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**AGENDA
MUNICIPAL SERVICES COMMITTEE
March 28, 2017**

MEMBERS

Margaret McAustin, Chair, District 2
Terry Tornek, Mayor
Tyron Hampton, District 1
Andy Wilson, District 7

STAFF

Gurcharan Bawa, General Manager
Valerie Flores, Recording Secretary

MISSION STATEMENT

The City of Pasadena is dedicated to delivering exemplary municipal services, responsive to our entire community and consistent with our history, culture and unique character.

Public meeting begins at 4:00 p.m.

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REGULAR MEETING OF THE
MUNICIPAL SERVICES COMMITTEE
Tuesday, March 28, 2017 4:00 P.M.
100 North Garfield Avenue, Pasadena, Council Chambers

AGENDA

1. **CALL TO ORDER/ROLL CALL**
2. **PUBLIC COMMENTS ON MATTERS NOT ON THE AGENDA**
3. **INFORMATION ITEMS**
 - A. Water Rate Redesign Update*
 - B. Water Master Plan Update*
 - C. Status Update of the 2011 Water Integrated Resources Plan and Current Water Supply Conditions*
 - D. Urban Forestry Planning Updates
4. **ADJOURNMENT**

*Attachment

NEXT MEETING

April 11, 2017 - scheduled to be cancelled

Margaret McAustin, Chair
Municipal Service Committee

POSTING STATEMENT:

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Susana Castro

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3.A



PASADENA WATER AND POWER

MEMORANDUM

March 28, 2017

To: Municipal Services Committee

From: Gurcharan S. Bawa *Gsbawa*
General Manager

Subject: Water Rate Redesign Update

This item is for information only.

EXECUTIVE SUMMARY

The Water and Power Department (“PWP”) conducted a cost of service and water rate structure analysis as part of its resource planning and drought mitigation strategy. The proposed rate design takes account of environmental, operational and financial sustainability needs based on current water consumption patterns and the expectation that water conservation practices will continue to develop. Alternative rate designs were analyzed and initial findings were presented to the Municipal Services Committee (“MSC”) in July 2016. In November 2016, PWP presented the proposed water rate structure to a “Study Group” to provide information and receive feedback.

The cost of service analysis identified several key considerations, including the need to realign revenues collected from the Distribution and Customer (“D&C”) and Commodity Charges, to adjust the Purchased Water Adjustment Charge (“PWAC”) to recover increased costs for purchased water and to ensure that revenue requirements and rates are in compliance with Proposition 218.

A separate cost of service study and rate analysis will be completed for the Non-potable Water Project when the capital and operating costs are better defined. The current estimate is that this cost analysis will be completed over the next 12 months.

PWP also developed a proposed water rate redesign using some budget-based principles to replace reliance on meter connection sizes to allocate water supplies and set commodity prices. The objectives of the proposed new design will retain Proposition 218 compliance, reduce reliance on variable rate revenue for fixed costs, and be consistent with the capabilities of the existing billing system. Key proposed changes to the water rate design are shown in Table 1.

Table 1: Summary of Rate Proposal

Rate Element	Current Rate Structure	Proposed Rate Structure
Distribution and Customer Charge	Fixed monthly charge based on meter size	No structural changes. Cost shift from commodity resulted from cost analysis
Commodity Pricing	4 rate tiers priced based on single source of supply (e.g., groundwater, MWD Tier 1, MWD Tier 2)	4 rate tiers priced based on blended supply sources including water efficiency
Commodity Allocation	Monthly allocation based on meter size	Monthly allocations based on customer class and factors such as property size, number of dwelling units, and historic usage. Detailed separately for each customer class
PWAC	Formula rate, currently \$0.4850/BU	No change to formula rate, Will be initially reset to \$0.0/BU
Capital Improvement Charge	Formula based 100% volumetric	Phased-in fixed charge component plus formula based volumetric rate component.

BACKGROUND

PWP staff completed a water cost of service study in early 2016 and followed with an extensive process to develop a proposed redesign of the water rate structure. PWP typically conducts a full cost of service study every 5-7 years, with annual updates of the cost model as part of the operating budget preparation. The cost of service analysis ensures that revenue requirements are met, that rates are equitable and fair between and within customer classes and are responsive to changing water resources and supply conditions. The analysis is particularly important due to the impact on PWP’s water supplies from reduced groundwater, higher costs for purchased water and reduced sales from conservation and efficiency.

The proposed changes to the water rates are designed to balance affordability, rate stability, and bill impact, ease of understanding, conservation incentives and the continued efficient use of water. The rate design also considers revenue stability and the ability to implement the rate design using the existing billing system.

Cost of Service Findings

- 1. Recognize a cost shift from the Commodity charge to the Distribution & Customer charge***
Based on the updated cost of service analysis, recover \$1.2 million less in Commodity revenue and recover an additional \$1.2 million of Distribution & Customer revenue. This cost shift is reflective of a change in resource allocation for maintenance work from supply (pumps, wells) to distribution since the last cost of service analysis was completed in 2008.
- 2. PWP selling more Block 1 water than associated supplies***
Several factors have made it necessary to update the water sources and block sizes in the water rate design. Production of groundwater has declined 25%; primarily due to a collaborative effort among members of the Raymond Basin to manage the aquifer. The state-wide drought and PWP customer response to conservation has reduced demand for

water by 40% from FY2007 to FY2016, and has increased customer interest in efficient water usage.

3. *Reset PWAC to Zero, Implement Future PWAC Increases*

The proposed commodity rates reflect all current costs associated with water supplies, thus the purchased water adjusted charge (“PWAC”) will initially be reset to \$0.00 per BU. The MWD has announced cost increases that need to be recovered in the commodity charge. In accordance with the Water Rate Ordinance, PWP will set the PWAC to \$0.015 per BU (0.3% system average rate) effective October 2017 to pass through \$166,000 of increased water commodity costs resulting from MWD’s January 2017 water rate increase. In October 2018 PWP will add another \$0.029 per BU (0.6% system average rate) increase to the PWAC to pass through \$321,000 of increased water commodity costs resulting from MWD’s January 2018 water rate increase.

4. *Elimination of Seasonal Rates*

The rate design found elimination of seasonal rates would simplify the rate structure and is not required to maintain cost of service.

5. *Retain Existing Outside of City rate differential*

The cost of service analysis has resulted in affirmation that the existing 25% differential charged Outside of City customers for the Commodity and Distribution & Customer charges and the 35% differential for the Capital Improvement Charge is appropriate and will continue to be applied.

6. *Future capital costs for non-potable pipeline*

Staff has concluded that the capital costs for the non-potable pipeline could be recovered in the same manner as other distribution infrastructure, which is allocated to all customers regardless of the source of commodity; however, at this time these costs have not been included in the proposed D&C or CIC rates. As cost estimates and work plans are finalized these costs will be recovered through the CIC charge.

7. *Future procurement and O&M costs for non-potable commodity are not known or included at this time*

In order to comply with Proposition 218 for determining the non-potable water rate, procurement cost of the non-potable water and the O&M costs of the pipeline from the plant through the City of Glendale must be finalized by contract. PWP is actively working with the City of Glendale on these matters.

Water Rates Study Group

Since the last water rate presentation to the MSC, a Water Rates Study Group (“Study Group”) was formed and three informational meetings with the Study Group were held in November 2016. The Study Group was comprised of residential customers from each City Council District and commercial customers selected in cooperation with the Chamber of Commerce. Each meeting consisted of a presentation and discussion on specific components of the cost analysis and proposed rate design. These meetings were facilitated by a senior member of the consulting firm RMC Water and Environment, Inc. and were also attended by a representative from the City Manager’s Office.

While not tasked with providing approvals or recommendations, the Study Group was asked to provide feedback and comment on the proposed rates and the ability of customers to easily understand the complex information that was presented.

