Advanced Metering Infrastructure (AMI) Implementation Project – Phase I

WaterSMART Water and Energy Efficiency Grants for FY2021

BOR-DO-21-F001- Funding Group I

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SECTION 1: TECHNICAL PROPOSAL

A. Executive Summary

Applicant Name: San Bernardino Municipal Water Department
Date: September 17, 2020
City: City of San Bernardino and unincorporated portions of the County of San Bernardino
County: San Bernardino
Project Length of Time: 24 months
State: California
Estimated Completion Date: April 2023
Located on a Federal Facility: No

The installation of the Automated Metering Infrastructure (AMI) System is one of the priority projects for the San Bernardino Municipal Water Department (SBMWD). SBMWD will be installing 7,500 AMI meters which will enable SBMWD to detect leaks and conserve within its service area. The funding offered by this grant will be used for the implementation of Phase I of the AMI system (the "Project") which will include replacement of manually read meters and placement of towers. In addition, this project proposes to upgrade 5,000 existing meters with leak detection capabilities and to connect these meters to the customer portal. The resulting water savings are estimated to be a minimum of **1,134** acre-feet per year (AFY), with an associated energy savings of **961,497** kilowatt -hours (kWh) per year. SBMWD has completed all the preliminary work and will be ready to advertise for public bids upon notice of this grant funding. SBMWD's goals for implementation of this projects are:

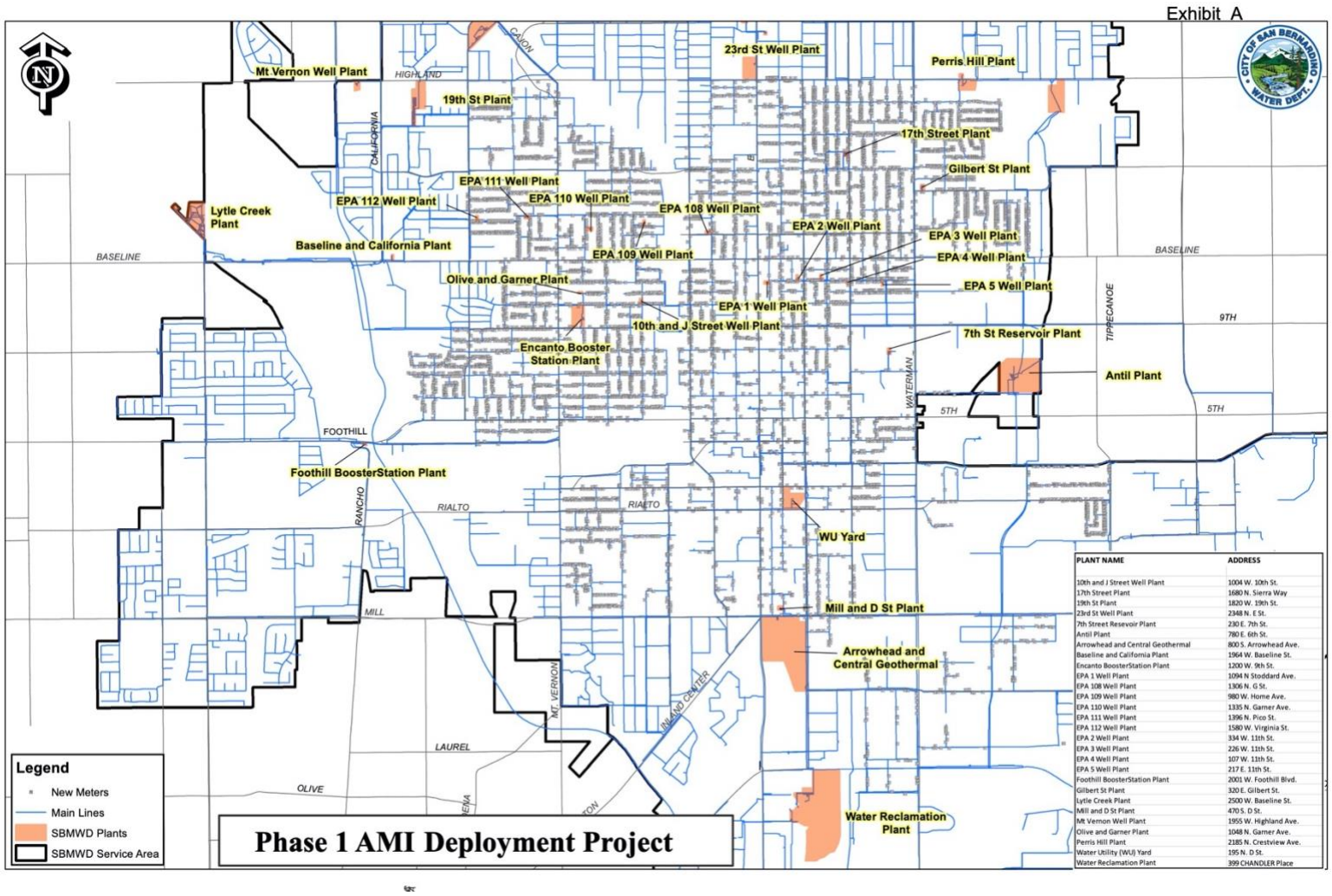
- Pro-active water leak detection system and increased conservation of costly local groundwater estimated at **1,134** AFY which will benefit the severely disadvantaged community of San Bernardino
- Increased operational efficiency and data accuracy, providing increased customer awareness of water consumption

B. Project Location

SBMWD's service area encompasses 45 square miles including the City of San Bernardino (the City) and some unincorporated areas of the San Bernardino county. The Project's approximate latitude is 34°8'N and longitude is 117°17'W. SBMWD's water service area as shown below in **Figure 1**, is located in one of the most disadvantaged communities within the State of California.

For this project, SBMWD has selected meters along 56 routes out of 187 total routes to be included in the Phase I that include a combination of residential and commercial developments which cover 56 of the Department's 187 total meter read routes:

Figure 1. SBMWD Service Area & Phase-I AMI Installation Areas



C. Technical Project Description

Currently, SBMWD's Field and Meter Services section performs meter reading for 187 routes within the water service territory which require personnel to drive to each of the 45,856 metered locations in order to manually read the water meters.

Due to the size and topography of the water service area, and in order to gain the highest water-savings most effectively, SBMWD has selected a Phase I AMI project area consisting of 56 reading routes in areas located in close proximity to SBMWD's maintenance facility. This location is where the majority of services include meters which do not currently have remote-read capabilities and are operating past their expected life expectancy. A majority of the 7,500 manually-read meters identified in SBMWD's Phase I project area include residential and commercial meters and are at least 15 years old which is past their operational lifetime.

Planning and Design:
SBMWD has identified the Project as a priority and has been trying to replace its outdated meters with AMI capable meters since 2005. SBMWD currently has 18,651 meters with remote-read capabilities out of a total 45,856 active water meters in its service area. However, these meters are not connected to a network and this project will connect 5,000 of these meters to allow real time data collection and leak detection opportunities. The cost of a comprehensive replacement has been a deterrent for continuing this program.

SBMWD conducted an extensive research and solicited demonstration from various vendors. Itron was selected based on its performance. Therefore, SBMWD has completed all required research on various types and capabilities of the various AMI technologies available and is ready to implement the next phase. The specified meters all have leak sensors and remote read capabilities.

Implementation: SBMWD will use grant funds to purchase various sizes of meters equipped with AMI technology, replace and install AMI registers, composite meter box lids, communications network, meter reading software with utility billing software, and installation. SBMWD has prepared the Technical Specification to formally request bids from contractor for the scope of work described below. SBMWD is ready to implement the Project upon notice of award from Reclamation for this project.

The scope of work proposed for the Phase I is as follows:

1. Replace the current meters with new 100 W endpoints for the following meter sizes: ½", 5/8", ¾", 1", 1 ½", 2", 3", 4", 6", 8", and 10" in the designated area.
2. Replace meter boxes and lids and end points: Concrete and steel meter boxes and lids that are not compatible with AMI are also expected to be replaced with AMI-compatible composite materials.
3. Install field data collection system with the following capabilities:

- Leak detection system with two-way communication to endpoints and to the repeater to collect on-demand reads and issue network commands.
- Extended data storage with time-synchronization of endpoint clocks, ensuring data collected territory-wide is accurately time-stamped and retrieval of missing interval data in the event of a network outage.
- Remote disconnect capabilities
- Manage and control theft and tampering and reverse flow flags

In addition, 5,000 current AMI meters that are not currently connected to the communication system will be integrated to take advantage of leak detection and other benefits.

With the data collection network system, SBMWD and its customers will have access to hourly data spanning 12 months to explain water usage, water billing, and to look at consumption compared to prior weeks, and months. The 100W endpoint that is connected to the water meter stores up to 40 days of water consumption data, so if there is a need to collect the hourly consumption data from the 100W via handheld or mobile collector because of temporary system outage, the utility can collect hourly reads for the last 40 days by walking or driving up to the meters. This solution can also perform on-demand reads to collect "near real-time" meter consumption data from the utility's office.

SBMWD plans to contract the installation of the meters and the field collection system to a licensed contractor by advertising the request for public bids according to its procurement policies.

Lastly, the Project will also include the installment of a new Customer Engagement Portal (CEP) to provide customers with the tools to understand, monitor, and adjust their water use patterns and respond to leaks promptly.

Environmental Process: SBMWD will complete the Notice of Exemption for California Environmental Quality Act (CEQA) once the Notice of Award has been announced. The Notice of Exemption for the Project falls under the categorical exemptions identified by the State Resources Agency (CEQA Guidelines 14 CCR Section 15300-15331). Specifically, the Project meets the following requirement: "no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment."

Public Outreach:
SBMWD will conduct public outreach in the form of customer bill messages and email notifications, targeted social media messages, and online presentations and resources.

Grant Compliance: SBMWD will provide administrative oversight for the Project following the recently adopted Grant Policy. Activities will include the review and execution of the grant

agreement and contract, prepare for and attend meetings with the Bureau of Reclamation (BOR), maintain all grant and project files, prepare and process requests for reimbursements, submit a fully completed SF-425 form for federal financial reports. Specifically with the final report, SBMWD will ensure grant compliance, conduct a final performance report, coordinate any audit requests for examination of records by BOR or independent auditors, and maintain all records.

E. Evaluation Criteria

E.1.1. Evaluation Criterion A—Quantifiable Water Savings

Up to 30 points may be awarded for this criterion. This criterion prioritizes projects that will conserve water and improve water use efficiency by modernizing existing infrastructure. Points will be allocated based on the quantifiable water savings expected as a result of the project. Points will be allocated to give greater consideration to projects that are expected to result in more significant water savings. All applicants should be sure to address the following:

Describe the amount of estimated water savings. For projects that conserve water, please state the estimated amount of water expected to be conserved (in acre-feet per year) as a direct result of this project. Please include a specific quantifiable water savings estimate; do not include a range of potential water savings.

The proposed Advanced Metering Infrastructure (AMI) Implementation Project will conserve water and improve water use efficiency with state-of-the-art meter reading technology that will modernize the existing infrastructure. As a direct result of this project, the estimated amount of water expected to be conserved is **1,134** AFY.

Most of 7,500 residential, commercial, and industrial meters within SBMWD's selected area are at least 15 years old and are expected to be replaced with new AMI meters. In addition, 5,000 existing meters will also be upgraded to have AMI remote read and leak detection capabilities.

Describe 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)?

Leakage sources are typically valving (faucets, water bibs, etc.), broken or cracked pipes, hot water heaters, and irrigation systems. Leakage either soaks into the ground (broken or cracked pipes, water bibs) or goes into drains feeding into the wastewater system. SBMWD obtains 100 percent of its potable water from the Bunker Hill Groundwater Basin, a sub-basin of the San Bernardino Basin Area (SBBA). The water that will be conserved will continue to be stored and protected for future use in the Bunker Hill Groundwater Basin.

Describe the support/documentation of estimated water savings: Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations. Note: projects that do not provide sufficient supporting detail/calculations may not receive credit under this section. Please be sure to consider the questions associated with your project type (listed below) when determining the estimated water savings, along with the necessary support needed for a full review of your proposal. In addition, please note that the use of visual observations alone to calculate water savings, without additional documentation/data, are not sufficient to receive credit under this section. Further, the water savings must be the result of reducing or eliminating a current, ongoing loss, not the result of an expected future loss.

Details regarding quantification methodology, estimated water losses, and support for these conclusions are provided below.

a. *Support/documentation of estimated water savings: Please provide sufficient detail supporting how the estimate was determined, including all supporting calculations.*

The Project will produce water savings in the following ways:

1. More timely identification and correction of leaks and correction in abnormal consumption resulting in reduced water loss
2. Customers making behavioral changes in response to the availability of near-real time data consumption metrics provided through the CEP resulting in reduced water consumption

Two prominent vendors of CEPs (WaterSMART and Smart Water Energy) have documented water reductions ranging from 4-7%. Additionally, East Bay Municipal Utilities District (EBMUD) released the results of an independent study conducted in 2014 which indicated that providing information to help households compare their water use to neighborhood averages reduces residential water use by 5%. SBMWD based its assumptions on this study that customer access to and utilization of the CEP would result in water savings of 5%, which is applied to 12,500 of SBMWD's customers/services that will be connected to the CEP as a result of the Project. Studies regarding the total number of years over which savings will accrue were not available, therefore a conservative five years is assumed to be the lifetime of this accrued savings.

Water savings estimates resulting from reductions in water losses is based on an EPA report on water loss control for public water systems that up to 75% of water loss in a water systems is recoverable (EPA, 2013). Another case study on the implementation of AMI in the City of Santa Maria, California found that AMI was able to reduce its non-revenue water loss by two-thirds, from 6% down to 2% (Godwin, 2011). In our water savings analysis, we estimated that two-thirds of SBMWD's non-revenue water losses were recoverable due to implantation of the AMI system. Therefore, of SBMWD's 9.6% of water losses, 6.4% is estimated to be recovered and therefore additional water savings.

Please address the following questions according to the type of infrastructure improvement you are proposing for funding. See Appendix A: Benefit Quantification and Performance Measure Guidance for additional guidance on quantifying water savings.

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

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

The steps taken in calculation of water savings are reflected in the below table:

Table 1. Water Conservation Estimate

Water Savings Calculation Variable	Value	Unit	Calculation	Source
Total Number of Active Service Connections	45,856	Meters		SBMWD
New AMI Meters and exising meters that will be upgraded to have AMI capabilities	12,500	Meters		
Percentage of total smart meters connected to AMI through the Project	27.3%		=12,500/45,856	
Total Water Supplied SBMWD in 2019	36,456	AFY		2019 Water Loss Audit
Estimated Volume of Water Supplied by AMI meters within Project	9,938	AFY	=16.4% x 36,456	
Percentage of System Water Losses in 2019	9.6%			2019 Water Loss Audit
Percentage of Recoverable Losses	6.4%		=2/3 x 9.6%	1) Godwin, 2011 , 2) EPA, 2013
Annual Recoverable Water Loss	637	AFY	=6.4% x 9,938	
Water Savings from Reduced Water Loss (20-years)	12,746	AFL	= 637x 20	
% Water Savings from Customer Web Portal (16.4% of all meters/customers – formula assumes equal % consumption by each meter)	1.4%		=5% x 27.3%	EBMUD, 2014
Annual Water Savings from Customer Web Portal	497	AFY	= 1.4% x 36,456	
Total Water Savings From Customer Web Portal (assumed 5-year life)	2,484	AFL	= 497 x 5	
Total Annual Water Savings	**1,134**	**AFY**	**= 637+497**	
Total Project Lifetime Water Savings	**15,230**	**AFL**	**= 12,746+2,484**	

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

Current distribution losses are determined by using AWWA WAS v5.0 Audit Software which is reported annually. The potential reductions in water use assumptions are based on the Environmental Protection Agency's (EPA) WaterSMART tool, Smart Water Energy, and the EBMUD 2014 study which all assume that individual water use decreases anywhere from 4-7% when AMI is installed.

In addition to improving metering practices and operational efficiency, the AMI system will enhance the customer experience and support conservation efforts by allowing customers to make more informed choices regarding water usage as well as identify potential issues on the customer side of the meter. The new AMI system will provide real-time information about water use where currently residents get monthly bills and it is at least 30 days before they can make a correction. The new CEP will provide the customers with the tools to understand, monitor, and adjust their water use patterns and respond to leaks promptly.

The AMI system will enable various alerts to be generated. Such alerts will include identification of leaks within the customer's private plumbing system and can be quantified by determining the average flow rate and duration for such events along with the total number of resolved instances. The parameters of the AMI system can be manipulated and SBMWD can set the desired alert criteria for the system. For example, SBMWD can set up an alert at 24 hours of continuous water usage. This notification would be sent to SBMWD and they would contact the customer to inform them that they had continuous water usage for 24 hours and to look for a leak. SBMWD could also set alerts for large spikes in usage showing a large break and SBMWD could notify the customer at the time of the alert.

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

SBMWD's 2017 AWWA Water Audit Water Loss Control Planning Guide attached in **Appendix 2**, indicates: "Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters

outside of +/- 6% accuracy". The Project follows this recommendation not to only replace the meters but to improve them with AMI capabilities for leak detection.

According to an article titled "*Advanced Metering Infrastructure Drivers and Benefits in the Water Industry*" published August 1, 2011 in WaterWorld, "water utilities across the country are literally leaking money. They take in, treat and pump water to their customer, but can be losing as much as 30% of their product along the way due to leaks in the distribution system. With an AMI system, the whole distribution network can be continuously monitored by hourly interval reads."

