

Application for: CWCB Drought Mitigation Planning Projects Grant

BACKGROUND

The City of Thornton's City Council adopted a comprehensive Drought Management Plan (DMP) in 2002. The primary purpose of the DMP is to provide management and operational guidance for the City of Thornton (Thornton) in times of drought. Thornton is submitting this grant application for the update of its 2002 DMP. Per requirements specified in CWCB's *Grant Guidelines for Drought Mitigation Planning Projects*, this grant application provides an overview of Thornton's water supplies and demands, summarizes historical drought impacts and details the scope of services needed to update the DMP including a detailed budget and timeline. Per grant requirements, Thornton is a "covered" local governmental entity. Supporting documentation of this is provided in Attachment C to this application.

1.1. THORNTON SERVICE AREA POPULATION

Thornton's water and wastewater service area is approximately 39 square miles and extends from the U.S. 36 on the south to 168th Avenue on the north, from roughly Zuni Street on the west to Yosemite Street on the east. The service area includes portions of unincorporated Adams County consisting of the Western Hills, Sherrelwood, Welby, Holly Crossing, and Wright Farms neighborhoods. Thornton also provides bulk treated water deliveries to the city of Westminster.

Thornton's population is estimated to be 158,459 in 2018 which includes its corporate boundaries and an extended water service area. As shown in Figure 2, the population has increased by 41% from 2002 to 2018. Annual increases have varied from -1% in 2011 when Thornton experienced a minor decline in population to a 9% increase between 2002 to 2003. Generally, population has annually increased by 1% to 3% since 2002.¹

Population estimates are developed by Thornton's City Development Department.

It is anticipated that Thornton's population will continue to grow with an estimated buildout service area population in 2065 of 258,830 people (242,000 within the city's corporate boundaries). This represents an increase of over 63% from the 2018 population. Figure 3 provides population projections through 2030 with an anticipated growth rate of 3% through 2020 followed by an annual growth rate of 1% through 2030. These estimates are provided by the City Development Department. As Thornton continues to grow, development projections are an integral part of planning for the future needs of the community. The focus of the growth will be single family and multifamily housing located along the Quebec Street corridor and North Metro Rail Line. In terms of commercial development, it is projected to occur along the I-25 corridor and E-470 in the northwest

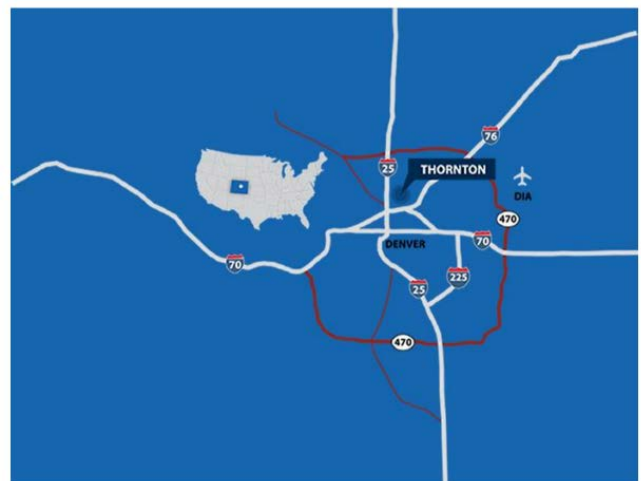


Figure 1: Location of Thornton

¹ Note, the 6.56% growth rate in 2015 is artificially high due to the city aligning population counts with third party population estimates produced by the U.S. Census and the Colorado State Demographers office. However, improving economic conditions also played a role.

portion of the service area. There are substantial sections of the service area that remain undeveloped.

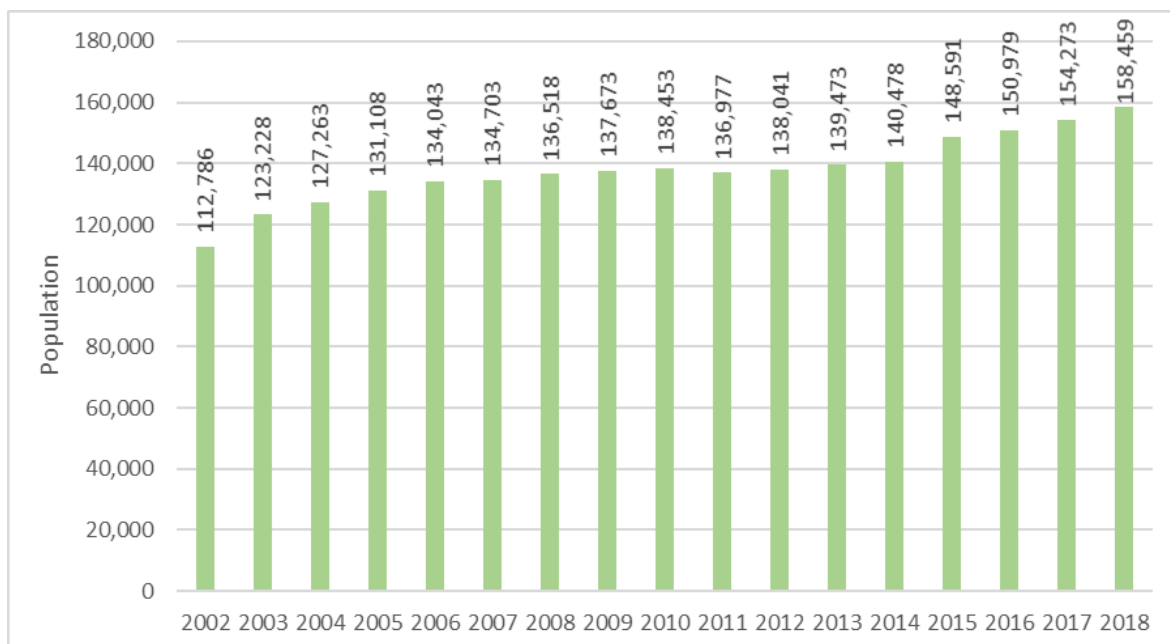


Figure 2: Historical Water Service Area Population

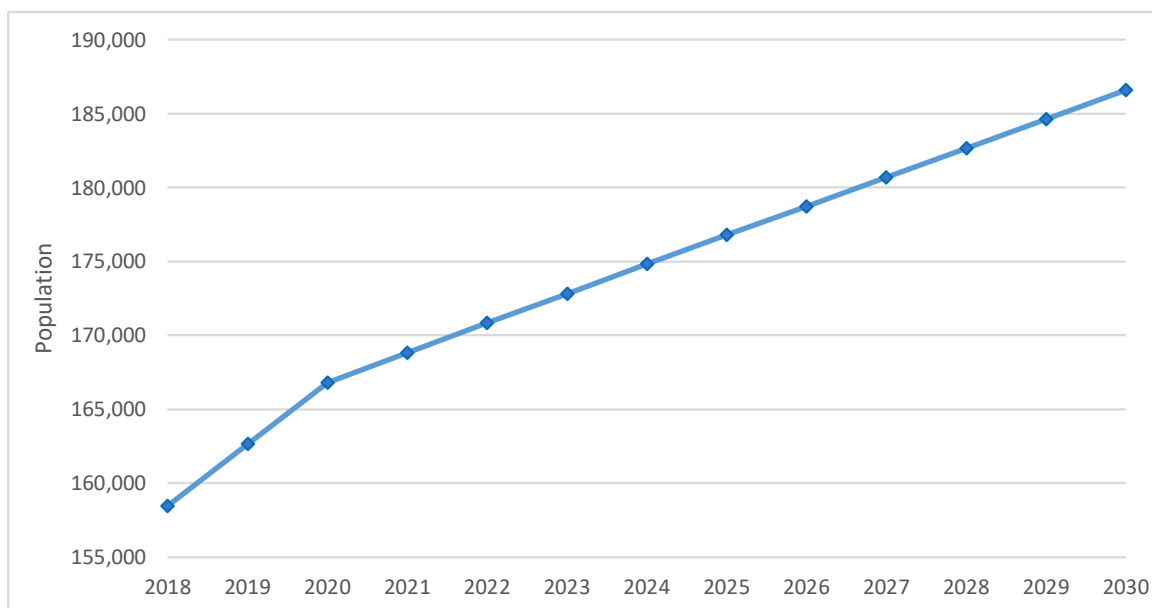


Figure 3: Projected Water Service Area Population

1.2. WATER SUPPLY SYSTEM

Overview of Thornton's Water Supply System

Thornton's raw water supply originates primarily in the form of melting snow in the mountains of the South Platte River and Clear Creek basins. Thornton maintains a significant portfolio of water rights associated with its ownership of stock in several ditch and reservoir companies, ranging in priority from the early 1860's to 2000's. The water associated with these water rights is delivered into storage at several reservoirs owned by Thornton and into reservoirs where the City shares ownership with other entities. As of April 2018, Thornton has 36,603 AF of storage capacity currently on-line within its system.

