



P A S A D E N A
Water&Power
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PASADENA ADVANCED METERING INFRASTRUCTURE PROJECT

**WATER AND ENERGY EFFICIENCY GRANTS FOR FY 2024 AND 2025
FUNDING OPPORTUNITY NUMBER: R24AS00052**

Date Submitted: November 13, 2024

Prepared For:

Bureau of Reclamation
Financial Assistance Operations
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Metropolitan Water District of Southern California
Raymond Basin Management Board
Mayor Victor M. Gordo
Pasadena Chamber of Commerce

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TECHNICAL PROPOSAL

A. Executive Summary

Date: November 13, 2024

Applicant Name: City of Pasadena, Department of Water & Power (PWP)

City: Pasadena

County: Los Angeles County

State: California

Applicant Category: A

Project Performance Period: 3 years (October 2025 to October 2028)

Located on a Federal Facility: Not on a Federal facility; but the Project has a nexus to Reclamation.

The City of Pasadena Water and Power Department (PWP) is a public utility that serves 164,344 residential and commercial water customers through 38,405 accounts. To combat water loss, encourage water conservation, enhance water waste ordinance enforcement, and improve water management (including billing accuracy), PWP will install the hardware and communication network for advanced metering infrastructure (AMI). AMI will benefit all PWP customers including residents in disadvantaged communities. The Project cost is \$22,531,614 with a proposed Federal share of \$2,000,000 which represents 9% of total costs. Benefits of the proposed Project include:

- Estimated minimum water savings of 4,294 acre-feet per year (AFY);
 - Associated energy savings of 7,049,317 kilowatt-hours (kWh) per year;
 - Reduced greenhouse gas (GHG) emissions of 4,927 metric tons of carbon dioxide (CO₂) per year;
- Enhanced water conservation (i.e., real-time availability of water usage data incentivizes customers to modify their consumption and reduce their water bill);
- Enhanced protection of the local groundwater supply and the watershed;
- Reduced pressure on imported supplies from the State Water Project (SWP) and the Colorado River;
- Increased reliability, sustainability, and management of PWP's water system through smart metering technologies;
- Increased resilience to recurring local and regional drought which severely affects PWP's water supply; and
- Resilience to worsening climate change characterized by extremes in temperature and precipitation leading to more severe and longer drought periods.

B. Project Location

Pasadena is the ninth-largest city in Los Angeles County, California (Fig. 1), and is a diverse community that is home to approximately 140,000 residents. It is one of the primary cultural centers of the San Gabriel Valley, located 11 miles northeast of the City of Los Angeles. Pasadena is bordered on the north by the unincorporated area of Altadena, on the east by the cities of Sierra Madre and Arcadia, on the south by the cities of San Marino and South Pasadena, and on the west by the cities of Glendale and La Cañada Flintridge.

The City of Pasadena Water and Power Department (PWP) is a public utility that provides water and electric service within a 26-square mile service territory, see Fig. 2. PWP serves 164,344 residential and commercial water customers through 38,405 accounts. Most of these customers are located in the City of Pasadena, and approximately 15% are located in unincorporated areas of Altadena, East Pasadena, and San Gabriel.

PWP's water supply comes from two sources: 1) Imported water from the State Water Project (SWP) and the Colorado River via the Metropolitan Water District of Southern California (MWD, 2/3 of the water supply), and 2) local water from the Raymond Basin, a local aquifer (1/3 of the water supply). PWP's residential and commercial water customers use 100 gallons per capita per day (GPCD) (2020 Urban Water Management Plan, UWMP).

The approximate Project latitude is 34°16'N and longitude is 118°13'W.

Fig. 1 City of Pasadena and PWP Location

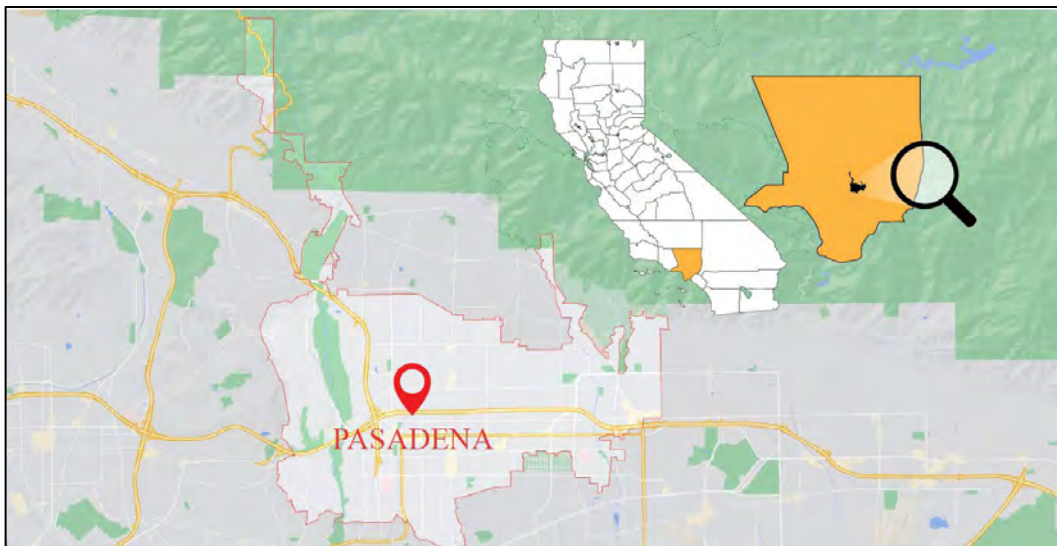
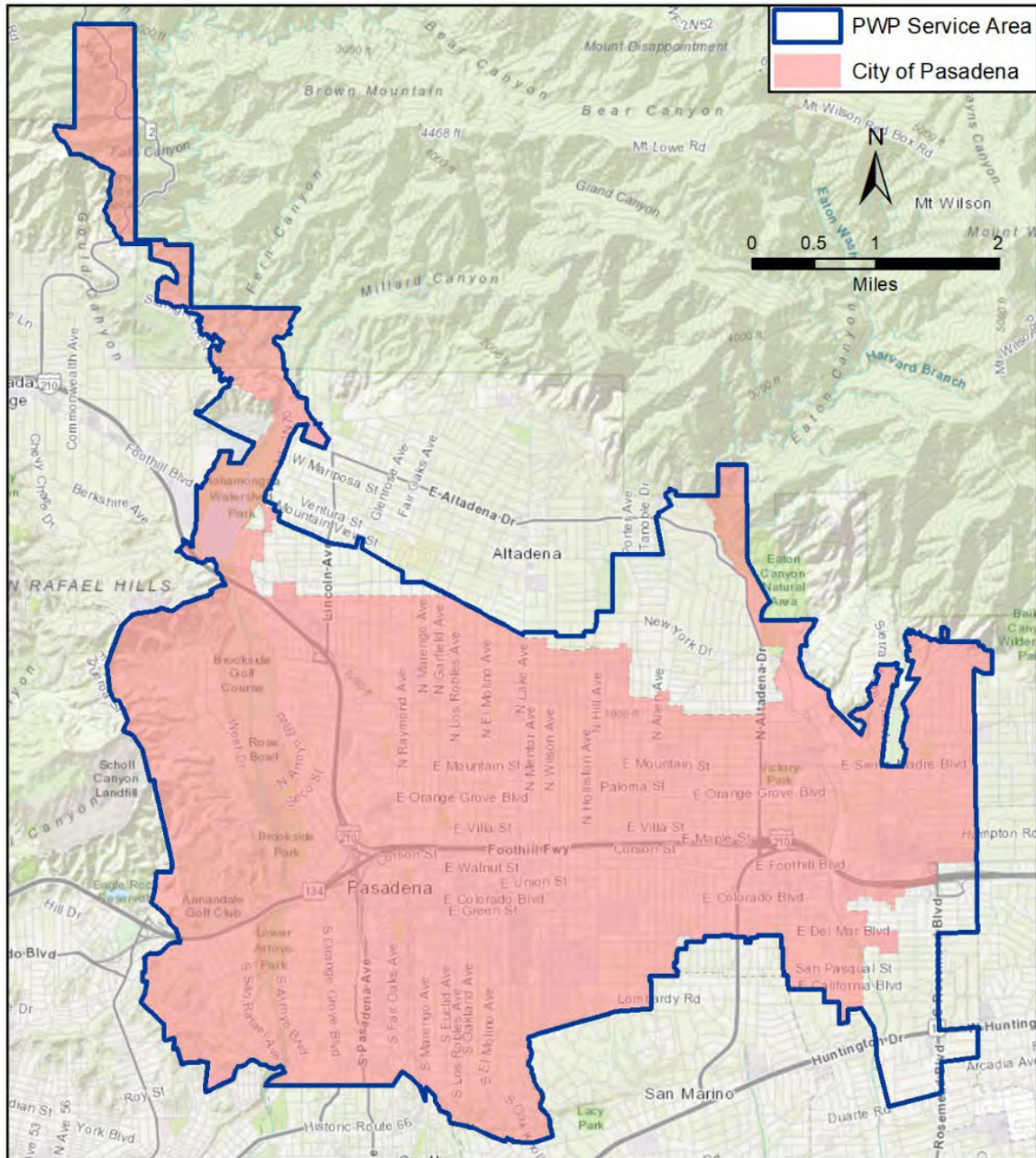




Fig. 2: Pasadena Water and Power (PWP) Service Area



Source: 2020 City of Pasadena Urban Water Management Plan



C. Technical Project Description

Project Summary

The proposed AMI Project will include:

- An initial deployment phase that includes final system design; and final system integration, and installation, testing, and validation of a sub-set of meters;
- Customer Engagement;
- Mass Deployment of 38,405 AMI Meters including 18,405 meter replacements, and 20,000 meter retrofits;
- Training for PWP Staff;
- Functional acceptance testing of the new AMI system; and
- Project and grant management.

The Project will combat water loss due to leaks, encourage customer water conservation using AMI's real-time usage capabilities, enhance water waste ordinance enforcement, and improve water management (including billing accuracy).

Existing System Details

The current AMR (automated meter reading) system was installed 16 years ago, and it captures meter data on a monthly and bimonthly basis. The AMR system—Itron's Field Collection System (FCS)—is a one-way radio communication system that allows meters to be read by a handheld unit from the street as the meter reader drives or walks nearby. Once the meter reader is back in the utility office, the data is transferred from the handheld unit and aggregated in the FCS system before sending the data to the customer billing system.

Since the deployment of the AMR system, PWP has experienced a high volume of water communication module (encoder receiver transmitters, ERT) failures. In 2018, 11,000 ERT modules, or 30%, were replaced by Itron. Since 2018, an additional 5,200 ERT modules have failed, requiring those water meters to be read manually each cycle. PWP estimates water losses of 1,222 AFY due to the inefficiencies and failures of the AMR system (see water savings details below in Evaluation Criterion A: Quantifiable Water Savings).

In 2022, PWP went live with a new Customer Information System (CIS), Oracle's Customer to Meter (C2M) that provides both the CIS and Meter Data Management System (MDMS) functionality in a single system. C2M includes customer account management and billing functions for both water and power utility services, through MyMeter, the customer facing portal. C2M also feeds customer usage information to PWP's WaterSmart Customer Portal, a third-party behavioral analytics software platform. The WaterSmart Customer Portal allows customers to track water use, view detailed analytics of historical water usage, set alerts for unusual usage, and receive electronic communication from PWP.

Even with these state-of-the-art data-sharing technologies, effective water-use data sharing is limited due to the current AMR system which requires manual meter reading. Customers must wait for PWP to issue bills through MyMeter and upload data to the WaterSmart Customer Portal, delaying leak detection and consumption awareness for as long as 60 days. Additional inefficiencies of the current system include: increased labor time and costs associated with

conducting manual reading and re-reading of existing meters and manual connection and disconnection of meters; cost of vehicle maintenance due to the added usage; GHG emissions from the miles the vehicle has traveled; and reliance on the public and PWP staff reporting of observed violations of the City's water waste ordinance.

In 2023 and 2024, PWP engaged an engineering consultant to analyze the AMR system and make recommendations for a water and electric AMI solution. PWP sought a single AMI solution to meet the unique business needs of its water and electric utilities using a single platform. The consultant completed the following in 2024:

AMI Needs Assessment. To determine the AMI system solution that would best meet PWP's needs, the engineering consultant conducted an AMI needs assessment to establish a baseline and identify the business, operational, and system needs for PWP to acquire and install an AMI system. The needs assessment included:

- Data Collection: Resource analysis, key interviews with PWP stakeholders, and compilation of existing data and reports.
- Current State Analysis: Current business, technical, and AMI requirements analyses.
- Future State Analysis: Target state solution architecture, considerations (i.e., business, technology, staffing, operations, etc.), and analysis of deployment models.
- Financial Analysis: Preliminary AMI deployment costs and cost of ownership.
- Solution Roadmap: Roadmap for all project phases including procurement, initial deployment, and mass deployment.

