Last Updated: November 2018

Colorado Water Conservation Board

Water Plan Grant Application

Instructions

To receive funding for a Water Plan Grant, applicant must demonstrate how the project, activity, or process (collectively referred to as "project") funded by the CWCB will help meet the measurable objectives and critical actions in the Water Plan. Grant guidelines are available on the CWCB website.

If you have questions, please contact CWCB at (303) 866-3441 or email the following staff to assist you with applications in the following areas:

Water Storage Projects	Anna.Mauss@state.co.us
Conservation, Land Use Planning	Kevin.Reidy@state.co.us
Engagement & Innovation Activities	Ben.Wade@state.co.us
Agricultural Projects	Alexander.Funk@state.co.us
Environmental & Recreation Projects	Chris.Sturm@state.co.us

FINAL SUBMISSION: Submit all application materials in one email to *waterplan.grants@state.co.us* in the original file formats [Application (word); Statement of Work (word); Budget/Schedule (excel)]. Please do not combine documents. In the subject line, please include the funding category and name of the project.

Water Project Summary

Name of Applicant	Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home rule city and municipal corporation
Name of Water Project	Direct Potable Reuse (DPR) Demonstration

CWP Grant Request Amount	$350,000
Other Funding Sources Colorado School of Mines	$161,352
Other Funding Sources Aqua Aerobic Systems Inc.(letter of support pending)	$25,000
Other Funding Sources _____	$
Applicant Funding Contribution	$299,022
Total Project Cost	$835,374

Last Updated: November 2018

Applicant & Grantee Information
Name of Grantee(s): Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home rule city and municipal corporation
Mailing Address: 1521 S. Hancock Expressway, Colorado Springs CO 80903
FEIN: DUN#127711760 and TIN# 84-6000574
Organization Contact: Kirk Olds
Position/Title: Engineering and Project Management Manager
Email: kolds@csu.org
Phone: 719-668-3739
Grant Management Contact: Kirk Olds
Position/Title: Manager – Water and Wastewater Engineering
Email: kolds@csu.org
Phone: 719-668-3739
Name of Applicant (if different than grantee): NA
Mailing Address
Position/Title
Email
Phone

Description of Grantee/Applicant
Provide a brief description of the grantee's organization (100 words or less).
Colorado Springs Utilities (UTILITIES) is an Enterprise Fund of the City of Colorado Springs, Colorado ("City") that provides electric, streetlight, natural gas, water and wastewater services to customers in the Pikes Peak region. The organization operates an electric generation, transmission and distribution system; a streetlight system; a natural gas distribution system; a water collection, treatment and distribution system; and a wastewater collection and treatment system (including non-potable water distribution). UTILITIES' service area includes the City, Manitou Springs and a portion of the suburban residential areas surrounding the City.

Last Updated: November 2018

Type of Eligible Entity (check one)	
	Public (Government): Municipalities, enterprises, counties, and State of Colorado agencies. Federal agencies are encouraged to work with local entities. Federal agencies are eligible, but only if they can make a compelling case for why a local partner cannot be the grant recipient.
	Public (Districts): Authorities, Title 32/special districts (conservancy, conservation, and irrigation districts), and water activity enterprises.
	Private Incorporated: Mutual ditch companies, homeowners associations, corporations.
	Private Individuals, Partnerships, and Sole Proprietors: Private parties may be eligible for funding.
	Non-governmental organizations (NGO): Organization that is not part of the government and is non-profit in nature.
X	**Covered Entity:** As defined in Section 37-60-126 Colorado Revised Statutes.

Type of Water Project (check all that apply)	
	Study
	Construction
	Identified Projects and Processes (IPP)
X	Other – Direct Potable Reuse Demonstration (mobile unit)

Category of Water Project (check the primary category that applies and include relevant tasks)	
	Water Storage - Projects that facilitate the development of additional storage, artificial aquifer recharge, and dredging existing reservoirs to restore the reservoirs' full decreed capacity and Multi-beneficial projects and those projects identified in basin implementation plans to address the water supply and demand gap. *Applicable Exhibit A Task(s):*
X	Conservation and Land Use Planning - Activities and projects that implement long-term strategies for conservation, land use, and drought planning. *Applicable Exhibit A Task(s):* ***Task 1 General Project Management, Task 2 Design, Task 3 Construction, Task 4 Operation***
X	Engagement & Innovation - Activities and projects that support water education, outreach, and innovation efforts. Please fill out the Supplemental Application on the website. *Applicable Exhibit A Task(s):* ***Task 1 General Project Management, Task 2 Design, Task 3 Construction, Task 5 Outreach***
	Agricultural - Projects that provide technical assistance and improve agricultural efficiency. *Applicable Exhibit A Task(s):*
	Environmental & Recreation - Projects that promote watershed health, environmental health, and recreation.

Last Updated: November 2018

	Applicable Exhibit A Task(s):	
	Other	Explain:

Location of Water Project

Please provide the general county and coordinates of the proposed project below in **decimal degrees**. The Applicant shall also provide, in Exhibit C, a site map if applicable.

County/Counties	El Paso County/State wide usage
Latitude	+38.846127
Longitude	-104.800644

Water Project Overview

Please provide a summary of the proposed water project (200 words or less). Include a description of the project and what the CWP Grant funding will be used for specifically (e.g., studies, permitting process, construction). Provide a description of the water supply source to be utilized or the water body affected by the project, where applicable. Include details such as acres under irrigation, types of crops irrigated, number of residential and commercial taps, length of ditch improvements, length of pipe installed, and area of habitat improvements, where applicable. If this project addresses multiple purposes or spans multiple basins, please explain.
The Applicant shall also provide, in Exhibit A, a detailed Statement of Work, Budget, Other Funding Sources/Amounts and Schedule.

Last Updated: November 2018

UTILITIES in partnership with Colorado School of Mines (Mines), will build a mobile treatment unit to demonstrate proven technologies associated with Direct Potable Reuse (DPR) using secondary treated wastewater. The DPR unit will be capable of modifying process sequence based on source water quality. Project goals include:

- Build a mutually beneficial relationship with Mines.
- Use as a sensory tool for DPR education and outreach to public, employee/leadership, and regulator/government groups.
- Create a local DPR "conversation" by hosting a beverage contest and participating in WateReuse Association's 2020 Denver Symposium.
- Build on PureWater Colorado momentum to continue the advancement of DPR and associated technologies.
- Provide a resource for other entities investigating DPR viability for individual/regional water systems.

UTILITIES and Mines believe that the mobile unit will benefit other entities interested in exploring DPR as a supply alternative. Anticipated benefits for other users include:

- Future collaborations with Mines on DPR pilot projects,
- Customize messaging for source and treatment specifics
- Focus operator training on processes for specific source water quality.

CWP Grant Funding will be used to supplement in-kind support for

- Purchase/rental of treatment process equipment and on-line metering instrumentation,
- Analytical costs,
- External engineering services,
- Development/production of educational, public relations and outreach event materials,
- Mobile unit fabrication
- Operations performance evaluation and optimization

Measurable Results	
To catalog measurable results achieved with the CWP Grant funds, please provide any of the following values as applicable:	
	New Storage Created (acre-feet)
	New Annual Water Supplies Developed or Conserved (acre-feet), Consumptive or Nonconsumptive
	Existing Storage Preserved or Enhanced (acre-feet)
	Length of Stream Restored or Protected (linear feet)
	Efficiency Savings (indicate acre-feet/year OR dollars/year)
	Area of Restored or Preserved Habitat (acres)
	Quantity of Water Shared through Alternative Transfer Mechanisms
	Number of Coloradans Impacted by Incorporating Water-Saving Actions into Land Use Planning
Initial Engagement 1000 - 2500 directly through education and outreach and > 400,000 indirectly (entire UTILITIES	Number of Coloradans Impacted by Engagement Activity

customer base) *Note: many more are anticipated to be impacted over the expected life of the mobile unit*		
50-200	Other	Explain: 2020 WRA Symposium participation has the potential to reach Colorado, other US states and potentially international attendees.

Water Project Justification

Provide a description of how this water project supports the goals of Colorado's Water Plan, the most recent Statewide Water Supply Initiative, and the applicable Roundtable Basin Implementation Plan and Education Action Plan. The Applicant is required to reference specific needs, goals, themes, or Identified Projects and Processes (IPPs), including citations (e.g. document, chapters, sections, or page numbers).

The proposed water project shall be evaluated based upon how well the proposal conforms to Colorado's Water Plan Framework for State of Colorado Support for a Water Project (CWP, Section 9.4, pp. 9-43 to 9-44;)

This project will provide further evidence to support DPR as a viable alternative water source in addition to supporting education, engagement, outreach and innovation goals outlined in Colorado's Water Plan, Statewide Water Supply Initiative, the Arkansas Basin Roundtable Basin Implementation Plan and the Basin Education Action Plan.