For Thornton’s operational purposes, the Clear Creek Basin is divided into upper and lower systems. Water from the upper system is delivered into storage at Standley Lake from the Farmers’ High Line Canal and the Croke Canal. The water stored in Standley Lake is conveyed to the Thornton Water Treatment Plant through an eleven-mile pipeline. Water from the lower system is delivered into storage at Brannan Lakes and at the West Gravel Lakes from the Lower Clear Creek Ditch and the Colorado Agricultural Canal. The water stored in Brannan Lakes can be pumped back into the Lower Clear Creek Ditch and conveyed to the West Gravel Lakes for storage. The water stored in the West Gravel Lakes is pumped to the Wes Brown Water Treatment Plant.

Thornton’s South Platte River Basin system consists of a series of interconnected reservoirs located along the South Platte River which store water delivered primarily from the Burlington Canal. Thornton’s reservoirs that take delivery of water conveyed through the Burlington Canal are South Tani Reservoir, East Gravel Lake No. 4, South Dahlia Reservoir, North Dahlia Reservoir, East Sprat Platte Reservoir, West Sprat Platte Reservoir, the Cooley West Complex, and Cooley East Reservoir. These reservoirs are all connected through a series of pipes. The water stored in these reservoirs is pumped to the Wes Brown Water Treatment Plant from East Gravel Lake No. 4 and the Cooley West Complex.

Thornton has developed a series of alluvial wells adjacent to the South Platte River. There are six wells that pump groundwater into the City’s reservoirs. Additionally, Thornton has constructed six non-tributary groundwater wells that supply water to a series of parks for irrigation.

Thornton also shares interconnections with the treated water systems of Denver Water, City of Northglenn, the City of Westminster, and the City of Brighton. 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 the City and the interconnection serves as the delivery point to Westminster.

Water Supply Reliability, System Limitations, and Future Needs

Thornton’s combination of senior water rights, junior water rights, and storage create a robust water system that is capable of meeting Thornton’s current needs, even in times of drought. Risks to the water supply reliability lie more in the areas of infrastructure and water quality than in securing adequate water sources. Thornton owns adequate supply to meet projected demands while reliably meeting present needs and potential vulnerabilities. Water rights have been acquired to meet projected demands through the estimated build-out in 2065. However, the infrastructure to deliver this water still needs to be built and remains a risk. Thornton has developed short- and long-term strategies to deal with adverse conditions caused by droughts. Climate change implications are also beginning to be incorporated into planning efforts. Water quality of the supply also is a concern. Table 1 summarizes Thornton’s water supply system reliability, limitations, and future needs.

Table 1 Water Supply System Reliability, Limitations and Future Needs

Water Supply Focus Area	Description	Means of Addressing Limitation or Need
Designated Critical Water Supply Shortage	Water supplies come from the South Platte Basin which has been identified as a gap area in the Statewide Water Supply Initiative.	Thornton has acquired and developed sufficient reliable water rights to meet anticipated demands at full buildout.
Aging Infrastructure	An aging distribution system contributes to non-account water due to leaks.	Thornton has a leak detection and pipeline replacement program that is systematically replacing distribution pipes.

Water Supply Focus Area	Description	Means of Addressing Limitation or Need
Drought Planning and Response	Thornton is in a geographic area that experiences periods of drought that must be planned for and mitigated when they do occur.	Long term planning, including climate change vulnerability assessments, allows Thornton to ensure that enough reliable water supplies are available to meet demands even in stress years. The city's DMP is used to mitigate the impacts drought has on water supplies. The DMP is being updated per this grant application.
System Infrastructure Improvements & Additions	New infrastructure will be needed to connect existing parts of the Thornton Water Project supply to the city's system. Some existing infrastructure was damaged in the 2013 floods.	The Thornton Water Project delivery infrastructure additions will meet this need.* Flood damage repairs are ongoing.
Water Quality	Water quality in the South Platte Basin fluctuates, causing water treatment challenges.	Thornton has invested in state-of-the-art water treatment technologies. Meeting water quality requirements is an ongoing task that requires constantly adapting to changing inputs from source water bodies.

* Furthermore, while drought conditions and below average snowpack can affect the entire state, it is much more common for shortages to be localized. For example, the South Platte River basin may experience below average snowpack in one season resulting in below average river flows, while the Poudre River basin collects above average snowpack in the same season, resulting in higher than normal river flows for most of the diversion season. Extending Thornton's water system to include water rights from the Poudre River provides much needed protection from localized droughts.

The Thornton Water Project (TWP) is the primary source of the additional water supply necessary to meet Thornton's future needs. The need for the TWP is two-fold: improve the quality of the City's source water; and, provide additional water to enhance the reliability of supplies to meet the demands of existing and future water customers. In 1986 Thornton acquired shares in the Water Supply and Storage Company (WSSC), a ditch company that diverts its water rights from the Poudre River northwest of Fort Collins. After investigating numerous options, Thornton determined that pipeline delivery is the only alternative that provides the full yield of the WSSC shares and maintains the high quality of the WSSC water.² Thornton is currently in the land use permitting and easement acquisition stage of the Project. Water Deliveries and Demands

Potable Demands

Thornton's service area includes residences, businesses, schools, parks, and open spaces. As shown in Figure 4, residential customers, including single- and multi-family, are the largest customer class making up 75% of the water demand. Irrigation and commercial comprise 13% and 12% respectively.

Figure 5 shows Thornton's potable water demands and population from 2002 to 2017³. The demand fluctuations have generally followed weather patterns with drier years experiencing increases in water demand due to increased irrigation. However, from 2012 to 2013, Thornton experienced a 17% reduction in total water use. Water use has not increased to 2012 levels, even though the population has increased, and restrictions are no longer in place. This is attributed to water efficiency behaviors and average weather conditions that occurred following the 2012 drought, maintaining stable demands.

² Delivering WSSC water by operating a water rights exchange up the South Platte River wouldn't provide the amount of water Thornton needed, and would eliminate any of the water quality benefits WSSC water provides.

³ This does not include deliveries to Westminster which are 1.8 MGD and unmetered demands.

