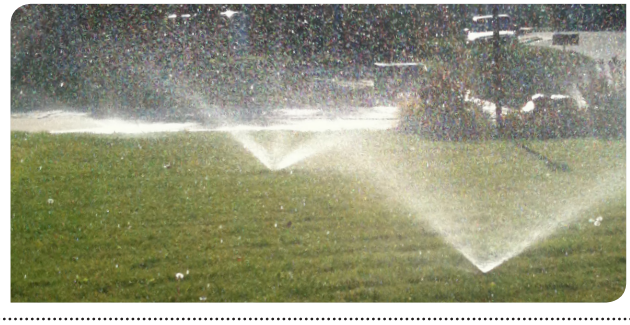
WEBER BASIN WATER CONSERVANCY DISTRICT

Uintah Bench Secondary Water Metering and Small Hydro Project



FY2016 WaterSMART: Water & Energy Efficiency Grants

Funding Opportunity Announcement No. R16-FOA-DO-004

APPLICANT

Weber Basin Water Conservancy District
2837 East Highway 193
Layton, Utah 84040

PROJECT MANAGER

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Applicant Info

The date, applicant name, city, county, and state

Date: January 15, 2016

Applicant Name: Weber Basin Water Conservancy District

City, County, State: Layton, Davis, Utah

Project Manager:

Name: David Rice, Conservation Programs, Weber Basin Water Conservancy District

Address: 2837 E. Highway 193, Layton, Utah 84040

Phone: 801-771-1677

Email: drice@weberbasin.com

Project Funding Request: Funding Group II $1,000,000 Total Project Cost $2,500,000

Project Summary

A one paragraph project summary that specifies the work proposed, including how project funds will be used to accomplish specific project activities and briefly identifies how the proposed project contributes to accomplishing the goals of this FOA

Weber Basin Water Conservancy District (WBWCD or District) Uintah Bench Secondary Water Metering & Small Hydro Project will install 2,956 new secondary meters, conduct a public education and information campaign on conservation and water efficiency, reconstruct a portion of the stream bed to ensure fish passage for two listed species, and install a 20kW hydroelectric unit that will be located at the outlet of the Causey Reservoir to generate approximately 68,000kW-hr/year. The meters will be installed in the Uintah Bench area which includes parts of Washington Terrace, Ogden and South Ogden Cities with an estimated 1,360 acre-feet of water conserved each year. Approximately 1,448 of the proposed 2,956 meters are located in a portion of the Uintah Bench service area that requires pumping. This project will save 387,365 kWh/yr. in reduced energy needed for pumping. The WBWCD project is one more step toward accomplishing the goals and priorities set forth in the System Optimization Review (SOR) developed in 2012.

The project is being requested under Task A – Water Conservation: Municipal Metering and Task B – Energy Water Nexus for Implementing Renewable Energy Project Related to Water Management and Delivery.

Schedule

State the length of time and estimated completion date for the project

This project is ready to move forward as soon as it is awarded. An environmental document will be prepared as part of the project and it is anticipated that a Categorical Exclusion will be approved based on the fact that the project will take place in previously disturbed areas and within existing road alignments.

At time of award (June- Sept 2016) WBWCD will initiate conversation with Reclamation on the development of non-federal hydropower on Reclamation dam to determine if the project requires either a lease of power privilege (LOPP) or a license issued by the Federal Energy Regulatory Commission (FERC). It is indicated that permitting authority is mutually exclusive; each Reclamation dam is either within Reclamation's or FERC's jurisdiction. Along with this a power sales agreement will need to be negotiated with Utah Association of Municipal Power Systems or Rocky Mountain Power. A 404 permit to do the work in the Creek will be required and application for this will be applied for at the same time.

The project will require design for the hydro element of the project. The environmental document will take one to three months. The installation of the meters and hydro will take 24 to 36 months and will take place through the winter and spring months (February – April 2017 and then again February – April 2018 and 2019). The education and information process will be ongoing with formal public information regarding the time and placement of the meters throughout the entire project. The hydro will be installed March 2017. The stream bed will be reconstructed during the low water time for Jacobs Creek. The project will be accomplished within the three-year allowance.

Federal Facility

Whether or not the project is located on a Federal Facility

In 1949, the Unites States Congress authorized the Weber Basin Project (Project), which was a U.S. Bureau of Reclamation (Reclamation) project aimed at developing and effectively utilizing the available water resources within the Weber River Basin Drainage. The Weber Basin Water Conservancy District was subsequently created in June of 1950 by a decree of the Second District Court of Utah and under the guidelines of the Utah Water Conservancy Act. The District is the operating agency for the Weber Basin Project and is responsible for the sale and delivery of project water, operation and maintenance of project facilities and is contracted with the U.S. Government for repayment of reimbursable costs of the Project.

Background Data

Map

WBWCD is one of Utah's largest secondary water retailers and provides wholesale water to many retail water agencies across the Wasatch Front. WBWCD secondary service areas include Centerville, Farmington, North Layton and South Layton, Uintah Bench (which includes parts of South Ogden, Ogden, and Washington Terrace), West Bountiful, West Haven, and Woods Cross. **See Attachment A for a Map of Secondary Service Area and Project Location.**

Water Supply

Describe the source of water supply, the water rights involved, current water uses (i.e., agricultural, municipal, domestic, or industrial), the number of water users served, and the current and projected water demand. Also, identify potential shortfalls in water supply. If water is primarily used for irrigation, describe major crops and total acres served.

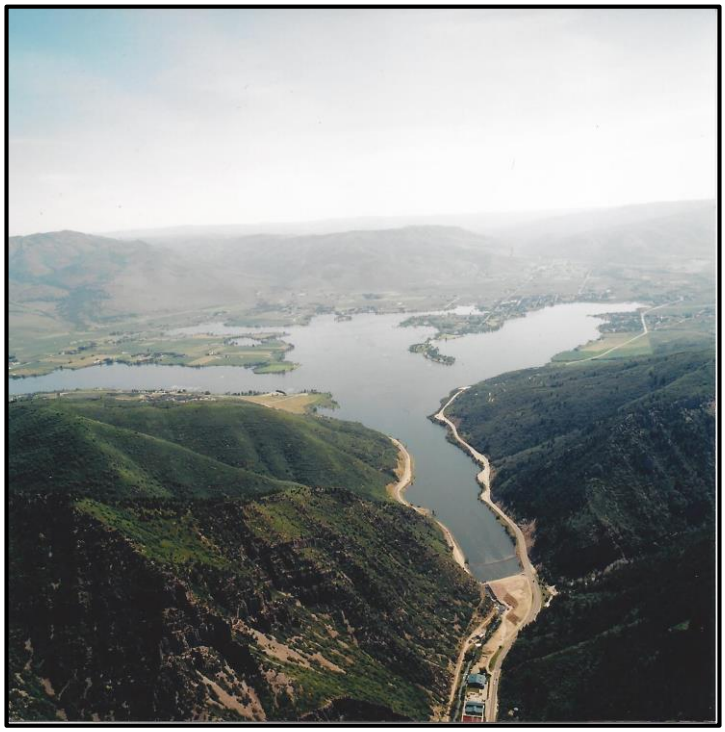
» *Source of water supply and water rights involved*

Source	Maximum Yield (AF)	Reliable Yield (AF)
Project Stored Water	377,278	**206,914**
District Stored Water	7,848	**7,848**
Wells (both District and Project)	70,990	**35,495**
Stock Water	20,601	**16,481**
Decreed Water Rights	3,960	**3,168**
Totals:	480,677	269,906

Water resources of the area were extensively developed before initiation of the Weber Basin Project. Numerous private developments antedate the Federal projects. Prior federal Reclamation developments include the Weber River Project on the main stem of the Weber River, and the Ogden River Project on the Ogden River. Also, as part of the Weber River and Ogden River Projects, water is diverted from the high reaches of the Weber River for multiple uses on the Provo River. The Weber Basin Project supplements all of the earlier undertakings, and its operation is correlated with users in approaching full practicable development of the area's water resources. Water is delivered from the Weber River to the District via two aqueducts.

The Weber Aqueduct conveys irrigation water to lands on the Uintah Bench, and municipal and industrial water to Ogden and adjacent communities in Weber County. Part of the irrigation water is pumped to parcels above the aqueduct and the remainder is delivered by a gravity pressure distribution system. At the terminal of the aqueduct, water is delivered to the District's Weber South Water Treatment Plant (WTP) from which it is treated then distributed to Ogden City and surrounding communities (an approximate population of 240,000 people). This area is where the subject of this proposal, the Uintah Bench Secondary Metering & Small Hydro Project, will occur. This Project will help to ease the demand in the Uintah Bench area which is served by the Weber aqueduct. The Weber aqueduct operates near or at full capacity during the summer months. There is no more capacity in the aqueduct to deliver additional water for future demand needs.

Photo 1 Pineview Reservoir a WBWCD Facility



The Davis Aqueduct extends to the south from the Weber Canyon along the foot of the Wasatch Mountains to North Salt Lake City. Part of the water is pumped for irrigation of lands above the

aqueduct; the remainder of the water is sold by the District to irrigation companies, Improvement Districts, Sub-conservancy Districts and individual landowners. The remaining water is processed through the District's Davis North WTP for distribution to communities in North Davis County, and through the Davis South WTP for communities in the south end of Davis County (Combined communities of approximately 300,000). A large block of treated and untreated industrial water is also delivered to the several oil refineries in the extreme south end of Davis County.

In addition to surface water distribution, nineteen deep wells relieve water shortages in dry periods and to meet peak water demands. Streams flowing from the face of the Wasatch Mountains toward the Great Salt Lake contribute small quantities of water for project use. The Ogden Valley Canal distributes Ogden River water to mountain valley lands near Huntsville and Eden.

Within the District's service area there may exist the largest number of retail secondary water connections in the United States. The District has approximately 17,000 individual connections that are operated and maintained by the District, with many other irrigation companies having tens of thousands of residential connections in their own retail areas throughout Davis and Weber Counties. These secondary connections are a great asset to the residents they serve, however, there is little incentive to conserve because secondary water has been primarily unmetered, resulting in users not having known how much water they actually use. This is why the metering of these connections is so cost effective and beneficial in the reduction of overall per capita use and the extension of existing water supplies.

» *Current water uses and number of water users served*

Currently District-administered water contracts totaled 224,195 acre-feet, with 85,126 acre-feet categorized as municipal and industrial (M&I) water, and the remaining 139,069 acre-feet categorized as irrigation. WBWCD serves a geographic area over 2,500 square miles, with five principle water uses:

1. **Wholesale Irrigation**: wholesale water is supplied to a number of irrigation suppliers along the Wasatch Front. These organizations then retail water to customers in their respective service areas. This use accounts for approximately 35% of the District's water contracts.
2. **Groundwater Replacement**: various drinking water purveyors and individuals (either residential or agricultural) with a water contract, which is then used in an exchange application to obtain approval from the State Engineer to drill a groundwater well to meet water supply needs. This use accounts for nearly 11% of WBWCD contracts currently.
3. **Retail Secondary Irrigation**: WBWCD provides residential customers with irrigation water in Davis and Weber counties via 211 miles of pipelines. This use accounts for roughly 26% of water contracts. They also deliver irrigation water to many irrigators and farmers in Box Elder, Davis, Morgan, Summit and Weber Counties.
4. **Treated Municipal Water**: The District wholesales culinary water to nearly 50 cities and water improvement districts in Davis and Weber Counties via 69 miles of transmission lines. This use accounts for approximately 22% of the District's contracts.
5. **Untreated Industrial Water**: This use accounts for about 5% of the District's Contracts.

» *Current and projected water demand/ Potential shortfalls in water supply*

As of 2015, existing contracts obligated 83% of the District's reliable yield supply. Current population projections for the District's service area show the population nearly doubling between 2010 and 2060 (575,500 to 1,099,100). As this growth takes place, additional water supply will be necessary to meet anticipated demands even with the conservation goals of 25% reduction in per capita use by 2025 and 35% conservation by 2050 when compared with year 2000 per capita use. Increased conservation will be critical and metering secondary connections as proposed in this project is one of the highest priorities of the District.

Water Delivery System

Describe the applicant's water delivery system as appropriate. For agricultural systems, please include the miles of canals, miles of laterals, and existing irrigation improvements (i.e., type, miles, and acres). For municipal systems, please include the number of connections and/or number of water users served and any other relevant information describing the system.

Delivery System: In addition to the summary below WBWCD receives 5,000 acre-feet from Echo Reservoir that was acquired as part of the Weber Basin Project. They have also acquired 1,357 acre-feet of Weber River Stock in Echo. **See Attachment B WBWCD Delivery System Information for a larger exhibit.**

Pressurized Secondary System: The District has approximately 17,000 individual connections that are operated and maintained by the WBWCD. There are many other irrigation companies having tens of thousands of residential connections that are serviced by WBWCD wholesale water throughout Davis and Weber Counties. Within the District's service area there are over 100,000 secondary irrigation connections.

