Final
Water Conservation Plan

Pagosa Area Water and Sanitation District

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Table of Contents

Appendices

List of Tables

List of Figures

Section 1
Introduction

Purpose

The Pagosa Area Water and Sanitation District (PAWSD or the District) provides safe, reliable, potable and non-potable water to its residential, commercial, and institutional customers located in and around the Town of Pagosa Springs, Colorado. PAWSD has long taken water conservation seriously, and has maintained a formal water conservation program since 2000. The backbone of PAWSD's water conservation efforts has been the combination of customer education and awareness programs along with indoor appliance rebate programs. These programs have been successful in helping PAWSD's customers reduce water use; however, it is clear that more robust and extensive water conservation measures and programs are justified and appropriate, since the area continues to experience growth and increased demand for water – both consumptive and non-consumptive.

PAWSD, its customers, and the area's businesses recognize the importance of wise water use and water use efficiency as an essential component of the community's culture – helping to maintain the local quality of life in a responsible, sustainable manner.

This Water Conservation Plan (hereafter "Plan"), therefore, defines future water conservation measures and programs that will help manage the future water supply needs of the growing residential, commercial, and institutional water users served by PAWSD. Noteworthy is that this Plan has been prepared in adherence to the prevailing state statutory requirements and allows for the responsible implementation of more meaningful water conservation in the coming years.

Acknowledgements

This Plan has been prepared through the cooperative efforts of PAWSD and various local water users including those members of the Community Committee listed in Appendix A. It was prepared under the leadership of PAWSD and was funded in part through a generous grant from the Colorado Water Conservation Board.

Section 2
Existing Water System Profile

The Pagosa Area Water and Sanitation District (PAWSD), successor to the Pagosa Water and Sanitation District formed in 1971, was reorganized in 1977 to provide water and wastewater service to the Pagosa Springs, Colorado area, located in Archuleta County in the southwestern portion of the state. Through an inclusion election held in 1992, the Town of Pagosa Springs and areas served by the former Archuleta Water Company were successfully included into PAWSD's boundaries for water service only, which nearly doubled PAWSD's boundaries at that time. For reference purposes PAWSD refers to the original PAWSD service area as District One, which generally is the area west of downtown Pagosa Springs, and the area added in 1992 as District Two, generally the areas north, south, and east and including downtown Pagosa Springs (see Figure 1 for the PAWSD service area).

Twenty-seven full-time PAWSD personnel manage and operate approximately 290 miles of water line and 80 miles of sewer line (PAWSD only provides sewer service in District One). The PAWSD water service area encompasses approximately 76 square miles. PAWSD currently provides approximately 1,900 acre-feet of treated water per year and may be required to supply several hundred acre-feet for landscape irrigation. PAWSD will have approximately 4,070 acre-feet of usable raw water storage with the completion of the enlargement of Stevens Reservoir to 1,770 acre-feet this fall.

Summary of Past Water Deliveries

Currently, PAWSD serves approximately 7,000 equivalent units (EUs). The Colorado State Demographer estimates that Archuleta County has 12,600 full-time residents; however, PAWSD serves approximately 75% - 85% of the County full-time population. PAWSD also provides water to a significant transient population associated with tourism and property owners who reside in the community only on a part-time basis. The transient population is not reflected in the published census data for the area. For this reason, PAWSD uses EUs to estimate existing and future water demands rather than population. When an estimate of population served is necessary, an approximate conversion rate of 1.5 persons per EU is used. Table 1 presents a summary of PAWSD water supply delivery in 2007.

It should also be noted that PAWSD has an obligation to provide up to 900 acre-feet (or about 290 million gallons per year (mgy)) of raw water to selected water customers (e.g., golf course, home owner associations (HOAs)) for seasonal irrigation purposes. Actual delivery of raw water varies from year to year depending on weather and customer planting patterns.

Figure 1 - Map of the Pagosa Area Water & Sanitation District Service Area

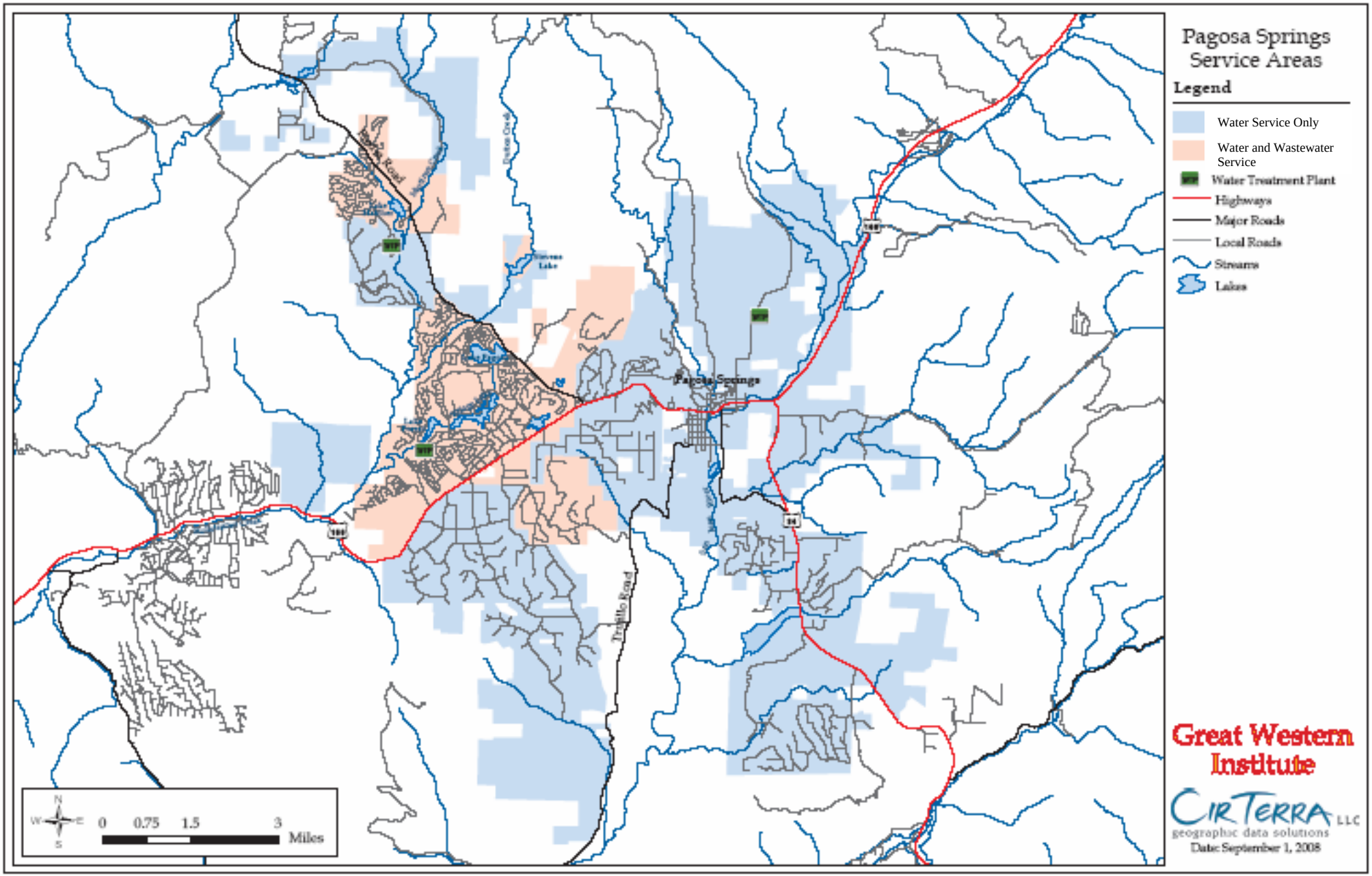


Table 1 - Summary of Annual Water Supply Deliveries in 2007

Annual Water Supply	Annual Volume (1,000,000 gallons)	Percent Metered
Surface Water Total	716.95	98%
Non-potable (Raw) Water Billed	89.5	100%
Treated (Potable) Water Billed	416.9	97%
Non-Revenue Treated Water*	210.5	
Equivalent Units Served at End of 2007	6,953	
Estimated Full Time Population Served at end of 2007	10,625	

* includes water used in the water treatment process, water for other in-house uses, and real and apparent losses

In 2007, total water delivery by PAWSD was nearly 717 million gallons, or about 2,200 acre-feet, including non-revenue water. Therefore, PAWSD is considered a covered entity under State of Colorado statutes regulating water conservation.

As shown in Table 2 on the following page, PAWSD predominantly serves residential and resort related commercial properties. District water service includes all potable water delivered through the central treatment and distribution system for domestic and commercial uses including residences, hotels and restaurants, shops, and other commercial enterprises. Water provided to these customers is used for all indoor and outdoor water uses associated with residential properties, including lawn irrigation.

Other major categories of water delivery include the following:

Town of Pagosa Springs – water provided to the Town of Pagosa Springs for both indoor and outdoor uses, noting that the majority of the use is for irrigation of Town parks.

Fill Stations and WWTP – metered water use associated with the operation of the wastewater treatment plant, and construction and residential water delivered at various stand pipes and fill stations located within the PAWSD service area.

WTP and other In-house Use – unmetered, unbilled use of water for in-house purposes, such as: filter backwash and associated processes at the water treatment plants, flushing of lines, hydrants and tanks, and known corrections to production meter over-registering.

Other Non-Revenue - the combination of apparent and real treated water losses. Includes leaks, meter inaccuracies and water theft.

Table 2 - Summary of Water Deliveries by Customer Type 2003-2007 (in 1,000,000 gallons)

						Non-Revenue Water*					
Year	Residential	Commercial	Irrigation	Town of Pagosa Springs	Fill Stations and WWTP	WTP and Other In-House Use	Other Non-Revenue	Total Treated Water Produced	% Other Non-Revenue Water	Non-Potable Water	Total Raw and Treated Water Produced
2003	308.34	79.93	3.4	11.73	16.8	118.51		538.71		113.31	652.02
2004	298.22	89.83	3.86	11.73	14.43	83.06	131.07	634.85	21%	122.62	757.47
2005	300.62	87.77	5.3	11.73	9.98	84.53	121.71	621.28	20%	108.97	730.25
2006	288.61	83.7	3.18	11.73	13.9	68	120.37	588.58	20%	82.64	671.22
2007	300.9	84.25	4.01	11.73	16.05	87.95	122.56	627.45	20%	89.5	716.95

*Non-Revenue Water calculated using the AWWA Water Audit software and District Records. No calculations available for 2003.

Non-Potable – the combined raw water irrigation use by the area golf course and those HOAs that are sufficiently close to raw water storage that they are able to utilize untreated water to meet their irrigation needs for a fee.

Water Supplies

The San Juan River Pipeline and Four Mile Creek, through the Dutton Ditch Pipeline, are the primary raw water sources for District One. PAWSD completed the construction of Dutton Ditch Pipeline in 2006 to eliminate the use of the old open ditch. District Two receives most of its water from the West Fork of the San Juan River through the Snowball Pipeline.

The annual supply provided by the existing diversions, pipelines and storage facilities is approximately 4,300 acre-feet based on the current demand pattern and including the safety supply margin (reserve storage) requirement.

The existing raw water diversion and storage facilities have limited capability due to the physical size of the facilities and the physical and legal supply of water at the diversion locations. For instance, in 2002 due to drought conditions there was no supply from the Dutton Ditch Pipeline. The only available Four Mile Creek water was the amount of carry-over storage retained from 2001 in the four reservoirs (described below) which was approximately half of the available storage capacity. Also in 2002, there was only about 4.6 cfs available at the San Juan Pump and Pipeline and about 2.3 cfs at the Snowball Pipeline. Therefore, the peak week capacity of the existing raw water system in a 2002-type drought is restricted to about 6.9 cfs. The current peak week raw water demand is approximately 6.0 cfs, which provides for only a 15% buffer in raw water supply capacity during drought. Therefore, PAWSD initiated planning to develop additional diversion capacity.

PAWSD is beginning the planning and design process to construct additional raw water diversion capacity from the San Juan River in 2014; however, even though there is additional diversion capacity there may not be water physically or legally available in a 2002 type drought. Given expected future water demands, the construction of Dry Gulch Project is essential to provide for the peak week demand in a 2002-type drought after about 2014.

Reservoirs

PAWSD presently has three reservoirs (Hatcher, Pagosa, and Forest) with a combined useable capacity of approximately 2,300 acre-feet. Also Stevens Reservoir is being enlarged in 2008 and will have a useable capacity of approximately 1,770 acre-feet. The total useable capacity at the end of 2008 will be approximately 4,070

acre-feet. In addition the surrounding golf courses, condominiums, time shares, and a hotel utilize Village Lake for raw water irrigation.

Hatcher Reservoir receives its primary source of water from Four Mile Creek through the Dutton Ditch Pipeline and through the Perkins Ditch. The Dutton Ditch Pipeline is capable of diverting water to Hatcher Reservoir, Stevens Reservoir, or both.

Operationally, when Hatcher Reservoir is full, water is diverted to Stevens Reservoir from the Dutton Ditch. When Stevens Reservoir is full it spills to Lake Pagosa through the Linn and Clark Ditch. When Lake Pagosa is full it spills into Village Lake. From there it spills into Lake Forest. Depending on various factors, including time of year and lake levels, PAWSD can and does pump raw water from the San Juan River through the San Juan Pipeline to the San Juan Treatment Plant; if needed San Juan River water can also be delivered to Village Lake, Lake Forest, or both. For water received from the West Fork of the San Juan River there is only a small settling pond which does not provide useable storage for the Snowball Water Treatment Plant.

Water Treatment

After water is collected from its various surface water sources and/or stored in PAWSD's reservoirs, it is treated at water treatment plants (WTP) to make it safe to drink and to remove unpleasant odors or tastes. PAWSD has three WTP's that are operated as needed. District One has two WTP's: Hatcher, and the San Juan. As their names imply, the Hatcher WTP (rated at 2 million gallons per day) treats water from Hatcher Reservoir and the San Juan WTP (rated at 3 million gallons per day) treats water from the San Juan River. District Two is supplied raw water by gravity pipeline from the West Fork of the San Juan River to the Snowball WTP (rated at 1.5 million gallons per day).

The District's total rated treatment capacity is 6.5 million gallons per day. During 2007, PAWSD produced and treated approximately 1,964 acre-feet of water (or about 634 million gallons).

Treated Water Storage

In District One, the Hatcher WTP pumps water to the Hatcher Storage Tank (500,000 gallon capacity). The Stevens Storage Tank (500,000 gallon capacity) is located near Stevens Reservoir. Meadows Storage Tank (1 millions gallon capacity) also provides treated storage. When the San Juan WTP is in operation, it pumps water to the Stevens Storage Tank and Meadows Storage Tank. Two additional District One storage tanks (380,000 gallon capacity) are also in place.

In District Two, the Snowball WTP supplies water to the Snowball Storage Tank (250,000 gallon capacity), the Cemetery Storage Tank (1 million gallon capacity), the Reservoir Hill Storage Tank (500,000 gallon capacity), the Putt Hill Storage Tank (150,000 gallon capacity), and two additional tanks (250,000 gallon capacity).

Section 3
Summary of Past and Current Water Conservation Activities

Current and Ongoing Water Conservation Measures and Programs

To support and manage water conservation activities PAWSD developed a Water Conservation Plan in January 2000, which was updated in 2004. Vital to this Plan was the use of education and information provided to PAWSD's customers regarding water conservation and water use efficiency. In addition, in an unprecedented move, the Board retained its first Conservation Program Director in the spring of 2003. The result of this action has been to further enhance public awareness and education related to local water conservation efforts.

