WaterSMART Grants: Water and Energy Grants for Fiscal Year 2020

Bureau of Reclamation FOA No. BOR-DO-20-F001

City of Thornton, Colorado

City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project

October 3, 2019

Applicant:
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12450 Washington St.
Thornton, CO 80241

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D.2.2.4.(1) Executive Summary

Date: October 3, 2019
Applicant Name: City of Thornton
City, County, and State: Thornton, Adams County, Colorado
Project Manager:

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Funding Group: Funding Group II
Grant Funding Request: $1,500,000
Non-Federal Matching Funds: $2,500,000
Total Project Cost: $3,999,976
Project Duration: 3 Years
Estimated Project Completion Date: Q4 2022
Located on Federal Facility: No

Project Summary

The City Of Thornton's *City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project* addresses two of the largest causes of water inefficiency – water leaks and inefficiencies in customer water use. This project will result in water savings estimated at 2,100 acre-feet per year, or approximately 9% of Thornton's current treated water production. Advanced Metering Infrastructure (AMI) is an integrated system of smart water meters, communications networks, and data management systems that enables two-way communication between utilities and customers. The system allows real-time access to water usage information at each water meter, and allows customers and the city to better manage water usage, detect water leaks, and operate the water distribution system. Currently, Thornton's customers' water usage is measured and recorded monthly. Funds for Thornton's project will be used to complete the installation of a citywide AMI system to allow for real-time readings of water usage, and will convert approximately 19,919 low resolution residential meters to high resolution meters. Combined, these two aspects of the project will provide the city the necessary information to quickly mitigate distribution system losses, and will provide customers with a customer portal designed to allow them to view their usage in real-time to help them make better decisions about their daily water use. This proposal includes the equipment and software for the installation of the AMI system, as well as the purchase and installation of the high resolution meters. This grant would allow the city to accelerate the entire project from ten years under current funding mechanisms to three years (Q1 2020 - Q4 2022). Thornton's project meets the goals of the Water and Energy Efficiency FOA by resulting in quantifiable water savings, improving system reliability, providing live data that will drive further conservation efforts at a city and personal level, and overall improve water supply reliability in one of the fastest growing metropolitan areas in the country. This project does not include a federal facility.

D.2.2.4.(2) Background Data

The City of Thornton is the third largest water provider in the Denver Metropolitan area, and the sixth largest city in Colorado. Unlike many municipalities in the Front Range that obtain water service from Denver Water, Thornton has been an independent water utility since the City's incorporation in the 1950s.

Thornton is located in the Front Range of Colorado in the Denver Metropolitan area, approximately 20 miles north of downtown Denver and approximately 15 miles east of the foothills of the Rocky Mountains. Thornton sits at 5,381 feet above sea level, and is within the semi-arid, continental climate zone. It has four distinct seasons. Due to its elevation and proximity to the Rocky Mountains, Thornton can experience sudden changes in weather. Summers range from warm to hot with occasional, sometimes severe, afternoon thunderstorms. Winters consist of periods of snow and very cold temperatures, alternating with periods of milder weather. The arid conditions bring over 300 days of sunshine, and between 8 and 15 inches of precipitation each year. The region typically experience about half of its annual precipitation in the form of rainfall between the months of June and September.

The bulk of the remaining precipitation accumulates in the form of snow; the region averages 55 inches of snow each winter.

Thornton’s current city limits encompass approximately 37.3 square miles (23,846 acres), and the future growth boundary encompasses approximately 60.3 square miles (38,609 acres). In addition to the city limits, Thornton’s current water service area also includes portions of unincorporated Adams County (Figure 1).

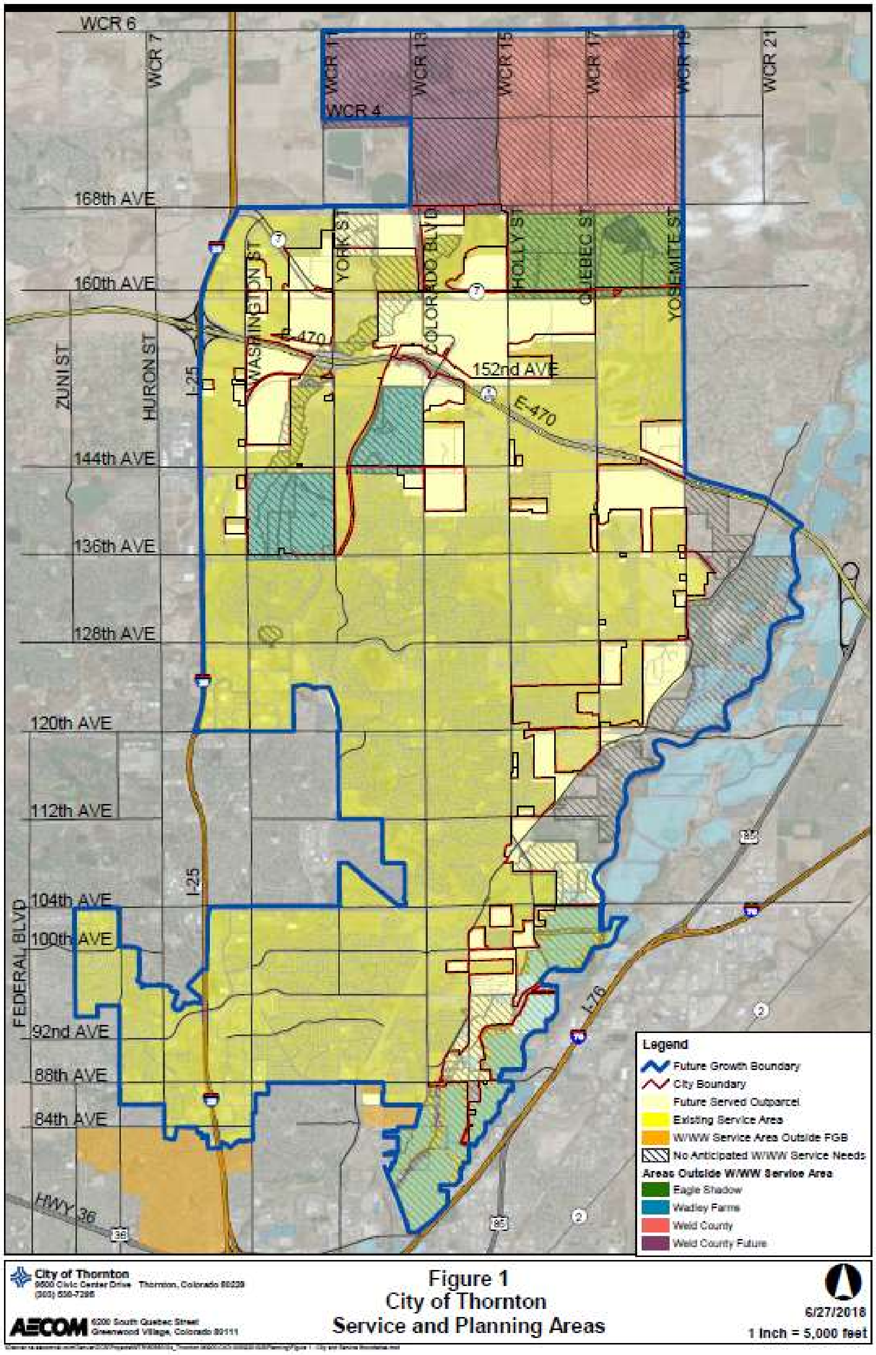
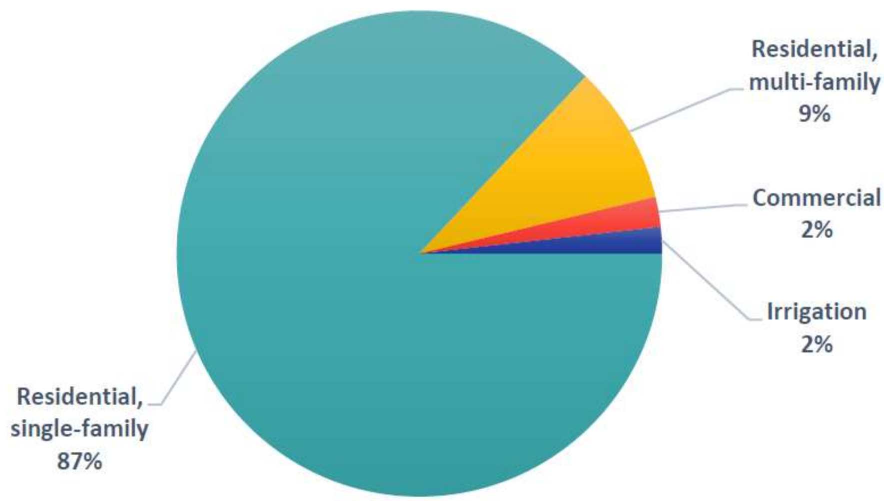


Figure 1
City of Thornton
Service and Planning Areas

Thornton's existing water supply system serves a population of 157,339 – an estimated 140,509 people residing within the city's corporate boundaries and 16,830 people in the extended service area. Thornton's service area includes residences, businesses, schools, parks, and open spaces. Most of the existing service area consists of residential development. Thornton also provides bulk treated water deliveries to the city of Westminster. Currently, residential customers, including single and multi-family, are the largest customer class connected to the city's treated water system, making up 96% of total water connections. The figure below shows the city's service connections by service type in 2015.



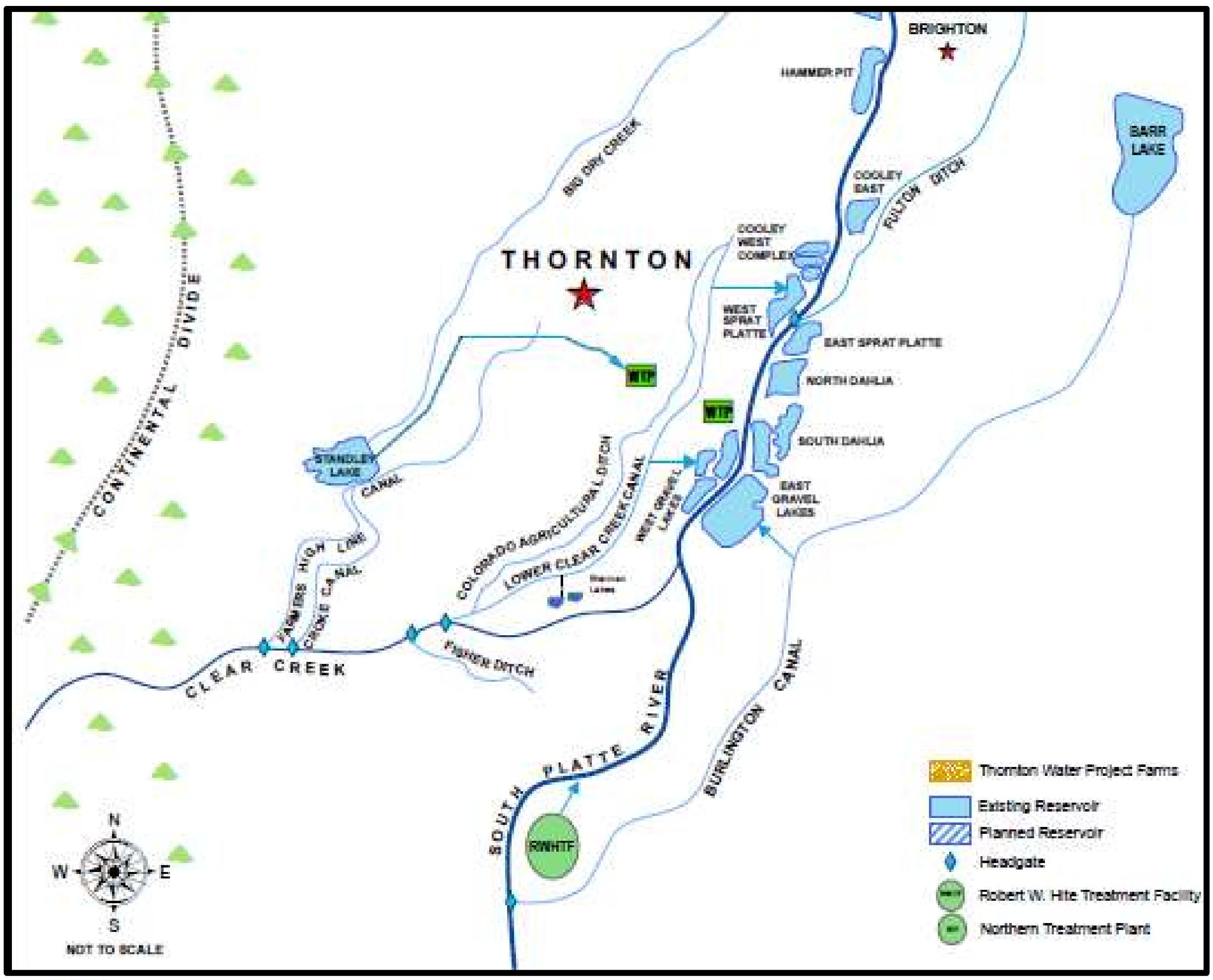
There are significant areas within the service area that remain undeveloped. Future growth trends indicate single-family housing outpacing multifamily and manufactured housing. In the near term, single-family detached is likely to see the highest number of new units. Longer term, Thornton's housing mix is projected to shift to a more balanced housing stock of single-family and multifamily dwellings. Factors influencing growth include regional migratory patterns, future commuter rail expansion (RTD North Metro line), and housing market growth indicators.