DAMS & RESERVOIRS

Name	Location	Type of Dam	Height (ft)	Total Capacity (AF)	Usable District Capacity (AF)	Acquisition Dates
Causey	Eastern Weber County	Earth & Rock	200	7,870	6,870	1962-1964
East Canyon	Southern Morgan County	Concrete Arch	245	51,200	20,100	1965-1967
Lost Creek	Eastern Morgan County	Earth & Rock	220	22,500	20,010	1964-1966
Pineview	Ogden Valley, Weber County	Earth & Rock	91	110,150	66,228	1955-1957
Smith & Morehouse	South-eastern Summit County	Earth & Rock	82	8,350	6,560	1984-1988
Wanship	Summit County	Earth & Rock	156	62,120	60,860	1954-1957
Willard	Southern Box Elder County	Earth	36	227,189	202,160	1957-1963

AQUIFER STORAGE & RECOVERY

Name	Location	Pond Area (acres)	Capacity (cfs)	Acquisition Dates
ASR	Weber County	7.5	10	2002

DIVERSIONS

Name	Location	Pass-Through Capacity (cfs)	Acquisition Dates
Ogden Valley	South Fork of Ogden River	2,000	1962-1964
Slaterville	Weber River west of Ogden	9,000	1956-1957
Stoddard	Weber River north of Morgan	6,000	1955-1956

HYDRO GENERATION POWER PLANTS

Name	Location	Type	Capacity (kw)	Acquisition Dates
Causey	Eastern Weber County	2 unit	2,100	1999-2000
Gateway	Mountain Green	1 unit	4,275	1957-1958
Wanship	Wanship	1 unit	1,950	1957-1958

CANALS, TUNNELS & PIPELINES

Name	Location	Type	Capacity (cfs)	Length (miles)	Acquisition Dates
Davis Aqueduct	Davis County	Concrete pipe	355	23.0	1954-1957
Gateway Canal	Morgan County	Concrete-lined	700	8.5	1954-1956
Gateway Tunnel	Morgan and Davis County	Concrete-lined	435	3.3	1952-1954
Layton Canal	Davis County	Earth-lined/concrete-lined/pipe	260	18.0	1962-1964
M&I Pipelines	Davis and Weber County	Varies 6"-48"	varies	80.0	1955-2012
Ogden Valley Canal	Weber County	Part earth-lined	35	9.2	1962-1964
Secondary Pipelines	Davis and Weber County	Varies 2"-36"	varies	325.0	1955-2012
Weber Aqueduct	Weber County	Concrete pipe	80	5.0	1954-1956
Western Summit County	Summit County	Ductile Iron	8.9	9.0	2013
Willard Canal	West Weber County	Earth-lined/concrete-lined	1,050	11.0	1961-1963

PUMPING PLANTS

Name	Location	Capacity (cfs)	Height of Lift (ft)	Acquisition Dates
Antelope Booster	Layton	22	50	1978
East Bountiful	Bountiful	18	475	1955
East Layton	Layton	9	65	1955
Gateway	Mountain Green	150	150	1995
Kanesville #1	West Haven	3	218	2000
Kanesville #2	West Haven	10	315	2001
Layton Canal	West Haven	260	23	1955
Old Post Rd Booster	Ogden	6	200	1960
Rockport	Wanship	25	45	2009
Roy Drought Relief	Roy	150	340	1981
Sand Ridge East	Layton	9	92	1955
Sand Ridge West	Layton	15	138	1955
South Davis	Bountiful	18	530	1955
Unitah Bench	South Ogden	18	365	1955
Val Verda	Bountiful	6	240	1955
West Haven #1	West Haven	10	218	2003
West Haven #2	West Haven	3	230	2010
Willard No. 1	West Weber County	500	45	1960
Willard No.2	West Weber County	250	20	1960

UNDERGROUND WATER WELLS

Name	Location	Type	Capacity (cfs)	Acquisition Dates
Ben Lomond	Harrisville	M&I	1.8	2001
Bountiful	Bountiful	M&I	5.2	1961
Clearfield #1	Clearfield	M&I	5.0	1961
Clearfield #2	Clearfield	M&I	5.0	1961
Davis Boulevard	Bountiful	M&I	2.2	2003
District Well #2	South Weber	M&I	11.0	1985
District Well #3	South Weber	M&I	10.0	1990
Fairfield	Layton	M&I	10.0	1992
Farmington #1	Farmington	Irrigation	5.0	1995
Farmington #2	Farmington	Irrigation	5.0	1996
Laytona	Layton	M&I	5.0	1958
Mills Park	West Bountiful	Irrigation	2.2	2011
North Ogden	North Ogden	M&I	1.8	1967
North Weber	Harrisville	M&I	1.6	2006
Orchard Dr. Well	Bountiful	M&I	0.8	1991
Riverdale	Riverdale	M&I	6.6	1960
South Weber #1	South Weber	M&I	10.0	1962
South Weber #2	South Weber	M&I	10.0	1962
Washington Terrace	Washington Ter.	Irrigation	4.0	2013
West Bountiful 5th South	West Bountiful	Irrigation	4.0	1992
West Bountiful Golf	West Bountiful	Irrigation	2.0	1993

WATER TREATMENT PLANTS

Name	Location	Capacity (MGD)	Acquisition Dates
Davis North WTP	Layton, Davis	46	1955
Davis South WTP	Bountiful, Davis	16	1955
East Canyon WTP	Jeremy, Summit	5.5	2013
Weber South WTP	Ogden, Weber	32	1955

AF=Acre Feet • CFS=Cubic Feet per Second • MGD= Million Gallons per Day

Energy Efficiency

If the application includes renewable energy or energy efficiency elements, describe existing energy sources and current energy uses.

This project will have renewable energy components built into the project by installing one 20kW small hydropower generation pump turbine at the District's Causey Reservoir. Causey Reservoir currently has a powerhouse with two horizontal Francis turbines with a total capacity of 2.1 MW that produce power during the irrigation season. During the fall and winter, approximately 10 cfs is released through the dam to maintain required minimum flows in the South Fork of the Ogden River. Since this flow is much too small to generate power with the existing turbines at the site, the water is currently released without capturing any of the available energy. The District proposes to install piping and equipment necessary for a 20 kW hydroelectric unit to take advantage of the winter flows which must be released from the dam

and are currently not used to generate electricity. The water savings from this project will also reduce energy costs and save 387,365 kWh/yr. by reducing pumping times.

Relationship with Reclamation

Identify any past working relationships with Reclamation. This should include the date(s), description of prior relationships with Reclamation, and a description of the projects(s).

WBWCD has collaborated with Reclamation on a number of recently completed and ongoing cooperative projects, including:

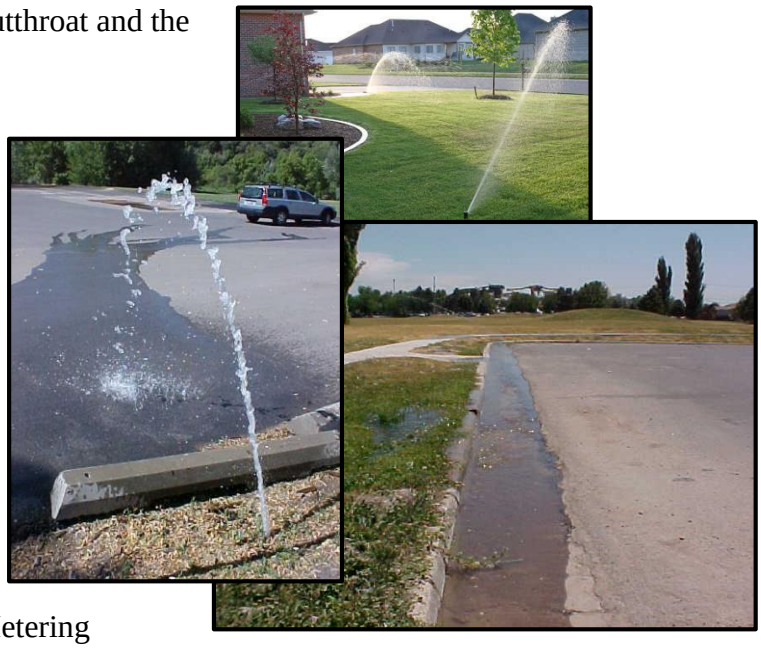
- Phase 3 Upper Willard Canal Lining and Water Marketing Project: This project, which received partial funding through the 2013 WaterSMART program has been completed.
- Phase 2 Upper Willard Canal Lining and Water Marketing Project: This project, which received partial funding through the 2012 WaterSMART program, has been completed.
- Phase 1 Upper Willard Canal Lining and Water Marketing Project: This project, which received partial funding through the 2011 WaterSMART program, is currently underway and is being constructed. Construction is completed.
- The Layton Canal Lining and Water Marketing Project: This project, which received partial funding through the 2010 WaterSMART program, has been completed.
- The first Secondary Water Meter Project: This project, which received partial funding through the 2010 WaterSMART program, has been completed with the installation of 1000 meters.
- System Trunk-line Meter Project: Completed in 2009, this project involved installation of large meters and provides information for the water deliveries through the many of the large lines that service portions of the District's retail secondary water system.
- System Optimization Review (SOR): Completed in 2008, this project evaluated the efficiencies of the District's entire water storage and distribution system.
- Weber River Basin Aquifer Recharge Water Bank: This project, which was completed in 2009, received partial funding through the 2007 Water 2025 program.
- Gateway Canal Landslide Stabilization Projects: This is an ongoing collaboration.

Technical Project Description

Describe the work in detail, including specific activities that will be accomplished as a result of this project. This description shall have sufficient detail to permit a comprehensive evaluation of the proposal.

WBWCD is proposing the Uintah Bench Secondary Water Metering & Small Hydro Project. The Project will include the installation of 2,956 secondary water meters on residential connections in the Uintah Bench area. The location of the proposed Project is shown in **Attachment A Project Location Map.** The Uintah Bench area was chosen because the project area is supplied by the Weber Aqueduct which is now at capacity. Additional users and future needs for irrigation water are projected to increase in the area in the future. The District began its secondary metering of individual connections in the Uintah Bench area in 2010 with the first 1,000 meters. The proposed Project will complete 2,956 WBWCD connections in Washington Terrace City South Ogden and Ogden Cities, which from prior data appears to be one of the higher water demand areas in the District. The project will also install a 20kW hydropower generation pump turbine located at the outlet Causey Reservoir and reconstruct the stream bed to allow for fish passage for the Bonneville Cutthroat and the Bluehead Sucker.

Photo 2 Water Waste in the Uintah Bench Area



In Utah it is estimated that approximately 60%-67% of all per capita water use is used to water landscapes. WBWCD is committed to reducing water usage and has made strides to reach a goal of reducing all water usage 25% by 2025 using the year 2000 as the base year. To achieve this goal, WBWCD knows there needs to be a push to significantly decrease residential outdoor water use in order to maintain water deliveries by 2025. Over the past ten years they have incorporated many methods of conservation, however, the two that have proven to have the greatest impact on conservation have been metering secondary water and public education. Metering secondary water can have and has had a profound impact on helping educate users how much they are really using as opposed to how much they actually need to use to water their lawns and gardens.

The District installed water meters on the trunk-line to the Project area in 2009. These meters have assisted the District in quantifying the water demand in the Project area. With the completion of this Project, the District will have the ability to compare the trunk-line water flows to the summation of the end user water flows to evaluate overall system efficiencies and identify the existence of other system loses.

As on past meter installation projects, WBWCD will purchase the water meters and the AMR radio transmitters for the Project. This reduces costs and properly correlates the meters to the appropriate address where they will be installed.

Prior to any physical construction or disruption to individual yards, a public involvement information campaign will be organized to identify and inform all users who will be affected. The District will also provide the time frame for installation and what benefits will come as a result of having an individual meter on their connection. The contractor will pass out door hangers prior to construction in any given areas to inform homeowners of their presence in the

areas where they will be working, providing at least 48 hours lead time to installation on their parcel.

The proposed project also includes the construction of a small hydroelectric facility at the District's Causey Reservoir. Causey Reservoir currently has a powerhouse with two horizontal Francis turbines with a total capacity of 2.1 MW that produce power during the irrigation season. During the fall and winter, approximately 10 cfs is released through the dam to maintain required minimum flows in the South Fork of the Ogden River. Since this flow is much too small to generate power with the existing turbines at the site, the water is currently released without capturing any of the available energy. The District proposes to install piping and equipment necessary for a 20 kW hydroelectric unit to take advantage of the winter flows which must be released from the dam and are currently not used to generate electricity. It is anticipated that approximately 68,000 kW-hr will be generated annually by this unit which will help offset winter heating, lighting, and telemetry loads at Causey Dam and Powerhouse and potentially allow for some power to be sold.

Evaluation Criteria

Evaluation Criteria A: Water Conservation

Subcriterion A.1: Quantifiable Water Savings

Describe the amount of water saved. *For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.*

The proposed project will include installing 2,956 additional end user meters. It is estimated the proposed project will conserve 1,360 acre-feet/year. See calculations 1 & 2 below.

Based on the data from existing metered end user connections in the Uintah Bench service area from 2012-2015 metered end user connections used on average 0.61 acre-feet/connection/yr. During the same time period, un-metered secondary connections are estimated to have used on average 1.07 acre-feet/connection/yr. The 1.07 acre-feet/connection/year was calculated using flow data for the Weber Aqueduct, the District's Washington Terrace Well and Burch Creek which all feed the Uintah Bench service area. From the total flow in, water delivered to the District's Weber South Water Treatment Plant, water consumed by metered end user connections and water wholesaled to other entities were removed. The remaining water is used by the Uintah Bench secondary unmetered service connections.