AMI Business Case. The AMI needs assessment described above was followed by the development of a Business Case to consider and recommend the preferred AMI solution strategy and specifications, finalize estimated AMI deployment and maintenance costs, identify risk and proposed mitigation, recommend community engagement and project messaging, and outline performance indicators. Importantly, the Business Case included a formal roadmap for next steps, and recommended the following:

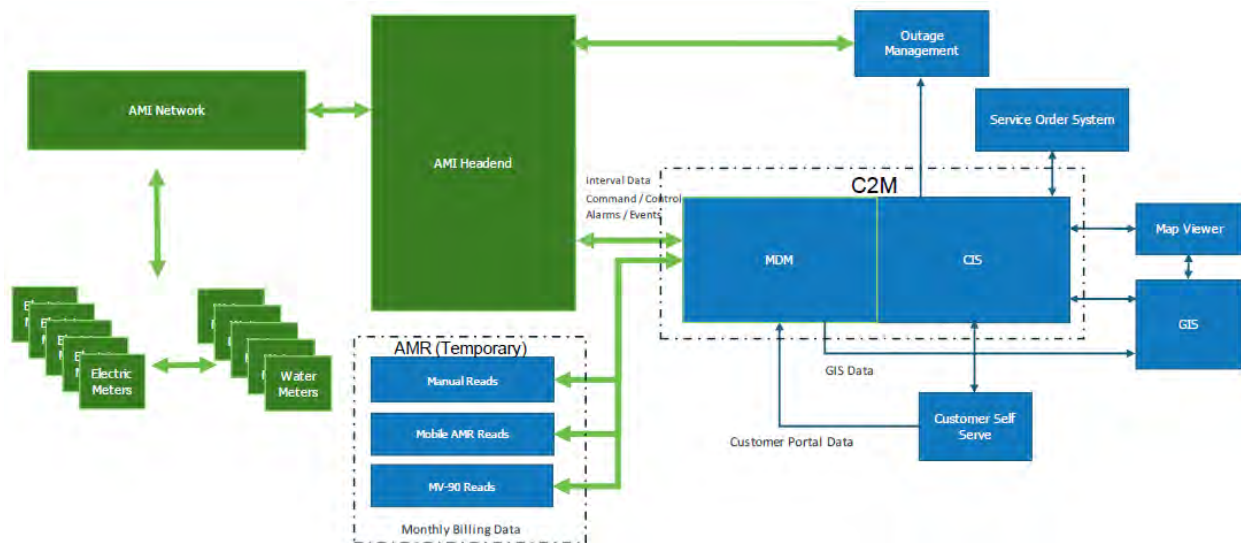
- An initial deployment phase to ensure that the proposed solution will work as planned prior to mass deployment (see details below). The recommended initial deployment is integral to the project; it is more than a simple test of the technology, it is a much larger integrated end-to-end system test that includes all vendors, and would include the full integration of all software and network solutions and implementation of a small, yet representative sub-set of the proposed meters; and
- Redundancies to provide backup during outages.

PWP's proposed AMI solution is described below. It is based on the findings and recommendations of the engineering consultant's needs assessment, Business Case, and Roadmap. This funding request is for the water portion of the AMI solution *only*, and only the water portion of the AMI solution is discussed during the remainder of this application.

Proposed System Details

Overview. PWP will implement an AMI solution that installs a fixed wireless network to read 38,405 AMI water meters remotely, including replacing 18,405 water meters (48%) installed before 2018, and retrofitting the remaining water meters (52%) with AMI registers and receivers to communicate with the AMI network. The Project also includes an 18-month initial deployment phase, network equipment and software, and integration of the AMI software with the C2M and the Customer Portal. Fig. 3, below, illustrates the AMI solution's technical architecture.

Fig. 3: Technical Architecture of PWP's Proposed AMI Solution



PWP will competitively procure the services of an expert vendor who will select, purchase, install, and test all equipment and software. The Project will take 36 months to complete.

Mass Deployment of AMI Water Meter Retrofits and Replacements. The AMI solution includes 38,405 water meters. In 2018, Itron replaced over 11,000 water meter communication modules that had failed since 2008. Since 2018, modules have continued to fail, with over 5,200 currently not operational. The AMI solution includes an estimated 20,000 water meters installed since 2018 that will be retrofitted with an AMI device. The remaining 18,405 water meters installed before 2018 will be replaced. The exact manufacturers and models of the AMI meters and register retrofits will be chosen by the selected vendor based on specifications in the Business Case developed by PWP's engineering consultant in 2024. The meters will include:



Table 1: Meter Replacements and Register Retrofits

Water Meter Register Retrofit	
Size	Number
¾ inch	11,199
1 inch	6,351
1 ½ inch	1,163
2 inch	949
3 inch	153
4 inch	118
6 inch	52
8 inch	13
10 inch	2
<i>TOTAL</i>	<i>20,000</i>

Water Meter Replacement	
Size	Number
¾ inch	10,306
1 inch	5,844
1 ½ inch	1,070
2 inch	874
3 inch	141
4 inch	108
6 inch	48
8 inch	12
10 inch	2
<i>TOTAL</i>	<i>18,405</i>

Other Equipment. Other equipment to be purchased and deployed will include:

- Network equipment. The network communication technology will be determined by the selected vendor during the design phase and prior to the initial deployment phase. The design will consider all available technologies including cellular, mesh, radio, and licensed radio.
- Water AMI meters and communication devices for each meter size described above (from ¾ to 10 inch); and
- Meter pit lids.

AMI Head-end System. The AMI head-end system will be hosted by the AMI vendor in a cloud platform environment which provides advanced security features to protect data. The vendor will initiate an environment build by allocating hardware in the vendor's data center and then installing the operating system and application software on the hardware. The vendor will then configure the software per PWP specifications to accommodate the number of meters and users of the system. The vendor will conduct build tests to ensure the system operates, that cybersecurity has been properly set up, and that appropriate access is made available to PWP staff.

AMI Network. The vendor will create a network propagation model that identifies the locations where the network equipment should be installed. Depending on the network technology, network equipment may be installed on existing facilities such as buildings, distribution and/or light poles, water tanks, or telecommunication towers. In some instances where existing facilities are not available or do not provide the necessary height for antenna installation, the vendor may need to construct a tower or monopole for the network equipment to be installed. After the network equipment has been installed, the network communication technology will need to be connected and communications to the head-end system tested. Upon a successful communications test, the AMI vendor will commission the network equipment for operation.

Installation. The selected AMI vendor will be responsible for installing the meter replacements, meter retrofits, new meter pit lids, and network equipment. The vendor will be responsible for any additional installation services including plumbing services, meter box resets, meter repairs, etc.

Software and Integration. The selected vendor will be responsible for purchasing and installing the meter data management (MDM) license and integrating all AMI software with C2M and the customer behavioral analytics software, such as the WaterSmart Customer Portal. Since the AMI head-end system will be hosted in a cloud environment by the vendor, the integration between the AMI head-end system and the Oracle-hosted C2M will be a cloud-to-cloud communication configuration. For alarms, on-demand commands, and other notifications, the vendor will set up a link between the AMI head-end and C2M. The engineering consultant also recommended that a Work Order Management System (WOMS) be installed that will be used during mass deployment. This is a two-way interface that will issue work orders to the vendor to exchange meters and receive the installed meter information.

Implementation Approach.

Initial Deployment Phase. PWP will conduct an 18-month initial deployment phase as recommended by the engineering consultant. The initial deployment phase will include final project design, permitting, installation of a sub-set of AMI meters, and full system integration. The exact number of meters will be selected by the vendor, but the engineering consultant recommends that 500-1,000 meters be installed for the initial deployment. This population of meters will be able to validate the AMI network performance and head-end functionality. Meter data can also be collected and used for integration testing. The vendor will conduct test cases once the initial deployment meters, systems, and integrations are fully in place. These test cases will verify AMI system and meter configurations, AMI network communications, meter data delivery, head-end functionality, and integrations. Once all the tests have been successfully executed and met the expected performance criteria, a formal system signoff will be given by PWP, and the Project will be allowed to proceed with mass deployment of the remaining meter replacements and retrofits.

Temporary Hybrid System. During the AMI mass deployment, the legacy AMR systems will need to remain operational for approximately two years to maintain continuity in billing. During the mass deployment of meters, both the AMR and AMI systems will provide meter reads for customer billing. Throughout the mass deployment phase, new AMI meters will replace the AMR meters until all the old meters have been replaced. Once the final functional acceptance test has been signed off and billing is performed using AMI meter reads, a plan will be developed for archiving the AMR system.

Mass Deployment Strategy. The selected vendor will develop a deployment strategy to determine the meters to be exchanged or retrofitted. Typically, meters are exchanged by read route, which decreases the reading of drive-by AMR meters as routes are converted to AMI. If

possible, exchanging a customer's electric and water meter simultaneously will minimize the customer's service interruptions.

Customer Engagement. A comprehensive customer engagement effort will ensure customers are aware of the schedule for forthcoming AMI installation at their homes and businesses and what AMI will mean for water conservation and potential reductions in their water bill. Engagement activities will include the following:

- Dedicated AMI page on PWP's website that includes the installation schedule, a list of benefits of AMI, detailed explanation of how customers can view and understand their usage, Frequently Asked Questions, etc. The webpage will remain online for continuous access to this critical information.
- Educational inserts in customer water bills;
- Engagement on social and traditional media;
- Press releases from the City Manager's Office;
- Informational webinars; and
- Tabling and presentations at community meetings, events, and festivals.

Training and Testing. The vendor will be responsible for training PWP staff and conducting functional acceptance testing of the system. The engineering consultant identified the following trainings that will be needed for PWP staff to operate and maintain the new AMI system:

AMI Overview Training: This training will provide a high-level understanding of how the AMI components work together to collect meter reads for billing, key functions such as remote connect/disconnect and outage/leak notifications, and other key usage information.

AMI Administrator Training: Provided to staff assigned to administer the AMI system.

AMI Operator Training: The AMI operator training focuses on monitoring meter reads, usage reporting, alert/alarm notifications, and troubleshooting. It will be provided by the AMI vendor in a train-the-trainer format.

Network Communications Training: This training may be combined with the AMI Administrator training with a specialized focus on the field network equipment and communication configurations.

Meter Configuration Training: Meter Configuration training provides the skills needed by PWP to create and load meter programs according to the meter types and engineering informational needs.

D. Evaluation Criteria

EVALUATION CRITERION A: Quantifiable Water Savings

Estimated Water Savings

The AMI Project's estimated water savings is **4,294 AFY** as follows:

1. Faster detection and repair of leaks	1,222 AFY
2. Enhanced customer water conservation behaviors	1,580 AFY
3. Enhanced water waste ordinance enforcement	<u>1,492 AFY</u>
TOTAL ESTIMATED WATER SAVINGS	4,294 AFY

Description of Current Losses

Where Current Losses are Going.

Water Lost from Leaks. Water lost from leaks is either infiltrating back into the ground, or flowing to storm drains that empty into the Pacific Ocean.

Loss from Customer Overconsumption. A noteworthy 50% of residential water use is related to irrigation (2020 UWMP), representing a significant opportunity to impact conservation efforts. AMI will provide PWP customers with real-time data on water consumption. PWP will utilize behavioral analytics software, such as the existing WaterSmart Customer Portal, to share consumption data. The readily available, real-time data allows residential and commercial customers to adjust their behaviors and conserve water—and reduce their water bill—by making conscious changes like using less water for irrigation. The behavioral analytics software will provide a customized action plan that identifies available PWP incentives to help save money and water. While the incentives change from year-to-year, examples include:

- Turf Replacement Program Rebate;
- Laundry-to-Landscape Greywater System Rebate;
- Water Efficient Toilet and Clothes Washer Rebate;
- Rain Barrel and Cistern Rebate; and
- Nozzle Sprinkler Head Rebate.

Customers can sign up for notifications to be notified when water use increases above set goals. Studies have shown that having real-time AMI data provides greater awareness about water usage and its impact on water bills and has an impact on usage (see details further below).

How Current Losses are Being Used/Known Beneficial Uses. There are no uses or benefits to water loss that goes to the Pacific Ocean via the storm drains. Water loss due to leaks infiltrates the ground, but not in sufficient amounts to recharge the groundwater (depth to water was approximately 430 feet in 2020).

Documentation for Estimated Water Savings

Estimation of the Annual Water Supply. The basis for the water savings calculations is the annual water supply in AFY. PWP used the average supply from the years 2017 to 2020 in the

calculations. This average is more representative of actual supply and losses, as conditions were skewed for several years after the COVID-19 pandemic. The source of these annual data are Water Loss Audit Reports from the American Water Works Association (AWWA).

PWP's average annual water supply for the years 2017 to 2020 is **28,721 AFY**, see Table 2. As noted previously, PWP's current water supplies include: local groundwater from the Raymond Basin (approximately 1/3), and purchases of imported water (approximately 2/3) from MWD. MWD obtains its water from the State Water Project (SWP) and the Colorado River.

Water Savings Source #1: Faster Detection and Repair of Leaks = 1,222 AFY.

The average real losses from the years 2017 to 2020 is the amount saved from faster detection and repair of leaks which is 1,222 AFY, see Table 2. The measure "real loss" comes from AWWA's methodology and is the loss from customer leaks that could have been prevented. The source of these annual loss data is the annual Water Loss Audit Reports from the AWWA, and copies of the reports are provided in Appendix A.

Table 2: PWP Water Supplies and Losses, 2017-2020

	2017	2018	2019	2020	2017-2020 Average
Water Supplies (AFY)	28,806.2	29,410.3	27,287.4	29,381.0	28,721.2
Real Losses (AFY)	1,846.0	571.5	824.6	1,646.6	1,222.2
Real Loss % of Supplies	6.4%	1.9%	3.0%	5.6%	4.3%

"Real loss" is defined as Water Loss minus:

- Unauthorized consumption;
- Customer meter inaccuracies; and
- Data handling errors.

AMI's ability to read consumption data in intervals of less than 15 minutes will provide real-time notification of leaks and, thus, quicker response for repairs. The current AMR system captures usage data monthly or every other month (for bimonthly billing accounts), thus significantly delaying notification and repair of leaks.

Water Savings Source #2: Enhanced Customer Water Conservation Behavior = 1,580 AFY

Savings from enhanced water conservation behavior were calculated using:

1. Average annual supply in AFY for 2017 to 2020 (described above); and
2. Percentage reduction of water supply anticipated from enhanced customer conservation behaviors.