Table 3 – Summary of Past and Ongoing Water Conservation Measures

Measures and Programs	Years Implemented
Indoor Residential	
Toilet Retrofit Kits	2000 to present
Low Flow and Dual Flush Toilet Rebates	2004 to present
High Efficiency Washing Machine Rebates	2007 to present
Commercial /Institutional	
Low Flow and Dual Flush Toilet Rebates	2004 to present
Project Planet Linen Reuse Program (for hotels, etc.)	2004 to present
High Use Customer Audits	2004 to present
Institutional Raw Water Irrigation System Conversions	2003 to present
Customer Education	
Xeriscape Demonstration Garden	1998 to present
Landscaping Seminar	2001 to present
Irrigation System Analyses (for Institutional Applications)	2003 to present
Brochures, Community Fairs, Newspaper Articles, Radio Ads	2003 to present
K-12 Education (i.e., Water Wise Kits)	2003 to present
Other	
Leak Detection and Repairs	2003 to present
Inclining Water Rate Structures	2003 to present
Capital Investment Incentive for Water Efficient Construction	2008 to present
Water Waste Proclamation	2003 to present

PAWSD updated its Water Conservation Plan in April 2004 to enhance the ongoing water conservation measures and programs and develop new ones. A summary of the ongoing water conservation measures and programs is provided in Table 3 and includes the following:

Water-Efficient Fixtures and Incentives to Implement Water Use Efficiency Techniques - During 2003, various methods were employed to determine

how effectively the U.S. Energy Policy Act was being followed in the local community. Due to allowing currently manufactured high use fixtures to be sold after the date of the Act, it was discovered that many relatively newly constructed commercial buildings had high use water fixtures installed. An active campaign was initiated and over 1,500 toilet retro-fit kits were distributed during residential and commercial water audits and public events.

With the assumption that toilets represent nearly 30 percent of indoor water use in non-conserving homes[1], the PAWSD initiated their first toilet rebate program in the summer of 2004. The goal of the program was to reduce water use within PAWSD's boundaries by encouraging the replacement of pre-1994 high-volume (e.g., 3.5, 5, and 7 gallon per flush (gpf)) toilets. Since then, the Rebate Program has been credited with the replacement of 202 high-volume toilets. This program is budgeted to continue in 2008. A High-Efficiency Washing Machine Rebate Program was initiated in 2007 with 35 older high-water-use washing machines removed from use.

Low Water-Use Landscapes and Efficient Irrigation - PAWSD installed a Xeriscape demonstration garden, located at the 100 Lyn Avenue offices, to provide customers with alternative low water use plant choices and the application of hard-scape in landscape planning. PAWSD presented a "Responsible Landscaping" seminar and due to the amount of public interest and enthusiasm follow up seminars were conducted to address efficient irrigation and soil amendment.

In the past, all of the area nurseries and landscaping firms were contacted to solicit their participation and support of wise water use landscaping. This was a very successful approach and increased the community's awareness of water wise alternatives. In addition, PAWSD is encouraging managers of public open space areas to evaluate the efficiency of current irrigation practices and to consider alternative landscaping. PAWSD is also participated in establishing new raw water irrigation systems for Town and school activity areas, as well as athletic fields and parks, thus reducing the use of potable water in these public use areas (there are still drinking fountains, etc. that use potable water in the parks).

Water Efficient Industrial and Commercial Processes - The PAWSD customer base is chiefly comprised of residential and commercial businesses. Special recognition has been given through the semi-annual newsletter whenever a commercial business takes steps to reduce water use by means of more efficient equipment or reuse.

[1] Based on Vicker (2001), Handbook of Water Use and Conservation, Waterplow Press.

The motel/hotel industry was introduced to the "Project Planet" program materials. Approximately 500 Project Planet laminated, multiple use door hangers where distributed to the local motel/hotels. These information cards encourage guests to conserve water by reducing laundry as well as other water conservation tips. Commercial customer water usage was analyzed, by type of business, and a personal visit was scheduled to meet with owners to deliver information regarding water use and related industry methods for water reduction. Both of these programs are on-going.

Water Re-Use Systems - The Board of Directors approved a preliminary design study for the possible inclusion of a reuse facility in the recent upgrade of the Vista Wastewater Treatment Plant. After consideration it was determined that the facility was cost prohibitive at that time; however, the Board remains committed to considering re-use systems for the future.

Distribution Leak Repair - PAWSD actively pursues distribution losses and promptly repairs leaks. District customers are encouraged to repair service lines as well as any internal leaks promptly, and a reduced rate may be allowed when unintentional water loss is discovered and repaired. PAWSD also compares water production to water sales to monitor system loss.

Currently, it is unclear how much of the District's non-revenue water results from real versus apparent losses. Apparent losses can result from inaccurate metering of customer water use – noting that as meters age they trend toward under estimating water use, especially for high-use, large diameter taps. To address this issue, PAWSD is implementing a new Firefly $_{tm}$ automated meter reading (AMR) program in conjunction with a meter replacement program and a new policy of sizing meters by fixture count. Together these changes will be used to better measure actual customer water use, and therefore better characterize real and apparent system losses.

It is anticipated that non-revenue water related to real and apparent losses, currently estimated to be about 20% of treated water deliveries, will be significantly reduced once the AMR units are installed and used, since apparent losses are expected to decrease with more accurate metering. As a result, real losses will be better characterized and system wide leak detection efforts can be honed based on real and apparent losses. In addition, the AMR technology will allow PAWSD to collect wintertime water usage, which has historically been estimated during the months that meters were covered and/or buried under snow.

Dissemination of Information - For several years PAWSD has, in cooperation with the San Juan Water Conservancy District, prepared a static

display at the local library during Water Week showing various water conservation methods and other water related materials. Brochures are also placed at a number of public establishments as well as the PAWSD office, and various age-appropriate materials are provided to the elementary and pre-schools. This program will continue on an annual basis.

During 2003, several new methods were employed to get information and useful materials out to the public; they included participation in various community events such as the Home Show, County Fair, and 4th of July Parade. An extensive newspaper and radio advertising campaign was developed related to outdoor water usage and water wise irrigation, soil amendment, and proper landscape planning. In addition, the advertising campaign promoted the toilet and washing machine rebate programs, as well as provided basic water-wise information and messaging. PAWSD also participates in a water conservation educational program for local grade school students on an annual basis.

Water Rate Structures - PAWSD has an increasing block water rate structure designed to encourage water conservation. In early 2003, the rate structures underwent a complete rate analysis with Integrated Utilities Group Inc. to design a structure that further encouraged water conservation by rewarding reduced usage. The new rate structure was adopted in July 2003 and the customers currently pay for each 1,000 gallons of water used plus a minimal monthly service fee. Previously the service charge was a flat amount for up to 8,000 gallons per equivalent unit with an additional charge for each 1,000 gallons over the minimum. The new rate structure also allows for two additional rate tiers with increasing costs for each tier. During times of drought or other events causing a raw water supply shortage, an additional water use surcharge may be applied as described by the PAWSD Drought Management Plan.

Meter Sizing – In 2008, PAWSD adopted a new methodology for calculating EUs based on meter size. This method provides monetary incentives for owners of new homes and new or change of use businesses to choose low flow rate fixtures and low water use landscapes such that their meter and tap size can be reduced, thereby reducing the cost of their capital investment fee.

Regulatory Measures - PAWSD has the authority to assess penalties for noncompliance with watering restrictions during different levels of water conservation and drought response. Meetings with representatives of the Town of Pagosa Springs, Archuleta County and other regulatory agencies were held to establish policies related to water efficient landscaping, plumbing fixtures and prohibiting water waste. These meetings began in November, 2003; it is the commitment of PAWSD to encourage policy

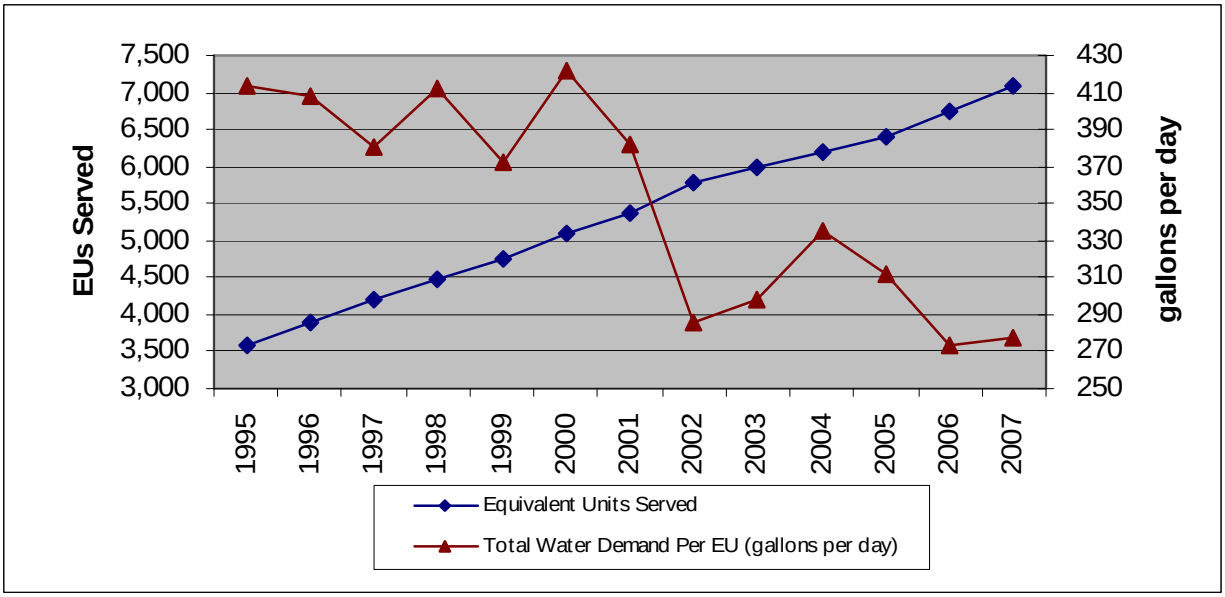
development to reduce water usage overall, not just during times of short supply.

One of the successful outcomes from these policy meetings was the adoption of a Water Waste Proclamation by various public and private entities (some of which that do not receive water from PAWSD) as well as by the principals of several private water systems that receive water from PAWSD.

Past Water Savings through Water Conservation

The average EU water use over the past 12 years for the PAWSD service area, as shown in Figure 2, has been significantly impacted by a combination of the drought of 2002 and 2003, and presumably by water conservation activities and messaging implemented by PAWSD since 2002. Specifically, average total EU water use (in gallons per day (gpd)) has dropped about 26% since 2001. Treated per EU water use has dropped from an average of about 330 gpd to an average of about 256 gpd, or about 22%, over this same time period.

Figure 2 – Total Water Use per EU and EUs Served 1995 - 2007



Active water conservation programs such as low flow and dual flush toilet and washing machine rebates, and high water use customer audits have made an impact on the overall area water use; however, it is most likely that the impact and severity of the 2002-2003 drought created the most substantial water use reductions through customer behavioral changes associated with mandatory and voluntary water use restrictions imposed during that time.

Messaging related to the drought and need for water use curtailment has left a lasting impression on water users across the state. According to the Colorado Springs Utilities water conservation plan:

> ***"The drought was a crisis that brought water to a higher level of awareness among customers. [As a result, our customers] made behavioral and physical changes to their water use patterns in response to this crisis and also in response to messages and rates from Springs Utilities. The drought shadow reflects the persistence of these responses into the future."***

Colorado Springs Utilities suggest that the drought shadow has caused a 7.5% reduction in per capita water use. Denver Water measured an average household water use decrease of about 37% between 1994 and 2004, presumably due in part to the influences of the drought.

For PAWSD, most of its water conservation measures and programs were established after the drought. Although water usage since 2004 has been reduced on a per EU basis (as shown in Figure 2), PAWSD is not in position to claim that all of the observed 26% reduction in total per capita water use is directly related to past and ongoing water conservation measures and programs. It is possible that a portion of the 26% reduction relates to the local water customers continuing to respond to the drought, such that future water conservation efforts will focus on maintaining past reductions as local memories fade and customers revert to pre-drought behaviors.

One of the goals of this Plan will therefore be to attempt to maintain the lower per capita use since the 2002 drought.

Section 4
Forecast of Future Water Demands

Forecasts can help to frame the need for water conservation based on identifying system limitations and/or future water supply needs. For PAWSD, limitations related to future treated water peak daily flows and raw water supply will likely influence the development of water conservation goals and the selection of water conservation measures and programs.

This section presents the future treated and raw water demands predicted for the PAWSD service area assuming that the potential effects of new water conservation efforts that will be selected during this planning process have not been implemented. Demand forecasting at this point has only been developed to predict future water demand based on the continuation of the current and ongoing water conservation efforts and "passive conservation" as older fixtures and appliances wear out and are replaced with models that meet current efficiency standards. A revision to the demand forecast based on implementing the selected conservation measures and programs is made later during the planning process, and is presented in Section 8.

Forecasting Methods and Results

The forecasting methods that were utilized in this planning effort were based on previous future raw water demand estimates developed by PAWSD[2]. Early each year the water usage and equivalent unit increases are evaluated and to date the data has not conclusively shown that major adjustments are needed to the 2003 Report's estimates of future water demands. In January of 2007, the PAWSD Board approved the future water demands shown in the "Total Annual Demand" column presented in Table 4. The acre-foot demand in Table 4 is essentially the same as the demands estimated in the 2003 Report except the 900 acre-feet of raw water demand is included and the EU demand is decreased. EU demand was decreased based on actual equivalent unit growth from 2003 to 2006.

Total Annual Water Demand

Total annual water demand includes a combination of all treated water demands, including revenue and non-revenue related water uses, as well as raw water demands. Treated water demands were estimated based on the following assumptions:

- Annual growth rate developed based upon Archuleta County Census Data and actual PAWSD's EU growth.

[2] Harris Water Engineering, Appraisal Report to Evaluate Future Raw Water Demands and Water Supply Alternative Plans as of March 2003

- Treated water demand was estimated based on expected treated per EU water use of 315 gpd from 2008 to 2014, and 307.5 gpd thereafter through the 10 year planning horizon of this Plan.
- Total water demand includes the treated water demand plus the expected raw water demand. Raw water demand includes 900 acre-feet, which is the current PAWSD obligation for the area golf courses and selected HOAs for non-potable irrigation water.

Note that forecasted water use for the PAWSD service area does not include the effects of the drought. To this point, estimated future raw water demands include no drought shadow effect and include the full raw water obligation of 900 acre-feet to area golf courses and HOAs.

Table 4 – Estimated PAWSD Future Water Demand

Year	Annual Growth Rate	Equivalent Units	Per EU Daily Usage (gpcd)	Total Annual Demand (acre-feet)	Total Annual Demand (mill gallons)	Total Annual Treated Demand (mill gallons)
2008	5.0%	7,437	315	3,524	1,148	855
2009	5.0%	7,809	315	3,655	1,191	898
2010	4.0%	8,200	315	3,793	1,236	943
2011	4.0%	8,528	315	3,909	1,274	981
2012	4.0%	8,869	315	4,029	1,313	1,020
2013	4.0%	9,224	315	4,155	1,354	1,061
2014	4.0%	9,593	315	4,285	1,396	1,103
2015	4.0%	9,976	307.5	4,336	1,413	1,120
2016	4.0%	10,380	307.5	4,475	1,458	1,165
2017	4.0%	10,796	307.5	4,618	1,505	1,212
2018	4.0%	11,225	307.5	4,766	1,553	1,260

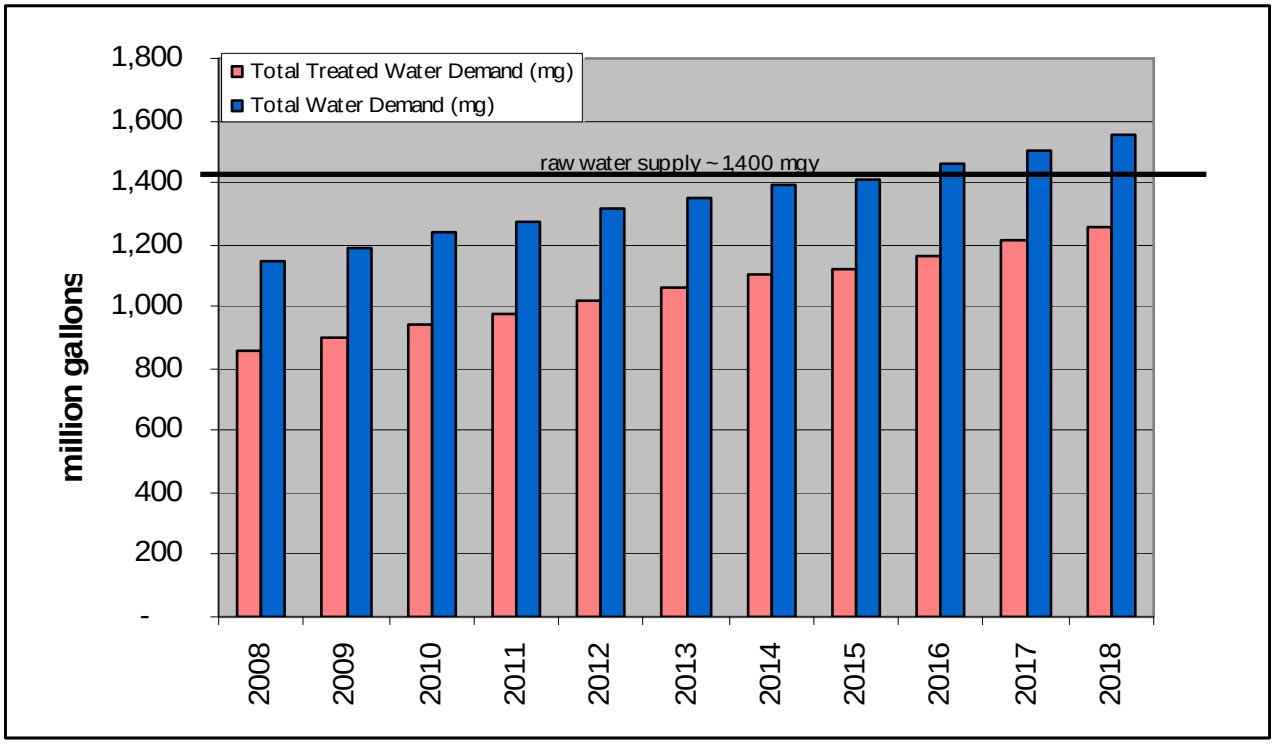
The existing facilities (when the Stevens Reservoir expansion is completed) are estimated to provide an annual supply of up to about 4,300 acre-feet (or about 1,400 mgy). Therefore, the current water supply available to PAWSD appears to reach its limit around 2015. Figure 3 presents both the forecasted total water demand and treated water demand for each of the next 10 years.