Calculation 1. Documented Water Use Reduction for Metered Secondary Connections

1.07 acre-feet/conn/yr. – 0.61 acre-feet/conn/yr. = 0.46 acre-feet/conn/yr. Water Savings

Calculation 2. Anticipated Water Savings for Proposed Project

2,956 new meters x 0.46 acre/conn/yr. savings = 1,360 acre-feet/yr.

In future projects the District plans to install a meter on every end user connection in the Uintah Bench service area. The District believes additional conservation is possible beyond the observed 0.46 acre-feet/conn/year if users continue to respond to the targets they are being given for appropriate use.

- ***Average annual acre-feet of water supply:***

  Within WBWCD's Uintah Bench secondary service area they deliver 12,268 acre-feet/year of water. Of this 12,268 acre-feet/year, 5,039 acre-feet/year is delivered for secondary water irrigation. The irrigation water services 4,990 connections. Currently, 809 of the 4,990 end user connections are equipped with a meter. (Water supplied for the 809 metered secondary connections is 430 acre-feet/year and 4,609 acre-feet for 4,181 un-metered secondary connections.) For this Project, the total water supply that will be considered is 4,609 acre-feet/year. The Project will be installing 2,956 additional meters.

- ***Where is the water that will be conserved currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground, etc.)?***

  Water is being overused on lawns, gardens, concrete sidewalks, and pastures. In some possible cases, the secondary system has been used to irrigate row crops and pastures.

- ***Where will the conserved water go?***

  Water conserved through this Project will be banked and used for future growth needs and to supply new connections and future demand needs for the Uintah Bench area. Water not needed for the Uintah area will remain in the system as stored water, stream flows, and potential water for hydro-power generation. It is also possible that saved water could go to meet needs in other areas of the District.

(2) Municipal Metering:

Municipal metering projects can provide water savings when individual user meters are installed where none exist to allow for unit or tiered pricing, when existing individual user meters are replaced with advanced metering infrastructure (AMI) meters, and when new meters are installed within a distribution system to assist with leakage reduction. To receive credit for water savings for a municipal metering project, an applicant must provide a detailed description of the method used to estimate savings, including references to documented savings from similar previously implemented projects. Applicants proposing municipal metering projects should address the following:

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

It is estimated the proposed project will conserve 1,360 acre-feet/yr. (Calculations 1 & 2). Based on the data from existing metered end user connections in the Uintah Bench service area from 2012-2015 metered end user connections used on average 0.61 acre-feet/connection/yr. During the same time period, un-metered secondary connections are estimated to have used on average 1.07 acre-feet/connection/yr. The 1.07 acre-feet/connection/yr. was calculated using flow data for the Weber Aqueduct, the District's Washington Terrace Well and Burch Creek which all feed the Uintah Bench service area. From the total flow in, water delivered to the District's South Weber Water Treatment Plant, water consumed by metered end user connections and water wholesaled to other entities were removed. The remaining water is used by the Uintah Bench secondary unmetered service connections.

Calculation 1. Documented Water Use Reduction for Metered Secondary Connections

1.07 acre-feet/conn/yr. – 0.61 acre-feet/conn/yr. = 0.46 acre-feet/conn/yr. Water Savings

Calculation 2. Anticipated Water Savings for Proposed Project

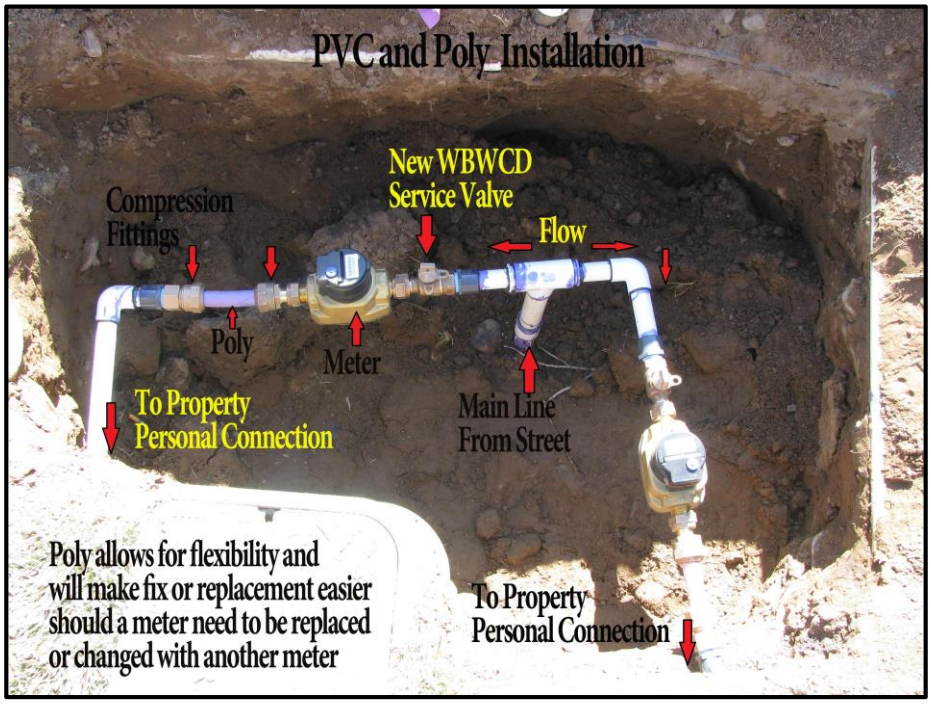
2,956 new meters x 0.46 acre-feet/conn/yr. savings = 1,360 acre-feet/yr.

In future projects the District plans to install a meter on every end user connection in the Uintah Bench service area. The District believes additional conservation is possible beyond the observed 0.46 acre-feet/conn/yr. if users continue to respond to the targets they are being given for appropriate use.

(b) How have current distribution system losses and/or the potential for reductions in water use by individual users been determined?

Water reductions for individuals in the proposed Project are being based on actual 2012-2015 metered connection data that are located within the project area. As was shown in the above calculations, there is an impact from having a meter on a water connection and showing water users what they use. Without usage information from the meter, people assume they are using a reasonable amount of water. However, when the actual usage is known, coupled with help and information on proper landscape water needs, data shows that water use in metered areas has decreased for the past four consecutive years. The calculation for how much each user can reduce usage is based on average use from what has been seen and recorded. However, it is believed that even greater savings can be achieved due to user demographics in remaining unmetered areas, parcel sizes, site locations and other factors that can play a role in high usage. WBWCD is confident that there will be substantial water savings with each new meter based on the historical data on meters already installed within the Weber Basin service area.

Photo 3 Meter Installation Diagram



(c) For installing individual water user meters, refer to studies in the region or in the applicant's service area that are relevant to water use patterns and the potential for reducing such use. In the absence of such studies, please explain in detail how expected water use reductions have been estimated and the basis for the estimations.

The District has installed a total of 2,683 secondary meters over their entire secondary service area. The first 1,000 meters were installed in part with WaterSMART FY2010 grant funding. Since then, the District has been installing additional meters each year in smaller numbers. All

new subdivisions and new service connections to the District's system are now required to install individual meters which accelerates the accomplishment of the goal that all District service connections be metered.

Data is available for all meters installed, but to have some consistency over time the District used data from a group of 1,057 meters that have usage records from 2012-2015. To analyze and determine effectiveness of these 1,057 meters, data was collected and compiled in hourly increments during the irrigation seasons of the past four years. In addition to usage data, the District has used mapping technology to identify the parcel size and the area of each parcel that would be considered to be "irrigated area" (everything that is not a physical structure or hardscape surfaces).

The four tables below show data from the 1,057 meters over the four-year period from 2012-2015. Each of these connections has data for this entire period. The data represents the same metered parcels for all years. The tables show the total amount of water allocated to the properties in the area, their actual use, and the use as a percentage of the allocation. The number and percent of properties that exceed the allocation is also shown.

Table 1 2012 Meter Data

2012 Meter Data								
							Exceeding Allocation	
Allocation Amounts	**# of Properties**	**Alloc. (AF)**	**Estimated Need (AF)**	**Use (AF)**	**% of Alloc.**	**% of Need**		
Washington Terrace	263	259.5	141.2	199.4	77	142	48	18%
South Ogden (Ph. 1)	292	251.9	155.0	228.6	91	148	81	28%
South Ogden Badgers	48	35.3	17.3	36.4	103	211	23	48%
South Weber	356	436.2	284.9	323.2	74	113	65	18%
South Ogden Ph. 2	98	86.8	64	85.8	99	134	43	44%
Total	**1,057**	**1,069.7**	**662.2**	**874.0**	**89%**	**150%**	**260**	**25%**

Table 2 2013 Meter Data

2013 Meter Data								
							Exceeding Allocation	
Allocation Amounts	**# of Properties**	**Alloc. (AF)**	**Estimated Need (AF)**	**Use (AF)**	**% of Alloc.**	**% of Need**	**#**	**%**
Washington Terrace	263	259.5	141.2	162.0	62	115	16	6%
South Ogden (Ph. 1)	292	251.9	155.0	172.8	69	111	42	14%
South Ogden Badgers	48	35.3	17.3	25.7	73	148	11	23%
South Weber	356	436.2	284.9	249.8	57	88	18	5%
South Ogden Ph. 2	98	86.8	64	65.1	75	102	17	17%
Total	**1,057**	**1,069.7**	**662.2**	**675.3**	**67%**	**113%**	**104**	**10%**

Table 3 2014 Meter Data

2014 Meter Data								
Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need (AF)	Use (AF)	% of Alloc.	% of Need	Exceeding Allocation	
							#	%
Washington Terrace	263	259.5	141.2	150.6	58	107	14	5
South Ogden (Ph. 1)	292	251.9	155.0	162.2	64	105	43	15
South Ogden Badgers	48	35.3	17.3	23.2	66	134	6	13
South Weber	356	436.2	284.9	235.8	54	83	20	6
South Ogden Ph. 2	98	86.8	64	58	67	91	10	10
Total	**1,057**	**1,069.7**	**662.2**	**629.9**	**62%**	**104%**	**93**	**9%**

Table 4 2015 Meter Data

2015 Meter Data								
Allocation Amounts	# of Properties	Alloc. (AF)	Estimated Need(AF)	Use (AF)	% of Alloc.	% of Need	Exceeding Allocation	
							#	%
Washington Terrace	263	259.5	141.2	124.8	48	88	4	2
South Ogden (Ph.1)	292	251.9	155.0	131.7	52	85	14	5
South Ogden Badgers	48	35.3	17.3	19.9	56	115	3	6
South Weber	356	436.2	284.9	192.8	44	68	10	3
South Ogden Ph. 2	98	86.8	64.0	46.5	54	73	4	4
Totals	**1057**	**1069.7**	**662.2**	**515.5**	**49**	**80**	**35**	**3%**

The relatively dry conditions over the last four years have brought a lot of media attention to water supply and water usage which could have brought more awareness to general public which may have had an influence on behavior and water reductions from year to year.

Each year the estimated need remains the same because it is based on the historical average reference rates with parcel size. The majority of users exceed the estimated need. Estimated need is listed on every metered customer's monthly usage report and is almost always less than the allotted amount they have for their parcel. **(see Attachment C Sample Monthly Usage Statement)**

The estimated need is based on the moisture needs of turf, which has the highest water demand in any landscape. The assumption is made that the entire landscape area is turf, which gives users a generous amount of water for different landscape needs. Considering that most yards are not 100% turf (turf requiring the highest water demand of landscape irrigation) and that other landscaping plants are more water efficient (trees, shrubs, gardens), it is a reasonable goal to have users reduce water consumption to meet and exceed their estimated need.

Table 5 below offers a side-by-side comparison of the 2012-2015 irrigation seasons again using the metered data group for calculation. On average, customers are using less than the traditional allocation which is 3 acre-feet per acre, per year. Average usage compared to estimated need over the four years shows a significant improvement from one year to the next. Users complying with the volume given them as the estimated need shows a significant improvement from 145% in 2012 to just 90% in 2015. However, each year has a fairly large standard deviation, meaning that the range of usage is quite large but still converging from one year to the next. Similar tendencies can be found on the percent of allocation used. This data seems conclusive in showing that having a meter and receiving usage information promotes accountability and will cause behavior changes in usage to occur when users are given a target.

Table 5 Water Use Comparisons of Metered Connections in 2012-2014

	2012	2013	2014	2015
Used Gallons	284,912,371	220,146,962	205,346,968	168,066,551
Used AF	874	675.3	629.9	515.5
Gross Acreage	324.4	324.4	324.4	324.4
Used AF / Gross Acreage	2.69	2.08	1.94	1.59
Landscaped Area	225.3	225.3	225.3	225.3
Used AF/ Landscaped Area	3.9	3	2.8	2.3
Estimated Need (Gal)	215,886,557	215,886,557	215,886,557	215,886,557
Percentage Used / Est. Need (Weighted)	145.00%	117.40%	109.71%	90.24%
Average % Allocation Used (Weighted)	83.00%	64.00%	59.60%	50.18%
Average Allocation	1.0 AF	1.0 AF	1.0 AF	1.0 AF
Total Allocation	1074.0 AF	1074.0 AF	1074.0 AF	1074.0 AF
***This data includes 1,057 meters that have data for 2012, 2013, 2014, and 2015, with accurate landscape area. 2012 was adjusted to reflect an Oct. 1st shutdown.**				

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

This project does not deal with the installation of distribution main meters. However, as mentioned WBWCD did install some main distribution meters in 2009 to help determine total water delivered to various areas. The Uintah Bench area was an area where mainline meters were installed. With this proposed Project, the portions of the Uintah Bench service area will be completely metered on all of secondary connections. This data will be compared with the data from the mainline meter to determine if there are system losses. If system losses are found, steps can be taken to find and repair leaks or to find and correct any unauthorized connections that may have been made to the system.