Colorado's Water Plan (2015)

Chapter 3 – Basin Challenges (pp. 3-4)

1. "Replacement of municipal water supplies that depend on the non-renewing Denver Basin aquifer…"
2. "Regional solutions are emerging…to address the needs of the Arkansas Basin."

Although these are not technically goals as written in the CWP, the UTILITIES project directly addresses these observations. The mobile unit design was carefully evaluated with consideration given to the needs of surrounding communities and water providers statewide. This mobile unit will allow UTILITIES and other water providers to initially test DPR and associated messaging in their service areas, providing a longer public engagement and education period. Additionally, the sustainability of the mobile unit provides an opportunity for entities to collaborate with Mines and other water providers and potentially realize regional solutions to water supply issues.

Section 6.2 – Goals (p. 6-21)

1. "Support regional infrastructure development for cost-effective solutions to local water supply gaps."
2. "Reduce or eliminate Denver Basin groundwater dependence for municipal users."
3. "The roundtable identified a critical gap as the need to replace nonrenewable groundwater and augment the sustainability of designated basins."

The UTILITIES DPR demonstration project will primarily be used to educate non-industry persons on the DPR process and costs as well as its potential financial, resiliency, and environmental benefits. UTILITIES is specifically designing this unit as a non-Reverse Osmosis (RO) demonstration due to the logistical challenges of brine disposal for inland communities and subsequent high treatment cost. As the mobile unit is used by other water providers, it could improve the likelihood these other entities will adopt a DPR supply strategy to reduce use of Denver Basin and other nonrenewable water sources.

Section 6.3 – Goal (p. 6-59)

1. "Promote water efficiency ethic throughout Colorado."

2. "Explore additional water reuse options."

UTILITIES recognizes these goals were intended to address traditional ideas for water conservation and reuse but believes the DPR demonstration project will assist us and other entities in exploring and promoting a viable reuse option. With education as the project's primary goal, this demonstration is uniquely suited to address DPR as another reuse option alongside current water efficiency practices.

Section 6.5 – Goal (p. 6-127)

1. "Meet community water needs during periods of drought."

This mobile demonstration will educate water providers and local, regional and state policymakers throughout Colorado on the benefits associated with utilizing DPR, including during times of drought. DPR can provide an operationally and cost-effective means for water utilities to fully utilize their reusable water supplies; thereby creating a higher level of water supply security in times of drought. Increased levels of DPR during times of drought can also decrease a utilities' first or single use withdrawals from surface and groundwater sources. Reduced withdrawals can not only accelerate drought recovery but can also mitigate water quality treatment issues and operational challenges due to low water levels.

Section 6.5 – Actions (p.6-155)

1. "While the right to buy or sell private property water rights must not be infringed upon, the State will encourage the innovation and creativity by agricultural producers and research institutions to maximize the productivity of every drop of water."
2. "Multipurpose project funding: The CWCB will prioritize support for multipurpose projects and those that modernize, make more efficient, or lead to the building of new critical infrastructure for agricultural purposes, M&I uses, and hydropower production."

Without the assistance and strong commitment of Mines, UTILITIES would not be able to undertake this demonstration project at this time. The ingenuity and technical knowledge demonstrated by Mines professors and staff coupled with their current DPR research focus will lead to design flexibility. Upon the completion of the UTILITIES demonstration period, the project ownership will transfer to Mines who can then partner with other water providers to demonstrate DPR with their unique water sources which may ultimately lead to building of new, more efficient water supply infrastructure.

Section 10.2 – Measurable Objectives and Adaptive Management (pp. 10-5 and 10-7)

1. "B. Conservation: Colorado's Water Plan sets a measurable objective to achieve 400,000 acre-feet of municipal and industrial water conservation by 2050.
2. "H. Education, Outreach and Innovation: Colorado's Water Plan sets a measurable objective to significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys." "Colorado's Water Plan will expand outreach and education efforts that engage the public to promote well informed community discourse and decision making regarding balanced water solutions."

As stated previously the intent of the UTILITIES DPR demonstration project is to educate multiple stakeholder groups on the viability of DPR as a conservation measure and a way for water providers to maximize the use of fully consumable water supplies.

Section 10.3 – Critical Goals and Actions (p. 10-14)

1. "Encourage Reuse: Encourage the development of reuse solutions to maximize fully consumable water supplies.

See section 10.2.

<u>Statewide Water Supply Initiative (2010)</u>

Section 8 – Recommendations (p. 8-1)

Last Updated: November 2018

1. "Support meeting Colorado's non-consumptive water needs by working with Colorado's water stakeholders to help: (1) Protect or enhance environmental and recreational values that benefit local and statewide economies; and (2) Encourage multi-purpose projects that benefit both water users and native species."

The intent of this project is to initiate, and in some cases, continue the discussion of DPR as an alternate potable water source. DPR by design leaves water in the system with potential use for non-consumptive water needs. Multiple stakeholder groups could be involved as the unit is mobile, so each entity using the unit would have the opportunity to involve stakeholders specific to their area.

2. "Actively encourage projects to address multiple purposes, including municipal, industrial, environmental, recreational, agricultural, risk management, and compact compliance needs."

Although this project is a demonstration rather than a full implementation of DPR, it provides an excellent opportunity to illustrate the potential benefits of DPR with regional stakeholders. UTILITIES believes that this outreach will lead to heightened awareness and acceptance of the technology, helping to pave the way for future DPR implementation both locally and statewide.

DPR can help address municipal, environmental, recreational, and risk management needs simultaneously. The water produced by this process can meet all state and federal drinking water regulations and is consequently suited for municipal potable use. DPR can be a cost and operationally effective means to utilize reusable water supplies and can reduce the amount of water that must be supplied from other water sources to meet demands. It can also reduce water supply risks during challenging hydrologic cycles providing a higher level of water supply security. For UTILITIES, this means a more efficient use of its water supply can be achieved generally allowing for reduced transmission and conveyance pumping and average water levels of several, mostly subalpine reservoirs to remain higher. This provides the environmental benefits of reduced energy consumption as well as increased habitat for aquatic species and the recreational benefit of a decreased risk for boat ramp closures due to low water levels (as was the case with Rampart Reservoir in 2018). Finally, DPR can provide a stabilizing effect to UTILITIES water portfolio, helping to mitigate risk.

3. "Identify and utilize existing and new funding opportunities to assist in implementing projects and methods to meet Colorado's consumptive and non-consumptive water supply needs."

It's intended that a significant portion of the project cost will be funded by one or more grants. In addition, UTILITIES will leverage existing relationships and potentially build new relationships with entities interested in providing funding and/or in-kind support to this project.

4. "Evaluate multi-purpose projects or packages of projects to develop new water supplies for use on the West Slope and Front Range."

The implementation of DPR can serve as an alternative to development of new water supply projects meeting municipal, environmental, and risk mitigation needs as described in Item 2. The mobile nature of the DPR demonstration unit will allow it to be used across the state of Colorado.

5. "Help safeguard Colorado's water supply during times of drought by incorporating drought mitigation and response in statewide and local water supply planning."

This mobile demonstration will help to inform UTILITIES and policymakers throughout Colorado of the benefits associated with utilizing DPR, including during times of drought. DPR may decrease a UTILITIES' dependence on withdrawing water from traditional sources such as an aquifer or reservoir. Especially during drought conditions this reduction of withdrawal can mitigate water quality changes and operational challenges due to low water levels.

6. "Support local water supply planning."

This project will help support local water supply planning for UTILITIES as well as throughout Colorado. Water providers stand to benefit from DPR in a variety of ways and may be interested in the demonstrated technology for different reasons.

The education and outreach opportunities that this mobile demonstration unit offers should serve to increase public acceptance of DPR. With this acceptance, water providers throughout the state should have an easier time incorporating DPR into future water supply planning.

Arkansas BRT Basin Implementation Plan (April 2015)

Section 1.6.2.1 – Goals (p. 14)

1. "Meet the municipal supply gap in each county within the basin"
2. "Support regional infrastructure development for cost effective solutions to local water supply gaps"

Specifically, the UTILITIES project seeks to demonstrate the technical feasibility and educate multiple stakeholder groups on the viability of repurposing our treated wastewater effluent for additional consumptive use to close a potential future supply gap. Additionally, the permanent mobile unit resulting from this project can be used by other entities in projects similar in design to the UTILITIES project, but the unit could also be used to investigate regional solutions by demonstrating technical feasibility using mixed treated wastewater effluents.