Thornton's existing and future projections of population for the water service area are shown below. The projected population data indicates an annual growth rate of approximately 3.2 percent until 2025, a 1.7 percent population growth between 2025 and 2035, and a growth of 0.7 percent between 2035 and 2065.

Water Service Area	Population			
	2018	**2025**	**2035**	**2065**
Within City Limits	140,509	168,437	197,764	238,513
Unincorporated Adams County	16,830	16,830	16,830	16,830
Total	**157,339**	**185,267**	**214,594**	**255,343**

Thornton's total water demands were approximately 27,000 acre-feet in 2018, 23,734 acre-feet of which was treated water Thornton delivered to its customers. Included in these totals are treated water deliveries of approximately 2,000 acre-feet per year (AFY) that Thornton supplies to nearby City of Westminster. Total water demands are projected to reach over 50,000 AFY by 2065.

Water Supply



CITY OF THORNTON COLORADO

THORNTON WATER SYSTEM SCHEMATIC

Thornton's source of supply is diverted from water rights the city owns on the South Platte River, Upper Clear Creek, and Lower Clear Creek. The city's water is diverted from these sources and conveyed to three main raw water storage facilities: East Gravel Lakes (EGLs), West Gravel Lakes (WGLs), and Standley Lake. Water from the South Platte River is conveyed to the EGLs facility, water from Upper Clear Creek is conveyed to Standley Lake, and water from Lower Clear Creek is conveyed to the WGLs facility. Raw water from storage is then conveyed for treatment to either the Wes Brown Water Treatment Plant (WBWTP) or the Thornton Water

Treatment Plant (TWTP), which have a combined permitted treatment capacity of 71.5 million gallons per day (MGD).

The WBWTP draws water from the WGLs and EGLs and utilizes upflow clarifiers and ultrafiltration as the primary treatment processes. The TWTP draws water from Standley Lake. It was originally constructed for the Northwest Utilities Company in 1953 and purchased by Thornton in 1963. A new plant is currently under construction, with an estimated 2020 completion; once online, the existing TWTP will be decommissioned. This new plant will provide a treatment capacity of 20.0 MGD.

Thornton will need to provide additional water supplies and expand treatment capacity to meet future system demands associated with planned population growth and development. A portion of the additional water supplies will be delivered as part of the Thornton Water Project (TWP), which will convey water from the Cache la Poudre River.

Water Efficiency Planning

Water efficiency is an essential component of Thornton's long-term water supply planning strategy. Thornton's 2009 Water Conservation Plan set a goal of establishing residential water use at 85 gallons per capita day (gpcd) or less by 2016, based upon a five-year rolling average. This goal was met, demonstrating a 20% decrease when compared to 106 gpcd usage during the pre-drought year of 2001, prior to the enactment of water use restrictions and an inclining block rate structure. In 2018, Thornton adopted a new Water Efficiency Plan which sets additional water savings goals. Thornton's projected water demands without water efficiency savings exceed the projected firm yield of the water system in 2022-2025. Water efficiency helps create a buffer for unknown factors that could affect water supply in the future.

Colorado's Water Plan was adopted by the Colorado Water Conservation Board on November 16, 2016. Thornton participated in the development of the plan, which took almost three years to draft and included over 30,000 public comments. The final plan serves as a roadmap for the collaborative and sustainable management of Colorado's water supply. A key objective of the state plan is to reduce the projected 2050 municipal and industrial water supply gap from 560,000 acre-feet to zero acre-feet by 2030. Municipal water efficiency strategies are an important element of the plan as municipal and industrial water efficiency goals aim to reduce water use 400,000 acre-feet by 2050. Thornton recognizes its role in responsibly managing its water supply and is committed to long-term water efficiency strategies that align with the State's goals.

Potential Shortfalls in Supply

Risks to Thornton's water supply reliability lie in the areas of infrastructure, water quality, drought, and regional aridification. Thornton owns adequate water supply to reliably meet present needs and projected demands under traditional planning scenarios. However, the infrastructure to deliver future water sources, the quality of some of Thornton's source water, drought cycles, and climate change all impact Thornton's system resiliency and its ability to reliably deliver water to its customers.

Water Delivery System

Thornton's treated water distribution system consists of over 580 miles of pipeline. Currently, there are five main pressure zones with 13 subzones, seven pump stations, ten storage tanks, and approximately 65 pressure reducing valves (PRVs). Thornton shares interconnections with the treated water systems of Denver Water, City of Northglenn, and the City of Westminster. The interconnections with Denver Water and the City of Northglenn are for emergency situations. The City of Westminster is a wholesale treated water customer of Thornton's and the interconnection serves as the single delivery point to Westminster. The buildout system is projected to serve approximately 260,000 people, with the majority of the expansion occurring in Zone 1 and Zone 3A within the northern portion of the system.

In 2004, Thornton began implementing Automated Meter Reading (AMR) by installing encoder receiver transmitters (ERTs) on all of its water meters. This allowed for water usage data to be collected automatically by a drive-by vehicle, rather than by manual field readings. Thornton's entire system was converted to AMR by the end of 2005.

In 2014, in anticipation of future implementation of an Automated Meter Infrastructure (AMI) fixed network system, Thornton began replacing the aging ERTs that were originally installed during the AMR conversion with new ERTs which were capable of both drive-by readings and AMI operations. By 2017, all meters in Thornton's system had been fitted with ERTs capable of both AMR an AMI operations. Using these new ERTs, Thornton has continued the drive-by operations for meter reading.

In addition to replacing the aging ERTs, in 2015 Thornton began, through its annual meter age change program, to replace older, 1,000 gallon resolution meters with newer meters capable of higher resolution readings. High resolution meters that read in as low as 0.1 gallon are most effective for use in AMI systems, especially in residential applications, to detect customer side-leaks by identifying consistent low volume usage, even when no consumption should be detected (e.g. continuous low-level usage every hour through the night). All new meters installed since 2014 are high resolution meters with both AMR and AMI capabilities.

As of September 30, 2019, there are 40,910 meters in Thornton's system. 2,576 of these meters are for commercial accounts (including irrigation). All of Thornton's commercial meters have ERTs that are compatible with both AMI and AMR. In addition, all of these meters are capable of measuring water usage at a resolution that is appropriate for their sizes. The remaining 38,334 meters are residential meters. All of Thornton's residential meters have ERTs that are compatible with both AMI and AMR. Thornton has incrementally converted these meters with meters that can read to 0.1 gallons through Thornton's annual meter age change out program. By Q2 of 2020, Thornton estimates 10,532 its residential meters will be at 0.1 gallon resolution. This project seeks to convert an additional 19,919 residential meters that currently read at

1,000 gallon resolution to 0.1 gallon resolution meters. The remaining 7,883 residential meters in Thornton's system that are not a part of this project read at 10 gallon resolution, and will be replaced through Thornton's future replacement program.

Hydropower Component

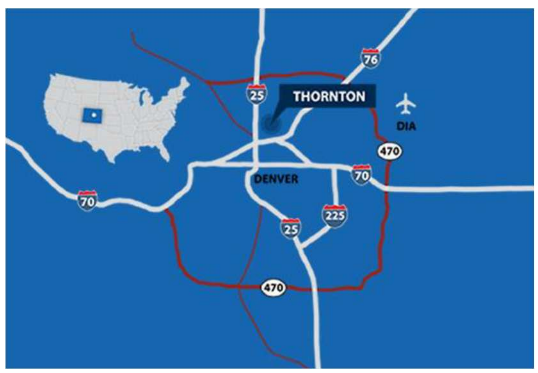
There is no hydropower component to this project.

Relationship with Reclamation

Thornton does not have existing projects with the Bureau of Reclamation.

D.2.2.4.(3) Project Location

The project is located in the City of Thornton, which is part of Adams County, Colorado. Thornton is located in the Front Range of Colorado in the Denver Metropolitan area, approximately 20 miles north of downtown Denver and approximately 15 miles east of the foothills of the Rocky Mountains. The approximate project latitude is 39.8680° N and the longitude is 104.9719° W. A map of Thornton in relation to the greater Denver metropolitan area is provided below.



D.2.2.4.(4) Technical Project Description

The City of Thornton's City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project is anticipated to save approximately 2,100 acre-feet of water each year (AFY) by providing the city's customers additional tools to make more efficient water saving decisions. In addition, the city anticipates being able to reduce its distribution system losses with implementation of AMI and associated technology.

This project will complete installation of an AMI fixed network system consisting of communication devices (collectors, repeaters, etc.), hardware and software for the AMI, a Meter Data Management software system, and a customer interface. It is estimated that the AMI fixed network will be installed by the end of 2021. The AMI system will integrate with existing distribution system technologies and operations (SCADA, acoustic leak detection), which will allow the city to gather real-time data on distribution system performance, water usage, as well as allow meters to be read remotely from a central location. This system will include a customer portal where customers can actively monitor and respond to their usage and utilize leak detection alerts.

In addition, to effectively realize the savings benefits of the new AMI system, this project will replace approximately 19,919 low resolution residential meters that currently read at 1,000 gallon resolution with meters that can read to a 0.1 gallon resolution. Meter replacement will occur during the duration of the project. The replacement of these meters is a necessity if the city and customers are to be proactive on catching customer leaks. A leaking toilet flapper, for example, is difficult to detect with the existing low resolution meters. The leak is simply too slow to trigger continuous use monitoring alerts. It is also too low to allow residents to properly tie their real-time water usage to specific actions on their part and make behavioral changes that will result in water savings.

The city has spent the last several years targeting its oldest and least accurate meters for replacement with meters that register at 0.1 gallon resolution. However, funding constraints have made this a slow process with an average of approximately 2,000 meters being replaced on an annual basis. At this rate, it would take another ten years for the city to replace its 1,000 gallon residential meters to a higher resolution in order to realize the full benefits of the AMI system. With the $1.5 million in WaterSMART grant funds from the Bureau of Reclamation, the city would have the funding to purchase the new meters and hire contract employees to accelerate and complete these replacements in three years. This will drastically expedite the realization of water savings for this program.

