Beaumont-Cherry Valley Water District

Advanced Metering Infrastructure (AMI) Project

WaterSMART: Water and Energy Efficiency Grant Proposal

by Beaumont-Cherry Valley Water District

Funding Group II

Bureau of Reclamation – WaterSMART Grants: Water and Energy Efficiency Grants for Fiscal Year 2020

BOR-DO-20-F001

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Executive Summary

October 3, 2019
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Beaumont-Cherry Valley Water District
Riverside and San Bernardino Counties, California

The Beaumont-Cherry Valley Water District (District) has received notice of Funding Announcement No. BOR-DO-20-F001 related to the WaterSMART: Water and Energy Efficiency Grants by the United States Department of the Interior, Bureau of Reclamation, Denver, Colorado. The District is the project applicant for this grant. As such, the District has received authorization from its Board of Directors to pursue this grant with the objective of conserving drinking water and recycled water resources through efficient and effective measurement techniques as provided by the Advanced Metering Infrastructure (AMI) Project. The District requests $1,500,000, or 26 percent of the $5,704,270 estimated project costs for the 3-Phase AMR/AMI project. The proposed AMI project will complete the conversion of 100 percent of the District's drinking water and recycled water connections, or approximately 19,154 meters, to an efficient Advanced Meter Infrastructure system. The existing meters are an average of 10 years old, and require the District staff to physically inspect the meters onsite. There is no way to determine daily patterns of water use or quickly "see" leaks with the current system and data. A leaky faucet may persist, or a crack in a distribution system pipe may leak for months or years before identifying the problem, thus wasting valuable resources. The three-year project implementation of an AMI system will modernize the current process, provide more accurate and consistent reading and provide real-time water usage information to customers. This will expedite the identification of leaks, eliminating the lag time between leak and detection, identify leaks in the distribution system, and help educate customers on water conservation.

The project will include the following activities, which will occur concurrently, with the project moving forward along each phase as each step is completed:

- **Phase 1 (2019-2020)**

The District currently (as of September 1, 2019) has 4,957 smart meters in use throughout the District. The implementation project has been ongoing in phases based on safety[1], accessibility, and location. In addition, new developments have been required to install the meters. Throughout the District, as meters require replacement, they are being replaced with smart water meters. ***Installation of these 4,957 meters has already occurred, and this is not part of this grant application. The District***

[1] Installed based on difficulty of access or those that are "unsafe" (i.e. no sidewalks, dogs on property, etc.)

does not intend to use grant funding to reimburse the District for installation of these meters.

The final step of Phase 1 will identify meters to be retrofitted with the smart water meter components. These meters are already installed in the ground and have the wiring component available to accept an Itron radio transceiver. With the additional components, these meters will be Automated Infrastructure (AMI) capable.

Any meters replaced during this phase as part of regular maintenance will be replaced to be Automated Infrastructure (AMI) capable.

- **Phase 2 (2020-2021)**

Phase 2 will primarily focus on identifying remaining meters that do not have the wiring component available to accept a radio receiver. These meters are already installed in the ground and will need to be completely replaced. Once replaced, the smart water meters will be Automated Infrastructure (AMI) capable with an Itron radio receiver and an upgraded meter box lid, when necessary.

With this, all existing 19,154 meters, including all newly installed meters, will be smart water meters. This is every meter in the District's distribution system, and all newly installed meters moving forward. The completion of Phase 2 at the end of year two will result in full district-wide AMR functionality.

- **Phase 3 (2021-2022)**

Phase 3 will finalize the total conversion to AMI by installing repeater equipment throughout the District will be distributed over the final year of the project. This will include finding the potential locations for the repeaters, equipment placement, and related licensing.

Direct results of the proposed Advanced Meter Infrastructure project include:

- Savings of 927 acre-feet (AF) of drinking water per year, all of which will reduce the amount of imported water from the California State Water Project (SWP).
- 5,022,486 kWh (5,418 kWh/AF x 927 acre-feet per year (AFY) reduction in energy from the SWP
- 693,396 kWh (748 kWh/AF x 927) reduction in energy usage to pump, treat and distribute 927 AFY
- 2,168 miles driven annually by staff meter readers, resulting in
- 181 gallons of fuel and 1.6 metric tons of carbon dioxide emissions

This project supports the Water and Energy Efficiency goals of the Bureau of Reclamation (BOR) thorough both water savings and increased reliability. Furthermore, it enhances the BOR's mission to *manage, develop and protect water and related resources in an environmentally friendly and economically sound manner.* The project leverages the money and resources of the District's ratepayers to conserve water and increase

efficiency, and it offsets groundwater pumping in an adjudicated basin with a potential risk of future water conflict.

Following the 2020 Funding Award, Phase 1 of the District's AMI Project will be completed by July 2020, Phase 2 will be completed by April 2021, and Phase 3 will be completed by October 2022, within three (3) years of awarding of the grant. This project does not include coordination, use, or installation of automatic meters on a Federal facility.

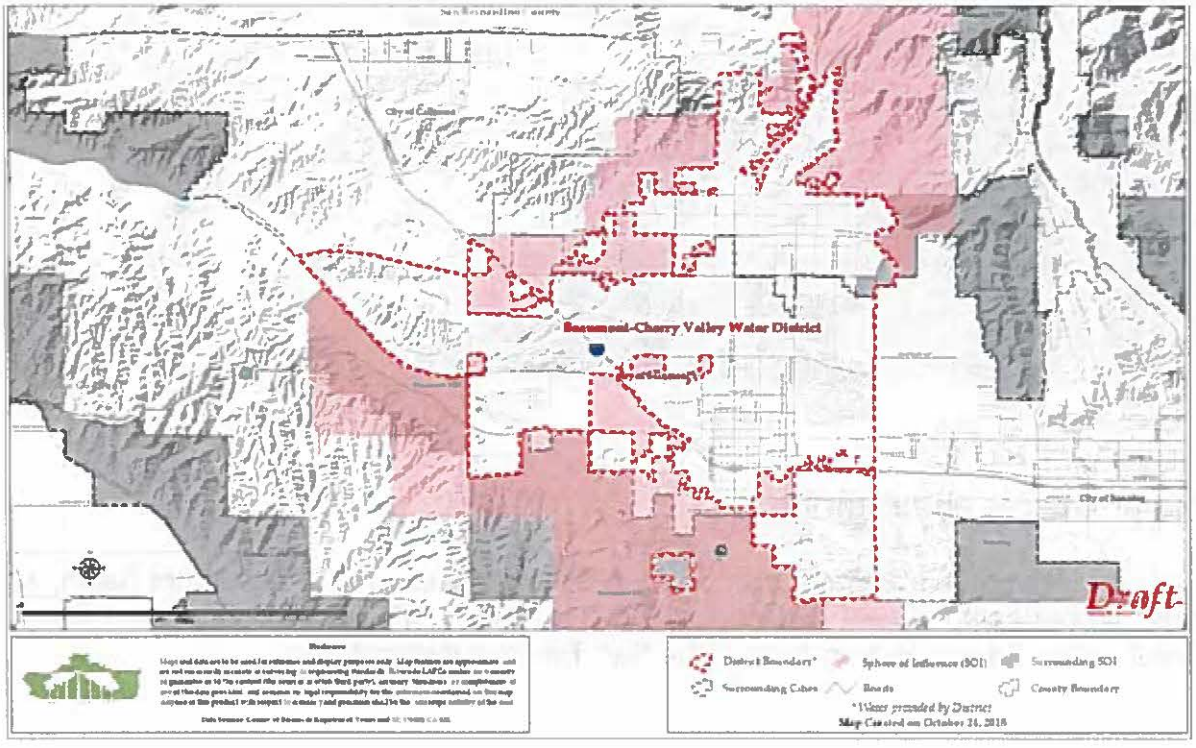
Background Data and Project Location

The District was formed in 1919 as the Beaumont Irrigation District. The name was changed to the Beaumont-Cherry Valley Water District in 1973. The District is governed by a five (5) member Board of Directors (Board). Board members are elected from five separate divisions of the District for staggered four-year terms. Day-to-day management of the District is designated to the General Manager, who works closely with an executive team and oversees the District's services and functions.

Project Location

The District is located in the State of California approximately 75 miles east of Los Angeles along Interstate 10. Figure 1 shows the current boundaries of the District, and Figure 2 shows the location of the District within Southern California location. The project latitude is 33°55'N and 116°58'W.