Rate Making Objectives

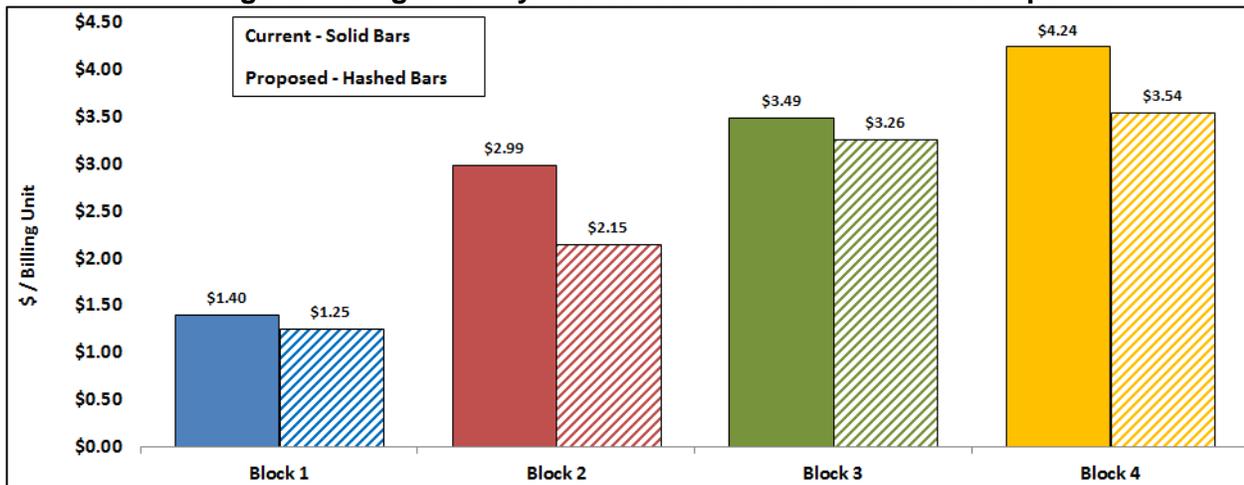
1. Proposition 218 compliance

Proposition 218 requires water rates to be cost based, and for revenues generated from the rates to be used for purposes directly related to the water system costs. The cost of service analysis resulted in the determination of revenues that need to be collected from each element of the water rate structure. PWP has consulted with the legal firm of Colantuono, Highsmith, and Whatley, PC, on Proposition 218 compliance issues. These advisory services will remain available until the water rate restructuring is finalized.

2. Continue offering four commodity price tiers, based on blended supplies

Significant analysis was performed on the projected water supply, including amount of groundwater available, the costs of water, and expected availability of water from MWD. A four tier commodity pricing structure was desirable to maintain to provide price signals at the higher levels of water usage, and to consider the cost differential between ground water and MWD purchased water. Instead of using “pure” water supply for price blocks, the proposed block prices consist of blended sources that more closely reflect operational constraints. Figure 1 compares the existing water block prices (including PWAC currently in effect) with the proposed block prices (including the October 2017 PWAC increase).

Figure 1: Single Family Residential Water Block Price Comparison



3. Replace meter size for water allocation

The water rate proposal includes changing how customers are classified for water allocation and pricing redesign. Customers would be classified as either single family residential (“SFR”), multi-family residential (“MFR”), or commercial (“COMM”). One of the benefits of this change is that it considers how customers use water to develop water block designs. The current blocks are defined primarily by water sources without consideration for how water may be consumed within each block. Table 2 includes the characteristics used to define each customer class.

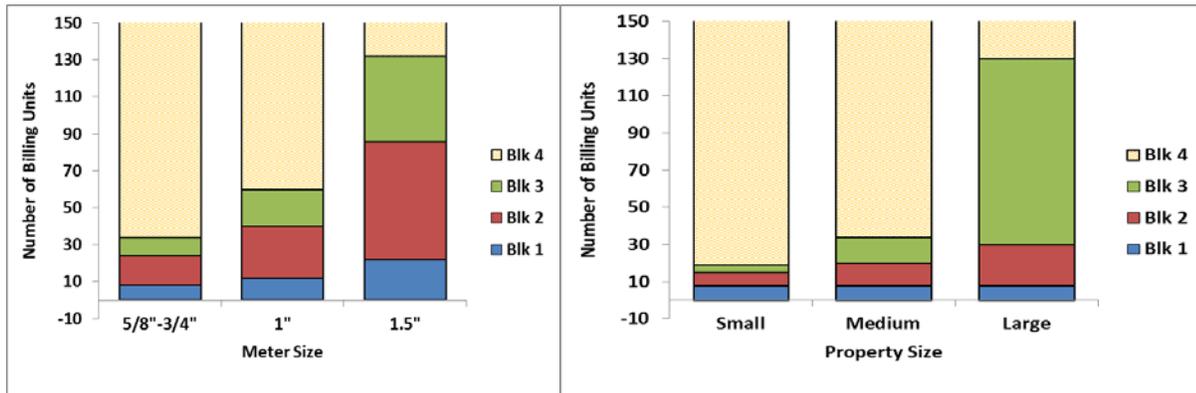
Table 2: Water Use Characteristics by Customer Class

Customer Class	Allocation Factor	Number of Groups	Distinctive Characteristics
SFR	Size of property	3	All residences receive same basic health and sanitation allocation for indoor use, larger properties receive larger allocation for outdoor use
MFR	Number of dwelling units	9	Each multi-family dwelling receives the same basic health and sanitation allocation for indoor use, the number of dwelling units per service is the primary factor allocation, small distribution for outdoor use
COMM	Historical usage quantities and primary type of usage	4	Commercial customers have specific business use requirements and are classified based on type of business

Using customer type to determine water allocation enables PWP to consider efficient use and improve the fairness of allocating the least cost water within the customer classes. Figure 2 contains the current water allocations for meter sizes that are primarily residential and Figure 3 contains the proposed Single Family Residential water allocations based on property size. Note that under the proposed structure all SFR customers are allocated the same amount of the least cost resource, Block 1. This block was designed to cover basic sanitation and health requirements.

Figure 2: Current Water Allocations

Figure 3: Proposed SF Residential Allocations



Several considerations were included in the allocation of water for each block within each customer classification:

SFR customers:

- Reduced groundwater availability
- Household size based on approximately 4 persons per residence
- Does not include estimate of irrigable square footage for property size

MFR customers:

- Reduced groundwater availability
- Household size is based on approximately 2 persons per dwelling unit
- Includes a smaller amount for irrigation and common areas (pool, spa)

Commercial customers:

- Blocks 1 and 2 expected to meet primary indoor use requirements
- Based on historical usage for previous three years
- Reflects significant investment in conservation programs by commercial customers

Table 6 shows the customer class usage characteristics of the proposed block design.

Table 6: Block Design Characteristics by Customer Class

Customer Class	Block 1	Block 2	Block 3	Block 4
SFR	Basic indoor health & sanitation	Satisfy indoor usage and contribute to outdoor usage	Outdoor usage	Remaining outdoor usage
MFR	Basic indoor health & sanitation	Satisfy indoor usage and contribute to outdoor usage	Outdoor usage	Remaining outdoor usage
COMM	Efficient indoor usage	Remaining indoor usage	Outdoor usage	Remaining outdoor usage

4. Reduce reliance on variable-rate revenue recovery for fixed-costs (CIC Charge – fixed component

The approved CIC formula generates revenues to fund capital improvement projects and debt service payments. The current rate is 100% volumetric, meaning that it is a rate applied to each unit of water sold. Although generally an effective rate methodology, revenue generated by volumetric rates tends to be less stable, especially when water sales decrease as is currently the case.

The cost of service and rate design study evaluated the impacts of ongoing and future obligations to be recovered by revenues from the CIC charge. To promote revenue certainty for possible future debt service obligations, the proposed rate structure will include a fixed charge component of the CIC rate to cover debt service costs for future bond issues. Under this proposal, the volumetric component will continue to generate revenue based on the CIC formula as currently defined in the Water Rate Ordinance for existing debt service. A new fixed component would become effective only if/when additional revenue or refunding bonds are issued.