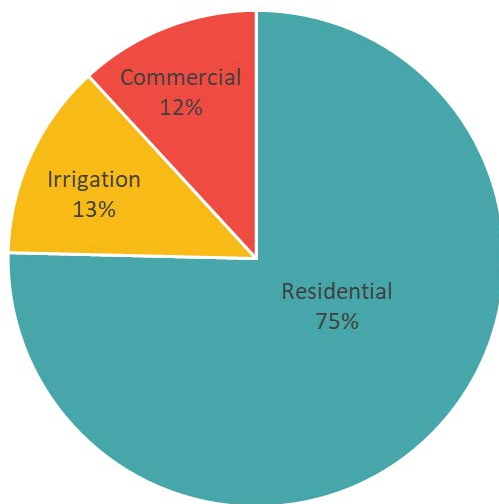


Figure 4: Potable Water Demand by Customer Type in 2017

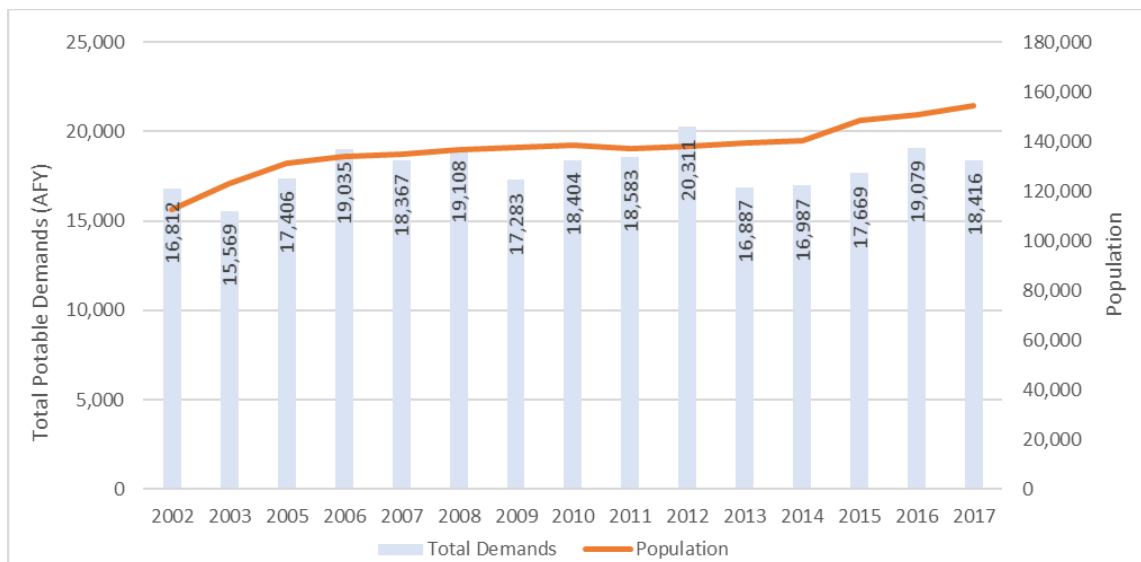


Figure 5: Potable Water Demand (2002 – 2017)

Per capita water demands correspond with these trends. As shown in Figures 6 and 7, total potable and residential per capita demands^{4,5} have decreased by 20% and 24%, respectively, from 2002 to 2017. The per capita demands tend to be higher during the 2002, 2006 and 2012 droughts followed by a period of significant reductions. As discussed above, this is attributed to weather patterns and improving water efficiency behaviors. Per capita demands have not returned to the levels observed during the 2002 drought.

⁴ Potable per capita water demands (gpcd) are calculated as the annual billed potable demand (gallons per year) divided by the population of Thornton and the expanded service area divided by 365 days. Potable per capita includes water use of all customer types. Residential per capita water demands (gpcd) are calculated as the annual residential demand (gallons per year) divided by the population of Thornton and the expanded service area divided by 365 days.

⁵ Master Metered (in 2002-2003) mobile home parks are not included in the residential number because they have a commercial rate code in the billing system. The rest of the years, Multi Family Master Metered are coded as residential.

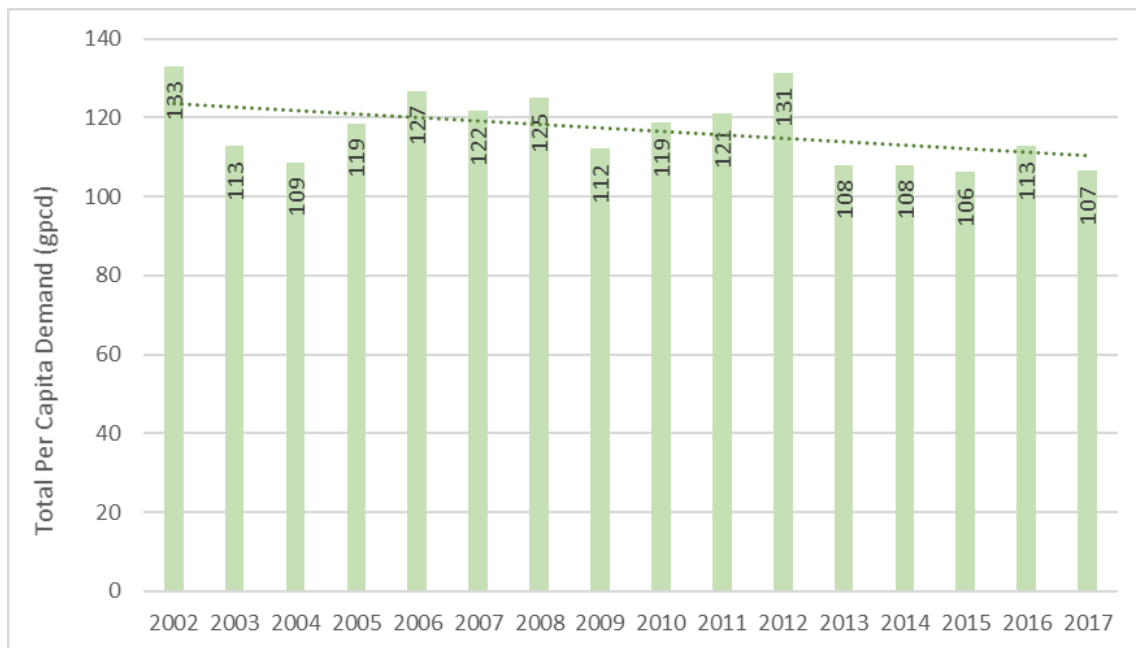


Figure 6: Total Potable Per Capita Demand (2002 -2017)

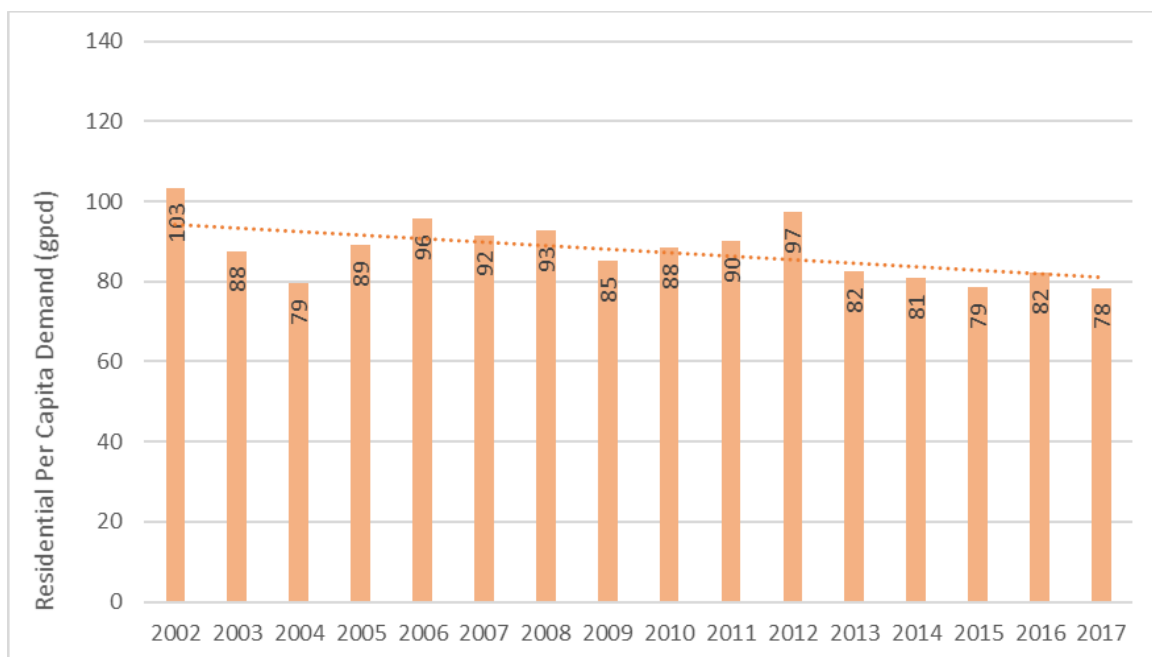


Figure 7: Residential Potable Per Capita Demand (2002-2017)

Non-Potable Demands

Thornton has provided non-potable water to the city's Thorncreek Golf Course and select parks for more than a decade. In recent years, the amount of irrigation done with non-potable water has been increasing. The non-potable water is drawn from different sources including surface water from Big Dry Creek and Clear Creek along with non-tributary groundwater. Total non-potable consumption has increased by approximately 12% from, 260 AF in 2005 to 291AF in 2017. Thornton currently irrigates 7 parks and 1 golf courses with non-potable water.

1.3. HISTORICAL DROUGHT IMPACTS AND RESPONSE

Thornton experienced three recent droughts in 2002, 2006 and 2012. The onset of the 2002 drought was quick and unexpected. To meet demands of its service area during 2002, Thornton entered into short-term lease arrangements with Denver Water, Coors and the Burlington Ditch Company. Thornton also adopted its current DMP, improved education on drought, hired a full-time employee to initiate its current water conservation (efficiency) program, started to convert the irrigation of some of its parks from treated water to non-potable water,⁶ and implemented mandatory water restrictions.