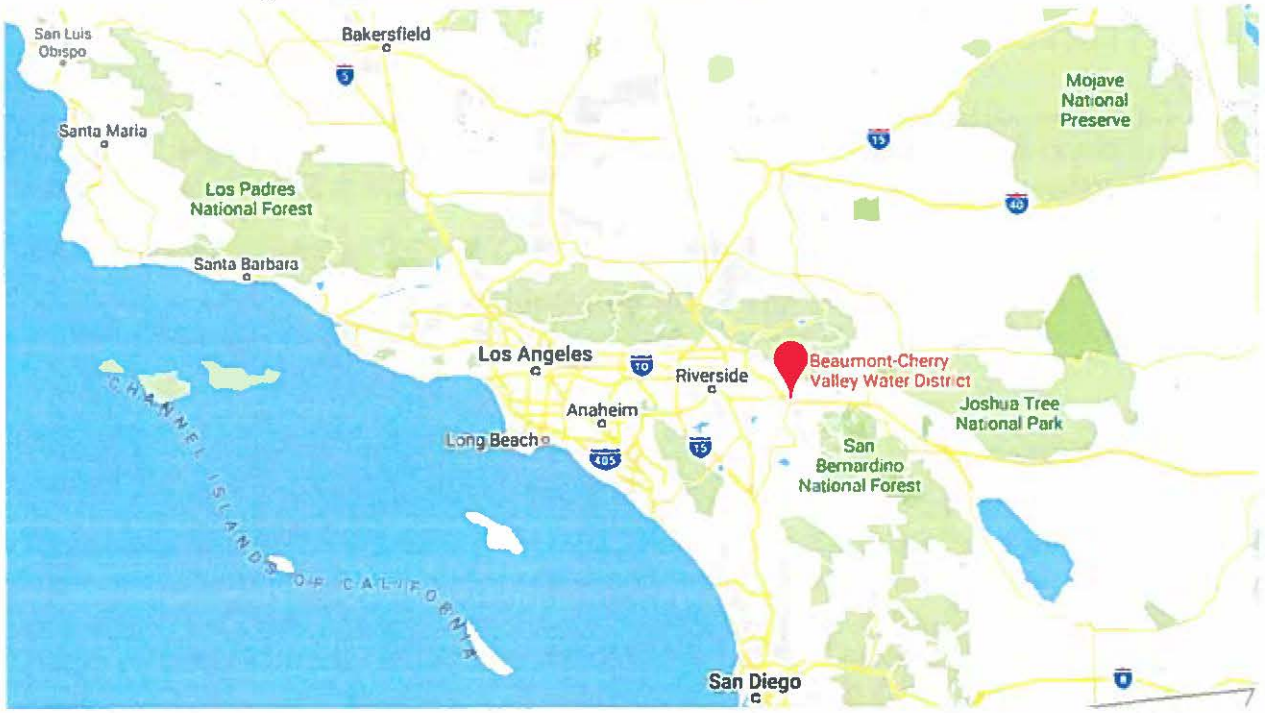
Figure 1: District Boundaries



The District's present service area covers approximately 28 square miles, virtually all of which is in Riverside County, and includes the City of Beaumont, the community of Cherry Valley and a small area of the City of Calimesa. The District owns 1,524 acres of watershed land in Edgar Canyon in San Bernardino County located just north of the Riverside-San Bernardino County line where the District operates a number of wells and several reservoirs.

The District's service area ranges in elevation from 2,300 feet above mean sea level (MSL) in Fairway Canyon area of Beaumont on the western boundary, to 2,900 feet in Cherry Valley, and over 4,000 feet in the upper reaches of the current Sphere of Influence (SOI). The area serves primarily as a "bedroom" community for the Riverside/San Bernardino Area and the communities east of Los Angeles County along the I-10 corridor.

Figure 2: District Location within Southern California



Water Supply and Demand

The District's potable water system is supplied by 24 wells in the Beaumont Basin, which must be replenished with water imported from the SWP, and the Little San Gorgonio Creek in the Edgar Canyon area of the San Timoteo Watershed.

Wells in Edgar Canyon are the preferred source but have limited yield and are not able to meet the current average daily demand, particularly in dry years. These wells provide approximately 15 to 20 percent of the total annual supply.

Wells in the Beaumont Basin are large capacity and pump from deep aquifers, providing the majority of supply. The safe yield of the Beaumont Basin was designated at 6,700 AF in 2013. When the safe yield is re-evaluated in 2023, District staff expects the number to be revised downward. The District's current share of the designated safe yield is 42.51 percent, or 2,848 AF per year. As shown in **Table 1** below, the 2015 UWMP estimates a need for 12,820 AFY to serve the anticipated population at build-out in 2035; therefore, the District must always be seeking additional water supplies wherever the opportunity arises, especially via local programs and efficiencies such as the AMI project.

The District's total well capacity is about 27.5 million gallons per day (mgd) to handily meet the 2018 15.3 mgd maximum demand. However, trends in 2018 show a rise in demand, likely due to relaxation of state drought restrictions, ongoing population growth, and customers returning to pre-drought-restriction habits. The District has engaged a public relations firm to assist with conservation messaging and outreach related to potential upcoming rate increases.

Table 1 – Additional SWP Imported Water Needs for Beaumont-Cherry Valley Water District

Year	**2015**	**2020**	**2025**	**2030**	**2035**
Imported Water Available for Recharge, AFY	2,316	2,020	1,890	1,845	1,795
Imported Water Used in Non-potable Water System, AFY	724	1,020	1,150	1,195	1,245
Total Imported Water Used to Meet Demands, AFY	3,040	3,040	3,040	3,040	3,040
Deficiency in AFY	4,366	4,686	6,126	7,850	9,780
Total Imported Water Needed, AFY	7,406	7,726	9,166	10,890	12,820

Source: Beaumont Cherry Valley Water District, from 2015 Urban Water Management Plan (UWMP)

Over the past decade, the Inland Empire has experience massive population growth. Riverside County is the second fastest growing county in the state. The population of the City of Beaumont has nearly quadrupled from 11,000 people in 2000 to 48,000 people in 2018. The City of Beaumont remains one of the fastest growing cities in the State of California. The approximate current population served by the District is 55,592. According to the Southern California Association of Governments, the population served by Beaumont-Cherry Valley Water District is expected to reach approximately 97,000 by

2030. The built-out population in the District's SOI is estimated to be about 112,300 based on projections of land use, as shown in **Table 2**.

Table 2 – Current and Projected Population in Beaumont-Cherry Valley Water District Service Area

Area	Population						
	2015	2020	2025	2030	2035	2040	Build-out
Beaumont	41,780	54,764	62,522	71,149	78,883	83,665	92,806
Cherry Valley	6,597	6,622	6,784	7,244	8,066	11,139	19,494
District Totals	48,377	61,386	69,306	78,393	86,949	94,804	112,300

Source: Beaumont Cherry Valley Water District, from 2015 UWMP

Ongoing and planned new construction for the District service area includes multiple residential developments totaling more than 8,800 units. The 2015 UWMP estimated the build-out of these tracts would be completed by 2040. The District estimates an average increase to its annual water production needs based on the addition of 500 homes per year. Currently, due to an observed slowing of the rate of construction, the District estimates its annual water production needs based on the addition of 500 homes per year. Also on the building horizon are numerous industrial warehouse and logistics projects. More than 5.5 million square feet of warehouse space are under construction, with the City of Beaumont poised to consider approving even more.

In summary, the District's long-term planning indicates that it must increase its purchases of imported water despite its pursuit of other sources, such as recycled water. **Table 3** on the following page shows estimated water demand through community build-out and the current estimated supply into the future. Without proactive measures, the District will be facing a deficit of up to 9,780 AFY by 2035. Proactive measures are already being taken; this grant application is one of them.

Table 3 – Beaumont-Cherry Valley Water District Potable Water Supply and Demand Summary

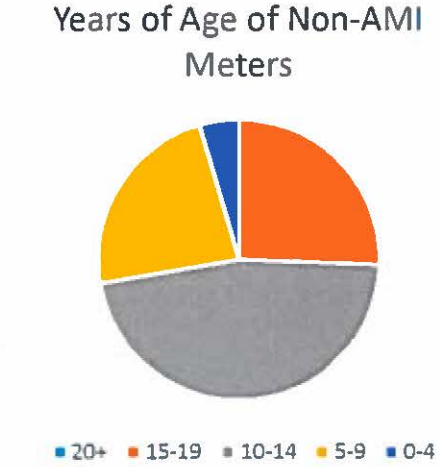
Year	2015	2020	2025	2030	2035
Demands					
Total Water Demand not incl. GCs, AFY	12,453	13,492	14,947	16,526	18,417
Non-potable Landscape Demand, AFY	1,500	1,580	1,660	1,740	1,830
Oak Valley GC, AFY	0	750	750	750	750
Total Non-potable Demand, AFY	1,500	2,330	2,410	2,490	2,580
Potable Water Demand, AFY	10,953	11,912	13,287	14,786	16,587
Sources of Potable Water Supply					
Edgar Canyon Groundwater, AFY	2,260	2,260	2,260	2,260	2,260
Beaumont Basin Groundwater, AFY	0	0	0	0	0
District Share of Unused Overlier Rights, AFY, based on 6000 AF Safe Yield	1,500	1,590	1,500	1,190	1,010
Overlier Forbearance of Pumping for Potable Water Supply, AFY	451	576	701	801	872
Overlier Forbearance of Pumping for Recycled Water Supply, AFY	0	780	810	840	870
Subtotal Groundwater Extractable without Replacement, AFY	4,271	5,206	5,271	5,091	5,012
Groundwater Used in Non-potable Water System, AFY	0	0	0	0	0
Groundwater Available to Meet Potable Water Demand, AFY	4,271	5,206	5,271	5,091	5,012
Groundwater Available – Potable Demand, AFY	-6,682	-6,706	-8,016	-9,695	-11,575
Supplemental Supplies, AFY					
Imported Water Not Used in Non-Potable System which can be Recharged, AFY	2,316	2,020	1,890	1,845	1,795
Total Water Available for Potable Supply, AFY	6,587	7,226	7,161	6,936	6,807
Potable Water Demand – Supply, AFY	-4,366	-4,686	-6,126	-7,850	-9,780

Source: Beaumont Cherry Valley Water District, from 2015 UWMP

Water Delivery System

As of September 1, 2019, the District provides potable and non-potable water service to 19,024 customers (19,154 connections), including 301 non-potable water connections (medians, etc.), as outlined in **Table 5** below. Potable water is delivered to ratepayers via a network of 380 miles of water mainlines. A developing non-potable water system so far consists of 40 miles of purple pipe delivering irrigation water to 301 customers. In 2018, the District provided more than 1,800 AF of non-potable water to these 301 customers.

Chart 1: Meter Age



Non-AMI capable meters throughout the District range in years of use, with the average age of the remaining meters at 12 years. **Chart 1** (right) shows the age of meters system-wide and details the breakdown of age of meters. The replacement of older meters is required for AMI functionality and to increase the resolution of the data gathered reduce inaccuracies due to age.

The topography within the boundary of the District rises from an elevation of about 2,300 feet above mean sea level in Fairway Canyon area of Beaumont on the western boundary, to 2,900 feet in Cherry Valley, and over 4,000 feet in the upper reaches of the SOI. The topography of the area is characterized by rolling foothills separated by deeply entrenched streambeds which makes the distribution of water to the 11 different pressure zones an inherent challenge. The distribution system is made up of many different sizes of pumps and motors.