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

WBWCD is currently approving the installation of the Sensus Iperl meter for the traditional 1-inch connections. In the case that a service requires more flow than a 1-inch meter can supply, the Elster EvoQ4 meter will be used. However, there will only be a few of these meters. The approved EvoQ4 meter for larger connections comes in 2-inch and 4-inch size. The EvoQ4 meters are compatible with the AMR radio transmitter used to gather meter usage data.

Photo 4 Sensus IPerl Meter with AMR

The approved AMR radio transmitter unit being used on all connections is the Itron 100W. This unit is compatible with a wide range of manufacturers and provides usage data in hourly increments, which is important to the District. The WBWCD can use the hourly data to track irrigation timing and volume of water used at irrigation times. This proposed Project will involve the installation of 991 meters and radio transmitters during year one and 1,000 each year for years two and three.

Photo 5 EvoQ4 Meter

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

At the completion of each year of the Project WBWCD will have water usage data from every meter installed. The data will be in hourly increments from April 15 to October 15. The data will also include a monthly consumption value. Water savings will not be fully known after just one irrigation year, however the usage will continue to be gathered every year and comparisons made to show how water use will adjust and decrease over time. It has been seen that simply having a meter installed has helped users quantify their usage and alter their behaviors. The historic data shows that most users have been responsive and appreciative of receiving monthly water use statements, and have reduced water usage as a result.

WBWCD will be able to use historical trunk line meter data to compare usage from years prior to metering with years following metering. This will more accurately depict what impact the installation of individual meters has on the entire system.

Subcriterion A.2: Percentage of Total Supply

Provide the percentage of total water supply conserved: *State the applicant's total average annual water supply in acre-feet. Please use the following formula:*

The calculated estimated amount of water conserved from the proposed project is 1,360 acre-feet/year. With the estimated average annual water supply for the project area of 5,039 acre-feet/year giving a percentage of total supply of 27%.

$$\frac{\text{1,360 acre-feet/year } (\textit{Estimated Amount of Water Conserved})}{\text{5,039 acre-feet/year } (\textit{Estimated Average Annual Water Supply for the Project Area})} = \mathbf{27\%}$$

Evaluation Criteria B: Energy-Water Nexus

Subcriterion B.1: Implementing Renewable Energy Projects Related to Water Management and Delivery

Describe the amount of energy capacity. *For projects that implement renewable energy systems, state the estimated amount of capacity (in kilowatts) of the system. Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

The proposed project would install a reverse pump hydro power turbine at the existing Causey Power Plant. The District proposes to install piping and equipment necessary for a 20 kW hydroelectric unit to take advantage of the winter flows which must be released from the dam and are currently not used to generate electricity.

It is proposed tap the existing penstock upstream of the existing turbine shutoff valve and install piping to the proposed 20 kW reverse pump turbine to generate power to offset winter electric loads at the Causey Dam and Powerhouse.

The potential power is determined by the following calculation.

(128 feet of head x 2.2 cfs x 80% efficiency x 62.4)/737 = 19.07 kW or 20 kW motor

Describe the amount of energy generated. *For projects that implement renewable energy systems, state the estimated amount of energy that the system will generate (in kilowatt hours per year). Please provide sufficient detail supporting the stated estimate, including all calculations in support of the estimate.*

A portion of the existing winter flows will be routed through the proposed hydro turbine. Depending on the year and weather conditions, the unit would operate on average 5 months per year between October and April. It is expected that power will be generated for 24 hours a day for 5 months of the year. The total power generated for the year would be 68,000 kWh per year.

19 kW x 150 days x 24 hours = 68,000kWh per year

Describe any other benefits of the renewable energy project. *Please describe and provide sufficient detail on any additional benefits expected to result from the renewable energy project, including:*
•Expected environmental benefits of the renewable energy system

This renewable energy source will operate during the winter months. The balance of power generated that is not being used at the Causey Dam and Powerhouse can potentially be sold back to the power provider - Utah Association of Municipal Power Systems (UAMPS) or Rocky Mountain Power. This facility will help reduce the need to use more fossil fuels to meet the energy demands of WBWCD.

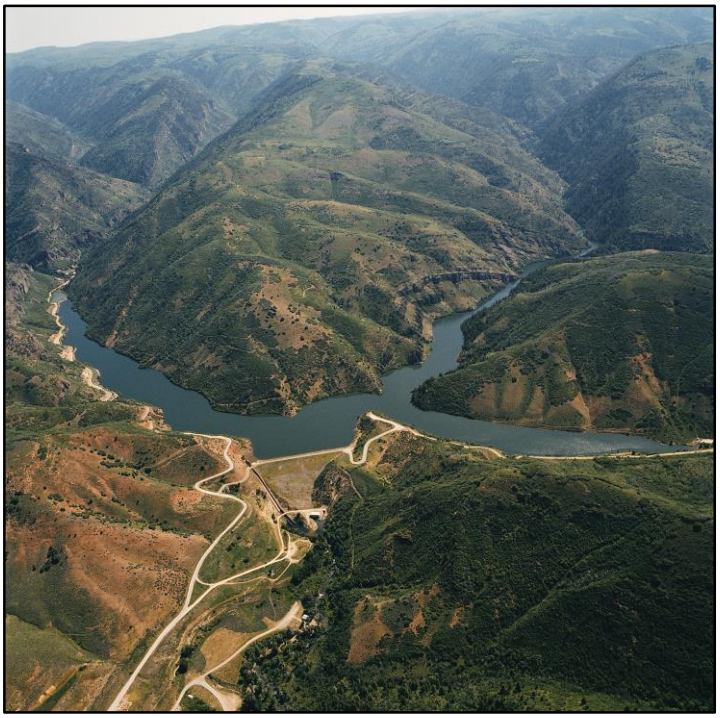
•Any expected reduction in the use of energy currently supplied through a Reclamation project

Yes, WBWCD currently uses energy which is generated at three power generation facilities. Gateway Power Plant and Wanship Power Plant were constructed as part of the Weber Basin Project. Causey Power Plant was constructed in 1999 at Causey Dam which is part of the Weber Basin Project. Power generated at these facilities is used to supply Weber Basin Project power

requirements such as project wells, treatment facilities and pumping stations. Since the energy currently used at Causey Dam and Powerhouse in the winter is energy from Reclamation project energy production, installing this new hydroelectric facility will allow this energy to power other District facilities.

Photo 6 Causey Dam

•Anticipated beneficiaries, other than the applicant, of the renewable energy system



Although this is a small amount of power in the overall scheme of things, the power generated will allow WBWCD to run other facilities in the District or sell back to the power provider - Utah Association of Municipal Power Systems (UAMPS) or Rocky Mountain Power, thus benefiting on a small scale the population along the Wasatch Front.

•Expected water needs of the renewable energy system

The small turbine hydropower generator will be operated by existing required winter flows. No additional water will be needed to operate the generator and, the generator will not deplete any water resources.

Subcriterion No. B.2: Increasing Energy Efficiency in Water Management

Describe any energy efficiencies that are expected to result from implementation of the water conservation or water management project (e.g., reduced pumping).
•Please provide sufficient detail supporting the calculation of any energy savings expected to result from water conservation improvements. If quantifiable energy savings are expected to result from water conservation improvements, please provide sufficient details and supporting calculations. If quantifying energy savings, please state the estimated amount in kilowatt hours per year.

Approximately 1,448 of the proposed 2,956 meters are located in a portion of the Uintah Bench service area that requires pumping to supply and pressurize the irrigation system. Total water savings for these 1,448 meters is expected to be 666 acre-feet/year (0.46 acre-feet/conn/yr. x 1,448 connections = 666.08 acre-feet/year).

In 2015, a total of 597,947 kilowatt hours (kWh) of electricity was required from April through October to pump approximately 1,819 acre-feet of water to the Uintah Bench pumped service areas. A one-to-one correlation of the amount of water saved to the amount of water pumped exists. Therefore, an energy savings of 218,944 kWh (666.08 acre-feet/ 1,819.10 acre-feet x 597,947 kWh) would be realized each year from the reduction in pumping.

$$597{,}947 \text{ kWh (total April-Oct.)} \times \frac{666.08 \text{ acre-feet}}{1{,}819.10 \text{ acre-feet}} = 218{,}944 \text{ kWh}$$

In addition, a portion of the water supplied to the Uintah Bench secondary system is provided by the Washington Terrace Well. Since the proposed project will save a significant amount of water,

the pumping costs at the Washington Terrace Well will be reduced. It is anticipated that a total of 1,360 acre-feet will be saved in the Uintah Bench area as a result of the proposed project. It is expected that this water savings will reduce the amount of water supplied from the Washington Terrace Well by 11.5% which will result in a reduction of 156.21 acre-feet of pumping from the well. A one-to-one correlation of the amount of water saved to the amount of water pumped exists. For 2015, the total Washington Terrace Well power use during the irrigation season was 1,015,921 kWh and the total volume pumped was 942.23 acre-feet. Therefore, an energy savings of 168,421 kWh (156.20 acre-feet / 942.23 acre-feet x 1,015,921 kWh) would be realized each year from the reduction in pumping.

$$1{,}015{,}921 \text{ kWh (total April-Oct.)} * \frac{156.20 \text{ acre-feet}}{942.23 \text{ acre-feet}} = 168{,}421 \text{ kWh}$$

Total Annual Pumping Cost Savings:

$$218{,}944 \text{ kWh} + 168{,}421 \text{ kWh} = 387{,}365 \text{ kWh}$$

This is a significant amount of energy which will be saved each year from the reduction in water being used due to the installation of individual meters.

•Please describe the current pumping requirements and the types of pumps (e.g., size) currently being used. How would the proposed project impact the current pumping requirements?

The reduction in water use due to the proposed metering project will decrease the amount of time the Uintah Bench Pump Station and Washington Terrace Well pump will need to run to satisfy water demands. The Uintah Bench Pump Station pumps water to the Uintah Bench Upper and Lower Reservoirs which feed approximately 1,448 of the 4,990 of the connections in the Uintah Bench area. The Uintah Bench Pump Station consists of two 200 Horsepower pumps and two 100 Horsepower Pumps. The Washington Terrace Well consist of a 500 Horsepower pump which provides a portion of the water to the entire Uintah Bench secondary service area.

•Please indicate whether your energy savings estimate originates from the point of diversion, or whether the estimate is based upon an alternate site of origin.

The energy savings are estimated from the point of diversion.

•Does the calculation include the energy required to treat the water?

No, the water used in the Uintah Bench secondary system is not treated.

•Will the project result in reduced vehicle miles driven, in turn reducing carbon emissions? Please provide supporting details and calculations. Describe any renewable energy components that will result in minimal energy savings/production (e.g., installing small-scale solar as part of a SCADA system).

No, there will be no saving on vehicle miles driven and no small scale renewable energy component will be incorporated besides the 20kW hydro generator proposed at the Causey Reservoir outlet.

Evaluation Criterion C: Benefits to Endangered Species

For projects that will directly benefit federally-recognized candidate species, please include the following elements:

•What is the relationship of the species to water supply?

The development of this project will allow for more water to be saved and held in Echo and Rockport Reservoirs and within the Weber River system. After talking with Paul Thompson, the Norther Regional Aquatics Manager with Utah Division of Wildlife Resources (UDWR) and Paul Burnett, with Trout Unlimited, it was indicated that if the District could allow more water to run down the Weber River during the irrigation season it would help the Bonneville Cutthroat Trout and Bluehead Sucker which are listed on the state's sensitive species list. It is proven and documented that by allowing for more available water to stay within the habitat areas for longer periods of time species are benefited. WBWCD is committed to working with the UDWR and Trout Unlimited to establish a percentage of the saved water to be released at critical times when the UDWR feels this could enhance the habitat for the Bonneville Cutthroat Trout and Bluehead Sucker. WBWCD will also work with UDWR and Trout Unlimited to enhance the culvert at Jacobs Creek and allow for better fish passage and allow access to spawning habitat for the Bonneville Cutthroat Trout and Bluehead Sucker. See the letters of support from the UDWR and Trout Unlimited under Letters of Support.

Photo 7Bonneville Cutthroat Trout

Based upon information obtained from UDWR, there are recent documented occurrences of the Bonneville Cutthroat Trout within a 2-mile radius of the Weber River in the area near Echo Reservoir. As well as recent occurrences for the bald eagle and Bluehead Sucker within ½ mile of the Echo reservoir all of which are included on the Utah Sensitive Species List. Although this project does not directly enhance the habitats for the species listed above, it is proven and documented that by allowing for more available water to stay within the habitat areas for longer periods of time, these species are benefited.