The Water Research Foundation's "*California Single-Family Water Use Efficiency* Study" (2016) documents an average leakage rate of 30.7 gallons per household per day for a California study group from 2005. This equates to 11,200 gallons per year, or 0.0343 AFY per household. The results of this study are higher than what was used above.

Another example was found after reviewing annual water loss audits for the City of Dallas, Georgia. It was determined that in one-year (2014) water loss accounted for nearly 20% of the city's total water supply for that year or 31.3 million gallons.

Additionally, the City of Santa Maria, CA began converting to AMI in December 2009. At the end of one year, with only one-third of their 20,000 meters converted, the water loss revenue was reduced from 6% to 2%, resulting in more than $600,000 in recovered revenue. Other California cities (both large and small) have converted to AMI and experienced similar conservation benefits including the cities of San Francisco, Santa Rosa, Pleasanton, Redwood City, Hayward, Sacramento, Westwood, Truckee Donner, Fresno, Beverly Hills, Pasadena, Huntington Beach, Fountain Valley, Solana Beach and San Diego.

In addition, SBMWD uses multiple planning documents to monitor its water supply and water loss. Following are some examples:

- **SBMWD Strategic Plan/Goals/Actions Plans adopted in August 2019, identifies development and implementation of AMI as one of the priority goals.**

- **Regional Water Shortage Contingency Plan:** Upper Santa Ana River Watershed Integrated Regional Water Management Plan. The water shortage contingency plan provides a framework for implementing specific measures to deal with water shortages during emergencies. The plan provides specific actions that should be taken to ensure critical water needs of the region are met during a period in which water supplies are cut by 50 percent. The 2015 IRWMP included an assessment entitled Vulnerability to Catastrophic Interruption of Water Supply and Disaster Preparedness, which is included in Appendix F of the IRWMP

- **San Bernardino Valley Regional Urban Water Management Plan -2015**

- **Water Facilities Master Plan -2015**

- **Emergency Response Network of the Inland Empire (ERNIE)**: ERNIE is a water/wastewater mutual aid network within San Bernardino and Riverside counties. ERNIE meets monthly and provides regular training for utilities in emergency response and long-term emergency planning.

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 proposed project does not include the installation of any distribution system meters

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

SBMWD has completed all of its preliminary investigation by installation of AMI units in pilot areas that have provided valuable information on the preferred capabilities of the products available in the market.

The Project proposes to install 7,500 Itron 100W smart meters (ERW-1300-403) and fixed base receivers Cellular Collector Units (CCU 100, model CCU-6027-032) and Repeater 100 (model RT-6000-125). Development of the billing system and integration process has been in process and the cost of this effort is not requested as part of this application.

As it is noted earlier, SBMWD has developed a technical specification that specifies the desired performance capabilities. In summary, SBMWD will enable automation of 5,000 existing AMI meters and install 7,500 AMI meters and radios to detect and notify SBMWD staff and end users of new and preexisting leaks quickly.

With the data collection network system, SBMWD and its customers will have access to hourly data spanning 12 months to explain water usage and billing, look at consumption compared to prior weeks, and months. The 100W endpoint that is connected to the water meter stores up to 40 days water consumption data, so if there is a need to collect the hourly consumption data from the 100W via handheld or mobile collector because of temporary system outage, the utility can collect hourly reads for the last 40 days by walking/driving up to the meter. The solution can also perform on-demand reads to collect "near real-time" meter consumption data from the utility's office.

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

SBMWD water savings will be verified in two 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 SBMWD'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% per capita reduction by 2020. It is anticipated that AMI will play a similar role in SBMWD.

2. **Gallon Per Capita Per Day (GPCD)** – SBMWD will use the gallons per capita per day from 2016 and 2017 as the baseline, comparing it to average gallons per capita per day using 2023 data post-project implementation. Please note ongoing data will be collected during deployment years regarding gallons per capita per day as the system goes live.

E.1.2. Evaluation Criterion B — Water Supply Reliability

Up to 18 points may be awarded under this criterion. This criterion prioritizes projects that address water reliability concerns, including making water available for multiple beneficial uses and resolving water related conflicts in the region. Note that an agreement will not be awarded for an improvement to conserve irrigation water unless the applicant agrees to the terms of Section 9504(a)(3)(B) of Public Law 111-11 (see p. 52 of the FOA for additional information).

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

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

SBMWD currently receives 100% of its water supply from groundwater produced from the

Bunker Hill Groundwater Basin, which underlies its water service area. When available, State Water Project (SWP) supplies are purchased to fill replenishment ponds to recharge the basin. The reliability of basin supplies is of utmost concern to SBMWD and all who pump from this groundwater basin, particularly since population of the area has nearly doubled since 1976. Any water conservation efforts (such as the AMI Project) will enhance the reliably of the supply in the groundwater basin by making more groundwater available and reduce imported supplies needed for recharge.

The 2015 UWMP considers "Climate is a primary factor affecting water management in the San Bernardino Valley." The climate in the San Bernardino Valley is characterized by relatively hot, dry summers and cool winters with intermittent precipitation. According to droughts.gov., the tool used by the US Drought Monitor, since 2000, the longest duration of drought (D1-D4) in California lasted 376 weeks ending on March 5th, 2019.

The 2015 UWMP also indicates that storing water in local groundwater basins for later use during droughts is one of the primary management strategies for the region.

The proposed project will increase water supply reliability by allowing SBMWD and its customers within the service area to efficiently manage and monitor water usage through an interactive web portal. The AMI system will streamline water conservation management efforts to support the reliability of SBMWD's water supply. Implementation of leak detection technologies will also help preserve the SBMWD's valuable water supply by ensuring that water leakages are identified and addressed immediately.

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

Implementation of the AMI Project will enhance the reliably of the supply in the groundwater basin, by making more groundwater available to its users, increasing the reliability of SBMWD's current water supplies by offsetting groundwater pumping and reducing dependency on the SWP for groundwater recharge. Conservation of groundwater is one of the essential goals for the water agencies in San Bernardino Valley.

As noted in the 2015 San Bernardino Valley Urban Water Management Plan -2015, due to recent drought conditions and increasing population and utilization of groundwater, Bunker Hill's water table dropped, resulting in the lowering of well pumps in some service areas. As a participant in the IRWMP, SBMWD has implemented an aggressive conservation plan to meet the requirements of the Western Judgment for not allowing the basin get into overdraft conditions.

Overdraft of the groundwater will result in declining water levels, increased pump lifts, and increased energy consumption to pump ground water for domestic and irrigation use. Therefore, SBMWD has identified preservation of water supply and improvement of infrastructure for energy efficiency as strategic priorities for its service area.

As discussed in Section 1.8 and in DWR's 2015 State Water Project Delivery Capability Report (2015 DCR), climate change adds another layer of uncertainty in estimating the future availability of SWP source water. Current literature suggests that global warming may change precipitation patterns in California from the patterns that occurred historically.

In addition, the proposed effort for this project as the phase I and SBMWD's subsequent efforts to implement AMI in the service area, follows the below guidelines set forth in the 2020 Water Resilience Portfolio that was published on July 28, 2020:

1. **Maintain and diversify water supplies**
2. **Protect and enhance natural ecosystems**
3. **Build connections**
4. **Be prepared**

The conserved water will remain in the local groundwater basins, allowing a more sustainable local supply to be managed during drought events.

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

The intended use of the conserved water is to reduce wasted water due to leakage and maintain reliable supply in the Bunker Hill Groundwater Basin. No mechanism is necessary.

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

Implementation of the AMI Project is expected to result in an average savings of approximately **1,134** AFY of conserved water, intended to enhance the water supply in the Bunker Hill groundwater basin that will reduce the need for the purchase of SWP by the same amount.

2. *Will the project make water available to achieve multiple benefits or to benefit multiple water users? Consider the following:*
   - *Will the project benefit multiple sectors and/or users (e.g., agriculture, municipal and industrial, environmental, recreation, or others)?*

Implementation of the AMI Project is expected to result in an average savings of approximately **1,134** AFY of conserved water, intended to enhance the water supply in the Bunker Hill Groundwater basin. This will make water available for the benefit of all users of the basin,

including residential, agriculture, municipal and industrial, environmental, and recreational users.

In addition, SBMWD's current meter reading method is inherently inefficient, requiring excessive time, labor, vehicle maintenance and fuel costs. In this proposed project, the SBMWD's existing water metering system will be replaced with state-of-the-art technology that will provide real-time data, as well as allow meters to be read remotely from a central location through a fixed communications network to reduce greenhouse gas emissions, and offer operational efficiencies for maintenance of the system. Increased efficiencies will result in cost reductions to benefit the disadvantaged community living in the service area.

Drought has a significant impact to water supply access in the region. This in turn affects a variety of areas. Potential ongoing drought losses in the Project area include but are not limited to the following:

Agriculture – There are no agricultural areas within the service area. However, Bunker Hill Basin is also used by other water agencies that have agricultural farms. Preserving water in this basin will not only benefit SBMWD, but also will help farmers in the region.

Industrial – Water is supplied to various types of industries in the region, including food and beverage, steel processing, and other beneficial industries. These industries rely on the water supply to operate and provide services, which helps maintain economic growth in the region. If drought reduces the water available, it could have a major economic impact due to the possible need to reduce production to match the reduction in water. Reduced water supply will impact industries which rely more heavily on water services such as commercial laundries, food processing, and other highly water dependent manufacturing.

Urban use – SBMWD's service area currently has over 200,000 people that depend on water supplies for food, families, business, etc. The population in this area is growing, increasing demand for resources. As future and existing drought continue, decreased water quality and supply availability may result in supply interruptions for customers.

Drought has a significant impact to the water supply in the region. Every single drop that can be saved in the region is highly important.

- *Will the project benefit species (e.g., federally threatened or endangered, a federally recognized candidate species, a state listed species, or a species of particular recreational, or economic importance)? Please describe the relationship of the species to the water supply, and whether the species is adversely affected by a Reclamation project.*

There has been a tremendous environmental impact from years of drought conditions. The recent drought conditions have caused losses or destruction of fish and wildlife habitat, loss of

wetlands, more wildfires and lower water levels in reservoirs, lakes, and ponds. Water conservation achieved through AMI system implementation will result in preservation of critical water resources such as the Santa Ana River that runs through the service area and reduced use of energy that will benefit the environment in the Valley.

In addition, since the implementation of this project will reduce the amount of water exported from Northern California stream systems. Covering an area of approximately 1,600 square miles, the Delta provides a habitat for more than 500 species of fish and wildlife. In 2013, the Bay Conservation Plan was released and identified over 30 species that are not federally listed that are potentially impacted by withdrawals from the Delta system through the SWP. These species are impacted by the operation of the SWP. Pumping from the Delta for SWP deliveries can reverse the flow of the Delta, capture fish species in pumping equipment, and increase saltwater intrusion. Decreasing reliance on the importation of Delta water could help alleviate these impacts on the Delta's ecosystem and help restore habitat for all species within the Delta's ecosystem. Additionally, a healthy Delta ecosystem has economic benefits. The Delta is used for fishing, hunting, boating, camping, picnics, and viewing nature which sums to approximately $809mm in income and economic value added per year for the region.

- *Will the project benefit a larger initiative to address water reliability?*

The proposed AMI project will benefit several larger initiatives to address water reliability, including the following:

1. **SBMWD Strategic Plan/Goals/Actions Plans adopted in August 2019, identifies development and implementation of AMI as one of the priority goals.**

2. **2015 Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IWRMP).** As it is noted in this plan, by 2035, demand in the Region is projected to increase by over 100,000 AFY and will require the continued development of a diverse water supply portfolio to overcome various challenges and uncertainties. The IRWM Region's water suppliers plan to meet demand through a combination of imported water, groundwater, local surface water, recycled water, and water use efficiency programs. The IRWM Region is highly dependent on its local water supplies, particularly precipitation stored as groundwater, which provides approximately 67% of supplies during average years and over 70% of supplies during drought years. The Region plans to store as much water as possible in groundwater basins during wet years and then to pump this water from groundwater storage during drought years (i.e. conjunctive use).

3. **2015 Urban Water Management Plan (UWMP)** (State approved water conservation plan that recognizes that unaccounted for water loss in SBMWD service area is estimated using the AWWA water audit tool with the latest estimate being at 9%

4. **2015 Comprehensive Water Facilities Master Plan** which identified several important operational improvements to reduce unaccounted for water, including water meter replacements.

5. **The Climate Change Handbook for Regional Water Planning (Department of Water Resources 2011)** recommends that regions identify strategies that can help them to adapt to climate change as well as mitigate greenhouse gas emission, which this project addresses both.

6. **DWR California Single-Family Water Use Efficiency Study** cites conservation as the simplest, most cost-effective way to remedy, or at least postpone water resource management issues.

Southern California has experienced several significant droughts and water shortages since the 1970s, triggering great concern regarding water reliability. Each of the above initiatives was developed in an effort to address the issue of water reliability. The proposed AMI project is consistent with the objectives of each of these initiatives. Implementation of AMI will allow SBMWD to detect and address water leaks in the system in an efficient and timely manner to prevent water waste. It will also help conserve water by allowing customers and the SBMWD to monitor water usage consumption and alert customers if there is excessive usage.

- *Will the project benefit Indian tribes?*

SBMWD is a service provider for the San Manuel Indian tribe (a federally recognized tribe) and the proposed water conservation will directly benefit the Bunker Hill Groundwater basin and in turn members of this tribe.

- *Will the project benefit rural or economically disadvantaged communities?*

Yes, based on 2017 American Community Survey, the Median Household Income (MHI) for the City of San Bernardino was $43,136. SBMWD's service area also includes unincorporated parts of San Bernardino County. According to an Appraisal Report prepared for SBMWD Board of Directors in June 2019, the MHI is reported as $41,027 and classified the area as "severely disadvantaged" as compared to California MHI: $71,228 and the national median household income of $57,652.

Should water shortages occur, this project will support reliability of water supplies, which will minimize the need to increase water rates to all customers, including economically disadvantaged communities.

- *Describe how the project will help to achieve these multiple benefits. In your response,*

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

Implementation of the AMI Project is expected to result in minimum water savings of approximately **1,134** AFY, intended to enhance the water supply in the Bunker Hill groundwater basin. Implementation of the AMI Project will enhance the reliability of the supply in the groundwater basin, by making more groundwater available to its users, thereby offsetting groundwater pumping. This will make water available for the benefit of all users of the basin. In addition, because SBMWD provides emergency connections to other agencies in the Cities of Colton, Devore, Rialto, Highland, Loma Linda, Muscoy, and Riverside. The proposed project savings will benefit the region and not just the residents in the service area.

In addition, the San Bernardino Valley is a seismically active area of Southern California. Four major fault zones are found in the region, including the San Jacinto Fault, the Chino-Corona segment of the Elsinore Fault, the Cucamonga Fault, and the San Andreas Fault. Numerous other minor faults associated with these larger fault structures may also present substantial hazards. The primary regional contingency strategy is groundwater storage. During an outage of the statewide system, agencies would rely primarily on local groundwater supplies. One of the primary management strategies in the IRWMP is to store water in wet years so that it is available in dry years. However, any additional stored water would also be available during a water shortage.

Installation of AMI meters will reduce water loss due to leakage to be stored in groundwater basin for other uses.

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

SBMWD is an active participant of Santa Ana Watershed Project Authority (SAWPA) “One Water One Watershed (OWOW)” program. OWOW is 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. This proposed AMI project will

conserve water using early leak detection, water consumption education, reduction in distribution losses and using the data that the AMI system will provide to determine where losses are and prevent those losses. This proposed AMI project will have a direct reduction in water consumption of **1,134 AFY** and a projected savings of **15,230 AFL** with substantial energy savings as a direct result of implementing this project.

SBMWD is also an active participant in the San Bernardino Basin Groundwater Council Agencies that was formed in 2015 to identify and develop a Groundwater Sustainability Council for the San Bernardino Basin Area. The goals of this Council are to prepare for and coordinate the management of groundwater supply resources throughout the Basin, and to coordinate maintenance of conveyance and recharge facilities to expedite such management.

In addition, SBMWD is a member of the Emergency Response Network of Inland Empire (ERNIE) facilitates public agency preparedness for, response to, and recovery from local and regional disasters to ensure the delivery of critical public services through mutual aid, communications and compliance with State and Federal emergency standards.
This project will be discussed with SBMWD's colleagues in SAWPA's OWOW program, Groundwater Council and ERNIE. The water conserved allows for an increase in water reliability, because it allows for groundwater sustainability and less water to be diverted from the Delta, increasing the health of the Delta, decreasing water restrictions due to habitat health and protecting the region in case of drought events.

- *Is there widespread support for the project?*

Yes, the proposed project has wide local and regional support which promotes and encourages local and regional collaboration to meet the goals set by the Governor's office in the recently published Water Resilience Portfoloio-2020 and achieve California's overarching goal to increase the reliability of water supply and provide long-term solutions to the effects of climate change and population growth. Letters of support that are included in this application.

In addition, there is widespread support as indicated below:

- **State Support**: Through their approval of the 2015 San Bernardino Valley Regional Urban Water Management Plan, The Climate Change Handbook for Regional Water Planning (Department of Water Resources 2011) and the DWR California Single-Family Water Use Efficiency Study which cites conservation as the simplest, most cost-effective way to remedy, or at least postpone water resource management issues.