Thornton anticipates eight general tasks, some of which will be completed concurrently, for completing the project which are outlined below. The estimated timeline for these tasks is a total of 36 months. A breakdown of the timeline is provided in the Evaluation Subcriterion F.3.

Task 1: Acceptance of Award and Formation of the Grant Administration Team. Thornton has institutionalized a process for grant acceptance and administration. The award agreement will be executed by the city's Executive Director of Infrastructure or his designee in accordance with the terms of the City Council Resolution adopted September 24, 2019.

While the Meter Superintendent, who is the Project Lead, will take primary responsibility for administration and oversite of the grant, a team comprised of representatives from the Water Utility, Finance Department, and the Management and Budget Office will meet at minimum on a quarterly basis to ensure compliance with all reporting, evaluate progress, and respond to any potential issues before they can become major problems. This process, which builds on years of experience successfully executing and managing multiple federal grant awards, will help the city to ensure all project aspects are completed within a timely manner, in-line with Bureau of Reclamation and WaterSMART goals, and in compliance with all appropriate federal Regulations. This team will meet upon acceptance of an award and will continue to meet until final closeout and all supporting reports and documentation have been submitted and approved.

Task 2: Reporting. Reporting will be performed on a semi-annual basis, including submittal of Financial Reports and Program Performance Reports. Based on the project timeline, the city expects there to be four interim Performance and Financial Reports. These reports will include progress and accomplishments based on the projected timeline, if the project is on schedule, and updates on performance measures such as meter installations and measured water savings. Final reports will be developed on completion of the project and will summarize the project's performance, whether the project objectives and goals were met, collaboration that occurred, photos documenting the project, performance measures and realized project benefits. The city will complete Financial Reimbursement Requests on a semi-annual basis using the online ASAP system through the System for Award Management (SAM).

Task 3: Selection and procurement of vendors, materials and supplies. Vendors and materials will be formally selected and procurement will occur in accordance with federal and city procurement processes. Activities include preparation of specifications and bid documents. This will be completed by the city's project team in partnership with the city's Contracts Division, which is well-versed in developing, advertising, and selecting vendors in compliance with federal requirements.

Task 4: Development of accelerated meter installation team. To complete this project, the city will use one current full-time Meter Technician to work 75 percent of their time on the installation of new meters. In addition, the city will hire contract employees to work 100 percent of their time on this project (two contract employees for two years). The city's Meter Superintendent, grant lead and project team will ensure that all hiring practices are in compliance with federal, state, and city policies, and will ensure that hours are properly attributed to the project for reimbursement.

Task 5: Installation and Oversite of 19,919 residential meters. With the support of the full-time and contract city employees, the 19,919 low resolution meters will be replaced with meters capable of reading to 0.1 gallons. Every attempt will be made to geographically group replacements where possible so as to maximize the number of installations that can be completed over the course of the grant, as well as to facilitate early realization of water savings. The city's Meter Superintendent will provide oversite for this portion of the project.

Task 6: Pre-AMI fixed network installation activities. Activities will include propagation studies to determine strategic placement and installation of the data collectors to maximize effectiveness, site visits, and pre-construction meetings.

Task 7: Installation and Oversite of AMI network. Data collectors will be installed as determined by propagation studies, and set-up of the customer/utility portal software will be performed by the awarded vendor. The vendor will work with staff to develop and test the software platform interface, and train utility end-users prior to activation. This portion of the project will be overseen by the city's project team in partnership with the city's Information Technology division.

Task 8: Communications and Customer Outreach. Thornton has an innovative, effective and award-winning water efficiency social marketing campaign which serves as the central point for communication with Thornton's water customers (www.ThorntonWater.com). Thornton modifies its communications strategy annually based on the water efficiency initiatives and goals for any given year, and AMI will be the primary focus of the social marketing campaign upon implementation. Prior to offering the AMI customer portal to Thornton customers, a public outreach and education effort will be designed then offered to Thornton customers to inform them of the availability of new customer portal software, and educate them on the tools available to help them better manage their own water usage.

E.1. Evaluation Criteria

E.1.1 Evaluation Criterion A—Quantifiable Water Savings (30 points)

Describe the amount of estimated water savings.

Thornton estimates this project will conserve approximately 2,100 AFY as a direct benefit of the installation of the AMI network and the upgrade of 19,919 low resolution residential water meters. This water savings will come from four sources:

- 465 AFY savings from residential customer water use reduction
- 1,025 AFY from residential customer leak detection and repair
- 175 AFY from commercial customer leak detection and repair
- 435 AFY from distribution system leak detection and repair

Describe current losses:

Water losses that this project seeks to reduce are:

- Customer inefficiencies
- Customer leaks - residential
- Customer leaks – commercial and irrigation
- Distribution system leaks

<u>Current Losses: Residential Customer Inefficiencies</u>

It's difficult to estimate the losses that are attributed to inefficient water use habits; however, there are studies that estimate potential savings. A case study performed by IBM Research and published by Hanes, D. (2013), *Every drop counts: How water utilities are putting water efficiency first*, found that informed, engaged, and incentivized citizens, through use of a customer portal, can reduce their water usage by 6.6 percent compared with citizens who receive usage data with standard billing procedures. This conservation is a result of changed behavior around water usage. Thornton's 2018 treated water demand within the AMI project area was 23,734 acre-feet. Approximately 15,500 acre-feet was residential customer demand. Therefore, this study demonstrates that approximately 900 AFY may be being wasted through inefficient use.

Current Losses: Customer Leaks - Residential

Household leaks also account for water losses on the customer side of the meter. The EPA estimates that the average household's leaks can account for 10,000 gallons of water wasted every year. Furthermore, 10 percent of homes have leaks that waste 90 gallons or more per day (or 32,850 gallons per year). Thornton currently has 38,334 residential meters. By Q2 of 2020, Thornton estimates 10,532 its residential meters will be at 0.1 gallon resolution. This project seeks to convert an additional 19,919 residential meters that currently read at 1,000 gallon resolution to 0.1 gallon resolution meters. The remaining 7,883 residential meters in Thornton's system that are not a part of this project read at 10 gallon resolution, and will be replaced through Thornton's future replacement. This project will result in all of Thornton's 38,334 residential meters reading at either 0.1 gallons or 10 gallons, which is high enough resolution to quickly detect and respond to customer leaks. Estimated water loss due to residential customer leaks is summarized below:

Leak volume (gal/year)	Number of Households	Total Leak volume (gal/yr)	Total Leak volume (AFY)
10,000	34,501	345,006,000	1,059
32,850	3,833	125,927,190	386
	38,334	**470,933,190**	**1,445**

Current Losses: Customer Leaks – Commercial and Irrigation

Meters in this category include Thornton-owned parks, other large irrigated accounts and commercial accounts. Thornton staff has audited several of these accounts since 2012, and from these audits Thornton estimates that on average, there is a 5 percent leakage rate at these accounts. In 2018, these accounts consumed approximately 5,000 acre-feet of water. Applying that 5 percent leakage, Thornton estimates that approximately 250 AFY is lost through leaks at these accounts.

Current Losses: Distribution System Leaks

Leaks within distribution systems are an additional source of water loss. Thornton's distribution system losses average 10 percent annually. In 2018, this loss was 9.16 percent, which equated to 704 million gallons, or 2,160 acre-feet. Thornton produces a quarterly and annual non-revenue water report, which compares metered use and estimates of other known uses (hydrant flushing, water breaks, etc.) during a specific time period and compares those volumes against treatment plant production volume during that same time period. The difference between the two volumes represents distribution system losses. These losses can be described as apparent losses due to conditions such as meter inaccuracy and distribution system storage, and real losses which are due to undetected leaks from pipes, valves, or storage tanks within the distribution system.

Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?
Indoor leaks and inefficient water use cause the wasted water to enter Thornton's sanitary sewer system unused, where it then treated with other wastewater by the Metro Wastewater Reclamation District, Thornton's wastewater provider. Once treated, this water is discharged to the South Platte River. This unused and wasted water requires unnecessary treatment and energy burdens on both the water and wastewater treatment and distribution systems.

Irrigation system leaks and distribution system leaks cause water to seep into the ground. This unused and wasted water requires unnecessary treatment and energy burdens to the water treatment and distribution systems.

Describe the support/documentation of estimated water savings:

Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.

Municipal Metering

How has the estimated average annual water savings that will result from the project been determined? Please provide all relevant calculations, assumptions, and supporting data.
Please see discussion below.

How have current distribution system losses and/or the potential for reductions in water use by individual users been determined?
Please see discussion below.

For installing individual water user meters, refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations.
<u>Estimated Savings: Improve Residential Customer Efficiencies (**465 AFY)**:</u>
A case study performed by IBM Research and published by Hanes, D. (2013), *Every drop counts: How water utilities are putting water efficiency first*, found that informed, engaged, and incentivized citizens, through use of a customer portal, conserved an average of 6.6 percent more water than those with standard billing procedures. This conservation is a result of changed behavior around water usage. Thornton's 2018 treated water demand within the AMI project area was 23,734 acre-feet. Approximately 15,500 acre-feet was residential customer demand. Therefore, this study demonstrates a potential savings of 900 AFY.

Reducing inefficient customer water use requires a strategic and multi-pronged approach that involves education, information, incentives, and pricing signals. Thornton already has a highly informed and engaged customer base, and has been offering a variety of water efficiency incentives for over a decade. Thornton also uses an inclining block rate structure, which charges customers based on water usage tiers. The more water a customer uses, the higher the tier and the unit rate. This multi-pronged approach has reduced Thornton's residential gallons per capita per day (gpcd) water demand by 25% since the pre-drought year of 2001. In addition, in 2018, Thornton implemented a Water Efficiency Report program, part of which provided all of Thornton's customers with online access to a customer portal. This portal provides the same monthly water usage information in 1,000 gallon increments that customers receive on their bills, but also shows how their water use compared with similar properties in their zip code. The report also offered specific water efficiency tips and programs to help customers reduce their water usage.

The AMI fixed network and high resolution meters will add another prong to the multi-pronged approach. Thornton's water customers are engaged, responsive and educated, but they are missing one of the most powerful tools to make better decisions and take their efficiency ethic to the next level: information. The customer portal and data resolution offered through Thornton's AMI and meter replacement project will allow customers real-time access to high resolution water use data. This will significantly improve all of Thornton's customers' ability to modify water use behavior. Because of Thornton's demonstrated progress in the area of customer engagement, it's likely that, in Thornton, some of this water savings potential identified in the Hanes report has already been achieved. Therefore, Thornton has reduced the 6.6 percent projected savings described in the literature to 3 percent. Thornton anticipates it will save an estimated 3 percent of residential consumption, or 465 acre-feet, through changes in customer water use behavior that result from real time access of high resolution water data.

<u>Estimated Savings: Residential Customer Leak Detection and Repair (**1,025 AFY)**:</u>
The AMI system and high resolution meters will allow Thornton and its customers to recognize if there is an increase in consumption that might indicate a leak or other issue, like user error on an irrigation controller, leading to faster detection and repair. Water savings potential due to improved detection of residential leaks was calculated using reduction factors and data from the EPA's WaterSense website. The EPA estimates that the average household's leaks can account for 10,000 gallons of water wasted every year. Furthermore, 10 percent of homes have leaks that waste 90 gallons or more per day (or 32,850 gallons per year). As previously described, estimated water loss due to residential customer leaks is 1,465 AFY.