The fixed charge would be calculated at the customer group level and will be based on the percentage of sales for each group. This allocation based on sales volume will then be divided equally among all customers within the group. This action would serve to provide a more stable revenue source to repay bondholders.

5. Develop understandable, manageable rates that can be implemented with the existing billing system

The current billing system has limitations that must be considered when developing a change to the rate structure. The number of customer classes and groups is limited. Under this design proposal, water rates would go from ten classifications (meter connection size) to three classes that have a total of 16 groups. This will be near the total capacity of the current system which does not allow each individual account to have property specific allocations.

Overall Impact of Proposed Water Rate Restructuring

The proposed rates are designed to result in no increase in water rate revenues, followed by 0.3% and 0.6% increases in October 2017 and October 2018, respectively.

Because of the necessary shifting of cost recovery from variable commodity rates to fixed D&C rates, combined with the significant shift in how commodity block prices are allocated, the impacts of the proposed rate structure will vary significantly from customer to customer; however, the impacts can be broadly characterized as follows:

- The vast majority of residential customers will see an overall bill impact in the range of -1% to +1%
- Nearly all residential customers with meters less than 1.5 inches will experience a bill decrease due to reduced block 1 and block 2 prices;
- Conversely, nearly all residential customers with meters 1.5 inches or larger will experience a bill increase due to reduced block 2 and block 3 allocations;
- Customers with larger meters will generally experience larger bill increases, and of those, customers with smaller property sizes are impacted the most;
- Smaller multifamily complexes with up to 20 units will see moderate bill increase, whereas those with more than 21 units will see moderate decreases;
- An average revenue increase of about 5% will be passed on to commercial customers as a group (excluding Extra Large Commercial) due to past under collection.

Schedule for Proposed Water Rate Restructure

PWP is developing a program for customer information and outreach for the proposed water rate restructuring. A web page is being designed with information regarding the rate proposal, including an informational video. The timeline summarizes the current schedule anticipated for presenting the proposed water rate adjustments to the MSC, the City Council and the community.

Date	Action Item
March 2017	MSC Update (information item)
April 2017	EAC Presentation (information item)
May-June 2017	City Council workshop (based on schedule availability)
June-July 2017	Customer outreach and feedback
July 2017	MSC and City Council Action: Rate recommendation and set public hearing
September 2017	Public Hearing and City Council Rate Action
October 2017	Rate Action Effective

3.B



PASADENA WATER AND POWER
MEMORANDUM

March 28, 2017

To: Municipal Services Committee

From: Gurcharan S. Bawa *Gsbawa*
General Manager

Subject: Water Master Plan Update

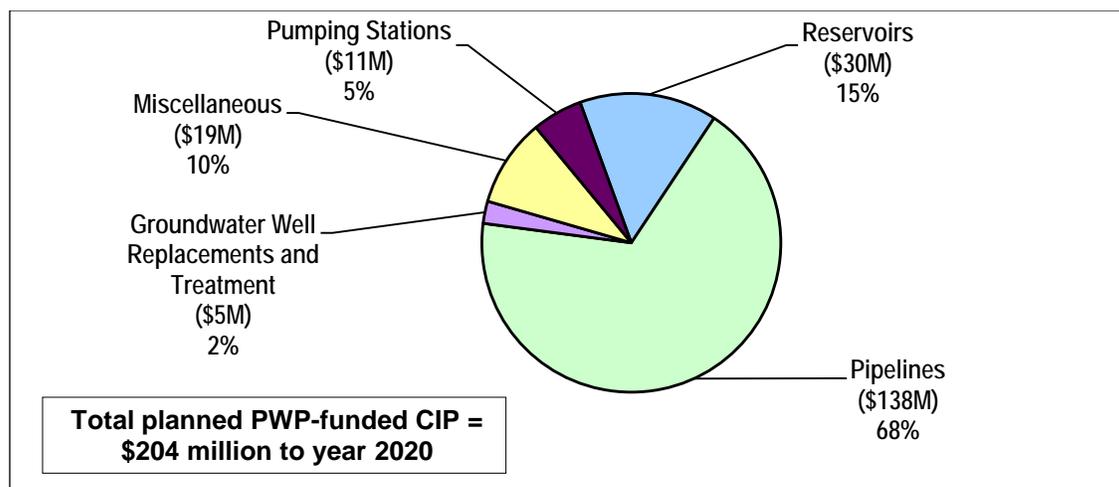
This item is for information only.

Background

In June of 2002, Pasadena Water and Power (“PWP”) completed a Water System Master Plan (“Master Plan”). The objectives of the Master Plan were to provide PWP with an evaluation of its existing water system infrastructure to adequately produce and distribute water under existing and future conditions through 2020. The evaluation identified existing infrastructure deficiencies and facility requirements needed to reliably meet increasing water demands over the 2002-2020 time frame. The report also provided detailed guidance for a proposed Capital Improvement Program (“CIP”) for the water system, including project phasing and capital requirements.

The Master Plan recommended an overall CIP totaling \$234.6 million over 18 years. Of this amount, approximately \$204 million of improvements needed to be funded by PWP (summarized in Figure 1), while the remaining \$30.6 million would be funded by NASA to support groundwater treatment. The “miscellaneous” improvements include SCADA, chloramination facilities, Eastside Collector Pipeline, and studies.

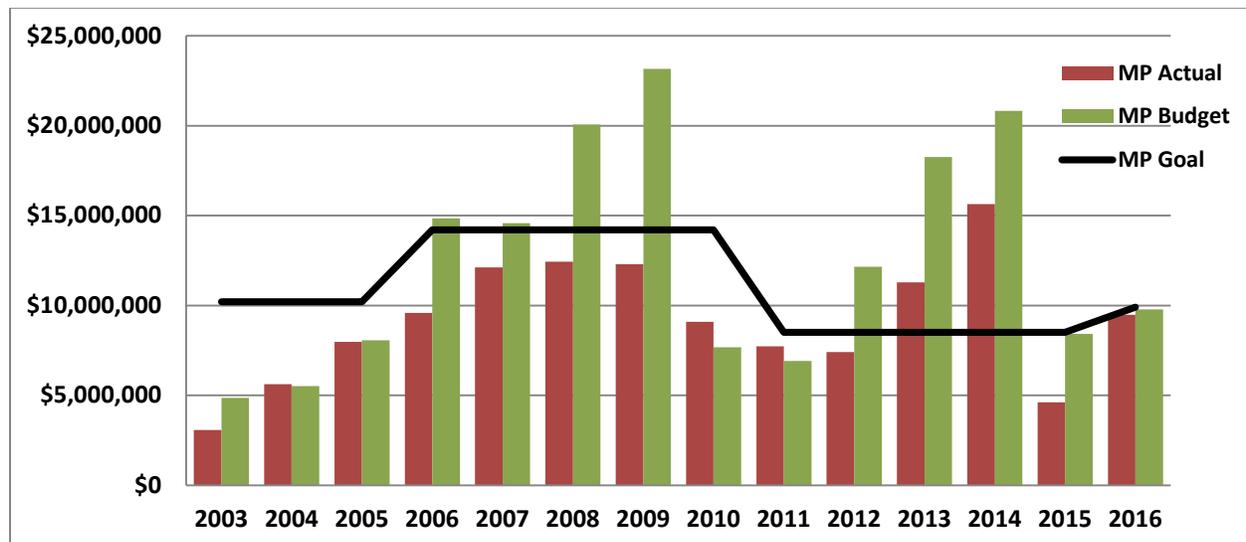
Figure 1 – Planned Master Plan Spending, FY2003-2020



Funding and Expenses

Since the completion of the Master Plan through the end of FY 2016 (14 years), PWP has spent over \$128.3 million on projects identified in the Master Plan, plus an additional \$40.3 million on non-Master Plan CIP projects. The recommended spending for this period was \$154 million. Figure 2 shows the annual spending compared to what was budgeted on Master Plan identified projects. The black line indicates the Master Plan recommended spending levels.