Section 3.1.6.1 – [Arkansas River Basin] Constraints (p. 108)

1. "The Arkansas River Basin is highly over-appropriated due to unmet demands of senior water rights and the Compact. Therefore, new water projects are not feasible because the yield of existing conditional or new water rights would be very limited. The unmet demands for both municipal and agricultural future demands will have to be met from better management of existing supplies including reuse of transbasin water supplies to the maximum potential along with consideration of new transbasin diversions from an IBCC approved project."

Full-scale DPR would directly address this constraint by reusing water, a substantial portion originating from transbasin water supplies, to maximize the potential "use to extinction" criteria of the transferred water. This small-scale DPR demonstration project will help UTILITIES evaluate the feasibility and benefits of future full-scale implementation.

Section 3.1.6.2 – [Arkansas River Basin] Opportunities (p. 109)

1. Additional water management programs may be feasible to increase the use of reusable water sources. These programs need to be carefully evaluated using the best water resources engineering and modeling available to determine feasibility.

Although the primary objective of the UTILITIES DPR project is to educate stakeholders, including water/wastewater treatment operators, on the feasibility of DPR, the mobile unit is being designed to allow flexibility in its configuration to help facilitate research of the overall process and its individual steps. This flexibility will help provide proof of concept, and the role of each unit process, while demonstrating the potential of the process and its contribution to regional water supply and resiliency.

Arkansas BRT Education Action Plan (Work Years 2016-2019)

1. The Arkansas River Basin PEPO workgroup has stated; "Our goal is to inform, involve, and educate the citizens of the Arkansas River Basin about local water resources."

The mobile unit design was carefully evaluated with consideration given to the needs of surrounding communities and water providers statewide. This mobile unit will allow UTILITIES and other water providers to initially test DPR and associating messaging in their service areas. The mobile unit allows water providers the ability to engage and educate the public and other stakeholders in a small group setting in a variety of manners: viewing active treatment in the demonstration, observation of treatment processes when not treating in unique settings, such as community events, or travel to schools for student interaction. Additionally, due to the sustainable nature of the permanent mobile unit it provides

an opportunity for entities to collaborate with Mines and other water providers to potentially realize regional solutions to water supply issues.

Related Studies

Please provide a list of any related studies, including if the water project is complementary to or assists in the implementation of other CWCB programs.

RECENT STUDIES (UTILITIES involved as stakeholder)

- WRCO "Colorado Guidelines for Direct Potable Reuse" project (scheduled release Nov/Dec 2019
- PureWater Colorado project

Both projects listed assist in implementation of CWCB goals for water efficiency and water planning

- Joint Front Range Climate Change Vulnerability Study

Participated as a contributing Utility

RECENT STUDIES – UTILITIES specific

- Integrated Water Resource Plan 2017
- Finished Water System Plan 2018
- Wastewater System Plan 2019
- Non-potable Water Resource Plan (in development)
- Mesa Water Treatment Plant Plan 2014

All listed studies address water supply, treatment, and management issues. This includes efficiencies, planning watershed protection and addressing future/current impacts of climate change.

Previous CWCB Grants, Loans or Other Funding

List all previous or current CWCB grants (including WSRF) awarded to both the Applicant and Grantee. Include: 1) Applicant name; 2) Water activity name; 3) Approving RT(s); 4) CWCB board meeting date; 5) Contract number or purchase order; 6) Percentage of other CWCB funding for your overall project.

Last Updated: November 2018

Colorado Springs Utilities

1. Colorado Springs Utilities
2. 2014 The Species Grant CWCB $500,000
3. N/A
4. N/A
5. CWCB Contract No. C154224
6. 0

Colorado Springs Utilities

7. Colorado Springs Utilities
8. 2016 The North to North NRCS CWCB Grant $945,000
9. N/A
10. N/A
11. CWCB Contract No. CTGG12016-22
12. 0%

Colorado Springs Utilities

13. Colorado Springs Utilities
14. 2018 Homestake Arkansas River Diversion (ARD) Improvements Project Grant $500,000
15. Arkansas Basin
16. N/A
17. CWCB Contract No. CTGG1 2018-1623
18. 0%

Colorado Springs Utilities

19. Colorado Springs Utilities
20. 2018 Homestake Arkansas River Diversion (ARD) Improvements Project Grant $200,000
21. Arkansas Basin
22. N/A
23. CWCB Contract No. CTGG1 2018-1624
24. 0%

Colorado Springs Utilities

25. Colorado Springs Utilities
26. 2018 The Water Plan Grant Homebuyer Landscape Outreach $50,000
27. Arkansas Basin
28. N/A
29. CWCB POGGI PDAA 201800000732
30. 0%

Colorado Springs Utilities

31. Colorado Springs Utilities
32. 2018 Tamarisk Removal Drake Power Plant and Pikes Peak Greenway Grant $35,000
33. N/A
34. N/A
35. CWCB POGGI PDAA 201800000795
36. 0%

Taxpayer Bill of Rights

The Taxpayer Bill of Rights (TABOR) may limit the amount of grant money an entity can receive. Please describe any relevant TABOR issues that may affect your application.

Last Updated: November 2018

None

Submittal Checklist	
X	I acknowledge the Grantee will be able to contract with CWCB using the Standard Contract.
Exhibit A	
X	Statement of Work(1)
X	Budget & Schedule(1)
NA	Engineer's statement of probable cost (projects over $100,000) – construction projects only
X	Letters of Matching and/or Pending 3rd Party Commitments(1) **Colorado School of Mines** **Aqua Aerobic Systems Inc. – letter pending, submission upon receipt**
Exhibit C	
NA	Map (if applicable)(1)
NA	Photos/Drawings/Reports
NA	Letters of Support (Optional)
X	Certificate of Insurance (General, Auto, & Workers' Comp.) (2)
NA	Certificate of Good Standing with Colorado Secretary of State(2) **As an enterprise of the City of Colorado Springs, Colorado Springs Utilities is not required to have a Certificate of Good Standing. Colorado Springs Utilities does have a registered trademark with the Secretary of State (http://www.sos.state.co.us/biz/ViewImage.do?fileId=20131004044&masterFileId=19981004747)**
X	W-9(2)
NA	Independent Contractor Form(2) (If applicant is individual, not company/organization)
Engagement & Innovation Grant Applicants ONLY	
X	Engagement & Innovation Supplemental Application(1)

(1) Required with application.
(2) Required for contracting. While optional at the time of this application, submission can expedite contracting upon CWCB Board approval.

Last Updated: November 2018

ENGAGEMENT & INNOVATION GRANT FUND SUPPLEMENTAL APPLICATION

Introduction & Purpose

Colorado's Water Plan calls for an outreach, education, public engagement, and innovation grant fund in Chapter 9.5.

The overall goal of the Engagement & Innovation Grant Fund is to enhance Colorado's water communication, outreach, education, and public engagement efforts; advance Colorado's water supply planning process; and support a statewide water innovation ecosystem.

The grant fund aims to engage the public to promote well-informed community discourse regarding balanced water solutions statewide. The grant fund aims to support water innovation in Colorado. The grant fund prioritizes measuring and evaluating the success of programs, projects, and initiatives. The grant fund prioritizes efforts designed using research, data, and best practices. The grant fund prioritizes a commitment to collaboration and community engagement. The grant fund will support local and statewide efforts.

The grant fund is divided into two tracks: engagement and innovation. The Engagement Track supports education, outreach, communication, and public participation efforts related to water. The Innovation Track supports efforts that advance the water innovation ecosystem in Colorado.

Application Questions

*The grant fund request is referred to as "project" in this application.

Overview (answer for both tracks)
In a few sentences, what is the overall goal of this project? How does it achieve the stated purpose of this grant fund (above)?
Project goals include: • Use as a sensory tool for DPR education and outreach to public, employee/leadership, and regulator/government groups. • Create a local DPR "conversation" by hosting a beverage contest and participating in WateReuse Association's 2020 Denver Symposium. • Build on PureWater Colorado's momentum to continue the advancement of DPR education and messaging and associated technologies. • Provide a sustainable resource (mobile demonstration) which may be used by other water providers in educational and public participation outreach. The project will only be utilizing proven and industry accepted DPR technologies, therefore budgeted analytical monies will be used to confirm process efficiency, finished water quality and potentially gather data on contaminants of public health concern. Therefore, the project budget, beyond the cost of designing and constructing the mobile unit will be devoted to outreach goals and research.
Who is/are the target audience(s)? How will you reach them? How will you involve the community?
Target audience is community decision makers, general public/ratepayers and students (to include college, high school, middle school and 4th-5th grade elementary students). • Decision makers – invitation only tours to include water tastings • General public/ratepayers – a beverage contest featuring local businesses.