PWP's new AMI technology, used in collaboration with behavioral analytics software, such as the existing WaterSmart Customer Portal, will provide customers with the opportunity to monitor their real-time water usage and make adjustments. PWP reviewed research studies that



estimated savings resulting from AMI deployment. PWP used a 5.5% reduction factor based on a 2018 article in *Resources, Conservation and Recycling* (Liu and Mukheibir, Digital Metering Feedback and Changes in Water Consumption – A Review, Vol. 134, pp. 136-148).¹ The study reviewed 25 customer water-use studies and interviewed staff from five water utilities that had deployed smart metering to identify water savings related to AMI and enhanced customer conservation. The study reported mean water savings from customer conservation across all the studies of “5.5%, within the 10th–90th-percentile envelope of 3.0%–8.0% savings.” Using the 5.5% water savings factor applied to the average annual supply:

$$\begin{aligned} & \text{Average Annual Supply 2017-2020} \\ & \quad * \\ & \text{Research-Based Water Savings \% from Customer Conservation} \\ & \quad = \\ & \text{Water Savings from Enhanced Customer Conservation Behavior} \\ & \quad \downarrow \\ & (28,721 \text{ AFY} \times 5.5\% = 1,580 \text{ AFY}) \end{aligned}$$

Water Savings Source #3: Enhanced Water Waste Ordinance Enforcement = 1,492 AFY

Pasadena has a Water Waste Ordinance that restricts watering days, times, and water waste. Current enforcement of the ordinance depends on public and PWP staff reporting observed violations. Violations result in the issuance of water waste report letters to customers. The ordinance and warning letters have been extremely effective in reducing water use, with an estimated 0.373 AF reduction per water waste report, see Appendix A for documentation. During peak drought periods, PWP ramped up on-the-ground enforcement of the ordinance and for two separate years issued over 3,000 and 5,000 water waste reports respectively (i.e., an average of 4,000 reports), resulting in significant water savings. It is expected that AMI will result in at least equivalent, if not more savings, due to violators being identified immediately through AMI, and immediate issuance of water waste reports to customers. Water savings from the AMI generated water waste reports is estimated at 1,492 AF annually. The calculations utilize the 4,000 average annual water waste reports noted above as the “anticipated annual number of water waste reports.”

$$\begin{aligned} & \text{Average Water Use Reduction Per Water Waste Report 2015-2022} \\ & \quad * \\ & \text{Anticipated Annual Number of Water Waste Reports} = \\ & \text{Water Savings from Enhanced Water Waste Ordinance Enforcement} \\ & \quad \downarrow \\ & (0.373 \text{ AFY} / \text{Report} \times 4,000 \text{ Reports} = 1,492 \text{ AFY}) \end{aligned}$$

¹ <https://www.sciencedirect.com/science/article/abs/pii/S0921344918301113>

Municipal Metering Questions

Documentation for Estimated Water Savings. The water savings calculation details are provided above. To summarize:

The AMI Project's estimated water savings is **4,294 AFY** as follows:

1. Faster detection and repair of leaks:	1,222 AFY
2. Enhanced customer water conservation behaviors	1,580 AFY
3. Enhanced water waste ordinance enforcement	<u>1,492 AFY</u>
TOTAL ESTIMATED WATER SAVINGS	4,294 AFY

Water Savings Source #1: Faster Detection and Repair of Leaks = 1,222 AFY.

PWP used the average real losses from the years 2017 to 2020 for this savings amount. The source of these annual real loss data is Water Loss Audit Reports from American Water Works Association (AWWA) (see Appendix A for a copy of these reports). The measure "real loss" comes from AWWA's methodology and is the loss from customer leaks that could have been prevented. The real loss average from 2017 to 2020 is **1,222 AFY**; see Table 2, above.

Water Savings Source #2: Enhanced Customer Water Conservation Behavior = 1,580 AFY

Savings from enhanced water conservation behavior were calculated using:

1. Average annual supply in AFY for 2017 to 2020 (described above); and
2. Percentage reduction of water supply anticipated from enhanced customer conservation behaviors.

PWP used a 5.5% reduction factor based on a 2018 article in *Resources, Conservation and Recycling* (Liu and Mukheibir, Digital Metering Feedback and Changes in Water Consumption – A Review, Vol. 134, pp. 136-148).² Using the 5.5% water savings factor applied to the average annual supply:

$$\begin{array}{c}
 \text{Average Annual Supply 2017-2020} \\
 \times \\
 \text{Research-Based Water Savings \% from Customer Conservation} \\
 = \\
 \text{Water Savings from Enhanced Customer Conservation Behavior} \\
 \downarrow \\
 (28,721 \text{ AFY} \times 5.5\% = 1,580 \text{ AFY})
 \end{array}$$

Water Savings Source #3: Enhanced Water Waste Ordinance Enforcement = 1,492 AFY

Savings from enhanced water waste ordinance enforcement were calculated using:

1. Actual water use reduction per water waste report (0.373 AFY per water waste report) issued by PWP to Water Waste Ordinance violators from 2015-2022 (see documentation in Appendix A); and

² <https://www.sciencedirect.com/science/article/abs/pii/S0921344918301113>



2. Average number of water waste reports for a two-year period (2021-2022) as an estimate for the number of expected violators per year.

Average Water Use Reduction Per Water Waste Report 2015-2022

*

***Anticipated Annual Number of Water Waste Reports Based on 2021 and 2022 =
Water Savings from Enhanced Water Waste Ordinance Enforcement***



$$(0.373 \text{ AFY} / \text{Report} * 4,000 \text{ Reports} = 1,492 \text{ AFY})$$

How Current System Losses were Determined. To determine annual system losses, PWP uses the AWWA Free Water Audit Software v5.0 to guide annual water auditing and to create annual Water Loss Audit Reports. PWP has reported annual distribution system losses as required by Senate Bill 555 and California Code of Regulations Section 638.1 since October 1, 2018, using this software. The AWWA software calculates the water system balance using methodology developed by the International Water Association and approved by the AWWA. PWP's annual water audit consists of identifying, validating, and categorizing all of the volumes of water in the system to calculate the components of the water balance. All water entering the system goes to one of two places: authorized consumption or losses. "Water supplies" and "real losses" are used in the water savings calculations noted above, and these figures were pulled from Water Loss Audit Reports for 2017 through 2020 which are included in Appendix A.

Potential for Reductions in Water Use. The potential for reductions in water use by individuals was determined to be approximately 5.5% of water supplies. This estimate is based on findings from the previously mentioned 2018 research study in *Resources, Conservation and Recycling* (Liu and Mukheibir, Digital Metering Feedback and Changes in Water Consumption – A Review, Vol. 134, pp. 136-148).³ The study reported mean water savings from customer conservation across all the studies of "5.5%, within the 10th–90th-percentile envelope of 3.0%–8.0% savings."

The State of California has proven that customer outreach and public education are effective methods of increasing water conservation, especially during times of drought. PWP intends to conduct customer outreach and education (see strategies described above in the Technical Project Description) to ensure customers know how to interpret AMI water use data in the behavioral analytics software, why conservation is critical, and how it can reduce their water bill. AMI will provide customers with an important new tool: easily-accessible, on-demand, real-time water usage data. This new tool, combined with PWP's proposed customer engagement activities and existing rebates and incentive programs, will encourage and empower customers to conserve water and reduce their water bills.

³ <https://www.sciencedirect.com/science/article/abs/pii/S0921344918301113>

Local or Regional Studies Showing the Potential for Reducing Water Use.

1. City of Pasadena Urban Water Management Plan (UWMP, 2020)⁴: The City of Pasadena's UWMP is updated every five years and is an analysis of long-term water supply and demand planning. It includes a water system description, population and socioeconomic statistics, water supply reliability, drought risk assessment, demand management measures, and climate change impacts. The 2020 UWMP reports that PWP customers are willing to change their water use behavior. Specifically, between 2016 and 2020, single-family residential customers achieved more than a 25% reduction in water demand, most likely due to "the state's conservation measures implemented in 2014 to mitigate drought impacts, as well as social awareness, outreach campaigns by state and water agencies, the economy and weather." As social awareness and outreach campaigns are an integral part of the proposed Project, PWP is confident these efforts will result in increased water conservation.

2. East Bay Municipal Utility District⁵: The District conducted an independent, social norms study (2014) that showed that customers will reduce their water use if they can compare their use to neighborhood averages. Project staff noted that the research shows that Californians are motivated to change their behaviors and to save water when you provide data that shows how their use compares to others. PWP will feed AMI data into the customer behavioral analytics software, which will provide user-friendly, real-time data that includes trends Citywide and by other geographies to help customers understand their water conservation posture compared to their neighbors.

3. Alliance for Water Efficiency⁶: The Alliance conducted an analysis of AMI deployment at four participating utilities including three in California: City of Sacramento, Sacramento Suburban Water District, and San Francisco Public Utilities Commission. The 2023 analysis used hourly AMI data to assess whether the leak notification program resulted in statistically significant reductions in water use, mean leak formation (how often leaks occurred), and mean leak duration (how long leaks lasted) for different programs at all four utilities. Among other findings, the analysis found that timely leak notification programs for single-family homes "resulted in statistically significant reductions in mean leak volume per meter, ranging from a decrease of 29 to 50 percent." PWP's proposed AMI solution will provide data to PWP daily at 15-minute intervals, allowing a significantly faster response to leaks than the current AMR system which provides data monthly or bimonthly depending on the account type.

Meter Description

All PWP's water meters are currently outfitted with communication modules to allow reading by the current AMR mobile reading system. The proposed AMI device will be able to be retrofitted onto some of these AMR-enabled meters. For this Project, an estimated 20,000 water meters

⁴ <https://ww5.cityofpasadena.net/water-and-power/uwmp/>

⁵ <https://www.ebmud.com/about-us/news/press-releases/new-technology-reduces-home-water-use-5-percent>

⁶ <https://www.allianceforwaterefficiency.org/impact/our-work/smart-practices-save-water-evaluation-ami-enabled-proactive-leak-notification#>



installed since 2018 will be retrofitted with an AMI device. The remaining 18,405 water meters installed before 2018 will be replaced, see Table 3. The exact manufacturers and models of the AMI meters and register retrofits will be chosen by the selected AMI vendor. The selected vendor will follow the specifications below.

Table 3: Meter Replacements and Register Retrofits

Water Meter Register Retrofit		Water Meter Replacement	
Size	Number	Size	Number
¾ inch	11,199	¾ inch	10,306
1 inch	6,351	1 inch	5,844
1 ½ inch	1,163	1 ½ inch	1,070
2 inch	949	2 inch	874
3 inch	153	3 inch	141
4 inch	118	4 inch	108
6 inch	52	6 inch	48
8 inch	13	8 inch	12
10 inch	2	10 inch	2
<i>TOTAL</i>	<i>20,000</i>	<i>TOTAL</i>	<i>18,405</i>

Further, the selected vendor's AMI solution must provide the following capabilities:

- Collect daily meter reads and 15-minute or less interval data;
- Provide redundant AMI network coverage for all locations;
- Real-time notifications and alerts for power outages, water leaks/pipe bursts, meter tampering, high voltage, and other vital indicators; and
- Provide engineering data to monitor meter status and service delivery quality.

Process for Verifying Water Savings

PWP proposes to use the following performance measures to quantify actual water savings. The proposed Project Manager (Alex Jang, Associate Engineer) will be responsible for monitoring and recording all performance outputs:

Performance Measure #1: Water Savings from Reduced Consumption and Enforcement

- At least one year of post-Project consumption data will be compared to pre-Project consumption levels to evaluate changes in overall consumption and water use patterns.
- At least one year of post-Project enforcement data will be compared to pre-Project data by examining water use per water waste report issued by PWP.
- Annual AWWA Water Loss Audit data and PWP tracking data will be used for these comparisons.

Performance Measure #2: Water Loss Reduction from Leakage Technology

- Before and after real water loss data will be evaluated using at least one year of post-Project data.
- Annual AWWA Water Loss Audit data includes real water loss estimates, which exclusively include water lost from leaks. This data will be used for comparing trends and analysis after the new AMI meters are installed.



EVALUATION CRITERION B: Renewable Energy

Expected Energy Savings

The AMI Project's estimated energy savings is 7,049,317 kWh per year, as follows:

1. Energy Related to Reduced Imported Water	5,496,320 kWh/year
2. Energy Related to Reduced Groundwater Use	<u>1,552,997 kWh/year</u>
TOTAL ESTIMATED ENERGY SAVINGS	7,049,317 kWh/year

Assumptions.

The AMI Project will result in significant energy savings due to a reduction in energy related to the Project's water savings of 4,294 AFY, described above.

PWP relies on two main of water supply: 1) local groundwater from the Raymond Basin representing 1/3 of the water supply; and 2) imported water purchased from MWD representing 2/3 of the water supply which is sourced from the SWP and the Colorado River.

PWP's Urban Water Management Plan from 2020 (UWMP 2020) defines the water-energy intensity (EI) factor used in the energy savings calculations below. The EI factor is based on recommendations from the California Department of Water Resources (DWR) and is defined as the amount of energy to use a given volume of water within an agency's service area.

Energy Savings Source #1:

Energy Related to Reduced Imported Water = 5,496,320 kWh/year

The 2020 UWMP reports that MWD's water-energy intensity (EI) is 1,920 kWh/AF and includes energy for transportation of the imported supplies from the SWP and Colorado River to PWP. Imported water represents 2/3 of PWP's water supply.

(AMI Project Water Savings * Percentage of Supplies that are Imported)

MWD EI

= Energy Related to Reduced Imported Water



(4,294 AFY x 66.7%) x 1,920 kWh/AF = 5,496,320 kWh/year

Energy Savings Source #2:

Energy Related to Reduced Groundwater Use = 1,552,997 kWh/year

The 2020 UWMP reports that the water-energy intensity (EI) of PWP's local water supply, sourced from the Raymond Basin, is 1,085 kWh/AF and includes energy expended for extraction and diversion, placement in storage, conveyance, and distribution. The groundwater represents 1/3 of PWP's water supply.

(AMI Project Water Savings * Percentage of Supplies from Groundwater)

PWP EI

= Energy Related to Reduced Use of Groundwater



(4,294 AFY x 33.3%) x 1,085 kWh/AF = 1,552,997 kWh/year

Energy Efficiency Improvements' Impact on Climate Change

The energy savings described above directly address climate change. Reducing kilowatt-hours lowers the demand for electricity which is generated from fossil fuels. The fossil fuels used in electricity generation include coal, gas, and oil, and their burning creates CO₂ which is a major source of GHG emissions. Thus, reducing kilowatt-hours reduces GHG emissions.

