010 Report identified water supply gap in South Platte Basin.	Water Efficiency Plan is in development; activities are being investigated and planned.
System experiences frequent water supply shortages and/or emergencies		X	Not at this time.	
System has substantial non-revenue water	X		Staff said a leak detection was performed and there were no major leakage issues in the system. However, there is potential to reduce non-revenue in the system.	Water Efficiency Plan is in development; activities are being investigated and planned that target non-revenue water.
Experiencing high rates of population and demand growth	X		May experience higher growth again in the future depending on new developments and general population increases along the Front Range.	Proactively acquiring additional water supplies and implementing water efficiency activities.
Planning substantial improvements or additions		X	Upgraded the water treatment plant efficiency and continued improvements in-progress.	
Increases to wastewater system capacity anticipated		X	Not a priority at this time.	
Need additional drought reserves		X	None needed at this time.	
Drinking water quality issues		X	None.	
Aging infrastructure in need of repair		X	Not a priority at this time.	
Issues with water pressure in portions of distribution system		X	Not a significant issue.	

Instructions:
[1] This column provides a list of limitations/future needs related to planning and operating the water supply system.
[2] Enter an "X" to show whether or not the system exhibits the limitations/future needs.
[3] Include any comments regarding the limitations/future needs that may be useful to consider in the planning process.
[4] If applicable, include how the limitation/future need is being addressed.

WORKSHEET D - IDENTIFICATION AND SCREENING OF FOUNDATIONAL ACTIVITIES

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Identification		Carry to Evaluation [6]	Reason for Elimination [7]
		Existing/ Potential Activity [3]	Targeted Customer Category [4]		
Metering (BP1)	V, VII				
Automatic Meter Reading Installation and Operations	V, VII				City working towards Advanced Metering Infrastructure Installation and Operations instead.
Meter and Transponder Upgrades	V	E	All Categories	X	
Meter Testing and Replacement	V	E	All Categories	X	
Submetering for Large Users (Indoor and Outdoor)	V				Not a significant number of large water users to warrant submetering.
Identify Unmetered/Unbilled Treated Water Uses	V	E	Non-Revenue	X	
Advanced Metering Infrastructure Installation and Operations		E/P	All Categories	X	
Data Collection - Monitoring and Verification (BP2)					
Frequency of Meter Reading	VII	E	All Categories	X	
Tracking Water Use by Customer Type	VII	E	All Categories	X	
Upgrade Billing System to Track Use by Sufficient Customer Types	VII	E	All Categories	X	
Tracking Water Use for Large Customers	VII	E	All Categories	X	
Area of Irrigated Lands in Service Area (e.g. acres)					Not a priority for the City.
Water Use Efficiency Oriented Rates and Tap Fees (BP1)	VII, VIII				
Volumetric Billing	VII, VIII	E	All Categories [a]	X	
Water Rate Study with Adjustments	VII, VIII		All Categories [a]	X	
Frequency of Billing	VII		All Categories	X	
Inclining/Tiered Rates	VII, VIII		All Categories [a]	X	
Water Budgets	VII, VIII		All Categories	X	
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	VII, VIII	E/P	Commercial, Residential	X	
Increase WTP Efficiency		E	All Categories	X	
System Water Loss Management and Control (BP3)	V				
System Wide Water Audits	V	P	Non-Revenue	X	
Control of Apparent Losses (with Metering)	V				Not a priority for the City. Existing metering sufficient. May be reevaluated in the next planning effort.
Leak Detection and Repair	V	E/P	Non-Revenue	X	
Water Line Replacement Program	V	E/P	Non-Revenue	X	
Planning (BP2)					
Integrated Water Resources Plans					Not a priority for the City
Master Plans/Water Supply Plans					Not a priority for the City
Capital Improvement Plans		E	All Categories	X	
Comprehensive Plans		E	All Categories	X	
Feasibility Studies					None needed by the City at this time.
Drought Management Plan					Not a priority for the City
Staff (BP4)					
Water Conservation Coordinator					Staff, time and budget constraints. Resources not available for this activity.
Integration of Land Use Efforts	IV(f)(i)				
Establish Regular Contact and Information Sharing					Not a priority for the City.
Align Data and Information Used					Not a priority for the City.
Establish Coordinated Procedures for Post-Occupancy Monitoring and Enforcement					Not a priority for the City.
Integrate Water Considerations into the Development Approval Process					Not a priority for the City.
Integrate Long Term Land Use and Water Planning		E	All Categories	X	Note: Included as part of the Comprehensive Plans/Capital Improvement Plans activity.

Instructions:
[1] This column provides a list of possible activities & identifies the Best Practice activity as defined in the Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.
[2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
[3] Specify whether the activity is "Existing" or a "Potential" activity to carry through screening by entering an "E" or "P", respectively.
[4] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
[5] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria. Note that the screening criteria for the City was not included in this table.
[6] Based on the screening process, indicate which activities will be carried onto the evaluation phase with an "X".
[7] If eliminated via screening, comment on why.
Notes:
[a] All customer categories included except for Non-Revenue and Hydrant Meters categories.

WORKSHEET E - IDENTIFICATION AND SCREENING OF TARGETED TECHNICAL ASSISTANCE INCENTIVES

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Identification					Carry to Evaluation [7]	Reason for Elimination [8]
		Existing/ Potential Activity [3]	SWSI Framework Levels [4]			Targeted Customer Category [5]		
			Level 1 Municipal Uses	Level 2 Customers with the Largest Water Use	Level 3 Customer Type(s) in Service Area			
Installation of Water Efficient Fixtures and Appliances	I							
Indoor Audits								Potential lack of community support. City evaluated Slow the Flow indoor audits but did not select the activity for implementation.
Toilet Retrofits								Not a priority for the City. May be limited benefit from water savings.
Urinal Retrofits								
Showerhead Retrofits								
Faucet Retrofits (e.g. aerator installation)								
Water Efficient Washing Machines								
Water Efficient Dishwashers								
Efficient Swamp Cooler and Air Conditioning Use								
Low Water Use Landscapes	II							
Drought Resistant Vegetation								Not a priority for the City. Focus is on improving irrigation equipment at the Golf Course/Parks/School for water savings.
Removal of Phreatophytes								Evaluated this during 2007 Plan - eliminated due to cost and potential lack of community support.
Irrigation Efficiency Evaluations/Outdoor Water Audits	II	P			X		X	Note: Included in Slow the Flow activities for residential and commercial water users.
Outdoor Irrigation Controllers	II	E/P	X	X			X	Note: Included in Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses activity.
Irrigation Scheduling/Timing								
Rain Sensors	II	E/P	X	X			X	Note: Included in Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses activity.
Residential Outdoor Meter Installations								Not a priority for the City.
Xeriscape		P			X		X	Note: Included in Xeriscape Demonstration Garden Tours activity under Education category and Garden in a Box Program for residential/commercial users.
Other Low Water Use Landscapes	II	P			X		X	
Irrigation Equipment Retrofits		E/P	X	X			X	Note: Included in Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses activity.
Inject Wetting Agent at Golf Course		E/P	X	X			X	
Water- Efficient Industrial and Commercial Water-Using Processes	III							
Specialized Nonresidential Surveys, Audits and Equipment Efficiency Improvements								City's goals focused on residential water use and irrigation water use.
Commercial Indoor Fixture and Appliance Rebates/Retrofits								
Cooling Equipment Efficiency								
Restaurant Equipment								
Incentives	X							
Toilet Rebates								Staff time and resources limited. Potential lack of City Council support for rebate programs.
Urinal Rebates								
Showerhead Rebates								
Water Efficient Faucet or Aerator Rebates								
Water Efficient Washing Machine Rebates								
Water Efficient Dishwasher Rebates								
Efficient Irrigation Equipment Rebates								
Landscape Water Budgets Information and Customer Feedback								Not a priority for the City. Staff prefer to participate in the activity: Post or Distribute ET Irrigation Scheduling to help customers reduce water use.
Turf Replacement Programs/Xeriscape Incentives (Garden in a Box)	X	P			X		X	
Give-aways	X							Lack of interest by the City. Rain Barrels activity may be a Give-Away program.
Rain Barrels		P			X		X	
Integration of Land Use Efforts	IV(f)(i)							
Developer Incentives to Reduce Water Demand		E/P		X	X		X	Note: Included in Tap Fees with Water Use Efficiency Incentives activity.
Conservation-Oriented Tap Fees		E/P		X	X		X	
Water Efficient Land Development Patterns								Not a priority for the City.
Model Landscape Plans								Staff time and resources limited.
Incentives for Reduced Irrigation		E/P		X	X		X	Note: Included in Tap Fees with Water Use Efficiency Incentives activity.
Water-Smart Home Options								Not a priority for the City.
Become a WaterSense Partner								Not a priority for the City.
Low Water Use Demonstration Homes								Staff time and resources limited. City could reevaluate this in the future as a Water Tour activity to visit another entity's example.
Water Audits								Not a priority for the City.
Rainwater Reuse								Staff preference is the Rain Barrels activity where the City will support residents to add rain barrels for rainwater reuse.

Instructions:

[1] This column provides a list of activities & if applicable, identifies the Best Practice activity as defined under *Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado*. List additional activities identified through the planning process.

[2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.

[3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.

[4] Specify which level the historical/potential activities fall under by entering an "X" in the appropriate column.

[5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.

[6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria. Note that the screening criteria for the City was not included in this table.

[7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".

[8] If eliminated via screening, comment on why.

WORKSHEET F - IDENTIFICATION AND SCREENING OF ORDINANCES AND REGULATIONS

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Identification					Carry to Evaluation [7]	Reason for Elimination [8]
		Existing/ Potential Activity [3]	SWSI Framework Levels [4]			Targeted Customer Category [5]		
			Level 1 Customer Type(s) within the Existing Service Area	Level 2 New Development	Level 3 Point of Sales on Existing Building Stock			
General Water Use Regulations	IX							
Water Waste Ordinance (BP 5)	IX	E	X	X		All Categories [b]	X	
Time of Day Watering Restriction	IX	E	X	X		All Categories [b]	X	
Day of Week Watering Restriction	IX	E	X	X		All Categories [b]	X	
Water Overspray Limitations								Not a priority for the City.
Landscape Design/Installation Rules and Regulations	IX							
Rules and Regulations for Landscape Design/Installation (BP 9)	IX	E/P		X		All Categories [b]	X	
Landscaper Training and Certification (BP 8)								Staff time and resources limited.
Irrigation System Installer Training and Certification (BP 8)								Staff time and resources limited.
Soil Amendment Requirements (BP 9)	IX	P		X		Apt, Comm, Ind, Hotel, Multi, Res	X	
Turf Restrictions (BP 9)	IX	P		X			X	
Irrigation Equipment Requirements	IX	P	X	X			X	
Outdoor Water Audits/Irrigation Efficiency Regulations (BP 10)								Not a priority for the City. Focus is on optional Slow the Flow audit programs for residents and businesses.
Outdoor Green Building Construction (BP 8,9)								Not a priority for the City.
Indoor and Commercial Regulations	IX							
High Efficiency Fixture and Appliance Replacement (BP 12)								Not a priority for the City.
Commercial Cooling and Process Water Requirements (BP 14)								Not a priority for the City. Not a significant number of commercial users impacted.
Green Building Construction (BP 12)								Not a priority for the City.
Indoor Plumbing Requirements (BP 12)								Not a priority for the City.
City Facility Requirements (BP 12)	IX	P	X	X		Commercial (City)		
Required Indoor Residential Audits (BP 13)								City evaluated Slow the Flow optional indoor program instead.
Required Indoor Commercial Audits (BP 14)								Not a priority for the City.
Commercial Water Wise Use Regulations (Car Washes, Restaurants, etc.)	IX	P	X	X		Commercial		
Integration of Land Use Efforts	IV(f)(i)							
Examine Existing Land Use Regulations for Barriers and Conflicts								Staff time and resources limited.
Adopt or Strengthen Water-Related Ordinances or Regulations								Not a priority for the City. Existing ordinances sufficient at this time.
Water Conservation in New Development, Re-Development, and Annexation								Not a priority for the City at this time. Focus is on Tap Fees with Water Use Efficiency Incentives activity instead as a means of water savings.
Incorporate Water Efficiency into Zoning Codes and Rezoning Procedures								Not a priority for the City at this time. Staff time and resources limited.
Subdivision or Site Plan Regulations that Include Water Conservation								
Implement Requirements that Contribute to Water Efficiency and Compact Infrastructure								
Water Efficient Landscape Code								Not a priority for the City at this time. May reevaluate in future planning efforts. Existing plumbing codes meet the provisions of the International Plumbing Code.
Building and Plumbing Codes								
Ordinances Promoting Efficient Fixtures in Existing Buildings								Not a priority for the City. Focus is on City Facility Requirements instead.
Regional Coordination of Water Policy and Procedures								Staff time and resources limited.