- **Regional support**: The approval and implementation of the 2015 Upper Santa Ana River Watershed Integrated Regional Water Management Plan (IWRMP), the 2015 Regional Urban Water Management Plan (Plan) for the San Bernardino Valley area was developed

by close collaboration among the following agencies: San Bernardino Valley Municipal Water District (Valley District) service area, and nine participating retail water purveyors: City of San Bernardino Municipal Water Department, City of Colton, East Valley Water District, City of Loma Linda, City of Redlands, City of Rialto, Riverside Highland Water Company, West Valley Water District, and Yucaipa Valley Water District.

One of the requirements of this plan was to identify conservation programs to encourage efficient use of urban water supplies. Implementation of the proposed project is in direct alignment with this goal and benefits not only SBMWD, but the Valley and therefore is supported by the participating agencies.

In addition, this project is in direct alignment with the goals of San Bernardino Basin Groundwater Council Agencies for groundwater sustainability.

- **Tribal support:** SBMWD is a service provider for the San Manuel Indian tribe (a federally recognized tribe) and the proposed water conservation will directly benefit the Bunker Hill Groundwater basin, and in turn, the members of this tribe.

- **Consistent Local Support**: **As it has been noted, the Strategic Plan for SBMWD that was adopted in August 2019, identifies implementation of AMI in the Action Plans for the Department.** through approval of the 2015 Water Facilities Master Plan and the updated 2015 Water Shortage Contingency Plan

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

Ultimately, the significance of the SBMWD's collaboration with and support from other agencies and inclusion in various water management programs is the dedication of the cities and agencies in the San Bernardino Valley to work together to conserve and better manage valuable water resources for the future of California.

The Upper Santa Ana River Watershed (USARW) has a long-standing history of collaboration by SBMWD and other water resource management agencies to manage the watershed's unique water supply, water quality, flood, and habitat challenges. In 2005, this collaboration allowed the agencies to successfully form the USARW Integrated Regional Water Management Region (IRWM Region or Region) and develop an integrated plan for managing water resources in the Region. The USARW Integrated Regional Water Management Plan (IRWM Plan) is the result of this effort. The 2014 IRWM Plan serves as an update to the IRWM Plan developed in 2007, and incorporates new information describing the Region, updates goals and objectives, re-evaluates strategies, and develops a process for future implementation of the IRWM Plan. Stemming from this effort, the agencies in the Region created the Basin Technical Advisory Committee (BTAC) to facilitate implementation of the IRWM Plan. Development of the BTAC has strengthened dialogue and cooperation between agencies and has improved regional planning. The BTAC, which serves as

the Regional Water Management Group, is open to all agencies and stakeholders who desire to participate in the IRWM Region's planning and management efforts.

San Bernardino climate typically exhibits hot, dry summers, when the daily temperature can easily exceed 100 degrees Fahrenheit and mild winters. Climate is a primary factor that influences water demand within the SBMWD service area. With the water supplies being so scarce within the region, SBMWD and its partners have recognized the need to manage the water supply in the region as a complete unit to ensure there is ample water resources for all citizens of the Valley now and in the future as the State faces the effects of climate change and population growth.

In addition, SBMWD strives to implement projects that will save significant amounts of valuable water that affect all of California. AMI systems have a proven track record in water conservation beyond drought stages. This is one of the single-most important factors in success of the AMI system and is achieved by customer's involvement in staying informed of their water usage. Also, water usage that meets SBMWD 15% water conservation goal is not assessed a water conservation surcharge thus creating an incentive that will allow the customer to become an effective partner in water conservation. The water savings achieved through implementation of the AMI system, will benefit all SBMWD partner agencies and their customers.

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

Yes. SBMWD will share best practices and results of the proposed project with the cities and agencies in regional organizations that SBMWD participates in such as SAWPA, Groundwater Sustainability Council, and ERNIE which will enable project replication in those agencies.

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

Conflicts over water rights have existed throughout history, including in the semi-arid San Bernardino Valley region that the proposed project promises to help to resolve.

Due to recent drought conditions and increased utilization of groundwater, Bunker Hill's water table has dropped, resulting in the lowering of well pumping in some of the water service areas. In order to prevent critical reductions in groundwater levels, IRWMP manages the groundwater for the region so that the Bunker Hill subbasin will not go into overdraft as required by the Western Judgment. IRWMP is the tool used to ensure the judgment's requirements are met. Through the development of the IRWMP, the basin technical advisory committee (BTAC) was created. Annually, BTAC produces a groundwater management plan which identifies the basins needs and recharge projections and capacities. The report also identifies groundwater table levels, quantity of water pumped, risks of subsidence/liquefaction and safe yield. Additionally, BTAC reviews projects to be included in the IRWMP which may result in regional benefits to increase basin yield and reduce demand in this basin.

Conflicts are all based on the simple issue of supply and demand. Population in California has nearly doubled since 1976, resulting in an increase in demand for water, yet supplies remain limited. Any efforts to narrow the gap between supply and demand will help to resolve or alleviate the conflict. The only way the supply can be "increased" is to reduce use of the available groundwater, i.e. to "conserve" the supplies we do have. Any water that can be conserved in the groundwater will help to mitigate the scale of the conflict. It has been proven that the proposed AMI Implementation project will conserve this precious resource which will allow the SBMWD to better manage its use and distribution of the water by reducing the amount of lost water.

- *Describe the roles of any partners in the process. Please attach any relevant supporting documents.*

SBMWD is the sole agency responsible for implementation of the project and does not have any partners.

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

No.

E.1.3. Evaluation Criterion C — Implementing Hydropower

This criterion is not applicable to this project.

E.1.4. Evaluation Criterion D — Complementing On-Farm Irrigation Improvements

This criterion is not applicable to this project.

E.1.5. Evaluation Criterion E — Department of Interior and Bureau of Reclamation Priorities

Up to 10 points may be awarded based on the extent that the proposal demonstrates that the project supports the Department of the Interior priorities. Please address those priorities that are applicable to your project. It is not necessary to address priorities that are not applicable to your project. A project will not necessarily receive more points simply because multiple priorities are addressed. Points will be allocated based on the degree to which the project supports one or more of the priorities listed, and whether the connection to the priority(is) is well supported in the proposal.

Department Priorities:

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

The 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. Water conservation achieved through this project will help preserve our precious natural resources.

- *Utilize science to identify best practices to manage land and water resources and adapt to changes in the environment;*
- *Foster relationships with conservation organizations advocating for balanced stewardship and use of public lands;*

Utilizing Science: The proposed project is the perfect example of utilizing science to better manage our scarce water resources to adapt to the changes in the environment. The science of AMI technology is state-of the-art water metering. Replacing old technologies (such as manual read and/or AMR meters) with AMI meters as this project proposes, will reduce the quantity of water losses experienced in the distribution system, and thereby conserve our limited water supply. In fact, the proposed AMI Implementation Project is the perfect example of utilizing science to manage and conserve our water resources and adapt to changes in the environment.

Fostering Relationships: SBMWD is a member agency participating in the Upper Santa Ana River Watershed Integrated Regional Water Management Plan (USARW IRWMP). The primary purpose of the USARW IRWMP is to provide a roadmap for the management of water resources in the area to ensure long-term, reliable water supply availability for the IRWM Region. The IRWMP has identified "Improving water supply reliability" as their top goal.

All the members share a goal to conserve water and believe implementing a modernized infrastructure today, to achieve greater efficiency and effectiveness in delivering water supplies, is critical for the future of California. This type of project can save hundreds of thousands of gallons of water by quickly identifying where a leak is located so that steps can be taken to fix the issue.

2. *Utilizing our natural resources*
   - *Ensure American Energy is available to meet our security and economic needs;*

Over the last two decades, the water-energy nexus has gained attention due to local, regional, national, and global concerns regarding energy security, water scarcity, and the impacts of global climate change. For example, the historic 2012-2015 North American Drought impacted electricity generation capacity by restricting surface

water withdrawals used for power plant cooling, as well as drastically reducing hydropower resource availability. Situations such as this highlight how water and energy systems are inextricably linked and the potential vulnerabilities this creates.

The energy needed for providing water can be a significant portion of all energy use, with a California Energy Commission report estimating that five percent of energy consumption in California can be attributed to the conveyance, distribution, and treatment of water. Advanced water metering reduces real water loss, thus reduces the need for energy to pump and clean water that will remain in local groundwater basins.

Implementation of this project will also result in reduction of efforts for meter reading, savings on fuel energy, reduction of greenhouse gas emissions and its subsequent impacts. In addition, automation of the billing system will further reduce energy as compared to conventional billing systems. Increased operational efficiency will also result in reduced energy for water distribution system. Energy savings from the Project are detailed in **Table 2** below.

Table 2: Energy Savings Estimate

Energy Savings	Value	Unit	Calculation	Source
Annual Water Conserved	1,134	AFY	From Table 1	From Table 1
Energy Used per Water Unit Produce	848	kWh / AF	used / 35,968.78 AF Produced	SBMWD
Total Energy Savings per Year	**961,497**	**kWH per Year**	**= 1,134 AFY x 848 kWh per AF**	

3. *Restoring trust with local communities*
   - *Be a better neighbor with those closest to our resources by improving dialogue and relationships with persons and entities bordering our lands;*

SBMWD is one of the stakeholders in the Basin Technical Advisory Committee (BTAC). The role of the BTAC is to facilitate implementation of the IRWMP and develops the annual water management plan. The BTAC stakeholders work cooperatively and strive to make decisions by consensus. BTAC focuses on long-term management of water resources by implementing the strategies in the USARW IRWMP. Currently, BTAC meets monthly with the primary purpose of providing technical advice for the management of local resources to the Western-San Bernardino Watermaster agencies, Western Municipal Water District and Valley District.

Directly or indirectly, SBMWD shares the limited water resources with these stakeholders. Any efforts undertaken by the SBMWD to use less of (i.e. conserve) these shared resources will help to restore the trust with these communities and help us to be a better neighbor.

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

As noted above, SBMWD is a participant in multiple local and regional planning groups and will be able to share the result of this state-of-the-art technology with other stakeholders. Actual savings will not only benefit SBMWD but will provide an opportunity for exchange of information in this ever-changing technical development world that we live in and encourage further discussion and cooperation.

Striking a regulatory balance

- *Reduce the administrative and regulatory burden imposed on U.S. industry and the public;*

  This priority is not applicable to this Project.

- *Ensure that Endangered Species Act decisions are based on strong science and thorough analysis.*

  This priority is not applicable to this Project.

Modernizing our infrastructure

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

  As mentioned earlier, the proposed project directly aligns with the Department of Interior's priority to modernize American infrastructure. The existing meters are at average of 15 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.

  The proposed AMI Project will utilize the latest technology in meter reading and leak detection to replace outdated, less efficient technology, consistent with the goal of "modernizing U.S. infrastructure".

a. *Remove impediments to infrastructure development and facilitate private sector efforts to construct infrastructure projects serving American needs;*

AMI Technology is offered through private innovation that SBMWD is utilizing to improve the infrastructure within its service area.

b. *Prioritize DOI infrastructure needs to highlight: 1) Construction of infrastructure; 2) Cyclical maintenance; 3) Deferred maintenance.*

This project is directly in line with the identified DOI infrastructure needs as it includes construction of infrastructure using modern technology that will reduce the cyclical and deferred maintenance requirements tremendously by replacement of antiquated meters with new state-of-the-art technology.

Currently 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 meters will modernize the process, allowing for use of real time data (every 6 minutes) reading, more accurate and consistent reading, and faster and more reliable identification of system leaks and issues. This will allow SBMWD to be to not only reduce the deferred maintenance but also attend to what is the most crucial section with largest potential for water waste.

Reclamation Priorities:

1. Increase Water Supplies, Storage, and Reliability under WIIN and other Authorities
This priority is not applicable to this Project.

2. Streamline Regulatory Processes and Remove Unnecessary Burdens to Provide More Water and Power Supply Reliability
This priority is not applicable to this Project.

3. Science and Technology to Improve Water Supply Reliability to Communities

The AMI project will utilize the latest in wireless and computer technology to help SBMWD find and fix leaks, and to help customers save water. This best practice and increased customer service will bring our water provider further along in achieving our conservation management goals. This project will indirectly help in resolving water supply disruptions and will expand capacity.

4. Address Ongoing Drought

In addition to the actual water savings realized by implementation of this project, the AMI system is projected to change behavior in residents so that they will reduce their metered water use and discover unknown leaks. Water conserved as a result of the Project's

implementation represents a decrease in local demand. This behavioral change will be most effective during drought events.

5. Improve the Value of Hydropower to Reclamation Power Customers

This priority is not applicable to this Project.

6. Improve Water Supplies for Tribal and Rural Communities

The San Manuel Indian tribe (a federally recognized tribe) relies on SBMWD for water service at a local business. The water conserved by this project will preserve local water assets, reduce energy and cost of operations that will benefit tribe members and SBMWD's disadvantaged communities.

E.1.6. Evaluation Criterion F — Implementation and Results

E.1.6.1. Subcriterion F.1 — Project Planning

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

Provide the following information regarding project planning:

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

SBMWD utilizes several documents including the following planning documents:

- **SBMWD Strategic Plan/Goals/Actions Plans adopted in August 2019, identifies development and implementation of AMI as one of the priority goals.**
- **Urban Water Management Plan -2015**
- **Water Facilities Master Plan -2015**

Above documents provide support for the proposed project and identify strategies for water conservation. The 2017 AWWA Water Audit Water Loss Control Planning Guide serves as a tool to analyze available data and provide suggested water system enhancements based on the validity of data available to the water purveyor. At this time, improving meter data collection, through a project such as AMI, is the most effective investment for SBMWD's water system, as it results in water savings, reduced cost that will be passed on to the disadvantaged community in the service area.

Each one of these documents provide the necessary information for SBMWD to incorporate technology to optimizing operational processes for maximum efficiency, and energy saving opportunities that AMI will address.

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

The AMI implementation is one of goals in the SBMWD Strategic Plans/Goals/Action Plans under Infrastructure/Efficiencies goals that were adopted in August 2019. This project is directly in line with the following goals and action plans:

1. Responsible planning of resources to meet current and future needs
2. Address technology to maintain or increase efficiencies
3. Address water supply sustainability
4. Exercise responsible financial management
5. Increase two-way community information/communication program

Using the above goals as a road map, the AMI implementation plan is a priority project that will allow SBMWD achieve their mission. The current need for meter replacement and the larger vision for water conservation will be achieved once this project is implemented.

Next, the project type is listed in the State of California Water Plan (2013 Update). The Water Plan is California's strategic plan for managing and developing water resources statewide for current and future generations. It provides a collaborative planning framework for elected officials, agencies, tribes, water and resource managers, businesses, academia, stakeholders, and the public to develop findings and recommendations and make informed decisions for California's water future. The plan is updated every five years, with the 2018 Update being the latest version.

The 2013 State of California Water Plan outlines smart metering as a top Best Management Practice (BMP), see Section 3: Urban Water Use Efficiency. Due to the large size of the Plan is not included in this application, but can be found here:
https://www.water.ca.gov/Programs/California-Water-Plan/Water-Plan-Updates

The 2018 State Water Plan Update, in preliminary draft form, lists "Modernize Water Management Systems" on page 1-6 and 1-7 and states "Water resource infrastructure is maintained, rehabilitated, or modernized to perform effectively. Such structures are more resistant to impacts from inter-annual hydrologic variability and other uncertainties." (Relevant pages are included in Appendix H of the State Water Plan Update) The proposed project will modernize our water management system, as prioritized in the document.

Most recent publishing of the California Water Portfolio in July 2020 encourages integrated use of science and monitoring, data, and technology, coupled with human coordination, to help

water managers match assets to challenges and share costs and benefits. The proposed AMI implementation project meets the goals of state, regional and local plans.

E.1.6.2. Subcriterion F.2 — Performance Measures

Provide a brief summary describing the performance measure that will be used to quantify actual benefits upon completion of the project (e.g., water saved or better managed, energy generated or saved). For more information calculating performance measure, see Appendix A: Benefit Quantification and Performance Measure Guidance.

All Water and Energy Efficiency Grant applicants are required to propose a "performance measure" (a method of quantifying the actual benefits of their project once it is completed). A provision will be included in all assistance agreements with Water and Energy Efficiency Grant recipients describing the performance measure and requiring the recipient to quantify the actual project benefits in their final report to Reclamation upon completion of the project. If information regarding project benefits is not available immediately upon completion of the project, the financial assistance agreement may be modified to remain open until such information is available and until a Final Report is submitted. Quantifying project benefits is an important means to determine the relative effectiveness of various water management efforts, as well as the overall effectiveness of Water and Energy Efficiency Grants.

Note: program funding may be used to install necessary equipment to monitor progress. However, program funding may not be used to measure performance after project construction is complete (these costs are considered normal operation and maintenance costs and are the responsibility of the applicant).

The following performance measures will be developed to measure the gained efficiencies in water conservation and energy consumption.

1. Water Savings: Post project water loss records will be compared to the latest prior to start of AMI implementation to determine the actual savings for the goal of water conservation of min **1,134** AFY
2. Energy Savings: Current cost of energy consumption is readily available and will be compared to the post project values to determine the energy savings
3. Operational Efficiencies: Annual cost of meter reading and replacement efforts as compared to that after AMI implementation will provide the gained savings through more efficiency operational process.

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

Applicants that include a detailed project implementation plan (e.g., estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates) will receive the most points under this criterion.