The United States Environmental Protection Agency (EPA) created a Greenhouse Gas Equivalencies Calculator which converts the amount of energy savings in kWh to avoided CO₂ emissions. The formula is:

Formula for kWh to Avoided CO₂:
kWh x CO₂ Emission Factor = Avoided CO₂

The Emission Factor is specific to the region or electricity source. To calculate emissions avoided, the EPA reports the following emission factor using data from 2021:

CO₂ Emission Factor for Pasadena:

1,540.1 lbs CO₂/MWh x 1 metric ton/2,204.6 lbs x 0.001 MWh/kWh = 6.99 x 10⁻⁴ metric tons CO₂/kWh

Multiplying the previously calculated energy savings in kWh by the local emission factor (above) results in the corresponding CO₂ emissions avoided:

CO₂ Avoided by the Project:

kWh energy saved by the Project x CO₂ Emission Factor = Avoided CO₂



7,049,317 kWh x 0.000699 metric tons CO₂/kWh = 4,927 metric tons CO₂

Project Impact on Pumping Requirements

Due to the water savings associated with the Project, implementation will reduce pumping from the Raymond Basin by **14.5%** resulting in **1,081,080kWh** saved annually due to avoided groundwater pumping. NOTE: These annual savings are incorporated into the larger project energy savings described above, i.e., Energy Savings Source #2.

Assumptions:

The AMI Project will result in water savings of 4,294 AFY, of which 33.3% comes from the Raymond Basin, which equals 1,431 AFY of water saved attributable to reduced groundwater pumping.

Current pumping requirement: Eight (8) active PWP-owned wells pump 9,867 AFY from the Raymond Basin, see Table 4, below (The data presented here is limited to active wells for which exact data is available).

Energy associated with groundwater pumping: 7,452,732 kWh annually; see Table 4, below.

Table 4: Current Groundwater Pumping Requirements and Pumps in Use

Active Well Name	Motor Size Horsepower	Annual kWh	kWh per Acre- Foot	Annual Production Acre-Feet per Year
Arroyo	250 HP	1,296,257	624	2,079
Well 52	200 HP	275,324	492	560
Ventura	125 HP	227,066	343	662
Sunset	200 HP	525,289	454	1,158
Chapman	350 HP	1,570,983	968	1,623
Twombly	450 HP	1,770,056	1,141	1,552
Wadsworth	400 HP	972,828	886	1,098
Woodbury	400 HP	814,930	718	1,135
Totals		7,452,732		9,867

Percentage of Groundwater Pumping Avoided due to the AMI Project: 14.5%

*AFY Water Savings from Groundwater/Total Annual Supply from Groundwater
= Percentage of Avoided Groundwater Pumping Due to the Project*



$$1,431 \text{ AFY} / 9,867 \text{ AFY} = 14.5\%$$

Dividing the groundwater savings by current annual pumping requirements shows that the Project would relieve about 14.5% of groundwater pumping between the eight active wells.

Energy Saved Due to Avoided Groundwater Pumping: 1,081,080 kWh annually

$$\begin{aligned}
 &\text{kWh Annually Due to Groundwater Pumping} \\
 &\quad * \\
 &\text{Percentage of Avoided Groundwater Pumping Due to the Project} \\
 &\quad = \\
 &\text{Energy Saved Due to Avoided Groundwater Pumping} \\
 &\quad \downarrow \\
 &7,452,732, \text{ kWh} * 14.5\% = 1,081,080 \text{ kWh}
 \end{aligned}$$

Energy Savings Origin

The energy savings are estimated from the point of diversion for local water sources and the point of origin for imported water from the SWP and the Colorado River.

Inclusion of Energy to Treat the Water

As described above, water-energy intensity (EI) of PWP's local water supply, sourced from the Raymond Basin, includes energy expended for treatment, as well as extraction and diversion, placement in storage, conveyance, and distribution.

Reduction in Vehicle Miles Driven

The Project will reduce vehicle miles driven by reducing the need for manual meter readings and manual service connections/disconnections. PWP estimates that **0.31 metric tons of CO₂** emissions will be avoided annually due to reduced vehicle miles as a result of the AMI Project.

Assumptions.

- The current AMR system requires PWP field representatives to drive up to 7 miles to reach initial meter reading locations and then drive an assigned route to acquire readings.
- PWP utilizes six vehicles to conduct meter readings across the 26-square mile service area.
- Field representatives drive an estimated 10 miles per vehicle per month to collect meter readings resulting in 120 miles driven annually per vehicle.
- The AMI solution will eliminate 90% of vehicle miles traveled for the purpose of meter readings, and approximately 10% of current vehicle miles traveled will remain for other purposes such as meter maintenance and repairs.
- The EPA's Greenhouse Gas Equivalencies Calculator states that 8.89×10^{-3} metric tons of CO₂ is emitted per gallon of motor gasoline burned.
- Estimated fuel consumption and CO₂ emitted are summarized in Table 5, below.

Annual Metric Tons of CO₂ Avoided Due to Reduced Vehicle Miles Traveled

*

Percentage of Miles Reduced by AMI Solution

=

Reduced CO₂ Emissions as a Result of Reduced Vehicle Miles



*0.341 Metric Tons * 90% = 0.31 Metric Tons of CO₂*

Table 5: Estimated Annual Fuel Consumption for AMR Meter Readings and Associated Annual CO₂ Emissions

Fleet Vehicle	Miles /Gallon	Distance (Miles)	Gallons Consumed (Annually)	CO ₂ Emitted (Metric Tons)
1. 2006 GMC Canyon	20	120	6.0	0.053
2. 2011 GMC Canyon	18	120	6.67	0.059
3. 2012 GMC Canyon	18	120	6.67	0.059
4. 2007 Ford Ranger	24	120	5.0	0.044
5. 2014 Jeep Wrangler	17	120	7.06	0.063
6. 2014 Jeep Wrangler	17	120	7.06	0.063
TOTALS			38.46	0.341

Renewable Energy Components

PWP will implement an AMI solution with redundancies. One of the redundancy layers is solar power for data collectors which are key network infrastructure. Solar redundancy is an efficient and sustainable strategy that will ensure seamless operation of the AMI system and water availability during electrical outages.

EVALUATION CRITERION C: Other Project Benefits

Resilience and Sustainability Benefits.

Drought Conditions and Project Impact. Although the City is not currently experiencing drought conditions, about 75% of the State is currently classified as being abnormally dry or in a moderate drought per the U.S. Drought Monitor. Historical data and ongoing extreme weather changes – such as the recent unusual, recording-breaking heat wave in Southern California (see Fig. 4) – point to the likelihood of future drought.

Recent And Historical Drought Conditions in Pasadena. Historical data point to cyclical drought patterns in Los Angeles County, with indications that conditions have been gradually worsening over time. Data from the National Integrated Drought Information System's (NIDIS) Historical Data and Conditions database (see Fig. 5) show cyclical drought periods going back more than 100 years. Three of these recent and substantial drought periods were: 2006-2008, 2011-2018, and 2020-2022.

The latest drought (2020-2022) resulted in the State's driest three-year period on record. As a result, in 2021, the Governor declared a statewide Drought Emergency and called for residents to voluntarily reduce water use by 15%. The City initiated watering restrictions to help meet the Governor's 15% objective.

The 2012-2018 drought created significantly harsh effects due to a combination of dry weather and extreme temperatures in Southern and Central California, indicating that climate change (namely its impact on rising temperatures) was likely a contributing factor. In January 2014, the Governor declared a statewide Drought Emergency, urging customers to cut water use by 20% and directing State and local officials to take all necessary actions to prepare for the severe drought conditions. As a result, all State Water Project deliveries throughout California were cut to zero for the year, which affected Pasadena and 29 other public water agencies that buy State Water Project water for about 25 million Californians.

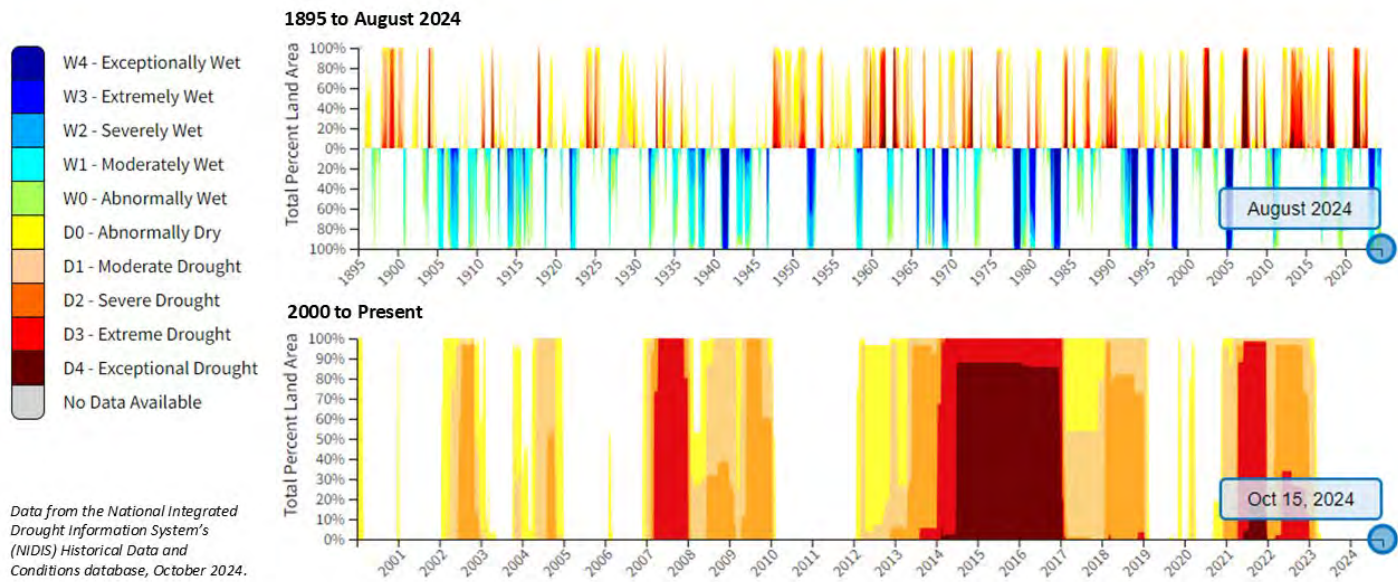
The 2007-2010 drought resulted in MWD cutting its allocation to Pasadena by 10% and imposing surcharges on all member cities, including Pasadena, if they did not meet water conservation targets. To maintain and increase groundwater levels in response to the drought and associated pressures, in 2009, the Raymond Basin Management Board initiated a voluntary 30% reduction

Fig. 4: National Weather Service Twitter post about record-breaking October 2024 heatwave in Los Angeles County



of groundwater production for all pumpers in the Pasadena Subarea (the voluntary reduction continues for the Pasadena Subarea; in addition, in July 2023 a voluntary 24% reduction of groundwater production was initiated for all pumpers in the Monk Hill Subarea of the Raymond Basin). In response to MWD water supply limitations and reduced local groundwater, the City implemented both temporary and permanent citywide water restrictions.

Fig. 5: Historical Drought Conditions in Los Angeles County, CA



Local Impacts of Drought

Impact on the Local Water Supply

Droughts, increased impervious surfaces, pumping, and climate change have all contributed to more than 100 years of decreasing groundwater levels in the Raymond Basin (2020 PWP Water System and Resources Plan⁷). Drought, specifically, has reduced rainfall providing less water for PWP's spreading grounds to recharge the groundwater. The impact of drought on PWP's local water supply cannot be overstated. When imported water is interrupted due to an emergency such as drought, regulatory constraints, contamination, or earthquake, the local groundwater is the only supply available to meet the City's water demands. While the resiliency of all water supplies is important, the resiliency of the local supply is critical. AMI enhances resiliency of PWP's local supply by reducing demand for local supplies which keeps more water in the Basin.

Impact on the Local Watershed

The resiliency of the groundwater is directly connected to the resiliency of the watershed. The PWP service area is within the Los Angeles River watershed and is divided across three tributaries. The western portion of the service area drains to the Arroyo Seco, and the eastern portion drains to Eaton Wash. To protect the quality of its surface water supplies, PWP purchased portions of the Arroyo Seco and Eaton Wash watersheds in the 1920s. PWP diverts mountain runoff from

⁷ <https://pwp.cityofpasadena.net/wp-content/uploads/2021/09/WSRP-Final-Report-Dec-2020-Rev-9.21.21.pdf>

Arroyo Seco to the Arroyo Seco Spreading Grounds and from Eaton Wash to Eaton Wash Spreading Grounds; in turn, these spreading grounds recharge the groundwater. Continued drought conditions, not only lessen the amount of water available in the watershed to recharge the Raymond Basin, but may also permanently damage the watershed. A 2021 study⁸ found that presumption of precipitation after a drought may not return a watershed to its pre-drought state. In fact, researchers observed that some watersheds remained in a drought-like state with low-runoff conditions even after drought conditions abated.

Impact on the City's Green Assets

Drought has devastating impacts on the City's green assets. Pasadena has 24 parks and open spaces that provide important outdoor recreation and green space in a dense urban city. Among these is the Arroyo Seco, which includes eight miles of protected stream and canyon that spans through the western portion of the City and supports thriving natural ecosystems that include several native plant communities and provides shelter, food, and nesting sites for hundreds of wildlife species. The Arroyo Seco was recently included in the National Register of Historic Places, placing it among the nation's top cultural resources. The City also has a thriving urban forest which consists of more than 60,000 trees. The City's tree canopy analysis found that more than 28% of the City is covered by tree canopy, with over 18% of that canopy located within public right of ways.⁹ The urban forest provides a multitude of benefits including, carbon sequestration, improved air quality, decreased stormwater runoff, reduced heat island affects, and more. Drought has devastating impacts on these green assets. Trees and vegetation may be stressed or die due to reduced rainfall and limited watering. Stress on trees and shrubs can make them more prone to pests and diseases. In large open spaces like the Arroyo Seco, drought can increase the likelihood of large-scale wildfires.