Last Updated: November 2018

Overview (answer for both tracks)
• UTILITIES will also be either transporting the mobile unit (post production) and/or setting up booths at community events, Event participation ideas include; What If Festival, Children's Waterfest, Pikes Peak or Bust Rodeo Street Breakfast, Pikes Peak Hill Climb Fanfest. • UTILITIES is also investigating the opportunity to participate either as a presenter or as a "special event" in the 2020 WateReuse Association Symposium being held in Denver CO. This symposium attracts attendees from across the U.S. including limited international attendance. • School outreach will be conducted through UTILITIES' already developed teacher/education outreach program.
Describe how the project is collaborative or engages a diverse group of stakeholders. Who are the partners in the project? Do you have other funding partners or sources?
UTILITIES has entered into a cooperative relationship with Mines for the design, construction, water analysis, and operation of the mobile treatment unit to advance the goals of both parties. For UTILITIES this is providing education and outreach on DPR, for Mines it allows students/faculty to participate in a unique DPR research opportunity, providing both entities the chance to leverage professional contacts and/or build new contacts and provide a sustainable resource for other water providers within the state to use. Currently project partners are UTILITIES and Mines with pending partners including Aqua Aerobic Systems Inc. and WateReuse Colorado. Additionally, UTILITIES also has plans to work closely with the beverage industry(s) in the proposed beverage contest which is part of the project scope.
Describe how you plan to measure and evaluate the success and impact of the project?
• A survey will be conducted prior to the DPR project to evaluate DPR knowledge and willingness to accept it as a source of water. A post project survey will also be conducted to compare pre and post tour DPR knowledge and potential shift in acceptance as a water source.   • Mines has conducted these type surveys in the past (as part of the National Science Foundation projects) and will be instrumental in conduction the survey under this DPR demonstration project. • Demonstration outreach numbers will be tracked (in some cases estimated) to evaluate success of event participations. • Project information documented by CSU required for grant reporting purposes will be available for future demonstration users.
What research, evidence, and data support your project?

• PureWater Colorado demonstration project
• WateReuse Colorado Advancing Direct Potable Reuse to Optimize Water Supplies and Meet Future Demands
  • Technical Memorandum 1 Development of Direct Potable Reuse Regulation in Colorado
  • Technical Memorandum 2 Communications and Outreach Plan for Direct Potable Reuse in Colorado
  • Technical Memorandum 3 Potable Reuse Planning Tools and Case Studies
• WRCO "Colorado Guidelines for Direct Potable Reuse" project (scheduled release Nov/Dec 2019)
• Numerous published AWWA, WEF and WRA reports, studies and projects

Describe potential short- and long-term challenges with this project.

Last Updated: November 2018

Overview (answer for both tracks)
Due to the accelerated schedule for this project, the short-term challenges include schedule impacts to UTILITIES staff and Mines faculty/staff/students, attaining firm commitments from potential partners and ensuring that all pre-requisite agreements are in place to ultimately fulfill project goals. The long-term challenge for the project is how to facilitate UTILITIES desire to ensure that Mines can assume ownership of the mobile treatment unit. The overall biggest challenge this project faces is the limited funding available from individual entities. Grant funding will make this project viable.

Please fill out the applicable questions for either the Engagement Track or Innovation Track, unless your project contains elements in both tracks. If a question does not relate to your project, just leave it blank. Please answer each question that relates to your project. Please reference the relevant documents and use chapters and page numbers (Colorado's Water Plan, Basin Implementation Plan, PEPO Education Action Plan, etc.).

Engagement Track
Describe how the project achieves the education, outreach, and public engagement measurable objective set forth in Colorado's Water Plan to "significantly improve the level of public awareness and engagement regarding water issues statewide by 2020, as determined by water awareness surveys."
This project is being designed to be a sensory tool to educate project visitors in water reuse specifically DPR. The project will include water tastings and product development using the DPR water (products under consideration include beer, wine, hard spirits, soda and lemonade). Additionally, informational materials will be developed for both student education and public information.
Describe how the project achieves the other measurable objectives and critical goals and actions laid out in Colorado's Water Plan around the supply and demand gap; conservation; land use; agriculture; storage; watershed health, environment, and recreation; funding; and additional.
This project addresses the supply/demand gap by addressing replacement of non-sustainable groundwater sources with the reuse of the sustainable surface water sources. Outreach materials will most likely include discussions on good water habits (conservation) and how the use of the right water for the right use must become part of the water conversation.
Describe how the project achieves the education, outreach, and public engagement goals set forth in the applicable Basin Implementation Plan(s).
Describe how the project achieves the basin roundtable's PEPO Education Action Plans.
The mobile unit design was carefully evaluated with consideration given to the needs of surrounding communities and water providers statewide. This mobile unit will allow UTILITIES and other water providers to initially test DPR and associated messaging in their service areas. The mobile unit allows water providers the ability to engage and educate the public and other stakeholders in a variety of manners; viewing active treatment in the demonstration, observation of treatment processes when not treating in unique settings, such as community events, or travel to schools for student interaction.

Last Updated: November 2018

Innovation Track
Describe how the project enhances water innovation efforts and supports a water innovation ecosystem in Colorado.
Describe how the project engages/leverages Colorado's innovation community to help solve our state's water challenges.
Describe how the project helps advance or develop a solution to a water need identified through TAP-IN and other water innovation challenges. What is the problem/need/challenge?
Describe how this project impacts current or emerging trends; technologies; clusters, sectors, or groups in water innovation.

Last Updated: November 2018

Colorado Water Conservation Board
Water Plan Grant - Exhibit A

Statement Of Work	
Date:	**7/21/19**
Name of Grantee:	Colorado Springs Utilities, an enterprise of the City of Colorado Springs, a Colorado home rule city and municipal corporation
Name of Water Project:	Direct Potable Reuse (DPR) Demonstration
Funding Source:	**CWCB Water Plan Grant, UTILITIES, Colorado School of Mines**

Water Project Overview:

UTILITIES is conducting a Direct Potable Reuse (DPR) Demonstration project with the primary objective of educating our community, customers, staff, leadership and government officials on not only the viability but the potential financial, resiliency, and environmental benefits of DPR.

While UTILITIES does not believe DPR in Colorado Springs is imminent, we do believe it to be a likely component of our long-term strategy for efficient and cost-effective use of our reusable water supplies. This project will allow us to explore and better understand the potential benefits and constraints of DPR including but not limited to:

- Raw water quality for potable treatment
- Potable water quality
- Reduced conveyance pumping and associated energy consumption
- Reduced conveyance infrastructure
- Reduced transit losses
- Presence and removal of emerging contaminants of human health concern

The project will also allow UTILITIES to contribute to the long-term advancement of DPR research and technology by building a mobile, reusable asset that can be used by other entities and organizations to further investigate site/utility specific technical analysis and reuse benefits.

UTILITIES in partnership with Colorado School of Mines (Mines) and with the assistance of an engineering contractor, will build a mobile treatment unit to demonstrate proven technologies associated with DPR using secondary treated wastewater. The DPR unit will be capable of modifying process sequence based on source water quality.

The mobile DPR treatment unit will be rated for 5-10 gallons per minute with a flexible treatment train that includes but may not be limited to the following unit processes:

a. Ozone
b. Biologically Active Filtration (BAF)
c. Granular Activated Carbon
d. Ultrafiltration
e. Ultraviolet (UV)/Advanced Oxidation

Project Objectives:

Project goals include:

- Build a mutually beneficial relationship with Mines.
- Use as a sensory tool for DPR education and outreach to public, employee/leadership, and regulator/government groups.
- Create a local DPR "conversation" by hosting a beverage contest and participating in WateReuse Association's 2020 Denver Symposium.
- Build on PureWater Colorado momentum to continue the advancement of DPR and associated technologies.
- Provide a resource for other entities investigating DPR viability for individual/regional water systems.

UTILITIES and Mines believe the mobile unit will benefit other entities interested in exploring DPR as a supply alternative. Anticipated benefits for other users are the ability to:

- Connect with Mines,
- Customize messaging for source and treatment specifics
- Focus operator training on processes for specific source water quality.