This project will allow for a water savings of 1,360 acre-feet. These savings along with implementing guidelines and requirements that allow for more water to remain in the Weber River system will help and enhance Jacobs Creek and the Weber River as well as help strengthen the working relationship between WBWCD, UDWR, and Trout Unlimited.

The Weber River has been deemed an impaired water. As WBWCD works with UDWR and Trout Unlimited to enhance fish passage and allow water to be released at critical times this project can also have an influence on the water quality within certain water use zones of the Weber River.

•What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?

The Bonneville cutthroat trout and the Bluehead sucker are native fish species found in portions of the Weber River. Both species are covered by conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Service and other parties. The population status of these two sensitive species warrants additional conservation effort to diminish the likelihood of future listings under the Endangered Species Act. The conservation agreements and strategies stipulate how those measures should be implemented. Low stream flows affect many aspects of the Weber River. Stable and connecting flows between those habitats are a fundamental requirement for those conservation actions to be successful. UDWR feels that projects that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction.

WBWCD has made major strides to improve their system to help allow for increased flows and higher water quality within the Weber River. While it is unknown as to the effect this project will have on other species besides the Bonneville Cutthroat Trout and the Bluehead Sucker the ability to enhance fish passage and make more water available in the Weber River will allow for better flows and take necessary steps in the right direction to protect and conserve native species.

For projects that will directly accelerate the recovery of threatened or endangered species or address designated critical habitats, please include the following elements:

(1) How is the species adversely affected by a Reclamation project?

N/A

(2) Is the species subject to a recovery plan or conservation plan under the ESA?

Both species are covered by conservation agreement that the State of Utah has entered into with the U.S. Fish and Wildlife Services. The population status of these two sensitive species warrants additional conservation efforts to diminish the likelihood of future listings under the endangered Species Act.

(3) What is the extent to which the proposed project would reduce the likelihood of listing or would otherwise improve the status of the species?

This project alone will not reduce the likelihood of listing but it is a step in the right direction. WBWCD, UDWR, and Trout Unlimited are willing to work together to allow for more water to flow at some of the most critical times of the year. This alone could improve the habitat and enhance the continuity of the Weber River

Projects that benefit both federally-recognized candidate species and federally-listed threatened or endangered species or designated critical habitat will receive additional consideration under this criterion. Please see <www.fws.gov/ endangered/index.html> for a complete listing of federally-recognized candidate species and federally-listed threatened or endangered species in your area.

Evaluation Criterion D: Water Marketing

Estimated amount of water to be marketed

Existing petition and water transfer agreement mechanisms will be used to market saved water. WBWCD is therefore able to market the entire amount of water saved through this project which is estimated to be 1,360 acre-feet/year. The marketed water will be used for the Uintah Bench area and will allow for future water sales without major infrastructure costs to increase trunk

lines or well development as the project area continues to reach its projected full growth potential.

- *A detailed description of the mechanism through which water will be marketed (e.g., individual sale, contribution to an existing market, the creation of a new water market, or construction of a recharge facility)*

  WBWCD has several mechanisms in place and continues to create a flexible water marketing legal structure which will allow this and other conserved water to be marketed for future uses. All of the water saved by the proposed project can be marketed. The District can sell additional water to the next block of users, the water could be used in WBWCD's groundwater recharge project and extracted later from wells, or it could simply be held in any of the upstream reservoirs until it is resold for the next needed growth area or usage type.

- *Number of users, types of water use, etc. in the water market*

  The proposed approach of storing the saved water at any of the WBWCD's upstream storage reservoirs will allow the District considerable flexibility in the number and types of users for the marketed water. As the demand for water is increasing, with few other sources of new water available, the District will have no difficulty in marketing water saved through this project.

- *A description of any legal issues pertaining to water marketing (e.g., restrictions under Reclamation law or contracts, individual project authorities, or State water laws)*

  Utah State law does not currently allow for water marketing. However, marketing this water to new customers within the existing service areas as described above does not violate any state laws. Water saved as a result of this project will most likely be marketed using the existing legal structure in place for many of the WBWCD's secondary water customers, via water lease petitions. Other mechanisms, such as transfer agreements, will also be considered to identify the best approach to achieve water conservation objectives in the WBWCD's SOR and Water Conservation Plan.

- *Estimated duration of the water market*

  The specific duration of transfer agreements will need to be determined during the course of the project. Water needed in the WBWCD's service area for new development would likely use the saved water and it would be a long term adjustment in water use agreements and allocations. If a water transfer agreement (or agreements) is the best approach for water conservation and water management, then WBWCD will negotiate these agreements. Interested parties will likely consist of the District's larger wholesale customers (other canal companies and cities).

Evaluation Criterion E: Other Contributions to Water Supply Sustainability

Subcriterion E.1: Addressing Adaptation Strategies in a WaterSMART Basin Study

- *Identify the specific WaterSMART Basin Study where this adaptation strategy was developed. Describe in detail the adaptation strategy that will be implemented through this WaterSMART Grant project, and how the proposed WaterSMART Grant project would help implement the adaptation strategy.*

Within the Colorado River Basin; Water Supply and Demand Study updated in 2013 there are 27 options submitted that related to municipal and industrial (M&I) conservation to reduce demand in areas receiving Colorado River supply. Many of these options were related to specific M&I conservation programs (e.g., metering, water accounting and loss control, public education, leak detection, irrigation efficiency, etc.) or targeted specific M&I water use sectors (e.g., golf courses, industrial use) that might provide additional opportunities for conservation in the Colorado River Basin (Basin) as a whole.

The project is consistent with this study as well as the State Regional Water Plan for the Weber River Basin in that the project addresses metering, irrigation efficiency, leak detection, and loss control. In the "Weber River Basin Planning for the Future" document prepared in September 2009 it states:

> *"The challenges facing the Weber River Basin are complex – solutions will involve many stakeholders and may stir emotional public debate and scrutiny…In order to meet future water needs, water planners and managers within the Weber River Basin must promote effective water conservation programs and measures. They must also ensure that agricultural water conversions are transferred to meet both indoor and outdoor urban water needs, and implement innovative water management strategies. This, along with carefully planned water developments, will secure sufficient water for the future."*

The Weber River Basin Plan of 2009 indicates, in Chapter 4 of the plan, several conservation goals that they would like to implement, most of which, this project will help to satisfy. The specific goal that this project will help implement is to help reduce outdoor use through better monitoring and more efficient application and delivery of the water. It also implements incorporating public conservation information programs which will be part of the metering portion of the project.

The 2009 Plan is available at http://www.slideshare.net/StateofUtah/weber-river-basin-2009-water-plan

- *Describe how the adaptation strategy and proposed WaterSMART Grant project will address the imbalance between water supply and demand identified by the Basin Study.*

  If water within the District's boundaries can be better managed and conservation goals achieved with the current water supply, there would be less of a need to seek for additional water supplies and to divert more water before it reaches the Colorado River. This may be part of water development in the overall Colorado River allocations and other source water allocations which are already out of balance and over allocated to meet the current needs according to the Colorado River Basin Water Supply and Demand Study 2013.

- *Identify the applicant's level of involvement in the Basin Study (e.g., cost-share partner, participating stakeholder, etc.).*

  WBWCD has participated in reviewing and commenting on the Colorado River Basin Water Supply and Demand Study 2013 and on the Weber River Basin Plan of 2009.

- *Describe whether the project will result in further collaboration among Basin Study partners.*

This project will require the collaboration with WBWCD as they are a major water seller in the basin. It will also allow for the collaboration between all of the cities and counties in which their secondary pressurized system is located.

Subcriterion E.2: Expediting Future On-Farm Irrigation Improvements

Include a detailed listing of the fields and acreage that may be improved in the future.

- *Describe in detail the on-farm improvements that can be made as a result of this project. Include discussion of any planned or ongoing efforts by farmers/ranchers that receive water from the applicant.*

  N/A

- *Provide a detailed explanation of how the proposed WaterSMART Grant project would help to expedite such on-farm efficiency improvements.*

  N/A

- *Fully describe the on-farm water conservation or water use efficiency benefits that would result from the enabled on-farm component of this project. Estimate the potential on-farm water savings that could result in acre-feet per year. Include support or backup documentation for any calculations or assumptions.*

  N/A

- *Projects that include significant on-farm irrigation improvements should demonstrate the eligibility, commitment, and number or percentage of farmers/ranchers who plan to participate in any available NRCS funding programs. Applicants should provide letters of intent from farmers/ranchers in the affected project areas.*

  N/A

- *Describe the extent to which this project complements an existing or newly awarded NRCS funded project or a project that either has been submitted or will be submitted to NRCS for funding.*

  N/A

Subcriterion E.3: Other Water Supply Sustainability Benefits

Will the project make water available to alleviate water supply shortages resulting from drought?

- *Explain in detail the existing or recent drought conditions in the project area. Describe the impacts that are occurring now or are expected to occur as a result of drought conditions?*

  In 2015, the state suffered its warmest and driest winter since the late 1800s, when Utah was still a territory. The lowest-elevation snowpack had melted by May 1st, and most of the higher altitudes quickly followed. Drought has continued to impact the water supply and will continue to have an effect on how WBWCD plans for the future. Utah's state water report characterized 2015 as "a dead skunk" and one of Utah water strategist warns the ongoing dry conditions are "the new normal." In 2015 federal officials declared eight counties in Utah drought-racked which would allow them to ask for emergency loans.

  Streams and reservoirs were running between 10% and 40% of normal. On a 1 – to – 100 scale that state officials use to rank their volume shows a low of 3 and an average of 25.

Utah state hydrologist Randall Julander, stated in an article in the Los Angeles Times, "that twenty-five is bad and three is a picture of a dead cow with a couple of buzzards on it. Drought now grips 40% of the West, with no end in sight: globally, nine of the 10 warmest years recorded since 1880 have occurred since 2000."

- *Describe the severity and duration of drought conditions in the project area.*

  This proposed project will increase the District's water supply by reducing water deliveries made as a result of end user accountability and their reduction in irrigation water use and conservation. Currently there are no major water shortages other than drought-related issues which will intensify as population grows. Due to increasing irregularity in weather patterns and the continued population growth within the District service area; this proposed project will help to ensure that water shortages and water crises can be averted by leaving more water in storage. It will allow additional water allocations with the current water supply that will be needed as growth in the system continues to occur.

  Utah has had six drought years out of the past ten years. The severity of the drought from year to year is what is having a real impact on Utah and on WBWCD's service area. WBWCD has had to reduce allocations to all of its users both retail and wholesale because of drought. Scientists have said that droughts in Utah aren't random. Instead, "there is a natural periodicity to them — distinct, multi-year wet and dry cycles of various durations." Climate cycles happen slowly in scale of a human lifetime, and an impending wet period doesn't mean Utah's in the clear when it comes to drought. Climate models still show that with human activities leading to a warmer planet, the West is going to continue getting drier overall so this project helps WBWCD continue their work toward their goal of reducing water use 25% by 2025 within their system.

- *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by drought. Provide a detailed explanation of how the proposed WaterSMART Grant project will improve the reliability of water supplies during times of drought.*

  This proposed project does not address drought specifically but is part of the District's drought mitigation measures. By reducing demands through conservation and metering measures, water supply can be extended with additional water being stored to help with prolonged drought situations. One other benefit is that with metering comes accountability when there is accountability, responsibility. The District will have the ability to measure the amount of water taken. If water shortages occur due to drought, various measures (depending on severity and length of drought) can be taken that may not have otherwise been possible such rationing water based on volume or being able find users that violate other drought condition restrictions

» *Will the project make water available to address a specific concern? For example:*

  – *Will the project directly address a heightened competition for finite water supplies and over-allocation (e.g., population growth)?*

  The water conserved and saved from the proposed project and the future metering of the entire District retail area will remain in storage reservoirs and will be remarketed to allow for future water needs to be met without developing new, expensive water sources. This will be a huge cost savings to all water users and will help the District to better plan for

and implement projects based on real need, not excessive use and waste. It will also avert and postpone the inevitable expensive challenges that will come as new water must be developed.

- *Describe how the water source that is the focus of this project (river, aquifer, or other source of supply) is impacted by climate variation.*

  All WBWCD's water supply is impacted by increased climate variability that may result in drought. Recently completed tree ring studies (dendrochronology) for the Weber River Basin show that prolonged years of drought occurred in the past 576 years that have not been observed in the years that streamflow records have been collected. Drought conditions could be even more severe in length or intensity due to climate change. The effects climate change and of future drought will be heightened by the increased demands on the system. This is why this metering project is so important to the District. Conservation is key to reducing the impacts of climate change.

- *Will the project help to address an issue that could potentially result in an interruption to the water supply if unresolved?*

  Not specifically.

» *Will the project make additional water available for Indian tribes?*

No.

» *Will the project make water available for rural or economically disadvantaged communities?*

Yes, possibly. WBWCD services many rural and economically disadvantaged communities (Coalville City, Clearfield City, Sunset City, etc.), the water saving from this proposed project could possibly be made available for others as they grow or require additional water

» *Does the project promote and encourage collaboration among parties?*

- *Is there widespread support for the project?*

  WBWCD, the cities in the service area, and other irrigation companies in the District support the improvements because they will help move the state of Utah and WBWCD closer to their goal of 25% in reduced water use by 2025. Letters of support for WBWCD project include Weber County, Division of Water Resources, Utah Division of Wildlife Resources, and Trout Unlimited and can be found under Letters of Support.