Forecasted Drought Conditions in Pasadena. Though recent weather conditions have relieved the most acute drought emergency in Southern California, the region's drought problems are far from over. Rapid swings in weather, such as the current record-breaking heatwave, mean that drought conditions could return as early as next year. Multiple regional studies have attempted to model forecasted drought trends, including:

- Climate Change in the Los Angeles Region Project (CCLARP)¹⁰;
- Los Angeles Basin Stormwater Conservation Study (LABSCS)¹¹;
- Bureau of Reclamation's Los Angeles County Basin Study¹²; and
- NIDIS's Drought in Southern California¹³.

⁸ <https://pubs.aip.org/physicstoday/online/4823/Droughts-may-permanently-change-watersheds-and>

⁹ https://proceedings.esri.com/library/userconf/proc09/uc/papers/pap_1042.pdf

¹⁰ https://research.atmos.ucla.edu/csrl/LA_project_summary.html

¹¹ U.S. Bureau of Reclamation. 2014. Los Angeles Basin Stormwater Conservation Study - Task 2 Water Supply & Water Demand Projections.

¹² <https://cawaterlibrary.net/document/los-angeles-basin-study/>

¹³ <https://www.drought.gov/drought-status-updates/drought-status-update-california-nevada-2024-10-17>

Among these studies, there is a consensus that temperatures in the region are projected to rise. The NIDIS study stated, "... all climate models predict significant warming in the next century." Warmer temperatures will impact evaporation rates in surface waters, leading to increased loss in water supplies.

Future projections of precipitation in California are uncertain due to precipitation's complex interplay as a hydroclimatic response to GHG emissions and other environmental factors. Regardless of whether precipitation increases or decreases, rising temperatures and an anticipated increase of intense storms and extreme weather events could create altered patterns of increased water supply at infrequent times, resulting in critical seasonal droughts at certain times of the year, even if total precipitation remains unchanged.

AMI As a Direct Response to Drought. Pasadena's proposed AMI Project directly addresses drought concerns in the following ways.

1. Faster leak detection and repair saves local and imported water and promotes drought resiliency. AMI's real-time data transmission will allow PWP staff to identify and repair leaks faster, reducing water loss.

2. Real-time usage data supports enhanced water conservation behavior among customers. Improved data accessibility will allow customers to observe their consumption habits, enabling them to make better-informed decisions about where to make cut-backs. PWP staff will also be able to assess water consumption data to develop targeted marketing and educational efforts for water conservation and drought response plans.

3. Increased customer water conservation and reduced water loss due to leaks will reduce pressure on groundwater supplies, and promote the resiliency of the watershed and the local groundwater. Likewise, increased customer conservation will reduce pressure on imported supplies and promote the resiliency of that important regional resource.

4. Support Pasadena's Water Waste Ordinance by quickly alerting PWP to violations instead of relying on public reporting of observed violations.

Issues Impacting Energy Sustainability and Project Impact. Pasadena's energy sustainability issue is reliance on fossil fuel energy sources which emit GHGs. The City's air quality is very poor with airborne concentrations of PM2.5 particulate in some Census Tracts ranking among the 99th percentile nationwide (see CEJST summary, below). The 2024 State of the Air¹⁴ report from the American Lung Association gave Los Angeles County a grade of F on the number of high ozone days and an F on particle pollution. Compared to other counties nationwide, Los Angeles County ranks 3rd worst for ozone and 14th worst for year-round particle pollution.

In 2023, the City Council of the City of Pasadena formally declared that climate change is an emergency that threatens the health and welfare of the City, region, state, nation, and the environment (Resolution No. 9977¹⁵). Energy sustainability is a key driver of the emergency declaration (along with water conservation, sustainable mobility and land use, and urban

¹⁴ <https://www.lung.org/research/sota/city-rankings/states/california>

¹⁵ <https://pwp.cityofpasadena.net/wp-content/uploads/2024/02/AR-5-ADOPTED-RESOLUTION-NUMBER-9977.pdf>

greening). The emergency declaration set a policy goal to source 100% of the City's electricity from carbon-free sources by the end of 2030. Other actions taken by the City to date include:

- 2018. The City adopted a Climate Action Plan (CAP),¹⁶ and the City has already implemented several recommended actions including: a commitment to procure only low carbon generating resources, commitment to phasing out all fossil fuel contracts, and offering a 100% renewable Green Program rate option for PWP customers.
- 2023. The City adopted a revised Integrated Resource Plan¹⁷ for power which incorporated the Emergency Declaration noted above and outlined strategies to meet the carbon reduction goals including AMI, distributed energy sources such as community solar, and others.
- Additional actions via ordinances and policies: promotion of electric vehicle technology (Pasadena now has one of the highest percentages of registered EVs in the nation); requirement to include electrification in new building designs; prohibiting the use of gas-powered leaf blowers; enhanced adoption of energy efficiency programs; and increasing outreach to residents on energy efficiency and emissions reduction.

As of 2023, the City has achieved sourcing 40% of their power from renewable sources; however, the remaining 60% still relies on fossil fuels. City departments are seeking every avenue to deploy renewable energy alternatives. For the proposed Project, PWP will implement an AMI solution with redundancies. One of the redundancy layers is solar power for data collectors which are key network infrastructure. The AMI solution will also eliminate the need to drive to customer locations for meter reads, connecting/disconnecting service, etc. PWP estimates that the AMI solution will result in a 90% reduction in field visits annually (see Table 5, above), which will result in annual reduced carbon emissions of 0.31 metric tons of CO₂.

More Efficient Management of the Water Supply. The AMI Project will improve management of the water supply by:

- Improving meter accuracy and providing accessible real-time water use data to PWP;
- Accelerating detection of leaks and actions to mitigate water loss;
- Providing the technology to effectively collect, store, and manage the large quantity of newly available data and reduce systematic data handling errors; and
- Providing detailed customer usage data to target conservation efforts for maximum impact.

The average apparent loss from 2017 to 2020 was **775 AFY**. Apparent losses are non-physical water losses that occur due to unauthorized consumption, customer metering inaccuracies, and data handling errors, which are all water management issues. With real-time data from the AMI system, PWP can address each of the issues driving apparent losses. See Appendix A for Water Loss Audit Reports from 2017 to 2020 for the source of this data.

Uses of the Water Conserved by the Project. The 4,294 AFY of water that will be conserved as a result of the Project will:

¹⁶ <https://www.cityofpasadena.net/planning/planning-division/community-planning/climate-action-plan/>

¹⁷ <https://pwp.cityofpasadena.net/powerirp/>

1. Supplement the groundwater in the Raymond Basin. Water savings from AMI will offset the need for groundwater supplies, reduce groundwater pumping from the Basin, and support the long-range sustainability of this important groundwater source. The Raymond Basin is a 40-square-mile natural aquifer that underlies much of Pasadena, Altadena, Sierra Madre, and part of Arcadia. The Basin's water comes from surface water in the San Gabriel Mountains and has a total storage capacity of 1,450,000 acre-feet. The Raymond Basin serves 15 agencies including the cities of Pasadena, Arcadia, Alhambra, Sierra Madre, and various irrigation districts and water companies. The Basin's groundwater levels have been steadily decreasing for the last 100 years which is an indicator of drought, over-pumping, and a reduction of the Basin's groundwater supply. Water saved by the Project will remain in the Basin and will directly benefit the Basin itself and all Basin member agencies. See the attached letter of support for the Project from the Raymond Basin Management Board.

2. Reduce demand on imported supplies. Water savings from AMI will also reduce deliveries of imported water from the State Water Project and the Colorado River via MWD. The Colorado River Basin recently experienced a decades-long mega-drought resulting in the driest 23-year period in more than 100 years. Drought conditions have abated, and water levels are the highest they have been in three years. However, Reclamation's 24-month operation plan estimates levels would steadily drop over the remainder of 2024, ending 17 feet lower by December. In 2025, the projection estimates that water levels may be at its lowest since the 1930s, when the lake was filled. Restrictions on State Water Project deliveries by federal court orders due to endangered Delta Smelt and other species have further increased pressure on MWD's ability to meet demands and refill regional storage. See the attached letter of support from MWD.

Both sources of PWP's water supply (groundwater and imported water) are in jeopardy and are vulnerable despite the ending of the most recent drought. Though the region had a wet winter in 2024, the Raymond Basin and the Colorado River have not fully recovered, and it will be many years before these water sources return to their optimal conditions. Local efforts to conserve water (such as the proposed Project) help reduce overall demand and pressure on these resources.

No additional mechanism will be needed to distribute the conserved water for its intended use. The conserved water will enhance the Raymond Basin's groundwater supply and reduce the need to purchase imported MWD water.

Support for Compliance with Interstate Compacts. The interstate compact regarding management of the Colorado River is still being negotiated. California, Nevada, and Arizona submitted a plan earlier this year to cut California's portion by about 10% in most years. Given PWP's reliance on imported water from the SWP and the Colorado River, it is imperative to reduce demand on imported supplies. The proposed Project will indirectly help the State of California with compact compliance by conserving groundwater and reducing demand on imported supplies from the Colorado River.

Support to Prevent Water-Related Crisis or Conflicts. At the local and regional level, the Project will help prevent depletion of groundwater in the Raymond Basin during times of water scarcity. The Raymond Basin serves 15 agencies including the cities of Pasadena, Arcadia, Alhambra, Sierra Madre, and various irrigation districts and water companies, all vying for finite groundwater resources. While there are no current tensions or crises, frequent droughts in California increase the potential for water-related tension and crises. Conserving water and supplementing groundwater with the Project's water savings will help mitigate future tension and crises among these member agencies.

Ecological Benefits

Benefit on Federal or State Species of Importance. By reducing imports from the State Water Project and the Colorado River, the Project will support species of interest in those ecosystems. The Project will indirectly support and protect the Bay-Delta Estuary (a source of PWP's imported water via the State Water Project). The Bay-Delta is the largest estuary on the west coast of North America. It is a four-million-acre watershed that supports over 700 plant, fish, and wildlife species including several species that are listed as endangered or threatened. Examples include:

Delta Smelt (Federal and State Endangered). The endangered Delta Smelt was once one of the most abundant fish species in the Bay-Delta. According to the U.S. Fish and Wildlife Service, cyclical and severe drought over the last 20 years has pushed the Delta Smelt closer to extinction. Surveys by both federal and State agencies indicate the population is now at an all-time low. In 2024, for the sixth year in a row, the State's Department of Water Resources has found no Delta Smelt in the estuary. The Delta Smelt are considered an "indicator" species, and their abundance reflects how well the Delta's aquatic environment is functioning including other species.

Longfin Smelt (Federal Endangered and State Threatened). The main cause of their declining population is habitat loss, primarily due to long-term reductions and alterations in freshwater flow into the estuary. The threats facing Longfin Smelt also impact other wildlife species that rely on Longfin Smelt as a food source.

Green Sturgeon (Federal Endangered and State Threatened). The Green Sturgeon is an ancient fish species on the brink of extinction from overharvesting and rapid habitat change. Among the largest, longest-living fish in freshwater, sturgeon can reach seven feet long, weigh 350 pounds and survive to be 70.

In addition, the Project will also indirectly support and protect the Colorado River (also a source of imported water). The Colorado River basin is home to four native fish species which are now federally endangered or threatened:

Endangered: Colorado Pikeminnow, Razorback Sucker, and Bonytail

Threatened: Humpback Chub

These species evolved in the Colorado River basin and exist nowhere else on earth.

Saved Water will Remain in the System. AMI technology will reduce water lost to leaks. This water that would otherwise seep into the ground (but not reach the groundwater), will remain in the local groundwater system due to reduced demand and thus reduced groundwater pumping. Similarly, water saved will also offset imports from the SWP and the Colorado River and keep water in those systems. Keeping water in local groundwater and in the SWP and Colorado River will add to the long-term sustainability of these supplies and enhance their resiliency in the face of future drought periods.

Improvement of Species Status. As described above, decreasing withdrawals on the local groundwater, SWP, and Colorado River keeps more water in those systems. Keeping water in those systems will only benefit the endangered and threatened species noted above. Habitat loss due to drought and reduced water levels, and warming waters due to temperature increases driven by climate change, may be mitigated by reducing withdrawals and keeping more water in these systems.

Other Ecosystem Benefits.

Protect Bird Migration Patterns. Reduced water levels in the Bay-Delta Estuary and Colorado River can affect birds' migratory patterns due to loss of habitat, loss of habitat suitability, and declining food sources. PWP's anticipated water savings represent one part of the larger effort that will be required to preserve these critical water resources and the species they serve.

Improve Water Quality. Reduced water levels can deteriorate water quality by increasing dissolved oxygen and concentrating pollutants and other contaminants. Keeping water in these systems will preserve or improve water quality.

Protect the Food Web. Reduced water levels can impact the entire food web as habitat and food sources become limited for aquatic organisms, which can have ripple effects throughout the food chain. Keeping water in these systems supports all levels of the food web.

Climate Change

Project Addresses Climate Change. In the coming decades, climate change is projected to shrink the amount of water California can deliver in an average year. The Governor's long-term water plans call for California to prepare for an estimated 10% decrease in the State's water supply by 2040. PWP's 2020 Urban Water Management Plan echoes this warning and identifies prioritized climate change vulnerabilities for PWP and its customers, see Fig. 6. The Project will address three of the five high priority vulnerabilities outlined in red in Fig. 6, as follows:

1. Meeting water conservation goals. In 2024, the State adopted water conservation goals that call for cities and towns to cut water use by about 500,000 AFY by 2030. To meet this goal, PWP will need to implement a portfolio of diverse strategies to both save water and reduce use. The proposed Project accelerates leak detection and repair, thereby reducing water loss. The Project also incorporates real-time data accessibility for customers along with customer engagement strategies to encourage and enhance water conservation behaviors.