Table 5 – Current Connections by Customer Type

	Domestic Water Utility		Non-potable Water
Customer Type	**Number of Connections (includes non-potable meters)**	**Number of Dwellings Serviced**	**Number of Connections**
Single Family	17,817		0
Multiple Units	159	1403	0
Commercial	701		3
Industrial	33		0
Irrigation - Landscape	355		298
Irrigation - Agriculture	87		0
Construction	2[2]		0
Total	19,154	1403	301

Source: Beaumont Cherry Valley Water District

[2] One construction meter is in the ground; there are several other devices that float locations and are not counted in this number since they are in and out of inventory; but they are included in consumption reports to the state.

Potential Shortfalls in Water Supply

Although California experienced record rainfall in early 2019, and the snowpack has reached above average levels, the drought cycle may not yet be over. Headlines[3] may not paint a clear picture. While the recent "atmospheric rivers" are refilling California's reservoirs, the long-term effects of the drought are still being felt and the District, with its primary source of supply being an adjudicated basin, must always remain focused on conservation.

The U.S. Drought Monitor shows greatly improved conditions; but even so, the District will receive less water this year than its historical average percentage of State Water Program (SWP) imported water. (See **Figure 2**, below: U.S. Drought Monitor – California.) The growth in population in the District's service area will require more and more water supply, even with the best of conservation measures and mitigation. In preparation for the anticipated growth, to assure adequate water supply for the region and its development, the District is participating as a partner in the Bureau of Reclamation Sites Reservoir Project, a 1.8 million AF storage facility planned in Northern California on the west side of the Sacramento Valley. It will add up to 500,000 AFY to California's water system and is expected to be fully operational in 2029.

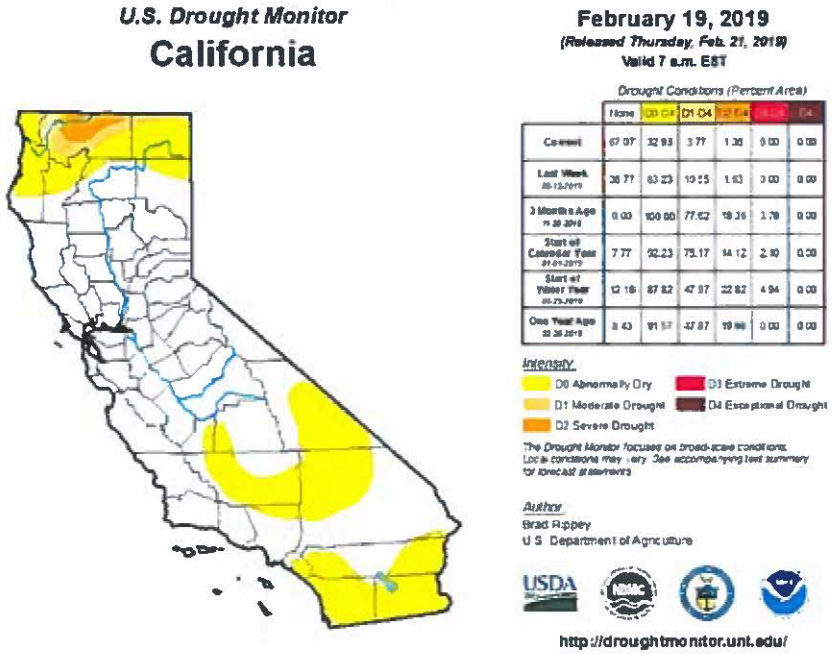
But supply is only part of the issue; imported water is also significantly increasing in cost. As previously noted, the water pumped from the Beaumont Basin must be replenished. Anticipated rate increases result from a need to purchase more imported water from the San Gorgonio Pass Water Agency (SGPWA), the District's State Water Contractor, for recharge to the Beaumont Basin. The SGPWA Board of Directors is currently discussing the extent of its inevitable rate increases, based on additional water supply needed from the SWP, participation in the planned Sites Reservoir, and other water transfer deals made to meet the increasing needs of the region. In order to mitigate the impact of future rate increases, the District is exploring all opportunities for conservation to reduce the amount of imported water needed to recharge the Beaumont Basin.

Currently, the region has the right to purchase 17,300 AFY of SWP water; the District is the largest purchaser who purchases water from this source. However, that source is inherently unreliable and the amount is subject to each year's reliability. Under certain hydrologic and water supply conditions, the State Department of Water Resources (DWR) is not always able to deliver all of the water requested by the SWP contractors. In these cases, a smaller amount ("allocation") is set by DWR and allocated and delivered by prorating the amount available in proportion to the contractor's requested amount. The average delivery for the most recent 10-year period has been 60 percent; for estimation purposes, the District uses a figure of 10,380 AFY for its current long-term average supply from the SWP. The amount of imported water must increase to 18,923 AFY by 2035 to meet the District's future replenishment needs.

[3] Kasler, Dale. "A Pretty good season. What California's winter rain and snow mean for you in 2019" The Sacramento Bee, 23 February 2019. Retrieved 2/28/19. https://www.sacbee.com/latest-news/article226462260.html

The Sites Reservoir is currently in the planning and permitting stages and is expected to come online in 2029. The District has worked with the SGPWA in participation with 4000 AF of supply from Sites Reservoir, with SGPWA participating in an additional 10,000 AF.

Figure 2 - U.S. Drought Monitor – California



Past Working Relationships with Reclamation

Beaumont-Cherry Valley Water District has no past working relationships with the Bureau of Reclamation.

Technical Project Description

The District is proposing the completion of a district-wide Automated Meter Infrastructure (AMI) system as part of its long-term goal of water supply reliability, water conservation, and efficient water management. The major components of an AMI system include the smart meter with transceiver, the tower gateway base stations (TGB), and the regional network interface (RNI). Utilizing these components, water meter data is conveyed via radio frequency and cellular communication back to the RNI database where the information is used for billing and consumption reports. The advantages of transmitting the customer meter data with an AMI include hourly meter reads, detailed water consumption analysis, leak detection and backflow alarms, as well as the elimination of manual meter reading. The practice of manually reading each meter in a water distribution system is a daunting task and requires staff to locate and open the meter box, read the meter register and then transfer the information via manual input into a handheld recording device.

The District has already completed the installation of 4,957 smart water meters that are AMI capable. This represents about 26 percent of the District's total 19,154 water meters in the system. The District will complete Phase 1 in 2019-2020 of the proposed AMI project, complete Phase 2 between 2020 and 2021, and Phase 3 in year three, as outlined below. The outlined project activities will occur concurrently, with the project moving forward along each phase as each step is completed, and with multiple phases of the project potentially occurring simultaneously.

Phase 1 of the Automated Meter Infrastructure Project (2019-2020)

As of September 1, 2019, BCVWD has 4,957 smart meters in use throughout the District. Those meters were replaced based on safety, accessibility, and location. New developments have been required to install smart meters and, throughout the District, as meters require replacement, they are being replaced with smart water meters. ***Installation of these meters has already occurred, and this is not part of this grant application. The District does not intend to use grant funding to reimburse the District for installation of these meters.***

The smart water meters already installed are Automated Infrastructure (AMI) capable, but do not have the transceivers or AMI capable meter box lids.

Phase 1 will continue to identify meters to be retrofitted with the smart water meter components. These meters are already installed in the ground and have the wiring component available to accept an Itron radio transceiver. With the additional components, these meters will be Automated Infrastructure (AMI) capable. Any meters replaced during this phase as part of regular maintenance will be replaced to be Automated Infrastructure (AMI) capable.

Phase 2 of the Automated Meter Infrastructure Project (2020-2021)

Phase 2 will focus on identifying remaining meters that do not have the wiring component available to accept a radio receiver. These meters are already installed in the ground and will need to be completely replaced. Once replaced, the smart water meters will be Automated Infrastructure (AMI) capable with an Itron radio receiver and an upgraded meter box lid, when necessary.

With this, all existing 19,154 meters, including all newly installed meters, will be smart water meters. This is every meter in the District's distribution system, and all newly installed meters moving forward. The total conversion to AMI by replacing the existing water meters will be distributed over two years, completing an average of 7,551 meter upgrades each year.

Phase 3 of the Automated Meter Infrastructure Project (2021-2022)

Phase 3 will finalize the total conversion to AMI by installing repeater equipment throughout the District. This phase will be distributed over the final year of the project. The phase will include finding the potential locations for the repeaters, equipment placement, and related licensing. The completion of Phase 3 in 2022 will result in full Automated Meter Infrastructure functionality district-wide.

The replacement of 14,197 meters within a two-year time frame (during Phase 1 and 2) is ambitious, and above the capability of the current staffing level at the District. The grant request, therefore, includes a budget for temporary workers, including field staff to install meters and office staff to enter the new meters into the system.

Evaluation Criteria

Evaluation Criterion A – Quantifiable Water Savings

Estimated Water Savings
The estimated average annual water savings for this project is 927 AFY, which is based on the completed AWWA Water Loss Audit for 2018. The water being saved from the proposed AMI project would decrease the amount of water that the District purchases from the State Water Project. The water that is conserved from this AMI project will not be diverted from the Delta and tributaries.

Current Losses
Please explain where the water that will be conserved is currently going (e.g., back to the stream, spilled at the end of the ditch, seeping into the ground)?

Current water losses are due to inaccurate metering, unmetered water usages such as water used to fight fires, theft, and leakage. This water ultimately seeps into the ground. Implementing AMI technology as part of this application will enable more accurate tracking of water losses.

Municipal Metering (section 2)
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.

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.**

The District completed the AWWA Water Loss Audit for 2018. Current distribution losses were determined by subtracting the authorized consumption of 12,267 AFY from the water supplied of 13,754 AFY. This gave a total water loss for 2018 of 1,488. Of this, 1,236 AFY were real losses.