A pilot study in Salt Lake City Utah from WaterSmart software which utilized automatic leak alert technology found that in the first three months of the program, Park City Water delivered over 150 leak alerts to residents, 70% of which were closed within ten days of the notification. Thornton applied a repair factor of 70% to the volume of customer leaks (1,465 AFY) to determine a water savings estimate of 1,025 AFY for enhanced customer leak detection and repair.

<u>Estimated Savings: Commercial Customer Leak Detection and Repair (**175 AFY**):</u>
Thornton currently has 2,576 meters that serve commercial (including irrigation) accounts. These meters vary significantly in size; however, all have previously been upgraded to read at high enough resolution to detect leaks. The installation of AMI will allow Thornton and these commercial customers to recognize if there is an increase in consumption that might indicate a

leak, leading to faster detection and repair. In 2018, these accounts consumed approximately 5,000 acre-feet of water. Thornton estimates that there is a leakage rate of at least 5% at these accounts, resulting in a water savings potential of approximately 250 AFY. Thornton applied a repair factor of 70% to the estimated volume of leaks (250 AF) to determine a water savings estimate of 175 AFY for enhanced commercial customer leak detection and repair.

<u>Estimated Savings from Distribution System Losses (**435 AFY**)</u>
Thornton's distribution system losses average 10 percent annually. Losses in 2018 were 9.16 percent of its 23,734 acre-feet, which equated to 2,160 acre-feet. Thornton estimates that it can reduce its distribution system losses by approximately 20%, resulting in a savings of 435 AFY.

Studies have concluded that between 50 percent and 75 percent of non-revenue water can be recovered through the installation of AMI. Specifically, the Las Virgenes AMI study report prepared by the Las Virgenes Municipal Water District in July 2011 estimated that through the implementation of AMI, the utility could expect a 50 percent reduction of the total annual water losses percentage amount. An EPA report on water loss control for public water systems estimated that up to 75% of water loss in systems is recoverable (EPA, 2013). Another case study on the implementation of AMI in the City of Santa Maria, California found that AMI was able to reduce its non-revenue water loss by two-thirds, from 6% down to 2%.

An AMI fixed network alone is not a silver bullet to reducing the water losses that result from distribution system leaks. Distribution system leak management and reduction requires a multi-disciplinary approach. Short of a water break at the surface, leak detection requires:

1. physical assessment of the distribution system;
2. robust data collection of water production, water use and system pressures
3. statistical analysis of those data to quickly detect leaks

Once leaks are detected, in order to actually achieve water savings, those leaks must be repaired, which requires strategic long-term program for repairing and replacing facilities.

Thornton promptly responds to water breaks, has had an ongoing pipeline replacement program of aging and poor performing pipes for over a decade, and in 2019, began using acoustic leak detection as a part of its strategy to reduce real losses in the distribution system. The addition of an AMI fixed network to Thornton's tool box will provide Thornton with higher resolution and more timely data from distribution system, and the AMI software will integrate with Thornton's existing technologies to allow for robust and targeted statistical analysis of Thornton's distribution system performance. This will result in strategic deployment of the acoustic leak detection program to specific areas in the distribution system where the data analytics indicate more losses. Once leaks are identified through the combination of AMI data analytics and the acoustic leak detection program, Thornton's pipeline preplacement program would then be adjusted to address the highest priority, previously undetected leaks in the distribution system. In addition, this evaluation will help Thornton identify specific areas in its distribution system where the installation of meters in distribution mains may be appropriate to further enhance leak detection. As Peter Drucker says, "You can't manage what you can't measure;” the AMI fixed network will greatly enhance Thornton’s ability to measure and interpret the water usage within its distribution system.

According to the studies sited previously, the water savings potential from reducing distribution system losses is extremely varied, ranging from a 50 percent to 75 percent reduction of non-revenue water. Since Thornton’s project is focused on reducing real water losses which occur through distribution system leaks, and because of the variation that exists in the literature, Thornton took a very conservative approach in estimating actual water savings. Thornton estimates that it will achieve a 20% reduction, or 435 AFY, in its non-revenue water losses due to adding an AMI fixed network and high resolution water meters.

If installing distribution main meters will result in conserved water, please provide support for this determination (including, but not limited to leakage studies, previous leakage reduction projects, etc.). Please provide details underlying any assumptions being made in support of water savings estimates (e.g., how leakage will be reduced once identified with improved meter data).

No distribution main meters will be installed as a part of this project. As discussed above, water savings from reduced distribution system losses will be achieved by more strategic deployment of the acoustic leak detection program, and adjustments to Thornton’s pipeline replacement program to focus on areas of known water loss.

What types (manufacturer and model) of devices will be installed and what quantity of each?

- 14,904 meters and registers will be replaced with Badger model M25 8 dial meters and registers. Meters will be replaced due to advanced meter age; registers will be replaced to allow for 0.1 gallon resolution.
- 5,015 registers will be replaced with Badger model M25 8 dial registers. Meters will not be replaced due to young meter age; registers will be replaced to allow for 0.1 gallon resolution.

How will actual water savings be verified upon completion of the project?

Actual water savings will be verified through the Program Performance Reports. Performance measures will be reported on a semi-annual basis throughout the project, and a Final Report will be completed to summarize the various performance measures and objectives. The AMI customer portal will be used to analyze customer interaction and participation in various incentive programs, as well as track trends in customer use over time. This data will then be summarized to show total water savings over specific timeframes. Likewise, residential and commercial leak detection will also be analyzed. The number of leaks identified, estimated volumes of each leak, and time between identifying and fixing leaks will be used to estimate water savings. Lastly, Thornton will be able to compare distribution system losses before and after project completion. The combination of AMI analytics and acoustic leak monitoring are expected to identify more distribution system leaks over time and decrease the volume of non-revenue losses.

E.1.2 Evaluation Criterion B—Water Supply Reliability (18 points)

Please address how the project will increase water supply reliability. Proposals that will address more significant water supply shortfalls benefitting multiple sectors and multiple water users, will be prioritized. General water supply reliability benefits (e.g., proposals that will increase resiliency to drought) will also be considered. Please provide sufficient explanation of the project benefits and their significance. These benefits may include, but are not limited to, the following:

Will the project address a specific water reliability concern? Please address the following:

Explain and provide detail of the specific issue(s) in the area that is impacting water reliability, such as shortages due to drought, increased demand, or reduced deliveries. Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?

Risks to Thornton's water supply reliability lie in the areas of infrastructure, water quality, drought, and regional aridification. Thornton owns adequate water supply to reliably meet present needs and projected demands under traditional planning scenarios. However, the infrastructure to deliver future water sources, the quality of some of Thornton's source water, drought cycles, and climate change all present uncertainties which impact Thornton's system resiliency and its ability to reliably deliver water to its customers. Water savings from this project will result in reduced treated water demand, allowing the saved water to remain in Thornton's raw water storage reservoirs to serve as an additional buffer in times of drought. Increases in Thornton's storage reserves, combined with lower demands, will result in decreased water diversions from the over-appropriated South Platte basin. In addition, decreased demands and increased storage reserves will improve the overall resiliency and reliability of Thornton's water system, benefitting all customer classes. The reduced treatment plant demand will also decrease operational costs, most of which are chemical and power, and these reductions in resources result in environmental and financial benefits.

Infrastructure. Water saved from this project will directly increase the resiliency of Thornton's water system, specifically during the critical 2023 to 2030 timeline, when Thornton will be building and bringing online a major infrastructure project to add a new source of supply to its system. The Thornton Water Project is a $450 million project that includes an approximately 75 mile pipeline and associated infrastructure. The pipeline will deliver water rights Thornton owns in the Cache la Poudre River to Thornton by 2025. This project is in the design, property acquisition, and permitting stage. Thornton has not yet obtained regulatory approval from all local jurisdictions. Those approvals as well as other uncertainties of delivering an infrastructure project of this magnitude may impact the timing of project completion. In the meantime, Thornton and the entire Denver metropolitan region continue to experience aggressive growth. Therefore, Thornton is taking prudent steps to ensure that its current supplies and system efficiencies are maximized to provide resiliency to Thornton's system. Savings from this project will reduce demand, and the saved water will stay in Thornton's raw water storage facilities. This stored water will contribute to extending the city's supply during this critical time should project delays occur.

Water Quality. Water saved from this project will translate into reduced demand on Thornton's water treatment plants. Over half of Thornton's water supply comes from the South Platte River downstream of the Denver metropolitan region. As such, this supply is impacted by wastewater discharges, non-point source pollution, and other water quality characteristics of an urban river. Thornton's Wes Brown Water Treatment Plant uses costly advanced treatment technologies to treat this source. Thornton has always met safe drinking water standards, but maximizing the use of high quality source water is the first choice to reduce risk to Thornton's customers and to minimize taste and odor events. The water savings from this project will reduce the demand on Thornton's treatment plants, resulting in lower treatment costs and allowing Thornton to keep more of its lower quality source water in storage for drought reserves.

Drought. Water saved from this project will improve Thornton's drought resiliency. The city has conducted extensive planning for short and long-term strategies to deal with adverse conditions caused by droughts. Thornton's water system has been designed to withstand a three-year drought, modeled after the drought the region experienced in the 1950s. Thornton has not experienced a multi-year, prolonged drought since this time. In addition, recent events indicate that the droughts many regions are currently experiencing are more severe than droughts that have been observed in the historical record. In 2019, Thornton updated its Drought Management Plan. A significant change that was incorporated in the 2019 Plan was the addition of a fourth "Exceptional Drought" stage, which was designed to reflect a drought of unprecedented magnitude, similar to what California, Australia, and Cape Town have experienced. Water savings from this project will add resiliency to Thornton's drought responses at all stages, but add particular resiliency for more severe, extended droughts which the region has not experienced recently, but which are inevitable.

Aridification. Water saved from this project will allow Thornton to keep more water in storage, which will consequently reduce river diversions. This will provide a supply buffer that will allow Thornton to better adapt to the impact regional warming is having on river flows, and consequently the availability and quantity of Thornton's water supply. Western water experts are coming to agreement that while the southwest will continue to experience droughts and wide fluctuations in precipitation and temperature, climate change is making the region and its river basins hotter and drier overall, essentially establishing a new normal. Therefore, in addition to planning for the next drought, Thornton is also adapting to a new baseline that is getting progressively hotter and drier than what previous planning had contemplated. Thornton anticipates that the primary impact aridification will have on its water supply is on the timing and availability of its water rights. Earlier and faster spring runoff and lower late-season river flows have routinely been experience over the last decade. These trends translate into higher reliance on senior water rights, and less frequent availability of junior water rights. It is typically the junior water rights that are kept in storage to help regulate seasonal demands and act as a measure of drought contingency. Saved water generated from this project will remain in storage, which will help mitigate the impact of reduced inflows from Thornton's junior water rights.

Describe how the project will address the water reliability concern? In your response, please address where the conserved water will go and how it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.

As described above, this project will decrease treated water demands which will leave more water in Thornton's raw water storage reservoirs and reduce South Platte River basin diversions. This additional stored water will help mitigate the current infrastructure, water quality, drought, and aridification vulnerabilities to Thornton's system. Thornton can draw upon this stored water for additional supplies should delays occur in the delivery of the Thornton Water Project or during drought. In addition, this stored water can help offset reduced diversions that are a result of the region's aridification. Finally, because overall demand is reduced, Thornton can choose to keep more of its lower quality source water in storage and maximize the use of its highest quality source water; this helps address water quality challenges that the city faces with its South Platte sources.

Provide a description of the mechanism that will be used, if necessary, to put the conserved water to the intended use.

The saved water will remain in Thornton's raw water storage facilities. As such, all the facilities and procedures currently exist to allow the water to be put to immediate use should any of the system vulnerabilities described above arise.