Tasks
Task 1 – General Project Management
Description of Task:
Provide general oversight and coordination of tasks between all parties for the timely implementation and completion of the proposed DPR demonstration project.
Method/Procedure:
UTILITIES will be responsible for the overall project management of the DPR Demonstration. UTILITIES staff will manage the project in accordance with the applicable portions of its standardized project management practice as defined in UTILITIES Project Delivery Handbook (most current version), available upon request. UTILITIES and Mines will be engaging a third-party engineer for design and operational support services for the mobile unit. The following excerpt from the Engineering Support Services Statement of Work (SOW) defines the engineer's project management task requirements: The Contractor shall use knowledge, skills, tools, and techniques to meet or exceed the needs and expectations of UTILITIES for this project. The task shall include, but is not limited to:

Last Updated: November 2018

Tasks
General • Prepare and submit a brief project plan and baseline schedule for review and approval by UTILITIES for Direct Potable Reuse Demonstration Engineering Design and Operations Support Services within fifteen (15) business days of Notice to Proceed (NTP). The baseline schedule shall meet the requirements set forth in Exhibit A - Attachment A3 Schedule Requirements. • Provide monthly updates of project progress, schedule, and budget reports for services and activities. Provide monthly cash flow projection submittals for budgeting purposes. Projections must be re-forecast with each monthly submittal. Schedule reports shall be prepared in accordance with Exhibit A - Attachment A3 Schedule Requirements. • Develop communication plan to coordinate and communicate with project team members. • Prepare a project quality management plan detailing quality assurance (QA) and quality control (QC) processes and procedures to be used throughout the entire lifecycle of the project. • Organize and facilitate an Initial Project Meeting/Kickoff with appropriate UTILITIES and CONTRACTOR representatives to review project requirements and establish roles and responsibilities for each project component. • Submit all project deliverables, contract administration documents (invoices, amendments, meeting agendas, meeting minutes, etc.) and all project correspondence through UTILITIES' Project Management Software as a Service (PM SaaS) workflow management, document management, and reporting system (EADOC). • Prepare a comprehensive list of deliverables and submittals with scheduled submission dates. • Organize and conduct deliverable review meetings as necessary to facilitate UTILITIES deliverable review and approval. • Prepare monthly invoice in accordance with the agreement terms and conditions for the project. Design • Manage the tasks described in Attachment A2 – Engineering Services statement of work and coordinate with UTILITIES. • Coordinate and facilitate review workshops at milestone deliverables. • Prepare Project Health and Safety Plan. Provide job safety briefing and training, and ensure that CONTRACTOR's staff, subcontractors, and subconsultants are aware of on-site safety requirements. • Coordinate, communicate via phone calls and email, and facilitate workshops as necessary with permitting agencies.
Deliverable:

Last Updated: November 2018

Tasks
The project shall include, but is not limited to, the deliverable items outlined below. General Electronic Files: Spatial data files must be compatible with ESRI ArcGIS standards for retrieval purposes. Map and drawing files shall be completed in AutoCAD Civil 3D V2014 or later with electronic copies provided in AutoCAD format in addition to searchable PDF files. All drawings files shall be modeled in 3D. Text and spreadsheet files shall be completed in Microsoft Word and Excel respectively, with electronic copies provided in Word/Excel format in addition to searchable PDF files. Input and output files for any engineering software used in the analysis must also be provided in addition to searchable PDF files of the results. All electronic files and project documents shall be submitted via UTILITIES PM SaaS system. Project Plan and Schedule: Provide one (1) electronic copy submitted via UTILITIES PM SaaS system of the overall project plan and schedule including a work break down with corresponding dates and milestones and cash flow projections within thirty (30) calendar days of Notice to Proceed (NTP). Include all of the tasks and subtasks included in Exhibit A – Statement of Work Attachments A and B. Prepare a detailed Critical Path Method (CPM) schedule using Primavera P6 software for the project. The schedule shall specify the proposed start and finish dates along with total float for each activity for all phases of the work. Monthly Status and Schedule Updates and Cash Flow Projections: Provide monthly updates of project progress, schedule, budget reports, and cash flow projections throughout the life of the project. Provide one (1) electronic copy submitted via UTILITIES PM SaaS system on or before the 5th day of each month. Project Quality Management Plan: At the beginning of the project, provide one (1) electronic copy submitted via UTILITIES PM SaaS system of the overall project quality management plan. Project Health and Safety Plan: At the beginning of the project, provide one (1) electronic copy submitted via UTILITIES PM SaaS system of the overall project health and safety plan for field activities. Meeting Agendas and Minutes: Meetings must be scheduled at least two (2) weeks in advance to ensure availability of required UTILITIES personnel and appropriate meeting space. Meetings will be held at Leon Young Service Center (LYSC). Organize and facilitate meetings with appropriate UTILITIES and CONTRACTOR representatives. Provide draft agenda via UTILITIES PM SaaS system to project distribution list at least two (2) days prior to scheduled meetings. Provide sufficient physical copies of meeting agenda at meeting for anticipated attendees. Submit electronic copy of minutes in UTILITIES PM SaaS system to all attendees within five (5) days of meeting. List of Deliverables: At the beginning of the project, provide one (1) electronic copy submitted via UTILITIES PM SaaS system of the deliverable list. Provide monthly updates in electronic format throughout the life of the project. Invoices and Payment Applications: Submit monthly payment applications on or before the 5th day of each month. Provide two (2) physical copies and one (1) electronic copy submitted via UTILITIES PM SaaS system.

Tasks
Task 2 – Design
Description of Task:

Last Updated: November 2018

Tasks
Design of a complete mobile direct potable reuse demonstration scale treatment unit using a flexible treatment train that includes but may not be limited to ozone, biologically active filtration, ultrafiltration, granular activated carbon, and UV/advanced oxidation as well as all connecting piping, instrumentation and controls and architectural/access features to facilitate public education and interaction objectives.
Method/Procedure:
UTILITIES and Mines will collaborate with a third-party engineer to design the mobile unit. UTILITIES and MINES will be responsible for developing design criteria and the review and approval of the engineer's design. Additionally, UTILITIES and Mines will support obtaining all necessary approvals from Authorities Having Jurisdiction (AHJs). The following excerpt from the Engineering Support Services Statement of Work (SOW) defines the third-party engineer's design task requirements: The Contractor shall use knowledge, skills, tools, and techniques to meet or exceed the needs and expectations of UTILITIES for this project. The task shall include, but is not limited to: <u>Site Reconnaissance</u> Perform site reconnaissance visits as necessary to become familiar with materials, equipment and enclosure provided by MINES as in-kind contribution to the project for incorporation into the final design of the mobile unit. <u>Basis of Design Technical Memorandum and Design Development (50% Submittal)</u> The Basis of Design Technical Memorandum involves advancing the concepts developed by the UTILITIES and MINES team and includes but is not limited to the activities and tasks listed below: • Treatment process design criteria o Capacity (5-10 gpm) o Influent characterization o Finished water criteria and requirements o Flexible treatment train configuration o Mass Balance o Detention times o Loading rates • Equipment evaluation and selection o Validation of suitability of equipment and material supply from MINES o When possible allow for multiple suppliers/manufacturers o Operational requirements defined • Mobile Unit Enclosure Evaluation

Last Updated: November 2018

Tasks
o Evaluate proposed cargo container enclosure with respect to meeting requirements for housing equipment and meeting demonstration education and interaction objectives o Prepare conceptual markups of the potential configuration of openings to accommodate demonstration interaction, and equipment to discuss during meetings • Material and corrosion analysis • Architectural code analysis • NFPA Hazard analysis (e.g. NFPA 820, etc.) • Life Safety Code analysis • Structural design criteria o Loading (static and dynamic) o Criteria needed to safely move and secure treatment equipment/materials within the mobile unit (if applicable) • Mechanical design criteria • Plumbing and Fire Protection design criteria (if applicable) • HVAC design criteria (if applicable) o Cooling o Heating o Plumbing • Electrical design criteria o Service load requirements o Power supply panel requirements o Control panel requirements • Instrumentation and control design criteria o Control strategies o Network architecture o Hardware o Software o Instruments o Programmable logic controllers (PLCs) o Variable speed drives • Hydraulic analysis • Commissioning and Start-Up recommendations and requirements based on the combination of equipment and material supply from MINES in-kind contributions and competitive procurement purchases • 50% drawing information that includes but is not limited to the following: o General ▪ Cover sheet/Index ▪ General notes ▪ Hydraulic grade line ▪ Process flow diagram o Architectural ▪ Notes, symbols and abbreviations ▪ Design criteria ▪ Plans (75%) ▪ Sections (50%)