Since 2002, Thornton has followed the steps and options outlined in its 2002 DMP to efficiently and wisely manage its water supplies during dry periods. This includes the augmentation of supplies when needed and demand management.⁷ Demand-side management strategies aim to reduce customer water use while supply-side management strategies aim to maximize opportunities to obtain water supplies. Public information strategies are utilized to raise awareness and foster willingness to comply with water restrictions.

Consequently, Thornton has been better prepared for drought. During the 2006 drought, Thornton entered several lease arrangements, although not nearly as many as in 2002. A mix of voluntary and mandatory water restrictions were enacted between 2003 and 2006 to ensure an adequate amount of water remained in storage to meet the critical needs in subsequent years. The 2012 drought also resulted in several lease arrangements and similar restrictions were put in place from May 2012 through June 2013. During the periods when water restrictions were in effect, Thornton water customers responded well and reduced their water usage, thereby avoiding the need to enact a stricter program. Table 2 provides further detail on the voluntary and mandatory restriction periods from 2002 through 2013.

Table 2: Drought Restriction Periods

Description	Restriction Periods
Voluntary restrictions	May 8, 2002 - August 31, 2002
Mandatory restrictions - 3 days/week, 15 min per spray zone, 45 min per rotor zone	Sept. 1, 2002 - October 31, 2002
No turf watering	November 1, 2002 - April 31, 2003
Mandatory restrictions - 2 days/week, 15 min per spray zone, 45 min per rotor zone	May 1, 2003 - May 14, 2003
New Tiered Rate Structure	May 15, 2003 – present
Voluntary restrictions	May 15, 2003 - June 30, 2006
Mandatory restrictions - 3 days/week, 15 min per spray zone, 45 min per rotor zone	July 1, 2006 - Sept. 30, 2006
Voluntary restrictions	Oct. 1, 2006 - April 1, 2007
Voluntary restrictions	May 21, 2012 - August 31, 2012
Mandatory restrictions - 2 days/week	Sept. 1, 2012 - June 26, 2013

⁶ Non-potable supply sources include raw water storage in Standley Lake and non-tributary groundwater wells.

⁷ In the case of emergency conditions, the 2002 DMP includes two recommendations for augmenting supplies. The first recommendation is to lease water in the short-term from farmers by negotiating agreements with farmers ahead of an actual drought emergency. The second recommendation is to temporarily terminate the water lease with the City of Westminster. This approach would save Thornton about 2,240 acre-feet of water per year, but would have a negative financial impact on the city and has not been utilized.

Table 3 provides a list of drought-related impacts that occurred during the 2002, 2006 and 2012 droughts identified by Thornton staff during the DMP update Kick-off Meetings. These historical impacts will be revisited during the DMP update with the Planning Team and during the community engagement effort to further historical impacts and develop a more comprehensive list.

Table 3: Historical Drought Impacts

Drought Year	Impact	Sector Impacted			
		Residential	Commercial/Industrial	Parks	City
2002	Significant supply shortages - Thornton had to lease water to meet demands	X	X	x	x
2002	Water quality issues - taste and odor	X	X		x
2002	Parks - browning of grass and loss of trees	X			
2002	Complaints from residences - some customers felt like they were "in the dark." They went from no restrictions to into a big drought	X			
2002	Financial hit - Less City revenue was generated as a result of water restrictions				x
2006	Confusion in community as to why Thornton was operating under drought conditions and other cities were not - this was mainly attributed to maintenance where one of Thornton's reservoirs was not in operation	X	X		
2012	Parks - some turf dry up			x	
2012	Complaints from landscapers - about the water restrictions		X		
2012	Complaints from HOAs - about water restrictions	X			

1.4. ESTIMATED WATER SAVINGS GOALS

The goals of the 2002 DMP are to aid Thornton in: 1) determining the onset and severity of drought, 2) reducing water demands, and 3) increasing water supplies sufficiently to ensure that the basic health and safety needs of all customers are met. Drought response is divided into three levels (Stages 1, 2, and 3) according to drought severity, which is assessed based on factors including projected demand, reservoir storage levels, projected stream flows and water rights yields, availability of alternative supplies, water quality, and drought indices. Each drought stage calls for a percentage of water savings or demand reduction goal, as show in Table 4.

During the DMP update Thornton will be adding "exceptional drought" as a fourth stage. Exceptional drought, corresponds to an area experiencing exceptional fire risk, and water shortages that result in water emergencies. Additionally, the drought stages and associated demand reductions goals will be revisited and updated where warranted during the DMP update.

Table 4: 2002 DMP Drought Stages and Demand Reduction Goals

Drought Stages		Demand Reduction Goal
Stage 1	Drought Watch	10%
Stage 2	Drought Warning	30%
Stage 3	Drought Emergency	45%

DROUGHT MANAGEMENT PLAN UPDATE

2.1 APPROACH AND SCOPE OF SERVICES

Thornton has convened a robust Planning Team for updating the 2002 DMP and recently entered contract with Headwaters Corporation to guide the update process, author the Plan and facilitate a community engagement process. Members of the Team are listed in Table 5 along with their position, role and estimated hours in updating the DMP. Billing rates are not included to protect the confidentiality of city employee salaries.

Table 5: Thornton DMP Update Planning Team

City Staff Member	Position	Role/Contribution	Estimated No. of Hours
John Orr	Water Resources Administrator (Project Manager for DMP)	Manage project, participate on planning workshops, lead community engagement effort, review plan	296
Laura Wing	Water Resources Administrator	Participate on planning workshops, community engagement effort where applicable, review plan	39
Mary Jensen	Water Resources Analyst II	Participate on planning workshops, community engagement effort where applicable, review plan	35
Ryan Doyle	Emergency and Safety Administrator	Participate on planning workshops, community engagement effort where applicable, review plan	34
Monica Heimbecher	Customer Billing Manager	Participate on planning workshops, community engagement effort where applicable, review plan	31
Richard Plautz	Park Maintenance Supervisor	Participate on planning workshops, community engagement effort where applicable, review plan	31
James Boswell	Water Policy and Quality Manager	Participate on planning workshops, community engagement effort where applicable, review plan	31
Brian Garner	Principal Planner - Current Planning	Participate on planning workshops, community engagement effort where applicable, review plan	31
Karen Widomski	Senior Policy Analyst - Policy Planning	Participate on planning workshops, community engagement effort where applicable, review plan	31
Emily Hunt	Water Resources Manager	Participate on planning workshops, community engagement effort where applicable, review plan	29

The primary tasks associated with the DMP update are to:

- Develop an updated DMP that guides Thornton during drought of any magnitude and that also meets CWCB requirements.
- Submit the DMP to Thornton's City Council for their adoption and to the CWCB for review and approval.
- Plan and implement a community engagement process to receive community input on the Plan as it is being developed.

The approach consists of three tasks described in detail in the Scope of Services which is included as Attachment A to this application. Task 1 entails the update of the DMP and is divided into five

subtasks. Task 2 focuses on community engagement and Task 3 is project administration. Each of these tasks contain a detailed description of work to be performed, corresponding to CWCB's *Municipal Drought Management Plan Guidance Document* and the required Plan Elements outlined in the CWCB-approved *Guidelines for the Office to Review and Evaluate Drought Mitigation Plans Submitted by Covered Entities and Other State and Local Governmental Entities*. The scope also identifies those responsible for performing the task and assumptions made for budgetary purposes.

2.2 COMMUNITY ENGAGEMENT AND PLAN REVIEW PROCESS

The community engagement effort will occur after Workshop 3 (see Attachment A) during which Thornton and Headwaters will present progress made on the DMP update focusing on acquiring feedback on historical drought impacts and vulnerabilities, mitigation and drought response strategies, drought stages, and drought response measures. Additionally, the Planning Team will identify key issues and questions during Workshops 1 and 2 that they would like to receive input on from the community. For instance, such issues could be related to the equity of possibly implementing drought surcharges and the community's values on preserving the tree canopy during severe drought.

The original two phases called out in the scope of services (Attachment A) will be consolidated into the tasks bulleted below that focus on 1) residential customers⁸ and 2) focus groups⁹. Each task serves the dual purpose of encouraging attendance at an interactive DMP Workshop while also acquiring data to inform the update. The interactive workshop will consist of both residential and focus group participants, encouraging dialogue and feedback.

- Focus group outreach
- Focus group meetings
- Residential outreach and survey
- DMP Update Workshop

Attachment B provides additional information on each of these tasks.