Indicate the quantity of conserved water that will be used for the intended purpose.

The quantity of conserved water that will be put to use for the purposes described above is 2,100 AFY.

Will the project make water available to achieve multiple benefits or to benefit multiple water users? Consider the following:

Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?

The project will directly benefit the municipal and environmental sectors. Thornton provides water throughout its municipal service area to its customers. Thornton's customers will benefit from both the AMI fixed network as well as the high resolution meters by providing them with real-time usage data which will allow them to better detect and respond to leaks and manage their water use habits. Currently, customers receive usage data via monthly billing, which reflects water usage to the nearest 1000 gallons. The timing and resolution of this information does not allow the customer to quickly detect leaks or other issues with their water usage, nor does it allow them to easily track the results of changed behavior or other adjustments. Real time water use data at high resolution will have particularly valuable applications during the irrigation season when half of residential water use occurs on landscaping. Irrigation system leaks can quickly waste a significant amount of water, and unless it is creating a problem at the surface, customers often don't know there is a problem until their bill arrives four to six weeks later. With this project, both Thornton and its customers will have real-time access to usage data, which will result in faster leak detection. Thornton will send customers alerts, and customers will be able to instantly see how their actions translate into water usage.

The environmental sector will also benefit from decreased load on Thornton's treatment plants and distribution system. This project will result in an estimate 9% reduction in treated water demand, which will reduce power consumption and chemicals used for water treatment. The added water savings will, at times, also result in less overall demand on the river system, adding river flows that will benefit the river ecosystem.

Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.
No. This project will not have an impact on species.

Will the project benefit a larger initiative to address water reliability?
Over the last several decades, Colorado has faced substantial and increasingly complex water related challenges. The sources of these challenges are as diverse as the state itself. They range from competing water needs including agriculture, oil and gas, tourism, environmental, recreational, industrial, and municipal uses, to differing regional outlooks about water management based on the state's geography and demographics.

It was this coalescing of challenges that in 2013 resulted in an executive order from Governor John Hickenlooper directing the Colorado Water Conservation Board to commence work on Colorado's Water Plan. As specified in the Executive Order, the plan integrates the following:

- A productive economy that supports vibrant and sustainable cities, viable and productive agriculture, and a robust skiing, recreation, and tourism industry
- Efficient and effective water infrastructure promoting smart land use
- A strong environment that includes healthy watersheds, rivers and streams, and wildlife.

Colorado's Water Plan tackles many water challenges faced by the state including:

- Addressing the projected municipal and industrial water supply gap that previous state reports indicate may reach 500,000 acre feet per year by 2050
- Addressing the largest regional supply gap in the South Platte Basin – the most populous and agriculturally productive Basin in the state
- Addressing how drought conditions worsen this projected supply gap
- Reducing the state's trend toward "buy and dry" transfers of water rights from agriculture to municipal use as demand increases
- Incorporating environmental and recreational values so important to the economy and quality of life in each of the state's river basins
- Addressing long-standing interbasin and intrabasin challenges through cooperative dialogue and action, including the basin roundtables and IBCC
- Recognizing that water quantity and quality issues in the state are integrally linked

- Addressing interstate water obligations for the nine compacts and two equitable apportionment decrees applicable to Colorado

Thornton contributed to the Colorado Water Plan through its membership in the Metro Basin Roundtable, which is one of nine roundtables in the state that were established in 2006 by HB05-1177 Colorado Water for the 21st Century Act. These basin roundtables facilitate discussions on water issues and encourage locally driven collaborative solutions for both basin and state-wide water issues. The basin roundtables developed each of their water supply needs, challenges and strategies which informed Colorado's Water Plan. As a part of this process, the Metro Basin and South Platte Basin Roundtables partnered to develop a South Platte Basin Implementation Plan (SPBIP).

Colorado's Water Plan sets a goal of reducing the industrial water supply gap from 560,000 acre-feet to zero acre-feet by 2030. Municipal water efficiency strategies are an important element of the plan as municipal and industrial water efficiency goals aim to reduce water use 400,000 acre-feet by 2050. Further, the SPBIP calls for the continued leadership in conservation and reuse, and the implementation of additional measures to reduce water consumption rates in the region.

Colorado's Water Plan and the companion SPBIP are a part of larger state-wide initiatives that aim to address water reliability. The water saved in Thornton's project will help meet the following goals of these statewide initiatives:

- Addressing state-wide water supply gap, and helping the state reach its overall goal of reducing municipal water use by 400,000 acre-feet by 2050
- Addressing the largest regional supply gap in the South Platte Basin – the most populous and agriculturally productive Basin in the state
- Addressing how drought conditions worsen supply gaps
- Integrating water quantity and quality issues
- Continued leadership in conservation

Will the project benefit Indian tribes?

No. This project will not benefit Indian tribes.

Will the project benefit rural or economically disadvantaged communities?

This project will benefit all Thornton customers, including economically disadvantaged communities and individuals in Thornton, by providing them with alerts and information to advise them of leaks or other issues that may cause their water bills to increase. Over 8 percent of Thornton residents are considered to be living in poverty. 33 percent of Thornton households are considered cost-burdened, which occurs when more than 30 percent of household income is spent on housing costs. With cost-burdened homes, unexpected increases to utility bills can have a great impact on household finances. This AMI and meter replacement project will reduce and eliminate many high water bills due to unidentified leaks, helping benefit lower income families in the community.

Thornton offers free installation of new toilets to income qualified customers, as well as toilet rebates, free showerhead exchanges, and free in-home water use consultations to all customers. Thornton also has a program called Thornton Cares, which provides water bill payment assistance to income qualified residents. These existing services, in conjunction with this project, will continue to allow Thornton ways to help economically disadvantaged customers achieve both water and money savings.

Describe how the project will help to achieve these multiple benefits. In your response, please address where the conserved water will go and where it will be used, including whether the conserved water will be used to offset groundwater pumping, used to reduce diversions, used to address shortages that impact diversions or reduce deliveries, made available for transfer, left in the river system, or used to meet another intended use.

Water savings from this project will have the direct result of reducing Thornton's treated water demand, allowing the saved water to remain in Thornton's raw water storage reservoirs and reducing South Platte River basin diversions. There are multiple benefits to reducing demand, including environmental benefits resulting from increased river flows and reduced chemical and power usage from reduced treatment. There are also regional and state-wide benefits when individual water providers are able to develop more resilient supplies. When an individual utility has a water shortage, it has the potential to impact the stability of the region. The resiliency benefits that Thornton gains from keeping this saved water in storage translate into Thornton not needing to acquire additional supplies to help it through a drought or to bolster its existing supplies due to regional warming.

Does the project promote and encourage collaboration among parties in a way that helps increase the reliability of the water supply?

Yes. This project is consistent with a state-wide initiative to address water reliability and water conservation as outlined in Colorado's Water Plan. A key objective of the state plan is to reduce the projected 2050 municipal and industrial water supply gap from 560,000 acre-feet to zero acre-feet by 2030, and to reduce drought vulnerability. Municipal water efficiency strategies are an important element of the plan as municipal and industrial water efficiency goals aim to reduce water use 400,000 acre-feet by 2050. Drought resiliency of water utilities is also an important element of Colorado's Water Plan. Collaboration toward achieving these goals is a primary objective of the Metro Roundtable, of which Thornton is a member. The water saved in Thornton's project will help reduce Thornton's portion of the state-wide water supply gap, and will help the state reach its overall goal of reducing municipal water use by 400,000 acre-feet by 2050. It will also help Thornton improve its drought resiliency.

In addition, Thornton is a member of Colorado WaterWise, which provides resources to the Colorado conservation community. Colorado WaterWise connects stakeholders that are invested in water efficiency in Colorado in order to foster integration and innovation of education and technology. It is a forum to share ideas on successful programs; provide technical analysis tools; give access to regional water efficiency experts; and provide professional networking and educational opportunities. Colorado WaterWIse has provided a letter of support, and Thornton will share its experience and results from this project with other water utilities in the state.

Is there widespread support for the project?

Yes. Thornton has received direct support from the Colorado Water Conservation Board, Colorado WaterWise, WaterNOW Alliance, and Western Resources Advocates.

In addition, this project aligns with the objectives of the following:

- Colorado's Water Plan
- South Platte Basin Implementation Plan

What is the significance of the collaboration/support?

As previously described, Colorado's water challenges are varied, integrated, dynamic, and complex. Without an integrated framework with which to address challenges and identify solutions, the potential for solutions that actually create more problems is very real. Thornton's Advanced Meter Infrastructure and Residential Meter Replacement Project is one of many strategies Thornton is implementing to do its part in addressing the state's water supply challenges. The fact that this project aligns with state-wide planning efforts is critical in order for Colorado to continue to make progress on its water supply challenges.

Is the possibility of future water conservation improvements by other water users enhanced by completion of this project?

Successful implementation of this technology and the resulting water savings will serve as an example to other water providers as they seek tools to meet their conservation goals. Due to the existing collaborative nature of water providers along Colorado's Front Range, Thornton will also be able to share lessons learned during its implementation of this project in order to inform and improve similar projects taken on by other providers.

Will the project help to prevent a water-related crisis or conflict? Is there frequently tension or litigation over water in the basin?

As is described in the South Platte and Metro Roundtables Basin Implementation Plan, in most years, the South Platte Basin does not have sufficient water to meet all of its needs and it faces an increasing water supply gap due to anticipated population growth. The Basin must work to protect the current vitality of economic, social, environmental and recreational attributes through management of its existing water supplies while simultaneously planning to meet future water needs. There is competition for and litigation over water supplies amongst Front Range water providers, and there is also significant conflict between the Western Slope and the Front Range, as well as across other river basins, over the development of new transbasin water supply projects. In addition, tension and conflict exists when outside entities develop and construct water projects in local communities that do not necessarily receive direct benefits from the projects themselves.

Thornton has already acquired the source water necessary for its current and future growth, so it is not competing for additional sources of supply. However, in order to prevent itself from needing to acquire additional supplies, Thornton must utilize its existing supplies in the most efficient way possible. It must also be able to develop all of the water supply it owns in order to meet current and future demands. Implementation of this project maximizes the use of Thornton's current and future supply, and helps prevent Thornton from adding to the municipal supply gap and resulting regional conflicts and tensions over water supply.

Describe the roles of any partners in the process. Please attach any relevant supporting documents.
There are no formal partnerships required for this process.

Will the project address water supply reliability in other ways not described above?
No.

E.1.3. Evaluation Criterion C—Implementing Hydropower (18 points)
There is not a hydropower component to this project.

Describe the amount of energy capacity.
Not applicable.

Describe the amount of energy generated.
Not applicable.

Describe any other benefits of the hydropower project.
Not applicable.

E.1.4. Evaluation Criterion D—Complementing On-Farm Irrigation Improvements (10 points)
There are no on-farm irrigation improvements as part of this project.

Describe any planned or ongoing projects by farmers/ranchers that receive water from the applicant to improve on-farm efficiencies.
Not applicable.

Described how the proposed WaterSMART project would complement any ongoing or planned on-farm improvement.
Not applicable.

Describe the on-farm water conservation or water use efficiency benefits that are expected to result from any on-farm work.
Not applicable.

E.1.5. Evaluation Criterion E—Department of the Interior Priorities (10 points)

Creating a conservation stewardship legacy second only to Teddy Roosevelt

Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment.

AMI and high resolution meters are both examples of using science to identify best practices to manage water resources and adapt to changes in the environment. These technologies improve the management of water resources by providing more accurate and timely data. This is important for normal operations, but it becomes increasingly important in times of shortages. In Thornton, these shortages are typically a result of changes to the environment such as intermittent drought and the general aridification that the region is experiencing. This project will result in better management of Thornton's water resources which will save water and increase water supply resiliency and reliability.