Figure 2 – Annual Master Plan Spending, FY2003-2020



To help fund the work in the Master Plan, PWP implemented a new Capital Improvement Charge (“CIC”) in April 2003 after an extensive public outreach effort. When originally implemented, the CIC revenues were projected to reach \$10 to \$12 million annually. However, over the past five years the CIC rate has generated average annual revenues of about \$8 million as a result of reduced water sales. To address this, the City Council approved a CIC rate increase in January 2016 in order to support the debt service and CIP expenditures for the Water System. The CIC is now expected to generate approximately \$10.6 million per year.

Since adopting the Master Plan, PWP has issued four water revenue bonds totaling \$76.55 million (excluding funds used to refund previous bond issues) to help fund Master Plan projects:

1. 2003 Revenue Bond: \$25,000,000 plus \$22,425,000 to refund 1994 Revenue Bond
2. 2007 Revenue Bond: \$21,550,000
3. 2010 Revenue Bond: \$30,000,000 that includes \$25,425,000 taxable Build America Bond and \$4,575,000 tax-exempt bond.
4. 2011 Revenue/Refunding Bond: \$29,770,000 to refund a portion of the outstanding 2003 Water Revenue Bond and pay the issuance costs of the 2011 Water Revenue/Refunding Bonds. The refunding has generated a savings of \$3.5 million.

The current debt service for these revenue bonds is about \$7.1 million annually.

Water Master Plan Progress to Date

Table I outlines the progress on the Master Plan projects as of the end of FY 2016. The first column lists the major project categories. The second column lists the FY2020 Master Plan targets. The third column lists targeted amounts of work to be completed by FY 2016 based on the Master Plan schedule. The fourth column lists the actual work completed by the end of FY 2016.

Table I – Key Master Plan Objectives

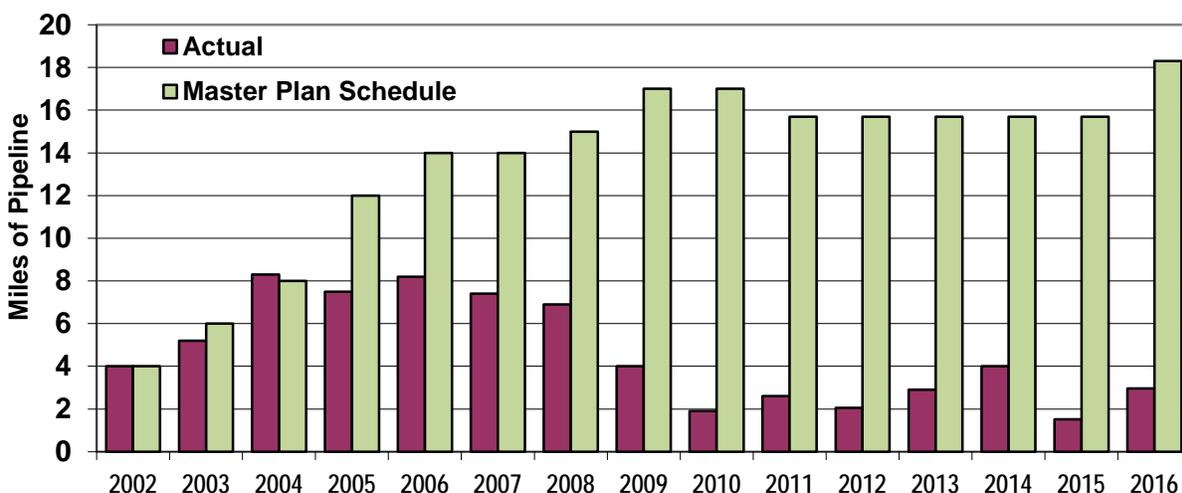
Project Categories	Master Plan Target by 2020	Master Plan Target (To Date)	Actual* (To Date)
Pipeline Replacement - Miles (Average Miles/Year)	273 (15.2)	204 (14.6)	70 (5.0)
Water Meter Replacement – No. of Meters	37,000	36,000	42,910
Reservoir Seismic Retrofits – No. of Reservoirs	12	12	2
Groundwater Wells Rehabilitated – No. of Wells	6	6	9
Booster Pumps Upgraded – No. of Pumps	12	12	8

* Deviations from Master Plan targets are explained in following sections.

Pipeline Replacement

As shown in Figure 3, the Master Plan pipeline replacement schedule was intended to accelerate over time, starting at four miles per year in FY2002 then increasing to 18 miles per year by FY 2016. This schedule would have resulted in replacing or cement lining 273 miles (54 percent) of PWP’s water pipelines by year 2020. However, PWP soon realized this schedule was far too aggressive. When more than five miles of pipelines were installed it was found to be quite disruptive to the community. As a result, lower annual goals have been set with each CIP budget since FY 2005 and only 70 miles of pipelines have been replaced in the last 14 years at an average rate of five miles per year. This pace was also affected by available funding and resources.

Figure 3 – Pipeline Replacement Program, FY2002-2016



The Master Plan had anticipated that 83 miles of the 273 miles of pipelines would be cement lined, rather than replaced. Cement lining is a less disruptive process that involves scraping out the rust and deposits in the pipe and lining the inside of the pipe with a thin coating of cement. Unfortunately, PWP experienced many adverse issues with cement lining program. While it was assumed that this process would extend the useful life the pipeline for about thirty years, some of these pipelines began to fail after the work was completed and one such project caused a major water quality issue that initiated boil water alert. Due to these adverse experiences, the cement lining program was discounted soon after the implementation of the Master Plan.

At the average completion rate of five miles per year, it would take 104 years to replace all the pipelines in PWP's 520 mile system. While this is a reasonable schedule given the estimated 100 year useful of these pipes, there are still approximately 80 miles of pre-1930 pipe remaining in the water system. Thus, without an accelerated schedule some pipes could reach an age of 120 years or more before being replaced. Table 2 compares PWP water pipe replacement cycle to other water agencies.

Table 2 – Pipeline Replacement Cycle

Agency	Replacement Cycle
PWP Master Plan Schedule (15 miles/year)	33 years
PWP Average Actual Rate (5 miles/year)	104 years
Los Angeles Department of Water and Power	225 years
Glendale Water and Power Department	200 + years*
Burbank Water and Power Department	200 + years*

* Rough estimate based on spending levels on pipeline replacement from annual financial reports.

To maximize the reliability benefits of the pipeline replacement program PWP has concentrated its efforts based on the age of the pipe and fire flow requirements, focusing on major traffic corridors and business districts where water main breaks could cause significant disruptions. On an average, PWP experiences about 24 water main breaks a year, which is relatively low for the size and age of PWP's water system.

Water Meter Replacement

The Master Plan Goal was to replace all small meters within 15 years, which equates to about 2,400 meters per year. However, in FY 2005 it was decided to accelerate the replacement of water meters with automatic meter read ("AMR") equipment. With AMR technology the water meter use data is collected through radio signals to mobile computers, eliminating the need to manually read the meter dials. Between 2005 and 2009 PWP replaced an average 5,800 meters per year or nearly 80 percent of the water meters in the water system.

Some of the "first generation" AMR equipment installed between 2005 and 2008 began to fail, requiring manual reading of the meters. By 2015 almost 30 percent of the water meters had to be read manually. In FY 2016, PWP was able to replace the nearly 10,000 failing AMR equipment using warranty and CIP funds with the latest technology. Currently, about 92 percent of the water meters are read using AMR. PWP intends to replace the remaining non-AMR water meters by the end of FY2018.