Taking into consideration the EPA's statement [4] that 75 percent of water loss is recoverable; the recoverable loss was calculated at 927 AFY. These recoverable losses could be identified using the AMI system and metering the District's 11 pressure zones.

[4] Thornton, J., Strum, R., Kunkel, G., *EPA Water Audits and Water Loss Control for Public Water Systems* report: "Average water loss in a system is 16 percent – up to 75 percent of that is recoverable." (2nd Edition) McGraw-Hill. 2008

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

The District completed the AWWA Water Loss Audit for 2018. Current distribution losses have been determined by calculating the total water loss by subtracting the water supplied of 13,754 AFY by the authorized consumption of 12,267 AFY equaling 1,487 AFY of total water loss for 2018, this is also known as Non-Revenue Water (NRW). Subtracting the apparent losses of 251 AFY (based on the AWWA Water Audit Software Reporting Worksheet), from the Water Losses of 1,487 AFY the Real Losses were 1,236 AFY.

Taking into consideration the EPA's statement [5] that 75 percent of water loss is recoverable; the recoverable loss was calculated at 927 AFY. These recoverable losses could be identified using the AMI system and metering pressure zones. The District has 11 pressure zones. Currently, the District cannot quantify distribution losses by an individual user but anticipates this ability with AMI conversion, which will lead to a reduction in water loss and increased efficiency.

Furthermore, the 2015 District Urban Water Management Plan (UWMP) addresses conservation within the District and sets forth Demand Management Measures consistent with the 20x2020 conservation goals established by former California Governor Arnold Schwarzenegger in 2008. The District continues to submit its production data to ensure compliance with the state's goal of 20 percent reduction in water use by the year 2020. This metering project is identified in the UWMP along with programs to assess and manage the distribution system real loss. The AMI program will provide a key component to allow the District to accomplish its water conservation goals.

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 estimation.

A 2016 paper in the Journal of Environmental Management by Fielding et al. explores the impact of customer-specific water use information on consumption patterns and found that daily consumption data from smart water meters can reduce water consumption by an average of 9 percent. Additionally, a 2014 pilot study at East Bay Municipal Utility District (EBMUD)[6], which supplies water throughout the San Francisco East Bay, installed water AMI systems that provided hourly water consumption data to customers through an online web portal. EBMUD found water savings between 5-50 percent, with an average of

[5] Thornton, J., Strum, R., Kunkel, G., *EPA Water Audits and Water Loss Control for Public Water Systems* report: "Average water loss in a system is 16 percent – up to 75 percent of that is recoverable." (2nd Edition) McGraw-Hill. 2008

[6] East Bay Municipal Utility District. "Advanced Metering Infrastructure (AMI) Pilot Studies Update." November 25, 2014

15 percent, among residential customers after the installation, while noting that some of these savings are likely due to customer-side leak repair (EBMUD 2014). Another recent report by *Water Research Foundation* by DeOreo et al.[7], "Residential End Uses of Water, Version 2", found that leaks account for 13 percent of all residential indoor water consumption across the U.S. (2016).

For this grant application, we used the lowest value of 9 percent reduction of water consumption to calculate the estimated reduction of water usage through the implementation of AMI. Using the 9 percent reduction of water consumption with AMI in conjunction with the District's total drinking water consumption in 2018 at 12,267 AF calculates to 1104 AFY reduction in water usage. A wide range of data collection, controls, and analytics capabilities allow water utilities to utilize advanced metering systems to reduce water loss through improved leak detection, reduce operating costs through streamlined billing, implement volumetric rate structures to incentivize water conservation, and utilize high-frequency, near real-time data for a various strategic system management efforts. Studies have demonstrated that information provided by advanced metering of energy and water can encourage behavioral reductions in consumption by increasing consumer knowledge about their resource use.

For calculating potential water savings in the water distribution system, we used the EPA's determination that 75% of water loss is recoverable in a water system. Recoverable in this sense means fixing and replacing distribution mains that have degradation and damage from soil pressure, excavation, and construction threats, tree roots, and earthquakes, etc. Using the data from the District's AWWA water loss audit completed in 2018 it was determined the Real Losses in the distribution system were 1,236 AFY. Using the 75% recoverable water loss in conjunction with the 1,236 AFY real water losses calculates to 927 AFY of recoverable water. AMI is the most important piece to recover water lost in our distribution systems due to leaks. The District's distribution system currently meters well production site and water input at distribution zones. These meters detail the amount of water that is going into each pressure zone. The implementation of AMI would show the hourly reads for the services in that pressure zone, in comparison to the amount of water going into the zone through distribution meters. The difference would help identify leaks in the pressure zone.

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)

The District has 11 pressure zones within the distribution system. This project would provide the connection of AMI smart water meters within these zones, allowing these zones to be separated and evaluated per zone. The process of segregating

[7] DeOreo, W.B., P. Mayer, B. Dziegielewski, J. Kiefer. "Residential End Uses of Water, Version 2: Executive Report." Water Research Foundation. April 2016

each zone's total water consumption and distribution can be conducted for a predetermined amount of time. Using the water consumption data gathered from the AMI service meter connections to customers for an allotted time and comparing it to the water distribution data from the distribution meters for the same allotted time would identify the amount of water lost due to distribution system leaks.

The District has estimated the amount of conserved water to be 927 AFY using methods described previously in this application.

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

There are 1,575 meters that will need to be retrofitted with a Digital Register and Itron AMR/AMI Radio. These will be the 100W+ 3 Port ERT's, Encode with Integral Connectors.

There are 12,622 meters that will need to be replaced with a Badger meter in addition to a Digital Register and Itron AMR/AMI Radio. These will be the meters with the Bronze meter housing, HRE 8 Encoder with Itron In-Line Connector.

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

The District's water savings will be verified in the following ways:

1) Water Conserved via AMI Leak Detection - Leaks detected from the alarms generated through the AMI system will be recorded throughout each year. The data will be used to estimate the water savings had the leak not been identified through early leak detection but had been identified as if it was on the District's current practice of manual monthly meter reads.

   Additionally, according to the California Water Plan Update 2013 from the California Department of Water, the City of Sacramento installed AMI smart meters to 17,600 residences. Of those 17,600 AMI smart meters 1,076 leaks were detected through AMI reports, 367 million gallons of aggregate annual water loss calculated through AMI reports, 236 million gallons of water saved; which equates to 12.6 GPCD in water savings. AMI played a major component in helping the City of Sacramento reach the State mandate of 20 percent per capita reduction by 2020. It is anticipated that AMI will play a similar role in the District.

2) Water Conserved from Main Line Leak Detection: As described previously, the District has 11 pressure zones within the system. This project would provide the installation and connection of AMI smart water meters within these zones, which can be separated and evaluated per zone. This process of segregating each zone's total water consumption (using the AMI smart water meter data) and distribution into the zone can be conducted for a

predetermined amount of time. Using the water consumption data gathered from the AMI meter connections for the allotted time and comparing that data to the water distribution data from the distribution meters for the same allotted time would identify the amount of water lost due to distribution system leaks. Once pressure monitors were installed in identified zones main line leaks will be identified, prioritizing pipeline replacements would be conducted, and continuing data would be taken regarding the water savings using the method mentioned previously.

Evaluation Criterion B – Water Supply Reliability

1. Will the project address a specific water reliability concern?

Yes, the project will address the following water reliability concerns:

Competition for supply

The District is approaching a tipping point in water supply. Three factors will affect the customers of the District within the next 10 years unless positive action is taken now to assure reliability of supply and additional supply: SWP reliability, continued population growth, and an anticipated reduction in safe yield from the Beaumont Basin.

As explained in the *Water Supply and Demand* section above (page 6), the District pumps the majority of its supply from the adjudicated Beaumont Basin and is required to replenish the amount pumped over its annual limit. The safe yield of the Beaumont Basin was designated at 6,700 AF in 2013. When the safe yield is re-evaluated in 2023, the District expects the number to be revised downward. The District's current share of the designated safe yield is 2,848 AF per year, however the District's 2015 Urban Water Management Plan estimates a need for 12,820 AFY to serve the anticipated population at build-out. This results in a net deficit gradually increasing with population growth, which the District must import or otherwise identify to replenish the Basin. The District must always be seeking additional water supplies wherever the opportunity arises, especially via local programs and efficiencies such as the AMI project.

As the safe yield of the Beaumont Basin is quantified and tracked, there is some disagreement within the Beaumont Basin Watermaster Committee as to how to account for water losses in the basin, and the transfer of overlying water rights. This minor conflict could escalate when the safe yield is re-evaluated in 2023 per the stipulated judgment between the parties. The District may be unable to extract its expected amount of groundwater from the basin, and/or must further replenish the Basin with purchased additional imported supply at increasing rates. The water savings anticipated from the AMI project could ease the burden if the safe yield is significantly reduced.

The conflict migrates to the San Gorgonio Pass Water Agency, whose efforts to identify additional reliable sources of supply will result in much greater costs to the Beaumont-Cherry Valley Water District. The current price of SWP water is $399 per AF. With the

new water deals made by the SGPWA the price of imported water is likely to increase, all of which must be absorbed by District ratepayers, including those within the District's identified Disadvantaged Community (DAC). District staff has pressed the SGPWA to evaluate different funding opportunities to ease the burden, however the SGPWA has been slow to respond and tension has resulted. The water savings achieved by the AMI project will offset some of the burden of the estimated increase in cost of imported SWP water by reducing the amount required to replenish the Beaumont Basin.

Increasing demand

In the meantime, production is again on the rise after several years of conservation and population growth. The District service area added 730 homes in 2018, and water production increased by 6.71 percent, or 865 AFY over 2017. With over 8,800 homes planned or in development, it is estimated that the District's water needs will continue to increase over the next 20 to 30 years.