Utilizing our natural resources

Ensure American Energy is available to meet our security and economic needs.

Water conservation saves energy by avoiding unnecessary water treatment, distribution, and wastewater treatment. In 2018, Thornton utilized approximately 15,990,440 KWH to treat and distribute 23,734 acre-feet of water. With the 2,100 acre-feet of water that is projected to result from this project, it is estimated that Thornton would decrease its energy consumption by approximately 9%, or 1,599,000 KWH.

Restoring trust with local communities

Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands.

Water is a precious and limited resource in Colorado. Any success in conserving water use as a municipality is going to directly and indirectly benefit the local and regional community. Other communities rely on the same water sources as Thornton, and any reduction in usage is a potential benefit to them or the river system itself. Thornton actively engages with the local community and regional water providers on water conservation and water resources issues. Thornton intends to improve on those relationship and hopes that the success of the AMI project will inspire other local entities to consider this improvement for their water systems.

Expand the lines of communication with Governors, state natural resources offices, Fish and Wildlife offices, water authorities, county commissioners, Tribes, and local communities.

Dialogue amongst Colorado state agencies and local water providers is occurring now through the basin roundtables and in Colorado's Water Plan development and implementation. This project is an integral step in the larger state effort of reducing the future water supply gap and in the fostering of water provider leadership in water conservation. Thornton will continue to participate in the Metro Roundtable and partner with state agencies, local governments, water authorities and local communities on water supply issues, further expanding the lines of communication amongst these entities.

Modernizing our infrastructure

Support the White House Public/Private Partnership Initiative to modernize U.S infrastructure.

AMI infrastructure plays a key role in Thornton's ongoing efforts to modernize city infrastructure. Having real-time remote access to water meters throughout the city will increase the response time and efficiency of leak detection. In turn, this will conserve water supply, save resident and government dollars, and reduce waste. Private partnerships with equipment manufacturers and vendors will be essential in this effort. Likewise, improved access to water data will help improve future decision making between and amongst public/private partnerships, especially in regards to city development.

Prioritize Department Infrastructure needs to highlight

- *Construction of infrastructure*
- *Cyclical maintenance*
- *Deferred maintenance*

Implementation of this project will require construction of new infrastructure. In addition, Access to the AMI platform will allow Thornton's utility maintenance to be targeted toward problem areas in the distribution system. If left undetected for long periods of time, leaks can cause more extensive and expensive repairs. These type of preventable repairs can cause budget issues and create deferred maintenance backlogs. This project will help identify and repair leaks faster, saving money that would otherwise be used for costlier repairs in the long-term. Overall, this project will help Thornton have a more efficient cyclical maintenance program, and progressively eliminate its deferred maintenance issues.

E.1.6. Evaluation Criterion F—Implementation and Results (6 points)

E.1.6.1. Subcriterion F.1—Project Planning

Does the applicant have a Water Conservation Plan and/or System Optimization Review (SOR) in place? Please self-certify or provide copies of these plans where appropriate to verify that such a plan is in place.

Yes. Thornton has a Water Conservation Plan, a Drought Management Plan, and is currently completing an Integrated Water and Wastewater Masterplan.

Provide the following information regarding project planning:

Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Drought Contingency Plan or other planning efforts done to determine the priority of this project in relation to other potential projects.

Describe how the project conforms to and meets the goals of any applicable planning efforts and identify any aspect of the project that implements a feature of an existing water plan(s).

2020 City of Thornton Capital Improvement Project Budget
The installation of an AMI fixed network is included in the 2020 City of Thornton budget. This budget has been adopted by the Thornton City Council. Thornton is committed to appropriate funds for the AMI fixed network portion of this project. These funds are a significant source of the city's match for this grant application, and the AMI fixed network will work in conjunction with the high resolution water meters which will be installed with the Reclamation grant funds, should the city be successful in its application.

2018 City of Thornton Water Efficiency Plan
In 2018, the city adopted an updated Water Efficiency Plan. The 2018 plan replaced the 2009 Water Conservation Plan. The 2018 plan has been adopted by Thornton City Council, has been approved by the Colorado Water Conservation Board (CWCB) and fulfills the requirements of the State of Colorado Water Conservation Act of 2004 (HB 1365) by following the guidance provided by the CWCB. The plan outlines the measures the city will take between 2018 and 2024 to further increase the water supply efficiency of the city and its customers. The installation of an AMI fixed network was identified in the 2018 Plan as a project to be completed by 2024 to help contribute to the city's water savings. The 2018 plan identifies an AMI fixed network as a powerful tool to facilitate customer engagement, education, and participation in Thornton's efficiency programs. The implementation of this project is consistent with the objectives in the 2018 plan, and will provide leverage for the water savings goals identified in the plan.

2019 Drought Management Plan
In 2019, Thornton adopted an updated Drought Management Plan. The 2019 plan replaced the 2003 Drought Management Plan. The 2019 plan was partially funded by a grant from the CWCB. It has been adopted by Thornton City Council, has been approved by the CWCB and follows the guidance provided by the CWCB in its *Municipal Drought Management Plan Guidance Document*. The plan outlines the measures the city will take to manage water supplies and water demand during four increasingly severe drought stages or water shortages. Implementing AMI is listed in the Drought Management Plan as drought response strategy under Operational Water Supply Strategies. The Drought Management Plan contemplates that AMI could be used to increase monitoring of inefficiencies in the distribution system and accelerate leak detection. In addition, AMI is listed in the Plan as a drought response strategy under Demand Side Response Strategies. The Drought Management Plan contemplates that AMI could be used during times of drought to accelerate leak detection efforts, customize water budgets by customer, and monitor adherence to mandatory watering rules/schedules.

Pending - Integrated Water and Wastewater System Masterplan
The city is in the process of developing an Integrated Water and Wastewater System Masterplan. This integrated plan provides an update to various utility masterplans, and also integrates the plans to assist with strategic and efficient implementation. The installation of an AMI fixed network is identified in this plan. It is contemplated that this project would contribute toward effective management, planning and optimization of the treated water distribution system. Thornton anticipates that this plan will be completed by the first quarter of 2020.

E.1.6.2. Subcriterion F.2—Performance Measures

This project outlines four areas of water savings.

- 465 AFY savings from residential customer water use reduction
- 1,025 AFY from residential customer leak detection and repair
- 175 AFY from commercial customer leak detection and repair
- 435 AFY from distribution system leak detection and repair

The performance measures that will be implemented for each of these areas to evaluate actual water savings are as follows:

<u>Improved Customer Efficiency</u>

Because it is difficult to distill the efficacy that a single change has on an integrated program, Thornton will measure improved customer efficiency that results from this project in several ways. Thornton will track customer engagement with the AMI customer portal, as well as participation in Thornton's various incentive programs that result from customer interaction with the portal. Thornton will compare the incentive program participation that result from the AMI customer portal to pre-implementation levels.

Thornton has water savings estimates for each of its incentive programs, for example, installation of a high-efficiency toilet or a smart irrigation controller. For customers who opt into these incentive programs via the AMI customer portal, Thornton will track the water savings that result from that specific incentive.

Thornton will continue long-term tracking of customer usage to evaluate trends in water use. Because outdoor irrigation of residential properties comprises approximately half of a customer's annual water demand, water use in Thornton is highly dependent on weather (particularly evapotranspiration rates). Thornton will utilizes a five-year rolling average of water use to detect trends, thus smoothing out the influence of weather extremes on usage.

<u>Improved Residential and Commercial Customer Leak Detection and Repair</u>

The AMI system and high resolution meters will allow Thornton and its customers to recognize if there is an increase in consumption that might indicate a leak or other issue on the customer side of the meter, like user error on an irrigation controller, leading to faster detection and repair. Thornton will measure the savings associated with improved leak detection and repair by tracking system-generated leak alerts, the estimated volume of each leak, the number of leaks which are resolved, and the time between detection and resolution. From this data, Thornton will be able to estimate the amount of water saved from more rapid detection and repair of leaks.

<u>Improved Distribution System Leak Detection and Repair</u>

Thornton will measure the water savings associated with improved distribution system leaks and repairs in two ways. Thornton will continue to produce its quarterly and annual non-revenue water report, which compares metered uses and estimates of other known uses (hydrant flushing, water breaks, etc.) during a specific time period and compares those volumes against treatment plant production volume during that same time period. The difference between the two volumes represents distribution system losses during that period. Thornton would expect to see these losses decrease as a result of this project. Thornton will also track the number and estimated volume of leaks that are identified through the combination of AMI data analytics and acoustic leak monitoring. Thornton will also track when it allocates resources to repair leaks that are identified in the distribution system through this program.

E.1.6.3. Subcriterion F.3—Readiness to Proceed

Describe the implementation plan of the proposed project. Please include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates.

The following table outlines the schedule, major tasks, and milestones for Thornton's proposed project. The project is estimated to require 36 months to completion, and includes the installation of the AMI fixed network and approximately 19,919 high resolution meters.

Project Schedule, Tasks and Milestones	Year 1				Year 2				Year 3			
	Q1 Jan - Mar 2020	Q2 Apr-Jun 2020	Q3 Jul-Sep 2020	Q4 Oct-Dec 2020	Q1 Jan-Mar 2021	Q2 Apr-Jun 2021	Q3 Jul-Sep 2021	Q4 Oct-Dec 2021	Q1 Jan-Mar 2022	Q2 Apr-Jun 2022	Q3 Jul-Sep 2022	Q4 Oct-Dec 2022
1. Financial Assistance Agreement, Formation of the Grant Administration Team, Grant Administration		★										
2. Reporting: Interim Performance Reports and Final Report				☆		☆		☆		☆		★
3. Selection and Procurement of Consultants, Materials and Supplies		★										
4. Development of Accelerated Meter Installation team		★										
5. Installation and oversite of high resolution residential meters												
6. Pre-AMI Fixed Network Installation Activities												
7. Installation of AMI Network and Implementation of Data Management System												
8. Communications and Customer Outreach												

Describe any permits that will be required, along with the process for obtaining such permits.

No permits are required for the completion of this project.

Identify and describe any engineering or design work performed specifically in support of the proposed project.

In June 2014, as the end-points of the AMR system that Thornton installed in 2004 were nearing their end-of-life, Thornton completed a Fixed Base Meter Reading Feasibility Study. The purpose of the study was to assess the feasibility of moving from AMR to Advanced Metering Infrastructure with the goal of determining how AMI would optimize meter reading, customer service, and water use efficiency. The study also developed and evaluated five alternatives to determine the extent of the effort and costs for converting to AMI and requirements to achieve AMI benefits. Based on this study, Thornton began replacing the aging ERTs that were originally installed during the AMR conversion with new ERTs which were capable of both drive-by readings and AMI operations. By 2017, all meters in Thornton's system had been fitted with ERTs capable of both AMR an AMI operations.

In addition to replacing the aging ERTs, in 2015 Thornton began, through its annual meter age change program, to replace older meters with newer meters capable of higher resolution readings. All new meters installed since 2014 are high resolution meters with both AMR and AMI capabilities.

In September 2017, Thornton completed a Refresh of Fixed Based Meter Reading Feasibility Study. This study provided updated information on the estimated costs for a Fixed Network AMI system, and a review of advances in AMI technologies.

Future engineering work will be required for the following components of this project: construction contract development, bid package development and support, plans and specifications development, procurement assistance, and construction oversight and inspection.

Describe any new policies or administrative actions required to implement the project.

No policies or administrative actions are required to implement this project. Thornton City Council has approved the Project and has delegated authority to staff for implementation.

Describe how the environmental compliance estimate was developed. Has the compliance cost been discussed with the local Reclamation office?