Water use by customer type, which is provided in Table 2 in Section 2, indicates that residential water use and non-revenue water (i.e., water treatment plant process water and water associated with real and apparent losses) are the largest current treated water demands. Commercial, fill stations, municipal and irrigation water use are also significant, as is raw water use. Given that numerous accounts contribute to overall expected increases in future water use, proposed water conservation measures and programs will need to address most, if not all of these different account types to create meaningful water savings.

Figure 3 shows that additional raw water facilities are needed in 2015. PAWSD has begun planning for the new facilities to meet this expected shortfall.[3] PAWSD currently is pursuing the construction of a new 5.2 cubic foot per second (cfs) diversion and treatment plant to be built near the Dry Gulch site to replace the existing Snowball Water Treatment Plant (which has a 2.3 cfs capacity) to serve District 2 and a new San Juan Intake diversion and pipeline to the San Juan Treatment Plant be built to divert and treat an additional 5.9 cfs for use in District 1. The planning, permitting and design of these facilities will begin in 2009 with construction scheduled for 2014.

Additional storage will be required to supply water to the new diversion facilities in a 2002-type drought year. However, Dry Gulch Reservoir cannot be completed and useable until 2025 or later. Therefore, should another 2002-type or other severe drought occur after 2015 and prior to the completion of the Dry Gulch Project, mandatory water restrictions will be necessary to reduce the demand to manage the available supply provided by the San Juan River and water storage in the existing reservoirs.

Figure 3 – Total Forecasted Annual Raw Water Demand and Treated Water Demand for PAWSD 2008-2018



[3] Harris Water Engineering, Report to Evaluate Alternatives for Raw Water Diversions from the San Juan River, January 2008.

Water Treatment Capacity

Currently the PAWSD treatment capacity is 1.5 million gallons per day (mgd) in District 2 and 5.0 mgd in District 1. Presently, there is limited capability to transmit water from District 1 to District 2 and no capability to transmit water the other direction. District 2 is presently using nearly the entire 1.5 mgd raw water pipeline and 40 year old water treatment plant capacity for short periods. In addition, the existing Snowball Pipeline that conveys water from the West Fork of the San Juan River into District 2 may potentially fail where it crosses the Jackson Mountain landslide. Therefore, the Snowball pipeline and treatment plant that serve District 2 are planned to be replaced by 2014 due to age, size and the potential for transmission line failure.

Section 5
Identification of Future Water and Capital Improvement Needs

Forecasting future total water and peak daily treated water demands helped to characterize some of the limitations that exist regarding PAWSD's future water supply needs. It appears that critical infrastructure limitations exist for PAWSD with regard to raw water diversion capacity, raw water storage, and water treatment plant production capacity within the next 6 to 20 years.

Appropriate, measurable new water conservation activities may be able to extend the time before new facilities and/or water supplies are needed by reducing demand, especially in the summer months through a reduction in outdoor irrigation. Decisions need to be made regarding how and when new facilities will be engineered and constructed. Specifically, PAWSD will require:

- Additional water supplies through construction of diversion facilities from the San Juan River and related storage reservoirs; and
- New and/or expanded water treatment facilities.

Cost estimates for these new and/or expanded facilities are being planned and cost estimates prepared periodically; however, with oil, steel, and concrete prices increasing dramatically in recent years, cost estimates are quickly outdated. For example, PAWSD has just completed the Hatcher water treatment plant engineering report. Based on this study[4], PAWSD is expecting to replace the existing 2 million gallon per day (mgd) filters with 2 mgd microfiltration system, with an estimated cost of about $5 to 7 million. The building and appurtenances will be sized to prepare for the future increase in the capacity of the Hatcher Plant by adding additional microfiltration units.

PAWSD has developed a plan to construct raw water facilities (diversion and storage) and water treatment plants to serve up to 28,308 equivalent units. There are currently over 7,000 EUs being served so the new facilities and costs are needed for the additional 21,308 EUs. Presently 28,308 EUs are estimated to exist within the PAWSD service area by 2040. The cost for all of the raw and treatment facilities to serve up to 28,308 equivalent units is estimated to be approximately $150,000,000 in 2006 dollars. These costs are expected to be incurred over the next 20 to 30 years – the largest cost being associated with the construction of the Dry Gulch Reservoir and related facilities in approximately 2020.

For purposes of comparison with conservation measures, the construction cost per acre-foot of raw and treated water facilities is approximately $20,000.

[4] Brilliam Engineering Services, LLC, Hatcher Water Treatment Plant Engineering Report, February 2007.

Water conservation measures and programs should be implemented as soon as possible to attempt to postpone the need for some of the new facilities and stretch the District's water supplies. For example, if the drought shadow can be made permanent or further reduced through water conservation programs and measures, some of the new facilities might be delayed by 5 to 10 years. The Snowball pipeline and treatment plant will be constructed in approximately 2014 regardless of demand reduction because the pipeline must be replaced in the near future and the treatment plant filters are near the end of their useful life.

Section 6
Goals and Objectives for Future Water Conservation Activities

Role of Water Conservation in Ongoing Water Supply Planning

For many utilities, including PAWSD, water conservation is an important component of overall water supply planning. Actions to reduce water demand, decrease system losses, and increase operating efficiencies will benefit PAWSD and its customers through the following:

- Reduction of operation and maintenance costs that are associated with increased water demand, such as pumping and chemical costs.
- Reduction of long-term water needs that reduce or delay the need for new water supply, transmission, storage and treatment facilities.
- Reduction of water demands such that more water remains in local streams and reservoirs providing in stream flows, which in turn enhance water quality, aquatic life, recreation and aesthetic benefits to PAWSD's customers and the local community.
- Reduction of residential, institutional, and commercial water consumption, which reduces wastewater flows and costs associated with the operation and maintenance of the wastewater treatment plants.
- Reduced individual customer water and sewer bills, and reduced energy costs due to decreased hot water usage.
- Demonstration of conservation and efficiency in the use of a limited natural resource that demonstrate the commitment of our community to environmental awareness and responsibility.

Although PAWSD maintains a reliable water supply, continued development in its service area is expected to occur. As increased residential and tourism-based development occurs, increased water demands are expected, both on a permanent and seasonal basis. Therefore, water conservation efforts will need to continue to expand and respond to the needs of the community, and will help reduce the impact of water supply and water treatment infrastructure limitations.

The development of an updated Water Conservation Plan ("Plan") allows PAWSD and its Board to better characterize its water supply system, customers and previous and existing water conservation measures and programs. Updating the Plan has also provided an opportunity for the PAWSD staff and its Board to learn about and become invested in a wider variety of potential water conservation measures and programs, focusing PAWSD resources on those activities that provide measurable and verifiable water savings at a reasonable cost.

Specific Goals and Objectives

Goals and objectives for future water conservation measures and programs will be set by PAWSD to help address future challenges that exist with regard to water supplies and water treatment infrastructure. The future challenges that PAWSD faces are not necessarily different from those of other Colorado communities; however, the timeframe for demonstrable water savings is perhaps shorter for PAWSD when compared to some other municipalities and special districts, in part due to the rapid growth that has been sustained in the PAWSD service area.

The key drivers for setting goals for PAWSD's water conservation efforts are as follows:

- Postpone capital projects related to new water treatment plant and related infrastructure, and new water storage facilities, to the extent practical.
- Reduce outdoor use of potable water to reduce peak daily treated water demand during the late spring and summer.
- Prepare for future growth by creating a tradition and culture of wise water use.

The quantitative goals that have been developed based on the timing of future water supply challenges are as follows:

- Reduce summertime and overall water use by 9 to 10 percent by 2018, which amounts to a savings of about 400 to 500 acre-feet (130 to 160 mgy) of annual water production.
- Reduce the amount of non-revenue water related to real and apparent treated water losses from 20% to 12% by 2018 (utilizing, in part, AMR technology to better characterize and differentiate real from apparent losses, and track leaks).

The water savings expected from the water conservation program identified in this Plan has an estimated value of between $8 and 10 million in today's dollars, based on a treated water development cost of $20,000 per acre-foot.

Section 7
Identification, Screening, and Selection of Water Conservation Measures and Programs

This section presents the identification, screening and selection of those water conservation measures and programs that are relevant and appropriate to the needs of PAWSD and its water customers. Noteworthy is that the process of water conservation measure and program identification, and screening, was aided by the interaction of PAWSD with a community stakeholder group that included members of local businesses, non-profits, and government. A complete listing of the community stakeholder group that assisted PAWSD in this process is provided in Appendix A.

It is important to understand the meaning of measures and programs within the framework of PAWSD's water conservation plan. Based on the prevailing literature[5], measures include both hardware devices and practices that actually reduce demand, whereas programs are strategic combinations of activities and measures (e.g., education and incentives with measures, etc.) that will bring about reduced water use demands. To this point, hardware measures are typically more reliable in achieving long-term water savings because they typically need to be installed only once and require little or no ongoing effort to maintain. Therefore, hardware devices such as low flow toilets create water savings without the need for changes in customer behavior.

In contrast, educating water users to adopt low-water-use or native landscaping and irrigation practices can require considerable time and effort since ongoing reminders are needed if water-efficient landscape and irrigation practices are to be consistent and persistent. The best water conservation programs link hardware installations with practices that support behavioral changes such that end user water demands are measurably reduced to levels that can be maintained and sustained. This is exactly the approach that PAWSD will be undertaking.

The water conservation measures and programs presented herein are focused on those activities that will occur over the next ten years, or until 2018. Any planning horizon beyond this time period, albeit valuable for long range and strategic planning, is wrought with extrapolations and estimates that do not necessarily support the short and midrange planning that is needed to develop the tactics which must be included in the water conservation plan. Therefore, the identification and selection of water conservation measures and programs will be limited to describing only those activities planned for implementation in the next ten years.

Focusing this plan on defining the future water conservation activities that will be implemented within the next ten year period serves two key functions for the District:

[5] Based on Vicker (2001), Handbook of Water Use and Conservation, Waterplow Press.

- It allows PAWSD to collect information that it currently lacks regarding customer water use, and develop specific measures and programs to address customer water conservation needs to improve their water use efficiency; and
- It allows PAWSD to respond as its customers embrace and engage the various measures and programs being promoted and provided by PAWSD to save water.

As indicted above, behavioral changes, which occur as a result of institutional, business, association, and/or individual customer response to key water conservation measures and programs, are important components of any water conservation effort. Meaningful water conservation requires that end users respond to education, request and utilize rebates, conduct audits and/or adhere to ordinances for water demand to be reduced. Given that behavioral changes strongly influence the acceptance and effectiveness of any water conservation measure or program, it is imperative that continuous and deliberate monitoring and verification of the proposed activities occur, and that the information collected is used to refine and alter the ongoing programs as they are implemented in response to customer behavior. Therefore, PAWSD will link those water conservation measures and programs that are selected for implementation with appropriate monitoring and verification activities for just this purpose.

Having water conservation measures and programs that include explicit means to monitor customer/end user acceptance and adherence, ultimately allowing for the measurement of "saved water", is vital to the overall success of the water conservation program. Monitoring customer water use becomes increasingly important as water conservation programs mature, such as those measures and programs that PAWSD has implemented in the past and is looking to implement in the future. Therefore, key components of this water conservation plan will include individual customer water use tracking for existing customers, substantial education for new customers (including both residential and commercial water users), and the use of deliberate customer feedback mechanisms such as surveys and focus groups (which will be linked to customer water audits and training programs) to track perceptions and behaviors.

Identification and Initial Screening of Measures and Programs

To develop a water conservation program that will satisfy the needs of the District and its customers, the universe of water conservation measures and programs available to PAWSD was developed and screened based on the following criteria:

- Are additional data and information needed to complete an evaluation of water savings and cost benefit associated with any specific measure or program?
- Does implementation of any specific measure or program allow for the tracking of future water savings?

- Are there other considerations that dictate whether or not an identified measure or program could not be implemented by the District (e.g., some ordinances would not meet with public acceptance, some measures and programs are not allowed by State regulation, etc.)?

Appendix B contains a summary of those measures and programs that were identified by PAWSD, in conjunction with the community stakeholder group, for initial screening. Appendix B also contains the results of the initial screening effort, presenting those measures and programs that were selected to be carried forward for further, detailed evaluation.

Please note that many of the unselected measures and programs listed in Appendix B may be implemented in the future by the District; however, adequate information does not currently exist to support a thorough cost benefit analysis at this time. Also note that educational efforts will be an important component of the future water conservation activities conducted by the District. The direct measurement of the water savings created by effective educational practices is not necessarily quantifiable; however, it is clear that without ongoing, appropriate education of the District's customers regarding water resources and its water conservation efforts, meaningful water conservation will be difficult to implement. In addition, the literature indicates that meaningful water conservation associated with rebates and incentives, as well as water rate increases, are more effective in conjunction with educational programs. Therefore, educational activities will be included in the District's overall water conservation efforts.

Detailed Description of Retained Measures and Programs

A description of the potential water conservation measures and programs that passed the initial screening effort is provided below, with a brief explanation of each as it relates to the District.

The screened measures and programs include both supply side and demand side activities. On the supply side, PAWSD will evaluate the relative benefits of improved metering and leak detection, system wide transmission losses, and in general improved water delivery efficiency. On the demand side, PAWSD will evaluate measures and programs that reduce water waste, improve water use efficiency, and provide incentives for wise water use.

The water conservation measures and programs that the District will consider for implementation, based on the initial screening presented in Appendix B includes:

> **Residential** – Includes those measures and programs that can be used to reduce indoor and outdoor water demand for existing residences, including part-time residences and full-time single family and multifamily dwellings. The breadth of measures and programs to be identified include, but are not limited to, rebates and incentives, ordinances, and water meter upgrades and enhancements. Note that

some PAWSD customers haul their potable water from fill stations to their homes. Still other residential customers, who receive potable water from PAWSD, also have access to raw water supplies for irrigation purposes due to their proximity to PAWSD ponds and lakes. The measures and programs described herein apply to all of PAWSD residential customers and their diverse water sources.

Commercial, Industrial and Institutional – Includes those measures and programs that can be used to reduce indoor and outdoor water demand for existing commercial, industrial and institutional facilities, including municipal buildings and parks, irrigation-only customers, restaurants, hotels and motels, assisted living facilities, car washes, and other commercial and industrial facilities. The breadth of measures and programs to be identified include, but are not limited to, rebates and incentives, ordinances, and water meter upgrades.

New Construction – Includes those measures and programs, which are chiefly comprised of regulations and standards, as well as rebates and incentives that would apply to new construction of residential, commercial, industrial and institutional buildings and facilities. New irrigation-only taps may also be included in this category. Note that regulation and standards developed for new construction will not be applicable to existing construction. For example, soil amendment and/or irrigation system requirements that would be developed for new construction would not apply to any existing facilities and/or buildings. Point of sale ordinances and regulations would fall within the residential and commercial, industrial and institutional categories listed above.