Tasks
▪ Elevations (50%) ▪ Standard details ▪ Project specific details (major) ▪ Modification plans (major) (50% complete) ▪ Modification details (major) o Structural ▪ Notes, symbols and abbreviations ▪ Design criteria ▪ Plans (75%) ▪ Sections (50%) ▪ Elevations (50%) ▪ Standard details ▪ Project specific details (major) ▪ Modification plans (major) (50% complete) ▪ Modification details (major) o Mechanical ▪ Notes, symbols and abbreviations ▪ Major equipment list (90%) ▪ Pipe Schedule (75%) ▪ Valve Schedule (75%) ▪ Plans (75%) ▪ Sections (75%) ▪ Standard details ▪ Project specific details (major) o Plumbing (if applicable) ▪ Notes, symbols, and abbreviations ▪ Plans (30%) ▪ Major sections ▪ Standard details o HVAC (if applicable) ▪ Notes, symbols, and abbreviations ▪ Design criteria ▪ Plans (30%) ▪ Major sections ▪ Standard details ▪ Modification plans (major) (30% complete) ▪ Modification details (major) o Electrical ▪ Notes, symbols, and abbreviations ▪ Plans (50%) ▪ Major sections/elevations ▪ One line diagrams (75%) ▪ Modification plans (major) (50% complete) ▪ Modification details (major)

Tasks
- o Instrumentation   ▪ Notes, symbols and abbreviations   ▪ Process and Instrumentation Diagrams (75%)   ▪ System architecture (75%)   - AACE Class 3 materials and equipment cost estimate   - Specifications table of contents (CSI 2004 format)   - Design Data Documentation that includes design calculations for unit process equipment, tank, and pipe sizing. The Design Data Documentation shall include relevant equipment cut sheets and vendor/manufacturer communications regarding equipment sizing and project application.   - QA/QC documentation   Final Design Documents (100% Submittal) The Contract Document Submittal statement of work involves advancing the design from a 90% detailed design to a 100% detailed design and includes but is not limited to the activities and tasks listed below: - Finalize all relevant technical specifications: Piping, Mechanical, Coatings, Process Equipment, Electrical, Special Equipment, Instrumentation and Controls, etc.   - Finalize all drawings   - Finalize Design Data Documentation   - Updated AACE Class 2 Estimate (materials and equipment only)   - Finalize Commissioning and Start-Up Requirements and Specifications   - QA/QC documentation   Regulatory Compliance and Agency Approval The Regulatory Compliance and Agency Approval statement of work involves assisting UTILITIES with acquiring approval for all the necessary permits, which includes but is not limited to the activities and tasks listed below: - Coordinate and participate in meetings as necessary with the state, county, and other regulatory agencies regarding permit pre-submittals and submittal reviews.   - Prepare technical submittals required to obtain 100% design approvals from the following agencies: - o Colorado Department of Public Health and Environment (CDPHE)   - o Colorado Department of Transportation (CDOT)   - o Colorado Springs Fire Department   - o Pikes Peak Regional Building Department (PPRBD)   - o Other Governmental and Quasi-Governmental Jurisdictions with Regulatory Approval Authority.   - Prepare technical submittals, as required by approving agencies, to obtain approval of design changes made during construction initiated RFI’s, change order, field orders, or other construction management documentation.
Deliverable:

Last Updated: November 2018

Tasks
The project shall include, but is not limited to, the deliverables outlined below. CONTRACTOR shall provide: Design Basis of Design Workshop: Provide one (1) electronic copy via UTILITIES PM SaaS system of the workshop presentation and summary. Basis of Design Technical Memorandum and Design Development Submittal Draft: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Basis of Design Technical Memorandum. Basis of Design Technical Memorandum and Design Development Submittal QA/QC Documentation: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Basis of Design Report QA/QC Documentation. Basis of Design Technical Memorandum and Design Development Submittal Final: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Basis of Design Technical Memorandum. Final Design Submittal: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Final Design Submittal. Final Design Submittal QA/QC Documentation: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Final Design Submittal QA/QC Documentation.

Tasks
Task 3 – Construction
Description of Task:
Construction of a complete mobile direct potable reuse demonstration scale treatment unit using a flexible treatment train that includes but may not be limited to ozone, biologically active filtration, ultrafiltration, granular activated carbon, and UV/advanced oxidation as well as all connecting piping, instrumentation and controls and architectural/access features to facilitate public education and interaction objectives.
Method/Procedure:

Last Updated: November 2018

Tasks

UTILITIES and Mines will collaborate to construct the mobile unit in conformance with the 100% design documents prepared by the third-party engineer. At the discretion of UTILITIES and Mines, construction may include any of the following individual or combination of construction delivery methods:
 	
• Third party general contractor
• MINES self-performed construction work
• MINES in-kind material and equipment contributions
• Utilities self-performed construction work
• Utilities in-kind material and equipment contributions
• Third party material and equipment providers
• Third party sub-contractors
 	
The following excerpt from the Engineering Support Services Statement of Work (SOW) defines the third-party engineer's construction task requirements:
 	
The Contractor shall use knowledge, skills, tools, and techniques to meet or exceed the needs and expectations of UTILITIES for this project. The task shall include, but is not limited to:
 	
<u>Office Construction Engineering Services</u>
 	
• Construction and Operations Phase office services including:
  o Construction documentation management through UTILITIES Project Management Software as a Service (PM SaaS) workflow management, document management, and reporting system (EADOC).
  o Shop drawing and submittal review
  o Design clarification preparation
  o RFI review and response (from UTILITIES and Mines)
 	
<u>Field Inspection and Testing</u>
 	
• Construction Phase field inspection and testing services shall ensure conformance with the design documents including but not limited to:
  o Enclosure access modifications
  o Equipment and piping installation
  o Preparing inspection and testing reports
  o Commissioning and start-up witness testing including:
  ▪ Mechanical equipment testing and inspection
  • Installation inspection
  • Field/installed performance testing
  ▪ Electrical equipment inspection and testing
  ▪ Instrumentation and control system testing

Deliverable:

Last Updated: November 2018

Tasks
Construction Electronic Files: Spatial data files must be compatible with ESRI ArcGIS standards for retrieval purposes. Map and drawing files shall be completed in AutoCAD Civil 3D V2014 or later with electronic copies provided in AutoCAD format in addition to searchable PDF files. Text and spreadsheet files shall be completed in Microsoft Word and Excel respectively, with electronic copies provided in Word/Excel format in addition to searchable PDF files. Input and output files for any engineering software used in the analysis must also be provided in addition to searchable PDF files of the results. Vendor Shop Drawing and Submittals: Provide one (1) electronic copy via UTILITIES PM SaaS System. Requests for Information: Provide one (1) electronic copy via UTILITIES PM SaaS system. Design Clarifications: Provide one (1) electronic copy via UTILITIES PM SaaS system. Materials and Equipment Testing Reports: Provide one (1) electronic copy via UTILITIES PM SaaS system. Field Inspection Reports: Provide one (1) electronic copy via UTILITIES PM SaaS system. As-built Record Drawings: Provide individual and combined 3D As-built Record Drawings of the project. Provide one (1) electronic copy in PDF format, and one (1) electronic copy in AutoCAD Civil 3D format via UTILITIES PM SaaS system.

Tasks
Task 4 – Operation
Description of Task:
Commissioning start-up, and operations of the mobile direct potable reuse unit for the planned operating period (July 2020 – September 2020).
Method/Procedure:

Last Updated: November 2018

Tasks
UTILITIES and Mines will collaborate to provide the successful commissioning, start-up and operations of the mobile unit with support from a third-party engineer. The following sections provide further detail for the operational tasks and activities including proposed responsibilities: Demonstration Site Set up and Administration – UTILITIES will provide the site for the proposed Colorado Springs demonstration operational period from July – September 2020. Site provisions will include denitrified secondary effluent for the mobile unit influent as well as appropriate mobile unit effluent management including provision of limited quantities for beverage production. Provisions will also include UTILITIES standard site security and appropriate access controls. Mobile Unit Operations – UTILITIES will provide staff to operate the mobile demonstration unit for the planned operating period in Colorado Springs from July – September of 2020 with technical support from a contract engineering consulting firm and Mines. Sampling and Analysis – UTILITIES staff will prepare an overall project Sampling and Analysis Plan to inform and document compliance as well as performance evaluation sampling and analysis requirements for the project. UTILITIES will provide staff, equipment, and laboratory analysis for all Colorado Department of Public Health and Environment (CDPHE) required operating period compliance sampling and analysis. UTILITIES will provide staff, equipment and laboratory analysis for evaluating and investigating demonstration unit performance during commissioning and start-up activities and throughout the operational period as coordinated and agreed to with Mines. Mobile Unit Decommissioning – Upon completion of the planned demonstration period, UTILITIES will decommission (shut down, drain and clean) the mobile unit and prepare it for transport to a storage and maintenance location. The following excerpt from the Engineering Support Services Statement of Work (SOW) defines the third-party engineer's operation task requirements: <u>Commissioning and Start-up</u> • Prepare a *Commissioning and Start-up (C&S) Plan* that includes the following elements: o Commissioning plan that includes all Components, Devices, and Equipment specified in Final Design. The commissioning plan shall define and sequence any installation and functional testing required for each Device, Component, and piece of Equipment as specified in Final Design. o Start-up plan that includes the following: ▪ Pre-start-up activities including but not limited to: • Start-Up Sequence Review • Temporary Testing Arrangement Finalization ▪ Start-up testing including but not limited to: • System Testing with Water, No Treatment • Control Loop Tuning • Start-Up