No environmental compliance costs are expected so no estimate was performed.

E.1.7. Evaluation Criterion G—Nexus to Reclamation Project Activities (4 points)

Is the proposed project connected to Reclamation project activities? If so, how? Please consider the following:

Does the applicant receive Reclamation project water?

No.

Is the project on Reclamation project lands or involving Reclamation facilities?

No.

Is the project in the same basin as a Reclamation project or activity?

Yes. A portion of the Colorado Big Thompson Project is located in the South Platte Basin. While Thornton is located in the South Platte basin, Thornton is not located within the service area of the Big Thompson Project and does not receive project water.

Will the proposed work contribute water to a basin where a Reclamation project is located?

No.

Will the project benefit any tribe(s)?

No.

E.1.8 Evaluation Criterion H—Additional Non-Federal Funding (4 points)

Non-federal funding provided is 62.5% of the total project costs. Below are the numbers and calculation used.

Non-Federal Funding	$2,500,000	x 100	=	**62.5%**
Total Project Cost	$3,999,976			

Project Budget

Funding Plan and Letters of Commitment

Please identify the sources of the non-Federal cost-share contribution for the project, including:

Any monetary contributions by the applicant towards the cost-share requirement and source of funds (e.g., reserve account, tax revenue, and/or assessments).

Any costs that will be contributed by the applicant.

Thornton will provide its $2,500,000 cost-share contribution through both cash and costs contributed by Thornton. Contributions will be from Water and Sewer revenue generated through water and sewer rates and tap fees. Thornton will appropriate approximately $2,170,000 for project costs, and the remaining $330,000 will be in-kind contributions in the form of salaried staff and city-owned equipment.

Any third-party in-kind costs (i.e., goods and services provided by a third party).

No third-party in-kind costs are included in the project.

Any cash requested or received from other non-Federal entities.

No cash requested or received from other non-Federal entities is included in the project.

Any pending funding requests (i.e., grants or loans) that have not yet been approved and explain how the project will be affected if such funding is denied.
No pending funding requests exist.

In addition, please identify whether the budget proposal includes any project costs that have been or may be incurred prior to award. For each cost, describe:
The budget proposal does not include any project costs that have been or may be incurred prior to the award.

Budget Proposal

The total project cost summary is provided below. Costs to be paid by the applicant total $2,499,976 and consist of cash contributions of approximately $2,170,000 and in-kind contributions of approximately $330,000. Contributions from this grant would total $1,500,000, and no third-party contributions are included.

Source	Amount
Costs to be reimbursed with requested funding	$ 1,500,000
Costs to be paid by the applicant	$ 2,499,976
Value of third party contributions	$ -
Total Project Cost	**$ 3,999,976**

Below is a summary of Thornton's available cost share contribution.

Thornton cash contributions:	$2,170,000
Thornton cost contribution (salaried staff):	$240,294
Thornton cost contribution (equipment):	$89,706
TOTAL	**$2,500,000**

A summary of the proposed project budget follows. The budget narrative provides more detailed descriptions of the project budget.

BUDGET ITEM DESCRIPTION	COMPUTATION		Quantity Type	TOTAL COST
	$/UNIT	Quantity		
Salaries and Wages				
Project Manager - Meter Superintendent - 2.5 yrs @ 25% time	$ 46.08	1,300	Hours	$ 59,904
Engineering Services Project Manager 1227 hours over 2.5 years	$ 41.89	1,227	Hours	$ 51,399
Meter Technician I - 2 years @ 75% time	$ 23.57	3,120	Hours	$ 73,538
Field Maintenance Worker I - Contract - 2 years at 100% time	$ 20.59	4,160	Hours	$ 85,654
Field Maintenance Worker I - Contract - 2 years at 100% time	$ 20.59	4,160	Hours	$ 85,654
Fringe Benefits				
Meter Superintendent - 2.5 yrs @ 25% time	$ 13.82	1,300	Hours	$ 17,971
Project Manager 1227 hours over 2.5 years	$ 12.57	1,227	Hours	$ 15,420
Meter Technician I - 2 years @ 75% time	$ 7.07	3,120	Hours	$ 22,062
Field Maintenance Worker I - Contract - 2 years at 100% time	$ 6.18	4,160	Hours	$ 25,696
Field Maintenance Worker I - Contract - 2 years at 100% time	$ 6.18	4,160	Hours	$ 25,696
Travel				
Not applicable				$ -
Equipment				
Vehicle 1 - 1/2 ton pick-up truck				$ 22,426
Vehicle 2 - 1/2 ton pick-up truck				$ 33,640
Vehicle 3 - 1/2 ton pick-up truck				$ 33,640
Supplies and Materials				
Meters and Registers				
Replace Hersey 4 dial meters & registers	$ 90	14,904	each	$ 1,341,360
Registers ONLY				
Replace registers on Badger 4 dial meters	$ 61	5,015	each	$ 305,915
Miscellaneous Costs for installation				
Not applicable				
Contractual/Construction				
Acoustic Leak Detection				$ 100,000
AMI Network Infrastructure				
Radio Tools and Field Devices	$ 500	10	each	$ 5,000
Analytic Software (one time then annual)	$ 50,000	1	each	$ 50,000
Server HW and SW for HES	$ 85,000	1	each	$ 85,000
Fixed Reading Equipment and Software	$ 350,000	1	each	$ 350,000
Network Installation Costs	$ 700,000	1	each	$ 700,000
Professional Services	$ 510,000	1	each	$ 510,000
Third-Party Contributions				
Not applicable				$ -
Other				
Not applicable				$ -
TOTAL DIRECT COSTS				**$ 3,999,976**
Indirect Costs				
Type of rate				
TOTAL ESTIMATED PROJECT COSTS				**$ 3,999,976**

Budget Narrative

The proposed total cost for Thornton's Advanced Metering Infrastructure and Residential Meter Replacement Project is $3,999,976. This application requests Bureau of Reclamation funding in the amount of $1,500,000 to be used toward the project. Thornton will provide the remaining $2,499,976 through in-kind contributions and budgeted funds.

Salaries and Wages

Hourly wages for City of Thornton salaried staff are included as in-kind contributions toward this project. Salaried staff and their rolls are as follows:

- Lead Project Manager
  Jason Montoya, Meter Superintendent. Overall project and grant management.
- Engineering Services Project Manager
  Staff TBD, Project Manager. AMI vendor oversight
- Meter Technician I
  Staff TBD, Meter installation

Estimated hours by task for salaried and contract staff are as follows:

Estimated Hours per Task	**Lead Project Manager - Meter Superintendent**	**Engineering Services Project Manager**	**Meter Technician**	**Field Maintenance Worker**	**Field Maintenance Worker**	**Total Hours**
1. Financial Assistance Agreement, Formation of the Grant Administration Team, Grant Administration	120	0	0	0	0	120
2. Reporting: Interim Performance Reports and Final Report	160	27	0	0	0	187
3. Selection and Procurement of Consultants, Materials and Supplies	120	400	0	0	0	520
4. Development of Accelerated Meter Installation team	20	0	0	0	0	20
5. Installation and oversite of high resolution residential meters	140	0	3,120	4,160	4,160	11,580
6. Pre-AMI Fixed Network Installation Activities	100	400	0	0	0	500
7. Installation of AMI Network and Implementation of Data Management System	320	400	0	0	0	720
8. Communications and Customer Outreach	320	0	0	0	0	320
Total	1,300	1,227	3,120	4,160	4,160	13,967

The rates listed in the proposed budget table represent the labor rates of the identified personnel. Tasks may include but are not limited to: contract development, bidding package development and support, plans and specifications development, procurement assistance, construction oversight and inspection, project meetings, meter installation, project administration, training, grant administration, and grant reporting. Hourly wages for contract staff who will be hired to supplement the meter installation will be paid for with grant funds, should Thornton's application be accepted.

Fringe Benefits

Fringe benefits are included in the project budget for salaried and contract city staff. Fringe benefits range from 20 to 30 percent of staff salaries. These benefits for salaried staff are considered in-kind contribution to the project; benefits for contract staff will be paid for with grant funds, should Thornton's application be accepted.

Travel

Reimbursement of travel is not required for this project.

Equipment

The city will be using three city-owned half ton pick-up trucks during this project as an in-kind contribution. Usage rates were calculated pursuant to the United States Army Corps of Engineers Construction Equipment Ownership and Operating Expense Schedule (EP 1110-1-8).

Materials and Supplies

The city will contract with local vendors for the purchase and installation of the meters and registers. It is estimated that 14,904 Badger M25 8 dial meters and registers will be purchased and 5,015 Badger M25 8 dial registers (without meters) will be purchased. Estimated costs are based on current city contracts.

Contractual

Acoustic Leak Detection. The City will contract with a vendor that provides acoustic leak detection services. Estimated cost are based on current city contracts.

The city will contract with a consultant for the design and installation of AMI fixed network, including fixed base data collectors, software to compile meter reading information into a usable format, customer/utility portal to maximize the benefits of the system, and staff training. The consultant will be formally selected and procurement will occur in accordance with federal and city procurement processes. This will be completed by the city's project team with support from the city's Contracts Division, which is well-versed in developing, advertising, and selecting vendors in compliance with federal requirements. Estimated costs are based on 2017 Refresh of Fixed Based Meter Reading Feasibility Study.

Third-Party In-Kind Contributions

Not applicable.

Environmental and Regulatory Compliance Costs
Not applicable.

Other Expenses
Not applicable.

Indirect Costs
Not applicable.

Environmental and Cultural Resources Compliance

Will the proposed project impact the surrounding environment (e.g., soil [dust], air, water [quality and quantity], animal habitat)? Please briefly describe all earth-disturbing work and any work that will affect the air, water, or animal habitat in the project area. Please also explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts.

No. The proposed project will not impact the surrounding environment. Installation of materials and supplies will occur within the already developed areas of the water system within the city's water service area.

Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area? If so, would they be affected by any activities associated with the proposed project?

No. The activities associated with the proposed project are not anticipated to effect any threatened or endangered species.

Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as "Waters of the United States?" If so, please describe and estimate any impacts the proposed project may have.

No. There are no impacts anticipated to wetlands or surface waters as a result of the proposed project.

When was the water delivery system constructed?

Thornton's original water system was built in the 1950s, and has been expanded as the city continues to grow.

Will the proposed project result in any modification of or effects to, individual features of an irrigation system (e.g., headgates, canals, or flumes)? If so, state when those features were constructed and describe the nature and timing of any extensive alterations or modifications to those features completed previously.

No. There are no impacts to irrigation systems as a result of the proposed project.

Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places? A cultural resources specialist at your local Reclamation office or the State Historic Preservation Office can assist in answering this question.

No. There are not any buildings, structures, or features listed or eligible for listing on the National Register of Historic Places that are impacted by the proposed project.

Are there any known archeological sites in the proposed project area?

No. There are no known archeological sites in the project area.

Will the proposed project have a disproportionately high and adverse effect on low income or minority populations?

No. The project will not have any adverse effect on low income or minority populations.

Will the proposed project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?

No. The project will not limit access to or limit ceremonial use of Indian sacred sites. It will not result in impacts to tribal lands.

Will the proposed project contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area?

No. The project will not contribute to the introduction or spread of noxious weeds or invasive species.

Required Permits or Approvals

No permits are anticipated to complete this project.