- *Identify and provide a summary description of the major tasks necessary to complete the project. Note: please do not repeat the more detailed technical project description provided in Section D.2.2.4.; this section should be focused on a summary of the major tasks to be accomplished as part of the project.*

1. SBMWD has prepared the Technical Specification to formally request bids from contractor for as soon as the agreement for this grant request has been processed.
2. SBMWD will also issue a construction bid to receive public bids for installation of the meters.
3. Board of Directors will then award the contracts for procurement and installation of the equipment.
4. While physical installation is in process, data acquisition and analytics will begin for importing and coordinating with billing system.
5. In the meantime, SBMWD will continue its outreach to provide education and support for its customers.
6. SBMWD Project Manager will provide construction management during the installation phase and coordinate all the work with the billing division.

Staff anticipates that installation will be accomplished over the two-year period by a contractor.

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

After completion of the CEQA Notice of Exemption, there will not be any permit requirements for this project.

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

SBMWD has been preparing for the implementation of the AMI system since 2005. SBMWD identified this project's direction many years ago and anticipated the need for AMI technology requiring new development to install smart water meters. In addition to new development installing smart water meters, SBMWD also replaces worn or broken water meters with smart meters. SBMWD completed a pilot project by soliciting demonstration of various available AMI technologies and evaluation of the capabilities.

In addition, SBMWD has been working with billing software consultants to upgrade the billing

system components to interact with the new Cellular Connection Units to receive and produce the billing information for each account.

SBMWD's investment and planning for this project has resulted in a substantial "head start" there are 5,000 additional meters currently in the ground awaiting the implementation of this project. Please note that SBMWD is not seeking reimbursement for these costs as part of these meters.

In addition, SBMWD has been preparing for this project by upgrading its billing system to integrate with the AMI communication system. As a result, a wide range of data collection, controls, and analytics capabilities have been developed to take advantage of the added meters to reduce water loss through improved leak detection, reduce operating costs through streamlined billing,

SBMWD is anxious to start this project and has prepared the technical specifications that will be used to evaluate the proposed systems by bidders and is ready to advertise for construction bids once the notice of grant award has been received. Meter replacements will start immediately after Board of Director award of contracts.

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

SBMWD process requires approval of the contracts award by the Board of Directors that will be scheduled upon execution of the agreement of this grant funding request. Award of the construction contact to the lowest responsible and responsive bidder will also need to be approved by the Board of Directors. There are no new policies or administrative actions required to implement the project.

Please also include an estimated project schedule that shows the stages and duration of the proposed work, including major tasks, milestones, and dates. Milestones may include, but are not limited to, the following: complete environmental and cultural compliance; mobilization; begin construction/installation; construction/installation (50% complete); and construction/installation (100% complete)

Table 3: Estimated AMI Implementation Plan

Estimated AMI Implementation Plan			
Phase	**Description**	**Start**	**Finish**
Design & Technology Selection	Evaluation of available technology and products		**completed**
	Develop bid document and technical		**completed**

	specification		
	Process CEQA	Immediately upon Notice of Award estimated Jan 2021	Feb 2021
Project Implementation & Construction Phase	Advertise for bids for equipment and installation	Immediately upon Execution of Agreement estimated April 2021	May 2021
	Award contracts	June 2021	June 2021
	Meter Replacement-50% construction	June 2021	May 2022
	Meter Replacement-100% construction	June 2022	April 2023
	System testing and network interface	Sep 2021	April 2023
Public Outreach	Conduct neighborhood meetings, consumer notifications, community engagement	June 2021	April 2023

E.1.7. Evaluation Criterion G — Nexus to Reclamation Project Activities

Up to 4 points may be awarded if the proposed project is in a basin with connections to Reclamation project activities. No points will be awarded for proposals without connection to a Reclamation project or Reclamation activity.

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

The proposed project is not connected to any Reclamation project activities.

- *Does the applicant receive Reclamation project water?*
  When available, SWP supplies are purchased to fill replenishment ponds to recharge the Bunker Hill Groundwater Basin.

- *Is the project on Reclamation project lands or involving Reclamation facilities?*
  No.
- *Is the project in the same basin as a Reclamation project or activity?*
  No.
- *Will the proposed work contribute water to a basin where a Reclamation project is located?*
  No.

- *Will the project benefit any tribe(s)?*

The water conserved by this project will preserve local water assets, reduce energy and cost of operations that will benefit the tribe as well.

E.1.8. Evaluation Criterion H — Additional Non-Federal Funding

Up to 4 points may be awarded to proposals that provide non-Federal funding in excess of 50 percent of the project costs. State the percentage of non-Federal funding provided using the following calculation:

Table 4: Percentage of Non-Federal Funding for Project

Percentage of Non Federal Funding		
Non-Federal Funding Amount	**Total Project Cost**	**Non-Federal Funding Percent**
$ 1,536,535	**$ 2,036,535**	**75.5%**

SECTION 2: PROJECT BUDGET

Standard Form 424 Budget Information

This document is included in the separate submission with all of the SBMWD's completed Standard Form 424 copies.

A. Funding Plan and Letters of Commitment

SBMWD does not have any third-party funding sources or expected Federal funding sources outside of this application for assistance. Currently, SBMWD does not have any pending funding requests for this project outside of this application and will provide the funding from the Water Utility Capital Project Funds for Fiscal Year 2021-2022 through 2022-2023 that has been allocated by the attached resolution of the Board of Directors .

B. Budget Proposal

Table 5: Total Project Costs

SOURCE	AMOUNT	Percentage
Costs to be reimbursed with the requested Federal funding	**$500,000.00**	**25%**
Costs to be paid by the applicant	**$1,536,535**	**75%**
Value of third-party contributions	**$0**	**0%**
Total Project Cost	**$ 2,036,535**	**100%**

Table 6: Summary of Funding Sources

Funding Sources	Amount	%
SBMWD Contributions	$1,536,535	75%
SBMWD in-kind Contributions	$ 0	0%
Bureau of Reclamation	$ 500,000	25%
Total	**$ 2,036,535**	**100%**

Table 7: Budget Proposal

Budget Item	Computation		Quantity Type	Total Costs
	$ / Unit	Quantity		
Salaries and Wages				**$ 30,655**
Tim Connor	73.69	416	hours	$ 30,655
Finge Benefits				**$ 15,330**
Tim Connor	36.85	416	hours	$ 15,330
Travel				**$ -**
N/A				
Equipment				**$ 1,329,550**
Registers for Meters	$50	7,500	each	$ 375,000
Lid Replacements	$48.28	7,500	each	$ 362,100
Collectors - 100CCU	$5,130	7	each	$ 35,910
Repeater 100	$3,580.00	13	each	$ 46,540
End Points - 100W	$68	7,500	each	$ 510,000
Misc Network Hardware	$ 9,015	1	LS	$ 9,015
Supplies and Materials				**$ -**
None				
Contractural/Construction				**$ 660,000**
Meter Installation	$90.50	5,000	hours	$ 452,500
Network Installation	$207,500.00	1	LS	$ 207,500
Other				$ -
N/A				
Total Direct Costs				**$ 2,035,535**
Indirect Costs				$ 1,000
Reclamation Environmental Consultant				$ 1,000
Total Estimated Project Costs				**$ 2,036,535**

C. Budget Narrative

Salaries and Wages

Tim Connor, the Distribution Superintendent, will be the project manager for this project. He is supported by the Engineering, Operations and Informational Technology staff members.
The salaries are not anticipated to be escalated within the contract implementation period.

Fringe Benefits

Fringe Benefits for key staff members are included in the Budget Proposal table.

Travel

Travel is not included in this proposal

Equipment

Cost of equipment and installation are listed in the Budget Proposal table.

Materials and Supplies

Material and supply for this project will be part of the contractual work.

Contractual

SBMWD has prepared the bid documents and the technical specifications to advertise the projects to receive public bids. SBMWD is ready to award the contract and start implementation of the project once the grant agreement has been executed. SBMWD also plans to contract the installation of the meters and the field collection system to a licensed contractor by advertising the request for public bids according to its procurement policies. The cost for the procurement, installation and field network interface have been included in the Budget Proposal table.

Third-Party In-Kind Contributions

There are no third-party contributions towards this project.

Environmental and Regulatory Compliance Costs

The project is categorically exempt from the provisions of CEQA. However, $1,000 has been allocated for environmental and cultural report studies if that would be necessary under Federal regulations.

Other Expenses

There are no other expenses.

Indirect Costs

There are no indirect costs associated with this project.

SECTION 3: ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

To allow Reclamation to assess the probable environmental and cultural resources impacts and costs associated with each application, all applicants should consider the following list of questions focusing on the NEPA, ESA, and NHPA requirements. Please answer the following questions to the best of your knowledge. If any question is not applicable to the project, please explain why. The application should include the answers to:

SBMWD will be completing the Notice of Exemption for CEQA once the Notice of award has been announced. The Notice of Exemption for this project falls under the categorical exemptions identified by the State Resources Agency. (CEQA Guidelines 14 CCR Section 15300-15331) and meets the following requirement: "no substantial evidence, in light of the whole record before the agency, that the project as revised may have a significant effect on the environment."

As demonstrated in the Budget Proposal summary, majority of the work in this project is the replacement of meters and network interface customer outreach. It is anticipated that Repeat Network Collectors will be installed on existing light poles as needed for data transmission.

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

As noted above, this project will not have any adverse impact on the surrounding environments. Most of the work involved is to replace the existing meters that will not require any disturbance to the surrounding area. The driving to each meter location is currently occurring on monthly basis and the replacement of the proposed meters will reduce the vehicular traffic and greenhouse gas produced by these trips. Repeat Network Collectors will be installed on existing light poles as needed for data transmission and will not have any impacts on the surrounding environment.

- *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?*

As described above, the meter locations are in developed areas. There are no known species listed or proposed to be listed as a Federal threatened or endangered species or designated

critical habitat in the project area.

- *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.*

Installation of meters and antenna will be within existing private properties and will not affect any "Waters of the United States".

- *When was the water delivery system constructed?*

SBMWD was created as a municipal utility by Article 9 of the City of San Bernardino Charter, as adopted on January 6, 1905.

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

The proposed AMI Project will not result in any modification or effect to individual features of an irrigation system such as head gates, canals, or flumes.

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

The meter replacement will not impact any of the structures or the historic places because the project proposes to replace the existing meters with new ones capable of AMI amenities.

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

The proposed project will only change the meters at developed locations and will not impact any undeveloped or archeological sites.

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

This project will directly benefit the low income and minority population as it will help identify water leakage and therefore lower the water usage cost. In addition, the benefits gained from

implementing the AMI system, will allow SBMWD to manage and operate the system at a higher efficiency that will lower the overall cost of water distribution to the benefit of its customers.

Based on 2017 American Community Survey, the Median Household Income (MHI) for the City of San Bernardino is $43,136. SBMWD's service area also includes unincorporated parts of San Bernardino County. According to an Appraisal Report prepared for SBMWD in June 2019, the MHI is reported as $41,027 which classified the area as "severely disadvantaged" as compared to California MHI: $71,228 and the national median household income of $57,652.
Should water shortages occur, this project will support reliability of water supplies, which will minimize the need to increase water rates to all customers, including economically disadvantaged communities.

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

The project is limited to the replacement of existing meters and does not propose any potential to limit access to and ceremonial use of Indian sacred sites.

- *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?*

The proposed project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-native invasive species known to occur in the area.

SECTION 4: REQUIRED PERMITS OR APPROVALS

No permits or approvals other than the contract approvals that have been noted in the schedule section are anticipated to be required in order to implement the Project.

SECTION 5: LETTERS OF SUPPORT

Per Reclamation's application guidelines in Section D.2.2.7. Letters of Support, all statements of support from interested stakeholders are included in **Appendix 1**.

SECTION 6: OFFICIAL RESOLUTION

RESOLUTION NO. 979

RESOLUTION OF THE WATER BOARD OF THE CITY OF SAN BERNARDINO, CALIFORNIA, AUTHORIZING THE GENERAL MANAGER TO SUBMIT AN APPLICATION TO THE BUREAU OF RECLAMATION FOR A WATERSMART WATER AND ENERGY EFFICIENCY GRANT

WHEREAS, in accordance with Section 603 of the City Charter, the Water Board is responsible for oversight and management of the City's water supply, recycled water, wastewater collection and treatment functions; and

WHEREAS, the San Bernardino Municipal Water Department (SBMWD) provides potable water to over 45,000 customers consisting of businesses and residents of the City of San Bernardino and surrounding communities. A majority SBMWD's customers are billed for water use via traditional mechanical meters that must be read manually by SBMWD and have no additional capabilities; and

WHEREAS, SBMWD is in the planning stages of an Advanced Meter Read and Infrastructure (AMR/AMI) Deployment Project. The proposed AMR/AMI Project involves, among other things, the replacement of existing manual-read meters with new smart meters that communicate via cloud technology and enable SBMWD to implement technological enhancements such as automated meter reads, usage notifications and interactive customer portals; and

WHEREAS, upgrading to an AMI system, customers can be supplied with on-demand, real time water consumption data enabling them to make more informed decisions about their water use. Case studies have shown that communities that upgrade to AMI systems can achieve water consumption savings of at least 15 percent; and

WHEREAS, the U.S. Department of the Interior has made funding available through the WaterSMART: Water and Energy Efficiency Grants program for Fiscal Year 2021 to support water conservation efforts; and

WHEREAS, through these grants, the Bureau of Reclamation provides assistance to water agencies to undertake projects that result in quantifiable water savings and support long-term water use efficiency and supply reliability; and

WHEREAS, SBMWD's first phase of the AMR/AMI Project is eligible for funding at a 50 percent cost share up to $500,000 in grant funds; and

WHEREAS, approval for application is required from SBMWD's governing body; and

WHEREAS, the SBMWD Water Board intends to apply and participate in the WaterSMART program and enter into an agreement with the Bureau of Reclamation if approved for "Phase 1" of an Advanced Meter Read and Infrastructure Deployment Project:

BE IT RESOLVED BY THE WATER BOARD OF THE CITY OF SAN BERNARDINO AS FOLLOWS:

SECTION 1. The above recitals are true and correct and are incorporated herein by this reference.

SECTION 2. The Water Board of the San Bernardino Municipal Water Department hereby authorizes and directs the General Manager, or his designee, to sign and submit, for and on behalf of SBMWD, a grant application for the Bureau of Reclamation's WaterSMART Drought Response Program for the AMI Project up to the amount of $500,000.

SECTION 3. The General Manager, or his designee, is designated to provide the assurances, certifications, and commitments required for the grant application, including executing a financial assistance or similar agreement with the Bureau of Reclamation within established deadlines and any amendments or changes thereto.

SECTION 4. The General Manager, or his designee, is designated to represent SBMWD in carrying out the responsibilities under the grant agreement, including certifying disbursement requests on behalf of the City and compliance with applicable state and federal laws.

SECTION 5. If a grant award is made by the Bureau of Reclamation, SBMWD commits to providing up to $500,000 in matching funds for the AMI Project plus any remaining balance noted in the funding plan.

SECTION 6. The Water Board finds this Resolution is not subject to the California Environmental Quality Act (CEQA) in that the activity is covered by the general rule that CEQA applies only to projects which have the potential for causing a significant effect on the environment. Where it can be seen with certainty, as in this case, that there is no possibility that the activity in question may have a significant effect on the environment, the activity is not subject to CEQA.

SECTION 7. Severability. If any provision of this Resolution or the application thereof to any person or circumstance is held invalid, such invalidity shall not affect other provisions or applications, and to this end the provisions of this Resolution are declared to be severable.

SECTION 8. Effective Date. This Resolution shall become effective immediately.

APPROVED and **ADOPTED** by the Water Board and signed by the President of the Water Board and attested by the Deputy City Clerk & Ex Officio Secretary of the Water Board this 8th day of September, 2020.