Reservoir Seismic Retrofits

Most of PWP's reservoirs are over 80 years old, and the Master Plan identified twelve in need seismic retrofit. This work has proven to be far more time and resource intensive than previously anticipated, requiring full investigation of the existing structural conditions before designing the retrofits. There may also be extensive water system modifications required before a reservoir can be taken out of service. As a result, only two of the twelve reservoir retrofit projects, Windsor and Sheldon, have been completed. Both of these retrofit projects included extra reinforcements to facilitate mounting solar photovoltaic panels on the reservoir roof.

Currently, PWP is doing a feasibility study to evaluate the five million gallon Sunset Reservoir that is next to the City Yards. This Reservoir was built in 1888. The initial investigation indicates that a total replacement of the reservoir with a new water tank will be more viable in the long term.

Groundwater Wells Rehabilitated

PWP has rehabilitated more groundwater wells than was recommended in the Master Plan. The accelerated rehabilitation schedule has been driven by mechanical problems and improvements necessary to compensate for declining groundwater levels. PWP continues to have problems with many of its older groundwater wells, some of which were drilled over 80 years ago and continue to experience operational problems. As part the FY 2017 CIP, PWP will investigate drilling new wells at two sites instead of rehabilitating the existing wells. The cost to drill a new well is approximately \$1.5 million, versus \$300,000 to \$400,000 to rehabilitate a well.

Eight of PWP's sixteen wells are operational at this time. These eight wells provide a maximum pumping capacity of about 9.2 million gallons per day ("MGD"), or up to 18,000 acre feet of water per year assuming continuous year-round operation. While this capacity is normally more than sufficient to extract PWP's 10,304 acre feet of annual groundwater pumping rights, it is well below PWP's average daily demand of 24 MGD or peak daily demand of over 33 MGD. Thus, there is insufficient capacity to deal with import constraints that last more than a few days without significant demand reduction. Of the seven wells that are not operational at this time, four have mechanical problems and three have water quality issues.

Booster Station Upgraded

PWP has upgraded eight of the twelve booster stations identified in the Master Plan. This includes three of the largest booster stations that are the foundation of the water distribution system. About sixty percent of all the water used in PWP's water system flows through one of these three booster stations serving customers north of the 210 freeway. In FY 2018, PWP will be reconstructing the Arroyo Booster Station that serves Northwest Pasadena and West Altadena. After the completion of the Arroyo Booster Station, there are only three small booster stations servicing the Linda Vista area that needs upgrading to complete the Master Plan goal.

Evolving Priorities for Master Plan Implementation

Over the last fourteen years, there has been some shift in priorities in CIP projects from those identified in the Master Plan:

- PWP has put additional emphasis on projects that increase the water supply. Some of these projects were identified in the Water Integrated Resource Plan;
- There have been additional projects not envisioned in the Master Plan. On average for the last five fiscal years about 26 percent of Water CIP has been spent on projects not identified in the Master Plan. These projects include: GIS, Customer Driven Construction, billing system upgrades, AMR metering, IVR, warehouse modernization, Arroyo Seco and Eaton Canyon Bridge and Road Repairs, Arroyo Seco Canyon Project, Water IRP, Security Systems, SCADA upgrades, and reconstructing well and reservoirs;
- Because of the age and condition of many water facilities, a change in emphasis has been considered from a refurbish and upgrade to demolish and rebuild for some facilities;
- PWP began deploying new technologies such as AMR water metering;
- Reevaluation of the amount of pipeline replacement that is appropriate given financial and community constraints;
- PWP began to refocus on general maintenance of the water system such as replacing broken water system gate valves and installing newer fire-hydrants;
- Not implementing the Cement Lining Program;
- Water demands are currently 28 percent lower than forecast in the Master Plan. The projected average annual water usage was to be 41,300 acre-feet by 2015. During the last three years the average water usage was 29,800 acre-feet. The sizing of pipes, reservoirs, and booster stations are dependent on water demands.

Next Steps

PWP will update the Water System Master Plan in FY 2018. While there are many facilities identified in the 2002 Master Plan that still need to be upgraded or replaced, there have been significant changes in the water system and in water demands. With lessons learned since the implementation of the original Master Plan, a fresh look at PWP's capital improvement program is needed.

Proposed Master Plan update schedule:

- May 2017: Prepare a scope of work and select engineering services consultant
- July 2017: Consultant commences work on the Water Master Plan
- October 2017: Review initial findings from the consultant
- November 2017: Discuss initial findings with MSC and prepare documents necessary for public discussion
- January 2018: Begin discussion with stakeholders and the public
- March 2018: Review draft Water Master Plan document
- April 2018: Distribute final Water Master Plan document

Key Issues for 2018 Master Plan Update

The Master Plan will be updated in FY 2018 to address the following key issues:

- Reduced water demand and sales volume/revenue
- Necessary and feasible rate of pipeline replacement
- Identify and address fire flow issues
- Review need for seismic improvements and prioritize
- Local water well production capacity and design to improve reliability, operational flexibility, and reduce energy use and peak demands
- Water treatment options to improve operational flexibility and reliability
- Distribution upgrades needed to facilitate additional local resources including non-potable supplies
- Technology changes including advanced metering; and, distribution system monitoring, automation, and control
- Investigate opportunities to provide flexible electric demand, energy storage, and or support local solar photovoltaic installations
- Forecast future water demands.

Seismic Resiliency

PWP has taken numerous steps to prepare for possible earthquake activity. A major earthquake could damage local water infrastructure, interrupt imported water supplies, and disrupt power supplies needed to operate facilities. Table 2 lists the seven earthquake scenarios used to evaluate the seismic vulnerability of the water system.

Table 2 – Scenario Earthquakes

Earthquake Source	Magnitude
San Andreas	7.9
Sierra Madre	7.2
Raymond	6.5
Verdugo-Eagle Rock	6.9
Upper Elysian Park	6.4
Puente Hills	7.1

Because of their proximity, the Sierra Madre or the Verdugo-Eagle Rock faults could cause more damage to PWP's water system than a 7.9 magnitude earthquake on the San Andreas Fault. Below is a discussion of how PWP's water infrastructure would perform during a seismic event:

Pipelines

- Most of PWP's pipelines are cast iron or ductile iron. This pipe material generally performs well in an earthquake and is flexible enough to allow for some earth movement.
- During a major earthquake, numerous pipe breaks could occur. A rupture on the Verdugo-Eagle Rock Fault would likely cause more pipeline breaks than the

other faults. It is estimated that PWP would experience 110 breaks from ground shaking, 22 breaks from landslides, and 8 breaks due to fault line offsets.

- While repairing the pipeline breaks may take weeks, it is important to quickly isolate the broken pipes from the rest of the water system. This isolation is made possible by the nearly 8,000 water system gate valves. PWP has an active valve exercising program to ensure gate valves are operational.
- PWP has its own construction crews and equipment to make repairs. However, after a major earthquake, prioritizing of repairs and “mutual-aid” may be needed.

Electric Power

- During an earthquake a disruption in power service is possible. Without power groundwater wells and booster pumps would stop operating.
- If the power outage is localized there will be little or no impact on water delivery. Operationally, PWP has the ability to move water throughout the system even if some of the booster pumps are off line. Also, PWP has interconnections with all of its neighboring water agencies to allow for transfer of water.
- In a major power outage, PWP would need to rely on the water that is in the reservoirs. Much of the City would be out of water in a couple of days.
- Having locally generated power does increase PWP’s power reliability.
- PWP has considered purchasing portable generators. The cost for a generator large enough for a groundwater well or a major booster pump is over \$1 million dollars. However, as part of the booster pump upgrades PWP has installed quick-connect couplings to accommodate for the use of portable generators.

Reservoirs

- Most reservoirs are buried tanks with a timber roof support system. There is little risk of gross failure of any of these reservoirs.
- Only two reservoirs out of the twelve reservoirs that need seismic retrofit have been retrofitted as recommended in the Master Plan. A major part of the seismic retrofits are to keep the roofs from sliding around over the reservoir. After an earthquake the reservoir may still be usable for non-drinking purposes.