Low reliability / reduced deliveries

Additionally, the supply of imported water from the State Water Project has been consistently much lower than the District's request, resulting in an average reliability of 64 percent. More recently, with expected continuing dry conditions despite the above-average rainfall in early 2019 the long-term effects of the drought are still being felt and it is not expected the SWP will be near 100 percent of requested deliveries at any time soon. The more water that is conserved locally, the less water the District will have to purchase from the SWP, enhancing the long-term reliability to SWP water resources. Continuous availability of SWP allocations will require complete development of the unfinished SWP, which currently is unable to meet maximum amount obligations during droughts. The District, with its primary source of supply being an adjudicated basin, must always remain focused on conservation.

Benefit to wildlife species

The Sacramento Bay-Delta is home to at least four federally recognized endangered/threatened species, including the Delta Smelt. Historically, delta smelt were relatively abundant in the upper Sacramento-San Joaquin Estuary, with populations declining dramatically in the 1980s. They were listed as threatened by both federal and state governments in 1993, and sustained record-low abundance indices prompted their listing as a protected species through a 2007 court order. In 2010, the species was listed as endangered under the California Endangered Species Act. The fish is extremely endangered and recent sampling done in 2015 collected only 6 specimens in contrast to several hundred collected in samples in years prior (Source: National Geographic). A last-ditch effort to save the species from extinction was released in July, 2016 by the California Natural Resources Agency and is titled the "Delta Smelt Resiliency Strategy." It calls for allowing between 85,000 and 200,000 acre-feet of extra water to wash out to sea in the summer to bolster the smelt habitat (Source: Sacramento Bee).

The District is not aware of a specific ratio or recovery rate for certain endangered species living in either the Sacramento Bay Delta or the Colorado River watershed, but our

projected water savings of 927 AF per year for this phase of our AMI project will help to alleviate the environmental stress on this specific endangered species.

The District's AMI project will be able to address specific critical habitats that survive in the Sacramento River watershed. The project will help to reduce the Authority's dependence on imported water thereby benefitting the habitat of the Delta Smelt and other species. The District does not have specific data on areas covered. The primary endangered species that the Authority is aware of is the Delta Smelt. Salmon and other species will also benefit. The water savings created from this project will be able to benefit the Smelt habitat. By keeping water flows higher in the delta, seawater intrusion will be limited, and the Smelt will have an increased chance of survival.

The District's AMI project will have no negative impacts to endangered, threatened, candidate species, or critical habitats. Conversely, the AMI project would only have positive impacts to species and habitats.

2. Will the project make water available to achieve multiple benefits or to benefit multiple water users?

Yes, the project will achieve the following multiple benefits:

The project benefits multiple users across sectors

The AMI project will benefit multiple users throughout the District. Conservation measures such as leak reduction provide benefit to all ratepayers (commercial, residential, schools, etc.), making more water available in the system to offset groundwater pumping, therefore allowing the District to minimize its purchase of costly imported water and keep water rates stable. The ability of the AMI system to detect leaks and allow for immediate response will save an estimated 927 AFY which translates to $369,873 savings for ratepayers annually. The water saved ultimately results in a lessened impact on species affected by the Delta pumping due to reduced need for imported water.

Additional actions by the District to increase water supply reliability include a partnership with the City of Beaumont on establishment of a recycled water facility along with its wastewater treatment plant expansion, participation in the Sites Reservoir project, and investigation of stormwater capture options.

The project benefits an economically Disadvantaged Community

There is a Disadvantaged Community (DAC) identified within the District's boundaries[8]. The State of California identifies a DAC as a "community with a median household income less than 80 percent of the state-wide average." The Cherry Valley West DAC consists of an unincorporated area located less than a mile to the west of Highland Springs Avenue,

[8] Upper Santa Ana River Watershed Integrated Regional Water Management Plan 2013. (page 2-58). https://www.sbvwcd.org/docman-projects/upper-santa-ana-integrated-regional-water-management-plan/3802-usarw-irwmp-2015-ch1-9-final/file.html

north of the Beaumont city limits. The area consists of large rural lots with mixed land uses ranging from low, medium and high density residential to general commercial and commercial retail and residential and light agricultural zoning. Cherry Valley West has an estimated population of approximately 1,017. According to a Bureau of Reclamation 2013 report, *Overview of Disadvantaged Communities & Native American Indian Tribes*, this "area relies primarily on septic tanks for wastewater disposal. It and surrounding areas also rely on groundwater wells for drinking water and have experienced nitrate levels exceeding the Maximum Contaminant Level, with leaching septic systems considered to be the primary cause." The AMI project would benefit this community by keeping water rates stable as described above, and by reducing reliance on groundwater pumping in this area. Additionally, the project supports the Upper Santa Ana River Watershed Integrated Regional Water Management Plan goals of ensuring equivalent water supply for DACs.

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

The AMI Project will improve the reliability of water supplies from both the State Water Project and the Beaumont Basin, which would ultimately benefit people, agriculture, and the environment associated with both of these water supply sources. The District is committed to the collaboration and maintenance of regional and local partnerships to enhance water supply reliability by promoting a regional common goal and adding flexibility to water portfolios and distribution systems. The AMI Project will provide a step forward in contributing towards this goal. Partners and / or supporters of the project include:

Santa Ana Watershed Project Authority. The District is member of the Santa Ana Watershed Project Authority (SAWPA) "One Water One Watershed (OWOW)" program, SAWPA's Integrated Water Resources Management Plan. SAWPA governance and the participants in OWOW provide a collaborative, transparent, and watershed-wide view embraced by the OWOW planning process from the onset seeking to improve the way in which water and other environmental resources are managed in the watershed. The Santa Ana Watershed Basin Study helped SAWPA and its member agencies identify data gaps, conduct tradeoff analyses, address the effects of climate change, and develop effective adaptation strategies. Through this Basin study, SAWPA and Reclamation have provided leadership on the path to a secure and sustainable water future, because without action, the demand for more water will quickly outstrip the amount available to the watershed's populations, agriculture, and industries[9].

Beaumont Basin Watermaster Committee. Litigation over the Beaumont Basin was avoided with the adoption of a Stipulated Judgement in 2004. The Beaumont Basin Watermaster Committee consists of representatives from five local agencies which rely on the Beaumont Basin and are charged with managing the Basin. Per the Stipulated Judgment, the safe yield of the basin is calculated and re-evaluated every 10 years. The

[9] Sims, J. "Santa Ana Watershed Basin Study: Summary Report" Bureau of Reclamation. September 2013

safe yield of the Beaumont Basin was designated at 6,700 AF in 2013. When the safe yield is re-evaluated in 2023, District staff expects the number to be revised downward. The District's current share of the designated safe yield is 42.51 percent, or 2,848 AF per year. The UWMP estimates a need for 18,923 AFY to serve the anticipated population at build-out; therefore, the District must always be seeking additional water supplies wherever the opportunity arises, especially via local programs and efficiencies such as the AMI project. Whenever a Beaumont Basin appropriator takes positive action to offset groundwater pumping, all members of the Basin benefit. The AMI project will further conservation efforts and result in a reduction in Beaumont Basin groundwater pumping of 927 AFY.

San Gorgonio Pass Water Agency (SGPWA), is the District's State Water Contractor. The SGPWA strives to identify additional reliable sources of supply for the region, however additional supply and the resultant higher prices will result in much greater costs to the Beaumont-Cherry Valley Water District. The current price of SWP water is $399 per AF. With the new water deals made by the SGPWA the price of imported water will likely increase, all of which must be absorbed by District ratepayers, including those within the District's identified Disadvantaged Community (DAC). District staff has pressed the SGPWA to evaluate different funding opportunities to ease the burden, however the SGPWA has been slow to respond and tension has resulted. The water savings achieved by the AMI project will offset some of the burden of the estimated increase in cost of imported water by reducing the amount required to replenish the Beaumont Basin.

4. **Will the project address water supply reliability in other ways not described above?**

The ways water conserved through the project will improve water supply reliability have been listed.

Evaluation Criterion C – Implementing Hydropower

The proposed AMI project does not consist of a hydropower element, but it does save a substantial amount of electricity by decreasing water consumption, therefore decreasing the energy required to transport State Water Project water to the southern region of California. Based on the publication "California's Water- Energy Relationship" prepared by the California Energy Commission (November 2005, page 51), the amount of electrical energy required to transfer one acre-foot of water from northern California (State Water Project) to an area just north of the Authority requires 3,000 kWh. "Energy Down the Drain: The Hidden Costs of California's Water Supply," by the National Resources Defense Council indicates that the amount of energy used to deliver water from the State Water Project to Southern California over the Tehachapi Mountains is equivalent to one-third of the total average household electric use in the region. This does not include the energy required to import water to Southern California from the Colorado River Aqueduct, and any reduction in water loss and overall consumption would reduce the overall energy consumption from system operations.

Energy will also be saved through reduced groundwater pumping, treatment and boosting the SWP water throughout the distribution system. The AMI project will result in increased energy efficiencies in multiple areas including reduced SWP pumping, reduced water treatment volume, reduced distribution pumping and reduced vehicle run time. The savings in the areas of pumping and water treatment volume are attributed to the estimated water savings that an AMI will provide through improved water conservation and leak detection. As AMI will eliminate the need to manually read each meter in the system, the District will also reduce the vehicle run times that are required to drive to each meter resulting in a measurable reduction in carbon emissions. The District will see a savings of up to 2,167 miles of driving saved, with an average fuel economy of 12 miles/gallon, this would be a savings of 181 gallons of fuel. Based on the Tailpipe Carbon Dioxide Calculation provided by the EPA, this would be a savings of 1.60 metric tons of carbon dioxide, annually.

Evaluation Criterion D – Complementing On-Farm Irrigation Improvements

This section does not apply to District's AMI project.