Fig. 6: Prioritized Climate Change Vulnerability Issues for PWP

Level	Vulnerability
High	- Decreased ability to meet water conservation goals - Reduced resiliency to drought - Municipal water demand would increase - Decrease in imported water supplies (from impacts to the Bay-Delta system) - Increase in wildfire risk and erosion and sedimentation which may impact water quality, flood control, and habitat
Medium	- Invasive species can reduce water supply available, alter flood regimes, and alter wildfire regimes - Decrease in local surface water supply - Increase in nutrient loading and decreased Dissolved Oxygen - Decrease in dilution flows - Increase in source control or surface water treatment - Increased impacts to habitat and flow availability for species
Low	- Limited ability to meet higher peaks in water demand (both seasonally and annually) - Habitat water demand would increase - Increases in inland and flash flooding

Source: PWP 2020 Urban Water Management Plan

2. Increasing resiliency to drought. The Project will enhance drought resiliency by keeping more water at its source. By reducing water loss due to leaks and enhancing customer water conservation behaviors, the Project offsets groundwater pumping. This maintains a higher water level in the Raymond Basin and extend the water supply through times of drought when replenishment is limited. The Project will also reduce import pressures on the SWP and the Colorado River. Every city that uses these water resources must play their part in protecting them. The Project will also improve PWP's water management capabilities further increasing resiliency.

3. Reducing pressure on imported supplies. PWP estimates that the Project will result in 4,294 AFY in water savings. That water savings will decrease pressure on imported supplies from the SWP and the Colorado River.

Improved Ecological Resiliency to Climate Change. The Project will indirectly improve ecological resiliency to climate change. PWP's water sources include the SWP and the Colorado River, and both of these ecosystems are under tremendous pressure from decades of drought, extreme weather, and other climate change impacts. As described above, by reducing imports from these vulnerable sources, the Project will:

Support Endangered and Threatened Species. The Project will protect species of interest by reducing imported supplies. Endangered and threatened species in the Bay-Delta Estuary include Delta Smelt, Longfin Smelt, and Green Sturgeon; endangered species in the Colorado River include Colorado Pikeminnow, Razorback Sucker, and Bonytail.

Protect Bird Migration Patterns. Reduced water levels in the Bay-Delta Estuary and Colorado River can affect birds' migratory patterns due to loss of habitat, loss of habitat suitability, and declining food sources. PWP's anticipated water savings represent one part of the larger effort

that will be required to preserve these critical water resources and the species they serve.

Improve Water Quality. Reduced water levels can deteriorate water quality by increasing dissolved oxygen and concentrating pollutants and other contaminants. Keeping water in these systems will preserve or improve water quality.

Protect the Food Web. Reduced water levels can impact the entire food web as habitat and food sources become limited for aquatic organisms, which can have ripple effects throughout the food chain. Keeping water in these systems supports all levels of the food web.

Project Mitigates Air and Water Pollution.

Air Pollution. The Project will mitigate GHG emissions resulting in 4,927 avoided metric tons of CO₂ associated with:

1. Reduced groundwater pumping.
2. Reduced water transportation energy associated with bringing imported supplies from the SWP and the Colorado River to Southern California.
3. Reduced energy related to water treatment (due to less volume of treated water).
4. Reduced vehicle miles traveled by PWP for manual meter readings.

Water Pollution. Reduced water levels in the SWP and the Colorado River can deteriorate water quality by increasing dissolved oxygen and concentrating pollutants and other contaminants. Keeping water in these systems will support improved water quality.

Project Includes Sustainable Infrastructure. Two Project components are considered sustainable infrastructure which will improve climate resilience.

1. AMI. The Project will replace the outdated AMR system with AMI smart meters which will provide frequent and accurate daily water use data at intervals of 15 minutes or less. As a result, the AMI meters will improve climate resilience by rapidly detecting leaks, allowing quicker response, and thus preventing excessive water loss. The accessibility of real-time data will also enhance customer water conservation behaviors. The outcomes will keep more water at its source (i.e., the Raymond Basin, SWP, and the Colorado River).

2. Solar Redundancy. For the proposed Project, PWP will implement an AMI solution with redundancies. One of the redundancy layers is solar power for data collectors which are key network infrastructure. Solar redundancy is an efficient and sustainable strategy that will ensure seamless operation of the AMI system and water availability during electrical outages.

Other Climate Resiliency Contributions. An additional benefit of AMI is the ability of PWP to quickly identify customers who violate water use restrictions. Water use restriction violations account for 1,492 AFY in water overconsumption that could be avoided. Currently, enforcement actions are the result of resident reports or meter use data that are potentially a month (or more) old. PWP estimates that improved enforcement efforts using real-time AMI data could result in enforcement warnings that would reduce consumption by 5.5%.



EVALUATION CRITERION D: Disadvantaged Communities and Tribal Benefits

Subcriterion D.1. Disadvantaged Communities

Pasadena's Disadvantaged Communities. Eight Census Tracts within the PWP water service area are disadvantaged according to the Climate and Economic Justice Screening Tool (CEJST, see sidebar and Fig. 7). The population of all disadvantaged Census Tracts combined is 41,077, which represents 30% of the City's total population. These Census Tracts are primarily clustered in the Northwest quadrant of the City, which is a highly-diverse area (80% of residents are non-white) and extremely low-income. In the Northwest quadrant, eligibility for the federal Free or Reduced Price Meal Program (a poverty indicator) is as high as 90% (for Madison Elementary, 2023-24).

These disadvantaged communities and their residents face numerous additional challenges:

Poor air quality. Pasadena faces extremely high vehicular emissions with diesel particulate matter ranking in the 90th percentile relative to other Census Tracts in the nation. Three of the eight disadvantaged Census Tracts are directly adjacent to the 8-lane Foothill Freeway (I-210/SH134) with an average daily traffic count of 125,000 (per the California Department of Transportation), and the other Tracts are located within two miles of this heavily congested corridor.

Health disparities. The Northwest quadrant of the City experiences less healthy conditions compared to the rest of the City (2022 Greater Pasadena Community Health Needs Assessment¹⁸) with low life expectancy ranking in the 95th percentile.

CEJST Summary for Pasadena, CA

Disadvantaged Census Tracts in Pasadena:

- 1) 0603746.1502
- 2) 0603746.2002
- 3) 0603746.2001
- 4) 0603746.2100
- 5) 0603746.1901
- 6) 0603746.2201
- 7) 0603746.2301
- 8) 0603746.2500

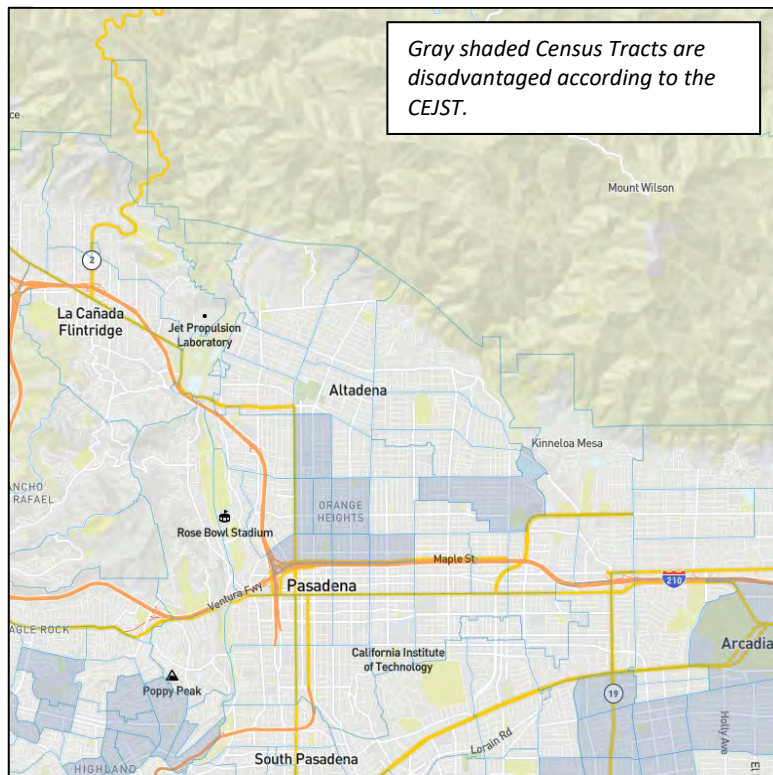
Disadvantaged Population: 41,077 residents (**30%** of the City's 138,699 population)

Burden Thresholds (percentile ranking):

Low Income (**69th** to **93rd**)
 PM 2.5 (**93rd**)
 Low Life Expectancy (**95th**)
 Proximity to Superfund Site (**90th**)
 Linguistic Isolation (**92nd** to **95th**)
 Housing Cost (**91st** to **99th**)
 Transportation Barriers (**94th** to **99th**)
 Traffic Proximity and Volume (**99th**)
 Education Less than HS Diploma (**10-45%**)

¹⁸ <https://www.cityofpasadena.net/public-health/wp-content/uploads/sites/32/2022-Community-Health-Needs-Assessment.pdf>

Fig. 7: Pasadena's Disadvantaged Census Tracts



Source: Climate and Economic Justice Screening Tool (CEJST)
<https://screeningtool.geoplatform.gov/en/#3/33.47/-97.5>

High housing costs. Low inventory, high demand, and median rent (\$2,284/month) that is 15% higher than the rents statewide¹⁹ place additional significant burdens on residents, especially the City's low-income residents. Housing costs in these Census Tracts rank as high as the 99th percentile.

Proximity to contaminated groundwater. Some of the disadvantaged Census Tracts are also located within five kilometers of the NASA Jet Propulsion Laboratory site which is a federally listed superfund site due to groundwater contamination with perchlorate and other chemicals from spacecraft construction activities conducted from the 1940s through the 1960s.

Other burdens. Among the City's strengths is its diversity. In addition to English and Spanish, many languages are represented in the City including: Asian languages (e.g., Mandarin, Cantonese, Korean, Tagalog, etc.) and Indo-European languages (e.g., Armenian, Dutch, French, Russian, etc.). Linguistic isolation is an issue in Pasadena where 42.7% of households speak a language other than English, and less than 15% speak English "less than very well."¹⁸ Additionally, educational attainment is low in these Census Tracts, with the percentage of residents having less than a high school diploma ranging as high as 45%.

¹⁹ https://data.census.gov/profile/Pasadena_city,_California?g=160XX00US0656000#housing

Project Benefits for the Disadvantaged Communities. The impact of climate change, drought, water shortages, and increasing water rates are greatest on disadvantaged populations simply because of those populations' inability to manage the impact on their daily lives due to the multitude of other burdens they face. The CEJST Summary (see sidebar, above) shows that disadvantage burdens on these eight Census Tracts are estimated among the worst in the nation (90th percentile or above). The lack of disposable income is a major constraint in the ability of disadvantaged residents to withstand the immediate impacts of climate change. According to the National Hazards Center, people on the margins suffer first and worst, and factors such as race, linguistic competence, education, and income determine who is hit hardest and who recovers fastest. The Project will directly benefit all PWP customers, but Pasadena's disadvantaged customers may benefit the most simply because their buffer of resiliency is so narrow. Benefits will include the following:

Real-Time Usage Monitoring. By leveraging the capabilities of smart meters and real-time data analytics, AMI can address many of the challenges faced by low-income households in managing their utility expenses. The Project will empower residents to track their water usage and make informed decisions regarding usage and conservation. When residents have more insight into their water consumption patterns, they can be empowered to adopt more water-efficient practices such as reducing consumption during periods of drought.

Early Leak Detection. One of the primary advantages of AMI for low-income residents is the ability to detect and address leaks promptly without wasting limited water resources and avoid unexpected spikes in utility bills.

More Accurate Billing. Real-time and more precise measurements also enable more accurate billing mechanisms. The current metering system requires some manual readings to estimate monthly water usage. AMI systems allow utility companies to charge based on actual usage. This transparency in billing can help alleviate financial burdens among low-income households by ensuring that they are charged accurately for services they receive.

AMI Mechanisms Support Non-English Speaking Customers. The AMI systems incorporate features such as mobile apps or online portals which can make billing easier for non-English speakers because translation services are more readily available.

Early leak detection may be a convenience for most residents, but it may represent the deciding factor on whether a disadvantaged household can pay their water bill. Benefits such as early leak detection, the ability to monitor consumption, and more accurate billing to prevent unfair charges for water they did not use—will be especially critical for the City's disadvantaged customers.

Subcriterion D.2. Tribal Benefits

This Project does not directly serve a Tribe; therefore, Tribal benefits are not applicable to this Project.

EVALUATION CRITERION E: Completing On-Farm Irrigation Improvements

This criterion is not applicable to the proposed Project.

EVALUATION CRITERION F: Readiness to Proceed

Summary of Major Tasks

Activities Completed Prior to Reclamation-Funded Project

Procurement. PWP will competitively procure the services of an expert vendor who will select, purchase, and install the entirety of the AMI solution including the proposed initial deployment phase. Procurement activities are not part of the Reclamation-funded Project. PWP initiated procurement activities in October 2024; procurement will be complete in November 2025 prior to the initiation of the initial deployment phase in December 2025.

Environmental. PWP expects to file a Categorical Exemption pursuant to CEQA Title 14 (California Code of Regulations), Chapter 3, Article 19, Section 15302c, and a Categorical Exclusion pursuant to NEPA because the Project will result in minor retrofit activities and will utilize existing facilities.

- CEQA: PWP expects the Project to be classified as a Class I project which consists of the “operation, repair, maintenance, permitting, leasing, licensing, or minor alteration of existing public and provide structures, facilities, mechanical equipment, etc.” (Section 15301, Existing Facilities, part b). Section 15301 states that “existing facilities” include “...publicly-owned utilities used to provide electric power, natural gas, sewage, or other public utility services.”
- NEPA: PWP expects the Project to meet the definition of Categorical Exclusion: “minor construction activities associated with authorized projects which...merely augment or supplement...” and “maintenance, rehabilitation, and replacement of existing facilities...”

PWP will complete and file this paperwork in June 2025 (prior to the start of the Reclamation-funded Project in October 2025) to allow six months for approval before the initial deployment phase begins in December 2025.