Imported Water Supplies

- The Metropolitan Water District (“MWD”) provides PWP’s imported water supplies. The San Andreas Fault crosses through both the State Water Project Aqueduct and the Colorado River Aqueduct that convey water to MWD. MWD has been preparing for a major earthquake of the San Andreas Fault for years. One purpose for the creation of the Diamond Valley Reservoir was to store up to six months of water supply west of the San Andreas Fault.
- MWD has only one pipeline that serves Pasadena. This pipeline from MWD’s treatment plant in La Vern to Pasadena crosses numerous seismically active areas. MWD has its own pipeline manufacturing shop to respond to any pipe breaks on MWD’s system, but repairs could take days or weeks.

3.C



PASADENA WATER AND POWER

MEMORANDUM

March 28, 2017

To: Municipal Services Committee

From: Gurcharan S. Bawa 
General Manager

Subject: Status Update of the 2011 Water Integrated Resources Plan and Current Water Supply Conditions

This item is for information only.

It has been six years since the City Council adopted the Pasadena Water and Power (“PWP”) Water Integrated Resources Plan (“WIRP”). This memo provides an informational update on the status of the projects that were approved by the City Council. It also discusses the timing for a formal update to the plan and when this will be of most benefit.

BACKGROUND

The goals of the WIRP are to address water supply challenges, establish a vision for a water supply portfolio, and provide policy guidance for evaluating investments for the City’s water resources and conservation programs. The City Council adopted the WIRP on January 31, 2011.

The WIRP evaluated over fifty water supply and conservation options. A water resource portfolio was recommended and it is called the Hybrid 1 Portfolio (“Hybrid 1”). When implemented over a 25-year horizon, Hybrid 1 proposed a sustainable balance between environmental stewardship, supply reliability, affordability, and efficient water use while maintaining Pasadena’s quality of life. This memo provides the status of the conservation goals and six projects included in the Hybrid 1 portfolio. Additionally, PWP initiated the Arroyo Seco Canyon Project to enhance stormwater capture, but this project was not included in Hybrid 1.

Status Update of Projects

1. Aggressive Water Conservation

Goal: Reduce demands by 9,000 acre-feet per year (AFY).

Status: On track. Achieved 14,300 AF in reduced demand for FY 2016.

PWP engages in education and outreach to promote its conservation programs and provides rebates to incentivize the use of water conserving devices.

Examples of conservation programs and education outreach include workshops on efficient irrigation, turf removal, drought tolerant gardens, and landscape audits for high water users. Rebates for water conserving devices include low flush urinals, high efficiency clothes washers, and weather-based irrigation controllers.

An estimated 2,240 AF per year of quantifiable savings has been conserved from devices installed as a result of PWP's incentive programs over the past 6 years. Additional water use reductions have occurred as a result of code changes, tiered water rates, drought response, and information/outreach campaigns. The combined impact has resulted in FY2016 water demand at 26,000 AF, or 14,300 AF (35%) less than the WIRP's 40,300 AF baseline "before conservation" FY2016 water demand forecast. This represents PWP's lowest water demand since FY1952.

2. Devil's Gate Dam Storage to Eaton Canyon for Groundwater Recharge

Goal: Provide 627 AFY in groundwater recharge.

Status: Project is led by Los Angeles County Department of Public Works ("LACDPW").

Expected Project Completion: Uncertain due to reason beyond control of PWP.

The project proposes to pump water stored behind the Devil's Gate Dam to Eaton Canyon Spreading Grounds. In 2009, the Station Fire burnt a large area of the Arroyo Seco watershed which was followed by significant winter storms in 2010 and 2011. More than a million cubic yards of sediment flowed into the Hahamongna Reservoir. In order to increase the capacity behind the dam, LACDPW is proposing to remove over 2 million cubic yards of debris over a four year period beginning in 2018. The sediment removal is necessary to create a pool for the pumps to draw water to Eaton Canyon. Currently LACDPW is completing an advanced feasibility study for this project.

3. Recycled Water for Irrigation at Brookside Golf Course and Nearby Parks

Goal: Provide 1,130 AFY in recycled water for irrigation.

Status: On-going.

Expected Project Completion: Phase 1, which will provide up to 700 AFY of non-potable water supply, is expected to be completed in mid- to late-2019.

In 2016, the environmental impact report was certified for the Pasadena Non-Potable Water Project which will provide 3,100 AFY in recycled water at build-out. Currently, PWP is pursuing State and Federal grants and regulatory permits for Phase 1, which will provide 700 AFY of recycled water. Concurrently, PWP is negotiating an agreement with Glendale Water and Power for a renewal of the existing recycled water agreement, and will be developing a retail rate structure to account for the capital, operating, and maintenance costs for the project.

4. Recycled Water for Recharge at Eaton Canyon Spreading Grounds

Goal: Provide 921 AFY in recycled water for groundwater recharge.

Status: Pending future phases of the Pasadena Non-Potable Water Project.

Expected Project Completion: Dependent on implementation of future phases of the Pasadena Non-Potable Project and/or LACDPW's Devil's Gate Dam Storage to Eaton Canyon for Groundwater Recharge Project.

A preliminary study was completed in 2012 to evaluate recharging recycled water at Eaton Canyon Spreading Grounds. Due to regulatory requirements and costs, the recycled water must blend with other sources such as storm water. The project requires a dedicated pipeline to the City's east side (Phase 6 of the Non-Potable Water Project) or for LACDPW to build the pipeline from Devil's Gate Dam to Eaton. Project planning will occur in tandem with future phases of the Non-Potable Water Project or when LACDPW proceeds with the pipeline to Eaton Canyon project.

5. Groundwater Storage of Imported Water

Goal: Provide 4,890 AFY in groundwater storage.

Status: Storage program on-hold.

The project, known as the Conjunctive Use Program ("CUP"), allows for storage of surplus water from Metropolitan Water District of Southern California ("MWD") in the Raymond Basin aquifer. The objective is to store water when supplies are plentiful for use during droughts or emergencies. However, due to recent hydrological conditions and changes in storage policies, storing excess water in the Raymond Basin aquifer is not likely to occur in the near future.

California faced a prolonged drought from 2012 to 2015 which required MWD to begin drawing from its reserves. Conditions have since improved so MWD's priority for the next several years is to restore its reserves in its surface reservoirs and existing storage programs. Due to the lack of surplus water, MWD ended its groundwater replenishment program in 2012 and is phasing out its CUP.

Over several decades, water levels in the Raymond Basin aquifer have lowered, especially in the Pasadena Sub-basin. Pumpers in this basin reduced pumping by 30% to mitigate this problem, and the Watermaster issued a moratorium on adding water to storage. The concern of the Watermaster is that MWD may direct agencies storing the excess water to begin pumping at the least opportune time. During or following a drought, for example, reliance on groundwater is already increased. Additionally, low precipitation does not allow for natural recharge of the aquifer. As a result the aquifer can exhibit excessive lowering of the groundwater and introduce other issues.

Currently there are no opportunities to store excess MWD water for the reasons mentioned above. However, conditions may change in the future. CUP requires improvements to infrastructure that will allow for increased pumping of stored supplies. Over the past six years, PWP completed the Eastside Well Collector Pipeline project, the Monk Hill Treatment Plant to restore four wells, and installed two disinfection plants.

The third and final disinfection facility is near completion. In addition, PWP will be installing two new wells and rehabilitating another well. These improvements will allow PWP to take advantage of storing excess supplies when the opportunity arises.

PWP maintains storage accounts that were initiated prior to the WIRP and as an on-going resource management program in the Monk Hill sub-basin. The storage accounts include a balance of 16,050 AF on behalf of MWD and 22,785 AF for PWP. At MWD's request, PWP is currently working to draw down MWD's storage balance over a 15 to 20 year time horizon. PWP will add to or draw down its Monk Hill storage for managing its resources to adjust for changes in demand and supply conditions.