Thornton will also facilitate a public review process of the draft DMP pursuant to section 6e of the CWCB-approved *Guidelines for the Office to Review and Evaluate Drought Mitigation Plans Submitted by Covered Entities and Other State or Local Governmental Entities*. The draft DMP will be posted online for public comment. Comments will be received by City staff and considered for incorporation into the final DMP. A web-cast or public meeting will also be held during the review period, providing another forum for public input. The duration of the public review period will either be the 60-day period suggested in the CWCB-approved Guidelines or be for the duration specified in Thornton's bylaws.

2.3 BUDGET

The total cost for the DMP Update is provided in Table 6. Hours spent on the update for both Thornton (in-kind services) and Headwaters staff (cash expenditures), hourly wages and associated costs per individual task are provided. Additionally, total expenditures and funding contributions are provided.

Funding contributions may be broken down as follows:

⁸ Focus groups may include: landscaping businesses, car washes, hotels, auto sales, health care operations (dialysis), developers, business parks, school districts and water ambassadors.

⁹ Residential groups include: HOAs, high water users in the residential sector, Spanish speakers and residential customers from a broad spectrum of income levels and locations throughout the service area.

Thornton In-Kind Services	\$37,414
Thornton Cash Expenditures	\$39,260
CWCB Contribution	\$30,000
Total	\$106,674

Thornton will be providing 72% of the funding for the project.

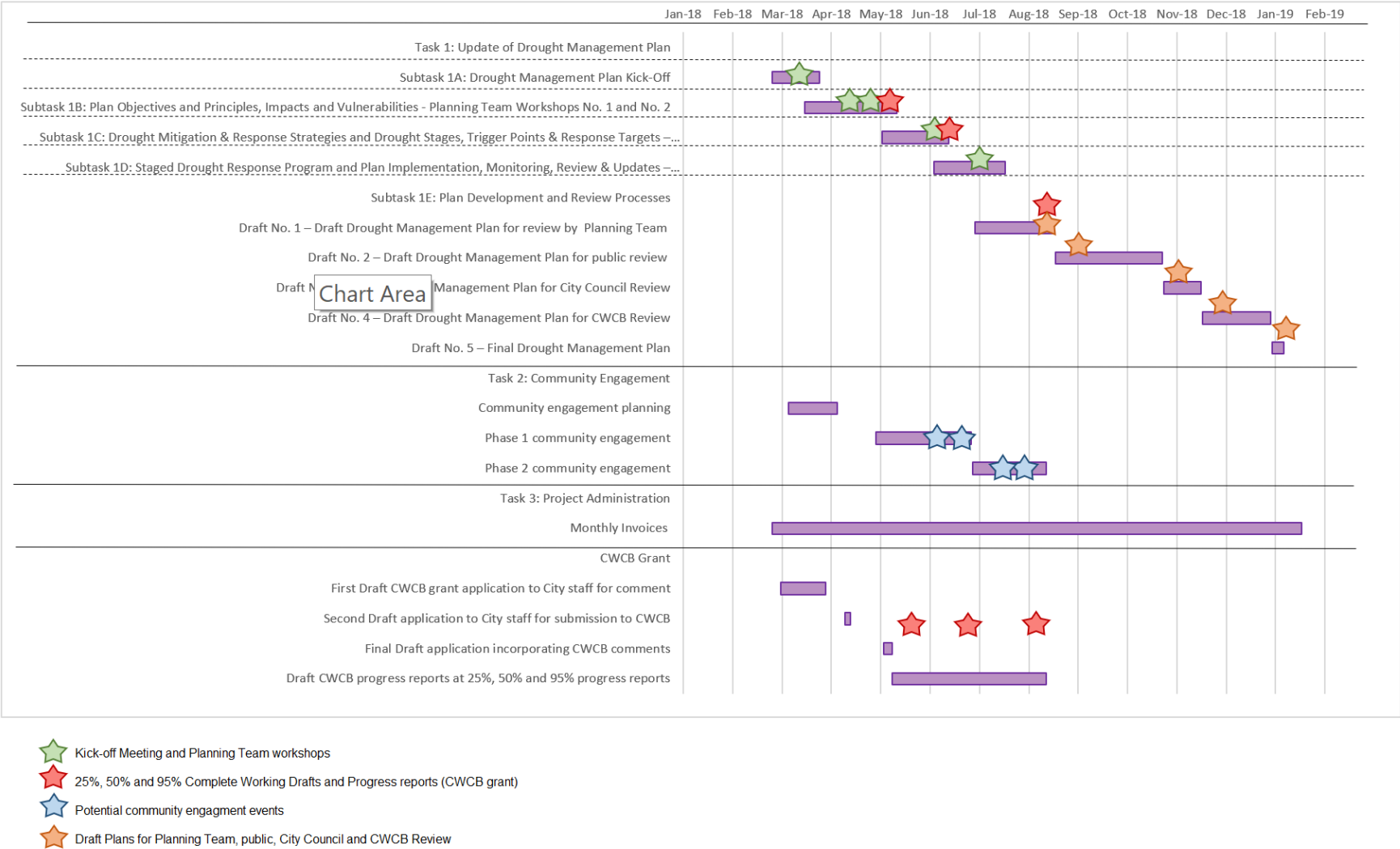
2.4 TIMELINE

The proposed timeline for the DMP update is provided in Figure 8. The purple bars show the estimated duration to complete each task while the stars denote key workshops, events and draft reports. The project commenced on the latter portion of February 2018 when Headwaters Corporation and Thornton entered contract. The Kick-off Meeting was held on March 19, 2018. This timeline assumes CWCB has approved the grant application by mid-May and that CWCB grant monies would be available to cover the majority of Subtask 1E and Task 2 as denoted in Table 8. If the grant application process is not complete by the middle of May, the project will be put on hold until funding is available and confirmed.