Education – Includes those measures and programs that would be developed to educate, inform, train, and when appropriate, certify water customers, including homeowners, property managers, landscapers, developers and commercial and industrial water users. Educational efforts will also be evaluated for K-12 student and teacher education. Public relations, outreach and messaging efforts also fall under this category of measures and programs.

Other – This category includes those measures and programs that do not necessarily fit into the above list. For example, increasing water rates falls into this category, as does large-scale wastewater reuse, system wide leak detection, raw water conversions, high water use account tracking, Town-wide tree programs, and other large scale, multi-user programs. Other measures and programs typically include those efforts that will impact demand side water management or most, if not all, water users.

A presentation of the water conservation measures and programs that were considered in this Plan are summarized in Table 5 to align with the requirements specified in CRS 37-60-126 (4)(a). Appendix C contains a copy of CRS 37-60-126.

Table 5 - Summary of the PAWSD's Ongoing and Proposed Water Conservation Measures and Programs

Requirement[a]	Current Program	Proposed Program
Water efficient fixtures and appliances (e.g., toilets, urinals, etc.)	PAWSD currently benefits from the federal plumbing code for new construction and remodels. In addition, PAWSD has established a residential rebate program for low flow and dual-flush toilets and high efficiency washing machines.	PAWSD will consider continuing its residential rebate program (for HE toilets) and expand its rebates for commercial and institutional indoor appliances. PAWSD will also evaluate demonstration projects for waterless toilets and urinals.
Low water use landscapes, drought-resistant vegetation, efficient irrigation	PAWSD provides educational material to residents regarding the benefits of xeriscape landscaping practices. PAWSD also has a xeriscape demonstration garden that is open to the public. PAWSD also provides irrigation system assessments for its commercial and irrigation customers. PAWSD has also converted two Town Parks from treated to raw water irrigation systems.	PAWSD will consider initiating rain sensor and ET controller rebate programs for commercial, residential and irrigation-only customers. PAWSD is also considering providing outdoor audit programs to these customers. PAWSD will also continue to evaluate implementation of non-potable irrigation systems for selected Town parks to reduce treated water inefficiencies and losses.
Water-efficient industrial and commercial processes	PAWSD has limited industrial customers. PAWSD has conducted reviews of commercial and irrigation accounts to identify high water users. PAWSD has also initiated a Planet Earth linen reuse program with area hotels and motels.	PAWSD is considering initiating commercial customer audits that will evaluate both indoor and outdoor use, and initiate commercial indoor appliance rebate and other programs as appropriate. PAWSD is also evaluating the efficacy of specific hotel/motel and restaurant audit programs that will target these specific water customers.
Water reuse systems	PAWSD has limited wastewater return flows that can be used for reuse purposes. At this time they do not have any formal reuse program.	PAWSD has considered reusing some of its treated wastewater for greywater irrigation, however the availability of raw water supplies renders reuse water overly expensive.
Distribution system leak identification and repair	PAWSD has implemented an Automated Meter Reading (AMR) system and is committed to a meter replacement program that involves replacing 500 customer meters per year over the next ten years. PAWSD also maintains a leak detection and repair program, identifying and repairing leaking water transmission and distribution mains on an as-needed basis.	PAWSD will evaluate the cost and benefit of expediting the installation of new meters for high water use customers. The new meters will be used to improve the measurement of apparent and real system losses, which in turn will help to track non-revenue water balances. PAWSD will also evaluate improved web-based tools to provide customers with more real-time water use data.

[a] As Compared to the Requirements of CRS 37-60-126 (4)(a)

Table 5 - Summary of the PAWSD's Ongoing and Proposed Water Conservation Measures and Programs

Requirement[a]	Current Program	Proposed Program
Public education, customer audits	PAWSD currently utilizes its website, newsletters, advertisements, and various customer training seminars to educate and engage its customers regarding water conservation and water resources management. PAWSD also supports local culture fairs with water conservation "giveaways".	PAWSD will continue these efforts and consider adding indoor and outdoor commercial and residential audits, outdoor residential and irrigation account audits and customer water use training workshops. PAWSD will also consider expanding current K-12 water education efforts. PAWSD will consider adding relevant customer data access ports to its website (e.g., customer water use, ET data, etc.).
Water rates structure and billing systems that encourage water efficiency	PAWSD currently utilizes inclining block rates for its residential and commercial customer accounts. It bills its customers monthly and includes billing inserts discussing water conservation. PAWSD has challenges collecting water meter readings in the wintertime and is therefore implementing its AMR and meter replacement program to remedy this shortcoming.	PAWSD plans to conduct water rate studies at least every three to five years in the future to support water rate increases. PAWSD will also utilize the more accurate water use information created by the AMR and meter replacement program to improve water billing accuracy.
Regulatory measures	PAWSD has the authority to assess penalties for noncompliance with watering restrictions during different levels of water conservation and drought response.	PAWSD will, in partnership with the County and the Town, evaluate landscape and irrigation system ordinances that will control soil amendments, plant materials and irrigation system installation for new construction. Similarly, PAWSD will work with the County and the Town to determine the efficacy of developing high efficiency water use fixture and appliance requirements for new housing and commercial properties.
Incentives including rebates	PAWSD has indoor appliance rebates for low flow and dual-flush toilets and high efficiency washing machines.	PAWSD will evaluate continuing its rebate programs (enhanced with HE toilets) and expanding its rebates for commercial indoor appliances, and residential, commercial and irrigation account outdoor irrigation equipment.

[a] As Compared to the Requirements of CRS 37-60-126 (4)(a)

Residential Possibilities

The list of potential residential measures and programs includes both indoor and outdoor management practices. The key measures and programs that PAWSD will be evaluating for implementation include metering improvements and incentives and rebates for low water use and/or high efficiency appliances and fixtures (noting that low flow shower heads and faucet aerators will only be provided to those customers that allow a whole house audit to be performed at their residence) and metering improvements. PAWSD already administers low flow and dual-flush toilet and high efficiency washing machine rebates.

PAWSD will also evaluate the cost and benefit of:

- Adding irrigation equipment rebates for those entities that undergo at least an outdoor irrigation audit;
- Developing a mulch material giveaway in conjunction with Christmas tree disposal activities conducted by the Town;
- Providing customer incentives for installing hot water on demand equipment in existing kitchens and bathrooms;
- Installing shut off valves on fill station hoses to reduce water spillage during fill ups; and
- Installing Smart House metering devices to allow individual homeowners to monitor their water use in real time.

Commercial, Industrial and Institutional Possibilities

Potential measures and programs that could be implemented to address commercial, industrial and institutional water use reduction include both indoor and outdoor management practices. The key measures and programs that PAWSD will be evaluating for this customer group include:

- Facility audits that will include those developed specifically for lodging businesses and restaurants;
- Incentives and rebates for low water use and/or high efficiency fixtures (noting that low flow shower heads and faucet aerators will only be provided to those customers that allow a commercial audit to be performed at their facility);
- Facility metering improvements (akin to the Smart House metering for residential customers); and
- A re-invigoration of the pre-wash nozzle giveaway performed in years past for restaurants in the area.

The focus of these giveaway and incentive programs will be to penetrate the commercial enterprises that make up the majority of this customer class (i.e., restaurants and hotels and motels) combining audits with installations of high efficiency fixtures. To this point, not

only will PAWSD evaluate commercial audits, but they will assess the value of establishing separate lodging and restaurant audit programs to target and support water conservation for these key business types.

It is anticipated that the largest permanent water savings that PAWSD can realize in the short to medium term will be through indoor programs for commercial entities. In the long term, outdoor irrigation practices can be improved to realize even larger water savings; however, outdoor programs are typically more expensive and difficult to implement. Therefore, PAWSD will evaluate the efficacy of implementing irrigation audits and irrigation control equipment rebates for its commercial, industrial and institutional customers. Control equipment may include rainfall sensors, flow meters with system shut off capabilities, and advanced irrigation controllers, which will be provided to large commercial and irrigation users, and Town of Pagosa Springs Parks Department, only after an irrigation and/or facility audit has been performed. PAWSD will also evaluate and assess raw water conversion options for one additional Town Park within the Town of Pagosa Springs.

Another program that PAWSD will consider is the implementation of demonstration projects using waterless toilets and urinals in high-traffic municipal and/or other institutional settings (e.g., at PAWSD facilities). These demonstration projects will be used to characterize the long-term cost and operational issues associated with each of these fixture types, since waterless toilets and urinals may not be the most cost-effective water savings devices in the short-term.

PAWSD is interested in initiating a "Wise Water Use Certification Program" that will be created to formally recognize water efficient businesses throughout the PAWSD service area, including but not limited to: car washes, restaurants, hotels and motels, and laundromats. If developed, the certification would include awarding a display that would be visible to the business's customers and the businesses receiving the award would be promoted through the PAWSD website or similar.

New Construction

Regulating and controlling new construction offers PAWSD the unique chance to influence water use by residential and commercial customers before they begin living and operating in Pagosa Springs. For this reason, new construction regulations and standards are enticing.

PAWSD does not have the direct authority to implement any kind of building or land development ordinance; however, the community stakeholder group working with PAWSD on this plan includes many of those entities that would be involved in creating and implementing new ordinances. Therefore, any new ordinance or requirement would need to be vetted and evaluated by numerous other organizations before implementation could occur. Notwithstanding this limitation, specific construction related ordinances and/or

regulations that will be evaluated in this Plan for potential water savings and cost implications include:

- High efficiency appliance and fixture standards;
- New lawn and landscaping standards;
- Soil amendment requirements and standards;
- Turf and landscaping restrictions;
- Irrigation system requirements and standards; and
- Top soil and wood products stockpiling and reuse standards.

This set of potential new construction regulations was chosen, in part, based on the existence of similar ordinances and construction requirements in other parts of Colorado.

PAWSD will also evaluate the cost and benefit of implementing a landscaper training and certification program for those practicing professionals in the PAWSD service area. This program would likely be developed in partnership with Green Industries of Colorado (GreenCo) who is doing the landscaper training for other municipalities in the state. Under this type of program, landscapers would be trained to properly install all aspects of water efficient landscaping, including soil amendments and preparation, appropriate irrigation systems, selected planting materials and mulching and maintenance requirements.

Education

Educational efforts are the foundation of most effective water conservation programs, since most other water conservation measures and programs are only effective if customers understand, embrace and promote their implementation. PAWSD's plan is no different. Therefore, PAWSD will evaluate the value and benefit of various educational programs within its Plan, including the following:

- Water Fairs
- K-12 Education (for children)
- K-12 Education (for teachers)
- Messaging Campaigns and Public Relations
- Customer Surveys and Focus Groups
- Web Based Newsletter
- Homeowner Education and Training
- Commercial Business/Irrigator Education and Training
- Homebuilder/Developer Education and Training
- Landscaper Education, Training and Certification
- Xeriscape Demonstration Garden Upgrade
- Web Site Update and Expansion
- EPA WaterSense Program Promotion

These educational efforts will be evaluated with regard to the potential to reach key customers and influence customer behaviors, as well as track individual customer water use. Bill stuffers typically have been shown to not have substantial reach, since they are not well read and therefore do not influence behaviors. PAWSD educational efforts will therefore be focused on influencing both permanent and transient water users, leveraging the efforts and resources both within PAWSD and within the larger Pagosa Springs and Archuleta County community.

Other Measures and Programs

The other measures and programs that PAWSD will be evaluating include those that typically impact most, if not all its customers (such as water rate changes) or require coordination of system wide efforts (such as system wide leak detection; high water use audits, etc.). PAWSD will be evaluating water rate increases as one of its key water savings measures; however, PAWSD is aware that water rate increases are substantially more effective when coupled with strong education and incentive programs for its customers. Therefore, PAWSD will implement water rate increases in conjunction with its numerous other measures and programs to help save water.

PAWSD will also evaluate the benefits of continuing to track its largest customers' water use. This effort will be coupled with the residential and commercial audit programs to help identify high water users and provide onsite support to their efforts to reduce water use and more efficiently use water.

PAWSD's new metering program that combines meter replacements with the installation of Automated Meter Reading (AMR) devices will also assist in the District's efforts to reduce system-wide leakage. Currently, it is unclear how much of the District's non-revenue water results from real versus apparent losses. Apparent losses can result from inaccurate metering of customer water use – noting that as meters age they trend toward under estimating water use, especially for high-use, large diameter taps. To address this issue, PAWSD is implementing a new Firefly $_{tm}$ AMR metering program in conjunction with a meter replacement program that will be used to better measure actual customer water use, and therefore better characterize real and apparent system losses.

It is anticipated that non-revenue water related to real and apparent treated water losses, currently estimated to be about 20% of treated water deliveries, will be significantly reduced once the AMR devices and the new meters are installed and used, since apparent losses are expected to decrease with more accurate and more timely meter readings. As a result, real losses will be better characterized and system wide leak detection efforts can be honed based on real and apparent losses. In addition, the AMR technology will allow PAWSD to collect wintertime water usage, which has historically been estimated during the months that the meters were covered and/or buried under snow.

Finally, PAWSD will evaluate the cost and benefit of installing and supporting a water waste hotline. The concept would be for PAWSD to establish and publicize a 1-800 number (or similar) that local residents and businesses could call to report wasteful water use. A PAWSD employee or contractor would respond to the call in a given amount of time by visiting the specific site, documenting the situation and helping to resolve the water waste condition. Water savings will be calculated based on the water user, past practices and the water equipment in operation.

Final Screening and Selection of Measures and Programs

PAWSD has limited resources to implement its water conservation program. Therefore, efforts of the District will focus its resources on those programs that provide the most cost-effective water savings based on those cost-benefit analyses presented in Appendix D and summarized in the Table 6 provided on the next page.

Based on the evaluations presented in Appendix D, including the cost-benefit information provided in Table 6, PAWSD has selected the following water conservation measures and programs to implement. The measures and programs selected will be implemented based on the availability of funding and the priorities indicated in Section 9.

Residential Water Conservation Programs – The District will continue its indoor appliance residential rebate programs for high efficiency toilets and washing machines. These programs will continue at least through 2013 or until customer demand drops below sustainable levels. The District will also initiate the following:

> Whole house audits with giveaways - A whole house residential audit program for PAWSD's residential customers will be developed in 2009 or 2010 to help individual homeowners identify and repair leaks, remedy irrigation system problems, and understand alternative landscaping options. During the audit, shower, toilet and faucet flow rates will be measured, and where appropriate shower and/or faucets will be replaced with low flow fittings. Individual customer water use will then be tracked to determine to efficacy of this program. If proven successful, whole house audits will be continued throughout the planning horizon.
>
> Irrigation audits and rebates – An outdoor irrigation audit program for PAWSD's residential customers will be developed beginning at the same time that the irrigation equipment rebate program begins, continuing throughout the planning horizon, as appropriate. This program is vital to the effectiveness of the irrigation

Table 6 – Summary of Costs for Water Saved for Various Measures and Programs

Measure and/or Program	Cost of Saved Water ($ spent/ acre-foot saved)	Source of Information
Pre-Rinse Spray Nozzle Giveaway	165	Appendix D
Water Rate Increases	340	Appendix D
Commercial HE Toilet Rebate	1,920	Appendix D
Commercial Rainfall Sensor Rebate	2,210	Appendix D
Commercial ULF Urinal Rebate	2,310	Appendix D
Residential HE Toilet Rebates	2,400	Appendix D
Commercial ET Controller Rebate	3,730	Appendix D
Residential Washing Machine Rebates	4,450	Appendix D
Commercial and Residential Education	4,500	Estimated from Colorado Springs Water Conservation Plan
Leak Detection and Repair	4,500	Appendix D
Commercial/Irrigation Outdoor Audits	5,370	Appendix D
Residential Rainfall Sensor Rebate	5,650	Appendix D
Residential Whole House Audit	6,730	Appendix D
Residential ET Controller Rebate	7,630	Appendix D
Waterless Urinal Pilot	10,560	Appendix D
Hot Water on Demand	12,000-30,000	See Footnote [a]
Commercial Facility Audit	12,900	Appendix D
Residential Outdoor Irrigation Audits	15,600	Appendix D
Waterless Toilet Pilot	19,200	Appendix D
Smart In-House Water Meters	30,900	Appendix D
Replacement Metering	31,870	Estimated from City of Longmont Water Conservation Plan [b]

[a] Hot water on demand was shown to save warm up water costs in the bath and kitchen. Energy savings not included in calculation. Cost of unit $300-400 for 3,500-8,000 gallons of water saved per year.