Instructions:
[1] This column provides a list of possible activities & if applicable identifies the Best Practice activity as defined under Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.
[2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.
[3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.
[4] For current/historical activities, specify which level the activities fall under by entering an "X" in the appropriate column.
[5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.
[6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria. Note that the screening criteria for the City was not included in this table.
[7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".
[8] If eliminated via screening, comment on why.
Notes:
[a] All customer categories included except for Non-Revenue and Hydrant Meters categories.
[b] All customer categories included except for Non-Revenue category.
Note on abbreviations: Apartment (Apt;, Commercial (Comm); Hotels & Motels (Hotel); Industrial (Ind); Multi-Family (Multi), Residential (Res).

WORKSHEET G - IDENTIFICATION AND SCREENING OF EDUCATION ACTIVITIES

Water Efficiency Activities for Screening [1]	State Statute Requirement [2]	Identification					Carry to Evaluation [7]	Reason for Elimination [8]
		Existing/ Potential Activity [3]	SWSI Framework Levels [4]			Targeted Customer Category [5]		
			Level 1 One-Way	Level 2 One-Way with Feedback	Level 3 Two-way communication			
Customer Education (BP6)	VI							
Bill Stuffers	VI							Focus is on other marketing mediums.
Newsletter		E/P	X			All Categories [a]	X	
Newspaper Articles	VI		X				X	
Mass Mailings			X				X	
Web Pages	VI		X				X	
Water Fairs	VI	P		X		Residential	X	
K-12 Teacher and Classroom Education Programs		P		X		Residential	X	
Message Development/Campaign	VI							Focus is on other marketing tactics.
Interactive Websites	VI	P		X		All Categories [a]	X	
Social Networking (e.g. Facebook)	VI	E/P		X		All Categories [a]	X	
Customer Surveys		P		X		Residential	X	
Focus Groups								Staff time and resources limited.
Citizen Advisory Boards								Staff time and resources limited.
Technical Assistance	VI							
Customer Water Use Workshops								Staff time and resources limited.
Landscape Design and Maintenance Workshops								Staff time and resources limited. Interested citizens can attend Northern Water's workshop.
Xeriscape Demonstration Garden	VI							Focus is on Water Facility and Demonstration Garden Tours.
Water Conservation Expert Available								Financial and staff time constraints.
Post or Distribute ET Irrigation Scheduling		P	X			All Categories [a]	X	
Water Facility Tours and Demonstration Garden Tours		E/P		X		Residential	X	
Integration of Land Use Efforts	IV(f)(i)							
Consistent Online Information		E/P		X		All Categories [a]		Note: Incorporated as part of Social Networking and Interactive Websites activities (combined in Public Education Activities).
Water Provider and Planning Department Work Together to Educate the Public								Focus is on Social Networking and Interactive Websites. Some overlap of these departments may be visible through these mediums.
Lead by Example								Not a focus for the City at this time. City is evaluating upgrading its City Facility Requirements to lead by example.
Jointly Engage with the Development Community and HOAs								Not a priority for the City at this time.
Share Success Stories and Case Studies with Other Communities and the Public								Focus is on Social Networking and Interactive Websites activities. Stories may be shared through these mediums.
Coordinate Education and Outreach Across the Region								Staff and resources limited.

Instructions:

[1] This column provides a list of possible activities & if applicable identifies the Best Practice activity as defined under Colorado WaterWise Guidebook of Best Practices (BP) for Municipal Water Conservation in Colorado. List additional activities identified through the planning process.

[2] This column identifies, by roman numeral, the elements that correspond with the best practices and that shall be fully considered in the planning process per Colorado State Statute 37-60-126.

[3] Specify whether the activity is an "Existing" or "Potential" activity to carry through screening by entering an "E" or "P", respectively.

[4] For current/historical activities, specify which level the activities fall under by entering an "X" in the appropriate column.

[5] As applicable, specify which customer category (residential, commercial, etc.) is/would be impacted by the activity.

[6] Enter screening criteria based on qualitative goals developed in Step 3 and insert an "X" for activities that meet the listed screening criteria. Note that the screening criteria for the City was not included in this table.

[7] Based on the screening process, indicate which activities will be carried on the evaluation phase with an "X".

[8] If eliminated via screening, comment on why.

Notes:

[a] All customer categories included except for Non-Revenue and Hydrant Meters categories.

WORKSHEET J - IMPLEMENTATION PLAN

Selected Water Efficiency Activities [1]	Period of Implementation [2]	Implementation Actions [3]	Entity/Staff Responsible for Implementation [6]	Coordination and Public Involvement [7]
Foundational Activities				
System Wide Water Audits	5 to 7 years	Take IWA/AWWA Water Audit Method training program through Colorado WaterWise or Colorado Water Loss Initiative and download software.	Public Works/Finance	
Advanced Meter Reading Installation and Operations	1 to 3 years	n/a	Public Works/Finance	Notify public of meter upgrades.
Water Rate Study - Water Efficient Rate Structure with Regular Updates	Ongoing	Develop a request for proposal and contract a consultant to complete rate study or continue internal rate studies and adjust rate structure.	Administration/Finance/Utility Billing	Update water rates and notify public.
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	Ongoing	Evaluate additional incentives.	Administration/Finance/Utility Billing	Notify developers of incentives.
Non-Potable Tiered Rates	Ongoing	Develop a request for proposal and contract a consultant to complete rate study or continue internal rate studies and adjust rate structure.	Administration/Finance/Utility Billing	Update water rates and notify public.
Increase WTP Efficiency	Ongoing	n/a	Public Works/Finance	
Leak Detection and Water Line Replacement Program	Ongoing	Request quote from consultant and schedule next leak detection.	Public Works/Finance	
Comprehensive Plans/Capital Improvement Plans	Ongoing	Continue periodic updates to Comprehensive/Capital Improvement Plans.	Public Works/Administration	
General Monitoring and Verification Activities and General Water Rates and Billing	Ongoing	n/a	Administration/Finance/Utility Billing	
Targeted Technical Assistance and Incentives				
Slow the Flow Commercial Irrigation Audits	1 to 3 years	Contact ReCen to set up program.	Finance/Utility Billing	Contact ReCen to set up program; Advertise program to businesses.
Slow the Flow Residential Irrigation Audits	1 to 3 years	Contact ReCen to set up program.	Finance/Utility Billing	Contact ReCen to set up program; Advertise program to residents.
Xeriscape Incentives - Garden in a Box	1 to 3 years	Contact ReCen to set up program.	Finance/Utility Billing	Contact ReCen to set up program; Advertise program to residents.
Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses	3 to 5 years	Purchase and install wind and rain sensors and program sprinkler systems.	Parks/Golf Course	
Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses	3 to 5 years	Purchase improved irrigation equipment and install.	Parks/Golf Course	
Inject Wetting Agent at Golf Course	3 to 5 years	Purchase wetting agent.	Parks/Golf Course	
Rain Barrels	3 to 5 years	Purchase 5 rain barrels as giveaways and/or prepare educational materials for bills/website/social media.	Administration	Advertise program to residents.
Ordinances and Regulations				
Weekly and Time of Day Outdoor Watering Restrictions	Ongoing	n/a	Administration	Notify the public of ordinances/regulations.
Water Waste Ordinance	Ongoing	n/a	Administration	
Landscape Design Ordinances and Restrictions	Ongoing	n/a	Administration	Notify developers of ordinances/restrictions.
City Facility Requirements	5 to 10 years	Research cost to upgrade toilets and fixtures in City buildings; Develop potential requirements and propose to City Council.	Facilities	
Commercial Water Wise Use Regulations	5 to 10 years	Develop regulations and propose to City Council.	Planning/Administration	Notify commercial water users of regulations.
Education Activities				
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	1 to 3 years	Prepare educational materials to distribute; prepare water-related article and submit to newspaper; develop and distribute customer surveys.	Administration	Look into partnering with Colorado WaterWise, Northern Water or other organizations for educational campaigns.
Interactive Webpages and Website Updates	1 to 3 years	Add a water conservation page.	Administration	
Social Networking (Facebook & Twitter)	1 to 3 years	Develop a plan for social media marketing efforts.	Administration	
K-12 Education Program	1 to 3 years	Research education programs and contact a school representative to develop program. Potentially contact Aims Community College for program volunteers.	Administration	Contact Aims Community College for program volunteers and contact a school representative to develop and set up program.
Water Facility Tours and Demonstration Garden Tours	1 to 3 years	Set up and organize tours. Contact Northern Water to set up a tour of its demonstration garden.	Administration	Contact Northern Water about setting up a tour. Notify the public of water facility and demonstration garden tour opportunities.
Children's Water Fair or Festival	1 to 3 years	Participate in Northern Water's next water fair; Contact school representatives to organize.	Administration	Contact Northern Water about participation.
Post or Distribute ET Irrigation Scheduling	1 to 3 years	Prepare information using Northern Water's ET Irrigation Scheduler and provide to customers.	Administration	Notify public of the irrigation schedule.

Instructions:
[1] Provide the list of water efficiency activities selected for implementation during Step 4.
[2] Provide period in which activity is going to be implemented.
[3] Include information on specific actions necessary to implement the activities (e.g. advertise rebates to public).
[4] Indicate timing of when the action are scheduled to be implemented (e.g. when leaks will be repaired, when rebate program will start, etc.). Note that the City did not include deadlines.
[5] Insert anticipated annual costs. Note that the City did not include costs.
[6] Specify which entity/staff responsible for implementing the activities.
[7] If applicable, comment on necessary coordination among staff/other entities and how the public will be involved. This includes educational campaigns, feedback, direct participation in certain actions, etc.