Toni Callicott, President
City of San Bernardino Water Board

Attest:

Robin Ohama
Robin Ohama (Sep 9, 2020 07:25 PDT)

Robin Ohama
Deputy City Clerk & Ex Officio Secretary of the Water Board

CERTIFICATION

STATE OF CALIFORNIA)
COUNTY OF SAN BERNARDINO) ss
CITY OF SAN BERNARDINO)

I, Robin Ohama, Deputy City Clerk & Ex Officio Secretary of the Water Board, hereby certify that the attached is a true copy of Resolution No. adopted at a regular meeting held on the 8th day of September, 2020 by the following vote:

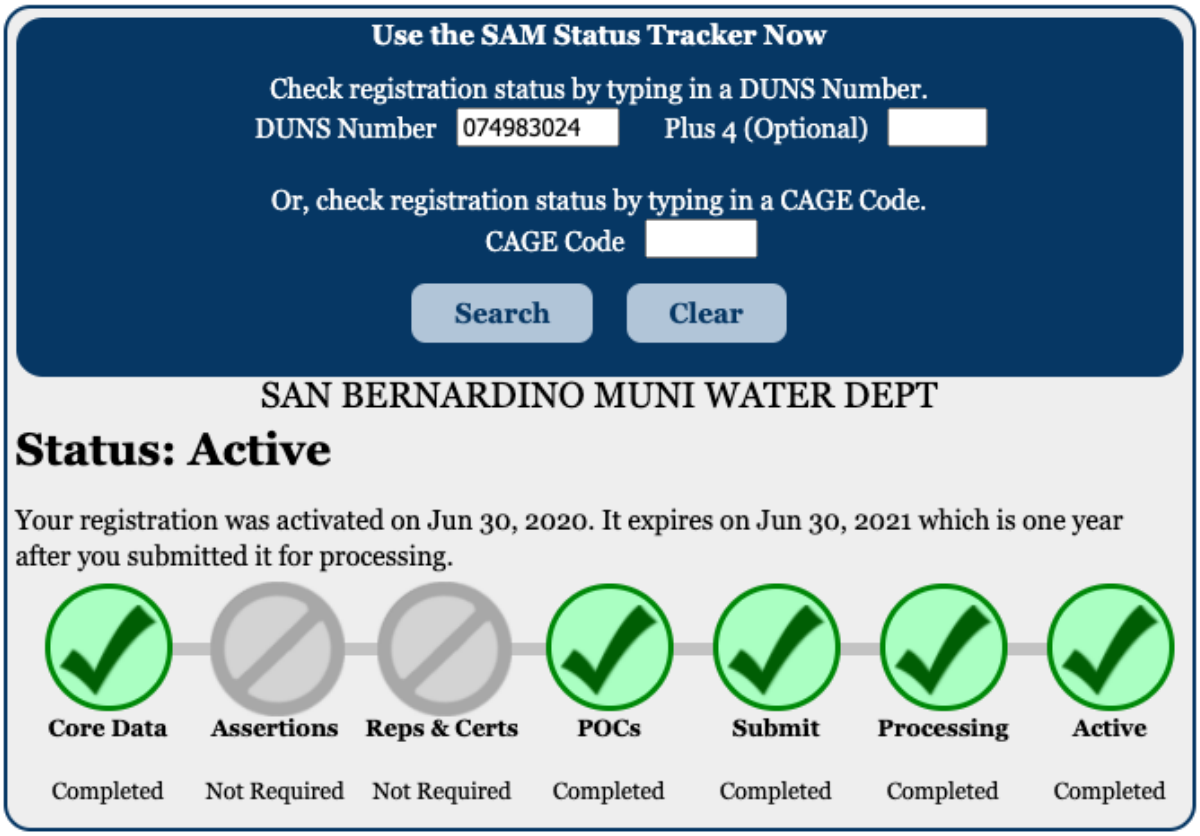
Council Members:	**AYES**	**NAYS**	**ABSTAIN**	**ABSENT**
CALLICOTT	X			
HENDRIX	X			
MLYNARSKI	X			
BRICKLEY	X			
JOHNSON	X			

WITNESS my hand and official seal of the City of San Bernardino this 8th day of September, 2020.

Robin Ohama
Robin Ohama (Sep 9, 2020 07:25 PDT)

Robin Ohama
Deputy City Clerk & Ex Officio Secretary of the Water Board

SECTION 7: UNIQUE ENTITY IDENTIFIER AND SYSTEM FOR AWARD MANAGEMENT



Appendix 1: Letters of Support

109 CANNON HOUSE OFFICE BUILDING
WASHINGTON, DC 20515
(202) 225-8201

685 EAST CARNEGIE DRIVE
SUITE 100
SAN BERNARDINO, CA 92408
(909) 890-4445

CHIEF DEPUTY WHIP

HOUSE DEMOCRATIC STEERING
AND POLICY COMMITTEE

PETE AGUILAR
CONGRESS OF THE UNITED STATES
31ST DISTRICT, CALIFORNIA

COMMITTEE ON APPROPRIATIONS
VICE CHAIRMAN
SUBCOMMITTEE ON DEFENSE
SUBCOMMITTEE ON HOMELAND SECURITY
SUBCOMMITTEE ON TRANSPORTATION,
HOUSING AND URBAN DEVELOPMENT, AND
RELATED AGENCIES

COMMITTEE ON HOUSE ADMINISTRATION
SUBCOMMITTEE ON ELECTIONS

September 8, 2020

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

Re: San Bernardino Municipal Water District Phase 1 Advanced Metering and Infrastructure Deployment Project – WaterSMART Water Energy Grant Program for Fiscal Year 2021

Dear Commissioner Burman:

I am writing to express my support for the San Bernardino Municipal Water District Phase 1 Advanced Metering and Infrastructure Deployment Project application submitted by the City of San Bernardino Municipal Water Department (SBMWD) for funding consideration under the Water Energy Efficiency Grant Program. If approved, the requested $500,000 grant will be matched by a 50 percent contribution from nonfederal funds. This funding will enable SBMWD to complete Phase 1 of an Advanced Metering and Infrastructure (AMI) system. This project will help customers monitor their daily water usage while helping SBMWD meet State of California water use compliance standards.

SBMWD provides water utility and wastewater collection and treatment services to over 200,000 residents and businesses in the City of San Bernardino, California and surrounding communities. Due to the semi-arid climate of this region, conservation and efficient use of water resources are vital to protect the health and growth of our community.

The AMI system and web portal technology will provide the tools needed to realize significant water savings in addition to preserving critical water supply throughout SBMWD's service area. If approved, the project will provide quantifiable and sustainable water savings. Grant funds will be used to purchase and install needed project equipment and infrastructure. 7,500 traditional meters will be replaced with advanced smart meters that have remote read capability. This technology will allow customers to monitor household water consumption and enable SBMWD staff to check water consumption patterns using real time data alerts. Customers will also gain the ability to immediately address issues such as water leakage or overuse thereby reducing water waste and improving water efficiency.

The SBMWD project is in direct alignment with the WaterSmart Water Energy Grant Program's goal of sustaining and managing America's water resources for tomorrow. I encourage you to give SBMWD's application your full and fair consideration, consistent with applicable laws and

regulations. If you have any questions, please contact Curt Lewis, Grant Program Director at my office at Curt.Lewis@mail.house.gov.

Sincerely,

Pete Aguilar

Pete Aguilar
Member of Congress

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0047
(916) 319-2041
FAX (916) 319-2147

DISTRICT OFFICE
290 North D. Street, Suite 903
San Bernardino CA 92401
(909) 381-3238
FAX (909) 885-8589

Assembly
California Legislature
ELOISE GÓMEZ REYES
ASSEMBLYMEMBER, FORTY-SEVENTH DISTRICT

September 14, 2020

Bureau of Reclamation
Financial Assistance Operations
Attn: Mr. Ned Weakland
P.O. Box 25007, MS 84-27815
Denver, CO 80225

RE: Request for Support for the San Bernardino Municipal Water Department Application to WaterSMART Water Energy Efficiency Grant Program for Fiscal Year 2021

Dear Mr. Weakland:

I write in strong support for the San Bernardino Municipal Water Department's (SBMWD) application to secure Bureau of Reclamation WaterSMART Water and Energy Efficiency Program funding to install an Advanced Metering Infrastructure (AMI) project.

By implementing AMI technology, SBMWD will create "smart" water saving solutions through technological advancement that conserves the region's precious water resources. The AMI project will provide SBMWD customers real-time water consumption data and improved water management tools to better manage the water system. AMI will also allow customers to immediately address issues such as water leakage or overuse thereby reducing water waste and improving water efficiency.

As a disadvantaged community, SBMWD serves over 200,000 residents and businesses in the City of San Bernardino and surrounding areas, leading regional efforts in water conservation in a variety of meaningful and constructive ways. I am happy to provide this letter of support and thank you for your consideration of this request to support SBMWD's application to the WaterSMART Water Energy Efficiency Program Funding.

Thank you for your consideration of this request. Should you have any questions please contact my office at (916) 319-2047.

Sincerely,

Assemblymember Eloise Gómez Reyes,
47th Assembly District

Appendix 2: AWWA ASSOCIATION 2017 WATER AUDIT AND PLANNING GUIDE

AWWA Free Water Audit Software:
Reporting Worksheet

Click to access definition
Click to add a comment

Water Audit Report for: San Bernardino Municipal Water Department (3610039)
Reporting Year: 2017 1/2017 - 12/2017

Please enter data in the white cells below. Where available, metered values should be used; if metered values are unavailable please estimate a value. Indicate your confidence in the accuracy of the input data by grading each component (n/a or 1-10) using the drop-down list to the left of the input cell. Hover the mouse over the cell to obtain a description of the grades

All volumes to be entered as: ACRE-FEET PER YEAR

To select the correct data grading for each input, determine the highest grade where the utility meets or exceeds all criteria for that grade and all grades below it.

<---------- Enter grading in column 'E' and 'J' ---------->

					Master Meter and Supply Error Adjustments		
WATER SUPPLIED					Pcnt:	Value:	
Volume from own sources:	6	38,477.991	acre-ft/yr	3	0.00%		acre-ft/yr
Water imported:	n/a	0.000	acre-ft/yr				acre-ft/yr
Water exported:	n/a	0.000	acre-ft/yr				acre-ft/yr
WATER SUPPLIED:		38,477.991	acre-ft/yr	Enter negative % or value for under-registration Enter positive % or value for over-registration			
AUTHORIZED CONSUMPTION							
Billed metered:	7	34,326.159	acre-ft/yr				
Billed unmetered:	n/a	0.000	acre-ft/yr				
Unbilled metered:	n/a	0.000	acre-ft/yr		Pcnt:	Value:	
Unbilled unmetered:	5	96.195	acre-ft/yr			96.195	acre-ft/yr
AUTHORIZED CONSUMPTION:		34,422.354	acre-ft/yr				
WATER LOSSES (Water Supplied - Authorized Consumption)		4,055.637	acre-ft/yr				
Apparent Losses					Pcnt:	Value:	
Unauthorized consumption:		96.195	acre-ft/yr		0.25%		acre-ft/yr
Default option selected for unauthorized consumption - a grading of 5 is applied but not displayed							
Customer metering inaccuracies:	3	1,061.634	acre-ft/yr		3.00%		acre-ft/yr
Systematic data handling errors:	5	85.815	acre-ft/yr		0.25%		acre-ft/yr
Default option selected for Systematic data handling errors - a grading of 5 is applied but not displayed							
Apparent Losses:		1,243.644	acre-ft/yr				
Real Losses (Current Annual Real Losses or CARL)							
Real Losses = Water Losses - Apparent Losses:		2,811.993	acre-ft/yr				
WATER LOSSES:		4,055.637	acre-ft/yr				
NON-REVENUE WATER							
NON-REVENUE WATER:		4,151.832	acre-ft/yr				
= Water Losses + Unbilled Metered + Unbilled Unmetered							
SYSTEM DATA							
Length of mains:	8	755.0	miles				
Number of active AND inactive service connections:	8	48,162					
Service connection density:		64	conn./mile main				
Are customer meters typically located at the curbstop or property line?		Yes					
Average length of customer service line:							
Average length of customer service line has been set to zero and a data grading score of 10 has been applied							
Average operating pressure:	6	79.4	psi				
COST DATA							
Total annual cost of operating water system:	10	$34,131,179	$/Year				
Customer retail unit cost (applied to Apparent Losses):	8	$1.47	$/100 cubic feet (ccf)				
Variable production cost (applied to Real Losses):	5	$202.82	$/acre-ft				

WATER AUDIT DATA VALIDITY SCORE:

***** YOUR SCORE IS: 63 out of 100 *****

A weighted scale for the components of consumption and water loss is included in the calculation of the Water Audit Data Validity Score

PRIORITY AREAS FOR ATTENTION:

Based on the information provided, audit accuracy can be improved by addressing the following components:

1: Volume from own sources
2: Customer metering inaccuracies
3: Variable production cost (applied to Real Losses)

AWWA Free Water Audit Software: Grading Matrix

WAS 5.0

The grading assigned to each audit component and the corresponding recommended improvements and actions are highlighted in yellow. Audit accuracy is likely to be improved by prioritizing those items shown in red

Grading >>>	n/a	1	2	3	4	5	6	7	8	9	10
WATER SUPPLIED											
Volume from own sources:	Select this grading only if the water utility purchases/imports all of its water resources (i.e. has no sources of its own)	Less than 25% of water production sources are metered, remaining sources are estimated. No regular meter accuracy testing or electronic calibration conducted.	25% - 50% of treated water production sources are metered; other sources estimated. No regular meter accuracy testing or electronic calibration conducted.	Conditions between 2 and 4	50% - 75% of treated water production sources are metered, other sources estimated. Occasional meter accuracy testing or electronic calibration conducted.	Conditions between 4 and 6	At least 75% of treated water production sources are metered, or at least 90% of the source flow is derived from metered sources. Meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of treated water production sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually, with less than 10% found outside of +/- 3% accuracy. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Volume from own Sources" component:		To qualify for 2: Organize and launch efforts to collect data for determining volume from own sources	To qualify for 4: Locate all water production sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered water production sources and replace any obsolete/defective meters.		To qualify for 6: Formalize annual meter accuracy testing for all source meters; specify the frequency of testing. Complete installation of meters on unmetered water production sources and complete replacement of all obsolete/defective meters.		To qualify for 8: Conduct annual meter accuracy testing and calibration of related instrumentation on all meter installations on a regular basis. Complete project to install new, or replace defective existing, meters so that entire production meter population is metered. Repair or replace meters outside of +/- 6% accuracy.		To qualify for 10: Maintain annual meter accuracy testing and calibration of related instrumentation for all meter installations. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to further improve meter accuracy.		To maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Volume from own sources master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its sources of supply	Inventory information on meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined	No automatic datalogging of production volumes; daily readings are scribed on paper records without any accountability controls. Flows are not balanced across the water distribution system: tank/storage elevation changes are not employed in calculating the "Volume from own sources" component and archived flow data is adjusted only when grossly evident data error occurs.	Conditions between 2 and 4	Production meter data is logged automatically in electronic format and reviewed at least on a monthly basis with necessary corrections implemented. "Volume from own sources" tabulations include estimate of daily changes in tanks/storage facilities. Meter data is adjusted when gross data errors occur, or occasional meter testing deems this necessary.	Conditions between 4 and 6	Hourly production meter data logged automatically & reviewed on at least a weekly basis. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and/or error is confirmed by meter accuracy testing. Tank/storage facility elevation changes are automatically used in calculating a balanced "Volume from own sources" component, and data gaps in the archived data are corrected on at least a weekly basis.	Conditions between 6 and 8	Continuous production meter data is logged automatically & reviewed each business day. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Tank/storage facility elevation changes are automatically used in "Volume from own sources" tabulations and data gaps in the archived data are corrected on a daily basis.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically balances flows from all sources and storages; results are reviewed each business day. Tight accountability controls ensure that all data gaps that occur in the archived flow data are quickly detected and corrected. Regular calibrations between SCADA and sources meters ensures minimal data transfer error.
Improvements to attain higher data grading for "Master meter and supply error adjustment" component:		To qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature.	To qualify for 4: Install automatic datalogging equipment on production meters. Complete installation of level instrumentation at all tanks/storage facilities and include tank level data in automatic calculation routine in a computerized system. Construct a computerized listing or spreadsheet to archive input volumes, tank/storage volume changes and import/export flows in order to determine the composite "Water Supplied" volume for the distribution system. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps.		To qualify for 6: Refine computerized data collection and archive to include hourly production meter data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Use daily net storage change to balance flows in calculating "Water Supplied" volume. Necessary corrections to data errors are implemented on a weekly basis.		To qualify for 8: Ensure that all flow data is collected and archived on at least an hourly basis. All data is reviewed and detected errors corrected each business day. Tank/storage levels variations are employed in calculating balanced "Water Supplied" component. Adjust production meter data for gross error and inaccuracy confirmed by testing.		To qualify for 10: Link all production and tank/storage facility elevation change data to a Supervisory Control & Data Acquisition (SCADA) System, or similar computerized monitoring/control system, and establish automatic flow balancing algorithm and regularly calibrate between SCADA and source meters. Data is reviewed and corrected each business day.		To maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters. Continue to replace or repair meters as they perform outside of desired accuracy limits. Stay abreast of new and more accurate water level instruments to better record tank/storage levels and archive the variations in storage volume. Keep current with SCADA and data management systems to ensure that archived data is well-managed and error free.
Water Imported:	Select n/a if the water utility's supply is exclusively from its own water resources (no bulk purchased/ imported water)	Less than 25% of imported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of imported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of imported water sources are metered, other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of imported water sources are metered, meter accuracy testing and/or electronic calibration of related instrumentation is conducted annually for all meter installations. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of imported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Imported Volume" component: *(Note: usually the water supplier selling the water - "the Exporter" - to the utility being audited is responsible to maintain the metering installation measuring the imported volume. The utility should coordinate carefully with the Exporter to ensure that adequate meter upkeep takes place and an accurate measure of the Water Imported volume is quantified.)*		To qualify for 2: Review bulk water purchase agreements with partner suppliers; confirm requirements for use and maintenance of accurate metering. Identify needs for new or replacement meters with goal to meter all imported water sources.	To qualify for 4: Locate all imported water sources on maps and in the field, launch meter accuracy testing for existing meters, begin to install meters on unmetered imported water interconnections and replace obsolete/defective meters.		To qualify for 6: Formalize annual meter accuracy testing for all imported water meters, planning for both regular meter accuracy testing and calibration of the related instrumentation. Continue installation of meters on unmetered imported water interconnections and replacement of obsolete/defective meters.		To qualify for 8: Complete project to install new, or replace defective, meters on all imported water interconnections. Maintain annual meter accuracy testing for all imported water meters and conduct calibration of related instrumentation at least annually. Repair or replace meters outside of +/- 6% accuracy.		To qualify for 10: Conduct meter accuracy testing for all meters on a semi-annual basis, along with calibration of all related instrumentation. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		To maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Continue to conduct calibration of related instrumentation on a semi-annual basis. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.