[b] Replacement meters save water through the better characterization of apparent versus real losses and the more sensitive detection of leaks. New meters typically increase water sales revenue, since old meters tend to under estimate water use.

equipment rebate program since the District will only provide rainfall sensors and/or ET controllers to those residences that have had an outdoor audit and have made the requisite repairs to their irrigation system. The rebate program, which will begin in one to two years, will be developed for those residences that have had either an irrigation audit or a whole house audit.

Meter replacement – PAWSD will continue its meter replacement program over the next 9 to 10 years. During this time, PAWSD may prioritize meter replacement on those homes based on one or more of the following criteria: high water use, age of meter, and/or customer willingness to be audited.

Education – The District will begin conducting residential customer workshops beginning in the next three to four years, continuing throughout the planning horizon. These workshops, which will be developed for single family and multi-family customers, will be used to provide general education on water wise practices and water use efficiency, promote the rebate and audit programs, and collect feedback on the efficacy of the District's water conservation measures and programs. The District will track individual customer water use before and after the workshops to help characterize the value and effectiveness of this particular educational tool. Other educational programs that the District will be implementing are discussed below.

Other measures and programs – The District will implement a campaign to reduce spillage at its fill stations. The campaign will involve educational efforts (e.g., fill station use and management will be part of the residential customer workshops attended by fill station customers) and signage at both fill station locations. Other means of communication may be initiated if the education and signage prove ineffective.

Commercial Water Conservation Programs – The District will expand its current indoor appliance residential rebate programs for high efficiency toilets to penetrate more commercial customers. The District will also develop an ultra low flow urinal rebate program by 2010. These programs will continue through the planning horizon or until customer demand drops below sustainable levels. The District will also initiate the following:

Commercial facility audits with giveaways – The District has identified that commercial facility audits with selected fixture giveaways will allow for the increased penetration of this customer base that currently is lagging. To increase penetration into the high water use customers, PAWSD will develop and implement two key commercial facility audit programs starting in 2009, if funding permits – one for hotels and motels, and one for restaurants.

The hotel/motel program will include conducting audits of entire facilities, prioritized by total water use and customer willingness to provide access. The audits will include visiting individual rooms, laundry and housekeeping facilities, cooling and heating systems, swimming pools, and kitchens. During the audit, shower, toilet and faucet flow rates will be measured, and when appropriate, low flow fixtures will be installed in showers and/or on faucets. Pre-rinse spray

nozzles will be installed as needed in kitchens and restaurants within the facility. Outdoor irrigation practices will be reviewed, including estimates of outdoor water use and demand, to determine if irrigation practices are consistent with the needs of the landscape. Educational materials will be provided and discussed with the property owners and/or managers regarding water conservation practices.

The restaurant program will be similar to the hotel/motel audits in that audits will be prioritized by total water use and customer willingness to provide access. The audit will include visiting restrooms, cooling and heating systems, refrigeration areas, and kitchens. During the audit, toilet and faucet flow rates will be measured, and when appropriate replaced with low flow fittings (for faucets only). Pre-rinse spray nozzles will be installed as needed in kitchens. Outdoor irrigation practices will be reviewed, including estimates of outdoor water use and demand, to determine if irrigation practices are consistent with the needs of the landscape. Educational materials will be provided and discussed with the property owners and/or managers regarding water conservation practices.

The District will track individual customer water use before and after the audits to help characterize the value and effectiveness of this particular water conservation tool. If proven successful, commercial facility audits once implemented will be continued throughout the planning horizon.

Irrigation audits and rebates – An outdoor irrigation audit program for PAWSD's commercial and irrigation-only customers will be developed beginning at the same time that the irrigation equipment rebates begin, and continuing throughout the planning horizon, as appropriate. This program is vital to the effectiveness of the irrigation equipment rebate program since the District will only provide rainfall sensors, flow controllers, and/or ET controllers to those customers that have had an outdoor audit and have made the requisite repairs to their irrigation system. The rebate program, which will begin in one to two years, will be developed for those customers that have had either an irrigation audit or a facility audit.

Meter replacement – PAWSD will continue its meter replacement program over the next 9 to 10 years. During this time, PAWSD may prioritize meter replacement for those commercial and irrigation-only customers based on one or more of the following criteria: high water use, age of meter, and/or willingness of the customer to be audited.

Raw water conversion projects – The District will continue to work closely with the Town of Pagosa Springs to convert treated water irrigation to raw water irrigation. Raw water irrigation has the advantage of being more efficient than treated water irrigation since treatment inefficiencies and distribution system losses are smaller for raw water systems. The Town has identified one remaining park, Centennial

Park, for a raw water conversion. Two other Town Parks have already been converted to raw water.

Education – The District will begin conducting commercial and irrigation-only customer workshops beginning in the next three to four years, continuing throughout the planning horizon, as funding allows. These workshops will be used to provide general education on water wise practices and water use efficiency, promote the rebate and audit programs, and collect feedback on the efficacy of the District's water conservation measures and programs. The District will track individual customer water use before and after the workshops to help characterize the value and effectiveness of this particular educational tool. Other educational programs that the District will be implementing are discussed below.

Other measures and programs – The District will implement a pilot project to demonstrate the value and use of waterless toilets and urinals in one or more high-use municipal and/or District buildings. It is anticipated that 2 to 5 of each fixture type will be installed and water use, maintenance costs, and public acceptance will be tracked to determine the true costs and effectiveness of these waterless fixtures. Future decisions regarding the use of these fixtures will be developed at the next major planning horizon based on the cost of future replacement water and of the fixtures themselves, and the effectiveness and limitations of the technology as determined through the pilot project.

Other Education and Outreach Efforts – The District will continue its efforts to provide educational materials and hands-on learning opportunities to all its citizens regarding water and water conservation. These efforts include many diverse efforts that will be implemented, as funding allows, over the next ten years.

To begin with, the District will continue its support of the regional water fair for 5th graders conducted through the Water Information Program (WIP) held at Fort Lewis College in Durango. The District will also evaluate the possibility of conducting a local water fair to help increase water awareness in its schools and with its teachers.

K-12 educational efforts will be increased, with the District working to conduct more in-class presentations and field trips to engage local students. In-class presentations will include the distribution of Water Wise$_{tm}$ Activity Kits to help school children measure and manage individual water use. The District will also sponsor water education for teachers through Project WET$_{tm}$, or similar, approximately every other year as funding permits.

Given the importance of water conservation awareness in the community, the District will strive to re-invigorate its H2Whoa messaging program with a new public relations and messaging campaign beginning in 2009. This campaign may be used to determine how to best utilize PAWSD resources to increase water user awareness regarding the need for water conservation. It is expected that the messaging and public relations planning effort

will be used to focus channel messaging and management, including radio programs and advertisement, printed media, bumper stickers, etc. It is possible that a business "wise water use" certification program will become an extension of the PAWSD messaging campaign.

As part of the messaging campaign, PAWSD may convene and leverage customer surveys and/or focus groups to test the effectiveness of future public relations efforts. To this end, it is anticipated that PAWSD will conduct a customer survey and/or focus groups prior to updating this plan (approximately 5 years from now).

The District is planning to upgrade its Xeriscape demonstration garden that is located at its administration building on Lyn Avenue in Pagosa Springs. The Xeriscape Garden needs to be updated to include more efficient irrigation and to include more diverse planting materials, including different types of turf grass. Upgrading the Xeriscape Garden is planned to occur twice over the next ten years.

Finally, and perhaps most importantly, the District will be upgrading and enhancing its web site to improve its water conservation messaging and content. Although the current site has information on rebate programs, water conservation practices for the home and business, and other educational features, an upgraded web site will be developed to include additional information regarding self audit programs, whole house and commercial facility audit scheduling, evapotransporation data, water use, and newsletters. The District expects that coupling the new AMR system with electronic data management will help support individual customer water use tracking that may be accessed over the web. In addition, the web site will be upgraded to allow for the tracking of individual "page" hits, such that customer interests and web site interactions can be tracked and understood. In this way, the District can better understand its customers' water information needs and uses.

New Construction Ordinances and Requirements –

As previously discussed, PAWSD is limited in what it can develop and implement regarding standards and ordinances that would control and/or regulate new construction. For this reason, PAWSD will partner with the Town and County to evaluate the usefulness and value of developing and implementing building ordinances that regulate future development and construction.

Other Measures and Programs

Water Rate Increases – PAWSD may conduct a water rate study in 2010 and about every three to five years thereafter to determine and set new water rates based on capital needs, infrastructure repair and maintenance, new water development costs and water conservation impacts on water sales. To this end, PAWSD will need to constantly be adjusting and re-adjusting water rates by revising some and/or all of the following:

- Water base rate
- Cost per tier of water use
- Adding new higher rate water use tiers for high water users
- Adding new lower rate water use tiers for low water users
- Developing alternative water rate structures for temporary water use (e.g., to establish new landscapes)
- Capital investment fees

PAWSD may also need to develop other water rate strategies depending on customer and business response.

For the purpose of estimating future water savings from water rate increases, it was assumed that all rates would increase by 5% at each of two future water rate increases expected over the next ten years. Actual future water rate increases may or may not include an increase in all water rates. Actual water rate increases will be determined based on in-depth water use and revenue projections at some time in the future.

Current water rates are provided in Table 7.

Leak Detection – Leak detection and repair will continue to be conducted as it has been performed in the past. Water main leaks are identified through inspections, tracking of system pressures, and customer reporting, and those leaks that are identified are repaired. These practices will continue in the future.

The AMR metering system may also help identify transmission system leaks, as well as help to better characterize real and apparent system losses. As PAWSD mines the AMR data, new means of tracking actual customer water use and identifying potential system leaks will be developed to better determine the nature, and perhaps location, of real system losses. Once identified, transmission lines with real losses will be tested and repaired on an as needed basis.

Monitoring and Verification

The District will step up its efforts to monitor and verify that the various water conservation measures and programs are cost-effective and efficient in saving water. For this to occur, PAWSD will begin to track overall customer as well as selected individual customer water use over the planning horizon, especially at those homes and businesses that have taken advantage of the District's audits and other educational efforts, and giveaway and rebate programs. Details regarding monitoring and verification efforts are provided in Section 9.

Table 7 – PAWSD Water and Wastewater Service Charge Rates

As published May 8 and May 15, 2008 in The Pagosa Sun

PAGOSA AREA WATER AND SANITATION DISTRICT
NOTICE OF WATER AND WASTEWATER SERVICE CHARGE INCREASES
EFFECTIVE WITH THE MAY/JUNE METER READING PERIOD

The Pagosa Area Water and Sanitation District Board of Directors adopted increases to various fees and charges on January 15, 2008.

WATER CHARGES

Monthly Service Charge: (per equivalent unit)	increase from $9.00 to $12.00
Volume Charge: 0-8,000 gallons usage (rate per 1,000 gallons)	increase from $2.70 to $4.20
8,001-20,000 gallons usage (rate per 1,000 gallons)	increase from $5.15 to $8.00
Over 20,001 gallons usage (rate per 1,000 gallons)	increase from $6.10 to $9.45

During mandatory water conservation levels, an additional drought surcharge would be imposed as follows:

Drought Surcharge: 0-8,000 gallons usage (rate per 1,000 gallons)	NO CHARGE
8,001-20,000 gallons usage (rate per 1,000 gallons) no change	$ 2.18
Over 20,001 gallons usage (rate per 1,000 gallons) no change	$ 2.40

WASTEWATER CHARGES

Monthly Service Charge: (per equivalent unit)	increase from $20.00 to $23.00

The above rate increases will be effective with the May/June meter reading period and reflected on the statement you receive early in the month of July. Pagosa Area Water and Sanitation District staff can help you determine the effect these increases will have on your monthly water and/or water and wastewater billing. Please feel free to call or come by the District office for more information or visit our website www.pawsd.org.

Water charges at the Trails and Museum Fill Stations will be increased at approximately the same time as the regular customer charges for water service. The rate increase will reflect approximately 7 gallons less per quarter or 68 cents per 100 gallons.

Section 8
Impacts of Proposed Water Conservation

PAWSD is planning to implement water conservation measures and programs as discussed in the prior section for purposes of reducing the amount of new water supplies that will be needed to support expected future customer water demand. It is understood that water conservation efforts will not eliminate the need for new water supply development and infrastructure in the future; however, water conservation will be useful in helping to reduce the costs of new water development efforts and improve the overall reliability of the water delivery system.

The estimated water savings that the District expects to realize through the implementation of the proposed water conservation efforts over the next ten years are summarized in Table 8 and presented in Figure 4. The estimated water savings have been developed using those assumptions and analyses presented in Appendix D.

It should be noted that the estimate of water savings shown in Table 8 assumes that all proposed measures and programs create permanent water savings that extend from the time they are implemented into the future. This assumption is based on the expectation that all measures and programs will create more aware customers, and that the behavior changes in the customers will allow for the water savings to be sustained into the future. Of course, any water saving fixture and/or appliance installed may fail in the future. However, this plan has assumed that future repairs and upgrades to water efficient fixtures and appliances will continue to save water at rates equal to or better than those that will occur through the rebate and giveaway programs that PAWSD proposes herein.

Table 8 – Estimated Water Conservation Plan Water Savings

Year	Annual Water Savings (acre-feet)	Cumulative Water Savings (acre-feet)
2009	19	19
2010*	56	75
2011	53	128
2012	47	175
2013	39	214
2014	29	243
2015*	63	306
2016	56	362
2017	47	409
2018	39	448

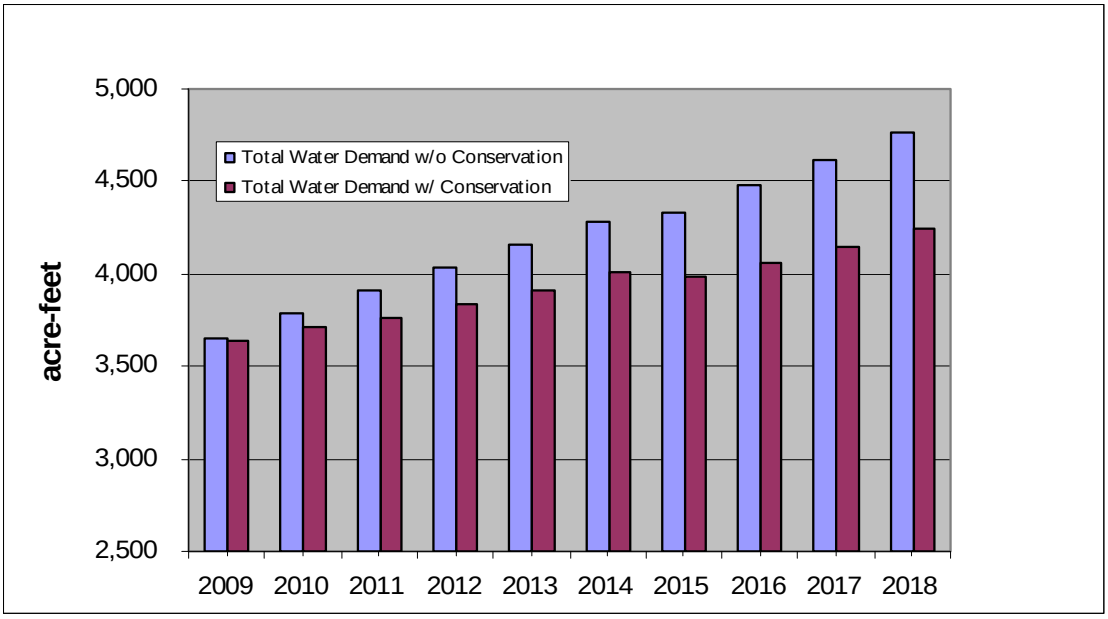
* estimated timing for future water rate studies and increases

Actual water savings will be dependent upon numerous internal and external forces influencing customer water use. Therefore, PAWSD will continuously monitor the progress of its proposed water conservation programs, such that the actual water savings are tracked and reported on a regular basis to the District Board and the public, as appropriate.

The overall cost to implement this plan is estimated to be about $3 million (including staffing costs) over the next ten years. It would cost approximately $9 million for the District to obtain a similar amount of replacement water to meet the reduced supply (i.e., 448 acre-feet).