WORKSHEET K - SELECTION OF MONITORING DEMAND DATA FOR MONITORING PLAN

Monitoring Data [1]	HB 10-1051 Reporting Requirement [2]				Selection [3]				Entity/Staff Responsible for Data Collection and Evaluation [4]	Comments [6]
	Annual	Monthly	Bi-Monthly	Daily	Annual	Monthly	Bi-Monthly	Daily		
Total Water Use										
Total treated water produced (metered at WTP discharge)					X	X			Administration/Public Works	Data from WTP.
Total treated water delivered (sum of customer meters)	√				X	X			Administration/Utility Billing/Finance	Data from billing software.
Raw non-potable deliveries					X	X			Administration/Utility Billing/Finance	Data from billing software.
Reclaimed water produced (metered at WWTP discharge)										
Reclaimed water delivered (sum of customer meters)										
Per capita water use					X				Administration	Calculation based on the total billed water (data from billing software) and the population (State Demography Office).
Indoor and outdoor treated water deliveries					X	X			Administration	Average usage in winter months taken as indoor usage in non-winter months.
Treated water peak day produced										
Reclaimed water peak day produced										
Raw water peak day produced/delivered										
Non-revenue water	√				X				Administrition	Calculation based on the total treated water at the WTP less the total billed water.
Water Use by Customer Type										
Treated water delivered		√			X	X			Administration/Utility Billing/Finance	Data from billing software.
Raw non-potable deliveries					X	X			Administration/Utility Billing/Finance	Data from billing software.
Reclaimed water delivered										
Residential per capita water use					X				Administration	Calculation based on the total billed water (data from billing software) and the population (State Demography Office).
Unit water use (e.g. AF/account or AF/irrigated acre)					X				Administration	Estimated based on the billed water by customer category and the number of taps.
Indoor and outdoor treated water deliveries					X	X			Administration	Average usage in winter months taken as indoor usage in non-winter months.
Large users					X	X			Administration	Evaluated through billing software and/or observations.
Other Demand Related Data										
Irrigated landscape (e.g. AF/acre or number of irrigated acres)										
Precipitation										
Temperature										
Evapotranspiration										
Drought index information										
Economic conditions										
Population					X				Administration	Data from State Demography Office or City estimates.
New taps					X	X			Administration/Utility Billing/Finance	Data from billing software.

Instructions:

[1] This worksheets provides a list of possible demand data. Add additional demand data provider would like to monitor.

[2] Specifies annual reporting requirements per HB 10-1051.

[3] Select demand data provider plans to use to monitor effectiveness of water efficiency activities by inserting an "X" in appropriate boxes.

[4] Specify staff/entity reponsible for data collection and evaluation.

[5] Specify the timing and/or set schedule in which data will be collected and evaluated. Note that the City did not specify the timing or set a schedule in this table.

[6] Add any additional comments.

APPENDIX C

Additional Tables

Table C1: Water Efficiency Activity Evaluation

Water Efficiency Activities for Evaluation	Existing/ Potential Activity	Targeted Customer Category	Review of Qualitative Screening					Evaluation									Final Selection	
			Qualitative Goals					Projected Water Savings						Quantitative Goals				
			Benefit in Water Savings	*Low Financial Implications*	*Public Acceptance*	*Staff Availability*	*Staff and Council Approval*	Total Water Savings over the Planning Period (MG)	Total Water Savings over the Planning Period (AF)	Average Annual Water Savings (MG/yr)	Average Annual Water Savings (AF/yr)	Cost per 1,000 gal saved	Projected Implementation Costs over Planning Period Including Lost Revenue	*Helps to Achieve Overall Savings Goals*	*Low Cost w/ Significant Water Savings*	*Beneficial to Community*	Notes on Additional Pros/Cons to Consider	Selected for Implementation
Foundational Activities																		
System Wide Water Audits	P	Non-Revenue	X	X	X	X	X	4.6	14.15	0.46	1.42	$2.03	$9,374	X	X			X
Advanced Metering Infrastructure Installation and Operations	E/P	All Categories, Non-Revenue	X		X	X	X	225.7	692.52	22.57	69.25	$11.44	$2,581,912	X		X		X
Water Rate Study - Water Efficient Rate Structure with Regular Updates	E/P	Apt, Comm, Hot & Mot, Ind, Multi, Res	X	X	X	X	X	170.5	523.32	17.05	52.33	$0.72	$123,435	X	X	X		X
Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)	E/P	Res, Comm	X		X	X	X	3.2	9.70	0.32	0.97	$10.73	$33,944	X				X
Non-Potable Tiered Rates	E	Non-Pot Irrigation	X	X	X	X	X	70.4	216.12	7.04	21.61	$0.64	$44,995	X	X	X		X
Increase WTP Efficiency	E	All Categories, Non-Revenue	X		X	X	X	260.7	800.19	26.07	80.02	$17.97	$4,686,637	X		X		X
Leak Detection and Water Line Replacement Program	E/P	Non-Revenue	X		X	X	X	46.1	141.50	4.61	14.15	$98.79	$4,555,194	X				X
Comprehensive Plans/Capital Improvement Plans	E	All Categories, Non-Revenue	X		X	X	X	13.0	40.01	1.30	4.00	$19.86	$258,939	X		X		X
General Monitoring and Verification Activities and General Water Rates and Billing	E	All Categories, Non-Revenue	X	X	X	X	X	13.0	40.01	1.30	4.00	$8.31	$108,362	X	X	X		X
Targeted Technical Assistance and Incentives																		
Slow the Flow Commercial Irrigation Audits	P	Comm	X	X	X	X	X	8.8	27.04	0.16	0.49	$9.90	$87,183	X	X			X
Slow the Flow Residential Irrigation Audits	P	Res	X		X	X	X	2.3	6.92	0.04	0.13	$21.44	$48,309	X				X
Xeriscape Incentives - Garden in a Box	P	Res	X		X	X	X	0.2	0.73	0.00	0.01	$40.54	$9,686	X				X
Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses	P	Non-Pot Irrigation	X	X	X	X	X	50.3	154.42	5.03	15.44	$2.00	$100,832	X	X			X
Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses	E/P	Non-Pot Irrigation	X	X	X	X	X	50.3	154.42	5.03	15.44	$5.62	$282,801	X	X			X
Inject Wetting Agent at Golf Course	E/P	Non-Pot Irrigation	X		X	X	X	39.1	120.00	3.91	12.00	$22.84	$893,124	X				X
Rain Barrels	P	Res	X		X	X	X	0.9	2.79	0.02	0.05	$30.82	$27,967	X				X
Ordinances and Regulations																		
Weekly and Time of Day Outdoor Watering Restrictions	E	Apt, Comm, Hot & Mot, Ind, Multi, Res, School	X	X	X	X	X	3.7	11.30	0.37	1.13	$6.87	$25,274	X	X	X		X
Water Waste Ordinance	E	All Categories	X	X	X	X	X	1.8	5.65	0.18	0.56	$8.14	$14,984	X	X	X		X
Landscape Design Ordinances and Restrictions	E/P	Apt, Comm, Hot & Mot, Ind, Multi, Res	X		X	X	X	8.7	26.62	0.87	2.66	$8.33	$72,247	X		X		X
City Facility Requirements	P	Comm	X		X	X	X	0.3	1.00	0.03	0.10	$25.14	$8,223	X				X
Commercial Water Wise Use Regulations	P	Comm	X		X	X	X	0.8	2.47	0.08	0.25	$12.34	$9,923	X				X
Education Activities																		
Paper Education Campaigns - Newsletter, Newspaper Articles, Mass Mailings, Customer Surveys, etc.	E/P	Apt, Comm, Hot & Mot, Ind, Multi, Res, School	X	X	X	X	X	68.8	211.1	6.9	21.11	$6.96	$478,936.49	X	X	X	These activities combined in cost-benefit analysis.	X
Interactive Webpages and Website Updates	P		X	X	X	X	X							X	X	X		X
Social Networking (Facebook & Twitter)	E/P		X	X	X	X	X							X	X	X		X
K-12 Education Program	P	Res	X		X	X	X	1.5	4.75	0.03	0.09	$21.51	$33,325.28	X				X
Water Facility Tours and Demonstration Garden Tours	E/P	Res	X		X	X	X	0.1	0.41	0.00	0.01	$29.00	$3,920.93	X				X
Children's Water Fair or Festival	P	Res	X		X	X	X	1.4	4.32	0.03	0.08	$12.95	$18,236.32	X				X
Post or Distribute ET Irrigation Scheduling	P	Apt, Comm, Hot & Mot, Ind, Multi, Res, School	X	X	X	X	X	36.7	112.72	3.67	11.27	$6.31	$231,819.75	X	X	X		X

All Categories = Treated Categories - Apartment, Commercial, Hotels & Motels, Industrial, Multi-Family, Residential, School, Hydrant

APPENDIX D

Activity Cost and Benefit Analysis

System Wide Water Audits

By implementing System Wide Water Audits, the City could identify unmetered and unbilled treated water uses in order to assess where losses are occurring and how losses can be addressed. These losses are considered Non-Revenue water. The City may utilize the IWA/AWWA Water Audit Method published in the AWWA Manual of Practice M36 to conduct a "top down approach."

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.5%

Category	Avg. Annual Water Use over Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Non-Revenue Water	92.22	461,080

Estimated Annual Water Savings	**0.46**	MG/yr
Estimated Savings over Planning Period	**4.6**	MG

Notes:

By specifically identifying these losses, additional actions can be taken to reduce the water lost. This measure has the potential to improve all categories, but Non-Revenue is the main category assumed. A conservative reduction of 0.5% of projected annual water use was assumed.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	20	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$937.40	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs	$0.00	/year
Annual Labor	**$937.40**	/year

Notes:

Estimated costs for Staff to spend approximately 20 hours per year at $46.87/hour to conduct audits.

The 20 hours is based on other water providers' time estimates to complete audits. Although some revenue may be lost on the demand side, more revenue will likely be realized on the supply side.

Estimated Annual Cost	**$937**	/year
Estimated Total Cost over Planning Period	**$9,374**	
Cost per 1000 Gallons Saved	**$2.03**	

Advanced Metering Infrastructure Installation and Operations

Advanced Metering Infrastructure (AMI) is a metering system that records customer consumption hourly or more frequently and provides for daily or more frequent transmittal of measurements over a communication network to a central collection point. AMI systems have the capability to offer customers an interactive portal where they would get usage alerts and be able to view billing and metering data. This process may involve various steps of upgrading meters or adding registers to existing meters that would transmit usage information to the City's metering system.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Estimated Average Annual Savings Rate	*Estimated Annual Water Savings (gal/yr)*
Non-Revenue	92.22	1.0%	922,160
Apartment	23.10	6.0%	1,385,917
Commercial	80.43	3.0%	2,412,880
Hotels & Motels	2.18	3.0%	65,508
Industrial	28.02	3.0%	840,687
Multi-Family	37.92	6.0%	2,274,996
Residential	235.78	6.0%	14,146,811
School	14.92	3.0%	447,638
Hydrant Meters	6.91	1.0%	69,147

Estimated Annual Water Savings	**22.57**	MG/yr
Estimated Savings over Planning Period	**225.7**	MG

Notes:

As more new meters are installed, the savings rate increases over the projected planning period. There are several influencing factors to the amount of savings realized including customer feedback and response, ease of incorporating new meters into the current system, etc.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	137	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$6,427.75**	/year

Material Costs		
Meter Cost (per unit)	**$300.00**	/ meter
Number of Meters/Year	**299**	
Annual Cost	**$89,790.00**	/year

Notes:

Annual Staff Costs for this savings measure include data processing. Other costs, such as fuel and vehicle maintenance are not included since some costs would be associated with reading the meters no matter what the scenario.