Last Updated: November 2018

Tasks
• Global Control Testing ▪ Performance testing including but not limited to: • Performance tests that cannot be performed during the commissioning work element • Process performance tests to prove mobile unit performance ▪ Detailed schedule of commissioning and start-up activities that includes durations, and sequencing requirements with the following activities identified: • Manufacturer's services (purchased equipment only) • Certificates of Proper Installation (purchased equipment only) • Operator training • Submission of Operation and Maintenance Manual (purchased equipment only) • Installation testing (as specified in Final Design) • Functional testing (as specified in Final Design) • Pre-Start-Up activities • Start-Up testing • Performance testing (as specified in Final Design) • Operational testing (as specified in Final Design) ▪ Testing and witness forms required to properly document the performance of required tests demonstrating individual unit functionality and performance to complete system functionality and performance. ▪ Testing plan with test logs and forms for each Component, Device, Equipment, Subsystem and each System when specified. Include testing of alarms, interlocks, control circuits, capacities, speeds, flows, pressures, vibrations, sound levels, and other parameters. o Hazardous Materials Management Plan (HMMP) – plan for how any commissioning and start-up and/or long term operations hazardous materials will be managed to comply with regulatory, code, and UTILITIES safety requirements o Hazardous Materials Inventory Statement (HMIS) – a list of any commissioning and start-up and/or long term operations hazardous materials that will be used on site o Any waste generated from the demonstration will be handled appropriately. • Provision of training and informational resources necessary for operations staff to operate the mobile unit. <u>Operations Period Engineering Support</u> Provide engineering support to troubleshoot operational challenges and optimize operations for the UTILITIES planned demonstration period from July 2020 – September 2020.
Deliverable:

Last Updated: November 2018

Tasks
UTILITIES: • Sampling and Analysis Plan • Demonstration Summary Report Third-Party Engineer: • Start-up and Commissioning Plan: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Start-up and Commissioning Plan. • Operator Training Material: Provide one (1) electronic copy via UTILITIES PM SaaS system of the Operator Training Material

Tasks
Task 5 – Outreach
Description of Task:
Performing multiple outreach initiatives during the planned operating period (July 2020 – September 2020) and post operation as deemed beneficial. Outreach initiatives will encompass programs for the public (including school programs), government officials, and industry personnel engagement.
Method/Procedure:
It is expected that UTILITIES and Mines will collaborate to develop and provide a successful DPR outreach program, however UTILITIES will assume primary responsibility for this task. Communications and Public Relations – UTILITES staff will be responsible for developing and distributing all project communications and promotional materials (written and oral, traditional and social media, and advertising) Education and Outreach Events – UTILITIES will be responsible for planning and executing all proposed outreach events including but not limited to: • Public tours • Private tours (government, City, and UTILITIES officials) • Educational institution tours • Community events “DPR booth” • Beverage production contest(s) • Beverage tasting event(s) • Project presentation at water industry symposiums/conferences/workshops

Last Updated: November 2018

Tasks
Deliverable:
UTILITIES: • Promotional materials • Survey results • Number of individuals reached (actual and/or estimated)

Budget and Schedule
This Statement of Work shall be accompanied by a combined Budget and Schedule that reflects the Tasks identified in the Statement of Work and shall be submitted to CWCB in excel format.

Reporting Requirements
Progress Reports: The applicant shall provide the CWCB a progress report every 6 months, beginning from the date of issuance of a purchase order, or the execution of a contract. The progress report shall describe the status of the tasks identified in the statement of work, including a description of any major issues that have occurred and any corrective action taken to address these issues.
Final Report: At completion of the project, the applicant shall provide the CWCB a Final Report on the applicant's letterhead that: • Summarizes the project and how the project was completed. • Describes any obstacles encountered, and how these obstacles were overcome. • Confirms that all matching commitments have been fulfilled. • Includes photographs, summaries of meetings and engineering reports/designs. The CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.

Last Updated: November 2018

Payment

Payment will be made based on actual expenditures and must include invoices for all work completed. The request for payment must include a description of the work accomplished by task, an estimate of the percent completion for individual tasks and the entire Project in relation to the percentage of budget spent, identification of any major issues, and proposed or implemented corrective actions.

Costs incurred prior to the effective date of this contract are not reimbursable. The last 10% of the entire grant will be paid out when the final deliverable has been received. All products, data and information developed as a result of this contract must be provided to CWCB in hard copy and electronic format as part of the project documentation.

Performance Measures

Performance measures for this contract shall include the following:
(a) Performance standards and evaluation: Grantee will produce detailed deliverables for each task as specified. Grantee shall maintain receipts for all project expenses and documentation of the minimum in-kind contributions (if applicable) per the budget in Exhibit B. Per Water Plan Grant Guidelines, the CWCB will pay out the last 10% of the budget when the Final Report is completed to the satisfaction of CWCB staff. Once the Final Report has been accepted, and final payment has been issued, the purchase order or grant will be closed without any further payment.
(b) Accountability: Per Water Plan Grant Guidelines full documentation of project progress must be submitted with each invoice for reimbursement. Grantee must confirm that all grant conditions have been complied with on each invoice. In addition, per Water Plan Grant Guidelines, Progress Reports must be submitted at least once every 6 months. A Final Report must be submitted and approved before final project payment.
(c) Monitoring Requirements: Grantee is responsible for ongoing monitoring of project progress per Exhibit A. Progress shall be detailed in each invoice and in each Progress Report, as detailed above. Additional inspections or field consultations will be arranged as may be necessary.
(d) Noncompliance Resolution: Payment will be withheld if grantee is not current on all grant conditions. Flagrant disregard for grant conditions will result in a stop work order and cancellation of the Grant Agreement.

COLORADO
Colorado Water Conservation Board
Department of Natural Resources

Colorado Water Conservation Board

Water Plan Grant - Exhibit B
Budget and Schedule

Prepared Date: August 1, 2019

Name of Applicant: Colorado Springs Utilities

Name of Water Project: Direct Potable Reuse (DPR) Demonstration

Project Start Date: April 1, 2019

Project End Date: December 31, 2020

Task No.	Task Description	Task Start Date	Task End Date	Grant Funding Request	Match Funding	Total
1	General Project Management	4/1/2019	12/31/2020	$ -	$ 107,184	$ 107,184
2	Design	10/1/2019	1/31/2020	$ 100,000	$ 35,738	$ 135,738
3	Construction	1/1/2020	6/30/2020	$ 150,000	$ 129,600	$ 279,600
4	Operation	7/1/2020	9/30/2020	$ 25,000	$ 75,716	$ 100,716
5	Outreach	7/1/2020	9/30/2020	$ 75,000	$ 137,136	$ 212,136
			Total	**$350,000**	**$485,374**	**$835,374**

Notes:

1. Costs include 20% Contingency.
2. Timelines overlap for some tasks as some subtasks can and will be conducted concurrently.
3. Decomissioning and relocation of mobile unit and project closeout will be conducted after the opertational period and is grouped with general project management.