6. On-site Storm Water Capture for Landscaping and Groundwater Recharge

Goal: Provide 138 AFY in storm water capture for on-site use.

Status: On-going. Achieved 12 AF in lifetime savings with use of rain barrels.

This project includes encouraging use of residential rain barrels and gardens, residential and commercial bio-swales, and permeable pavement. In the past 3 years, PWP issued more than 1,200 rebates for rain barrels, which has conserved 4 AF and a projected lifetime savings of 12 AF. In 2011, PWP collaborated with the Planning Department and Public Works Department to install a rain garden as an educational and community engagement demonstration project.

PWP is developing a plan for a residential infiltration pilot project to use as a demonstration and encourage further savings. In 2015, the City adopted a Low Impact Development Strategy and Green Street Policies to support on-site storm capture for residential and commercial properties.

Non-WIRP: Arroyo Seco Canyon Project

Goal: Provide an average of 1,000 AFY in stream water capture for recharge.

Status: Commenced infrastructure improvements and regulatory permitting.

PWP continues work on the Arroyo Seco Canyon Project to capture storm water on a larger scale. This project was not specifically called out in Hybrid 1, but it aims to take advantage of storm water flows in the Arroyo Seco stream. This project is partially funded under Proposition 1 that provides up to \$3.3 million in grant funding. PWP has received approximately \$573,200 in grant funds for work completed to date.

This project proposes to provide recreational enhancement and environmental improvements in two areas of the Arroyo, and expanding its spreading facilities in the former JPL parking lot. Accessing the two areas in the Arroyo requires crossing three bridges, but two of the structures will not withstand the weight of the construction equipment. In July 2016, PWP went out to bid on the installation of temporary bridges to span the two underrated bridges, and in September 2016 the contract for this work was approved by the City Council. In January 2017, the construction for the temporary bridges began and will be completed in May 2017. Starting the work for the temporary

bridges in advance is important so when construction begins for the remaining work, accessibility is less of an issue and it helps to compress the construction schedule.

Currently, this project is in litigation. The petitioners claim the project was not properly analyzed per the California Environmental Quality Act, and the City is adamantly challenging the claim. The trial began and concluded in January 2017 with a timeline of 30 to 90 days for the presiding judge to announce his ruling. Due to the lawsuit, grant funds are temporarily on-hold pending the outcome. If the decision is not favorable to the City and it requires a more detailed environmental review then it could jeopardize the grant funding permanently.

The Arroyo Seco stream captures runoff from the watershed during storm events, but the flow is highly seasonal. One of the key features of this project is to modernize the intake so during higher stream flows more water can be diverted for beneficial use by spreading. This project when completed will provide approximately 600 AFY in pumping credits, which equates to a savings of \$500,000 per year versus purchasing imported water from MWD.

This project is in the final design and permitting stages. The anticipated timeline is to commence construction by the end of calendar year 2017 and be completed in 18 months. This assumes the final decision by the judge is favorable to the City.

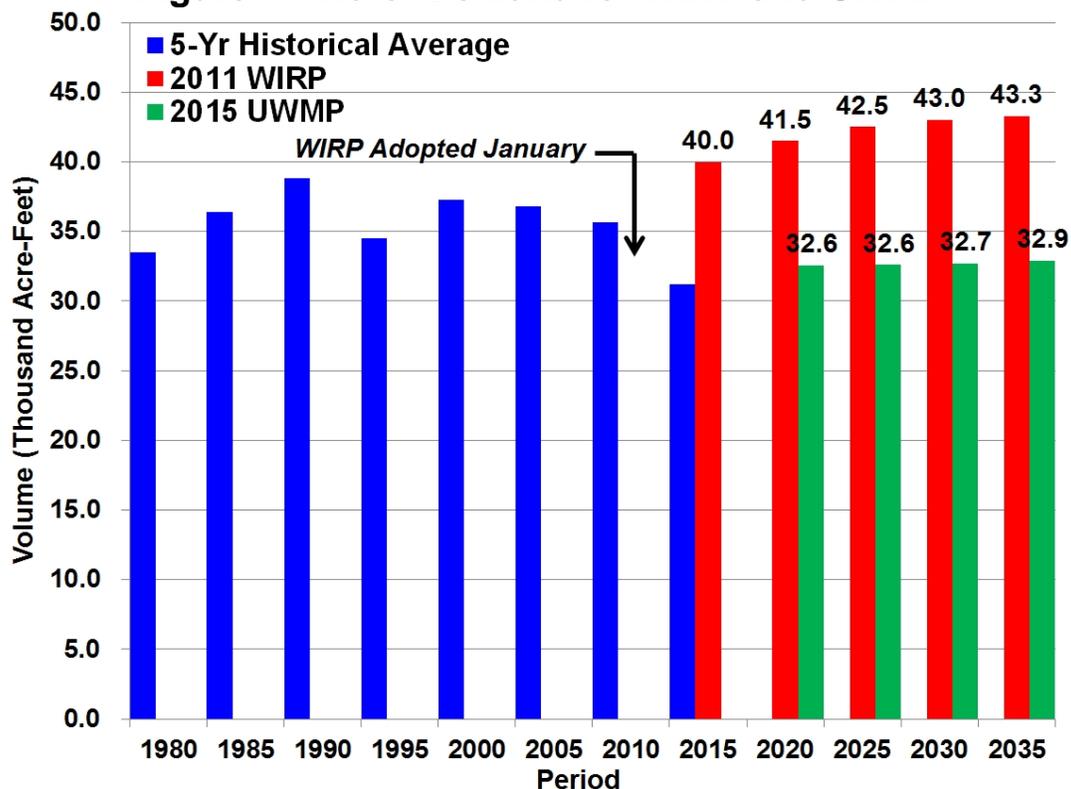
WIRP Adaptive Management Strategy

As implementing a long-term water supply strategy faces uncertainty due to a variety of reasons generally beyond control of PWP, the WIRP incorporated an adaptive management strategy. As conditions change, the Hybrid 1 projects are reassessed to determine if their implementation continues to be the best strategy. Since adopting the WIRP, the two most significant changes include lowered water demands and increased regulations.

Water Demands

Figure 1 illustrates PWP's historical "five-year average" water demand from 1975 to 2015, and the projected water demand forecasts used in the WIRP and the 2015 Urban Water Management Plan ("2015 UWMP"). Note that the demand projections for the WIRP and the 2015 UWMP include "unaccounted for water" (unmetered usage, losses, leaks, etc.) as well as savings from passive conservation (i.e. code based savings), but it does not account for savings from active conservation programs. The 2015 UWMP forecast was recalibrated to reflect significant conservation and changes in demand experienced between 2010 and 2013.

Figure 1 - Water Demand for WIRP and UWMP



The historical demand was generally in a gradual upward trend leading to the development of the WIRP, but the five years that followed were dramatically downward. By 2016, demands dropped to 26,000 AF which was the lowest since 1952. The WIRP projected a demand of 40,000 AF in 2015 and 43,300 AF by 2035. In comparison, actual demand in 2015 was 29,300 AF. The demand projections were re-analyzed while preparing the 2015 UWMP. Based on updated population data and new conservation standards and programs, the 2035 demand is projected to be 32,900 AF, which is 10,400 AF or 25% lower than the projection in the WIRP.

State Regulations

The year 2015 marked a pivotal point in California’s water regulations. From 2012 to 2015, the state witnessed consecutive periods of below average precipitation. In northern California, where the state relies heavily for its water supply, the average precipitation was 25% below normal and 2014 had the lowest levels since 1977. Conditions in southern California were worse.