Advanced Metering Infrastructure Installation and Operations

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Apartment	$6.69
Commercial	$6.51
Hotels & Motels	$7.34
Industrial	$6.86
Multi-Family	$6.48
Residential	$8.20
School	n/a
Hydrant Meters	n/a

Notes:

The annual revenue loss was estimated based on current rates for listed City customers.

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$3,065,487	/year
Estimated Average Annual Revenue with Water Savings	$2,903,513	/year
Estimated Annual Revenue Loss Related to Water Savings	$161,973	/year

Estimated Annual Cost	**$258,191**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$962,178**	
Estimated Total Cost over Planning Period Including Lost Revenue	**$2,581,912**	
Cost per 1000 Gallons Saved	**$11.44**	

Water Rate Study - Water Efficient Rate Structure with Regular Updates

Based on many studies, water rates (e.g., inclining and/or tiered) are one of the most effective ways to encourage efficient water use. A rate study is necessary to ensure maximum water conservation savings. Because they are very interrelated, this measure also includes Volumetric Billing and Tiered Rates within it.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Annual Estimated Savings Rate	*Estimated Annual Water Savings (gal/yr)*
Apartment	23.10	5.00%	1,154,931
Commercial	80.43	2.00%	1,608,587
Hotels & Motels	2.18	2.00%	43,672
Industrial	28.02	2.00%	560,458
Multi-Family	37.92	5.00%	1,895,830
Residential	235.78	5.00%	11,789,009

Notes:

Assumed a conservative reduction of per customer category of projected total billed water. Rate change studies have often shown an even greater savings (e.g., Southwest Florida Water Management District study indicated a 13% savings). Conservative savings rates were applied to each category.

Estimated Annual Water Savings	**17.05**	MG/yr
Estimated Savings over Planning Period	**170.5**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	20	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$937.40	
Third Party Costs (Rate Study)	$50,000.00	
Staff Hours for Rate Study and Program Set-Up	150	hours/study
Annual Labor	**$12,343.50**	/year

Notes:

Annual Revenue Lost due to water savings is not incorporated into the Total Cost to Water Provider because these costs are absorbed and included in the rate adjustments to the customers. The cost assumes two rate studies are completed by consultants in the 10-year planning period. Currently, the City does annual in-house rate studies and adjusts rates accordingly.

Total Cost to Water Provider

Estimated Annual Cost	**$12,344**	/year
Estimated Total Cost over Planning Period	**$123,435.00**	
Cost per 1000 Gallons Saved	**$0.72**	

Tap Fees with Water Use Efficiency Incentives (Lot-based water dedication)

Fort Lupton would encourage smaller lots designated by developers by charging reduced fees for smaller lot sizes. For example, this might include a discount on tap fees for turf areas of less than 3,000 square feet or a discount for a smaller percentage of irrigated areas. Typically an irrigated area of less than 30% is considered conservative in nature. On the opposite end, an additional fee may be charged for larger irrigation areas.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.10%

Category	**Avg. Annual Water Use over Planning Period** (MG)	*Estimated Annual Water Savings gallons/yr*
Residential	235.78	235,780
Commercial	80.43	80,429

Notes:

A conservative reduction of 0.1% of projected annual water use was assumed. 0.1% was calculated by a 2% growth rate multiplied by 5% savings (based on participation and overall savings).

This measure mainly impacts future residential developments.

Estimated Annual Water Savings	**0.32**	MG/yr
Estimated Savings over Planning Period	**3.2**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	20	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$937.40	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs	$0.00	/year
Annual Labor	**$937.40**	/year

Notes:

Estimated costs for Staff to spend approximately 20 hours per year at $46.87/hour to help coordinate within the service area.

Water Rates

Rate Category	**Current Rates** (per 1,000 gals)
Residential	$8.20
Commercial	$6.51

Notes:

The annual revenue loss was estimated based on current rates for residential and commercial customers.

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$2,456,993	/year
Estimated Average Annual Revenue with Water Savings	$2,454,536	/year
Estimated Annual Revenue Loss Related to Water Savings	**$2,457**	/year

Estimated Annual Cost	**$3,394**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$9,374**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$33,944**	
Cost per 1000 Gallons Saved	**$10.73**	

Non-Potable Tiered Rates

Based on many studies, water rates (e.g., inclining and/or tiered) are one of the most effective ways to encourage efficient water use. A rate study is necessary to ensure maximum water conservation savings. Because they are very interrelated, this measure also includes Volumetric Billing and Tiered Rates within it. This measure targets non-potable water usage. The City currently has tiered rates for non-potable customers.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Non-Potable Customer Category	Avg. Annual Water Use over Planning Period (MG/yr)	Annual Estimated Savings Rate	*Estimated Annual Water Savings (gal/yr)*
Industrial	251.48	2.00%	5,029,564
School	25.48	2.00%	509,507
Parks and Open Space	35.94	2.00%	718,769
Golf Course	39.22	2.00%	784,486

Notes:

Assumed a conservative reduction of per customer category of projected total billed water. Rate change studies have often shown an even greater savings (e.g., Southwest Florida Water Management District study indicated a 13% savings). Conservative savings rates were applied to each category.

Estimated Annual Water Savings	**7.04**	MG/yr
Estimated Savings over Planning Period	**70.4**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	96	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$4,499.52	
Third Party Costs (Rate Study)	$0.00	/year
Annual Labor	**$4,499.52**	/year

Notes:

Annual Revenue Lost due to water savings is not incorporated into the Total Cost to Water Provider because these costs are absorbed and included in the rate adjustments to the customers. Rate study cost is included in the activity 'Water Rate Study - Water Efficient Rate Structure with Regular Updates' and excluded from this activity to avoid double-counting costs.

Total Cost to Water Provider

Estimated Annual Cost	**$4,500**	/year
Estimated Total Cost over Planning Period	**$44,995**	
Cost per 1000 Gallons Saved	**$0.64**	

Increase WTP Efficiency

The City's previous Water Treatment Plant (WTP) did not recover 7.5% to 8.0% of the raw water entering the plant. In simpler terms, 92.0 to 92.5 out of every 100 gallons delivered to the WTP was delivered to customers and the remainder was lost to the system. The City has upgraded its WTP and improved the efficiency. The City continues to upgrade its system.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Estimated Average Annual Savings Rate	*Estimated Annual Water Savings (gal/yr)*
Non-Revenue	92.22	5.0%	4,610,802
Apartment	23.10	5.0%	1,154,931
Commercial	80.43	5.0%	4,021,467
Hotels & Motels	2.18	5.0%	109,180
Industrial	28.02	5.0%	1,401,145
Multi-Family	37.92	5.0%	1,895,830
Residential	235.78	5.0%	11,789,009
School	14.92	5.0%	746,064
Hydrant Meters	6.91	5.0%	345,737

Estimated Annual Water Savings	**26.07**	MG/yr
Estimated Savings over Planning Period	**260.7**	MG

Notes:

The annual water savings represents a 5% improvement to all the treated water uses.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	120	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$5,624.40**	/year

Upgrade Cost		
Annual Cost of Continued Improvements:	**$309,765.00**	/year

Notes:

Annual Staff Costs for this savings measure include working with a 3rd party consultant on the remaining upgrades and monthly data processing. Remaining upgrade costs from the City's budgeted Capital Improvements Program. Costs prior to 2018 are not included.

Increase WTP Efficiency

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Apartment	$6.69
Commercial	$6.51
Hotels & Motels	$7.34
Industrial	$6.86
Multi-Family	$6.48
Residential	$8.20
School	n/a
Hydrant Meters	n/a

Notes:

The annual revenue loss was estimated based on current rates for listed City customers.

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$3,065,487	/year
Estimated Average Annual Revenue with Water Savings	$2,912,212	/year
Estimated Annual Revenue Loss Related to Water Savings	$153,274	/year

Estimated Annual Cost	**$468,664**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$3,153,894**	
Estimated Total Cost over Planning Period Including Lost Revenue	**$4,686,637.28**	
Cost per 1000 Gallons Saved	**$17.97**	

Leak Detection and Water Line Replacement Program

Fort Lupton could perform a Leak Detection Program in-house or use an outside consultant (e.g., American Leak Detection). The City typically completes a leak detection and repair program every four to five years using an outside consultant. Since 2010, the City has replaced a portion of its water and sewer line systems with new pipes. Fort Lupton continues to replace valves and lines each year.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	5.0%	
Annual Estimated Non-Revenue Water without Savings	92.22	MG/yr
Estimated Annual Water Savings	**4.61**	MG/yr
Estimated Savings over Planning Period	**46.1**	MG

Notes:

The average system unaccounted leakage/loss rate is 18%.

Savings equals the current projected water usage of Non-Revenue water multiplied by the estimated savings rate.

Costs

Total Cost to Water Provider

Leak Detection Program

Labor Costs		
Staff Hours	25	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$1,171.75	
Third Party Costs (Leak Detection Consult)	$2,990.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$832.35**	/year

Notes:

Third Party Costs include leak survey performed over the entire system over the planning period by a consultant. Annual labor costs are distributed over the planning period.

Water Line Replacement Program

Labor Costs		
Staff Hours	100	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$4,687.00	
Water Line Replacement Cost	$450,000.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$454,687.00**	/year

Annual labor costs are for Staff hours working with consultants. Water line replacement program costs based on the City's Capital Improvements Program for 2018 through 2024.

Estimated Annual Cost	**$455,519**	/year
Estimated Total Cost over Planning Period	**$4,555,193.50**	
Cost per 1000 Gallons Saved	**$98.79**	

Comprehensive Plans/Capital Improvement Plans

Fort Lupton plans to continue developing, updating, and evaluating various plans (Comprehensive Plans, Capital Improvement Plans) that will improve its overall water efficiency and help plan for future use. These plans also help to identify and integrate long term land use and water planning.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.25%

Notes:

This measure has the potential to improve all categories. A conservative reduction of 0.25% of projected annual water use was assumed.

Category	Avg. Annual Water Use over Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Non-Revenue	92.22	230,540
Apartment	23.10	57,747
Commercial	80.43	201,073
Hotels & Motels	2.18	5,459
Industrial	28.02	70,057
Multi-Family	37.92	94,791
Residential	235.78	589,450
School	14.92	37,303
Hydrant Meters	6.91	17,287

Estimated Annual Water Savings	**1.30**	MG/yr
Estimated Savings over Planning Period	**13.0**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	90	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$4,218.30	
Third Party Costs	$15,000.00	/year
Evaluation and Follow-up Costs	$0.00	/year
Annual Labor	**$19,218.30**	/year

Notes:

Estimated staff costs for Staff to spend an average of 90 hours per year at $46.87/hour to help develop the Plans for the City.

Third party costs include a consultant to aid staff in the development of these Plans.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on a weighted average of current rates for all customers.

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$2,670,224	/year
Estimated Average Annual Revenue with Water Savings	$2,663,548	/year
Estimated Annual Revenue Loss Related to Water Savings	**$6,676**	/year

Estimated Annual Cost	**$25,894**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$192,183**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$258,939**	
Cost per 1000 Gallons Saved	**$19.86**	

General Monitoring and Verification Activities and General Water Rates and Billing

Water savings is evident from Fort Lupton's existing water monitoring and verification activities which include frequent meter reading and tracking of use for large water customers. Additionally, Fort Lupton's water rates and billing encourage citizens to conserve water through volumetric billing with inclining/tiered rates, frequent billing and providing water budgets for certain large water users. The following calculates estimated savings for these activities.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.25%

Notes:

These activities are estimated to save a quarter of a percent per year. Current system leakage/loss rate is estimated at 18%.