Letters of Project Support

Letters of support from the following entities are included in Attachment A:

- Colorado Water Conservation Board
- WaterNOW Alliance
- Colorado WaterWise
- Western Resource Advocates

COLORADO
Colorado Water
Conservation Board

Department of Natural Resources
1313 Sherman Street, Room 718
Denver, CO 80203

October 1, 2019

Bureau of Reclamation
Financial Assistance Support Section
Attn: Ms. Janeen Koza
P.O. Box 25007 MS: 84-27814
Denver, CO 80225

Re: WaterSMART: Water and Energy Efficient Program
City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project

Dear Ms. Koza:

I am pleased to write in support of the City of Thornton's WaterSMART Water and Energy Efficiency grant application. As you may know, the Colorado Water Conservation Board (CWCB) is the water policy and planning agency for the state of Colorado and projects such as this align with many of our statewide goals for water demand management and water efficiency.

The City of Thornton is a growing community and considers water to be a precious resource. Its population is expected to increase from 140,000 to over 240,000 by 2065. As it must constantly assess its water supply, and since the arid months mean a smaller water supply in general, this WaterSMART grant is essential to allow the City to modernize as its population grows.

The CWCB strongly encourages you to support Thornton's WaterSMART: Water and Energy Efficiency grant application. The City of Thornton is applying to receive funds to upgrade its water metering system to allow it to diagnose and respond to leaks in the system at a quicker rate by placing smart meters within the system to allow for less water loss when leaks do occur. In its present state it is difficult to detect leaks within the system and properly address them quickly.

Specifically, the $1.5 million for which the City is applying would help to replace 22,000 residential meters over a three year period. Installation of these meters will result in an estimated 684 million gallons of water saved per year. This is because the new meters will more accurately pinpoint the source of any leak using live data and thus improve response and repair time. As a secondary benefit the new system will allow water users to see a more detailed picture of their water usage, which can increase efficiency and reduce water consumption through changes in behavior.

This letter constitutes formal support of Thornton's WaterSMART grant application. The proposed AMI Project is consistent with Colorado's State Water Plan's measurable objectives and is an example of a project that will help the state of Colorado achieve the goal of a 400,000 acre foot demand reduction by 2050. Therefore we advocate your support of this important project, and favorable consideration of Thornton's grant application.

Sincerely,

Ben Wade
Water Conservation Coordinator
Colorado Water Conservation Board

waternow alliance
water leaders. resilient solutions.

September 24, 2019

Bureau of Reclamation
Financial Assistance Support Section
Attn: Ms. Janeen Koza
P.O. Box 25007 MS: 84-27814
Denver, CO 80225

Re: WaterSMART: Water and Energy Efficient Program
City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project

Dear Ms. Koza:

On behalf of WaterNow Alliance, I am pleased to write in support of the City of Thornton's WaterSmart Water and Energy Efficiency Grant application for City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project. WaterNow Alliance, a national network of local water leaders supporting sustainable water management measures, has been working with the City of Thornton's water department for the past year to support their water efficiency objectives.

The City of Thornton is a growing community in the Front Range of Colorado with limited water resources. Its population is expected to increase from 140,000 to over 240,000 by 2065. Recognizing the need to implement sustainable solutions to address the City's water supply reliability, in 2018 Thornton adopted an ambitious Water Efficiency Plan. Over the last year, WaterNow Alliance has supported the City in this regard by developing a program to incentivize water efficiency in new home construction. This program is intended to reduce water use in new developments by 20%. Another key feature of the City's Water Efficiency Plan is to implement Advanced Metering Infrastructure (AMI) to better manage water usage and detect water leaks. Thornton and WaterNow Alliance share a joint commitment to the efficient use of our limited water resources. In our view, having worked with a number of communities in connection with the Bureau's WaterSmart Program, Thornton has both the internal expertise and capacity to implement and administer a WaterSmart Grant. This grant would enable the City to continue to implement its admirable and important water conservation goals.

Thornton is applying for funds to upgrade its water metering system to allow the City to diagnose and respond to leaks in the system at a more rapid rate by installing AMI to substantially reduce water loss resulting from leaks. Current meter technology does not allow the utility or consumers to detect and address leaks within the system in real time leading to often lengthy delays in leak detection. Specifically, the $1.5 million for which the City is applying will support replacing 22,000 residential meters over a three year period. Installation of these meters will result in an estimated 684 million gallons of water saved per year. The new meters will more accurately pinpoint the source of any leak using live data thus improving response and repair time. As a secondary benefit, the new system will provide water consumers with a more detailed picture of their water usage, which will further increase deployment of efficiency measures across the community and reduce water consumption through changes in behavior.

We believe that Thornton's proposal is sound and would materially advance the purposes of the WaterSMART Water and Energy Efficiency program. For this reason and those enumerated above, WaterNow urges your favorable consideration of Thornton's grant application for the City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project. Thank you for your consideration of our views.

Sincerely,

Cynthia Koehler

Cynthia Koehler, Executive Director
WaterNow Alliance

colorado waterwise

The Voice of the Colorado Water Conservation Community

September 26, 2019

Bureau of Reclamation
Financial Assistance Support Section
Attn: Ms. Janeen Koza
P.O. Box 25007 MS: 84-27814
Denver, CO 80225

RE: WaterSMART Water and Energy Efficient Program
City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project

Dear Ms. Koza:

Thank you for the opportunity to write in support of the City of Thornton's grant application for this year's WaterSMART grant program. As a non-profit organization with the mission to promote urban water efficiency in Colorado, we know the value of the WaterSMART program as it helps improve our water efficiency in Colorado and across the United States.

The City of Thornton is a growing community and considers water to be a precious resource. Its population is expected to increase from 140,000 to over 240,000 by 2065. As it must constantly assess its water supply, and since the arid months mean a smaller water supply in general, this WaterSMART grant is essential to allow the City to modernize as its population grows.

As you may have seen in the application, the City of Thornton is applying to receive funds to upgrade its water metering system to allow it to diagnose and respond to leaks in the system at a quicker rate by placing smart meters within the system to allow for less water loss when leaks do occur. In its present state it is difficult to detect leaks within the system and properly address them quickly.

Specifically, the $1.5 million for which the City is applying would help to replace 22,000 residential meters over a three year period. Installation of these meters will result in an estimated 684 million gallons of water saved per year. This is because the new meters will more accurately pinpoint the source of any leak using live data and thus improve response and repair time. As a secondary benefit the new system will allow water users to see a more detailed picture of their water usage, which can increase efficiency and reduce water consumption through changes in behavior.

The City of Thornton has been an active member of Colorado WaterWise for 15 years and consistently demonstrates its commitment to water efficiency. We support the City of Thornton's WaterSMART grant application.

Sincerely,

Diana Denwood, Co-chair
Colorado WaterWise

P.O. Box 40202 • Denver CO • 802204-0202
www.coloradowaterwise.org • admin@coloradowaterwise.org

PROTECTING THE WEST'S LAND, AIR, AND WATER

September 30, 2019

Bureau of Reclamation
Financial Assistance Support Section
Attn: Ms. Janeen Koza
P.O. Box 25007 MS: 84-27814
Denver, CO 80225

Re: WaterSMART: Water and Energy Efficient Program
City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project

Dear Ms. Koza:

Western Resource Advocates is please to write this letter in support of the City of Thornton's grant application for this year's WaterSMART grant program. Western Resource Advocates is a non-profit organization, dedicated to protecting the West's water, land and air. As such we have considerable expertise in urban water management and efficiency, and we strongly support the City's efforts to upgrade their meters, which will help them to detect leaks and better manage their municipal water supplies and deliveries.

The City of Thornton is a growing community - its population is expected to grow rapidly. As the City looks to the future, this WaterSMART grant is essential to better managing current deliveries, allowing the City to modernize as its population grows. As you may have seen in the application, the City of Thornton is applying to receive funds to upgrade its water metering system by replacing older meters with smart meters. This will allow for more rapid leak detection, and more timely response to any leaks detected.

The $1.5 million for which the City is applying would help to replace 22,000 residential meters over a three year period. Installation of these meters will result in an estimated 684 million gallons of water saved per year. This is because the new meters will more accurately pinpoint the source of any leak using live data and thus improve response and repair time. As a secondary benefit the new system will allow water users to see a more detailed picture of their water usage, which can increase efficiency and reduce water consumption through changes in behavior.

Thank you again for the opportunity to write in support of the Thornton's application. I appreciate your consideration of their application and look forward to hearing the results.

Sincerely,

Amelia Nuding

Amelia Nuding
Sr. Water Resources Analyst
Western Resource Advocates
amelia.nuding@westernresources.org
720.763.3749

RESOLUTION

A RESOLUTION SUPPORTING THE GRANT APPLICATION AND MATCHING FUNDS COMMITMENT FOR THE U.S. DEPARTMENT OF INTERIOR – BUREAU OF RECLAMATION FY20 WATERSMART: WATER AND ENERGY EFFICIENCY PROGRAM VOR-DO-20-F001.

WHEREAS, the City recognizes the importance of long-term water security; and

WHEREAS, the City currently serves over 157,000 water customers, and is expecting to grow that customer base to over 255,000 by 2065; and

WHEREAS, the City's current metering system and gaps in automation make it difficult for the City quickly detect and respond to leaks, these and other factors contribute to average water losses of approximately 10 percent annually; and

WHEREAS, by upgrading to an Advanced Metering Infrastructure (AMI) fixed meter reading system and more precise meters, the City and its customers are supplied with on-demand, real-time water consumption data enabling them to make more informed decisions about their water use, which will result in a projected water savings of approximately 10%; and

WHEREAS, under the WaterSMART: Water and Energy Efficiency Grants for FY 2020 program (the Grant), the United States Bureau of Reclamation may award up to $1,500,000 towards the maximum 50/50 cost sharing to pay for project costs, and the City is capable of providing a match not to exceed $2,500,000 in cash and/or in-kind contributions specified in the grant application's funding plan to pay for remaining project costs; and

WHEREAS, these grant funds would permit the City to replace water meters throughout the City in approximately three years, rather than the current rate of 15 years, thereby fully realizing the benefits of AMI much more quickly through the AMI and Meter Replacement Project.

NOW, THEREFORE, BE IT RESOLVED BY THE CITY COUNCIL OF THE CITY OF THORNTON, COLORADO, AS FOLLOWS:

1. The City Council, hereby expresses its support for Grant application and directs the City Manager, or his designee, to provide final review, to execute, and submit, on behalf of the City of Thornton, an application for the Bureau of Reclamation's WaterSMART Water and Energy Efficiency Program up to the amount of $1,500,000.00, which funds would be applied towards the AMI and Meter Replacement Project;

2. The City Manager, or his designee, is designated to provide assurances, certifications, and commitments required for the grant application, and is

hereby authorized to execute a financial assistance agreement, the grant agreement, or any required cooperative agreement or similar agreement with the Bureau of Reclamation related to the Grant and any amendments or changes thereto;

3. The City of Thornton, through the City Manager, or his designee, will work with the Bureau of Reclamation to meet established deadlines for entering into a grant or cooperative agreement.

4. The City Manager, or his designee, is designated to represent the City of Thornton in carrying out the City's responsibilities under the grant agreement, and compliance with all applicable State and Federal laws;

5. If a grant award is made by the Bureau of Reclamation, the City of Thornton commits to providing approximately $2,400,000 in matching funds and/or in-kind donations for completion of the AMI and Meter Replacement Project;

PASSED AND ADOPTED at a regular meeting of the City Council of the City of Thornton, Colorado, on September 24, 2019.

CITY OF THORNTON, COLORADO

Jan Kulmann

Jan Kulmann, Mayor Pro Tem

ATTEST:

Kristen N. Rosenbaum, City Clerk

BOR WaterSMART Grants: Water and Energy Efficiency Grants for FY 2020 – BOR-DO-20-F001

Applicant: City of Thornton, Colorado
Applicant Congressional Districts: CO-007, CO-006
Project Title: City-Wide Advanced Metering Infrastructure and Residential Meter Conversion Project
Project Congressional Districts: CO-007, CO-006