As discussed in the next section, it is anticipated that the District would pursue water efficiency grants with the CWCB Office of Water Conservation and Drought Planning once this plan has been reviewed and approved. The grants would be pursued chiefly to support commercial and irrigation water conservation programs in the next three to four years.

Figure 4 - Predicted Total Annual Water Demand With and Without Proposed Water Conservation Program



Section 9
Implementation Plan

Implementation Plan

The implementation of this water conservation plan involves multiple steps including:

- Public review and comment period
- Final Plan preparation and submittal
- Implementation of measures and programs
- State grant applications
- Program monitoring and verification
- Reporting
- Plan updates

Each of these steps is addressed in the subsections provided below.

Public Review and Comment

PAWSD provided copies of the Draft Water Conservation Plan to the District Board and the public for review and comment from August 5 to October 7, 2008, in accordance with CRS 37-60-126. The public review period and process was presented to the public in a news release published in the Pagosa Springs Sun on July 31st and in a legal notice published August 7th and August 14th. An additional notice and a copy of the Draft Plan was placed on the PAWSD website at http://www.pawsd.org/view/96/1869/Conservation.html. Notices of the public review period were also posted at PAWSD administrative offices, Archuleta County courthouse, Town of Pagosa Springs Town Hall and the Ruby Sisson Public Library.

A copy of the Draft Plan was also made available at the PAWSD administrative offices, the County and Town administrative offices, the Pagosa Lakes POA office and the library.

To stimulate public comment, PAWSD held a series of Community Committee Meetings in June and July 2008. These meetings were held to facilitate the open exchange of ideas and information regarding the development, context, and content of the plan. A list of the Community Committee Meeting attendees is provided in Appendix A.

PAWSD also held an Open House for the Public on August 13, 2008 to provide the public with information regarding the plan development process, and the proposed water conservation measures and programs. The Open House was held at the PAWSD Administrative Offices. Five citizens attended.

Finally, a public hearing was held on October 14, 2008 at the District Board meeting. The hearing was intended to give the public a chance to comment and ask questions about the Draft Plan and its content. No public comments were received during the 60-day comment period or at the October 14 public hearing.

Final Plan Preparation and Submittal

Once the public comment period was completed and comments were obtained from both the District Board and the public, a Final Plan was to be prepared incorporating comments as appropriate into the document. A comment response was to be developed for each comment received. However, there were no comments received. The PAWSD Board of Directors adopted this Water Conservation Plan at their regular meeting on October 14, 2008 following a public hearing.

The Final Plan was forwarded to the Office of Water Conservation and Drought Planning for review and approval in October 2008.

Implementation of Measures and Programs

The measures and programs selected in Section 7 will be implemented based on the availability of funding from the District and the CWCB through its Water Efficiency Grant Program. To focus the water conservation efforts of PAWSD over the next three to five years, during which time the District will collect data vital to the development and implementation of future water conservation efforts, the following priorities were established:

Residential Measures and Programs

> Primary priorities – Rebates for high efficiency toilets and washing machines. Develop homeowner/residential customer educational workshops. Continue meter replacement program focusing on high water use and audited customers, as well as those with meters more than 10 years old.
>
> Secondary priorities – Develop whole house audit program which will include: determining individual customer indoor and outdoor water use; training customers on identifying and repairing leaks, managing irrigation systems, and planning for and implementing alternative landscaping options; and providing customers with low-flow shower head and faucet giveaways. Develop outdoor irrigation equipment rebate program.
>
> PAWSD will focus its funding to address these primary and secondary priorities over the next three to five years. PAWSD will also implement data collection efforts that will be used to characterize individual water use patterns and behaviors

tracking those customers that utilize the measures and programs funded through PAWSD.

Commercial and Irrigation Customer Measures and Programs

Primary priorities – Develop commercial facility audit programs for restaurants and hotel/motel customers which will include: determining entity indoor and outdoor water use; training customers on identifying and repairing leaks, best management practices for commercial water use, managing irrigation systems, and planning for and implementing alternative landscaping options; and providing customers with low-flow shower head, pre-spray rinse nozzle and faucet giveaways, as appropriate.

Secondary priorities – Develop/expand rebate programs for indoor appliances and outdoor irrigation equipment. Develop wise water use certification program for commercial businesses. Expand commercial audit program to include other large water users such as car washes, irrigation only customers, etc. Develop commercial and irrigator educational workshops. Initiate waterless toilet and urinal demonstration pilot project.

PAWSD will attempt to utilize CWCB grant funds, in conjunction with PAWSD resources, to plan and conduct the commercial and irrigation audits over the next three to four years. PAWSD will also commit available resources to address the other listed primary and secondary priorities as funding permits. PAWSD will also implement data collections efforts that will be used to characterize individual water use patterns and behaviors tracking those customers that utilize the measures and programs funded through PAWSD.

New Construction Measures and Programs

Primary priorities – PAWSD will partner with the County and the Town to evaluate ordinances that would control and/or regulate wise water use and water use efficiency in new construction both indoors and outdoors.

Educational Measures and Programs

Primary priorities –

- Contribute to local and/or regional water fairs for school aged children.
- Develop/expand K-12 teacher water education through Project WET.
- Develop local messaging campaign to expand current reach into full time and part time residential and business customers.
- Upgrade and update PAWSD web site to include more information on new and existing water conservation measures and programs, track local

evapotransporation, provide customer access to water use, promote the EPA Water Sense Program, etc.

Secondary priorities –

- Develop/expand K-12 student water and water conservation educational efforts.
- Upgrade the PAWSD Xeriscape Demonstration Garden.

Other Measures and Programs

Primary priorities – Continue to conduct:

- Meter replacement efforts;
- Ongoing leak detection and repair, on an as needed basis; and
- Development of data mining practices to utilize AMR-based data collection to support characterization of real versus apparent system losses, .

Secondary priorities – Conduct water rate studies at regular intervals to adjust water rates and the related tier structure.

The proposed schedule for implementation of the various selected measures and programs is provided in the summary sheet of Appendix D.

State Grant Applications

Vital to the successful implementation of the Final Plan will be the procurement of CWCB grant funding over each of the next three to four calendar years. Specific grant applications will be developed to support the District's activities related to the following key measures and programs:

- Commercial and irrigation customer audits;
- Low-flow shower head, faucet and pre-rinse spray nozzle giveaways (performed in conjunction with the commercial customer audits);
- Wise water use certification program; and
- Commercial water use tracking programs.

These combined programs are expected to become the core practice areas for the District to realize future water savings. The importance and value to PAWSD of CWCB monetary support to initiate these programs cannot be overstated.

Grant applications will be prepared as soon as the Final Plan is approved by the CWCB.

Monitoring and Verification of Program Effectiveness

Monitoring and verification of program effectiveness will be conducted through a combination of tracking techniques and methods to measure the value of the various individual measures and programs being implemented by the District. Of course, some of the proposed water conservation measures and programs such as general customer education and increased water rates will not be measured directly but will instead be characterized by average annual and peak monthly per EU water use. However, for some of the measures and programs such as the commercial and irrigation account audits, tracking individual customer water use can be performed to monitor water efficiency.

The monitoring and verification efforts that PAWSD proposes to initiate for each measure and/or program identified in Section 7 is presented in Table 9.

Reporting and Plan Updates

The District will summarize the findings of the monitoring and verification efforts conducted by PAWSD and its subcontractors and provide a briefing to the District Board once a year. These briefings will be documented in a white paper which can be updated and revised as information and data are collected and analyzed.

The District will use these data, along with community and customer input as the basis for formally updating the water conservation plan once every three to five years.

Table 9 – Summary of Monitoring and Verification Activities for Tracking Water Savings

Measures and/or Programs	Tracking Methods and Metrics					
	Number of giveaways, rebates and/or audits [a]	Individual customer water use [b]	Customer class water use	Per EU water use	Non-Revenue Water	Peak and Annual Treated and Total Water Demand
Residential Customers						
Audits	x	x	x	x	x	x
Low-Flow Showerhead and Faucet Giveaways	x	x		x		x
ET Controller/Rain Sensor Rebates	x	x		x		x
Indoor Appliance Rebates	x	x		x		x
Customer Workshops		x		x		x
Commercial/Irrigation Customers						
Audits	x	x	x	x	x	x
Low-Flow Showerhead and Faucet Giveaways	x	x		x		x
Pre-Rinse Spray Nozzle Giveaways	x	x		x		x
ET Controller/Rain Sensor Rebates	x	x		x		x
Indoor Appliance Rebates	x	x		x		x
Customer Workshops		x		x		x
Education/Other						
Water Rate Increases			x	x		x
Leak Detection and Repair				x	x	x
AMR Installations and Meter Replacement		x		x	x	x
Raw Water Conversion Project		x		x		x
General Customer Education			x	x	x	x

[a] – only giveaways and rebates with observed and/or proven installations will be counted

[b] – will include tracking of outdoor water use for pre- and post- installation periods compared to estimated ET calculated for each year of interest

Appendix A

Community Committee Membership

MEETING SIGN IN SHEET

PROJECT: Water Conservation Plan	**MEETING DATE: June 26, 2008**
FACILITATOR: Tracy Bouvette, Great Western Inst.	**PLACE/ROOM: PAWSD Board Room**

NAME	TITLE	ORGANIZATION	PHONE	EMAIL
Tracy Bouvette	Exec Director	Great Western	720-641-6136	tbouvette@tde.com
Doug SHARP	owner	ECO-SAFE SEPTIC LLC	264-6775	dougshary@centurytel.net
VAL VALENTINE		Geo-Graphics	264-2685	PAGOSAHUAC@centurytel.net
[illegible]	SJWCD	SJWCD	903-8675	[illegible]
Kerry Dermody	hmm.	Reserve@Pagosa Peak POA	731-5217	dermody@skywerx.com
Jerry Archuleta	District Cons. ~~Tech~~	NRCS	731-3615	jerry.archuleta@co.usda.nrcs
Becca Smith	Hydrologist	USFS	264-1521	rsmith@fs.fed.us
LARRY LYNCH	PROP. MGR. MANAGER	PLPOA	731-5635	[illegible]
Bill Kirsky	~~Sales~~ Sales	Galles	946-1804	Bill@gallesproperties.com

MEETING SIGN IN SHEET

PROJECT: Water Conservation Plan	**MEETING DATE: June 26, 2008**
FACILITATOR: Tracy Bouvette, Great Western Inst.	**PLACE/ROOM: PAWSD Board Room**

NAME	TITLE	ORGANIZATION	PHONE	EMAIL
Tonya Hamilton	Maintenance	School Dist.	264-0392 x600	thamilton@pagosa.k12.co.us
Sharon Crump	EO	Builder Assoc	731-3939	PagosaBuilders@centurytel.net
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GREG SCHULTE	COUNTY ADMIN.	ARCHULETA CO.	264-8300	gschulte@archuletacounty.org
Sandie Hansen	owner	Sandies Carwash LLC	946-0678	redroane@skywerx.com
Paul Hansen	owner	Mulch Factory	946-0653	↑ SAME
Mary Jo Coulehan	Director	Chamber of Commerce	264-2360	director@pagosachamber.com
Angela Atkinson	Town Council	Town of P.S.	946-5261	aatkinson@centurytel.net
Tamra Allen		TOPS	264-4151	tallen@pagosasprings.co.gov
Denise Rue-Pastin	WIP Coord	WIP	731-9672	d-rue-pastin
William Nobles	Extension	CSU	264-5931	william.nobles@colostate.edu
Sheila Berger		PAWSD	731-2691	sheila@pawsd.org
Jodie Blankenship	Nat Director	RWUF	264-5983	sales@rwuf.com
Cindi Galabota	Admin. Dir.	Habitat for Humanity	264-6960	cindihabitatarchuleta@centurytel.net

MEETING SIGN IN SHEET

PROJECT: Water Conservation Plan	**MEETING DATE: July 18, 2008**
FACILITATOR: Tracy Bouvette, Great Western Inst.	**PLACE/ROOM: PAWSD Board Room**

NAME	TITLE	ORGANIZATION	PHONE	EMAIL
Denise Rue-Pastin	Coordinator	WIP	946.9024	d_rue_pastin@hotmail.com
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Tonya Hamilton		School Dist		
Mary Sealy		Four Seasons	731-4285	SMSEALY@SKYWEST.COM
Sheron Crump				
Windsor Crowder		PAWSD	264-6295	
Jodie Blankenship	News	KWUF	264-5983	sales@kwuf.com
VAL				
BOB HART		Hart Construction	264-0110	rbenthart@centurytel.net
Owen PARKER		Navajo Rental	7312822	
Cindi Galabota		Habitat Humanity for	264-6960	cindihabitat@centurytel.net
DOUG SHARP	OWNER	Eco-Safe Septic	LLC 264-6755	dougsharp@CT.NET
Rick Bellis	Director of	Archuleta Co. County Development	Cell (732)267-2957	rbellis@archuletacounty.org
CJ KAPP		CHI	264-6950	chicj@centurytel.net 970
Kerry Dermody	Ass't Mgr.	Reserve @ Pagosa Peak	731-5217	dermody@skywest.com

Appendix B

Summary of Identified and Screened Water Conservation Measures and Programs

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

Water Conservation Measures and Programs	Additional Effort/Data Needed Prior to Implementation	Measureable Outcomes	Other Considerations	Measure and Program Carried to Final Evaluation
Soil and Wood Product Management Requirements	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County for builders to stock pile and use top soil and mulch wood products for site use; includes inspections and follow-up*	**Yes**
EDUCATION				
Water Fairs		*n/a*	*Best when coordinated with K-12 education*	**Yes**
Water Use Awareness (e.g., CSU's CoCorans)		*n/a*	*K-12 education will occur as a result of Teacher Training; other hands on training; etc.*	*No*
K-12 Education		*n/a*	*K-12 education will occur as a result of Teacher Training; other hands on training; etc.*	**Yes**
K-12 Teacher Education and Training		*n/a*	*Teacher Training available in Colorado through Project WET*	**Yes**
Messaging Campaigns/Public Relations (multi-media)		*n/a*	*Needed to coordinate messaging and focus outreach efforts*	**Yes**
Customer Surveys and Focus Groups		*n/a*	*To be developed as part of Public Relations Campaign Development*	**Yes**
Bill Stuffers		*n/a*	*Typically expensive with limited readership*	*No*
Newletters		*n/a*	*Typically expensive with limited readership if mailed; place on website*	*No*
Homeowner Education and Training		*n/a*	*Will be used with volunteer and high water use groups*	**Yes**
Commercial/Irrigator Education and Training		*n/a*	*Will be used with volunteer and high water use groups; coordinate with water fair activities*	**Yes**
Property Manager/HOA Education and Training		*n/a*	*Will be used with volunteer and high water use groups; coordinate with water fair activities*	**Yes**
Homebuilder/Developer Education and Training		*n/a*	*Will be used with volunteer and high water use groups; coordinate with water fair activities*	**Yes**
Landscaper Education/Training/Certification		*n/a*	*Will need program developed, along with certification and testing procedures (conducted with GreenCo Colorado)*	**Yes**
Xeriscape Demostration Gardens Improvements		*n/a*	*Ongoing program that needs upgrades*	**Yes**
EPA WaterSense Program Promotion		*n/a*	*National program can be promoted by PAWSD for little to no cost*	**Yes**
Educational Kits (e.g., Garden in a Box)		*n/a*	*Not available in Pagosa*	*No*
Web-Site Tools and Postings (e.g., ET Rates, Customer Water Use, Program Water Savings, Customer Self Audits, etc.)		*n/a*	*Need to have website updated to be more water user friendly and current*	**Yes**
OTHER PROGRAMS				
Water Rate Increases (residential)	*Yes*	*Yes*	*Ongoing program, needs additional evaluations*	**Yes**
Water Rate Increases (CII)	*Yes*	*Yes*	*Ongoing program, needs additional evaluations*	**Yes**
Water Budgets	*Yes*	*Yes*	*PAWSD does not have the data needed to implement; will maintain inclining block rate*	*No*
Seasonal Water Pricing	*Yes*	*Yes*	*PAWSD will maintain inclining block rate structure*	*No*
High Water Use Accounts Notification/Audits	*Yes*	*Yes*	*Ongoing program, needs additional evaluations*	**Yes**
System Wide Leak Detection	*Yes*	*Yes*	*Ongoing program, needs additional evaluations*	**Yes**
Wastewater Reuse	*Yes*	*Yes*	*Some opportunities exist for limited reuse; needs engineering to explore and evaluate*	*No*
Removal of Phreatophytes	*No*	*No*	*Some opportunities exist for limited phreatophyte removal; needs engineering to explore and evaluate*	*No*
Water Waste Hotline	*No*	*Yes*	*Needs dedicated phone line and specific response defined; coordinate with leak detection*	**Yes**
Grass Tax	*Yes*	*Yes*	*Needs better definition of institutional barriers; structural requirements; and funding for inspections/verification*	*No*
Tree City Program	*Yes*	*Yes*	*Need to look into programs that provide grant funding for tree programs*	*No*