Evaluation Criterion E – Department of the Interior Priorities

1. *Create a conservation stewardship legacy second only to Teddy Roosevelt*

The District's AMI project highly supports the conservation legacies of Theodore Roosevelt. President T. Roosevelt found tremendous value in conserving wilderness and preserving wild spaces for future generations to enjoy. He wanted to preserve not just the land, but also the trees, plants and other wildlife. He understood that although industry and the extraction of raw minerals and natural resources is important, that there must be a proper balance and the Federal government should be there to help preserve these natural locations for the benefit of the people.

The District's AMI project matches the values of T. Roosevelt by assisting to conserve 927 Acre-feet of water each year that can help the two major tributaries in the Southwest, the Sacramento Delta and the Colorado River. This project can help these rivers remain a habitable environment for wild species such as the Delta Smelt, Chinook Salmon, Coho Salmon, Bonytail, razorback sucker, humpback chub, and the southwestern willow flycatcher.

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

The Safeguarding California Plan: 2018 Update is the State's roadmap for everything state agencies are doing and will do to protect communities, infrastructure, services, and the natural environment from climate change impacts. In the Water Sector Plan section, dozens of actions are listed as underway for California to prepare for climate change impacts on the water sector. These actions utilize science to identify best practices that

span the different areas of the water sector including: (1) surface water and groundwater, (2) drinking and environmental water supplies, (3) wastewater, (4) flood flows and storm water, and (5) recycled water. The actions focus on safeguarding State and locally managed infrastructure and resources by supporting current actions and incentivizing local water managers to plan for future actions to address climate change impacts on local and regional water resources. Several best practices are listed that are reflected in the proposed project. These include diversifying local supplies and increasing water use efficiency. Increasing regional self-reliance and diversification of local water supplies and maximizing water conservation and water use efficiency will enable Californians to better respond to changing economic and climatic conditions while ensuring a reliable water supply for the diversity of the State's water needs. These strategies must ultimately be implemented by local and regional water management agencies throughout the State. The District's AMI project is an outstanding example of the utilization of science to identify best practices to manage land and water resources and adapt to change in the environment and to assist with the greater California goal of water conservation while addressing climate change. The AMI system technology allows the District to implement a new best practice of timely identifying leaks at a customer's property, as well as in the customer's distribution system. Quickly addressing leaks thereby decreases the amount of water the District would otherwise divert from the Delta. This also facilitates the priorities of the Department of the Interior: keeping water in the Delta helps keep the Delta healthy and the fish population to thrive.

Eliminating water waste is the purpose of this AMI project. The AMI project additionally helps the District in its conservation efforts throughout the system through leak detection in the distribution system. Water savings also results in energy savings due to decreased pumping and water treatment activities, further conserving the natural resources used to produce energy.

3. *Examine land use planning processes and land use designations that govern public use and access*

The District proudly works cooperatively with the City of Beaumont and the County of Riverside amid startling growth and development in its service area. As indicated previously, the District requires new development to install the smart meters on residential, commercial and industrial development. In addition, the District and the City have entered a Memorandum of Understanding toward the goal of substantially increasing the recycled water program, which will also benefit from the smart meter technology.

4. *Restoring trust with local communities*

Communication with local agencies, as described above, is a key to having a successful AMI project. In addition, the hourly water consumption data collected from the AMI project offers an opportunity to reach out to the community and offer personalized water consumption information and provide a gateway to conservation dialogue. The District

can use the data to educate consumers on comparable use in their neighborhoods, suggest conservation techniques, and show customers how AMI data has helped the District identify leaks within the distribution system.

5. *Striking a regulatory balance*

Reducing the amount of water that the District diverts from the Delta is helpful in reducing the administrative and regulatory burden on U.S. industry and the public. With the effective and timely addressing of leaks, the District will reduce its water imports from the SWP. This is a small step in restoring the health of the Delta, but still supports the co-equal goals of the California Water Fix: providing a more reliable water supply for California and protecting, restoring, and enhancing the Delta ecosystem.

6. *Modernizing Infrastructure*

The proposed project directly aligns with the Department of Interior's priority to modernize American infrastructure. The existing meters are an average of 10 years old, and require staff to physically inspect each of the meters onsite and visually perform a meter read, a long, time-consuming process that bears no periodic water use data. Additionally, leaks in the distribution system must reach the surface before they are noticed or flagged for repair, as in the example shared at the beginning of this application. The outdated meter infrastructure has allowed leaks to go unnoticed for years. The new AMI system will modernize the process and make data available to the Beaumont-Cherry Valley Water District to identify leaks within the distribution system and help the District prioritize pipe replacement, which is then coordinated with the City's paving schedule. The system allows the District to set up alerts for leaks and excess water consumption, which can be communicated to the customer and addressed in a more timely manner, rather than waiting for the end of a billing cycle.

Evaluation Criterion F – Implementation and Results

1. Project Planning

In 2015, the District selected the proposed Automated Meter Infrastructure project as a priority Capital Improvement Project. The District identified the direction of this project several years ago as the AMI technology became available, was improved, and more widely adopted. The District anticipated the need for AMI by requiring new development to install smart water meters, starting in 2016.

In addition, the District replaces worn or broken water meters with smart water meters. The District has a total of 4,957 smart water meters currently in the ground awaiting the implementation of this project. The District's investment and planning for this project has resulted in a substantial "head start" with about 26 percent of the total water meters in the system having AMI capabilities. The District is not seeking reimbursement for these prior costs as part of this grant application but is seeking funding to complete the AMI project,

which will include replacing the remainder of the meters in the District with AMI-capable smart meters.

Furthermore, the 2015 the District's Urban Water Management Plan (UWMP) addresses conservation within the District and sets forth Demand Management Measures consistent with the 20x2020 conservation goals established by former California Governor Arnold Schwarzenegger in 2008. The District continues to submit its production data to ensure compliance with the state's goal of 20 percent reduction in water use by the year 2020. The metering project is identified in the 2015 UWMP along with programs to assess and manage the distribution system real loss. The 2015 UWMP can be found on the District's website at: https://bcvwd.org/wp-content/uploads/2017/09/January-2017-Urban-Water-Management-Plan-Final.pdf

The AMI program will provide a key component to allow the District to accomplish its water conservation goals.

2. Performance Measures

The performance measure that is to be applied to the proposed AMI project will be multifaceted. First, the District is required to complete a yearly AWWA water loss report. This details the water loss throughout the distribution system. The findings will detail the water audit conducted to determine the real water loss of the District. The AWWA Water Loss Audit will be submitted with the *Final Project Implementation Report* that will be submitted to the Bureau of Reclamation. Also included in this *Final Project Implementation Report* will be the actual water usage throughout the District prior to implementation of the AMI project compared to the water usage post-implementation of the project to detail the actual water saving due to the benefit of AMI project.

Part of the *Final Project Implementation Report* will include a section for Customer Leak Analysis. The Customer Leak Analysis is a site-specific water savings verification plan that will compare leaks that occur on customer property before and after AMI. The leak detection and notification properties of an AMI system will be proven to be effective tools in conserving wasted water by utilizing the Customer Leak Analysis. This performance measure was selected by the District as many of our customers experience leaks that are only identified by the billing department. Data collected from the AMI system will also be printed on the customer bills for educational purposes. The District strives to educate the community and will perform multiple community outreach events to help educate water conservation and the District's mission. The community outreach events will be helpful to connect with customers using their own personal consumption data collected from AMI. Data will also be complied for the distribution system to help identify leaks.

Gathering the Data

The Customer Leak Analysis will profile fifty (50) of the largest customer leaks before and after the AMI implementation. The year prior to the AMI system will be compared against subsequent years. The leak profile framework for the Customer Leak Analysis will be as follows:

Customer Leak Analysis Leak Profile

Before Automated Meter Infrastructure

Leak Number	(B-1)
Total Leak Volume	(Acre Feet)
Duration of Leak	(Days/Hours)
Means of Identification	(Staff/Customer)

Customer Leak Analysis Leak Profile

After Automated Meter Infrastructure

Leak Number	(A-1)
Total Leak Volume	(Acre Feet)
Duration of Leak	(Days/Hours)
Means of Identification	(AMI/Customer)

Performing Analysis

This straightforward comparison will be a valuable tool to measure performance of leak response time and in turn volume of water conserved. Using the data gathered from the fifty largest customer leaks from the year after AMI was implemented, we can drill deeper into the actual savings. A monthly billing cycle of 30 days will be used for these calculations.

Generate Report

At the end of year (and subsequent years) after the implementation of the Automated Meter Infrastructure, the leak profiles and estimated acre feet of water saved will be compiled into a report that will identify actual water conservation. It is understood that the assumption of the water leak being repaired on customer property is the responsibility of the customer and may not always occur when notified by the District. The Customer Leak Analysis is merely a tool to measure performance of an ever-changing system before and after the implementation of a technology designed for accuracy. These profiles and reports will focus heavily on pre and post implementation of the AMI project and will be reported in the *Final Project Implementation Report*

3. Readiness to Proceed

The project schedule will be as follows:

Task Name	Start	Finish	Staff Involved
Phase 1 - Retro Meters	Award Announce (estimated 2020)	July 2020	
Initial Project Kickoff Meeting Phase I			BCVWD Project Staff

Identify Properties for retrofit			IT Staff / Field Staff
Order Equipment			IT Staff / Field Staff
Receive Equipment			IT Staff / Field Staff
Create Work Orders			Administrative Staff
Program Registers and deliver to field staff			IT Staff
Install Equipment at identified properties			Field Staff
Audit Installed Equipment			Field Staff
Field completion of Work order			Field Staff
Enter Work Order data into Springbrook			Administrative Staff
Switch property into AMR route for reading			Administrative Staff
Conduct first read and test billing			IT Staff / Field Staff / Administrative Staff
Phase II - Replacement Meters	July 2020	April 2021	
Initial Project Kickoff Meeting Phase II			BCVWD Project Staff
Identify Properties for retrofit			IT Staff / Field Staff
Order Equipment			IT Staff / Field Staff
Receive Equipment			IT Staff / Field Staff
Create Work Orders			Administrative Staff
Program Registers and deliver to field staff			IT Staff
Install Equipment at identified properties			Field Staff
Audit Installed Equipment			Field Staff
Field completion of Work order			Field Staff
Enter Work Order data into Springbrook			Administrative Staff
Switch property into AMR route for reading			Administrative Staff
Conduct first read and test billing			IT Staff / Field Staff / Administrative Staff
Phase III - AMI	July 2020	September 2022	