Grant Task 1: Project and Grant Management

Kickoff Meeting with BOR. PWP’s assigned Project Manager (Associate Engineer Alex Jang) will work with PWP officials to execute the grant agreement with Reclamation. Once the grant agreement is complete, the Project Manager will coordinate a kickoff meeting with PWP staff. Reclamation officials

Project Reporting and Invoicing. The PWP Project Manager will be responsible for semi-annual reporting to Reclamation (or whatever frequency is determined in the grant agreement). Reports will include Financial Reports and Program Performance reports, as well as Financial Reimbursement Requests using the online ASAP system through the System for Award Management (SAM). Report contents will be in accordance with the requirements included in the grant agreement. The Project Manager will also be responsible for responding to ad hoc requests for information from Reclamation, providing all requested information and documentation for grant compliance, and conducting all Project closeout activities.

Performance Monitoring. The PWP Project Manager will be responsible for collecting the performance monitoring data outlined below in the section Performance Measure. Briefly, these include: 1) water savings from reduced consumption; 2) water loss reduction from avoided leaks; 3) water savings from reduced metering inaccuracies (these are apparent losses, not physical losses, and represent improved water management); 4) increased energy savings; and 5) reduced GHG emissions. These data will be included in the semi-annual reporting to Reclamation. The Project Manager will also monitor the Project's budget and schedule, the vendor's activities and responsibilities, coordinate PWP staff training with the vendor, and coordinate mobilization activities including warehousing for Project materials, parking and office space for the vendor, etc.

Grant Task 2: Customer Engagement

The Project will begin with community engagement to ensure customers are aware of the schedule for forthcoming AMI installation at their homes and businesses and what AMI will mean for water conservation and potential reductions in their water bill. PWP will conduct all engagement activities and will include the following:

- Dedicated AMI page on the PWP's website that includes the installation schedule, a list of benefits of AMI, instructions for customers on how to monitor their usage, Frequently Asked Questions, etc. The webpage will remain online for continuous access to this critical information.
- Educational inserts in customer water bills;
- Engagement on social and traditional media;
- Press releases from the City Manager's Office;
- Informational webinars; and
- Tabling and presentations at community meetings, events, and festivals.

Dedicated time is included in the Project budget for PWP staff to coordinate and execute the community engagement activities.

Grant Task 3: Initial Deployment Phase

The vendor will conduct the 18-month initial deployment phase. The initial phase will test and validate the new AMI solution, and will require the full installation of software, network equipment, AMI communication equipment, and system integration. The initial deployment phase will include:

- Final Project design and permitting (if required, see description below);
- Install a sub-set of AMI meters; the exact number will be selected by the vendor (likely to be 500-1,000);
- Install AMI Head-end System;
- Construct the AMI Network based on a network propagation model that identifies locations for network equipment installation; and
- Full system integration and testing. All network and software installation and integration

will be required to validate the AMI network performance and head-end functionality. The vendor will conduct test cases once the initial meters, systems, and integrations are fully in place. These test cases will verify AMI system and meter configurations, AMI network communications, meter data delivery, head-end functionality, and integrations. Once all the tests have been successfully executed and the expected results are met, a formal system signoff will be given by PWP, and the Project will be allowed to proceed with mass deployment of the remaining meter replacements and retrofits.

Grant Task 4: Training for PWP Staff

The Project Manager will coordinate training for PWP staff towards the end of the initial deployment phase, and training activities will be scheduled periodically through October 2028. The vendor will conduct the trainings, and some of these will be train-the-trainer efforts, where PWP staff will then train other PWP staff. The trainings will include:

AMI Overview Training. This training will provide a high-level understanding of how the AMI components work together to collect meter reads for billing, key functions such as remote connect/disconnect and outage/leak notifications, and other key usage information.

AMI Administrator Training. Provided to staff assigned to administer the AMI system.

AMI Operator Training. The AMI operator training focuses on monitoring meter reads, usage reporting, alert/alarm notifications, and troubleshooting. It will be provided by the AMI vendor in a train-the-trainer format.

Network Communications Training. This training may be combined with the AMI Administrator training with a specialized focus on the field network equipment and communication configurations.

Meter Configuration Training. Meter Configuration training provides the skills needed by PWP to create and load meter programs according to the meter types and engineering informational needs.

Grant Task 5: Mass Deployment Phase

Authorization to Proceed. Mass deployment of the AMI meters will take 18 months, starting in May 2027 with completion in October 2028. Mass deployment of the meters will be executed by the vendor and will begin after completion of the 18-month initial deployment phase and formal system signoff by PWP.

Replacement and Retrofit of Water Meters. The vendor will develop a deployment strategy to determine the meters to be exchanged or retrofitted, and the deployment will be conducted with the support of a PWP Water System Crew Supervisor. Typically, meters are exchanged by read route, which decreases the reading of drive-by AMR meters as routes are converted to AMI. If possible, exchanging a customer's electric and water meter simultaneously will minimize the customer's service interruptions. The vendor will replace water meter lids, as necessary.

Temporary Hybrid System. During the AMI mass deployment, the legacy AMR systems will need to remain operational for approximately two years to maintain continuity in billing. During the AMI mass deployment, both the AMR and AMI systems will provide meter reads for customer billing. Throughout the AMI mass deployment, new AMI meters will replace the AMR meters until all the old meters have been replaced. Once the final functional acceptance test has been signed off and billing is being performed using AMI meter reads, a plan will be developed for archiving the AMR system.

Grant Task 6: Functional Acceptance Testing

The nine-month final testing task will ensure the functionalities of the system including accurate data collection from the meters; optimal data storage and management; functionality of the communication network; and integration with the C2M and the behavioral analytics software. . The testing will be conducted simultaneously with the final portion of the mass deployment task. The testing will be conducted by the vendor and PWP staff.

Required Permits

The replacement of existing water meters and endpoints will not require permitting. However, there are design and deployment circumstances that may require permitting as follows:

- Excavation needed to replace a service lateral. If meter installation requires excavation to replace lateral lines (for any reason), permits will be sought from the City of Pasadena Department of Public Works for properties within the City limits, and from the Los Angeles County Department of Public Works for property within PWP's service area that are in unincorporated areas outside of the City limits (see Fig. 2 above for a map showing PWP's service area). PWP has extensive experience seeking these type of permits using standardized forms and procedures. PWP has conducted significant work in unincorporated portions of PWP's service area which has required significant coordination with and permitting from Los Angeles County including multiple recent projects such as the Arroyo Seco Water Reuse Project, Sierra Madre Median Enhancements Project, and the Lower Arroyo Seco Trail Restoration Project.
- Type of selected network communication technology. The network communication technology will be selected during the design phase and prior to the initial deployment phase. The design will consider all available technologies including cellular, mesh, radio, and licensed radio.
 - o If licensed radio technology is selected, it will require licensing from the Federal Communications Commission (FCC) to use a specific radio frequency. The FCC can take up to six months to process applications which requires electronically submitting a signed FCC Form 605.
 - o If mesh is selected, the Project may need to install additional power poles, which could require permits for excavation (similar to what is noted above).

Completed Preliminary Design Work

Completed: Needs Assessment and Business Case.

1. AMI Needs Assessment

To determine the AMI system solution that would best meet PWP's needs, the engineering consultant conducted an AMI needs assessment to establish a baseline and identify the business, operational, and system needs for PWP to acquire and install an AMI system. The needs assessment included:

- Data Collection: Resource analysis, key interviews with PWP stakeholders, compilation of existing data and reports.
- Current State Analysis: Current business, technical, and AMI requirements analyses.
- Future State Analysis: Target state solution architecture and considerations (i.e., business, technology, staffing, operations, etc.), and analyze deployment models.
- Financial Analysis: Preliminary AMI deployment costs and cost of ownership.
- Solution Roadmap: Roadmap for all project phases including procurement, initial deployment, and mass deployment.

PWP will provide a copy of the needs assessment report upon request.

2. AMI Business Case

The AMI needs assessment described above was followed by the development of a Business Case to consider and recommend the preferred AMI solution strategy and specifications, finalize estimated AMI deployment and maintenance costs, identify risk and proposed mitigation, recommend community engagement and project messaging, and outline performance indicators.

New Policies or Administrative Actions. The only administrative actions that will be required are PWP staff trainings on the new AMI system (these are described above in Grant Task 4: Training for PWP Staff). No other new policies or administrative actions are required to implement the Project. As noted above, PWP engaged an engineering consultant who has completed a formal needs assessment and Business Case for the proposed Project. Thus, all potential policies and administrative actions that would be required have been thoroughly vetted.

Design Status. Final design and permitting will be completed as part of the 18-month initial deployment phase described above. Preliminary design was completed in early 2024 by PWP's engineering consultant who provided the following deliverables: needs assessment, Business Case, and Project Roadmap. The Project Schedule (see below) includes six months for final design starting in December 2025, with completion by the end of February 2026, prior to the initial deployment phase.

Project Schedule. The proposed Project schedule and estimated milestones are provided below in Table 6. PWP discussed the Project including environmental and cultural compliance during debriefing consultations with Reclamation's WEEG program staff on August 28, 2024, and July 13, 2023.

Table 6: Project Schedule

TASK	MAJOR TASKS	Months	2024-25 Federal Qtrs Oct 2024- Sept 2025				2025-26 Federal Qtrs Oct 2025- Sept 2026				2026-27 Federal Qtrs Oct 2026- Sept 2027				2027-28 Federal Qtrs Oct 2027- Sept 2028				2028- 29 Fed Qtrs Oct 2028	
			1	2	3	4	1	2	3	4	1	2	3	4	1	2	3	4	1	2
Pre-Award Activities (Outside of the Scope of the Grant)																				
0.1	Vendor Procurement (Oct 2024-Nov 2025)	14																		
0.2	Environmental Compliance (CAT EX June-Sept 2025)	4																		
Grant-Funded Activities (Funded by BOR WEEG)																				
1.	Project and Grant Management (Oct 2025-Oct 2028)	36																		
	1.1 Kickoff Meeting with BOR (Nov 2025)	1																		
	1.2 Project Reporting and Invoicing (Semi-annually)	7																		
	1.3 Performance Monitoring	18																		
2.	Customer Engagement	36																		
3.	Initial Deployment Phase (Equipment Procurement/ Installation/Testing) (Dec 2025-May 2027)	18																		
	3.1 System Design (Dec 2025-Feb 2026)	3																		
	3.2 50% of Integration Complete (Feb 2026-July 2026)	6																		
	3.3 100% of Integration Complete (July 2026-Mar 2027)	9																		
	3.4 System Sign-off (March-May 2027)	3																		
4.	Training for PWP Staff	Varies																		
5.	Mass Deployment Phase (May 2027-Oct 2028)	18																		
	5.1 50% of Meters Installed (May 2027-Jan 2028)	9																		
	5.2 100% of Meters Installed (Feb 2028-October 2028)	9																		
6.	Functional Acceptance Testing (Feb 2028-October 2028)	9																		

Start Date 10/31/25; Completion Date 10/31/28 for Grant-Funded Activities (36 months)

Milestones 

EVALUATION CRITERION G: Collaboration

Public Support for the Project and Water Conservation

Through City Council meetings, social media, and customer service calls, PWP customers have expressed their desire to have access to real-time data, as well as assistance with identifying leaks within their homes. State and local water conservation campaigns have educated Pasadena residents about the importance of water conservation, and they are eager to make changes to their water use. PWP's 2020 UWMP confirms customers' willingness to modify their behavior. Between 2016 and 2020, PWP's single-family residential customers achieved more than a 25% reduction in water demand, most likely due to the State's conservation mandates in the face of the drought. Implementing AMI technology will provide customers with solutions to both requests. Real-time data accessible through the new CIS will enable customers to monitor their water usage with confidence that the data is accurate. This will help them to identify leaks and repair them quickly, thereby saving customer and PWP resources.

PWP routinely engages customers in their planning efforts to keep them apprised and engaged in water planning and system improvements. For instance, for development of PWP's 2020 *Water System and Resources Plan*,²⁰ a stakeholder advisory committee provided a range of additional perspectives, initial ideas, and essential feedback on the Plan, and included a diverse group of people representing PWP's residential, commercial, institutional, and large water customers. The committee met six times and conducted two public meetings. Youth from the Pasadena community were engaged in one workshop and one outreach event. The committee's key recommendations included: make the local water supply more resilient; enhance local supplies to represent 1/2 of total supplies versus the current 1/3 of total supplies; and enhance protections from unexpected interruption of imported supplies (e.g., from drought, earthquake, etc.).

Letters of Support

The Project has significant support from the community to increase water savings, as shown by the five attached letters of support (see Appendix B):

- PWP's water supplier, the Metropolitan Water District of Southern California (MWD), who find water conservation to be a critical component of ensuring adequate future water supplies.
- The Raymond Basin Management Board, representing the interests of the Raymond Basin, California's first adjudicated basin, PWP's source of groundwater.
- Assemblymember Chris Holden and Pasadena Mayor Victor Gordo, representing all residential and commercial customers in PWP's service area; and
- Pasadena Chamber of Commerce, representing PWP's commercial customers.

The AMI Project will benefit multiple sectors and/or users. PWP distributes water to 74% single

²⁰ <https://pwp.cityofpasadena.net/wp-content/uploads/2021/09/WSRP-Final-Report-Dec-2020-Rev-9.21.21.pdf>

family residences, 12% multi-family residences, and 14% commercial, city accounts and miscellaneous connections, including industrial and recreational, such as Victory Park, Brookside Park and Desert Industrial Supply.

EVALUATION CRITERION H: Nexus to Reclamation

The proposed Project has a nexus with Reclamation. PWP receives approximately 2/3 of its water from the Metropolitan Water District of Southern California (MWD); PWP is a MWD member agency. MWD receives its water from the State Water Project (which is considered a federal water source), and the Colorado River, which is managed, in part, by Reclamation.

The applicant is not a tribe.