Water imported master meter and supply error adjustment:	Select n/a if the Imported water supply is unmetered, with Imported water quantities estimated on the billing invoices sent by the Exporter to the purchasing Utility.	Inventory information on imported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with water Exporter(s) are missing or written in vague language concerning meter management and testing.	No automatic datalogging of imported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Imported supply metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis by the Exporter with necessary corrections implemented. Meter data is adjusted by the Exporter when gross data errors are detected. A coherent data trail exists for this process to protect both the selling and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly Imported supply metered data is logged automatically & reviewed on at least a weekly basis by the Exporter. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error confirmed by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling and the purchasing Utility.	Conditions between 6 and 8	Continuous Imported supply metered flow data is logged automatically & reviewed each business day by the Importer. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and/or results of meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the Exporter. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling and purchasing Utility at least once every five years.
Improvements to attain higher data grading for "Water imported master meter and supply error adjustment" component:		To qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the selling and purchasing Utility.	To qualify for 4: Install automatic datalogging equipment on Imported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the Exporters to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		To qualify for 6: Refine computerized data collection and archive to include hourly Imported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		To qualify for 8: Ensure that all Imported supply metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		To qualify for 10: Conduct accountability checks to confirm that all Imported supply metered data is reviewed and corrected each business day by the Exporter. Results of all meter accuracy tests and data corrections should be available for sharing between the Exporter and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreement between the selling and the purchasing Utility; at least every five years.		To maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the Exporter to help identify meter replacement needs. Keep communication lines with Exporters open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
Water Exported:	Select n/a if the water utility sells no bulk water to neighboring water utilities (no exported water sales)	Less than 25% of exported water sources are metered, remaining sources are estimated. No regular meter accuracy testing.	25% - 50% of exported water sources are metered; other sources estimated. No regular meter accuracy testing.	Conditions between 2 and 4	50% - 75% of exported water sources are metered; other sources estimated. Occasional meter accuracy testing conducted.	Conditions between 4 and 6	At least 75% of exported water sources are metered, meter accuracy testing and/or electronic calibration conducted annually. Less than 25% of tested meters are found outside of +/- 6% accuracy.	Conditions between 6 and 8	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted annually, less than 10% of meters are found outside of +/- 6% accuracy	Conditions between 8 and 10	100% of exported water sources are metered, meter accuracy testing and electronic calibration of related instrumentation is conducted semi-annually for all meter installations, with less than 10% of accuracy tests found outside of +/- 3% accuracy.
Improvements to attain higher data grading for "Water Exported Volume" component: (*Note: usually, if the water utility being audited sells (Exports) water to a neighboring purchasing Utility, it is the responsibility of the utility exporting the water to maintain the metering installation measuring the Exported volume. The utility exporting the water should ensure that adequate meter upkeep takes place and an accurate measure of the Water Exported volume is quantified.*)		To qualify for 2: Review bulk water sales agreements with purchasing utilities; confirm requirements for use & upkeep of accurate metering. Identify needs to install new, or replace defective meters as needed.	To qualify for 4: Locate all exported water sources on maps and in field, launch meter accuracy testing for existing meters, begin to install meters on unmetered exported water interconnections and replace obsolete/defective meters		To qualify for 6: Formalize annual meter accuracy testing for all exported water meters. Continue installation of meters on unmetered exported water interconnections and replacement of obsolete/defective meters.		To qualify for 8: Complete project to install new, or replace defective, meters on all exported water interconnections. Maintain annual meter accuracy testing for all exported water meters. Repair or replace meters outside of +/- 6% accuracy.		To qualify for 10: Maintain annual meter accuracy testing for all meters. Repair or replace meters outside of +/- 3% accuracy. Investigate new meter technology; pilot one or more replacements with innovative meters in attempt to improve meter accuracy.		To maintain 10: Standardize meter accuracy test frequency to semi-annual, or more frequent, for all meters. Repair or replace meters outside of +/- 3% accuracy. Continually investigate/pilot improving metering technology.
Water exported master meter and supply error adjustment:	Select n/a only if the water utility fails to have meters on its exported supply interconnections.	Inventory information on exported meters and paper records of measured volumes exist but are incomplete and/or in a very crude condition; data error cannot be determined Written agreement(s) with the utility purchasing the water are missing or written in vague language concerning meter management and testing.	No automatic datalogging of exported supply volumes; daily readings are scribed on paper records without any accountability controls to confirm data accuracy and the absence of errors and data gaps in recorded volumes. Written agreement requires meter accuracy testing but is vague on the details of how and who conducts the testing.	Conditions between 2 and 4	Exported metered flow data is logged automatically in electronic format and reviewed at least on a monthly basis, with necessary corrections implemented. Meter data is adjusted by the utility selling (exporting) the water when gross data errors are detected. A coherent data trail exists for this process to protect both the utility exporting the water and the purchasing Utility. Written agreement exists and clearly states requirements and roles for meter accuracy testing and data management.	Conditions between 4 and 6	Hourly exported supply metered data is logged automatically & reviewed on at least a weekly basis by the utility selling the water. Data is adjusted to correct gross error when meter/instrumentation equipment malfunction is detected; and to correct for error found by meter accuracy testing. Any data gaps in the archived data are detected and corrected during the weekly review. A coherent data trail exists for this process to protect both the selling (exporting) utility and the purchasing Utility.	Conditions between 6 and 8	Continuous exported supply metered flow data is logged automatically & reviewed each business day by the utility selling (exporting) the water. Data is adjusted to correct gross error from detected meter/instrumentation equipment malfunction and any error confirmed by meter accuracy testing. Any data errors/gaps are detected and corrected on a daily basis. A data trail exists for the process to protect both the selling (exporting) Utility and the purchasing Utility.	Conditions between 8 and 10	Computerized system (SCADA or similar) automatically records data which is reviewed each business day by the utility selling (exporting) the water. Tight accountability controls ensure that all error/data gaps that occur in the archived flow data are quickly detected and corrected. A reliable data trail exists and contract provisions for meter testing and data management are reviewed by the selling Utility and purchasing Utility at least once every five years.

Improvements to attain higher data grading for "Water exported master meter and supply error adjustment" component:		To qualify for 2: Develop a plan to restructure recordkeeping system to capture all flow data; set a procedure to review flow data on a daily basis to detect input errors. Obtain more reliable information about existing meters by conducting field inspections of meters and related instrumentation, and obtaining manufacturer literature. Review the written agreement between the utility selling (exporting) the water and the purchasing Utility.	To qualify for 4: Install automatic datalogging equipment on exported supply meters. Set a procedure to review this data on a monthly basis to detect gross anomalies and data gaps. Launch discussions with the purchasing utilities to jointly review terms of the written agreements regarding meter accuracy testing and data management; revise the terms as necessary.		To qualify for 6: Refine computerized data collection and archive to include hourly exported supply metered flow data that is reviewed at least on a weekly basis to detect specific data anomalies and gaps. Make necessary corrections to errors/data errors on a weekly basis.		To qualify for 8: Ensure that all exported metered flow data is collected and archived on at least an hourly basis. All data is reviewed and errors/data gaps are corrected each business day.		To qualify for 10: Conduct accountability checks to confirm that all exported metered flow data is reviewed and corrected each business day by the utility selling the water. Results of all meter accuracy tests and data corrections should be available for sharing between the utility and the purchasing Utility. Establish a schedule for a regular review and updating of the contractual language in the written agreements with the purchasing utilities; at least every five years.		To maintain 10: Monitor meter innovations for development of more accurate and less expensive flowmeters; work with the purchasing utilities to help identify meter replacement needs. Keep communication lines with the purchasing utilities open and maintain productive relations. Keep the written agreement current with clear and explicit language that meets the ongoing needs of all parties.
AUTHORIZED CONSUMPTION											
Billed metered:	n/a (not applicable). Select n/a only if the entire customer population is not metered and is billed for water service on a flat or fixed rate basis. In such a case the volume entered must be zero.	Less than 50% of customers with volume-based billings from meter readings; flat or fixed rate billing exists for the majority of the customer population	At least 50% of customers with volume-based billing from meter reads; flat rate billing for others. Manual meter reading is conducted, with less than 50% meter read success rate, remaining accounts' consumption is estimated. Limited meter records, no regular meter testing or replacement. Billing data maintained on paper records, with no auditing.	Conditions between 2 and 4	At least 75% of customers with volume-based, billing from meter reads; flat or fixed rate billing for remaining accounts. Manual meter reading is conducted with at least 50% meter read success rate; consumption for accounts with failed reads is estimated. Purchase records verify age of customer meters; only very limited meter accuracy testing is conducted. Customer meters are replaced only upon complete failure. Computerized billing records exist, but only sporadic internal auditing conducted.	Conditions between 4 and 6	At least 90% of customers with volume-based billing from meter reads; consumption for remaining accounts is estimated. Manual customer meter reading gives at least 80% customer meter reading success rate; consumption for accounts with failed reads is estimated. Good customer meter records exist, but only limited meter accuracy testing is conducted. Regular replacement is conducted for the oldest meters. Computerized billing records exist with annual auditing of summary statistics conducted by utility personnel.	Conditions between 6 and 8	At least 97% of customers exist with volume-based billing from meter reads. At least 90% customer meter reading success rate; or at least 80% read success rate with planning and budgeting for trials of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) in one or more pilot areas. Good customer meter records. Regular meter accuracy testing guides replacement of statistically significant number of meters each year. Routine auditing of computerized billing records for global and detailed statistics occurs annually by utility personnel, and is verified by third party at least once every five years.	Conditions between 8 and 10	At least 99% of customers exist with volume-based billing from meter reads. At least 95% customer meter reading success rate; or, minimum 80% meter reading success rate, with Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) trials underway. Statistically significant customer meter testing and replacement program in place on a continuous basis. Computerized billing with routine, detailed auditing, including field investigation of representative sample of accounts undertaken annually by utility personnel. Audit is conducted by third party auditors at least once every three years.
Improvements to attain higher data grading for "Billed Metered Consumption" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	To qualify for 2: Conduct investigations or trials of customer meters to select appropriate meter models. Budget funding for meter installations. Investigate volume based water rate structures.	To qualify for 4: Purchase and install meters on unmetered accounts. Implement policies to improve meter reading success. Catalog meter information during meter read visits to identify age/model of existing meters. Test a minimal number of meters for accuracy. Install computerized billing system.		To qualify for 6: Purchase and install meters on unmetered accounts. Eliminate flat fee billing and establish appropriate water rate structure based upon measured consumption. Continue to achieve verifiable success in removing manual meter reading barriers. Expand meter accuracy testing. Launch regular meter replacement program. Launch a program of annual auditing of global billing statistics by utility personnel.		To qualify for 8: Purchase and install meters on unmetered accounts. If customer meter reading success rate is less than 97%, assess cost-effectiveness of Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system for portion or entire system; or otherwise achieve ongoing improvements in manual meter reading success rate to 97% or higher. Refine meter accuracy testing program. Set meter replacement goals based upon accuracy test results. Implement annual auditing of detailed billing records by utility personnel and implement third party auditing at least once every five years.		To qualify for 10: Purchase and install meters on unmetered accounts. Launch Automatic Meter Reading (AMR) or Advanced Metering Infrastructure (AMI) system trials if manual meter reading success rate of at least 99% is not achieved within a five-year program. Continue meter accuracy testing program. Conduct planning and budgeting for large scale meter replacement based upon meter life cycle analysis using cumulative flow target. Continue annual detailed billing data auditing by utility personnel and conduct third party auditing at least once every three years.		To maintain 10: Continue annual internal billing data auditing, and third party auditing at least every three years. Continue customer meter accuracy testing to ensure that accurate customer meter readings are obtained and entered as the basis for volume based billing. Stay abreast of improvements in Automatic Meter Reading (AMR) and Advanced Metering Infrastructure (AMI) and information management. Plan and budget for justified upgrades in metering, meter reading and billing data management to maintain very high accuracy in customer metering and billing.
Billed unmetered:	Select n/a if it is the policy of the water utility to meter all customer connections and it has been confirmed by detailed auditing that all customers do indeed have a water meter; i.e. no intentionally unmetered accounts exist	Water utility policy does not require customer metering; flat or fixed fee billing is employed. No data is collected on customer consumption. The only estimates of customer population consumption available are derived from data estimation methods using average fixture count multiplied by number of connections, or similar approach.	Water utility policy does not require customer metering; flat or fixed fee billing is employed. Some metered accounts exist in parts of the system (pilot areas or District Metered Areas) with consumption read periodically or recorded on portable dataloggers over one, three, or seven day periods. Data from these sample meters are used to infer consumption for the total customer population. Site specific estimation methods are used for unusual buildings/water uses.	Conditions between 2 and 4	Water utility policy does require metering and volume based billing in general. However, a liberal amount of exemptions and a lack of clearly written and communicated procedures result in up to 20% of billed accounts believed to be unmetered by exemption; or the water utility is in transition to becoming fully metered, and a large number of customers remain unmetered. A rough estimate of the annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 4 and 6	Water utility policy does require metering and volume based billing but established exemptions exist for a portion of accounts such as municipal buildings. As many as 15% of billed accounts are unmetered due to this exemption or meter installation difficulties. Only a group estimate of annual consumption for all unmetered accounts is included in the annual water audit, with no inspection of individual unmetered accounts.	Conditions between 6 and 8	Water utility policy does require metering and volume based billing for all customer accounts. However, less than 5% of billed accounts remain unmetered because meter installation is hindered by unusual circumstances. The goal is to minimize the number of unmetered accounts. Reliable estimates of consumption are obtained for these unmetered accounts via site specific estimation methods.	Conditions between 8 and 10	Water utility policy does require metering and volume based billing for all customer accounts. Less than 2% of billed accounts are unmetered and exist because meter installation is hindered by unusual circumstances. The goal exists to minimize the number of unmetered accounts to the extent that is economical. Reliable estimates of consumption are obtained at these accounts via site specific estimation methods.