Initial Project Kickoff Meeting Phase III			BCVWD Project Staff
Initiate District Survey for AMI			IT Staff
Identify Potential Locations for Repeaters			IT Staff / Field Staff
Negotiate Lease / Equipment Placement / Licensing			BCVWD Project Staff
Identify Equipment List / Order			IT Staff
Order AMI Repeater Equipment			IT Staff
Install Equipment			IT Staff
Program All equipment			IT Staff
Test all equipment to ensure full coverage			IT Staff / Field Staff
Install additional equipment as needed			IT Staff / Field Staff
Perform a system read to ensure full functionality			IT Staff / Field Staff
Final Project Meeting / Project Closure	October 2022	October 2022	
Final Thoughts			BCVWD Project Staff
Final Documentation			BCVWD Project Staff
Project Closure details			BCVWD Project Staff

Evaluation Criterion G – Nexus to Reclamation Project Activities

1. **Does the applicant receive Reclamation project water?**
   Yes. The proposed project received Reclamation project water and is connected to Reclamation project activities, because it benefits the SWP, a water facility project managed in tandem with the Bureau of Reclamation, as mandated in the 1986 Coordinated Operations Agreement between the United States of America and the Department of Water Resources for the State of California.

   The District is the largest purchaser of water from the San Gorgonio Pass Water Agency, which includes SWP water. The project will conserve 927 AFY of potable water, meaning that the District can rely less on imported water for recharge and keep the water in the local basins, without the need to pump or treat for potable use. This will benefit all SWP water recipients, as it decreases the need to draw on this imported water source.

2. **Is the project on Reclamation project lands or involving Reclamation facilities?**

The project is not on Reclamation project lands but it does involve the SWP, a facility jointly managed by Reclamation and the State of California.

3. **Is the project in the same basin as a Reclamation project or activity?**
   No, the project is not in the same basin as a Reclamation project or activity.

4. **Will the proposed work contribute water to a basin where a Reclamation project is located?**
   The proposed project will contribute water to a basin that receives Reclamation water for recharge, as it will decrease the need of the District to draw on the SWP water.

Evaluation Criterion H – Additional Non-Federal Funding

The District is funding 73% of the total project cost for the proposed Automated Meter Infrastructure project. The District is requesting $1,500,000 of funding assistance from the Bureau of Reclamation through the WaterSMART Water and Energy Efficiency Grant. No additional funding is anticipated.

Non-Federal Funding ($4,204,270) / Total Project Cost ($5,704,270) = .7370 (73%)

Project Budget

Funding plan and letters of commitment

Project funding for the non-Federal cost-share will be provided from the District's Capital Replacement Reserve Funds. As shown in the Proposed Budget table on the following page, the total estimated project cost is projected to be $5,704,270 with the District providing $4,204,270 and requesting $1,500,000 from the Bureau of Reclamation. The District is providing the funds for the non-Federal portion of the cost-share and no other sources of funding from a third party are being considered. Therefore, no additional Letters of Commitment are attached.

Total Project Cost

SOURCE	AMOUNT
Costs to be reimbursed with the requested Federal funding	$1,500,000
Costs to be paid by the applicant	$4,204,270
Value of third-party contributions	$0
TOTAL PROJECT COST	$5,704,270

Budget Proposal

Budget Item Description	COMPUTATION		Quantity Type	TOTAL COST
	$/Unit	Quantity		
Salaries and Wages				
Office Temp (Part Time)	$ 17.12	1,200	Hrs	$ 20,544
Field Temp (Part-Time)	18.90	1,184	Hrs	22,378
Office Temp 2 (Part Time)	17.12	1,200	Hrs	20,544
Employee 4	41.63	764	Hrs	31,805
Employee 5	39.77	70	Hrs	2,784
Employee 6	59.72	158	Hrs	9,436
Employee 7	49.75	2,402	Hrs	119,500
Field Temp 2 (Part-Time)	18.90	3,550	Hrs	67,095
Employee 9	20.81	710	Hrs	14,775
Fringe Benefits				
Full-Time Employees	$ 28.41	4,104	Hrs	$ 116,595
Part-Time Employees	3.30	7,134	Hrs	23,542
Supplies and Materials				
Meter Body (5/8")	$ 168.71	11,599	Units	$ 1,956,867
Meter Body (3/4")	184.75	108	Units	19,953
Meter Body (1")	248.35	384	Units	95,366
Meter Body (1.5")	511.81	127	Units	65,000
Meter Body (2")	718.70	238	Units	171,051
Digital Registers (5/8")	85.57	12,850	Units	1,099,575
Digital Registers (3/4")	84.99	292	Units	24,817
Digital Registers (1")	85.12	427	Units	36,346
Digital Registers (1.5")	91.59	158	Units	14,471
Digital Registers (2")	91.59	294	Units	26,927
Itron AMR/AMI Radio	79.09	14,198	Units	1,122,920
Contractual/Construction				
Contractor A	$17,000.00	1	Week	$ 17,000
Contractor A	6,500.00	5	Units	32,500
Contractor B	750.00	5	Units	3,750
Contractor A	6,500.00	1	Units	6,500
Contractor B	30.00	1,800	Units	54,000
Other				
Other				
TOTAL DIRECT				$ 5,196,041
				Indirect Costs
de minimis	10%		$5,082,291	$ 508,229
TOTAL ESTIMATED PROJECT COSTS				$ 5,704,270

Budget narrative

Salary and Wages
This portion of the budget includes key personnel who will be working on the AMI project. The personnel needed to complete the implementation of the project will be filled by meter reading and administrative staff. The District currently has six full time field staff employees who devote the first week (and a half) of each month to reading meters. The Work Order portion of meter readings is spread out over several administrative staff employees, including utility billing and inventory.

Additional administrative staff will be required to enter new meters into the inventory system as well as the utility billing portion of the customer accounts. As such, in addition to current staff, the budget includes two temporary field staff members and two temporary office staff members. The AMI project installation of the meter boxes, installation of any other equipment, as well as programming the project will be done in house at the District.

Part time employees completing the change-out of meters and lid replacement may work either half workdays (five hours) or full workdays (ten hours) for fewer days per week.

Fringe Benefits
Fringe Benefits are those typical of a part time employee: Social Security, Medicare, Worker's Compensation, and sick leave. The Fringe Benefit cost listed in the Budget includes the potential for PEPRA in case the temporary staff hired for this project already have CalPERS, but if temporary staff are hired for no more than 1000 hours of work, these staff would not qualify for PEPRA. The difference would be approximately $1.30 in fringe benefits per hour.

Supplies and Material
The supplies and materials listed in the Budget Proposal table are required for the AMI project. Phase 1 of the project, with the retrofitting of the meters, will require ,1575 Digital Registers along with an Itron AMR/AMI Radio. Phase 2 of the project, with the replacement of the remaining 12,622 meters will require a Digital Register with Meter Body along with an Itron AMR/AMI Radio. These 14,197 upgrades, in addition to the 4,957 smart meters already installed will mean that all 19,154 meters will be smart water meters.

Phase 3 of the Project is estimated to require 5 Repeaters, 5 Cellular Modems, as well as 1,800 Meter Box Extender Lids (10% of hardware). The equipment for Phase 3 may change slightly based on the site survey to be completed in 2021.

Contractual/Construction
The Automated Meter Infrastructure generates a large amount of data and must be managed with software that can secure, analyze and display the information. The one-time cost associated with the initial setup of this service is the SAAS Setup Fee. The acronym SAAS stands for Software As A Service and will provide BCVWD with access to meter data analytics without the need to install, host, secure, and update software

locally on BCVWD servers. In addition to the SAAS setup fee, an annual maintenance fee will be applied to the annual operating budget. Additionally, a Base Station Maintenance fee will also be added to the annual operating budget. The Base Station Maintenance is required in order to ensure that the equipment is regularly maintained in order to provide a robust and reliable system. The first year of SAAS maintenance as well as the Base Station Maintenance is included in the initial project cost.

Indirect Costs - In accordance with 2 CFR Sec. 200.68 regarding Modified Total Direct Cost, the District has included a ***de minimis*** rate of 10% of the Modified Total Direct Costs (MTDC). The MTDC ($4,725,089) is a reflection of the Total Direct Costs minus unallowed costs.

Total Costs - The **Total Estimated Project Costs** are a summation of the direct and indirect cost of the proposed Automated Meter Infrastructure project that will result in quantifiable water savings, promote water use efficiency, and improve to overall service of the District

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.**

No, the AMI Project involves an upgrade to existing meters and should pose no impact to the surrounding environment. The work will be performed on property that is considered already disturbed, and no further requirements are needed.

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 known species listed or proposed to be listed as a Federal endangered or threatened species, or designated critical habitats are within the AMI Project area.

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 proposed project may have.**

No, there are no wetlands or other surface waters inside the AMI Project boundaries that potentially fall under CWA jurisdiction as "waters of the United States." No associated impacts would occur and no mitigation is required.

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

The original water delivery system was built in 1919.

5. **Will the project result in any modification of or effects to, individual features of an irrigation system (e.g. headgates, canals, or flumes)?**

There will be no modification of or effects to, individual features of an irrigation system including headgates, canals, or flumes.

6. **Are there any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?**

There are no buildings, structures, or features listed or eligible for listing on the National

Register of Historic Places within the AMI Project areas.

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

There are no known archeological sites in the AMI Project areas.

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

The AMI Project will not have a disproportionately high and adverse effect on low income or minority populations. The AMI Project has the potential to provide positive monetary benefits to low income and minority populations by identifying water inefficiencies within their community, which after installation of AMI, will potentially decrease the costs to that population.