Category	Avg. Annual Water Use over Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Non-Revenue	92.22	230,540
Apartment	23.10	57,747
Commercial	80.43	201,073
Hotels & Motels	2.18	5,459
Industrial	28.02	70,057
Multi-Family	37.92	94,791
Residential	235.78	589,450
School	14.92	37,303
Hydrant Meters	6.91	17,287

Estimated Annual Water Savings	**1.30**	MG/yr
Estimated Savings over Planning Period	**13.0**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	90	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$4,218.30	
Evaluation and Follow-up Costs	$0.00	/year
Annual Labor	**$4,218.30**	/year

Notes:

Estimated staff costs for Staff to spend an average of 90 hours per year at $46.87/hour to help develop and implement these activities for the City.

Revenue losses are absorbed by the usage rates customers pay.

Water Rates

Rate Category	Rates
Weighted average of customer rates	$6.17

Estimated Average Annual Revenue without Water Savings	$2,647,153	/year
Estimated Average Annual Revenue with Water Savings	$2,640,535	/year
Estimated Annual Revenue Loss Related to Water Savings	**$6,618**	/year

General Monitoring and Verification Activities and General Water Rates and Billing

Estimated Annual Cost	**$10,836**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$42,183**	
Estimated Total Cost over Planning Period	**$108,362**	
Cost per 1000 Gallons Saved	**$8.31**	

Slow the Flow Commercial Irrigation Audits

The City may partner with Resource Central (ReCen) for irrigation audits for HOAs and businesses through the "Slow the Flow" program. "Slow the Flow's trained technicians perform a detailed analysis of your existing sprinkler system and will provide a comprehensive report detailing findings and recommendations to improve efficiency. The service will provide suggestions that will deliver measurable improvements in water use reduction, saving your business money, and supporting community conservation goals." -ReCen

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Participant Annual Estimated Savings Rate	5.0%

Customer Category	**Avg. Annual Outdoor Water Use Over the Planning Period** (gal/tap)	***Estimated Annual Water Savings*** *(gal/tap/yr)*	***Annual Program Participants*** *(taps)*
Commercial	160,180	8,009	20

Estimated Annual Water Savings	**0.16**	MG/yr in Year 1
Estimated Savings over Planning Period	**8.8**	MG

Notes:

The outdoor use estimates are based on the following approximations for each customer category: Commercial = 42%.

Assumed a conservative estimate of 5% savings of projected outdoor water usage . Customers have to put Auditor's advice and suggestions into practice.

Program Participants based on other water providers' participation rates for similar programs.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	15	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$703**	/year
Third Party Costs		
Audit Cost	$114	
Number of Participants	20	/year
Annual Cost	**$2,280**	/year

Notes:

Costs include staff time for implementing (approximately 45 min. per participant). Program is largely organized by ReCen .

Third Party Costs include ReCen 's time.

Commercial audits = $114/audit.

Slow the Flow Commercial Irrigation Audits

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Commercial	$6.51

Note:

The annual revenue loss was estimated based on current rates for the Commercial customer category.

Estimated Average Annual Revenue without Water Savings	$114,705	/year
Estimated Average Annual Revenue with Water Savings	$108,970	/year
Annual Revenue Loss Related to Water Savings	**$5,735**	/year

Notes:

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Annual Cost	**$8,718**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$29,831**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$87,183**	
Cost per 1000 Gallons Saved	**$9.90**	

Slow the Flow Residential Irrigation Audits

The City may partner with Resource Central (ReCen) for residential irrigation audits. ReCen offers the "Slow the Flow" program which provides outdoor sprinkler consultations to residential customers. "The service usually takes 90 minutes and involves a visual inspection, data collection, and in-depth evaluation. Our technicians will deliver a clear and actionable list of suggestions to reduce water use and runoff at each property, while keeping landscapes and lawns healthy." -ReCen

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Participant Annual Estimated Savings Rate	5.0%

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants (taps)*
Residential	40,973	2,049	20

Estimated Annual Water Savings	**0.04**	MG/yr in Year 1
Estimated Savings over Planning Period	**2.3**	MG

Notes:

The outdoor use estimates are based on the following approximations for each customer category: Residential = 40%.

Assumed a conservative estimate of 5% savings of projected outdoor water usage . Customers have to put Auditor's advice and suggestions into practice.

Program Participants based on other water providers' participation rates for similar programs.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	15	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$703**	/year
Third Party Costs		
Audit Cost	$114	
Number of Participants	20	/year
Annual Cost	**$2,280**	/year

Notes:

Costs include staff time for implementing (approximately 45 min. per participant). Program is largely organized by ReCen .

Third Party Costs include ReCen 's time. Residential audits = $114/audit.

Slow the Flow Residential Irrigation Audits

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20

Note:

The annual revenue loss was estimated based on current rates for the Residential customer category.

Estimated Average Annual Revenue without Water Savings	$36,958	/year
Estimated Average Annual Revenue with Water Savings	$35,110	/year
Annual Revenue Loss Related to Water Savings	**$1,848**	/year

Notes:

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Annual Cost	**$4,831**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$29,831**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$48,309**	
Cost per 1000 Gallons Saved	**$21.44**	

Xeriscape Incentives - Garden in a Box

Each year Resource Central (ReCen) offers an array of do-it-yourself Xeric garden kits, created by professional landscape designers for sun, shade, and everything in between. These plant-by-number gardens can have a significant conservation impact and are perfect for anyone who wants to beautify their yard while using less water than standard turf.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Participant Annual Estimated Savings Rate	25%	[1]

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants (taps)*
Residential	40,973	434	10

Estimated Annual Water Savings	**0.004**	MG/yr in Year 1
Estimated Savings over Planning Period	**0.2**	MG

Notes:

[1] The "Annual Estimated Saving Rate" represents a 25% savings of water for the turf area replaced with the Garden in the Box plants and not a 25% savings overall. Similar to the Demonstration Gardens themselves, this measure affects projected outdoor water usage for the listed Customer Categories.

It is estimated that approximately 40 % of residential customer use is outdoor use. Each garden is estimated to use up to 60% less water than the same area of turf, but irrigation systems need to be adjusted for benefit to be realized.

A garden typically covers 100 sq ft. Assumption was made that same area of turf will be replaced with same area of xeriscaping. Irrigation requirements = approximately two AF/acre for turf = 748 gal/garden savings. This estimate was cut in half due to other potential problems.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	2.5	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$117.18	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$117.18**	/year

Notes:

Staff cost include approximately 1/4 hour per participant. ReCen offers end consumers a discount through the water provider.

Xeriscape Incentives - Garden in a Box

Materials Costs

Associated Costs	$65.55	/garden
Number of Participants	10	/year
Annual Materials	**$655.50**	/year

ReCen's price is $4,370 for 80 gardens. An assumed 20% mark-up was made for smaller quantities.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20

Notes:

The annual revenue loss was estimated based on current rates for customers and assumes rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$18,479	/year
Estimated Average Annual Revenue with Water Savings	$18,283	/year
Annual Revenue Loss Related to Water Savings	**$196**	/year

Estimated Annual Cost	**$969**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$7,727**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$9,686**	
Cost per 1000 Gallons Saved	**$40.54**	

Install Wind and Rain Sensors at Parks, Schools, Open Space Areas and Golf Courses

Rain Sensors and Winds Sensors could be installed at the City's Parks, Schools, Open Space Areas and Golf Courses to save non-potable irrigation water. These sensors, combined with Irrigation Controllers, are used to automatically shut off sprinklers during rain events or windy conditions when irrigation efficiency is reduced. Irrigation Controllers allow a user to program automatic irrigation schedules for different irrigation zones.

Planning Period	2018 to 2027
Years in Planning Period	10
Program Length	10

Estimated Water Savings

Annual Estimated Savings Rate	5.00%

Location	**Non-Potable Water Use** (AF/yr)	***Estimated annual Water Savings*** (gal/yr)
Golf Course	120.4	1,961,216
Parks and Open Space	110.3	1,796,923
School	78.2	1,273,768
TOTAL	308.8	5,031,906

Notes:

Non-Potable Water Use is the projected average outdoor use per year during the planning period.

Estimated Annual Water Savings	**5.03**	MG/yr
Estimated Savings over Planning Period	**50.3**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	90	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$4,218.30	
One-Time Set-Up by Staff	$5,624.40	

Materials Costs

Wind Sensor Unit Cost	$900.00	/item
Rain Sensor Unit Cost	$35.00	/item
Irrigation Controller and Transmitter Unit Cost	$2,600.00	/item
Total Materials	**$53,025.00**	

Notes:

Annual Staff time is based on 6 hours/year per Irrigation Controller Station for data collection, monitoring and follow-up. A one-time set-up cost is based on 8 hours per Irrigation Controller Station.

It was assumed the City would need 15 Irrigation Controller Stations and 15 of each type of sensor. Materials cost based on the Rain Bird online store (http://www.rainbird.com).

Estimated Annual Cost	**$10,083.24**	/year
Estimated Total Cost over Planning Period Including Set-up	**$100,832.40**	
Cost per 1000 Gallons Saved	**$2.00**	

Irrigation Equipment Improvements at Parks, Schools, Open Space Areas and Golf Courses

The City may purchase and install new irrigation equipment, such as updated sprinkler systems, to reduce water use through improved irrigation efficiency. The City has installed new equipment at Pearson Park and would like to continue improving equipment at other locations.

Planning Period	2018 to 2027
Years in Planning Period	10
Program Length	10

Estimated Water Savings

Annual Estimated Savings Rate	5.00%

Location	**Non-Potable Water Use** (AF/yr)	***Estimated annual Water Savings*** (gal/yr)
Golf Course	120.4	1,961,216
Parks and Open Space	110.3	1,796,923
School	78.2	1,273,768
TOTAL	308.8	5,031,906

Notes:

Non-Potable Water Use is the projected average outdoor use per year during the planning period. A 5% improvement in water efficiency was assumed.

Estimated Annual Water Savings	**5.03**	MG/yr
Estimated Savings over Planning Period	**50.3**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	150	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$7,030.50	
One-Time Set-Up by Staff	$37,496.00	

Materials Costs		
Sprinkler Unit Cost	$3,500.00	/item
Total Materials	**$175,000.00**	

Notes:

Annual Staff time is based on 3 hours/year per sprinkler system for maintenance. A one-time set-up cost is based on 16 hours per sprinkler system. It was assumed the City would need 50 systems.

Estimated Annual Cost	**$28,280.10**	/year
Estimated Total Cost over Planning Period Including Set-up	**$282,801.00**	
Cost per 1000 Gallons Saved	**$5.62**	

Inject Wetting Agent at Golf Course

A wetting agent reduces the surface tension of water and allows it to spread more easily. This improves the irrigation efficiency and reduces water runoff and water lost to evaporation. It also creates uniform turf areas.

Planning Period	2018 to 2027
Years in Planning Period	10
Program Length	10

Estimated Water Savings

Location	Non-Potable Water Use (AF per year)	Non-Potable Water Use (gallons per year)
Golf Course	120.0	39,102,120

Notes:

The average non-potable water use at the golf course is 120.0 acre-feet per year based on 2010 through 2017 data. A conservative saving estimate of 10% was assumed.