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

Water Conservation Measures and Programs	Additional Effort/Data Needed Prior to Implementation	Measureable Outcomes	Other Considerations	Measure and Program Carried to Final Evaluation
Conservation Hotels and Motels Program (CHAMP)	*No*	*Yes*	*Method to educate customer and collect information on individual water use; will include cerifications and publicity; but will require training of PAWSD Staff or contractor*	**Yes**
AMR Metering and Submetering	*Yes*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Leak Detection and Repair	*Yes*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Point of Sale Water Efficiency Ordinance	*Yes*	*Yes*	*Needs better definition of institutional barriers; structural requirements; and funding for inspections/verification*	*No*
On Property Display of Water Use (Smart House Monitoring)	*Yes*	*Yes*	*Linked to new installations of AMR and website tools*	**Yes**
Wise Water Use Certifications and Publicity	*No*	*Yes*	*Includes inspections and cerification by staff*	**Yes**
Urinal Ordinance (for all commerical men's bathrooms)	*Yes*	*Yes*	*Includes inspections and cerification by staff*	*No*
NEW CONSTRUCTION (Residential and/or Commercial)				
Indoor				
High Efficiency Appliance Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	**Yes**
Single Pass Cooling System Prohibitions	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up; Follows CII Audits*	*No*
Boiler/Heating Systems Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up; Follows CII Audits*	*No*
Laundry and Laundromat Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up; Follows CII Audits*	*No*
Car Wash Efficiency Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up; Follows CII Audits*	*No*
Cleaning and Sanitation Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up; Follows CII Audits*	*No*
Low Water Use and Appliance Builder Incentives and Codes	*Yes*	*Yes*	*Requires new ordinance with inspections and follow-up*	*No*
Outdoor				
Landscape Irrigator Certification	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	*No*
New Landscape/Lawn Permits	*No*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	**Yes**
Decorative Water Feature Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	*No*
Soil Amendment Requirements/Standards	*No*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	**Yes**
Turf and Landscape Restrictions/Standards	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	**Yes**
Irrigation System Requirements/Standards	*Yes*	*Yes*	*Requires new ordinance developed in close partnership with the Town and County; includes inspections and follow-up*	**Yes**
Low Water Grass Seed Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Soil Amendment Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Turf Replacement Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Xeriscape Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

Water Conservation Measures and Programs	Additional Effort/Data Needed Prior to Implementation	Measureable Outcomes	Other Considerations	Measure and Program Carried to Final Evaluation
Cooling Water Tower Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Process Water Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Swimming Pool Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Car Wash Efficiency Assessements and Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Cleaning and Sanitation Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Commerical Kitchens and Restaurant Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Laundries and Laundromats	*Yes*	*Yes*	*Follows audits*	*No*
Swamp Cooler Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Boiler and Heating System Improvements	*Yes*	*Yes*	*Follows audits*	*No*
Outdoor				
Irrigation Audits	*No*	*Yes*	*Method to educate customer and collect information on individual water use but will require training of PAWSD Staff or contractor*	**Yes**
Soil Moisture Probes Rebate/Incentives	*No*	*No*	*Corrosion of probes limits useful life*	*No*
Rainfall/Moisture Sensors Rebate/Incentives	*No*	*Yes*	*Technology improving but requires irrigation audit to implement*	**Yes**
ET Controllers Rebate/Incentives	*No*	*Yes*	*Technology improving but requires irrigation audit to implement*	**Yes**
Flow Meter (w/ auto shut-off)/Incentives	*No*	*Yes*	*Technology improving but requires irrigation audit to implement*	**Yes**
Installation of Alternative Irrigation (subsurface, drip, etc.)	*No*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Soil Amendment Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Turf Replacement Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Xeriscape Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Rainwater Harvesting	*Yes*	*Yes*	*State regulations (Division of Water Resources) restrict rainwater harvesting*	*No*
Water Waste Ordinance	*Yes*	*Yes*	*Would require new ordinance; additional staff for inspections and verification*	*No*
Watering Restrictions - Hours	*No*	*Yes*	*Would require new ordinance; additional staff for inspections and verification*	*No*
Watering Restrictions - Days	*No*	*Yes*	*Daily restrictions best saved for drought response*	*No*
Greywater Reuse	*Yes*	*Yes*	*State regulations (Division of Water Resources and Department Public Health and Environment) do not allow for greywater reuse in business settings*	*No*
Raw Water Conversions	*Yes*	*Yes*	*Ongoing program, needs additional evaluations and coordination with Town*	**Yes**
Other				
Commerical/Industrial/Institutional (CII) Audits	*No*	*Yes*	*Method to educate customers and collect information on individual water use but will require training of PAWSD Staff or contractor*	**Yes**
Restaurant Audits, Education and Cerification Program	*No*	*Yes*	*Method to educate customers and collect information on individual water use; will include cerifications and publicity; but will require training of PAWSD Staff or contractor*	**Yes**

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

Water Conservation Measures and Programs	Additional Effort/Data Needed Prior to Implementation	Measureable Outcomes	Other Considerations	Measure and Program Carried to Final Evaluation
Outdoor				
Irrigation				
Irrigation Audits	*No*	*Yes*	*Method to educate customer and collect information on individual water use but will require training of PAWSD Staff or contractor*	**Yes**
Soil Moisture Probes Rebate/Incentives	*No*	*No*	*Corrosion of probes limits useful life*	*No*
Rainfall/Moisture Sensors Rebate/Incentives	*No*	*Yes*	*Technology improving but requires irrigation audit to implement*	**Yes**
ET Controllers Rebate/Incentives	*No*	*Yes*	*Technology improving but requires irrigation audit to implement*	**Yes**
Installation of Alternative Irrigation (subsurface, drip, etc.)	*No*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Raw Water Metering (for those adjacent to lakes)	*Yes*	*Yes*	*Requires new infrastructure and tracking of additional individual customer practices; need better quantitification of number of customers and use before consideration*	*No*
Rainwater Harvesting	*Yes*	*No*	*State regulations (Division of Water Resources) restrict rainwater harvesting*	*No*
Water Waste Ordinance	*No*	*Yes*	*Would require new ordinance; additional staff for inspections and verification*	*No*
Watering Restrictions - Hours	*No*	*Yes*	*Would require new ordinance; additional staff for inspections and verification*	*No*
Watering Restrictions - Days	*No*	*Yes*	*Daily restrictions best saved for drought response*	*No*
Greywater Reuse	*Yes*	*Yes*	*State regulations (Division of Water Resources and Department Public Health and Environment) restrict greywater applications outdoors, must be 18 to 24 inches below grade*	*No*
Landscape Options				
Soil Management Requirements	*Yes*	*Yes*	*Requires new ordinance and additional staff for inspections and verification*	*No*
Mulch Rebate/Incentives	*No*	*No*	*Limited chance for measurable reductions in water use; but consistent with xeric principles; attempt to coordinate with Christmas Tree Recycling program*	**Yes**
Low Water Grass Seed Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Soil Amendment Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Turf Replacement Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
Xeriscape Rebate/Incentives	*Yes*	*Yes*	*Costs generally prohibitive for retrofits at this time; organic efforts only with link to Homeowner education*	*No*
COMMERCIAL/INDUSTRIAL/INSTITUTIONAL				
Indoor				
Dual Flush Toilets Rebates/Incentives	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Low Flow Toilets Rebates/Incentives	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Waterless Toilets Rebates/Incentives	*No*	*Yes*	*PAWSD prefers low flow and dual flush toilets at this time; will evaluate demostration project for municipal setting*	**Yes**
Ultra Low Flow Urinals Rebates/Incentives	*No*	*Yes*	*Need to expand PAWSD current rebate program to include urinals*	**Yes**
Waterless Urinals Rebates/Incentives	*No*	*Yes*	*PAWSD prefers ultra low flow urinals at this time; will evaluate demostration project for municipal setting*	**Yes**
Pre-Rinse Spray Nozzle Giveaway	*No*	*Yes*	*Excellent way to reduce kitchen water use, requires staff to verify installation*	**Yes**

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

	Screening Criteria			
Water Conservation Measures and Programs	**Additional Effort/Data Needed Prior to Implementation**	**Measureable Outcomes**	**Other Considerations**	**Measure and Program Carried to Final Evaluation**
RESIDENTIAL (single and mulit-family)				
Indoor				
Bath				
Tooth Brush BMP	*No*	*No*	*Organic efforts are effective; tie to K-12 Education - no other action needed*	*No*
Warm Up Water Capture and Reuse	*No*	*No*	*Organic efforts are effective; tie to K-12 and Homeowner Education - no other action needed*	*No*
Low Flow Showerhead and Faucet Aerator Giveaways	*No*	*Yes*	*Will be linked to K-12 education and Whole House Audits (to ensure installations)*	**Yes**
Dual Flush Toilet Rebate	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Low Flow Toilets Rebate	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Waterless Toilets Rebate	*No*	*Yes*	*Challenges building codes and customer sensitivities*	*No*
Hot Water on Demand (for bath and sink)	*No*	*Yes*	*Can be effective for low water use homes*	**Yes**
In Shower Warm-up Water Storage	*Yes*	*Yes*	*Technology that is cost prohibitive for retrofits; best for new construction*	*No*
Kitchen/Laundry				
Low Flow Faucet Aerator Giveways	*No*	*Yes*	*Will be linked to K-12 education and Whole House Audits (to ensure installations)*	**Yes**
High Efficiency Dishwashing Machine	*No*	*Yes*	*Costs are too high for saved water when compared to washing machines, toilets, etc.*	*No*
High Efficiency Clothes Washer	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Warm Up Water Capture and Reuse	*No*	*No*	*Organic efforts are effective; tie to K-12 and Homeowner Eduction - no other action needed*	*No*
Hot Water on Demand (in kitchen)	*No*	*Yes*	*Can be effective for low water use homes*	**Yes**
Other				
Whole House Audits	*No*	*Yes*	*Will focus on highest water users; volunteers; and those with detected leaks*	**Yes**
Individualized Leak Detection and Repair	*Yes*	*Yes*	*Follows whole house audits; Homeowner training workshops*	*No*
Swamp Cooler Improvements	*Yes*	*Yes*	*Follows whole house audits, as needed*	*No*
AMR Water Meters	*No*	*Yes*	*Part of ongoing PAWSD program*	**Yes**
Point of Sale Water Efficiency Ordinance	*Yes*	*Yes*	*Needs better definition of institutional barriers; structural requirements; and funding for inspections/verification*	*No*
On Property Display of Water Use (Smart House Monitoring)	*Yes*	*Yes*	*Linked to new installations of AMR and website tools*	**Yes**
Fill Station Metering by Customer/Hauler	*Yes*	*Yes*	*Needs better definition of card readers; remote metering; etc.*	*No*
Fill Station Shut-Off Valving	*No*	*Yes*	*Used to prevent/reduce spillage during water transfers*	**Yes**
Submetering Multi-Family Residential Factilities	*Yes*	*Yes*	*Requires owners to retrofit existing facilities with meters for each condo, apartment, etc.*	*No*
Greywater Reuse	*No*	*Yes*	*State regulations (Division of Water Resources and Department Public Health and Environment) restrict greywater use in home; may be feasible for fill station customers only*	*No*

Appendix B
Summary of Identified and Screened Conservation Measures and Programs for PAWSD

Water Conservation Measures and Programs	Additional Effort/Data Needed Prior to Implementation	Measureable Outcomes	Other Considerations	Measure and Program Carried to Final Evaluation
Lake Dredging to Increase Available Storage	*Yes*	*No*	*Need to have engineering conduct assessment*	*No*
Transmission System Improvements (e.g., ditches to pipes)	*Yes*	*Yes*	*Need to have engineering conduct assessment*	*No*
Note : most measureable outcomes related to verifying that water savings are occuring will require tracking of individual customer water use over multiple months and/or years				

Appendix C

Colorado Revised Statute 37-60-126

37-60-126. Water conservation and drought mitigation planning - programs - relationship to state assistance for water facilities - guidelines - water efficiency grant program - repeal.

(1) As used in this section and section 37-60-126.5, unless the context otherwise requires:

(a) "Agency" means a public or private entity whose primary purpose includes the promotion of water resource conservation.

(b) "Covered entity" means each municipality, agency, utility, including any privately owned utility, or other publicly owned entity with a legal obligation to supply, distribute, or otherwise provide water at retail to domestic, commercial, industrial, or public facility customers, and that has a total demand for such customers of two thousand acre-feet or more.

(c) "Grant program" means the water efficiency grant program established pursuant to subsection (12) of this section.

(d) "Office" means the office of water conservation and drought planning created in section 37-60-124.

(e) "Plan elements" means those components of water conservation plans that address water-saving measures and programs, implementation review, water-saving goals, and the actions a covered entity shall take to develop, implement, monitor, review, and revise its water conservation plan.

(f) "Public facility" means any facility operated by an instrument of government for the benefit of the public, including, but not limited to, a government building; park or other recreational facility; school, college, university, or other educational institution; highway; hospital; or stadium.

(g) "Water conservation" means water use efficiency, wise water use, water transmission and distribution system efficiency, and supply substitution. The objective of water conservation is a long-term increase in the productive use of water supply in order to satisfy water supply needs without compromising desired water services.

(h) "Water conservation plan", "water use efficiency plan", or "plan" means a plan adopted in accordance with this section.

(i) "Water-saving measures and programs" includes a device, a practice, hardware, or equipment that reduces water demands and a program that uses a combination of measures and incentives that allow for an increase in the productive use of a local water supply.

(2) (a) Each covered entity shall, subject to section 37-60-127, develop, adopt, make publicly available, and implement a plan pursuant to which such covered entity shall encourage its domestic, commercial, industrial, and public facility customers to use water more efficiently. Any state or local governmental entity that is not a covered entity may develop, adopt, make publicly available, and implement such a plan.

(b) The office shall review previously submitted conservation plans to evaluate their consistency with the provisions of this section and the guidelines established pursuant to paragraph (a) of subsection (7) of this section.

(c) On and after July 1, 2006, a covered entity that seeks financial assistance from either the board or the Colorado water resources and power development authority shall submit to the board a new or revised plan to meet water conservation goals adopted by the covered entity, in accordance with this section, for the board's approval prior to the release of new loan proceeds.

(3) The manner in which the covered entity develops, adopts, makes publicly available, and implements a plan established pursuant to subsection (2) of this section shall be determined by the covered entity in accordance with this section. The plan shall be accompanied by a schedule for its implementation. The plans and schedules shall be provided to the office within ninety days after their adoption. For those entities seeking financial assistance, the office shall then notify the covered entity and the appropriate financing authority that the plan has been reviewed and whether the plan has been approved in accordance with this section.

(4) A plan developed by a covered entity pursuant to subsection (2) of this section shall, at a minimum, consider the following plan elements:

(a) The water-saving measures and programs to be used by the covered entity for water conservation. In developing these measures and programs, each covered entity shall, at a minimum, consider the following:

(I) Water-efficient fixtures and appliances, including toilets, urinals, showerheads, and faucets;

(II) Low water use landscapes, drought-resistant vegetation, removal of phreatophytes, and efficient irrigation;

(III) Water-efficient industrial and commercial water-using processes;

(IV) Water reuse systems;

(V) Distribution system leak identification and repair;

(VI) Dissemination of information regarding water use efficiency measures, including by public education, customer water use audits, and water-saving demonstrations;

(VII) Water rate structures and billing systems designed to encourage water use efficiency in a fiscally responsible manner;

(VIII) The department of local affairs may provide technical assistance to covered entities that are local governments to implement water billing systems that show customer water usage and that implement tiered billing systems;

(IX) Regulatory measures designed to encourage water conservation;

(X) Incentives to implement water conservation techniques, including rebates to customers to encourage the installation of water conservation measures;

(b) A section stating the covered entity's best judgment of the role of water conservation plans in the covered entity's water supply planning;

(c) The steps the covered entity used to develop, and will use to implement, monitor, review, and revise, its water conservation plan;

(d) The time period, not to exceed seven years, after which the covered entity will review and update its adopted plan; and

(e) Either as a percentage or in acre-foot increments, an estimate of the amount of water that has been saved through a previously implemented conservation plan and an estimate of the amount of water that will be saved through conservation when the plan is implemented.