Detailed Cost Breakdown

		Internal CSU Cost			Colorado School of Mines			Consultant Design Cost			Equipment / Lab / Transportation		Task Cost	Task Cost with 20% Contingency	Funding Source: In-Kind Contributions with 20% Contingency	Funding Source: Cash Services Required with 20% Contingency	Funding Source: CWCB Funds	Notes
Task	**Description**	**Hours**	**Avg Rate**	**Subtotal**	**Hours**	**Avg Rate**	**Subtotal**	**Hours**	**Avg Rate**	**Subtotal**	**Type**	**Subtotal**						
Task 1 - General Project Management	Adminstration/Partnering Outreach/Communications	120	$75	$9,000									$9,000	$10,800	$10,800	$0		Includes conversations with CDPHE, Brewers, and potential partners
	Project Meetings Before RFP	56	$75	$4,200	24	$60	$1,440						$5,640	$6,768	$5,904	$864		Assumes 8 meetings (1 hour) with 7 team members for CSU
	Grant Applications	160	$75	$12,000	20	$60	$1,200						$13,200	$15,840	$15,120	$720		CSU costs for grants application, Mines in-kind estimate of services and assistance with grant
	Draft RFP/RFQ	40	$75	$3,000	16	$60	$960						$3,960	$4,752	$4,176	$576		Assumes 1 FTE over 5 days
	Procurement	80	$75	$6,000									$6,000	$7,200	$7,200	$0		Assumes 1 FTE over 2 weeks
	Response to Questions, Review Proposals	60	$75	$4,500	16	$60	$960						$5,460	$6,552	$5,976	$576		Assumes 5 Team Members 12 hours each to respond to questions, review proposals, and meet for scoring of proposals/decision.
	Biweekly Meetings With Consultant	182	$75	$13,650	26	$60	$1,560	78	$200	$15,600			$30,810	$36,972	$17,316	$19,656		Assumes 3 members from Consultant Project Team and 7 Members of CSU Project Team for 26 meetings
	Biweekly Coordination Meetings with Mines	70	$75	$5,250	30	$60	$1,800	10	$200	$2,000			$9,050	$10,860	$7,380	$3,480		Assumes 1 member from consultant team and 7 Members of CSU Project Team for 10 meetings
	Decommissioning/Relocation	24	$75	$1,800	40	$60	$2,400				Truck	2,000	$6,200	$7,440	$6,000	$1,440		Assumes time relocate mobile facility to Mines and close out project
	Subtotal												***$89,320***	***$107,184***	***$79,872***	***$27,312***	***$0***	
Task 2 - Design	Kickoff Meeting	21	$75	$1,575	14	$60	$840	9	$200	$1,800			$4,215	$5,058	$2,394	$2,664		Assumes 3 hour meeting with 3 members from Consultant Project Team and 7 Members of CSU Project Team
	Consultant T&M Related Fees							435	$200	$87,000			$87,000	$104,400	$0	$104,400		See sheet estimate bottom of page
	Review of Deliverables, PM related tasks	80	$75	$6,000	80	$60	$4,800						$10,800	$12,960	$10,080	$2,880		Assumes 1 FTE over 2 weeks of total anticipated work with assistance from Mines
	Communications and publicity	84	$75	$6,300	80	$60	$4,800						$11,100	$13,320	$10,440	$2,880		Assumes 60 hour communication strategy and material development and 2 hours/week for 12 week operating period.
	Subtotal												***$113,115***	***$135,738***	***$22,914***	***$112,824***	***$100,000***	
Task 3 - Construction	Ozone System				80	$60	$4,800				Equipment	19,700	$24,500	$29,400	$2,880	$26,520		See Mines Costs Tab
	BAF				80	$60	$4,800				Equipment	7,250	$12,050	$14,460	$7,080	$7,380		See Mines Costs Tab
	GAC				80	$60	$4,800				Equipment	7,250	$12,050	$14,460	$7,080	$7,380		See Mines Costs Tab
	UF/MF				80	$60	$4,800				Equipment	41,000	$45,800	$54,960	$39,480	$15,480		See Mines Costs Tab
	UV/AOP				80	$60	$4,800				Equipment	22,100	$26,900	$32,280	$4,920	$27,360		See Mines Costs Tab
	Container				240	$60	$14,400				Equipment	26,000	$40,400	$48,480	$20,640	$27,840		See Mines Costs Tab
	Sensors				80	$60	$4,800				Equipment	26,400	$31,200	$37,440	$9,480	$27,960		See Mines Costs Tab
	SCADA System / Hardware and Software				160	$60	$9,600				Equipment	6,500	$16,100	$19,320	$8,160	$11,160		Mines to build this in-house, see Mines tab for equipment cost
	Modifications from Mines				400	$60	$24,000						$24,000	$28,800	$14,400	$14,400		Anticipated modifications to install purchased and donated equipment; Mines work to construct the unit
	Subtotal												***$233,000***	***$279,600***	***$114,120***	***$165,480***	***$150,000***	
Task 4 - Operation	Contaminant Testing				300	$60	$18,000				Lab	12,000	$30,000	$36,000	$10,800	$25,200		Mines assistance plus lab costs
	Compliance Laboratory Testing	240	$75	$18,000							Lab	6,250	$24,250	$29,100	$21,600	$7,500		Assumes CSU time for 60 days, 4 hours of testing, and lab costs per Jerry's estimate, 0.25 multiplier on external lab costs for analysis consumables
	Supply Beverage Production with Water	120	$75	$9,000	80	$60	$4,800				Production	2,000	$15,800	$18,960	$13,680	$5,280		Assumes costs associated with producing DPR water and supplying to beverage producer plus coordination
	Mobilization	56	$75	$4,200	48	$60	$2,880	24	$200	$4,800	Truck	2,000	$13,880	$16,656	$9,168	$7,488		Assumes 1 day for 7 members of CSU project team, Mines Assistance, and 3 members of consultant team
	Subtotal												***$83,930***	***$100,716***	***$55,248***	***$45,468***	***$25,000***	
Task 5 - Outreach	Demonstration	640	$75	$48,000	240	$60	$14,400	40	$200	$8,000	Production	5,000	$75,400	$90,480	$66,240	$24,240		Assumes 2 FTE over 8 Weeks (6 for demo plus 2 setup and tear down), Assistance from Mines and Consultant, plus $5000 for production related expenses (generator, O&M, etc.)
	Promo & Ed items, Beverage Competition	400	$75	$30,000	250	$60	$15,000				Marketing	40,000	$85,000	$102,000	$45,000	$57,000		Assumes CSU staff 400 hours, Assistance from Mines, and cash marketing budget
	WRA Symposium	80	$75	$6,000	48	$60	$2,880				Misc	7,500	$16,380	$19,656	$8,928	$10,728		Time to prepare presentation materials and attend, Misc travel expenses, accommodations and conference fee
	Subtotal												***$176,780***	***$212,136***	***$120,168***	***$91,968***	***$75,000***	
	Totals	**2,513**		**$188,475**	**2,592**		**$155,520**	**596**		**119,200**		**232,950**						

Totals				
Task Cost	**Task Cost with 20% Contingency**	**In-Kind Contributions with 20% Contingency**	**Cash Services Required with 20% Contingency**	**CWCB Funds**
$696,145	**$835,374**	**$392,322**	**$443,052**	**$350,000**

General Notes

Avg. billing rate of CSU staff assumed to be $50/hr * 1.46 overhead = $75/hr
Avg. billing rate of consultant assumed to be $200/hr
See next tab for Mines cost estimate
1/2 of time spent on project by Mines assumed to be in-kind contributions
Avg Mines bill rate approximately $60/hr per Mines Costs Tab sheet (includes fringe benefits and overhead)
Total Mines hours adjusted to match cost estimate provided by Mines

Consultant Deliverable Estimate

Sheet	Cost Each	Quantity	Total
General Sheet	$5,000	1	$5,000
Architectural	$6,000	2	$12,000
Process Mechanical	$10,000	3	$30,000
Electrical	$10,000	2	$20,000
I&C	$10,000	2	$20,000
Total			**$87,000**

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July 31, 2019

Re: Letter of Support for Colorado Springs Utilities DPR Demonstration Project

Dear Mr. Olds,

The Colorado Center for a Sustainable WE^{2}ST at the Colorado School of Mines (Mines) proudly supports Colorado Springs Utilities (Utilities) financial support application submitted to the Colorado Water Conservation Board (CWCB) to conduct a demonstration study of direct potable reuse (DPR) of reclaimed water. Mines is also excited to be a partner on this project.

Mines is a public teaching and research university in Colorado, devoted to engineering and applied science, with special expertise in the development and stewardship of the Earth's natural resources—water being a of them. The WE^{2}ST Water Technology Hub is Mines' new research center focusing on industry-academia partnerships to promote research and development treatment and reuse of water in energy- and water-intensive industries. WE^{2}ST was established to promote the joint sustainability of energy and water resources through education of energy-water literate graduate and undergraduate students, and by conducting world-class research on both the economic feasibility and community acceptance of water resource development reuse.

Mines will provide the following services in conjunction with the proposal submitted by Mr. Olds to the CWCB:

- Design-support, construction, and operation of a mobile, pilot-scale water treatment system to demonstrate DPR of Utilities' reclaimed water
- Analytical support for identification and quantification of emerging contaminants of concern
- Collaboration with community stakeholders and business customers to maximize project promotion and acceptance

Mines will work collaboratively with Mr. Olds and his team to ensure that our goals are aligned with the goals of the award proposal, including efforts to track and report on outcomes. I believe that our support and commitment will significantly improve the impact that this project will have on increasing water reclamation and reuse in Colorado, thereby improving water sustainability in Colorado and reducing drought impacts on Colorado's communities, economy, and environment. We are looking forward to playing a major role and ensuring the success of this project.

Sincerely,

Tzahi Cath

Dr. Tzahi Y. Cath

Professor of Environmental Science & Engineering
Director, WE^{2}ST Water Technology Hub
Director, Advanced Water Technology Center (AQWATEC)