Annual Estimated Savings Rate	10.0%	
Estimated Annual Water Savings	**3.91**	MG/year
Estimated Savings over Planning Period	**39.1**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	28	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$1,312.36	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$1,312.36**	/year
Materials Costs		
Wetting Agent Unit Cost	$40.00	/quart
Volume Per Season	2,200	/quarts
Annual Materials	**$88,000.00**	/year

Notes:

Staff hours include the wetting agent application time throughout the season. Application is typically one to two times per month over the 168-acre golf course.

Volume needed is based on the 168-acre golf course and a season of mid-April through mid-October.

Estimated Annual Cost	**$89,312.36**	/year
Estimated Total Cost over Planning Period Including Set-up	**$893,123.60**	
Cost per 1000 Gallons Saved	**$22.84**	

Rain Barrels: Giveaways and Bill Stuffers

Colorado residents are able to collect rainwater draining from their rooftops in up to two barrels with a total capacity of 110 gallons. The collected rainwater can be used for outdoor irrigation on gardens or lawns. This reduces the City's residential treated water demand and reduces participating customers' water bills. This water efficiency activity assumes the City will purchase and giveaway five Rain Barrel systems to customers and will provide bill stuffers with information on rain barrel water- and cost-savings to encourage residential customers to purchase their own Rain Barrel systems.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	***Estimated Annual Water Savings*** *(gal/tap/yr)*	***Annual Program Participants*** *(taps)*
Residential	40,973	1,650	10

Estimated Annual Water Savings	**0.02**	MG/yr
Estimated Savings over Planning Period	**0.91**	MG

Notes:

Estimated Savings over Planning Period is calculated by compounding the estimated annual water savings per the total number of participants for each given year. Savings estimated to be approximately 4% of outdoor use. Residential outdoor use is equal to 40%.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours (Electronic Bill Stuffers, etc.)	25	/year
Total:	$46.87	/hour
Annual Labor	**$1,171.75**	/year

Give Aways per Year		
Barrels per Year	**5**	/year
Barrel System Cost	$176.15	/barrel
Materials Cost	**$880.75**	/barrel

Materials Costs		
Unit Cost (cost of Electronic Bill Stuffers)	$0.00	/participant
Avg. Number of Participants (receiving bill stuffers) over Planning Period	2,302	/year
Annual Materials	**$0.00**	/year

Notes:

Cost assumes Fort Lupton provides 5 rain barrels as giveaways and 5 households participate by purchasing their own rain barrel system. Staff hours include 3 hours per rain barrel giveaway and 1 minute per tap for educational materials and/or bill stuffers.

Rain barrel cost based on a Complete 2-Barrel System (110 gallons total) from Blue Barrel Systems (www.bluebarrelsystems.com).

Assume the City will use an electronic link in customer bills to provide rain barrel information.

Rain Barrels: Giveaways and Bill Stuffers

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20

Notes:

The annual revenue loss was estimated based on current rates for listed customers. Estimated revenue assumes that the current rates will not change over the planning period.

Estimated Average Annual Revenue without Water Savings	$18,479	/year
Estimated Average Annual Revenue with Water Savings	$17,735	/year
Annual Revenue Loss Related to Water Savings	**$744**	/year

Estimated Annual Cost	**$2,797**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$20,525**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$27,966.50**	
Cost per 1000 Gallons Saved	**$30.82**	

Weekly and Time of Day Outdoor Watering Restrictions

Fort Lupton's Municipal Code states the use of water for lawn sprinkling may be prohibited or restricted as determined by the Fort Lupton Utility Enterprise Board. It also states the setting of sprinklers or nozzles to interfere with traffic or sidewalks is prohibited.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.20%	

Notes:

Outdoor use is estimated at a weighted average of approximately 39% for the listed categories.

A conservative estimate of 0.2% savings of projected outdoor water usage was assumed.

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Apartment	9.10	18,202
Commercial	34.18	68,365
Hotels & Motels	2.18	4,367
Industrial	19.81	39,624
Multi-Family	12.63	25,252
Residential	94.31	188,624
School	11.83	23,665

Estimated Annual Water Savings	**0.4**	MG/yr
Estimated Savings over Planning Period	**3.7**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	10	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$468.70	
Annual Labor	**$468.70**	/year

Notes:

Costs include staff time for enforcing water restrictions for existing measure.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on current weighted rates for listed customer categories

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$1,029,367	/year
Estimated Average Annual Revenue with Water Savings	$1,027,308	/year
Annual Revenue Loss Related to Water Savings	**$2,059**	/year

Estimated Annual Cost	**$2,527**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$4,687**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$25,274.34**	
Cost per 1000 Gallons Saved	**$6.87**	

Water Waste Ordinance

Fort Lupton's Municipal Code has a waste water ordinance that prohibits the waste of water, "Consumers shall prevent unnecessary waste of water in all uses of water and keep all hydrants, appliances and fixtures in good repair."

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.10%	

Notes:

Outdoor use is estimated at a weighted average of approximately 38% for the listed categories.

A conservative estimate of 0.1% savings of projected outdoor water usage was assumed.

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Apartment	9.10	9,101
Commercial	34.18	34,182
Hotels & Motels	2.18	2,184
Industrial	19.81	19,812
Multi-Family	12.63	12,626
Residential	94.31	94,312
School	11.83	11,833

Estimated Annual Water Savings	**0.18**	MG/yr
Estimated Savings over Planning Period	**1.8**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	10	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$468.70	
Annual Labor	**$468.70**	/year

Notes:

Costs include staff time for enforcing waste water ordinance for existing measure.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on current weighted rates for listed customer categories

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$1,029,742	/year
Estimated Average Annual Revenue with Water Savings	$1,028,713	/year
Annual Revenue Loss Related to Water Savings	**$1,030**	/year

Estimated Annual Cost	**$1,498**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$4,687**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$14,984.42**	
Cost per 1000 Gallons Saved	**$8.14**	

Landscape Design Ordinances and Restrictions

Landscape design ordinances include Rules and Regulations for Landscape Design/Installation, Soil Amendment Requirements, Turf Restrictions, and Irrigation Equipment Requirements.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Average Annual Estimated Savings Rate	0.51%

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (MG)	*Estimated Annual Water Savings (gal/yr)*
Apartment	9.10	45,846
Commercial	34.18	172,197
Industrial	19.81	99,805
Hotels & Motels	2.18	11,000
Multi-Family	12.63	63,605
Residential	94.31	475,104

Notes:

Outdoor use is estimated at a weighted average of approximately 44% for the listed categories.
A conservative estimate of an average 0.51% savings of projected outdoor water usage was estimated. Most of these ordinances and restrictions would only be applied to new construction. The estimated savings is based on 534 new taps which are projected by the end of the planning period.

Estimated Average Annual Water Savings	**0.9**	MG/yr
Estimated Savings over Planning Period	**8.7**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	40	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$1,874.80	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs	$0.00	/year
Annual Labor	**$1,874.80**	/year

Notes:

Costs include staff time for setting up rules and ordinances and for enforcing them.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on current weighted rates for listed customer categories

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$106,999	/year
Estimated Average Annual Revenue with Water Savings	$101,649	/year
Annual Revenue Loss Related to Water Savings	**$5,350**	/year

Estimated Annual Cost	**$7,225**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$18,748**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$72,247.45**	
Cost per 1000 Gallons Saved	**$8.33**	

City Facility Requirements

Fort Lupton is evaluating updating its City facility fixtures with water saving fixtures.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Percent Savings	**10%**

Annual Estimated Water Use Per Tap without Savings

Customer Category	**Avg. Annual Indoor Water Use Over the Planning Period** (gal/tap)	***Estimated Annual Water Savings***
City Facilities	216,715	See Below

Number of City Buildings and Facilities	6	
Number of employees	35	
Toilets and urinals per building	3	
Total Toilets and Urinals	18	
Estimated flushes	105	/day
Gallons Saved per flush per day	0.4	gallons
Total gallons saved per year	15,330	gallons/yr
Faucets per building	5	
Total Faucets	27	
Estimated minutes	4	/person/day
Total number of minutes	51,100	/yr
Amount saved	0.3	gpm
Total gallons saved per year	17,374	gallons/yr
Estimated Annual Water Savings	**0.033**	MG/yr
Estimated Savings over Planning Period	**0.33**	MG

Notes:

Original savings based on 6 City Buildings and Facilities with approximately 3 toilets and urinals per building. It is also estimated that approximately 1.5 faucets per toilet/urinal will be in each area. These would include sink areas outside of restrooms. As Fort Lupton looks into the facilities more thoroughly, this number may change.

It is also estimated that there are approximately 35 employees total utilizing City facilities.

City Facility Requirements

Costs

Total Cost to Water Provider

Installation (One Time) Labor Costs		
Staff Hours	50	1st year
Hourly Cost	$46.87	/hour
Labor	$2,343.50	1st year
Yearly Labor Costs		
Staff Hours	4	/year
Hourly Cost	$46.87	/hour
Annual Labor	$187.48	/year
Equipment		
High Efficiency Toilet Cost	$200.00	each
Fixture/Faucets	$15	each
Total Equipment Costs	**$4,005.00**	one time fee

Notes:

Annual staff time is estimated at approximately 2 hrs. per toilet and 30 min. per fixture/faucet replacement).

This time includes water savings tracking.

Toilet equipment cost is estimated at $200 each and fixture/faucet replacement at $15 each.

One Time Cost	**$6,349**	
Estimated Annual Cost	**$822**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$8,223**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$8,223.30**	
Cost per 1000 Gallons Saved	**$25.14**	

Commercial Water Wise Use Regulations

These may be applicable to Fort Lupton at carwashes, restaurants, etc. Some policy examples include: providing water to restaurant customers only upon request; requiring shutoff valves for hoses used to clean vehicles; establishing water-use standards for fixtures in new commercial developments.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Annual Estimated Savings Rate	0.10%	

Notes:

This measure targets the commercial category. A conservative estimate of 0.10% savings is used for calculations.

Customer Category	**Avg. Annual Water Use over Planning Period** (MG)	***Estimated Annual Water Savings*** *(gal/yr)*
Commercial	80.43	80,429

Estimated Annual Water Savings	**0.08**	MG/yr
Estimated Savings over Planning Period	**0.8**	MG

Costs

Total Cost to Water Provider

Labor Costs

Staff Hours	10	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$468.70**	/year

Notes:

Estimated one time staff costs for Staff to spend approximately 10 hours at $46.87/hour to evaluate and enforce a new ordinance.

Water Rates

Rate Category	**Current Rates** (per 1,000 gals)
Commercial	$6.51

Notes:

The annual revenue loss was estimated based on a the average rate of commercial customers.