Improvements to attain higher data grading for "Billed Unmetered Consumption" component:		to qualify for 2: Conduct research and evaluate cost/benefit of a new water utility policy to require metering of the customer population; thereby greatly reducing or eliminating unmetered accounts. Conduct pilot metering project by installing water meters in small sample of customer accounts and periodically reading the meters or datalogging the water consumption over one, three, or seven day periods.	to qualify for 4: Implement a new water utility policy requiring customer metering. Launch or expand pilot metering study to include several different meter types, which will provide data for economic assessment of full scale metering options. Assess sites with access difficulties to devise means to obtain water consumption volumes. Begin customer meter installation.		to qualify for 6: Refine policy and procedures to improve customer metering participation for all but solidly exempt accounts. Assign staff resources to review billing records to identify errant unmetered properties. Specify metering needs and funding requirements to install sufficient meters to significant reduce the number of unmetered accounts		to qualify for 8: Push to install customer meters on a full scale basis. Refine metering policy and procedures to ensure that all accounts, including municipal properties, are designated for meters. Plan special efforts to address "hard-to-access" accounts. Implement procedures to obtain a reliable consumption estimate for the remaining few unmetered accounts awaiting meter installation.		to qualify for 10: Continue customer meter installation throughout the service area, with a goal to minimize unmetered accounts. Sustain the effort to investigate accounts with access difficulties, and devise means to install water meters or otherwise measure water consumption.		to maintain 10: Continue to refine estimation methods for unmetered consumption and explore means to establish metering, for as many billed remaining unmetered accounts as is economically feasible.
Unbilled metered:	select n/a if all billing-exempt consumption is unmetered.	Billing practices exempt certain accounts, such as municipal buildings, but written policies do not exist; and a reliable count of unbilled metered accounts is unavailable. Meter upkeep and meter reading on these accounts is rare and not considered a priority. Due to poor recordkeeping and lack of auditing, water consumption for all such accounts is purely guesstimated.	Billing practices exempt certain accounts, such as municipal buildings, but only scattered, dated written directives exist to justify this practice. A reliable count of unbilled metered accounts is unavailable. Sporadic meter replacement and meter reading occurs on an as-needed basis. The total annual water consumption for all unbilled, metered accounts is estimated based upon approximating the number of accounts and assigning consumption from actively billed accounts of same meter size.	Conditions between 2 and 4	Dated written procedures permit billing exemption for specific accounts, such as municipal properties, but are unclear regarding certain other types of accounts. Meter reading is given low priority and is sporadic. Consumption is quantified from meter readings where available. The total number of unbilled, unmetered accounts must be estimated along with consumption volumes.	Conditions between 4 and 6	Written policies regarding billing exemptions exist but adherence in practice is questionable. Metering and meter reading for municipal buildings is reliable but sporadic for other unbilled metered accounts. Periodic auditing of such accounts is conducted. Water consumption is quantified directly from meter readings where available, but the majority of the consumption is estimated.	Conditions between 6 and 8	Written policy identifies the types of accounts granted a billing exemption. Customer meter management and meter reading are considered secondary priorities, but meter reading is conducted at least annually to obtain consumption volumes for the annual water audit. High level auditing of billing records ensures that a reliable census of such accounts exists.	Conditions between 8 and 10	Clearly written policy identifies the types of accounts given a billing exemption, with emphasis on keeping such accounts to a minimum. Customer meter management and meter reading for these accounts is given proper priority and is reliably conducted. Regular auditing confirms this. Total water consumption for these accounts is taken from reliable readings from accurate meters.
Improvements to attain higher data grading for "Unbilled Metered Consumption" component:		to qualify for 2: Reassess the water utility's policy allowing certain accounts to be granted a billing exemption. Draft an outline of a new written policy for billing exemptions, with clear justification as to why any accounts should be exempt from billing, and with the intention to keep the number of such accounts to a minimum.	to qualify for 4: Review historic written directives and policy documents allowing certain accounts to be billing-exempt. Draft an outline of a written policy for billing exemptions, identify criteria that grants an exemption, with a goal of keeping this number of accounts to a minimum. Consider increasing the priority of reading meters on unbilled accounts at least annually.		to qualify for 8: Draft a new written policy regarding billing exemptions based upon consensus criteria allowing this occurrence. Assign resources to audit meter records and billing records to obtain census of unbilled metered accounts. Gradually include a greater number of these metered accounts to the routes for regular meter reading.		to qualify for 8: Communicate billing exemption policy throughout the organization and implement procedures that ensure proper account management. Conduct inspections of accounts confirmed in unbilled metered status and verify that accurate meters exist and are scheduled for routine meter readings. Gradually increase the number of unbilled metered accounts that are included in regular meter reading routes.		to qualify for 10: Ensure that meter management (meter accuracy testing, meter replacement) and meter reading activities for unbilled accounts are accorded the same priority as billed accounts. Establish ongoing annual auditing process to ensure that water consumption is reliably collected and provided to the annual water audit process.		to maintain 10: Reassess the utility's philosophy in allowing any water uses to go "unbilled". It is possible to meter and bill all accounts, even if the fee charged for water consumption is discounted or waived. Metering and billing all accounts ensures that water consumption is tracked and water waste from plumbing leaks is detected and minimized.
Unbilled unmetered:		Extent of unbilled, unmetered consumption is unknown due to unclear policies and poor recordkeeping. Total consumption is quantified based upon a purely subjective estimate.	Clear extent of unbilled, unmetered consumption is unknown, but a number of events are randomly documented each year, confirming existence of such consumption, but without sufficient documentation to quantify an accurate estimate of the annual volume consumed.	Conditions between 2 and 4	Extent of unbilled, unmetered consumption is partially known, and procedures exist to document certain events such as miscellaneous fire hydrant uses. Formulae is used to quantify the consumption from such events (time running multiplied by typical flowrate, multiplied by number of events).	Default value of 1.25% of system input volume is employed	Coherent policies exist for some forms of unbilled, unmetered consumption but others await closer evaluation. Reasonable recordkeeping for the managed uses exists and allows for annual volumes to be quantified by inference, but unsupervised uses are guesstimated.	Conditions between 6 and 8	Clear policies and good recordkeeping exist for some uses (ex: water used in periodic testing of unmetered fire connections), but other uses (ex: miscellaneous uses of fire hydrants) have limited oversight. Total consumption is a mix of well quantified use such as from formulae (time running multiplied by typical flow, multiplied by number of events) or temporary meters, and relatively subjective estimates of less regulated use.	Conditions between 8 and 10	Clear policies exist to identify permitted use of water in unbilled, unmetered fashion, with the intention of minimizing this type of consumption. Good records document each occurrence and consumption is quantified via formulae (time running multiplied by typical flow, multiplied by number of events) or use of temporary meters.
Improvements to attain higher data grading for "Unbilled Unmetered Consumption" component:		to qualify for 5: Utilize the accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 2: Establish a policy regarding what water uses should be allowed to remain as unbilled and unmetered. Consider tracking a small sample of one such use (ex: fire hydrant flushing).	to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of this use. to qualify for 4: Evaluate the documentation of events that have been observed. Meet with user groups (ex: for fire hydrants - fire departments, contractors to ascertain their need and/or volume requirements for water from fire hydrants).		to qualify for 5: Utilize accepted default value of 1.25% of the volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process, and should focus on other components since the volume of unbilled, unmetered consumption is usually a relatively small quantity component, and other larger-quantity components should take priority.	to qualify for 6 or greater: Finalize policy and begin to conduct field checks to better establish and quantify such usage. Proceed if top-down audit exists and/or a great volume of such use is suspected.	to qualify for 8: Assess water utility policy and procedures for various unmetered usages. For example, ensure that a policy exists and permits are issued for use of fire hydrants by persons outside of the utility. Create written procedures for use and documentation of fire hydrants by water utility personnel. Use same approach for other types of unbilled, unmetered water usage.		to qualify for 10: Refine written procedures to ensure that all uses of unbilled, unmetered water are overseen by a structured permitting process managed by water utility personnel. Reassess policy to determine if some of these uses have value in being converted to billed and/or metered status.		to maintain 10: Continue to refine policy and procedures with intention of reducing the number of allowable uses of water in unbilled and unmetered fashion. Any uses that can feasibly become billed and metered should be converted eventually.

APPARENT LOSSES											
Unauthorized consumption:		Extent of unauthorized consumption is unknown due to unclear policies and poor recordkeeping. Total unauthorized consumption is guesstimated.	Unauthorized consumption is a known occurrence, but its extent is a mystery. There are no requirements to document observed events, but periodic field reports capture some of these occurrences. Total unauthorized consumption is approximated from this limited data.	conditions between 2 and 4	Procedures exist to document some unauthorized consumption such as observed unauthorized fire hydrant openings. Use formulae to quantify this consumption (time running multiplied typical flowrate, multiplied by number of events).	Default value of 0.25% of volume of water supplied is employed	Coherent policies exist for some forms of unauthorized consumption (more than simply fire hydrant misuse) but others await closer evaluation. Reasonable surveillance and recordkeeping exist for occurrences that fall under the policy. Volumes quantified by inference from these records.	Conditions between 6 and 8	Clear policies and good auditable recordkeeping exist for certain events (ex: tampering with water meters, illegal bypasses of customer meters); but other occurrences have limited oversight. Total consumption is a combination of volumes from formulae (time x typical flow) and subjective estimates of unconfirmed consumption.	Conditions between 8 and 10	Clear policies exist to identify all known unauthorized uses of water. Staff and procedures exist to provide enforcement of policies and detect violations. Each occurrence is recorded and quantified via formulae (estimated time running multiplied by typical flow) or similar methods. All records and calculations should exist in a form that can be audited by a third party.
Improvements to attain higher data grading for "Unauthorized Consumption" component:		To qualify for 5: Use accepted default of 0.25% of volume of water supplied. To qualify for 2: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)	To qualify for 5: Use accepted default of 0.25% of system input volume To qualify for 4: Review utility policy regarding what water uses are considered unauthorized, and consider tracking a small sample of one such occurrence (ex: unauthorized fire hydrant openings)		To qualify for 5: Utilize accepted default value of 0.25% of volume of water supplied as an expedient means to gain a reasonable quantification of all such use. This is particularly appropriate for water utilities who are in the early stages of the water auditing process.	To qualify for 6 or greater: Finalize policy updates to clearly identify the types of water consumption that are authorized from those usages that fall outside of this policy and are, therefore, unauthorized. Begin to conduct regular field checks. Proceed if the top-down audit already exists and/or a great volume of such use is suspected.	To qualify for 8: Assess water utility policies to ensure that all known occurrences of unauthorized consumption are outlawed, and that appropriate penalties are prescribed. Create written procedures for detection and documentation of various occurrences of unauthorized consumption as they are uncovered.		To qualify for 10: Refine written procedures and assign staff to seek out likely occurrences of unauthorized consumption. Explore new locking devices, monitors and other technologies designed to detect and thwart unauthorized consumption.		To maintain 10: Continue to refine policy and procedures to eliminate any loopholes that allow or tacitly encourage unauthorized consumption. Continue to be vigilant in detection, documentation and enforcement efforts.
Customer metering inaccuracies:	select n/a only if the entire customer population is unmetered. In such a case the volume entered must be zero.	Customer meters exist, but with unorganized paper records on meters; no meter accuracy testing or meter replacement program for any size of retail meter. Metering workflow is driven chaotically with no proactive management. Loss volume due to aggregate meter inaccuracy is guesstimated.	Poor recordkeeping and meter oversight is recognized by water utility management who has allotted staff and funding resources to organize improved recordkeeping and start meter accuracy testing. Existing paper records gathered and organized to provide cursory disposition of meter population. Customer meters are tested for accuracy only upon customer request.	Conditions between 2 and 4	Reliable recordkeeping exists; meter information is improving as meters are replaced. Meter accuracy testing is conducted annually for a small number of meters (more than just customer requests, but less than 1% of inventory). A limited number of the oldest meters are replaced each year. Inaccuracy volume is largely an estimate, but refined based upon limited testing data.	Conditions between 4 and 6	A reliable electronic recordkeeping system for meters exists. The meter population includes a mix of new high performing meters and dated meters with suspect accuracy. Routine, but limited, meter accuracy testing and meter replacement occur. Inaccuracy volume is quantified using a mix of reliable and less certain data.	Conditions between 6 and 8	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for various types of meters.	Ongoing meter replacement and accuracy testing result in highly accurate customer meter population. Statistically significant number of meters are tested in audit year. This testing is conducted on samples of meters of varying age and accumulated volume of throughput to determine optimum replacement time for these meters.	Good records of all active customer meters exist and include as a minimum: meter number, account number/location, type, size and manufacturer. Ongoing meter replacement occurs according to a targeted and justified basis. Regular meter accuracy testing gives a reliable measure of composite inaccuracy volume for the customer meter population. New metering technology is embraced to keep overall accuracy improving. Procedures are reviewed by a third party knowledgeable in the M36 methodology.
Improvements to attain higher data grading for "Customer meter inaccuracy volume" component:	If n/a is selected because the customer meter population is unmetered, consider establishing a new policy to meter the customer population and employ water rates based upon metered volumes.	To qualify for 2: Gather available meter purchase records. Conduct testing on a small number of meters believed to be the most inaccurate. Review staffing needs of the metering group and budget for necessary resources to better organize meter management.	To qualify for 4: Implement a reliable record keeping system for customer meter histories, preferably using electronic methods typically linked to, or part of, the Customer Billing System or Customer Information System. Expand meter accuracy testing to a larger group of meters.		To qualify for 6: Standardize the procedures for meter recordkeeping within an electronic information system. Accelerate meter accuracy testing and meter replacements guided by testing results.		To qualify for 8: Expand annual meter accuracy testing to evaluate a statistically significant number of meter makes/models. Expand meter replacement program to replace statistically significant number of poor performing meters each year.		To qualify for 9: Continue efforts to manage meter population with reliable recordkeeping. Test a statistically significant number of meters each year and analyze test results in an ongoing manner to serve as a basis for a target meter replacement strategy based upon accumulated volume throughput.	To qualify for 10: Continue efforts to manage meter population with reliable recordkeeping, meter testing and replacement. Evaluate new meter types and install one or more types in 5-10 customer accounts each year in order to pilot improving metering technology.	To maintain 10: Increase the number of meters tested and replaced as justified by meter accuracy test data. Continually monitor development of new metering technology and Advanced Metering Infrastructure (AMI) to grasp opportunities for greater accuracy in metering of water flow and management of customer consumption data.

Systematic Data Handling Errors:	Note: all water utilities incur some amount of this error. Even in water utilities with unmetered customer populations and fixed rate billing, errors occur in annual billing tabulations. Enter a positive value for the volume and select a grading.	Policies and procedures for activation of new customer water billing accounts are vague and lack accountability. Billing data is maintained on paper records which are not well organized. No auditing is conducted to confirm billing data handling efficiency. An unknown number of customers escape routine billing due to lack of billing process oversight.	Policy and procedures for activation of new customer accounts and oversight of billing records exist but need refinement. Billing data is maintained on paper records or insufficiently capable electronic database. Only periodic unstructured auditing work is conducted to confirm billing data handling efficiency. The volume of unbilled water due to billing lapses is a guess.	Conditions between 2 and 4	Policy and procedures for new account activation and oversight of billing operations exist but needs refinement. Computerized billing system exists, but is dated or lacks needed functionality. Periodic, limited internal audits conducted and confirm with approximate accuracy the consumption volumes lost to billing lapses.	Conditions between 4 and 6	Policy and procedures for new account activation and oversight of billing operations is adequate and reviewed periodically. Computerized billing system is in use with basic reporting available. Any effect of billing adjustments on measured consumption volumes is well understood. Internal checks of billing data error conducted annually. Reasonably accurate quantification of consumption volume lost to billing lapses is obtained.	Conditions between 6 and 8	New account activation and billing operations policy and procedures are reviewed at least biannually. Computerized billing system includes an array of reports to confirm billing data and system functionality. Checks are conducted routinely to flag and explain zero consumption accounts. Annual internal checks conducted with third party audit conducted at least once every five years. Accountability checks flag billing lapses. Consumption lost to billing lapses is well quantified and reducing year-by-year.	Conditions between 8 and 10	Sound written policy and procedures exist for new account activation and oversight of customer billing operations. Robust computerized billing system gives high functionality and reporting capabilities which are utilized, analyzed and the results reported each billing cycle. Assessment of policy and data handling errors are conducted internally and audited by third party at least once every three years, ensuring consumption lost to billing lapses is minimized and detected as it occurs.
Improvements to attain higher data grading for "Systematic Data Handling Error volume" component:		To qualify for 2: Draft written policy and procedures for activating new water billing accounts and oversight of billing operations. Investigate and budget for computerized customer billing system. Conduct initial audit of billing records by flow-charting the basic business processes of the customer account/billing function.	To qualify for 4: Finalize written policy and procedures for activation of new billing accounts and overall billing operations management. Implement a computerized customer billing system. Conduct initial audit of billing records as part of this process.		To qualify for 6: Refine new account activation and billing operations procedures and ensure consistency with the utility policy regarding billing, and minimize opportunity for missed billings. Upgrade or replace customer billing system for needed functionality - ensure that billing adjustments don't corrupt the value of consumption volumes. Procedurize internal annual audit process.		To qualify for 8: Formalize regular review of new account activation process and general billing practices. Enhance reporting capability of computerized billing system. Formalize regular auditing process to reveal scope of data handling error. Plan for periodic third party audit to occur at least once every five years.		To qualify for 10: Close policy/procedure loopholes that allow some customer accounts to go unbilled, or data handling errors to exist. Ensure that billing system reports are utilized, analyzed and reported every billing cycle. Ensure that internal and third party audits are conducted at least once every three years.		To maintain 10: Stay abreast of customer information management developments and innovations. Monitor developments of Advanced Metering Infrastructure (AMI) and integrate technology to ensure that customer endpoint information is well-monitored and errors/lapses are at an economic minimum.
SYSTEM DATA												
Length of mains:		Poorly assembled and maintained paper as-built records of existing water main installations makes accurate determination of system pipe length impossible. Length of mains is guesstimated.	Paper records in poor or uncertain condition (no annual tracking of installations & abandonments). Poor procedures to ensure that new water mains installed by developers are accurately documented.	Conditions between 2 and 4	Sound written policy and procedures exist for documenting new water main installations, but gaps in management result in a uncertain degree of error in tabulation of mains length.	Conditions between 4 and 6	Sound written policy and procedures exist for permitting and commissioning new water mains. Highly accurate paper records with regular field validation or electronic records and asset management system in good condition. Includes system backup.	Conditions between 6 and 8	Sound written policy and procedures exist for permitting and commissioning new water mains. Electronic recordkeeping such as a Geographical Information System (GIS) and asset management system are used to store and manage data.	Conditions between 8 and 10	Sound written policy exists for managing water mains extensions and replacements. Geographic Information System (GIS) data and asset management database agree and random field validation proves truth of databases. Records of annual field validation should be available for review.
Improvements to attain higher data grading for "Length of Water Mains" component:		To qualify for 2: Assign personnel to inventory current as-built records and compare with customer billing system records and highway plans in order to verify poorly documented pipelines. Assemble policy documents regarding permitting and documentation of water main installations by the utility and building developers; identify gaps in procedures that result in poor documentation of new water main installations.	To qualify for 4: Complete inventory of paper records of water main installations for several years prior to audit year. Review policy and procedures for commissioning and documenting new water main installation.		To qualify for 6: Finalize updates/improvements to written policy and procedures for permitting/commissioning new main installations. Confirm inventory of records for five years prior to audit year; correct any errors or omissions.		To qualify for 8: Launch random field checks of limited number of locations. Convert to electronic database such as a Geographic Information System (GIS) with backup as justified. Develop written policy and procedures.		To qualify for 10: Link Geographic Information System (GIS) and asset management databases, conduct field verification of data. Record field verification information at least annually.		To maintain 10: Continue with standardization and random field validation to improve the completeness and accuracy of the system.
Number of active AND inactive service connections:		Vague permitting (of new service connections) policy and poor paper recordkeeping of customer connections/billings result in suspect determination of the number of service connections, which may be 10-15% in error from actual count.	General permitting policy exists but paper records, procedural gaps, and weak oversight result in questionable total for number of connections, which may vary 5-10% of actual count.	Conditions between 2 and 4	Written account activation policy and procedures exist, but with some gaps in performance and oversight. Computerized information management system is being brought online to replace dated paper recordkeeping system. Reasonably accurate tracking of service connection installations & abandonments; but count can be up to 5% in error from actual total.	Conditions between 4 and 6	Written new account activation and overall billing policies and procedures are adequate and reviewed periodically. Computerized information management system is in use with annual installations & abandonments totaled. Very limited field verifications and audits. Error in count of number of service connections is believed to be no more than 3%.	Conditions between 6 and 8	Policies and procedures for new account activation and overall billing operations are written, well-structured and reviewed at least biannually. Well-managed computerized information management system exists and routine, periodic field checks and internal system audits are conducted. Counts of connections are no more than 2% in error.	Conditions between 8 and 10	Sound written policy and well managed and audited procedures ensure reliable management of service connection population. Computerized information management system, Customer Billing System, and Geographic Information System (GIS) information agree; field validation proves truth of databases. Count of connections recorded as being in error is less than 1% of the entire population.
Improvements to attain higher data grading for "Number of Active and Inactive Service Connections" component:	**Note: The number of Service Connections does not include fire hydrant leads/lines connecting the hydrant to the water main**	To qualify for 2: Draft new policy and procedures for new account activation and overall billing operations. Research and collect paper records of installations & abandonments for several years prior to audit year.	To qualify for 4: Refine policy and procedures for new account activation and overall billing operations. Research computerized recordkeeping system (Customer Information System or Customer Billing System) to improve documentation format for service connections.		To qualify for 6: Refine procedures to ensure consistency with new account activation and overall billing policy to establish new service connections or decommission existing connections. Improve process to include all totals for at least five years prior to audit year.		To qualify for 8: Formalize regular review of new account activation and overall billing operations policies and procedures. Launch random field checks of limited number of locations. Develop reports and auditing mechanisms for computerized information management system.		To qualify for 10: Close any procedural loopholes that allow installations to go undocumented. Link computerized information management system with Geographic Information System (GIS) and formalize field inspection and information system auditing processes. Documentation of new or decommissioned service connections encounters several levels of checks and balances.		To maintain 10: Continue with standardization and random field validation to improve knowledge of system.