- *What is the significance of the collaboration/support?*

  Currently the District delivers water to many cities, sub-conservancy districts and private irrigation companies. The District has the highest percentage of secondary water use in the United States. This is the primary reason that emphasis has been made and the accountability for this water at the user level is such a priority. This project will allow the District to work with these other entities and lead the way in improving the efficiency of the secondary water systems within District boundaries.

  It will also increase water use awareness among residential water users in a way that could not be achieved in any other way. The District believes that this project, along with other conservation goals and activities will help prevent against water related crisis or

conflict because it will provide more water to be available for future needs and growth which is projected to double along the Wasatch Front by 2060. The future customers in the District's service area can be more aware of their water use and it will be easier to help them reduce if they fall into a category of excessive use.

- *Will the project help to prevent a water-related crisis or conflict?*

  The proposed project will reduce the potential for water related conflict. The District serves one of the fastest growing regions in the Western United States, with the population of the region (and thereby the demand for water) expected to increase by 20-30% by 2025. Due to this rapid growth, there is an increasingly volatile balance between the demand for irrigation water, and the rapidly increasing demand for additional municipal and industrial (M&I) water; particularly in years of drought contribute substantially to the District's conservation efforts and will help to alleviate potential future conflicts.

- *Is there frequently tension or litigation over water in the basin?*

  There is always tension when it comes to water. Natural disasters, drought, residential users over watering, and un-maintained canals and ditches seem to be the major factors in developing tension within any service area. WBWCD has had its share and, will continue to feel the tension especially as demands for more water come from expanding residential growth. However, in the past four years there has been more tension than usual due to the Safety of Dam Program (SOD) work at Echo Reservoir, the drought situation which reduced water allocations to our wholesale users.

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

  WBWCD has already seen conservation improvements by others i.e. Davis and Weber Counties Canal Company – large piping and metering projects in 2014 and 2015. Other improvements are happening within the WBWCD service area, as irrigation companies that WBWCD wholesales water to, are piping, pressurizing, and metering their systems.

» *Will the project increase awareness of water and/or energy conservation and efficiency efforts?*

  Yes, the educational programs developed on conservation that will be incorporated with this proposed project are ones that WBWCD has incorporated in the past. They plan to incorporate these same programs to continue awareness to all users not just those who will be getting meters. The education campaign will be for the entire service area.

- *Will the project serve as an example of water and/or energy conservation and efficiency within a community?*

  Yes. The metering and hydro project can be used as an example to other secondary water providers that maintain and operate their own secondary water systems.

- *Will the project increase the capability of future water conservation or energy efficiency efforts for use by others?*

  This project will increase water use awareness among residential water users in a way that could not be achieved in any other way. The District believes that this project, along with other conservation goals and activities will help others see the benefits of metering and will give others some best practice when it comes to incorporating a metering project. Past metering projects have shown major water and energy savings within the

WBWCD's system that can now make more water available and, reduce the cost and energy used for pumping that water, for future needs and growth which is projected to double along the Wasatch Front by 2060.

- *Does the project integrate water and energy components?*

  Yes. The project has both a water conservation of 1,360 acre-feet and a better management of 4,609 acre-feet of water. It also has an energy component that will produce 68,000 kWh/year allowing WBWCD to use or sell back the produced energy and will reduce energy used for pumping by 387,365 kWh at the Washington Terrace Well and Uintah Bench Pump Station.

Evaluation Criterion F: Implementation and Results

Subcriterion No. F.1: Project Planning

Does the project have a Water Conservation Plan, System Optimization Review (SOR), and/or district or geographic area drought contingency plans in place? Does the project relate/have a nexus to an adaptation strategy developed as part of a WaterSMART Basin Study)? Please self-certify, or provide copies of these plans where appropriate, to verify that such a plan is in place.

Provide the following information regarding project planning:

Weber Basin Water Conservancy District has a water conservation plan that has been implemented, updated and submitted in 2013 to the Utah State Division of Water Resources as well as the Bureau of Reclamation (Provo Area Office). The District has also completed an SOR in the overall planning and projecting of future water needs and demands. In addition, the proposed project does have a nexus to the Colorado River Basin Water Supply and Demand Study published by Reclamation in 2013. The District intends to follow existing plans and amend them as needed as water demands and water supplies continue to change.

(1) Identify any district-wide, or system-wide, planning that provides support for the proposed project. This could include a Water Conservation Plan, SOR, Basin Study, drought contingency plan, or other planning efforts done to determine the priority of this project in relation to other potential projects.

The District has completed a District Wide System Optimization Review (SOR). This SOR has identified canal lining and metering projects as the top two priorities. This application addresses metering projects. The District has also developed a water conservation plan that was most recently updated in 2013. Retail secondary irrigation metering is one of the priority items listed in the District's water conservation plan. Metering fits into conservation as well as water management plans that will assist the District in accounting for current water use while planning how to meet the needs for future demands.

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

The proposed project will assist the District in meeting its conservation goals, which is also the State of Utah's goal of a 25% reduction in per capita use by 2025. In the District's area with current unmetered secondary water, the greatest potential for conservation comes with accountability and end user knowledge of how much they use. Data that is presented in the proposal also shows the conservation savings which will be achieved to benefit the District and

to benefit surrounding areas and other water purveyors to meet water conservation goals, environmental improvement goals and energy reduction goals by reduced pumping costs.

Subcriterion No. F.2: Readiness to Proceed

Points may be awarded based upon the extent to which the proposed project is capable of proceeding upon entering into a financial assistance agreement.

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

Estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates:

SCHEDULE	Year 1				Year 2				Year 3			
Milestone/Task	Sept –Oct 2016	Nov 2016 - Jan 2017	Jan – April 2017	May - Sept 2017	Oct – Dec 2017	Jan – March 2018	April – May 2018	June - Sept 2018	Oct – Dec 2018	Jan –Mar 2019	April – Sept 2019	Oct 2019
Sign WaterSMART contracts												
Environmental Document prepared and approved by Reclamation												
Metering Project Bid/Award Full Project												
Metering Project Installation Year 1												
Metering Project Installation Year 2												
Metering Project Installation Year 3												
LOPP or FERC/Electrical/404 Permit Application												
Design Small Hydro Project												
Construction Jacob's Creek Fish Passage Culvert												
Construction Small Hydro Project												
Final reporting and project close-out												

Please explain any permits that will be required, along with the process for obtaining such permits. Identify and describe any engineering or design work performed specifically in support of the proposed project.

At time of award (Sept - Oct 2016) WBWCD will initiate conversation with Reclamation on the development of non-federal hydropower on Reclamation dam to determine if the project requires either a lease of power privilege (LOPP) or a license issued by the Federal Energy Regulatory Commission (FERC). It is indicated that permitting authority is mutually exclusive; each Reclamation dam is either within Reclamation's or FERC's jurisdiction. Along with this a power

sales agreement will need to be negotiated with Utah Association of Municipal Power Systems or Rocky Mountain Power. A 404 permit to do the work in the Creek will be required and application for this will be applied for at the same time.

Subcriterion No. F.3: Performance Measures

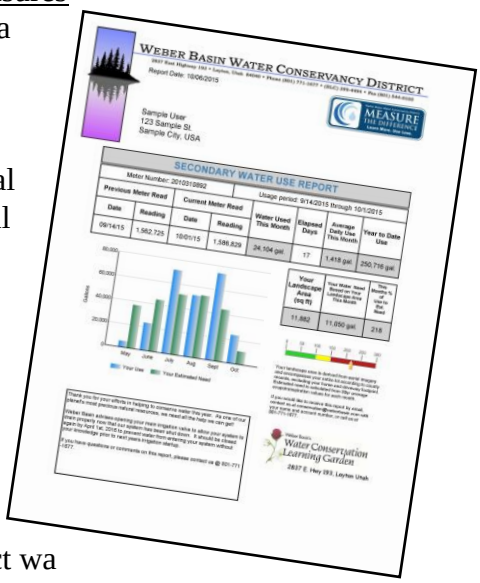
Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved, marketed, or better managed, or energy saved).

There are two areas of this project where performance measures can be documented and quantified to show the actual benefits upon completion of the project. They include renewable energy that will be generated and water that is saved and/or better managed.

Energy Generated Performance Measures

The energy produced by the reverse pump turbine will be metered. The metered output will be recorded monthly and compared to the estimation of power generated in this application.

Water Savings and/or Better Water Management Performance Measures



This proposed Project will be measured for success by the reading a logging of the data from the installed meters which will be logged monthly by an AMR system. The information gathered will be in hourly intervals and will be analyzed and compared over time to show and track water savings. As WBWCD logs hourly incremental data from the meter they are able to compare allocations with actual usage. This will allow them to determine if the allocations are too large, and use the collected water usage data to tailor and target water conservation educational material to users that may not understand or may not recognize they need assistance in reducing usage. Current usage is based on trunk line and facility meters in the area. This produces an average use per un-metered connection in the area. Once meters are installed, water savings will be quantified using the individual meters and new measures for targeting high use can be developed and implemented and the direct wa savings will be tracked.

All of this will be documented for the water users and sent to them for their information using the Water User Monthly Statement. **See Attachment C Sample Water User Statement.**

Subcriterion No. F.4: Reasonableness of Costs

Please include information related to the total project cost, annual acre-feet conserved, energy capacity, or other project benefits and the expected life of the improvement(s).

Total project cost: $ 2,500,000.00
Annual acre-feet conserved (or better managed): 4,609 acre-feet will be better managed and 1,360 acre-feet conserved
Energy saved from pumping: 387,365 kWh/year
Energy produced from hydro power generation: 68,000kWh/year

For all projects involving physical improvements, specify the expected life of the improvement in number of years and provide support for the expectation (e.g., manufacturer's guarantee, industry accepted life-expectancy, description of corrosion mitigation for ferrous pipe and fittings, etc.).

Expected life of the improvement:

- Meters 20 years
- 20 kW reverse pump turbine 20 years

Support for expectation: **(Please see Attachment D Technical Support)**

Evaluation Criterion G: Additional Non-Federal Funding

Of the total project costs is $2,500,000.00. WBWCD is requesting a Federal share of the project to be $1,000,000 or 40%. WBWCD will be responsible for the remaining $1,500,000.00 or 60% of the total project costs.

$1,500,000 Non-Federal Funding
$2,500,000 Total Project Cost = **60%**

Evaluation Criterion H: Connection to Reclamation Project Activities

(1) How is the proposed project connected to Reclamation project activities?

This project is directly connected to Reclamation activities, since the water supplying the Uintah Bench area is part of the Weber Basin Project. Much of the infrastructure, pumping and other activities are connected to Reclamation owned land, facilities and infrastructure that the District operates to provide the water where needed.

(2) Does the applicant receive Reclamation project water?

All the water received in the project area is original Weber Basin Project water. Weber Basin is the central entity for Reclamation Project water for the entire region.

(3) Is the project on Reclamation project lands or involving Reclamation facilities?

The majority of the proposed project will not take place on Reclamation project lands, but will have an effect on Reclamation facilities due to the decrease in water needed over the long term. Decreased usage equates to increase in storage, increase in water marketing, decrease in pumping and a less cost to upsize and improve existing infrastructure to carry additional water to meet the future demands. The 20kW small hydro unit will be constructed at the existing Causey Dam Powerhouse which is on Reclamation property.

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

The proposed project is within the Weber Basin District boundaries which is a Reclamation project.

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

This proposed project will serve to support Reclamation objectives and will augment water supplies in the Weber Basin area, thus reducing future conflicts for water to this area. Water saved in this project will be used for future demands in the Weber Basin service area, which is part of a Reclamation project.

(6) Will the project help Reclamation meet trust responsibilities to Tribes?

This proposed project will not affect responsibilities to Tribes.

Environmental and Cultural Resources Compliance

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

   The project will require only a minimal level of earthwork to install meters. There will be some excavation of the existing connection to all allow for a meter pit to be installed. No animal habitats will be negatively impacted, and work impacts will be very minimal even to existing landscapes. The work within Jacobs Creek will have all the required permits and approvals.

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

   No endangered species are impacted by this project.

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

   No wetlands are in the project boundaries.

4. *When was the water delivery system constructed?*

   The original District/Reclamation Project began in the late 1950's and continued over a several year period in the early 1960's. Since then additional infrastructure with conveyance canals and pipes have been added to meet the growing population water needs.

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

   No, there will be no major modifications to the main conveyance system within the metering portion of the project. All modifications will happen at the point of delivery to individual parcels. The 20kW hydro turbine will be located in an existing powerhouse at Causey Reservoir. The reconstruction of the stream banks at Jacobs Creek will go through all required permitting processes and approvals.

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

   No, WBWCD is not aware of any building, structures or features that would be impacted or would qualify. A cultural resource inventory will be completed as part of the submitted environmental document.

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

   No, WBWCD is not aware of any impacts to any archeological sites. An archeological resource inventory will be completed as part of the submitted environmental document.

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

   No, the project would not require a right-of-way or relocations from adjacent properties and would have no impact on residential uses within the study area.