In response to the drought conditions, Governor Brown took decisive actions. From 2014 to 2016, the State issued a number of executive orders mandating state-wide water reductions ranging from 20% to 25%. Each city was assigned a percent target. By May 2016, due to state-wide efforts in conserving water, the State shifted from a mandatory percent reduction to a reliability demonstration by requiring water agencies to adopt the State’s Reliability Stress Test. The intent was to show whether an agency

was prepared to meet its demands over a three year drought period. Pasadena performed the test and demonstrated it could meet the water demands. Agencies demonstrating similar results were no longer mandated to conserve but agencies failing the test were required to reduce its water usage.

In November 2016, the State released a draft report for Making Conservation a California Way of Life. The draft report, which addresses elements in Executive Order B-37-16, provides a framework for using water more wisely, eliminating water waste, strengthening local drought resilience, and improving agricultural water use efficiency and drought planning. One of the elements would include standards that build upon the 20% reduction by 2020 mandated by Senate Bill X7-7. The draft report proposes a water budget model that would begin in 2025 and continue into the future.

Thus far the winter of 2016/2017 has yielded improved water supply conditions, but new regulations for conservation and water use reduction will continue as the new norm. PWP anticipates that water demands will likely stabilize at current historic lows, and may continue to decline as structural behavioral changes take root and water efficiency improves. Applying an adaptive management strategy to account for lowered water usage over the long-term under an increasing regulatory environment warrants an update to the WIRP.

Path Forward

In fiscal year 2018, PWP will update the 2002 Water System Master Plan (“2002 Master Plan”). The 2002 Master Plan evaluated the existing water system infrastructure and identified necessary improvements so that PWP could adequately produce and distribute water through 2020. Since adopting the 2002 Master Plan, PWP has invested in a number of capital projects. The objectives for updating the 2002 Master Plan are to re-evaluate its water system and to identify new sets of priorities for its on-going capital improvement program considering progress made to date, changes in water demand, and WIRP goals to increase local water supply availability and resiliency. The updated Master Plan is expected to be completed by spring 2018.

Although initial work on the WIRP update will commence in conjunction with the Master Plan update, the bulk of the work to update the WIRP will follow the completion of the new Master Plan. The priorities will help to establish and align both demand targets with conveyance and delivery systems. Also during the Master Plan update and the subsequent year, PWP will continue to work through the Arroyo Seco Canyon Project and the Non-Potable Water Project. It is also expected in the next year the State will finalize the plan for Making Conservation a California Way of Life. PWP anticipates a much clearer picture will develop as PWP’s new projects come on-line in parallel with promulgation of new regulations on water efficiency, waste, and reduction over the next two years, providing greater certainty in planning PWP’s future water resource needs. PWP anticipates completing work on the WIRP update in fiscal year 2019 to support the 2020 UWMP process.

Water Supply Update

The past six months have had a profound change in California's drought. The winter of 2016/2017 is likely to set new records in rainfall and snowfall. In northern California, the record rainfall of 82 inches occurred in the winter of 1982/1983. As of March 9th, the rainfall in northern Sierra was 77.9 inches or 212% of seasonal average for that time of the year.

The rainfall this winter continues to fill many of the state's surface reservoirs topping spillways to allow room for runoff. Seventy-five percent of the state's total storage (27.6 million AF or MAF) captures runoff from the Sacramento and San Joaquin rivers, which provide water for the State Water Project ("SWP"). The wettest water year (1982/83), resulted in a total storage of 20.4 MAF. As of February 13, 2017 the total for the current year was 20.5 MAF. Although the water level was lowered at Orville Reservoir due to the damaged spillway, the 2.9 MAF storage level as of March 9, 2017 was still higher than the average level of 2.4 MAF for this time of the year and within the flood regulation storage boundaries.

Currently, the SWP allocation is at 60% and very likely to climb further. MWD is the largest SWP contractor with rights up to 1.91 MAF per year. During surplus years, MWD will add water to its storage (surface reservoirs, groundwater storage and banking programs) for withdrawal during dry years. In addition, MWD maintains emergency storage reserve which is at 0.63 MAF. Assuming a 70% allocation for SWP water, MWD anticipates it will add 0.85 MAF in surplus water to storage reserves raising the total to 2.1 MAF. This is a stark contrast to 2015 when the storage level was at 0.9 MAF. If the allocation rises to 80%, MWD will add up to 1.15 MAF to storage raising the total to 2.4 MAF (3.1 MAF with emergency supplies) which would be near record high set in 2012. MWD's storage capacity is 5.4 MAF and is planning to store as much water made available this year. Increasing MWD's storage reserves benefit member agencies for future drought years.

PWP's water supplies consist of local groundwater and imported MWD water. PWP has a pumping right of 10,304 AFY and also spreads stream water from the Arroyo Seco and Eaton Canyons converting it to pumping credits. As of March 9, 2017, Pasadena's rainfall was 140% of average for this time of the year (20 vs 14 inches), but recharge by spreading has been minimal. The watershed has been severely impacted by the recent drought. Dry soil conditions will require multiple cycles of rainfall before ground conditions become saturated allowing higher flows in the streambed. In addition, sediment has accumulated at the Arroyo Seco stream intake making it challenging to divert flows for recharge. Spreading credits will be around 600 to 800 AF in this fiscal year.

Since 2003, PWP has entered into long-term purchase water agreements with MWD. The agreement provides a fixed volume of water of 22,965 AFY at the lowest cost known as the Tier 1 rate. The contract does not limit PWP from purchasing more than the fixed volume, but additional purchases are at a higher-cost Tier 2 rate.

As described previously, PWP’s water demands are currently at historic lows as a result of the drought, conservation efforts, and state regulations. FY 2016 water demand was at the lowest level since FY 1952. PWP customers are becoming accustomed to using less water. Table I summarizes the short-term demand and supply to FY 2019.

Table I - Projected Water Demand vs Supply (AF)

Fiscal Year	FY 2017	FY 2018	FY 2019
Projected Demand	27,100	27,900	28,800
Less Groundwater Production ¹	10,900	10,900	10,900
Less MWD Tier 1 Purchase	16,200	17,000	17,900
MWD Tier 1 Available Supply ²	22,965	22,965	22,965
MWD Tier 1 Excess ³	6,765	5,965	5,065

1. Production includes 10,304 AF in decreed and approximately 600 AF in spreading credits.
2. The Tier 1 available supply is a fixed amount for the lowest cost of MWD water.
3. The excess represents the difference between the projected Tier 1 purchase and the fixed amount under the Tier 1 rate. Member agencies may purchase more MWD water but at a higher Tier 2 rate.

PWP has multiple sources of water to meet current and future demands. The City’s water supply is a combination of local and imported MWD water. Imported MWD water plays a crucial role and the City has a long-term purchase contract with MWD that does not limit the amount of water PWP may purchase. From a short-term outlook, surplus supply will average 21% of the projected demand and ranges between 5,100 to 6,800 AF. In addition PWP will continue to make investments in conservation to ensure greater reliability for years to come.

CONCLUSION

The WIRP applied an adaptive management strategy to identify and promote cost effective solutions to meet the City’s long-term water demands. PWP has a very reliable water supply consisting of groundwater and imported MWD water. In addition PWP continues to promote conservation programs while investing in local supply resources such as the Non-Potable Water and Arroyo Seco Canyon projects. Since 2011, when the WIRP was adopted, some criteria that were integral in the decision making process for recommendations in Hybrid 1 changed such as long-term demands and the regulatory environment. Implementing an adaptive management strategy allows for an opportunity for re-examining and refining the assumptions, objectives, and targets in the WIRP as opposed to a rigid set of planned actions over the coming years.

In fiscal year 2018, PWP will complete the updates to the 2002 Master Plan, which will establish priorities for the long-term capital improvement program PWP should make in anticipation of future water demands as population and economic development occurs. Updating the WIRP will follow the completion of the new Master Plan, which will provide updated water system information and help establish plans that are supportive of future investments. While some elements of the WIRP will be developed in parallel with the Master Plan development, PWP anticipates performing the bulk of analytical work on the WIRP update during fiscal year 2019 in preparation and support of the 2020 UWMP.