Table 6: Thornton DMP Update Budget

STAFF	Cash Expenditures for Headwaters Services				Total Expenditures			Allocation of Funding Contributions			
	Turner	Black	Werbylo								
	Senior Water Resources Engineer	Senior Water Resources Engineer	Water Resources Engineer	Reimbursable Expenses	Cash Expenditures (Headwaters Services)	Thornton In-Kind Services	Total Cost	Thornton In-Kind Services	Thornton Cash Expenditures	CWCB Grant Monies	Total
HOURLY RATE	\$160	\$150	\$120								
Task 1: Update of Drought Management Plan											
Subtask 1A: Drought Management Plan Kick-Off											
Prep and Kick-off Meeting	4	10	5	\$100	\$2,840	\$1,878	\$4,718	\$1,878	\$2,840	\$0	\$4,718
Draft Kick-off meeting notes for review and comment by City staff	0	2	4	\$0	\$780	\$0	\$780	\$0	\$780	\$0	\$780
Final draft Kick-off Meeting notes incorporating City staff comments	0	1	2	\$0	\$390	\$125	\$515	\$125	\$390	\$0	\$515
Subtask Total	4	13	11	\$100	\$4,010	\$2,003	\$6,013	\$2,003	\$4,010	\$0	\$6,013
Subtask 1B: Plan Objectives and Principles, Impacts and Vulnerabilities - Planning Team Workshops No. 1 and No. 2											
Prep and Planning Team Workshop No. 1	5	24	6	\$150	\$5,270	\$4,550	\$9,820	\$4,550	\$5,270	\$0	\$9,820
Prep and Planning Team Workshop No. 2	5	24	6	\$150	\$5,270	\$4,550	\$9,820	\$4,550	\$5,270	\$0	\$9,820
Electronic images of workshop materials for Planning Team Workshops No. 1 and 2	0	0	4	\$0	\$480	\$0	\$480	\$0	\$480	\$0	\$480
Working draft of the Plan at 25% completion	1	24	2	\$0	\$4,000	\$125	\$4,125	\$125	\$4,000	\$0	\$4,125
Subtask Total	11	72	18	\$300	\$15,020	\$9,225	\$24,245	\$9,225	\$15,020	\$0	\$24,245
Subtask 1C: Drought Mitigation & Response Strategies and Drought Stages, Trigger Points & Response Targets – Planning Team Workshop No. 3											
Prep and Planning Team Workshop No. 3	6	24	5	\$150	\$5,310	\$4,550	\$9,860	\$4,550	\$5,310	\$0	\$9,860
Electronic images of workshop materials for Planning Team Workshop No. 3	0	0	4	\$0	\$480	\$0	\$480	\$0	\$480	\$0	\$480
Working draft of the Plan at 50% (Planning Team and community engagement feedback)	1	32	2	\$0	\$5,200	\$125	\$5,325	\$125	\$5,200	\$0	\$5,325
Subtask Total	7	56	11	\$150	\$10,990	\$4,675	\$15,665	\$4,675	\$10,990	\$0	\$15,665
Subtask 1D: Staged Drought Response Program and Plan Implementation, Monitoring, Review & Updates – Planning Team Workshop No. 4											
Prep and Planning Team Workshop No. 4	5	24	5	\$150	\$5,150	\$4,550	\$9,700	\$4,550	\$5,150	\$0	\$9,700
Electronic images of workshop materials for Planning Team Workshop No. 4	0	0	4	\$0	\$480	\$0	\$480	\$0	\$480	\$0	\$480
Subtask Total	5	24	9	\$150	\$5,630	\$4,550	\$10,180	\$4,550	\$5,630	\$0	\$10,180
Subtask 1E: Plan Development and Review Processes											
Draft No. 1 – Draft Drought Management Plan for review by Planning Team at 95%	8	40	8	\$0	\$8,240	\$4,625	\$12,865	\$4,625	\$1,360	\$6,880	\$12,865
Draft No. 2 – Draft Drought Management Plan for public review & attending workshop	0	16	0	\$0	\$2,400	\$312	\$2,712	\$312	\$0	\$2,400	\$2,712
Draft No. 3 – Draft Drought Management Plan for City Council Review and attending meeting	0	12	0	\$0	\$1,800	\$250	\$2,050	\$250	\$0	\$1,800	\$2,050
Draft No. 4 – Draft Drought Management Plan for CWCB Review	0	6	0	\$0	\$900	\$250	\$1,150	\$250	\$0	\$900	\$1,150
Draft No. 5 – Final Drought Management Plan	0	2	0	\$0	\$300	\$250	\$550	\$250	\$0	\$300	\$550
Subtask Total	8	76	8	\$0	\$13,640	\$5,687	\$19,327	\$5,687	\$1,360	\$12,280	\$19,327
Task 1 Total	35	241	57	\$700	\$49,290	\$26,139	\$75,429	\$26,139	\$37,010	\$12,280	\$75,429
Task 2: Community Engagement											
Prep, Conference call on community engagement process and draft meeting notes	0	12	4	\$0	\$2,280	\$2,415	\$4,695	\$2,415	\$0	\$2,280	\$4,695
Final draft community engagement conference call notes incorporating comments	0	4	0	\$0	\$600	\$0	\$600	\$0	\$0	\$600	\$600
Preparation and facilitation of up to four community engagement events	4	50	30	\$500	\$12,240	\$5,998	\$18,238	\$5,998	\$0	\$12,240	\$18,238
Supporting materials for the community engagement process (up to six visual aids)	0	0	20	\$200	\$2,600	\$625	\$3,225	\$625	\$0	\$2,600	\$3,225
Task 2 Total	4	66	54	\$700	\$17,720	\$9,037	\$26,757	\$9,037	\$0	\$17,720	\$26,757
Task 3: Project Administration											
Monthly invoices and progress reports	0	15	0	\$0	\$2,250	\$2,237	\$4,487	\$2,237	\$2,250	\$0	\$4,487
Task 3 Total	0	15	0	\$0	\$2,250	\$2,237	\$4,487	\$2,237	\$2,250	\$0	\$4,487
Total Hours	39	322	111								
Total Cost	\$6,240	\$48,300	\$13,320	\$1,400	\$69,260	\$37,414	\$106,674	\$37,414	\$39,260	\$30,000	\$106,674

Figure 8: Thornton DMP Update Timeline



SCOPE OF SERVICES

I. PROJECT DESCRIPTION

Thornton City Council adopted a comprehensive Drought Management Plan (“DMP”) in 2002. The goal of this Project is to revise and update the 2002 DMP in accordance with current industry standards and best practices. The primary tasks of this Scope of Services is to:

1. Develop an updated DMP that meets Colorado Water Conservation Board (“CWCB”) and Thornton’s requirements and submit it to Thornton’s Thornton City Council for their adoption and the CWCB for review and approval.
2. Plan and implement a community engagement process to receive community input on the Plan as it is being developed. 3. Provide an application to Thornton to submit to for the CWCB’s Drought Mitigation Planning grant program.

II. SCOPE OF SERVICES

Task 1: Drought Management Plan Update

Purpose

The primary purpose of a DMP is to provide management and operational guidance for Thornton in times of drought.

A drought mitigation plan can be defined as a strategy or combination of strategies for temporary supply management, and demand management responses to temporary and potentially recurring water supply shortages, and other water supply emergencies. Drought response measures in this context typically include mandatory restrictions on certain water uses water allocation or the temporary use of an alternative water supply. The main objective is to preserve essential public services and minimize the adverse effects of a water supply emergency on public health and safety, economic activity environmental resources, and individual lifestyles. Most important in developing a drought plan is to determine the actions and procedures for responding to a drought related water supply emergency before an actual water shortage emergency occurs.

The objective of this Scope of Services is to develop a plan that guides Thornton during droughts of any magnitude. A corollary objective is to produce a plan that meets the CWCB guidance.

An important part of the revised plan will be the addition of an “exceptional drought” stage to the existing Thornton drought stages. Exceptional drought, corresponds to an area experiencing exceptional fire risk, and water shortages that result in water emergencies.

Another important part of the revised plan will be the addition of decision making under uncertainty to the drought planning process.

Subtask 1A Drought Management Plan Kick-Off

One (1) Kick-off Meeting will be held with key Thornton staff members to initiate the Plan update, exchange ideas and questions on the update process, and discuss the data needs necessary to develop the CWCB grant application. The Kick-off Meeting will include the following:

- Review schedule, process and roles for developing the DMP.
- Discuss CWCB grant application process and data needs.
- Review keys to success.

- Discuss CWCB Drought Management Plan checklist (Section 5.3 of the Guidance Document). This checklist will be distributed to Thornton staff in preparation for the Kick-off Meeting. It will be used as a DMP template and to identify specific information for inclusion in the DMP.
- Identify Planning Team members and discuss schedule for workshops.
- Discuss community engagement process (Task 2).
- Discuss how scenario planning may be integrated in the drought planning process.

Consultant shall provide meeting materials, including an agenda, for the Kick-off meeting. Thornton shall provide space with AV capabilities for the meeting as well as coordinate invitation of pertinent Thornton staff.

Consultant shall, within seven (7) Calendar Days of the meeting, provide Thornton with draft Kick-off Meeting notes, summarizing the meeting discussion and providing the action items for moving forward with the DMP development. Thornton shall respond with on consolidated set of comments on the meeting minutes. After review and incorporating notes received from Thornton, Consultant shall issue final Kick-off Meeting notes. Thornton will reach out to the identified members of the Planning Team and invite them to the DMP update process.

Subtask IA Requirements

- One (1) Kick-off Meeting will be facilitated with Thornton staff.
- In efforts to streamline communication, outside of meetings, Consultant will work with one (1) point of contact representing Thornton staff through the DMP update process.
- All Thornton staff and Planning Team comments on the Kick-off Meeting notes and interim DMP development materials will be provided to Consultant in one (1) consolidated set.
- The Planning Team will primarily consist of Thornton staff and will have a general understanding of Thornton's water supply system and planning efforts.
- Thornton will be responsible for inviting Planning Team members to the DMP update process and managing day-to-day correspondence with members.
- Thornton will provide AV and meeting accommodations for the Kick-off Meeting.

Subtask IA Deliverables

1. Meeting materials for the Kick-off Meeting (e.g. agenda).
2. Draft Kick-off Meeting notes for review and comment by Thornton staff seven (7) Calendar Days after Kick-off Meeting.
3. Final draft Kick-off Meeting notes incorporating Thornton staff comments.

Subtask IB: Plan Objectives and Principles, Impacts and Vulnerabilities - Planning Team Workshops No. 1 and No.2

Subtask 1 B focuses on the introduction of the Planning Team to the DMP update process, development of DMP objectives and principles, and conducting historical drought impact and vulnerability assessments. Two (2) interactive workshops, Planning Team Workshop No. 1 and No. 2, will be held with the Planning Team for Subtask IB. Workshop No. 1 will introduce the Plan update process and schedule, discuss the Planning Team roles, and receive input on each of the following items:

- Develop Plan objectives and principles. The goal in Thornton's 2002 Drought Plan will be revisited along with new ideas to develop a set of Plan objectives and principles reflective of community values.