E. Performance Measures

PWP proposes to use the following performance measures to quantify actual benefits upon completion of the Project. The proposed Project Manager (Alex Jang, Associate Engineer) will be responsible for monitoring and recording these outputs):

Performance Measure #1: Water Savings from Reduced Consumption and Enforcement

- At least one year of post-Project consumption data will be compared to pre-Project consumption levels to evaluate changes in overall consumption and water use patterns.
- At least one year of post-Project enforcement data will be compared to pre-Project data by examining water use per water waste report issued by PWP.
- Annual AWWA Water Loss Audit data and PWP tracking data will be used for these comparisons.

Performance Measure #2: Water Loss Reduction from Leakage Technology

- Before and after real water loss data will be evaluated using at least one year of post-Project data.
- Annual AWWA Water Loss Audit data includes real water loss estimates, which exclusively include water lost from leaks. This data will be used for comparing trends and analysis after the new AMI meters are installed.

Performance Measure #3: Water Savings from Reduced Metering Inaccuracies

- Before and after metering accuracy data will be evaluated using at least one year of post-Project data.
- Water meter efficiency tests will be conducted within a year after Project implementation to ensure increased accuracy of new meters.
- Annual AWWA Water Loss Audits will reflect metering accuracy improvements as part of the quantified apparent water losses. This data will also be used for pre/post-Project comparison.
- It is expected that some usage will “increase” as a result of more accurate readings from some meters where the old meters were not registering correctly. We expect that this will be a temporary occurrence that will be corrected as customers become aware of their

real level of water usage.

Performance Measure #4: Increased Energy Savings

- PWP will also be calculating the quantity of energy savings resulting from the water use data by comparing pre- and post-Project energy bills for water production and distribution, taking into account changes in pricing structure that would affect the anticipated cost savings.
- Anticipated cost savings are based on reduction of energy usage for water production and distribution due to a lower demand for water.

Performance Measure #5: Reduced Greenhouse Gas Emissions

- Before and after vehicle mileage data will be evaluated using at least one year of post-Project data. The annual mileage from each of the fleet vehicles previously used in meter readings will be monitored for annual variations over a reasonable period of time.

End 50-Page Limit Technical Proposal



ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

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.

No, the Project involves the one-for-one replacement or retrofit of existing meters and therefore, does not require any earth disturbance.

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

No, there are no known species listed or proposed to be listed as a Federal threatened or endangered species within the Project area. There is no 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.

The replacement of meters will occur within areas already disturbed at the curbs of connected water users, so the Project will not impact any surface waters or wetlands within the Project boundaries.

When was the water delivery system constructed?

The water delivery system was first constructed in the 1880s, but many improvements and changes have been made since then. Small neighboring water agencies have been integrated into what is now Pasadena Water and Power.

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.

No, the proposed Project will not result in any modification of or effects to individual features of an irrigation system.

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 Project is not located in an irrigation district.

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

No, there are no known archeological sites where meter replacements will occur.

Will the proposed project have a disproportionate and adverse effect on any communities with

environmental justice concerns?

No, the proposed Project will not have a disproportionately high and adverse effect on low-income or minority populations.

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

No, the proposed Project will not have any impact on Tribal lands.

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

No, the 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.

REQUIRED PERMITS OR APPROVALS

As noted above, the replacement of existing water meters and endpoints will not require permitting. However, there are design and deployment circumstances that may require permitting as follows:

- Excavation needed to replace a service lateral. If meter installation requires excavation to replace lateral lines (for any reason), permits will be sought from the City of Pasadena Department of Public Works for properties within the City limits and from the Los Angeles County Department of Public Works for property within PWP's service area that are in unincorporated areas outside of the City limits (see Fig. 2 for a map showing PWP's service area). PWP has extensive experience seeking these types of permits using standardized forms and procedures. PWP has conducted significant work in unincorporated portions of PWP's service area which has required significant coordination with and permitting from Los Angeles County including multiple recent projects such as the Arroyo Seco Water Reuse Project, Sierra Madre Median Enhancements Project, and the Lower Arroyo Seco Trail Restoration Project.
- Type of selected network communication technology. The network communication technology will be selected during the design phase and prior to the initial deployment phase. The design will consider all available technologies including cellular, mesh, radio, and licensed radio.
 - o If licensed radio technology is selected, it will require licensing from the Federal Communications Commission (FCC) to use a specific radio frequency. The FCC can take up to six months to process applications which requires electronically submitting a signed FCC Form 605.
 - o If mesh is selected, the Project may need to install additional power poles, which could require permits for excavation (similar to what is noted above).

OVERLAP OR DUPLICATION OF EFFORT STATEMENT

There is no known overlap between the proposed Project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. In addition, PWP reports that the proposal submitted under this program is not in any way duplicative of any proposal or project that has been or will be submitted for funding consideration to any other potential funding source.

CONFLICT OF INTEREST DISCLOSURE

There is no actual or potential conflict of interest at the time of submission. PWP will take the appropriate steps to avoid any conflicts of interest that may arise. Should any conflicts of interest arise during the life of the award, PWP will notify the Financial Assistance Officer.

UNIFORM AUDIT REPORTING STATEMENT

The City of Pasadena's Single Audit reports are available on the Federal Audit Clearinghouse website and can be accessed with the City's Employer Identification Number (EIN) 95-6000759. The audit for the most recent closed fiscal year (FY22-23) was filed with the Federal Audit Clearinghouse on March 28, 2024.

CERTIFICATION REGARDING LOBBYING

This form is included in the Grants.gov submission of required federal forms.

STATE CAPITOL
P.O. BOX 942849
SACRAMENTO, CA 94249-0041
(916) 319-2041
FAX (916) 319-2141

DISTRICT OFFICE
600 NORTH ROSEMEAD BLVD., SUITE 117
PASADENA, CA 91107
(626) 351-1917
FAX (626) 351-6176

Assembly
California Legislature



COMMITTEES
COMMUNICATIONS AND CONVEYANCE
RULES
UTILITIES AND ENERGY
SELECT COMMITTEE
CHAIR, REGIONAL TRANSPORTATION
SOLUTIONS
CAUCUSES
CALIFORNIA LEGISLATIVE BLACK CAUCUS

November 4, 2024

Ms. Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC, 20240-0001

RE: Letter of Support for the City of Pasadena's Advanced Metering Infrastructure Project Application

Dear Commissioner Touton,

I am writing in support of the City of Pasadena's application to the Bureau of Reclamation's WaterSMART: Water and Energy Efficiency Grant Program for the City's Advanced Metering Infrastructure (AMI) Project. As the current Assemblymember representing the 41st District, and the former Mayor and Councilmember of Pasadena, I am proud to represent this vibrant and diverse community. Pasadena Water and Power's (PWP) water service area covers 26 square miles, serving more than 38,000 residential and commercial customer accounts within the City and in adjacent unincorporated communities in the San Gabriel Valley.

I am fully aware of the impact of climate change and future risk of drought. I have held numerous committee meetings in Pasadena and throughout my district to urge residents to adopt water conservation strategies, and I have worked to create practices that improve and protect water delivery services. The proposed project will result in significant water savings by detecting water leaks and meter failures in real-time, while providing a tool for residents to monitor their own usage and make water-wise decisions about consumption. For these reasons, I strongly support PWP's application, and I thank you for your consideration.

Sincerely,

A handwritten signature in black ink that reads "Chris Holden". The signature is stylized, with the first name "Chris" written in a cursive-like script and the last name "Holden" in a more upright, blocky script.

CHRIS R. HOLDEN
Assemblymember, 41st District



THE METROPOLITAN WATER DISTRICT
OF SOUTHERN CALIFORNIA

Office of the General Manager

November 5, 2024

Ms. Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC, 20240-0001
Via e-mail: ajang@cityofpasadena.net
dterrell@blaisassoc.com

Ms. Touton:

Support for City of Pasadena Advanced Metering Infrastructure Project Grant Application

The purpose of this letter is to express The Metropolitan Water District of Southern California's (Metropolitan) support for City of Pasadena's Advanced Metering Infrastructure project.

Metropolitan is the largest provider of treated water in the United States, serving 19 million Californians within our 5,200-square-mile service area. Metropolitan's mission is to provide adequate and reliable supplies of high-quality water to meet present and future needs in an environmentally and economically responsible way.

In partnership with local water agencies, Metropolitan is a leader in implementing a One Water approach for supply reliability. Metropolitan has invested more than \$1.6 billion in drought-resilient resources such as conservation, recycling, groundwater recovery, and storage. Even with these efforts, Metropolitan recognizes the continued need to diversify Southern California's water resource portfolio to proactively plan for severe droughts, shortage on the Colorado River, projected long-term impacts of climate change, and interruptions in water supply.

The Advanced Metering Infrastructure project will play a vital role in conserving water through quick identification and resolution of overuse and leaks. This project represents a key step toward reducing water waste, particularly of potable water, a precious resource in California. By safeguarding this resource, the project ensures that our community's water supply is being efficiently managed, directly benefiting residents, businesses, and future generations.

Ms. Camille Calimlim Touton

Page 2

November 5, 2024

Given these reasons, Metropolitan supports City of Pasadena's efforts to secure funding for the Advanced Metering Infrastructure Project. Please contact Krista Guerrero at (213) 217-6768 or via email at kguerrero@mwddh2o.com if you have any questions.

Sincerely,

A handwritten signature in dark ink, appearing to read 'B. Goshi', with a stylized 'B' and a horizontal line extending to the right.

Brandon J. Goshi

Interim Manager, Water Resource Management

KG:vsm



**RAYMOND BASIN
MANAGEMENT
BOARD**

City of Alhambra

October 30, 2024

City of Arcadia

California-American Water Company

H.E. Huntington Library and
Art Gallery

Kinneloa Irrigation District

Ms. Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington, D.C. 20240-0001

La Canada Irrigation District

Las Flores Water Company

RE: Support for City of Pasadena's Bureau of Reclamation
WaterSMART Grant Application

Lincoln Avenue Water Company

Dear Commissioner Touton:

Pasadena Cemetery Association

City of Pasadena

On behalf of the Raymond Basin Management Board, I am writing to share our support for the City of Pasadena's Advanced Metering Infrastructure (AMI) Project. The Raymond Basin Management Board has served as Watermaster to the Raymond groundwater basin since 1984, administering and enforcing the Raymond Basin Judgment which established water rights and the responsibility to effectively manage the quantity and quality of water. The City of Pasadena's proposed project lies within our interests, as the City is the largest producer of groundwater in the Raymond Basin. The City provides potable water to approximately 164,000 customers in the city limits and unincorporated areas of Los Angeles County including Altadena, East Pasadena, and San Gabriel. Overall, the Basin provides water to the City of Pasadena and 14 other member agencies.

Rubio Canon Land and Water
Association

San Gabriel County Water District

City of Sierra Madre

Sunny Slope Water District

Valley Water Company

The AMI Project as proposed will reduce water loss by providing early detection of water leaks and meter failures along with numerous other benefits. We strongly support projects such as AMI that offer protection and wise stewardship of our critical groundwater. Thank you for your consideration of the City's application.

Sincerely,

Kelly L. Gardner
Executive Officer
Raymond Basin Management Board



OFFICE OF THE MAYOR

November 4, 2024

Ms. Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC, 20240-0001

Re: City of Pasadena Advanced Metering Infrastructure Project - Support Letter

Dear Commissioner Touton:

On behalf of the City of Pasadena, I would like to provide my support for the Pasadena Water and Power Department's (PWP) application to the Bureau of Reclamation's Water and Energy Efficiency Grant Program. If awarded, Grant funding will be used to implement Advanced Metering Infrastructure (AMI), or smart meters, servicing the City's 164,000 residents and businesses.

In 2020, the American Water Works Association Water Loss Audit for the City of Pasadena reported that the PWP's water supply experienced losses of 2,613 AFY, or nearly 9% of the total supply. These losses were the result of leaking pipe lines, storage tanks, and connections, as well as unauthorized consumption and meter reading inaccuracies. These losses are significant, impacting costs for the PWP and customers, as well as increasing the City's water demand.

In 2023, the City authorized Resolution No. 9977, declaring a state of Climate Emergency for the City of Pasadena. The Resolution referenced recent drought and water shortages, and promoted water conservation policies in the interest of mitigating the effects of future drought conditions. The proposed project is directly aligned with the Resolution's recommitment to environmental stewardship and continued leadership in sustainability.

PWP's plan to use grant funding to install smart meters citywide will directly address the aforementioned causes of water loss, providing wireless, real-time data transmission from meters to the PWP. This technology will enable the PWP to accurately track water usage, stay on top of leaks as they occur, and provide more engaging information to customers, encouraging better awareness and conservation practices.

This vital project will provide impactful cost efficiency and resource protection and sustainability. Please join me in supporting this innovative program which will help our City meet its conservation goals and realize critical water savings.

Sincerely,


VICTOR M. GORDO
Mayor



October 30, 2024

Ms. Camille Calimlim Touton
Commissioner
Bureau of Reclamation
1849 C Street NW
Washington DC, 20240-0001

SUBJECT: Letter of Support for City of Pasadena's Water and Energy Efficiency Grant Application

Dear Ms. Touton,

The Board of Directors of the Pasadena Chamber of Commerce and Civic Association enthusiastically supports the City of Pasadena's application to the Bureau of Reclamation's WaterSMART: Water and Energy Efficiency Grant. The grant will support the City's Advanced Metering Infrastructure (AMI) Project an important element in the City's sustainability initiatives.

The project will improve metering and billing accuracy and will detect water leaks and meter failures in real-time. The new smart meters will greatly reduce operating expenses through remote and real-time data collection, making significant strides in protecting and sustaining our vulnerable water supply. Water efficiencies and savings are more critical than ever as we struggle to cope with climate change and the impacts on the availability of water.

The project is aligned with the Chamber's sustainability objectives as we work to make Pasadena a place where businesses thrive.

The Pasadena Chamber and our Board of Directors are very supportive of this grant application and encourages its approval by the Bureau of Reclamation.

Thank you,



Paul Little
President and Chief Executive Officer