Estimated Revenue assumes that the current rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$523,595	/year
Estimated Average Annual Revenue with Water Savings	$523,071	/year
Estimated Annual Revenue Loss Related to Water Savings	**$524**	/year

Estimated Annual Cost	**$992**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$4,687**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$9,922.95**	
Cost per 1000 Gallons Saved	**$12.34**	

Public Education Activities

Analysis of costs and benefits for educational activities are combined as shown below. Activities include Newspaper Articles, Mass Mailings, Electronic Bill Links, Water Efficiency Page on Fort Lupton's website, Education Campaign, and Social Media (e.g., Facebook, Twitter, etc.). One goal is to provide consistent online information between platforms and planning efforts.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Customer Category	Avg. Annual Water Use over Planning Period (MG)	Estimated Annual Savings Rate	*Estimated Annual Water Savings (gal/yr)*
Apartment	23.10	2.00%	461,972
Commercial	80.43	0.75%	603,220
Hotels & Motels	2.18	0.75%	16,377
Industrial	28.02	0.75%	210,172
Multi-Family	37.92	2.00%	758,332
Residential	235.78	2.00%	4,715,604
School	14.92	0.75%	111,910

Estimated Annual Water Savings	6.88	MG/yr
Estimated Savings over Planning Period	**68.8**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	91	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$4,283.92**	/year
Materials Costs		
Unit Cost (cost of Mailers)	$0.25	/participant
Avg. Number of Participants (receiving bill stuffers) over Planning Period	2,742	/year
Annual Materials	**$685.50**	/year
Annual Costs		
CO WaterWise Membership (optional)	$500.00	/year

Notes:

Staff hours include time spent preparing mass mailings, updating the website, adding electronic links in bills to conservation webpage and preparing social media posts/campaigns.

The average number of taps during the planning period is projected to be 2742.

Annual WaterWise membership cost included for a small utility. The City could use the Live Like You Love It campaign materials.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on current rates for the City customers and assumes rates will not change significantly over the planning period.

Public Education Activities

Estimated Average Annual Revenue without Water Savings	$2,647,153	/year
Estimated Average Annual Revenue with Water Savings	$2,604,729	/year
Estimated Annual Revenue Loss Related to Water Savings	**$42,424**	/year

Estimated Annual Cost	**$47,894**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$54,694**	
Estimated Total Cost over Planning Period Including Lost Revenue	**$478,936.49**	
Cost per 1000 Gallons Saved	**$6.96**	

K-12 Teacher and Classroom Education Programs

The City can develop a K-12 Teacher and Classroom Education Program and/or potentially partner with Aims Community College or its students.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Customer Category	0.25%

Customer Category	**Avg. Annual Water Use Over the Planning Period** (gal/tap)	***Estimated Annual Water Savings*** *(gal/tap/yr)*	***Annual Program Participants***
Residential	102,433	256	110

Estimated Annual Water Savings	**0.03**	MG/yr
Estimated Savings over Planning Period	**1.5**	MG

Notes:

This measure only affects residential water usage. It was asssumed 110 students are enrolled in the program each year (estimated that one entire grade is enrolled).
Each year it is assumed 110 new students participate, so by year 10 of the planning period, a total of 1100 students have been through the program.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	40	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$1,874.80	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$1,874.80**	/year
Materials Costs		
Annual Materials Budget	$500	/year
Annual Materials	**$500.00**	/year

Notes:

Staff hours include time spent preparing and updating an education program, ordering and preparing educational materials, and training educators. Assumes 4 staff members spend 10 hours/year. Note the staff time may be less if partnering with another organization.

Material costs include a $500 annual budget for education materials costs.

For more information please see:
www.projectwet.org
www.watereducationcolorado.org

Water Rates

Rate Category	**Current Rates** (per 1,000 gals)
Residential	$6.18

Notes:

The annual revenue loss was estimated based on current rates for the City customers and assumes rates will not change significantly over the planning period.

K-12 Teacher and Classroom Education Programs

Estimated Average Annual Revenue without Water Savings	$383,091	/year
Estimated Average Annual Revenue with Water Savings	$382,133	/year
Annual Revenue Loss Related to Water Savings	**$958**	/year

Estimated Annual Cost	**$3,332.53**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$23,748.00**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$33,325.28**	
Cost per 1000 Gallons Saved	**$21.51**	

Water Facility Tours and Xeriscape Demonstration Garden Tours

The City has an on-going program to provide water facility tours to the general public to teach how water is treated and delivered and to provide a concept of the costs associated with water treatment and delivery. The City provides these tours every two years. In addition, the City is considering organizing tours to Northern Water's xeriscape demonstration garden in Berthoud, CO.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Water Facility Tours

Participant Annual Estimated Savings Rate: 0.10%

Customer Category	Avg. Annual Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants*
Residential (Indoor and Outdoor)	102,433	102	15

Demonstration Garden Tours

Participant Annual Estimated Savings Rate: 0.15%

Customer Category	Avg. Annual Outdoor Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants*
Residential (Outdoor)	40,973	61	15

Estimated Annual Water Savings	**0.002**	MG/yr
Estimated Savings over Planning Period	**0.14**	MG

This measure only affects residential water usage. It was asssumed 30 people participate in water facility tours every two years which equates to 15 people per year. It's assumed 30 new people participate, so by year 10 of the planning period, a total of 150 people have participated in the water tours. The same assumptions were made for the demonstration garden tours.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	6	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$281.22	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$281.22**	/year

Notes:

Staff hours include time participating in biennial water tours and demonstration garden tours. It was assumed the City would participate in 2 water facility tours for 1 hour each with 2 hours of prep time for each. The same assumptions were used for demonstration garden tours. These tours would occur every two years.

Water Facility Tours and Xeriscape Demonstration Garden Tours

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20

Notes:

The annual revenue loss was estimated based on current rates for customers and assumes rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$97,014	/year
Estimated Average Annual Revenue with Water Savings	$96,903	/year
Annual Revenue Loss Related to Water Savings	**$111**	/year

Estimated Annual Cost	**$392.09**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$2,812.20**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$3,920.93**	
Cost per 1000 Gallons Saved	**$29.00**	

Children's Water Fair or Festival

Fort Lupton would like to participate in Children's Water Fairs or Festivals and provide educational materials and information to students about water efficiency and conservation. Northern Water typically organizes an annual water fair that the City could participate in by sending one or two grade levels of students. Fort Lupton could also set up a booth at a local event in the City.

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Participant Annual Estimated Savings Rate	0.25%

Customer Category	Avg. Annual Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants*
Residential	102,433	256	100

Estimated Annual Water Savings	**0.03**	MG/yr
Estimated Savings over Planning Period	**1.4**	MG

Notes:

This measure only affects residential water usage. It was asssumed 100 children participate in a water fair each year.
Each year it is assumed 100 new children participate, so by year 10 of the planning period, a total of 1000 children have participated in the water fairs.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	10	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$468.70	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Labor/Consultant)	$0.00	/year
Annual Labor	**$468.70**	/year
Materials Costs		
Annual Materials Budget	$200	/year
Annual Materials	**$200.00**	/year
One Time Labor and Material Costs		
One Time Materials Cost	$0.00	
Third Party Costs	$0.00	
One Time Labor/Material Cost	**$0.00**	

Notes:

Staff hours include time participating in water fairs or festivals. It was assumed the City would participate in 1 fair for 8 hours with 2 hours of prep time.

Material costs may include an annual budget for educational materials.

Children's Water Fair or Festival

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20

Notes:

The annual revenue loss was estimated based on current rates for the customers and assumes rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$461,973	/year
Estimated Average Annual Revenue with Water Savings	$460,818	/year
Annual Revenue Loss Related to Water Savings	**$1,155**	/year

Estimated Annual Cost	**$1,823.63**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$6,687.00**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$18,236.32**	
Cost per 1000 Gallons Saved	**$12.95**	

Post or Distribute ET Irrigation Scheduling

ET irrigation schedules using historical averages of weather data can be prepared by the City prior to the irrigation season and sent out to all customer categories to reference when programming their irrigation systems. Northern Water has tools on their website that can aid with this calculation. The schedule could be printed on the bill or posted on the web at the beginning or for the duration of the irrigation season.

Planning Period	2018 to 2027
Years in Planning Period	10
Program Length	10

Estimated Water Savings

Annual Estimated Savings Rate	2.00%

Customer Category	Average Outdoor Water Use (gal/tap)	*Estimated Annual Water Savings (gal/tap)*
Apartment	138,101	2,762
Commercial	160,180	3,204
Hotels & Motels	661,698	13,234
Industrial	888,439	17,769
Multi-Family	106,731	2,135
Residential	40,973	819
School	704,320	14,086

Notes:

This measure affects projected outdoor water usage for the customer categories shown

Estimate that approximately 39% of potable use is used outdoors.

Estimated Annual Water Savings	**3.67**	MG/yr
Estimated Savings over Planning Period	**36.7**	MG

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	8	/year
Hourly Cost	$46.87	/hour
Annual Staff Costs	$374.96	
Third Party Costs	$0.00	/year
Evaluation and Follow-up Costs (Website updates, etc.)	$93.74	/year
Annual Labor	**$468.70**	/year
One Time Labor and Material Costs		
One Time Materials Cost	$0.00	
One Time Labor Costs	$562.44	
One Time Labor/Material Cost	**$562.44**	

Notes:

Staff hours include time spent preparing schedules. It is assumed a schedule is sent out one time per year. One-time labor costs include 12 hours of program set-up by City Staff and then 8 hours per year of Staff support.

Over the planning period, there are a projected average total of 2743 potable taps.

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Weighted average of customer rates	$6.17

Notes:

The annual revenue loss was estimated based on current rates for the City customers and assumes rates will not change significantly over the planning period.

Estimated Annual Cost	**$524.94**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$5,249.44**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$231,819.75**	
Cost per 1000 Gallons Saved	**$6.31**	

Slow the Flow Residential Indoor Audits (Not Selected)

ReCen offers indoor water audits. "Slow the Flow offers inspections on residential water usage and suggests simple measures to increase water use efficiency in the home. Participants simply schedule an inspection with a trained technician in their home. During the one-hour appointment the technician will measure outputs from faucets, toilets, and shower heads, and perform a cost/benefit analysis on fixture replacement options. They may also install high efficiency shower heads and faucet aerators at no cost. You'll be left with a customized list of recommendations for increasing water use efficiency." - ReCen

Planning Period	2018 to 2027	
Years in Planning Period	10	
Program Length	10	years

Estimated Water Savings

Participant Annual Estimated Savings Rate	5.0%

Customer Category	Avg. Annual Indoor Water Use Over the Planning Period (gal/tap)	*Estimated Annual Water Savings (gal/tap/yr)*	*Annual Program Participants (taps)*
Residential	61,460	3,073	15
Multi-Family	213,782	10,689	5

Estimated Annual Water Savings	**0.10**	MG/yr in Year 1
Estimated Savings over Planning Period	**5.5**	MG

Notes:

The indoor use estimates are based on the following approximations for each customer category: Residential = 60%. Multi-Family = 66%.

Assumed a conservative estimate of 5% savings of projected indoor water usage . Customers have to put Auditor's advice and suggestions into practice. Shower heads and aerators may be installed by ReCen.
Program Participants based on other water providers' participation rates for similar programs.

Costs

Total Cost to Water Provider

Labor Costs		
Staff Hours	15	/year
Hourly Cost	$46.87	/hour
Annual Labor	**$703**	/year
Third Party Costs		
Audit Cost	$114	
Number of Participants	20	/year
Annual Cost	**$2,280**	/year

Notes:

Costs include staff time for implementing (approximately 45 min. per participant). Program is largely organized by ReCen .

Third Party Costs include ReCen 's time. Residential audits = $114/audit.

Slow the Flow Residential Indoor Audits (Not Selected)

Water Rates

Rate Category	Current Rates (per 1,000 gals)
Residential	$8.20
Multi-Family	$6.48

Note:

The annual revenue loss was estimated based on current rates for customers and assumes rates will not change significantly over the planning period.