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

   No.

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

    No.

Required Permits or Approvals

Applicants must state in the application whether any permits or approvals are required and explain the plan for obtaining such permits or approvals.

At time of award (June- Sept 2016) WBWCD will initiate conversation with Reclamation on the development of non-federal hydropower on Reclamation dam to determine if the project requires either a lease of power privilege (LOPP) or a license issued by the Federal Energy Regulatory Commission (FERC). It is indicated that permitting authority is mutually exclusive; each Reclamation dam is either within Reclamation's or FERC's jurisdiction. Along with this a power sales agreement will need to be negotiated with Utah Association of Municipal Power Systems or Rocky Mountain Power. A 404 permit to do the work in the Creek will be required and application for this will be applied for at the same time

Washington Terrace City, Ogden City and South Ogden City will be involved and notified of all project implications and timelines. Any concerns they have will also be addressed prior to the project construction. WBWCD will work with home owners to minimize installation impacts and provide an improved service connection.

Letters of Project Support

- Utah Department of Wildlife Resources – Paul Thompson, Northern Region Aquatics Manager
- Resolution of support from Natural Resources Committee and the Legislature of the state of Utah
- Trout Unlimited – Paul Burnett
- Division of Water Resources – Eric Millis, Director
- Weber County – Kerry Gibson, Weber County Commission, Chair

WEBER COUNTY

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January 5, 2016

Tage I. Flint, General Manager/CEO
Weber Basin Water Conservancy District
2837 East Hwy 193
Layton, UT 84040

Dear Tage,

Weber County is pleased to write in support of your grant application being submitted to the Bureau of Reclamation Water and Energy Efficiency Grants Program. We applaud your efforts to increase the efficiency of your system to conserve valuable water and energy. We understand that this metering project will meter all water supplied to the resident and inform the resident through a monthly statement of how much water they are using. This information will then be used by the resident to help them adjust their watering schedules and conserve water.

Weber County recognizes the importance of water conservation in our often water-short basin. The water saved through these improvement projects will provide benefit to water users and the regional environment. Weber Basin continues to be a valuable partner promoting wise water uses in our community.

We strongly support your grant application and appreciate the advancements it will make in water savings and improving water efficiencies in the District boundary of Weber Basin Water Conservancy District.

Sincerely,

Kerry W. Gibson
Weber County Commission, Chair

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Wildlife Resources
GREGORY J. SHEEHAN
Division Director

January 11, 2016

Darren E. Hess, P.E.
Assistant General Manager, Strategic Initiatives
Weber Basin Water Conservancy District
2837 East Highway 193
Layton, Utah 84040

Subject: U.S. Bureau of Reclamation Water and Energy Efficiency Grant

Dear Mr. Hess:

As the Aquatics Manager in Northern Utah for the Utah Division of Wildlife Resources (UDWR) , I am pleased to write in support of the grant application you are submitting to the U.S. Bureau of Reclamation Water and Energy Efficiency Grants Program. I applaud your efforts to increase the efficiency of your system to conserve valuable water and energy. All water savings in the Weber River are valuable to ensure that we have adequate water for future generations.

The Bonneville cutthroat trout and bluehead sucker are native fish species found in portions of the Weber River. Both species are covered by conservation agreements the State of Utah has entered into with the U.S. Fish and Wildlife Service and other parties. The population status of these two sensitive species warrants additional conservation effort to diminish the likelihood of future listings under the Endangered Species Act. UDWR's approach to aquatic species conservation and management in the Weber River, in part, focuses on reconnecting and maintaining connectivity of priority habitats by removing unnecessary barriers to fish migration, or by modifying existing barriers to allow upstream movement of these species, particularly for Bonneville cutthroat trout and bluehead sucker. Naturally of course, stable and connecting flows between those habitats are a fundamental requirement for those conservation actions to be successful. Within that context, most any project that enhances the continuity and maintenance of flows within the Weber River is a step in the right direction, as we work cooperatively to protect and conserve these native species.

The Weber Basin Water Conservancy District has been a great partner and contributed to a graduate student project that is currently studying bluehead sucker in the Weber River. The outcome from this study will be to determine important spawning locations (including spawning habitat requirements) and the type of low velocity/backwater habitats needed for juvenile bluehead sucker survival and recruitment. The results from this study will guide future management of bluehead sucker in the Weber River into the future and will help guide future habitat restoration projects.

The population of Bonneville cutthroat trout in the lower Weber River is quite unique in that they travel significant distances in the mainstem Weber River and

ultimately up into tributary streams to spawn. This life history attribute has been lost from almost all Bonneville cutthroat trout populations, but still persists in the Weber River! We are very excited regarding the objective in this grant application that specifically addresses a culvert in Jacobs Creek that needs to be modified to allow better access for adult spawning Bonneville cutthroat trout. Our data demonstrates that Jacobs Creek is the single most utilized stream for this spawning cutthroat trout population. The UDWR and Trout Unlimited (TU) have worked with Questar and replaced a culvert lower in Jacobs Creek and the modification of this culvert would remove the last barrier to movement and allow access to all cutthroat trout. Both the UDWR and TU are fully committed to partner with the Weber Basin Water Conservancy District to ensure that the work in Jacobs Creek is completed, thus allowing spawning access to this stream. This project will help ensure that Bonneville cutthroat trout do not become a federally listed species under the Endangered Species Act in the future.

Sincerely,

Paul Thompson
Northern Region Aquatics Manager
Utah Division of Wildlife Resources

GARY R. HERBERT
Governor
SPENCER J. COX
Lieutenant Governor

State of Utah
DEPARTMENT OF NATURAL RESOURCES
MICHAEL R. STYLER
Executive Director
Division of Water Resources
ERIC L. MILLIS
Division Director

January 11, 2016

Tage I. Flint, General Manager/CEO
Weber Basin Water Conservancy District
2837 East Hwy 193
Layton, UT 84040

Tage:

The Utah Division of Water Resources is in support of your grant application to the Bureau of Reclamation Water and Energy Efficiency Grants Program. We applaud and encourage your efforts to increase the efficiency of your system to conserve valuable water and energy. A recent state water audit identified universal metering as an important water conservation and accountability strategy. Your efforts to expand secondary water metering are in-line with that recommendation.

The Division recognizes the importance of water conservation. The water saved by these secondary water meters will provide benefit to water providers, users, and the regional environment. The Division has enjoyed working with Weber Basin on the Slow the Flow campaign, as well as Prepare60, aquifer storage and recovery, and various other programs to ensure water is managed as responsibly and efficiently as possible.

We strongly support your grant application for this secondary water metering project and appreciate the advancements it will make in water savings and improving water efficiencies within the service area boundary of Weber Basin Water Conservancy District.

Sincerely,

Eric L. Millis, P.E.
Director

1594 West North Temple, Suite 310, PO Box 146201, Salt Lake City, UT 84114-6201
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Paul Burnett
Director /Weber River Home Rivers Initiative

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801-781-7180
e-mail: pburnett@tu.org

7 October 2016

Darren E. Hess, P.E.
Assistant General Manager, Strategic Initiatives
Weber Basin Water Conservancy District
2837 East Highway 193
Layton, Utah 84040

Re: U.S. Bureau of Reclamation Water and Energy Efficiency Grants Program

Dear Mr. Hess,

As the project manager for Trout Unlimited's (TU) Weber River Restoration Program, I am happy to provide this letter of support for your grant application to the U.S. Bureau of Reclamation Water and Energy Efficiency Grants Program. TU supports your efforts to increase water use efficiency and improve fish passage in Jacobs Creek, a critical spawning tributary.

TU has approximately 1,500 volunteers and seven full-time staff in the State of Utah. Our mission is to protect and restore coldwater fisheries and their habitats in Utah and across the West. Consistent with that mission, we strongly support and participate in broad efforts to improve water quality, aquatic habitat and fish population resiliency within our communities as they surround our critically valuable waterways. We have extensive experience working collaboratively with water users, federal, state and local agencies and other non-governmental organizations in restoration across Utah with projects that improve water delivery, habitat quality, and connectivity ensuring the resiliency of coldwater fish populations. Local examples of those projects include:

- Lower Weber River Diversion Modernization – Fish passage and screening on a mainstem irrigation diversion near the mouth of Weber Canyon. Project partners, including TU, provided funding support to the water users to help them rebuild their diversion structure while incorporating critical fish passage and screening components into the system.

- South Fork Chalk Creek Reconnection – TU worked with a broad partnership to develop an irrigation diversion upgrade project near the mouth of the South Fork of Chalk Creek near Coalville, UT. In this case we managed the budgets and construction of diversion structure removal, and the construction of pivots with a screened intake structure.

- Fish Creek Reconnection – Also in the Chalk Creek watershed, TU staff worked with private landowners to remove a culvert, reconstruct the stream channel and hillslopes to restore fish passage and reduce sedimentation into the Chalk Creek watershed.

- Gordon Creek Reconnection – A direct tributary to the Weber River near Morgan, UT, this stream supports critical spawning and rearing habitat for Fluvial Bonneville cutthroat trout in the Weber River, although a majority of the spawning habitat has been disconnected from the river because of a waterfall at a driveway bridge. TU staff along with project partners rebuilt a 75-foot long section of stream to reestablish fish access to upstream reaches. We reconstructed the stream channel by installing 7 10-inch drops composed of large boulders to break up the large drop into passable steps.

The Weber Basin Water Conservancy District has been a strong partner in the watershed, by contributing to some of the projects above, by playing a leadership role in the Weber River Partnership and by contributing to research investigating bluehead sucker in the Weber River. The results of which, will guide future management of bluehead sucker and Bonneville cutthroat trout in the Weber River into the future and will help guide future habitat restoration projects.

As the UDWR has described in their letter of support, the population of Bonneville cutthroat trout in the lower Weber River is unique by being migratory, moving between the mainstem Weber River and tributary streams for spawning and rearing. This life history attribute has been lost from almost all Bonneville cutthroat trout populations, but still persists in the Weber River because of weakly connected tributary spawning habitat.

Like the UDWR, we are very supportive of the objective in this grant application that specifically addresses a culvert in Jacobs Creek that needs to be modified to allow better access for adult spawning Bonneville cutthroat trout. Data from the UDWR demonstrates that Jacobs Creek is the single-most-utilized stream for this spawning cutthroat trout population. The UDWR and TU have worked collaboratively with Questar to replace the lower culvert in Jacobs Creek. The modification of the upper culvert would ensure fish passage through the last barrier to movement and allow all cutthroat trout to access spawning habitat. Both the UDWR and TU are fully committed to partnering with the Weber Basin Water Conservancy District to ensure that the work in Jacobs Creek is completed, thus allowing spawning access to this stream. This project will help ensure that Bonneville cutthroat trout do not become a federally listed species under the Endangered Species Act in the future.

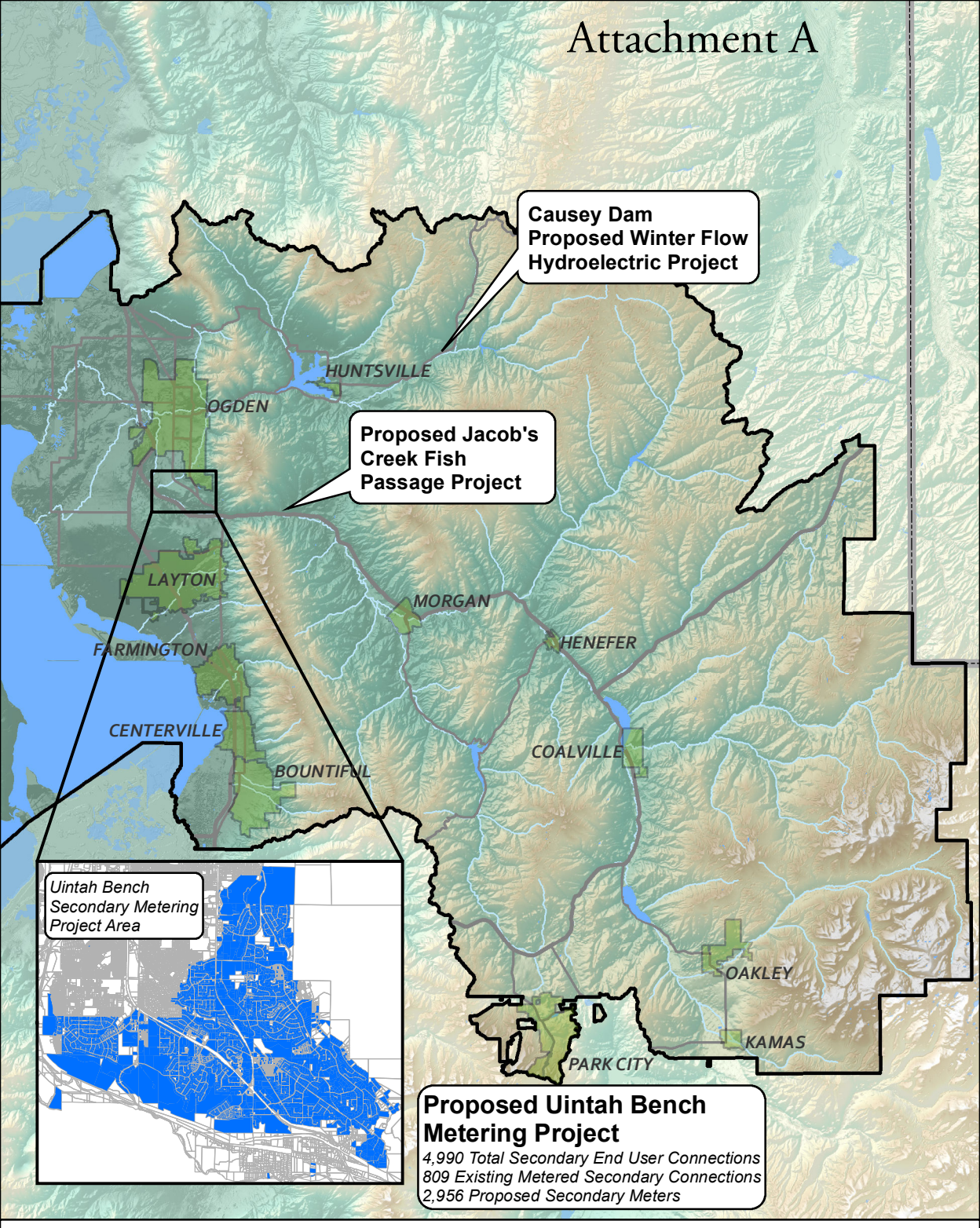
Kind regards,

Paul Burnett
Trout Unlimited
Weber River Home Rivers Initiative Coordinator

Official Resolution

Weber Basin Water Conservancy District will submit the official resolution within 30 days from the required due date.