- Refine water use priorities identified in the Thornton’s 2002 Drought Plan.
- Characterize drought impacts, mitigation and response strategies associated with historical droughts. This includes the 2002 drought and when water restrictions were in effect in 2003-2006 and in 2012 -2013.

Planning Team Workshop No. 2 will focus on the development of planning scenarios. Consultant will use lessons learned from other entities on the Front Range that have engaged in scenario planning (e.g., Denver Water and CWCB) to develop a scenario planning process most conducive for Thornton’s DMP update purposes. This process will focus on the development of scenarios representative of community values and potential drought-related futures. One of the primary objectives of the exercise will be to identify vulnerabilities that would typically not be addressed assuming stationarity to form a more robust platform for updating the drought triggers, stages, mitigation and response strategies. This will be a qualitative exercise.

Applicable worksheets provided in the CWCB Guidance Document, visual aids and other materials will be used throughout the workshops to obtain information for the DMP. These materials will be collected by the Consultant at the end of the workshops, incorporated into the Draft DMP, and sent as electronic images to the Thornton for documentation purposes. A working draft of the Plan, incorporating the information from Workshops No. 1 and No. 2, will be provided to the Thornton. This draft may serve as an attachment to the twenty-five percent (25%) completion report the Thornton must submit to CWCB per grant requirements.

Subtask 1B Requirements

- Consultant shall facilitate two (2) workshops, Planning Team Workshop No. 1 and No. 2, with the Planning Team. This includes the provision of meeting materials necessary to receive Planning Team input
- Thornton will provide AV and meeting room accommodations for the Planning Team workshops.
- The scenario planning will be a qualitative exercise and not require modeling or other more rigorous quantitative analysis.
- Thornton comments on the twenty-five percent (25%) working draft DMP will be limited to inconsistencies and concerns that could have implications on the remainder of the DMP update. The Planning Committee will have the opportunity to provide thorough comments on the first completed draft (Subtask I E).

Subtask 1B Deliverables

1. Materials used during Planning Team Workshop No. 1 and 2.
2. Electronic images of relevant workshop materials following Planning Team Workshop No. 1 and 2.
3. Twenty-five (25%) complete working draft of the Plan.

Subtask IC: Drought Mitigation & Response Strategies and Drought Stages, Trigger Points & Response Targets — Planning Team Workshop No. 3

Subtask IC focuses on drought mitigation and response strategies along with the trigger points and response targets associated with four (4) drought stages. One (1) workshop, Planning Team Workshop No. 3, will be held with the Planning Team.

The first portion of the workshop will focus on the development of the drought mitigation, response strategies and a framework for the Public Drought Campaign. Benefits and lessons learned from response strategies and activities included in the 2002 Drought Management Plan will be addressed

along with the generation of new ideas for potential incorporation. Thornton's current drought mitigation activities (e.g., water conservation and supply planning) will also be identified and potential synergies of using the Thornton's public outreach vehicles for water conservation and the Water Efficiency Outreach Initiative will be addressed and considered for incorporation into the Public Drought Campaign.

The latter portion of Workshop No. 3 will focus on updating Thornton's drought stages, trigger points and response targets specified in the 2002 Drought Management Plan. Thornton would like to add "exceptional drought" as a fourth drought stage. Consultant shall facilitate a discussion on how well the three (3) drought stages and associated triggers and response targets functioned over the past fifteen (15) years and identify how these stages can be improved, complement the exceptional drought stage, and meet the newly updated priorities identified in Subtask IA. The Planning Team will also define a fourth exceptional drought stage.

CWCB Guidance Document worksheets along with other interactive exercises may be used to aid the Planning Team. Consultant will facilitate the workshop and prepare meeting materials in advance. Information from this workshop will feed into the community engagement process outlined in Task 2 where the community will have an opportunity to provide feedback on the work completed to date. A working draft of the Plan, incorporating the information from Workshops No. 3 will be provided to Thornton following the Phase I community outreach engagement process. This draft will be an attachment to the fifty percent (50%) completion report the Thornton must submit to CWCB per grant requirements.

Subtask IC Requirements

- Consultant shall facilitate one (1) workshop, Planning Team Workshop No. 3, with the Planning Team. This includes the provision of meeting materials necessary to receive Planning Team input.
- Thornton will provide AV and meeting room accommodations for the Planning Team workshop.
- The evaluation of the drought stages, triggers and response targets will primarily be qualitative with relatively simple spreadsheet computations, if needed. Any demand and supply information will be provided by Thornton to Consultant for evaluation.
- Any comments on the fifty percent (50%) working draft Plan will be limited to inconsistencies/concerns that could have implications on the remainder of the DMP update. The Planning Committee will have the opportunity to provide thorough comments at the completion of the initial draft.

Subtask IC Deliverables

1. Materials used during Planning Team Workshop No. 3.
2. Electronic images of relevant workshop materials following Planning Team Workshop No. 3.
3. Fifty percent (50%) complete working draft of the DMP.

Subtask ID: Staged Drought Response Program and Plan Implementation, Monitoring, Review & Updates — Planning Team Workshop No. 4

Subtask ID focuses on the update of the staged drought response program, further refining the drought response strategies identified in Subtask IC, and on the Plan implementation, monitoring, review and updates. One (1) workshop, Planning Team Workshop No. 4, will be held with the Planning Team.

The first portion of this workshop will review the drought response strategies and Public Drought Campaign framework refined during the Phase I community engagement process. Specific drought

response measures/actions associated with each response strategy and drought stage will be identified through discussion and stakeholder engagement exercises. The Public Drought Campaign framework will also be refined to the degree necessary to provide guidance on how the Thornton may reach out to the public during specific drought stages.

The second portion of this workshop will focus on DMP implementation and monitoring. Per CWCB Guidelines this includes a mitigation action plan, monitoring of drought indicators, decision-making process for drought declaration, implementation and enforcement of the staged drought response program, revenue implications, monitoring of plan effectiveness, Plan approval and updates. Discussion of key pieces of information associated with these Plan items will be facilitated with the Planning Team.

CWCB Guidance Document worksheets along with other interactive exercises may be used to aid the Planning Team. Headwaters will facilitate the workshop and prepare meeting materials in advance. Information from this workshop will inform the Phase 2 community engagement process outlined in Task 2.

Subtask ID Requirements

- Consultant shall develop and facilitate one workshop, Planning Team Workshop No. 4, with the Planning Team.
- The Thornton will provide AV and meeting room accommodations for the workshop.

Subtask ID Deliverables

1. Materials used during Planning Team Workshop No. 4.
2. Electronic images of relevant workshop materials following Planning Team Workshop No. 4.

Subtask I E: Plan Development and Review Processes

Subtask 1 E entails the interim and final drafts necessary to carry the draft DMP through the Planning Team, public, Thornton City Council and CWCB review processes. These drafts are itemized below in the deliverables. Consultant will work closely with Thornton to ensure that comments are addressed for each draft iteration. Consultants will attend one (1) Thornton City Council Meeting and one (1) Public Meeting to answer questions and support adoption of the Plan.

Draft No. I for review by the Planning Team will serve as an attachment to the ninety-five percent (95%) completion report the Thornton must submit to CWCB per grant requirements.

Subtask IE Requirements

- Consultant shall attend one (1) Thornton City Council Meeting and one (I) Public Meeting to address questions.
- Headwaters will be responsible for incorporating graphics in the final draft and where appropriate, in interim drafts.
- Thornton will be responsible for consolidating comments from each review and providing a single set of comments to Headwaters for incorporation.
- Consultant shall provide the Final Draft Plan in editable electronic (WORD) and pdf form.

Subtask IE Deliverables

1. Draft Drought Management Plan for review by Planning Team (Ninety-five percent [95%] completion draft for CWCB grant requirements).

2. Draft Drought Management Plan for public review.
3. Draft Drought Management Plan for Thornton City Council Review.
4. Draft Drought Management Plan for CWCB Review.
5. Final Drought Management Plan.

Task 2: Community Engagement

Task 2 includes the planning and implementation of a community engagement process to receive community input on the Plan as it is being developed. The community engagement process will include both a community education component as well as provide a forum where Thornton can receive community input on the DMP.