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

The AMI Project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.

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

No, the AMI Project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native species known to occur in the area.

Required permit or approvals

Permits may be required in Phase 3 of this project if AMI equipment is installed on property that the District acquires in the future. Permit requirements will not be known until final assessments are completed in Phase 3. However, the District is prepared to obtain all necessary permits and all Project-related approvals will be executed in a timely and efficient manner.

We anticipate that the proposed project will qualify for a California Environmental Quality Act (CEQA) Categorical Exemption because the project will not result in individual or cumulatively significant environmental effects, and therefore falls within Section 43, Code of Federal Regulations, Part 46, Subsection 46.210(f): Routine and continuing government business, including such things as supervision, administration, operations, maintenance, renovations, -and replacement activities having limited context and intensity (e.g., limited size and magnitude or short-term effects).

In addition, we anticipate that the project will be considered a National Environmental

Policy Act (NEPA) Categorical Exclusion, according to the list of Categorical Exclusions located in the Code of Federal Regulations for the Department of Interior. The project meets the following Categorical Exclusion definitions: "minor construction activities associated with authorized project which ... merely augment or supplement ... " and "maintenance, rehabilitation, and replacement of existing facilities which may involve a minor change in size, location, and/or operation."

Environmental documentation will be filed after the grant is executed and the contract is awarded.

Letters of Project Support

The District has secured letters of support for the Automated Meter Infrastructure project from the following stakeholders and representatives:

1. United States House of Representatives – Congressman Raul Ruiz, 36th Congressional District
2. United States House of Representatives – Congressman Paul Cook, 8th Congressional District
3. California State Senate – Senator Mike Morrell, 23rd Senate District
4. California Assembly – Assemblymen Chad Mayes, 42nd Assembly District
5. Santa Ana Watershed Project Authority – General Manager Rich Haller
6. City of Beaumont – Mayor Becky Ames

RAUL RUIZ, M.D.
36TH DISTRICT, CALIFORNIA
COMMITTEE ON ENERGY AND COMMERCE
SUBCOMMITTEE ON HEALTH
SUBCOMMITTEE ON OVERSIGHT AND INVESTIGATIONS
SUBCOMMITTEE ON ENVIRONMENT AND CLIMATE CHANGE

2342 RAYBURN HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
P (202) 225-3330
F (202) 225-1220

43675 WASHINGTON STREET, SUITE F
PALM DESERT, CA 92211
P (760) 424-8808
F (760) 424-8803

645 EAST FLORIDA AVENUE
HEMET, CA 92543
P (951) 765-2304
F (951) 765-3784

WEBSITE RUIZ.HOUSE.GOV

Congress of the United States
House of Representatives
Washington, DC 20515-0536

September 25, 2019

Brenda Burman
Commissioner, Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

Dear Commissioner Burman,

I write in support of the Beaumont-Cherry Valley Water District (BCVWD) Advanced Metering Infrastructure (AMI) project. Implementation of this project will allow for more accurate monitoring and remediation of leaks throughout the BCVWD's service area, which includes the City of Beaumont, the community of Cherry Valley, and part of the City of Calimesa. AMI will provide real-time radio transmitted data of water consumption, which will lead to reduced water waste through active monitoring leak detection and customer education about water usage.

Current tracking of water consumption is done through monthly manual meter readings, which leaves residents vulnerable to water leaks that go undetected between readings and results in unnecessary waste of scarce potable water resources. The use of AMI technology will minimize previous unaccounted water loss, not only increasing water conservation, but also helping residents reduce costs by more effectively addressing leaks. This project enhances local, state, and federal water conservation objectives by measuring products and/or leakage quantifications that will result in measurable water savings. Additionally, the project will help to further investments in water conservation in Southern California to the economic benefit of BCVD customers and the State.

It is the mission of Beaumont-Cherry Valley Water District to be a leader in water resource management while providing customers with safe, reliable drinking water at the lowest possible cost. Technology and projects like AMI will enable the BCVWD to enact this mission by locally addressing California's long-standing water shortages with water-wise tactics. AMI will allow for more accurate and timely information about water usage, allowing customers to be more informed consumers and empowering them to be better stewards of the environment.

I support the Beaumont-Cherry Valley Water District (BCVWD) and their application and urge you to give full and fair consideration to their application, consistent with all relevant program rules and regulations. If you have any additional questions, please feel free to contact my Palm Desert office at 760-424-8888.

Sincerely,

Raul Ruiz, M.D.
Member of Congress

PAUL COOK
8th District, California

1222 Longworth House Office Building
Washington, DC 20515
(202) 225-5861

Congress of the United States
House of Representatives
Washington, DC 20515–0508

September 25, 2019

Brenda Burman
Commissioner, Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

Dear Commissioner Burman,

I write to you to offer my full support for the Beaumont-Cherry Valley Water District (BCVWD) Advanced Metering Infrastructure (AMI) project. Implementation of this project will allow for more accurate monitoring and remediation of leaks throughout the BCVWD's service area, which includes the City of Beaumont, the community of Cherry Valley, and part of the City of Calimesa.

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It is the mission of Beaumont-Cherry Valley Water District to be a leader in water resource management while providing customers with safe, reliable drinking water at the lowest possible cost. Technology and projects like AMI will enable the BCVWD to enact this mission by locally addressing California's long-standing water shortages with water-wise tactics. I fully support this project, and I thank you for the opportunity to submit this letter. Should you have any questions, please contact my Apple Valley District Office at (760) 247-1815.

Sincerely,

Col. Paul Cook (ret.)
Congressman, 8th District of California

PRINTED ON RECYCLED PAPER

CAPITOL OFFICE
STATE CAPITOL
ROOM 3056
SACRAMENTO CA 95814
TEL (916) 651 4023
FAX (916) 651 4823

DISTRICT OFFICE
10350 COMMERCE CENTER DRIVE
SUITE A 220
RANCHO CUCAMONGA CA 91730
TEL (909) 919-7771
FAX (909) 919-7739

California State Senate

MIKE MORRELL
SENATOR, TWENTY THIRD DISTRICT

COMMITTEES
HOUSING
VICE CHAIR
LABOR, PUBLIC EMPLOYMENT AND RETIREMENT
VICE CHAIR
BANKING AND FINANCIAL INSTITUTIONS
BUDGET AND FISCAL REVIEW
BUDGET SUBCOMMITTEE #1 ON EDUCATION
PUBLIC SAFETY
TRANSPORTATION

September 18, 2019

Brenda Burman
Commissioner, Bureau of Reclamation
1849 C Street NW
Washington, DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

Dear Commissioner Burman,

I am pleased to express support for the Beaumont-Cherry Valley Water District (BCVWD) Advanced Metering Infrastructure (AMI) project. Implementation of this project will allow for more accurate monitoring and remediation of leaks throughout the BCVWD's service area, which includes the City of Beaumont, the community of Cherry Valley, and part of the City of Calimesa. AMI will provide real-time radio transmitted data of water consumption, which will lead to reduced water waste through active monitoring leak detection and customer education about water usage.

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It is the mission of BCVWD to be a leader in water resource management while providing customers with safe, reliable drinking water at the lowest possible cost. Technology and projects like AMI will enable the BCVWD to enact this mission by locally addressing California's long-standing water shortages with water-wise tactics. AMI will allow for more accurate and timely information about water usage, better informing consumers and empowering them to be effective stewards of the environment.

For these reasons, I fully endorse this project and ask the Bureau of Reclamation to closely consider the project as a benefit to the local community, the region, and the state.

Sincerely,

Mike Morrell

Mike Morrell
Senator, 23rd District

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0042
(916) 319-2042
FAX (916) 319-2142

Assembly
California Legislature

CHAD MAYES
ASSEMBLYMEMBER, FORTY-SECOND DISTRICT

DISTRICT OFFICE
41-603 INDIAN TRAIL, SUITE 7
RANCHO MIRAGE, CA 92270
(760) 346-6342
FAX (760) 346-4506

September 24, 2019

Brenda Burman
Commissioner, Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

Dear Commissioner Burman,

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For these reasons, I fully endorse this project and ask the Bureau of Reclamation to closely consider the project as a benefit to the local community, the region, and the State.

Sincerely,

Chad Mayes
Member of the Assembly

Santa Ana Watershed Project Authority

OVER 50 YEARS OF INNOVATION, VISION, AND WATERSHED LEADERSHIP

September 24, 2019

Brenda Burman
Commissioner, Bureau of Reclamation
1849 C Street NW
Washington DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

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For these reasons, I fully endorse this project and ask the Bureau of Reclamation to closely consider the project as a benefit to the local community, the region, and the State.

Sincerely,

Richard E. Haller, P.E., ENV SP
General Manager

BEAUMONT
CALIFORNIA

September 23, 2019

The Honorable Brenda Burman
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington, DC 20240-0001

RE: Bureau of Reclamation WaterSMART Water and Energy Efficiency Grant Application - Beaumont-Cherry Valley Water District Advanced Metering Infrastructure (AMI) Project

Dear Commissioner Burman:

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For these reasons, I fully endorse this project and ask the Bureau of Reclamation to closely consider the project as a benefit to the local community, the region, and the State.

Sincerely,

Julio Martinez III
Mayor

City of Beaumont | 550 E. 6th Street, Beaumont, CA 92223 | (951) 769-8520 | BeaumontCA.gov

Official Resolution

Due to the previously scheduled meetings, the District Board of Directors will adopt an official resolution approving this project on October 9, 2019. A copy of the resolution will be submitted once it has been adopted by the Board of Directors in accordance with the application.

The resolution will verify the District's legal authority to enter into an agreement; that the Board of Directors has reviewed and supports submittal of this application; the capability of the District to provide the amount of funding and in-kind contributions specified in the Funding Plan; and that the District will work cooperatively with the Bureau of Reclamation to meet established deadlines for entering into a cooperative agreement.