Attachment A



WEBER BASIN WATER CONSERVANCY DISTRICT

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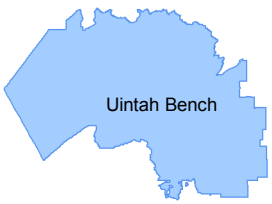


Weber Basin Service Area

Attachment B Delivery System Information

Weber Basin Water Principal Infrastructure

DAMS & RESERVOIRS

Name	Location	Type of Dam	Height (ft)	Total Capacity (AF)	Usable District Capacity (AF)	Acquisition Dates
Causey	Eastern Weber County	Earth & Rock	200	7,870	6,870	1962-1964
East Canyon	Southern Morgan County	Concrete Arch	245	51,200	20,100	1965-1967
Lost Creek	Eastern Morgan County	Earth & Rock	220	22,500	20,010	1964-1966
Pineview	Ogden Valley, Weber County	Earth & Rock	91	110,150	66,228	1955-1957
Smith & Morehouse	South-eastern Summit County	Earth & Rock	82	8,350	6,560	1984-1988
Wanship	Summit County	Earth & Rock	156	62,120	60,860	1954-1957
Willard	Southern Box Elder County	Earth	36	227,189	202,160	1957-1963

AQUIFER STORAGE & RECOVERY

Name	Location	Pond Area (acres)	Capacity (cfs)	Acquisition Dates
ASR	Weber County	7.5	10	2002

DIVERSIONS

Name	Location	Pass-Through Capacity (cfs)	Acquisition Dates
Ogden Valley	South Fork of Ogden River	2,000	1962-1964
Slaterville	Weber River west of Ogden	9,000	1956-1957
Stoddard	Weber River north of Morgan	6,000	1955-1956

HYDRO GENERATION POWER PLANTS

Name	Location	Type	Capacity (kw)	Acquisition Dates
Causey	Eastern Weber County	2 unit	2,100	1999-2000
Gateway	Mountain Green	1 unit	4,275	1957-1958
Wanship	Wanship	1 unit	1,950	1957-1958

CANALS, TUNNELS & PIPELINES

Name	Location	Type	Capacity (cfs)	Length (miles)	Acquisition Dates
Davis Aqueduct	Davis County	Concrete pipe	355	23.0	1954-1957
Gateway Canal	Morgan County	Concrete-lined	700	8.5	1954-1956
Gateway Tunnel	Morgan and Davis County	Concrete-lined	435	3.3	1952-1954
Layton Canal	Davis County	Earth-lined/concrete-lined/pipe	260	18.0	1962-1964
M&I Pipelines	Davis and Weber County	Varies 6"-48"	varies	80.0	1955-2012
Ogden Valley Canal	Weber County	Part earth-lined	35	9.2	1962-1964
Secondary Pipelines	Davis and Weber County	Varies 2"-36"	varies	325.0	1955-2012
Weber Aqueduct	Weber County	Concrete pipe	80	5.0	1954-1956
Western Summit County	Summit County	Ductile Iron	8.9	9.0	2013
Willard Canal	West Weber County	Earth-lined/concrete-lined	1,050	11.0	1961-1963

PUMPING PLANTS

Name	Location	Capacity (cfs)	Height of Lift (ft)	Acquisition Dates
Antelope Booster	Layton	22	50	1978
East Bountiful	Bountiful	18	475	1955
East Layton	Layton	9	65	1955
Gateway	Mountain Green	150	150	1995
Kanesville #1	West Haven	3	218	2000
Kanesville #2	West Haven	10	315	2001
Layton Canal	West Haven	260	23	1955
Old Post Rd Booster	Ogden	6	200	1960
Rockport	Wanship	25	45	2009
Roy Drought Relief	Roy	150	340	1981
Sand Ridge East	Layton	9	92	1955
Sand Ridge West	Layton	15	138	1955
South Davis	Bountiful	18	530	1955
Unitah Bench	South Ogden	18	365	1955
Val Verda	Bountiful	6	240	1955
West Haven #1	West Haven	10	218	2003
West Haven #2	West Haven	3	230	2010
Willard No. 1	West Weber County	500	45	1960
Willard No.2	West Weber County	250	20	1960

UNDERGROUND WATER WELLS

Name	Location	Type	Capacity (cfs)	Acquisition Dates
Ben Lomond	Harrisville	M&I	1.8	2001
Bountiful	Bountiful	M&I	5.2	1961
Clearfield #1	Clearfield	M&I	5.0	1961
Clearfield #2	Clearfield	M&I	5.0	1961
Davis Boulevard	Bountiful	M&I	2.2	2003
District Well #2	South Weber	M&I	11.0	1985
District Well #3	South Weber	M&I	10.0	1990
Fairfield	Layton	M&I	10.0	1992
Farmington #1	Farmington	Irrigation	5.0	1995
Farmington #2	Farmington	Irrigation	5.0	1996
Laytona	Layton	M&I	5.0	1958
Mills Park	West Bountiful	Irrigation	2.2	2011
North Ogden	North Ogden	M&I	1.8	1967
North Weber	Harrisville	M&I	1.6	2006
Orchard Dr. Well	Bountiful	M&I	0.8	1991
Riverdale	Riverdale	M&I	6.6	1960
South Weber #1	South Weber	M&I	10.0	1962
South Weber #2	South Weber	M&I	10.0	1962
Washington Terrace	Washington Ter.	Irrigation	4.0	2013
West Bountiful 5th South	West Bountiful	Irrigation	4.0	1992
West Bountiful Golf	West Bountiful	Irrigation	2.0	1993

WATER TREATMENT PLANTS

Name	Location	Capacity (MGD)	Acquisition Dates
Davis North WTP	Layton, Davis	46	1955
Davis South WTP	Bountiful, Davis	16	1955
East Canyon WTP	Jeremy, Summit	5.5	2013
Weber South WTP	Ogden, Weber	32	1955

AF=Acre Feet • CFS=Cubic Feet per Second • MGD= Million Gallons per Day

Attachment C

WEBER BASIN WATER CONSERVANCY DISTRICT

2837 East Highway 193 • Layton, Utah 84040 • Phone (801) 771-1677 • (SLC) 359-4494 • Fax (801) 544-0103

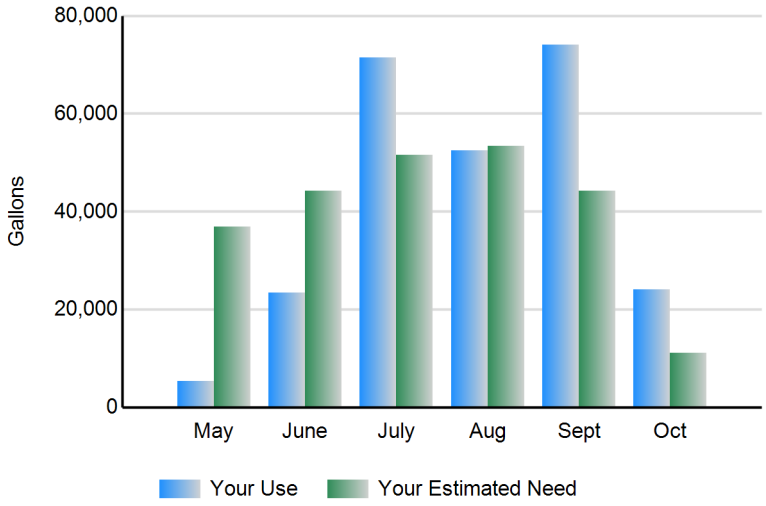
Report Date: 10/06/2015

Weber Basin Water Conservancy District
MEASURE THE DIFFERENCE
Learn More. Use Less.

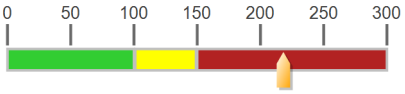
Sample User
123 Sample St.
Sample City, USA

SECONDARY WATER USE REPORT

Meter Number: 2010310892		Usage period: 9/14/2015 through 10/1/2015					
Previous Meter Read		**Current Meter Read**		**Water Used This Month**	**Elapsed Days**	**Average Daily Use This Month**	**Year to Date Use**
Date	**Reading**	**Date**	**Reading**				
09/14/15	1,562,725	10/01/15	1,586,829	24,104 gal.	17	1,418 gal.	250,716 gal.



Your Landscape Area (sq ft)	Your Water Need Based on Your Landscape Area This Month	This Months % of Use to Est. Need
11,882	11,050 gal.	218



Your landscape area is derived from aerial imagery and encompasses your entire lot according to county records, excluding your home and driveway footprint. Estimated need is calculated from 30yr average evapotranspiration values for each month.

If you would like to receive this report by email, contact us at conservation@weberbasin.com with your name and account number, or call us at 801-771-1677.

Thank you for your efforts in helping to conserve water this year. As one of our planet's most precious natural resources, we need all the help we can get!

Weber Basin advises opening your main irrigation valve to allow your system to drain properly now that our system has been shut down. It should be closed again by April 1st, 2016 to prevent water from entering your system without your knowledge prior to next years irrigation startup.

If you have questions or comments on this report, please contact us @ 801-771-1677.

Weber Basin's
Water Conservation Learning Garden
2837 E. Hwy 193, Layton Utah

iPERL™ Water Management System

Specifications

Attachment D

TYPE

Solid state, battery operated electromagnetic flow measurement system with a hermetically sealed, glass covered, electronic register with a programmable 9-digit display.

CONFORMANCE TO STANDARDS

Must conform to American Water Works Standard C-700 and C-710 as most recently revised with respect to accuracy and pressure loss requirements, or other appropriate American Water Works Standard. Must be compliant with NSF/ANSI Standard 61 Annex F and G.

REGISTER

The register must be an electronic device encapsulated in glass with 9 programmable digits utilizing a liquid crystal display (LCD). It will have indicators for flow direction, empty pipe, battery life and unit of measurement. The register must be hermetically sealed with a heat tempered glass cover and be tamperresistant. The register shall not be removable from the measuring sensor. The register shall utilize a magnetic coupling technology to connect to a touch read, radio read or fixed base meter reading system in either an inside or pit set installation.

MEASURING ELEMENT

The measuring element shall be made of a noncorrosive, lead-free glass fiber reinforced, composite alloy material. A battery powered magnetic flow sensor utilizing silver/silver chloride electrodes will be utilized to measure the velocity of the ater which is linearly proportional to the volume. The measuring element will have no moving parts and will be specific for each size.

EXTERNAL HOUSING

The register and measuring element will be an integrated unit housed within a thermal plastic external casing. This integrated unit will not be removable from the external housing. The systems shall have the size and direction of water flow through the system imprinted on the external housing.

PRESSURE CAPABILITY

System shall operate up to a working pressure of 200 pounds per square inch (psi), without leakage or damage to any parts. The accuracy shall not be affected by variation of pressure up to 200 psi.

PERFORMANCE WARRANTIES

In evaluating bid submittals, warranty coverage will be considered. All bidders are required to submit their most current nationally published warranty statements for water meter maincases, registers and measuring chambers.

OPERATING CHARACTERISTICS

Under normal operating conditions, the unit shall be calibrated for flow as low as:

Sizes	Starting Flow (GPM)	Low Flow Range (+/ 3%)	Normal Operating Range (+/ 1.5%)	Pressure Loss (Not to Exceed)
5/8”	0.03	>0.11<0.18	0.18 to 25	4psi @ 15gpm
5/8” x 3/4”	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4” Short	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
3/4” Reg	0.03	>0.11<0.18	0.18 to 35	2psi @ 15gpm
1”	0.11	>0.3<0.4	0.4 to 55	2psi @ 25gpm

8601 Six Forks Road, Suite 700
Raleigh, NC 27615
1-800-638-3748
www.sensus.com/water

SENSUS