Consultant shall facilitate one (1) conference call (or meeting if more appropriate) with Thornton staff following the Kick-off Meeting to plan the engagement process. This process will be incorporated into the CWCB grant application narrative and may also be included in the grant cost estimate where time spent by Thornton staff to support the community engagement process may be considered as an in-kind-services in meeting the minimum twenty-five percent (25%) match grant requirement.

Community engagement shall occur in two (2) phases. The objective of the first phase is to bring key community members up to-speed on the Thornton's drought planning efforts and receive their initial input on the drought response strategies and Plan material developed to date. The first phase would occur after the Planning Team has developed an initial draft set of response strategies. The second phase would focus on receiving input on the drought response measures after the Planning Team has had an opportunity to develop a preliminary staged drought response program.

Headwaters will facilitate one (1) conference call with the Planning Team at the onset of both phases to coordinate the engagement process. Consultant shall organize and facilitate up to four (4) community engagement events where each event would last for up to two (2) hours and provide supporting text and graphics for up to six (6) visual aids (e.g. PowerPoint presentation(s), poster boards, invitational materials, etc.).

Task 2 Requirements

- One (1) community engagement planning conference call, following the Kick-off Meeting, shall be held with Thornton staff to refine the community engagement process prior to submittal of the CWCB grant application.
- Thornton staff comments on the community engagement conference call notes will be provided to Consultant in one (1) consolidated set.
- Consultant shall facilitate one (1) coordination conference call with the Planning Team at the onset of both phases of the community engagement processes. These calls may entail developing agenda(s), developing materials/visual aids, addressing logistical issues, etc.
- Consultant shall organize and facilitate up to four (4) community engagement events assuming each event lasts up to two (2) hours.
- Consultant shall provide supporting text and graphics for up to six (6) visual aids during the community engagement (e.g. PowerPoint presentation(s), poster boards, invitational materials, etc.). Thornton will be responsible for production of meeting materials.
- Thornton will arrange the AV and meeting accommodations for community engagement events.
- Thornton will be responsible for identifying invitees and advertising community engagement activities. Consultant can provide input in this process where needed.

Task 2 Deliverables

1. Draft meeting notes following the community engagement conference call refining the community engagement process for comment by Thornton staff. These notes may specify workshops/meetings, key action items, schedule, roles, etc.
2. Final draft community engagement conference call notes incorporating comments from Thornton staff.
3. Preparation and facilitation of up to four (4) community engagement events.
4. Supporting materials for the community engagement process (up to six [6] visual aids).

Task 3 Project Administration

Consultant shall work closely with Thornton to ensure that progress on the Project is aligned with the Scope of Services and budget. Invoices and progress reports shall be submitted to Thornton on a monthly basis.

Task 3 Requirements

All invoices and progress reports submitted to Thornton shall be compatible with Thornton accounting and billing requirements. All invoices and progress reports submitted to Thornton will be compatible with Thornton's accounting and billing requirements.

Task 3 Deliverables

Monthly invoices with brief progress reports summarizing the monthly work performed for each task.

REFINED COMMUNITY ENGAGEMENT APPROACH

April 5, 2018

The community engagement effort will occur after Workshop 3 where we will present progress made on the DMP update focusing on acquiring feedback on historical drought impacts and vulnerabilities, mitigation and drought response strategies, drought stages and drought response measures. Additionally, the Planning Team will identify key issues and questions during Workshops 1 and 2 that they would like to receive input on from the community. For instance, such issues could be related to the social justice of possibly implementing drought surcharges and the community's values on preserving the tree canopy during severe drought.

The original two phases called out in the scope of work will be consolidated into the four subtasks discussed below that focus on 1) residential customers and 2) focus groups (commercial/other specific interest groups). Each task serves the dual purpose of encouraging attendance at an interactive DMP Workshop while also acquiring data to inform the update. The interactive workshop will consist of both residential and focus group participants, encouraging dialogue and feedback.

Focus groups may include: landscaping businesses, car washes, hotels, auto sales, health care operations (dialysis), developers, business parks, school districts and water ambassadors. Residential groups include: HOAs, high water users in the residential sector, Spanish speakers and residential customers from a broad spectrum of income levels and locations throughout the service area.

Task 2A: Focus Group Outreach

Conduct a series of targeted phone calls to an existing network of focus groups, informing them of the planning effort. During these calls we will ask whether we can be put on the agenda of an upcoming meeting to speak about the DMP update while also generating interest in attending the workshop. (Ideally, we would like a 15-minute time slot to speak on the agenda). If a meeting is not possible, we will ask if members of the focus group can answer a series of DMP update related questions on Survey Monkey. This questionnaire will also advertise the upcoming workshop. Focus groups will be identified through several sources including utility billing data and Neighborhood Services.

Headwaters

- Provide general information for phone calls (informal script)
- Develop survey. Can be available electronically (pdf) and also on survey monkey. The Planning Team will have the opportunity to comment on the survey prior to distribution.
- Process survey data, summarize results and incorporate into Plan.

Thornton

- Identify who to contact.
- Make phone calls/
- Record information from calls to provide to Headwaters.
- Schedule focus group meetings.
- Encourage community members to fill out the survey on Survey Monkey.

Task 2B: Focus Group Meetings

Attend the focus group meetings and provide a brief presentation on the DMP update effort and upcoming workshop. If time is available, we will also conduct exercises/facilitate discussion to receive input for the DMP update. At the end of the meeting we will distribute and/or encourage attendees to fill out a DMP update questionnaire on survey monkey.

Headwaters

- Attend and if needed, facilitate the first focus group meeting to help Thornton staff get comfortable in facilitating the subsequent meetings.
- Develop presentation on the DMP update and other materials needed to encourage feedback from meeting attendees.
- Modify (if necessary) survey developed for Task 2A for distribution at or post meetings via survey monkey.
- Process the survey data and input received during the meetings, summarize results and incorporate information into the Plan.

Thornton

- Attend and facilitate all meetings using materials that Headwaters has provided.
- Record information from meetings to provide to Headwaters.

Task 2C: Residential Outreach and Survey

Conduct a broad-scale outreach effort to residential customers advertising the DMP update workshops and encouraging them to fill out a questionnaire specially geared towards residential customers on Survey Monkey. In contrast to the targeted outreach effort in Task 2A which focuses on specific groups, the objective of this outreach effort is to reach as many residents as reasonable throughout Thornton's service area, capturing Spanish speakers and residents with a diverse income levels. Thornton may use outreach media that has proven to be successful in the past such as bill inserts, schools, social media (Twitter), thorntonwater.com, etc, encouraging residents to fill out the questionnaire on Survey Monkey which will be the primary vehicle for receiving input. In addition, the outreach effort involves the attendance at up to four HOA meetings where Thornton can be put on the agenda. Like the targeted focus group meetings, a presentation and a series of exercises/discussion will be provided to generate input and encourage attendance at the DMP update workshop.

Headwaters

- Attend one of the HOA meetings and facilitate, if needed.
- Develop presentation and background materials for HOA meetings (will likely be similar to the focus groups yet customized for residential customers)
- Develop residential questionnaire on Survey Monkey
- Process survey data and feedback from the HOA meetings. Summarize results and incorporate into Plan.

Thornton

- Advertise DMP update and distribute residential survey through various media
- Attend and facilitate HOA meetings using materials that Headwaters has provided.
- Record information from meetings to provide to Headwaters.

Task 2D: DMP Update Workshop

One DMP Update workshop will be held to engage attendees in interactive discussions and exercises to provide input on the Plan. Exercises will be facilitated in a manner to "draw out" concerns that attendees may have given different drought scenarios and severity. Information from the Planning

Team workshops, surveys and other feedback obtained from Tasks 2A – 2C will inform the workshop agenda.

Headwaters

- Develop agenda and facilitate workshop. The Planning Team will have the opportunity to comment on the agenda prior to the workshop.
- Develop text & graphics for materials needed for workshop.
- Collect/record feedback from workshop for incorporation into the Plan.

Thornton

- Distribute workshop invitations to all contacts generated from Tasks 2A – 2C.
- Field any questions about the DMP Update workshop and track RSVPs (this can be set up electronically).
- Produce materials (where needed) for the DMP Workshop.
- Arrange the AV and meeting accommodations for the DMP Workshop.

ORGANIZATIONAL STRUCTURE & CHARTER

CITY OF THORNTON