Estimated Average Annual Revenue without Water Savings	$79,673	/year
Estimated Average Annual Revenue with Water Savings	$75,690	/year
Annual Revenue Loss Related to Water Savings	**$3,984**	/year

Estimated Annual Cost	**$6,967**	/year
Estimated Cost over Planning Period not including Lost Revenue	**$29,831**	
Estimated Total Cost over Planning Period Including Set-up and Lost Revenue	**$69,667**	
Cost per 1000 Gallons Saved	**$12.73**	

APPENDIX E

Public Notice and City Resolution

Public Notice
Water Conservation Plan Update

NOTICE IS HEREBY GIVEN TO THE RESIDENTS OF THE CITY OF FORT LUPTON THAT CITY COUNCIL WILL CONSIDER AN UPDATE TO THE WATER CONSERVATION PLAN AT A CITY COUNCIL MEETING ON DECEMBER 2, 2019. A 60 DAY PUBLIC COMMENT PERIOD WILL BEGIN SEPTEMBER 20, 2019 AND END NOVEMBER 19, 2019. ANY INTERESTED CITIZEN MAY INSPECT AND COMMENT THE PLAN DRAFT ONLINE AT WWW.FORTLUPTONCO.GOV OR AT CITY HALL, 130 S. MCKINLEY AVENUE DURING NORMAL OFFICE HOURS. YOUR SUBMISSION WILL BE DOCUMENTED AND CONSIDERED. A PUBLIC PRESENTATION OF THE PLAN IS SCHEDULED ON OCTOBER 2, 2019 AT 6:30 PM AT CITY HALL, 130 S. MCKINLEY AVENUE. ANY CITIZEN MAY APPEAR AT THE PUBLIC PRESENTATION AND WILL BE GIVEN THE OPPORTUNITY TO COMMENT ON THE SAID DRAFT IF THEY SO DESIRE.

Published in the Fort Lupton Press
September 18, 2019
#191006

RESOLUTION NO. 2019R079

A RESOLUTION OF THE CITY COUNCIL OF THE CITY OF FORT LUPTON APPROVING THE CITY OF FORT LUPTON WATER CONSERVATION PLAN, AND ITS SUBMISSION TO THE COLORADO WATER CONSERVATION BOARD (CWCB).

WHEREAS, the City of Fort Lupton has received a grant from the CWCB to update the Water Conservation Plan, and

WHEREAS, the Clear Water Solution has prepared such a plan at the City's request and the plan is now complete and ready for submission to the CWCB for their approval.

NOW THEREFORE BE IT RESOLVED that the City of Fort Lupton hereby approves the City of Fort Lupton Water Conservation Plan and its submission to the CWCB.

APPROVED BY THE FORT LUPTON CITY COUNCIL THIS 2nd DAY OF DECEMBER 2019.

City of Fort Lupton, Colorado

Zo Stieber, Mayor

CITY OF FORT LUPTON SEAL STATE OF COLORADO

Attest:

Maricela Peña, City Clerk

Approved as to form:

Andy Ausmus, City Attorney

APPENDIX F

Colorado Water Conservation Board Cover Letter and Approval

CITY OF
Fort Lupton
EST 1836
COME PAINT YOUR FUTURE WITH US

City of Fort Lupton

130 S. McKinley Avenue
Fort Lupton, Colorado 80621
www.fortluptonco.gov

Office: 303-857-6694
Fax: 303-857-6090

February 24, 2020

Mr. Ben Wade, CWCB
1313 Sherman Street, Room 721
Denver, CO 80203

RE: City of Fort Lupton Municipal Water Efficiency Plan Update

Dear Mr. Wade:

The City of Fort Lupton (City) would like to submit a locally adopted Municipal Water Efficiency Plan Update for review and approval by the Colorado Water Conservation Board's Office of Water Conservation and Drought Planning. This letter is also intended to meet the Cover Letter Submittal Requirements for CWCB review.

Name and contact information:

City of Fort Lupton
Attn: Chris Cross, City Administrator
130 S. McKinley
Fort Lupton, CO 80621
T: (303) 857-6694
ccross@fortluptonco.gov

List of organizations and individuals that assisted in plan development:

Clear Water Solutions, Inc.
Michelle Hatcher, Sira Sartori and Steve Nguyen

CITY OF
Fort Lupton
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City of Fort Lupton

130 S. McKinley Avenue
Fort Lupton, Colorado 80621
www.fortluptonco.gov

Office: 303-857-6694
Fax: 303-857-6090

Quantity of retail water delivery and population for past five years:

Table 1: Water Demand by Customer Category

Year	Total Treated Water (AF)	Total Water Usage (Billed to Customers) (AF)	Annual Non-Revenue Water (AF)	Percentage of Non-Revenue Water
2012	1,318	1,154	164	12%
2013	1,246	866	380	30%
2014	1,193	1,026	167	14%
2015	1,001	958	43	4%
2016	1,144	919	225	20%
2017	-	1,045	-	-
Average	1,180	995	196	16%

Notes: The averages exclude missing data.

Table 2: City of Fort Lupton Current and Projected Populations

Year	Projected City Population	Change in Population (2-yr increments)	Projected Population Growth
2018	8,586	426	5%
2020	9,507	472	10%
2022	10,527	523	10%
2024	11,655	579	10%
2026	12,905	641	10%
2028	14,289	710	10%
2030	15,336	301	7%
2032	15,956	313	4%
2034	16,600	325	4%
2036	17,271	339	4%
2038	17,969	352	4%

CITY OF
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City of Fort Lupton

130 S. McKinley Avenue
Fort Lupton, Colorado 80621
www.fortluptonco.gov

Office: 303-857-6694
Fax: 303-857-6090

Public review and comment information:

The City held its public review period from September 20, 2019, to November 19, 2019. Notification was posted in the Fort Lupton Press on September 18, 2019, announcing the public review timeframe and that a draft Plan would be available for the public to review at City Hall. The draft Plan was also posted on the City's website. During the public review period, the City received no comments on the Water Efficiency Plan.

The City is pleased with the Water Efficiency Plan that has been developed and will commit the resources necessary, as they become available, for the implementation of the Plan.

Please let me know if you have any further requirements.

Sincerely,

Chris Cross,
City Administrator

COLORADO WATER CONSERVATION BOARD
Conservation Plan Submittal Required Plan Elements Checklist

Name of Entity: Fort Lupton
Date Submitted: 2/24/20

Required Conservation Plan Elements	Completed?
1. Name and contact information	Yes_x__ No___ Comment: in cover letter
2. Organizations and individuals assisting with plan development	Yes___x__ No_____ Comment: in cover letter
3. Quantified annual retail water delivery?	Yes_x__ No ___ Comment: cover letter and pg. x; 2017 1045 af total billed usage; average 1180 af produced 2012-2017; Treated water demand to increase to 1577 af by 2027 not including water loss; 1916 af including water loss
4. Identified population served by retail water delivery?	Yes__x___ No_____ Comment: cover letter and pg. X; 8586 residents in 2018; 15,035 in 2029; 17,969 in 2038
5. Public comment period completed? (60 days or local regulation)	Yes___x__ No___ Comment: September 20-November 19, 2019
6. Signature with authority to commit resources of the submitting entity?	Yes__x__ No__ Comment: in cover letter
7. All required water saving measures and programs considered?	Yes_x__ No____ Comment:
I. Fixtures and appliances – toilets, urinals, showerheads, faucets, etc.?	Yes_x_ No ___ Comment: Water efficient fixtures and appliances will be installed in 6 city-owned facilities;
II. Waterwise landscapes, drought resistant vegetation, removal of phreatophytes, efficient irrigation, etc.?	Yes_x__ No_____ Comment: irrigation equipment improvements at parks, schools, open spaces and golf courses including rain and wind sensors; Resource Central commercial and residential slow the flow irrigation audits; resource Central garden in a box program;
III. Water efficient industrial and commercial processes?	Yes_x__ No_____ Comment: Commercial water use audits (see landscapes above)
IV. Water reuse systems?	Yes_x__ No_____ Comment: water rights aren't useable for reuse pg 6

V. Distribution system leak ID and repair?	Yes_x____ No_____ Comment: will use M36 AWWA methodology for system wide audits; leak detection and repair program; Advanced metering infrastructure
VI. Information, public education, audits, demos?	Yes__x___ No_____ Comment: public education activities such as website and newsletter; K-12 education like a teacher and classroom education program or collaboration with Ames Community College; water facility and garden tours; Children's water festival; distribute ET scheduling
VII. Conservation oriented rate structure and billing system?	Yes__x___ No____ Comment: 3 tier inclining block rate structure pg.14
VIII. Regulatory measures designed to encourage water conservation?	Yes_x__ No_____ Comment: water waste ordinance; weekly/time of day water restrictions; landscape code including turf restrictions and soil amendment requirement
IX. Incentives, rebates to encourage conservation implementation?	Yes_x___ No_____ Comment:giving away 5 rain barrel systems; see garden in a box in landscapes;
8. Role of water conservation plan in overall water supply planning?	Yes __x__ No_____ Comment: pg 26 reducing need for expensive future water supplies and freeing up water for new development and drought resilience
9. Steps to implement, monitor, review, and revise conservation plan including time period not to exceed 7 years?	Yes _x_ No _____ Comment: pg 40-43
10. Estimates of water saved through previous conservation efforts AND water saved through plan implementation?	Yes__x___ No_____ Comment: 267 af by 2027 overall treated water reduction or 16.7%.
11. Best management practices for water demand management, water efficiency, and water conservation that may be implemented through land use planning efforts	Yes___x___ No____ Comment: pg 20-21; conservation oriented tap fees called out in the 2018 comp plan; The Comp plan touches on a few water conservation elements specifically regarding landscaping

Plan Review Findings

____x____ Approved

_____ Conditional Approval

_____ Disapproval with Modifications

Plan review comments:

This plan review was completed by Kevin Reidy of the Colorado Water Conservation Board. Questions about the review, comments provided, the plan review process and the statutory requirements can be directed to Kevin.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

June 3, 2020

Chris Cross
City of Fort Lupton
130 S. McKinley
Fort Lupton, CO 80621

Dear Mr Cross:

The Colorado Water Conservation Board (CWCB) received a locally adopted Water Efficiency Plan from the City of Fort Lupton for review and approval. The CWCB has determined the Plan to be in accordance with §37-60-126 and the CWCB's Guidelines for the Office to Review Water Conservation Plans Submitted by Covered Entities. The Plan is hereby ***approved*** and Fort Lupton may proceed with its implementation.

The Plan will be kept on file at the CWCB and shall be accessible to the public through our website and the Water Resource Information Center. The Plan will also be made available to the Colorado Water Resources & Power Development Authority and the Finance section within the CWCB should you apply for a loan from either agency. ***This Plan will expire June 3, 2027***.

As Fort Lupton begins implementing the efficiency measures outlined in the Plan, please know that the CWCB staff will be available to provide technical and financial assistance.

Thank you again for all your efforts in updating your Water Efficiency Plan. Should you have any questions or need additional assistance, please feel free to contact Kevin Reidy at 303-866-3441 ext 3252.

Sincerely,

Rebecca Mitchell

Rebecca Mitchell
CWCB Director

cc: Sira Sartori, Clear Water Solutions
Kirk Russell, CWCB Finance Section
Jim Griffiths, Colorado Water Resources & Power Development Authority