		Gradings 1-9 apply if customer properties are unmetered, if customer meters exist and are located inside the customer building premises, or if the water utility owns and is responsible for the entire service connection piping from the water main to the customer building. In any of these cases the average distance between the curb stop or boundary separating utility/customer responsibility for service connection piping, and the typical first point of use (ex: faucet) or the customer meter must be quantified. Gradings of 1-9 are used to grade the validity of the means to quantify this value. (See the "Service Connection Diagram" worksheet)									
Average length of customer service line:	Note: if customer water meters are located outside of the customer building next to the curb stop or boundary separating utility/customer responsibility, then the auditor should answer "Yes" to the question on the Reporting Worksheet asking about this. If the answer is Yes, the grading description listed under the Grading of 10(a) will be followed, with a value of zero automatically entered at a Grading of 10. See the Service Connection Diagram worksheet for a visual presentation of this distance.	Vague policy exists to define the delineation of water utility ownership and customer ownership of the service connection piping. Curb stops are perceived as the breakpoint but these have not been well-maintained or documented. Most are buried or obscured. Their location varies widely from site-to-site, and estimating this distance is arbitrary due to the unknown location of many curb stops.	Policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. The piping from the water main to the curb stop is the property of the water utility; and the piping from the curb stop to the customer building is owned by the customer. Curb stop locations are not well documented and the average distance is based upon a limited number of locations measured in the field.	Conditions between 2 and 4	Good policy requires that the curb stop serves as the delineation point between water utility ownership and customer ownership of the service connection piping. Curb stops are generally installed as needed and are reasonably documented. Their location varies widely from site-to-site, and an estimate of this distance is hindered by the availability of paper records of limited accuracy.	Conditions between 4 and 6	Clear written policy exists to define utility/customer responsibility for service connection piping. Accurate, well-maintained paper or basic electronic recordkeeping system exists. Periodic field checks confirm piping lengths for a sample of customer properties.	Conditions between 6 and 8	Clearly worded policy standardizes the location of curb stops and meters, which are inspected upon installation. Accurate and well maintained electronic records exist with periodic field checks to confirm locations of service lines, curb stops and customer meter pits. An accurate number of customer properties from the customer billing system allows for reliable averaging of this length.	Conditions between 8 and 10	Either of two conditions can be met for a grading of 10: a) Customer water meters exist outside of customer buildings next to the curb stop or boundary separating utility/customer responsibility for service connection piping. If so, answer "Yes" to the question on the Reporting Working asking about this condition. A value of zero and a Grading of 10 are automatically entered in the Reporting Worksheet . b). Meters exist inside customer buildings, or properties are unmetered. In either case, answer "No" to the Reporting Worksheet question on meter location, and enter a distance determined by the auditor. For a Grading of 10 this value must be a very reliable number from a Geographic Information System (GIS) and confirmed by a statistically valid number of field checks.
Improvements to attain higher data grading for "Average Length of Customer Service Line" component:		to qualify for 2: Research and collect paper records of service line installations. Inspect several sites in the field using pipe locators to locate curb stops. Obtain the length of this small sample of connections in this manner.	to qualify for 4: Formalize and communicate policy delineating utility/customer responsibilities for service connection piping. Assess accuracy of paper records by field inspection of a small sample of service connections using pipe locators as needed. Research the potential migration to a computerized information management system to store service connection data.		to qualify for 6: Establish coherent procedures to ensure that policy for curb stop, meter installation and documentation is followed. Gain consensus within the water utility for the establishment of a computerized information management system.		to qualify for 8: Implement an electronic means of recordkeeping, typically via a customer information system, customer billing system, or Geographic Information System (GIS). Standardize the process to conduct field checks of a limited number of locations.		to qualify for 10: Link customer information management system and Geographic Information System (GIS), standardize process for field verification of data.		to maintain 10: Continue with standardization and random field validation to improve knowledge of service connection configurations and customer meter locations.
Average operating pressure:		Available records are poorly assembled and maintained paper records of supply pump characteristics and water distribution system operating conditions. Average pressure is guesstimated based upon this information and ground elevations from crude topographical maps. Widely varying distribution system pressures due to undulating terrain, high system head loss and weak/erratic pressure controls further compromise the validity of the average pressure calculation.	Limited telemetry monitoring of scattered pumping station and water storage tank sites provides some static pressure data, which is recorded in handwritten logbooks. Pressure data is gathered at individual sites only when low pressure complaints arise. Average pressure is determined by averaging relatively crude data, and is affected by significant variation in ground elevations, system head loss and gaps in pressure controls in the distribution system.	Conditions between 2 and 4	Effective pressure controls separate different pressure zones; moderate pressure variation across the system, occasional open boundary valves are discovered that breech pressure zones. Basic telemetry monitoring of the distribution system logs pressure data electronically. Pressure data gathered by gauges or dataloggers at fire hydrants or buildings when low pressure complaints arise, and during fire flow tests and system flushing. Reliable topographical data exists. Average pressure is calculated using this mix of data.	Conditions between 4 and 6	Reliable pressure controls separate distinct pressure zones; only very occasional open boundary valves are encountered that breech pressure zones. Well-covered telemetry monitoring of the distribution system (not just pumping at source treatment plants or wells) logs extensive pressure data electronically. Pressure gathered by gauges/dataloggers at fire hydrants and buildings when low pressure complaints arise, and during fire flow tests and system flushing. Average pressure is determined by using this mix of reliable data.	Conditions between 6 and 8	Well-managed, discrete pressure zones exist with generally predictable pressure fluctuations. A current full-scale SCADA System or similar realtime monitoring system exists to monitor the water distribution system and collect data, including real time pressure readings at representative sites across the system. The average system pressure is determined from reliable monitoring system data.	Conditions between 8 and 10	Well-managed pressure districts/zones, SCADA System and hydraulic model exist to give very precise pressure data across the water distribution system. Average system pressure is reliably calculated from extensive, reliable, and cross-checked data. Calculations are reported on an annual basis as a minimum.
Improvements to attain higher data grading for "Average Operating Pressure" component:		to qualify for 2: Employ pressure gauging and/or datalogging equipment to obtain pressure measurements from fire hydrants. Locate accurate topographical maps of service area in order to confirm ground elevations. Research pump data sheets to find pump pressure/flow characteristics	to qualify for 4: Formalize a procedure to use pressure gauging/datalogging equipment to gather pressure data during various system events such as low pressure complaints, or operational testing. Gather pump pressure and flow data at different flow regimes. Identify faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) and plan to properly configure pressure zones. Make all pressure data from these efforts available to generate system-wide average pressure.		to qualify for 6: Expand the use of pressure gauging/datalogging equipment to gather scattered pressure data at a representative set of sites, based upon pressure zones or areas. Utilize pump pressure and flow data to determine supply head entering each pressure zone or district. Correct any faulty pressure controls (pressure reducing valves, altitude valves, partially open boundary valves) to ensure properly configured pressure zones. Use expanded pressure dataset from these activities to generate system-wide average pressure.		to qualify for 8: Install a Supervisory Control and Data Acquisition (SCADA) System, or similar realtime monitoring system, to monitor system parameters and control operations. Set regular calibration schedule for instrumentation to insure data accuracy. Obtain accurate topographical data and utilize pressure data gathered from field surveys to provide extensive, reliable data for pressure averaging.		to qualify for 10: Annually, obtain a system-wide average pressure value from the hydraulic model of the distribution system that has been calibrated via field measurements in the water distribution system and confirmed in comparisons with SCADA System data.		to maintain 10: Continue to refine the hydraulic model of the distribution system and consider linking it with SCADA System for real-time pressure data calibration, and averaging.

COST DATA										
Total annual cost of operating water system:		Incomplete paper records and lack of financial accounting documentation on many operating functions makes calculation of water system operating costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to estimate the major portion of water system operating costs.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. However, gaps in data are known to exist, periodic internal reviews are conducted but not a structured financial audit.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited periodically by utility personnel, but not a Certified Public Accountant (CPA).	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited at least annually by utility personnel, and at least once every three years by third-party CPA.	Conditions between 8 and 10	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Data audited annually by utility personnel and annually also by third-party CPA.
Improvements to attain higher data grading for "Total Annual Cost of Operating the Water System" component:		<u>to qualify for 2</u>: Gather available records, institute new financial accounting procedures to regularly collect and audit basic cost data of most important operations functions.	<u>to qualify for 4</u>: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		<u>to qualify for 6</u>: Establish process for periodic internal audit of water system operating costs; identify cost data gaps and institute procedures for tracking these outstanding costs.		<u>to qualify for 8</u>: Standardize the process to conduct routine financial audit on an annual basis. Arrange for CPA audit of financial records at least once every three years.		<u>to qualify for 10</u>: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		<u>to maintain 10</u>: Maintain program, stay abreast of expenses subject to erratic cost changes and long-term cost trend, and budget/track costs proactively
Customer retail unit cost (applied to Apparent Losses):	Customer population unmetered, and/or only a fixed fee is charged for consumption.	Antiquated, cumbersome water rate structure is used, with periodic historic amendments that were poorly documented and implemented; resulting in classes of customers being billed inconsistent charges. The actual composite billing rate likely differs significantly from the published water rate structure, but a lack of auditing leaves the degree of error indeterminate.	Dated, cumbersome water rate structure, not always employed consistently in actual billing operations. The actual composite billing rate is known to differ from the published water rate structure, and a reasonably accurate estimate of the degree of error is determined, allowing a composite billing rate to be quantified.	Conditions between 2 and 4	Straight-forward water rate structure in use, but not updated in several years. Billing operations reliably employ the rate structure. The composite billing rate is derived from a single customer class such as residential customer accounts, neglecting the effect of different rates from varying customer classes.	Conditions between 4 and 6	Clearly written, up-to-date water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average residential rate using volumes of water in each rate block.	Conditions between 6 and 8	Effective water rate structure is in force and is applied reliably in billing operations. Composite customer rate is determined using a weighted average composite consumption rate, which includes residential, commercial, industrial, institutional (CII), and any other distinct customer classes within the water rate structure.	Conditions between 8 and 10	Current, effective water rate structure is in force and applied reliably in billing operations. The rate structure and calculations of composite rate - which includes residential, commercial, industrial, institutional (CII), and other distinct customer classes - are reviewed by a third party knowledgeable in the M36 methodology at least once every five years.
Improvements to attain higher data grading for "Customer Retail Unit Cost" component:		<u>to qualify for 2</u>: Formalize the process to implement water rates, including a secure documentation procedure. Create a current, formal water rate document and gain approval from all stakeholders.	<u>to qualify for 4</u>: Review the water rate structure and update/formalize as needed. Assess billing operations to ensure that actual billing operations incorporate the established water rate structure.		<u>to qualify for 6</u>: Evaluate volume of water used in each usage block by residential users. Multiply volumes by full rate structure.	<u>Launch effort to fully-meter the customer population and charge rates based upon water volumes</u>	<u>to qualify for 8</u>: Evaluate volume of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		<u>to qualify for 10</u>: Conduct a periodic third-party audit of water used in each usage block by all classifications of users. Multiply volumes by full rate structure.		<u>to maintain 10</u>: Keep water rate structure current in addressing the water utility's revenue needs. Update the calculation of the customer unit rate as new rate components, customer classes, or other components are modified.
Variable production cost (applied to Real Losses):	Note: if the water utility purchases/imports its entire water supply, then enter the unit purchase cost of the bulk water supply in the Reporting Worksheet with a grading of 10	Incomplete paper records and lack of documentation on primary operating functions (electric power and treatment costs most importantly) makes calculation of variable production costs a pure guesstimate	Reasonably maintained, but incomplete, paper or electronic accounting provides data to roughly estimate the basic operations costs (pumping power costs and treatment costs) and calculate a unit variable production cost.	Conditions between 2 and 4	Electronic, industry-standard cost accounting system in place. Electric power and treatment costs are reliably tracked and allow accurate weighted calculation of unit variable production costs based on these two inputs and water imported purchase costs (if applicable). All costs are audited internally on a periodic basis.	Conditions between 4 and 6	Reliable electronic, industry-standard cost accounting system in place, with all pertinent water system operating costs tracked. Pertinent additional costs beyond power, treatment and water imported purchase costs (if applicable) such as liability, residuals management, wear and tear on equipment, impending expansion of supply, are included in the unit variable production cost, as applicable. The data is audited at least annually by utility personnel.	Conditions between 6 and 8	Reliable electronic, industry-standard cost accounting system in place, with all pertinent primary and secondary variable production and water imported purchase (if applicable) costs tracked. The data is audited at least annually by utility personnel, and at least once every three years by a third-party knowledgeable in the M36 methodology.	Conditions between 8 and 10	Either of two conditions can be met to obtain a grading of 10: 1) Third party CPA audit of all pertinent primary and secondary variable production and water imported purchase (if applicable) costs on an annual basis. or: 2) Water supply is entirely purchased as bulk imported water, and unit purchase cost serves as the variable production cost.
Improvements to attain higher data grading for "Variable Production Cost" component:		<u>to qualify for 2</u>: Gather available records, institute new procedures to regularly collect and audit basic cost data and most important operations functions.	<u>to qualify for 4</u>: Implement an electronic cost accounting system, structured according to accounting standards for water utilities		<u>to qualify for 6</u>: Formalize process for regular internal audits of production costs. Assess whether additional costs (liability, residuals management, equipment wear, impending infrastructure expansion) should be included to calculate a more representative variable production cost.		<u>to qualify for 8</u>: Formalize the accounting process to include direct cost components (power, treatment) as well as indirect cost components (liability, residuals management, etc.) Arrange to conduct audits by a knowledgeable third-party at least once every three years.		<u>to qualify for 10</u>: Standardize the process to conduct a third-party financial audit by a CPA on an annual basis.		<u>to maintain 10</u>: Maintain program, stay abreast of expenses subject to erratic cost changes and budget/track costs proactively

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VICE CHAIRMAN
SUBCOMMITTEE ON DEFENSE
SUBCOMMITTEE ON HOMELAND SECURITY
SUBCOMMITTEE ON TRANSPORTATION,
HOUSING AND URBAN DEVELOPMENT AND
RELATED AGENCIES

COMMITTEE ON HOUSE ADMINISTRATION
SUBCOMMITTEE ON ELECTIONS

September 8, 2020

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

Re: San Bernardino Municipal Water District Phase 1 Advanced Metering and Infrastructure Deployment Project – WaterSMART Water Energy Grant Program for Fiscal Year 2021

Dear Commissioner Burman:

I am writing to express my support for the San Bernardino Municipal Water District Phase 1 Advanced Metering and Infrastructure Deployment Project application submitted by the City of San Bernardino Municipal Water Department (SBMWD) for funding consideration under the Water Energy Efficiency Grant Program. If approved, the requested $500,000 grant will be matched by a 50 percent contribution from nonfederal funds. This funding will enable SBMWD to complete Phase 1 of an Advanced Metering and Infrastructure (AMI) system. This project will help customers monitor their daily water usage while helping SBMWD meet State of California water use compliance standards.

SBMWD provides water utility and wastewater collection and treatment services to over 200,000 residents and businesses in the City of San Bernardino, California and surrounding communities. Due to the semi-arid climate of this region, conservation and efficient use of water resources are vital to protect the health and growth of our community.

The AMI system and web portal technology will provide the tools needed to realize significant water savings in addition to preserving critical water supply throughout SBMWD's service area. If approved, the project will provide quantifiable and sustainable water savings. Grant funds will be used to purchase and install needed project equipment and infrastructure. 7,500 traditional meters will be replaced with advanced smart meters that have remote read capability. This technology will allow customers to monitor household water consumption and enable SBMWD staff to check water consumption patterns using real time data alerts. Customers will also gain the ability to immediately address issues such as water leakage or overuse thereby reducing water waste and improving water efficiency.

The SBMWD project is in direct alignment with the WaterSmart Water Energy Grant Program's goal of sustaining and managing America's water resources for tomorrow. I encourage you to give SBMWD's application your full and fair consideration, consistent with applicable laws and

regulations. If you have any questions, please contact Curt Lewis, Grant Program Director at my office at Curt.Lewis@mail.house.gov.

Sincerely,

Pete Aguilar

Pete Aguilar
Member of Congress