(5) Each covered entity and other state or local governmental entity that adopts a plan shall follow the entity's rules, codes, or ordinances to make the draft plan available for public review and comment. If there are no rules, codes, or ordinances governing the entity's public planning process, then each entity shall publish a draft plan, give public notice of the plan, make such plan publicly available, and solicit comments from the public for a period of not less than sixty days after the date on which the draft plan is made publicly available. Reference shall be made in the public notice to the elements of a plan that have already been implemented.

(6) The board is hereby authorized to recommend the appropriation and expenditure of such revenues as are necessary from the unobligated balance of the five percent share of the operational account of the severance tax trust fund

designated for use by the board for the purpose of the office providing assistance to covered entities to develop water conservation plans that meet the provisions of this section.

(7) (a) The board shall adopt guidelines for the office to review water conservation plans submitted by covered entities and other state or local governmental entities. The guidelines shall define the method for submitting plans to the office, the methods for office review and approval of the plans, and the interest rate surcharge provided for in paragraph (a) of subsection (9) of this section.

(b) If no other applicable guidelines exist as of June 1, 2007, the board shall adopt guidelines by July 31, 2007, for the office to use in reviewing applications submitted by covered entities, other state or local governmental entities, and agencies for grants from the grant program and from the grant program established in section 37-60-126.5 (3). The guidelines shall establish deadlines and procedures for covered entities, other state or local governmental entities, and agencies to follow in applying for grants and the criteria to be used by the office and the board in prioritizing and awarding grants.

(8) A covered entity may at any time adopt changes to an approved plan in accordance with this section after notifying and receiving concurrence from the office. If the proposed changes are major, the covered entity shall give public notice of the changes, make the changes available in draft form, and provide the public an opportunity to comment on such changes before adopting them in accordance with subsection (5) of this section.

(9) (a) Neither the board nor the Colorado water resources and power development authority shall release loan proceeds to a covered entity unless such covered entity provides a copy of the water conservation plan adopted pursuant to this section; except that the board or the authority may release such loan proceeds if the board or the authority, as applicable, determines that an unforseen emergency exists in relation to the covered entity's loan application, in which case the board or the authority, as applicable, may impose a loan surcharge upon the covered entity that may be rebated or reduced if the covered entity submits and adopts a plan in compliance with this section in a timely manner as determined by the board or the authority, as applicable.

(b) The board and the Colorado water resources and power development authority, to which any covered entity has applied for financial assistance for the construction of a water diversion, storage, conveyance, water treatment, or wastewater treatment facility, shall consider any water conservation plan filed pursuant to this section in determining whether to render financial assistance to such entity. Such consideration shall be carried out within the discretion accorded the board and the Colorado water resources and power development authority

pursuant to which such board and authority render such financial assistance to such covered entity.

(c) The board and the Colorado water resources and power development authority may enter into a memorandum of understanding with each other for the purposes of avoiding delay in the processing of applications for financial assistance covered by this section and avoiding duplication in the consideration required by this subsection (9).

(10) Repealed.

(11) (a) Any section of a restrictive covenant that prohibits or limits xeriscape, prohibits or limits the installation or use of drought-tolerant vegetative landscapes, or requires cultivated vegetation to consist exclusively or primarily of turf grass is hereby declared contrary to public policy and, on that basis, that section of the covenant shall be unenforceable.

(b) As used in this subsection (11):

(I) "Executive board policy or practice" includes any additional procedural step or burden, financial or otherwise, placed on a unit owner who seeks approval for a landscaping change by the executive board of a unit owners' association, as defined in section 38-33.3-103, C.R.S., and not included in the existing declaration or bylaws of the association. An "executive board policy or practice" includes, without limitation, the requirement of:

(A) An architect's stamp;

(B) Preapproval by an architect or landscape architect retained by the executive board;

(C) An analysis of water usage under the proposed new landscape plan or a history of water usage under the unit owner's existing landscape plan; and

(D) The adoption of a landscaping change fee.

(II) "Restrictive covenant" means any covenant, restriction, bylaw, executive board policy or practice, or condition applicable to real property for the purpose of controlling land use, but does not include any covenant, restriction, or condition imposed on such real property by any governmental entity.

(III) "Turf grass" means continuous plant coverage consisting of hybridized grasses that, when regularly mowed, form a dense growth of leaf blades and roots.

(IV) "Xeriscape" means the application of the principles of landscape planning and design, soil analysis and improvement, appropriate plant selection, limitation of

turf area, use of mulches, irrigation efficiency, and appropriate maintenance that results in water use efficiency and water-saving practices.

(c) Nothing in this subsection (11) shall preclude the executive board of a common interest community from taking enforcement action against a unit owner who allows his or her existing landscaping to die; except that:

(I) Such enforcement action shall be suspended during a period of water use restrictions declared by the jurisdiction in which the common interest community is located, in which case the unit owner shall comply with any watering restrictions imposed by the water provider for the common interest community;

(II) Enforcement shall be consistent within the community and not arbitrary or capricious; and

(III) Once the drought emergency is lifted, the unit owner shall be allowed a reasonable and practical opportunity, as defined by the association's executive board, with consideration of applicable local growing seasons or practical limitations, to reseed and revive turf grass before being required to replace it with new sod.

(12) (a) There is hereby created the water efficiency grant program for purposes of providing state funding to aid in the planning and implementation of water conservation plans developed in accordance with the requirements of this section and to promote the benefits of water efficiency. The board is authorized to distribute grants to covered entities, other state or local governmental entities, and agencies in accordance with its guidelines from the moneys transferred to and appropriated from the water efficiency grant program cash fund, which is hereby created in the state treasury. For the 2005-06 through 2010-11 fiscal years, the general assembly shall appropriate from the fund to the board up to five hundred thousand dollars annually for the purpose of providing grants to covered entities, other state and local governmental entities, and agencies in accordance with this subsection (12). Commencing July 1, 2008, the general assembly shall also appropriate from the fund to the board fifty thousand dollars each fiscal year through 2011-12 to cover the costs associated with the administration of the grant program and the requirements of section 37-60-124. However, if less than five hundred thousand dollars is appropriated or expended in any such fiscal year, an amount equal to the difference between five hundred thousand dollars and the amount actually appropriated or expended in that fiscal year shall be available for appropriation and expenditure to the grant program in the next fiscal year in addition to the five hundred thousand dollars available for appropriation in that fiscal year. Any moneys remaining in the fund on June 30, 2012, shall be transferred to the reserve in the operational account of the severance tax trust fund described in section 39-29-109 (1) (c) (III) (A), C.R.S.

(b) Any covered entity or state or local governmental entity that has adopted a water conservation plan and that supplies, distributes, or otherwise provides water at retail to customers may apply for a grant to aid in the implementation of the water efficiency goals of the plan. Any agency may apply for a grant to fund outreach or education programs aimed at demonstrating the benefits of water efficiency. The office shall review the applications and make recommendations to the board regarding the awarding and distribution of grants to applicants who satisfy the criteria outlined in this subsection (12) and the guidelines developed pursuant to subsection (7) of this section.

(c) This subsection (12) is repealed, effective July 1, 2012.

Source: L. 91: Entire section added, p. 2023, § 4, effective June 4. L. 99: (10) repealed, p. 25, § 3, effective March 5. L. 2003: (4)(g) amended and (11) added, p. 1368, § 4, effective April 25. L. 2004: Entire section amended, p. 1779, § 3, effective August 4. L. 2005: (1), (2)(b), and (7) amended and (12) added, p. 1481, § 1, effective June 7; (11) amended, p. 1372, § 1, effective June 6. L. 2007: (1)(a), (2)(a), (5), (7), and (12) amended, p. 1890, § 1, effective June 1.

Editor's note: Subsection (12) was originally enacted as (13) in House Bill 05-1254 but has been renumbered on revision for ease of location.

Cross references: (1) In 1991, this entire section was added by the "Water Conservation Act of 1991". For the short title and the legislative declaration, see sections 1 and 2 of chapter 328, Session Laws of Colorado 1991.

(2) For the legislative declaration contained in the 2004 act amending this section, see section 1 of chapter 373, Session Laws of Colorado 2004.

Appendix D

Cost Benefit Analyses and Summary for Selected Water Conservation Measures and Programs

Residential High-Efficiency Toilet Rebate

Residential HEToilet Rebates

Cost Assumptions

cost per unit [a]	*180*
rebate per unit	*95*
cost of water per 1000 gallons from PAWSD	*4.2*
Estimated savings per unit	
persons per unit	*2.6*
uses per person	*4*
gallons per unit, before	*4.5*
gallons per unit, after	*1.1*
days/year of use	*365*
gallons saved per year/unit	*12,906.40*
AF saved per year/unit	*0.040*
customer payback period w/o incentive, years [b]	*3*
customer payback period w/ incentive, years [b]	*2*

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
LFT in use [c]	6,643	7,149	7,990	8,724	9,486	10,153	10,840	11,548	12,207	12,888	13,593	14,321	15,076
new units during year, rebate	50	45	50	70	70	70	70	70	-	-	-	-	-
new units during year, organic	25	100	100	100	100	100	100	100	100	100	100	100	100
new units during year, new construction	192	361	692	564	592	497	517	538	559	581	605	629	654
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total residential toilets in use [d]	10,220	10,580	11,272	11,836	12,428	12,925	13,442	13,980	14,539	15,120	15,724	16,353	17,008
total water use for residential toilets, gallons	87,868,258	89,013,285	92,133,574	94,330,629	96,700,281	98,493,460	100,407,411	102,446,965	105,122,013	107,927,814	110,879,795	113,978,705	117,230,421
per capita water use for toilets	8,683	8,378	8,258	8,053	7,862	7,700	7,547	7,404	7,306	7,212	7,125	7,042	6,965
total water savings with rebated LFT, gallons		580,788	645,320	903,448	903,448	903,448	903,448	903,448	-	-	-	-	-
total water savings with rebated LFT, AF		1.78	1.98	2.77	2.77	2.77	2.77	2.77	-	-	-	-	-
cumulative savings, AF		1.78	3.76	6.53	9.31	12.08	14.85	17.62	17.62	17.62	17.62	17.62	17.62
total cost to District	$ 4,275	$ 4,750	$ 6,650	$ 6,650	$ 6,650	$ 6,650	$ 6,650	$ 6,650	$ -	$ -	$ -	$ -	$ -
total cost to District per AF replacement water	$ 2,399	$ 2,399	$ 2,399	$ 2,399	$ 2,399	$ 2,399	$ 2,399	$ 2,399	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
cumulative cost to District	$ 4,275	$ 9,025	$ 15,675	$ 22,325	$ 28,975	$ 35,625	$ 42,275	$ 42,275	$ 42,275	$ 42,275	$ 42,275	$ 42,275	$ 42,275

Other Assumptions:

Low Flow Toilets (LFT) are defined as those toilets that use no more than 1.6 gallons per flush

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 65% of existing toilets in 2006*

[d] *estimated as 1.8 per residential and multifamily tap*

Residential High Efficiency Washing Machine Rebate

Residential Washing Machine Rebates

Cost Assumptions

cost per unit[a]	800
rebate per unit	95
cost of water per 1000 gallons from PAWSD	4.2
Estimated savings per unit	
Loads per capita per day	0.37
people per machine	2.6
gallons per load, before	44
gallons per load, after	24.2
days/year of use	365
gallons saved per year/unit	6,952
AF saved per year/unit	0.021
customer payback period w/o incentive, years[b]	27
customer payback period w/ incentive, years[b]	24

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
HE Washing Machines in Place	150	310	470	630	790	950	1,110	1,270	1,395	1,520	1,645	1,770	1,895
new units during year, rebate	-	35	35	35	35	35	35	35	-	-	-	-	-
new units during year, organic	25	25	25	25	25	25	25	25	25	25	25	25	25
new units during year, new construction	100	100	100	100	100	100	100	100	100	100	100	100	100
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
Total Washing Machines in Use[c]	5,488	5,681	6,053	6,355	6,673	6,940	7,218	7,506	7,807	8,119	8,443	8,781	9,132
total water use for washing machines gallons	83,737,691	85,617,713	90,244,963	93,808,212	97,607,207	100,618,810	103,795,373	107,143,494	110,913,367	114,861,835	119,009,966	123,358,784	127,916,316
per capita water use for toilets	8,275	8,058	8,089	8,008	7,936	7,866	7,802	7,744	7,708	7,676	7,647	7,622	7,599
total water savings with rebated HE Washing Machines, gallons		243,333	243,333	243,333	243,333	243,333	243,333	243,333	-	-	-	-	-
total water savings with rebated HE Washing Machines, AF		0.75	0.75	0.75	0.75	0.75	0.75	0.75	-	-	-	-	-
cumulative savings, AF		0.75	1.49	2.24	2.99	3.73	4.48	5.23	5.23	5.23	5.23	5.23	5.23
total cost to District	$ 3,325	$ 3,325	$ 3,325	$ 3,325	$ 3,325	$ 3,325	$ 3,325	$ 3,325	$ -	$ -	$ -	$ -	$ -
total cost to District per AF replacement water	$ 4,453	$ 4,453	$ 4,453	$ 4,453	$ 4,453	$ 4,453	$ 4,453	$ 4,453	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
cumulative cost to District	$ 3,325	$ 6,650	$ 9,975	$ 13,300	$ 16,625	$ 19,950	$ 23,275	$ 23,275	$ 23,275	$ 23,275	$ 23,275	$ 23,275	$ 23,275

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 1 per single family and .85 per multifamily tap*

Residential Rainfall Sensors Give Away and Rebate

Residential Rain Sensor Rebates

Cost Assumptions

cost per unit[a]	$ 35
rebate per unit	$ 25
cost of water per 1000 gallons from PAWSD	4.2

Estimated savings per unit

outdoor water use per irrigator, gal/yr[b]	19,222
watering days per year, before rebate	75
watering days per year, after rebate (7.5% fewer water days)	69
efficiency	0.6
gallons saved per year/unit	1,442
AF saved per year/unit	0.00
customer payback period w/o incentive, years[c]	5.78
customer payback period w/ incentive, years[c]	1.65

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	20	129	338	508	702	872	1,053	1,241	1,435	1,635	1,843	2,058	2,281
new units during year, give away	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, rebate	-	-	-	-	15	20	25	25	25	25	25	25	25
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction[d]	-	109	209	170	179	150	156	162	169	175	183	190	198
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total residential irrigation systems[e]	1,544	1,653	1,862	2,032	2,211	2,361	2,517	2,679	2,848	3,024	3,207	3,397	3,594
total water use for outdoor irrigation systems, gallons[f]	29,540,687	31,079,221	34,030,233	36,434,192	38,835,215	40,824,194	42,890,778	45,045,568	47,394,612	49,835,479	52,379,002	55,025,709	57,779,725
per residential tap water use for outdoor irrigation systems	19,137	18,806	18,280	17,932	17,567	17,292	17,040	16,811	16,639	16,481	16,335	16,201	16,076
total water savings with rain sensors, gallons		-	-	-	21,625	28,834	36,042	36,042	36,042	36,042	36,042	36,042	36,042
total water savings with rain sensors, AF		-	-	-	0.07	0.09	0.11	0.11	0.11	0.11	0.11	0.11	0.11
cumulative savings, AF		-	-	-	0.07	0.15	0.27	0.38	0.49	0.60	0.71	0.82	0.93
total cost to District	$ -	$ -	$ -	$ -	$ 375	$ 500	$ 625	$ 625	$ 625	$ 625	$ 625	$ 625	$ 625
total cost to District per AF replacement water				#DIV/0!	$ 5,651	$ 5,651	$ 5,651	$ 5,651	$ 5,651	$ 5,651	$ 5,651	$ 5,651	$ 5,651
cumulative cost to District	$ -	$ -	$ -	$ -	$ 375	$ 875	$ 1,500	$ 2,125	$ 2,750	$ 3,375	$ 4,000	$ 4,625	$ 5,250

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; and Amy Vicker, "Water Use and Conservation", June 2002; and calculations via WeatherTRAK

[a] *cost per unit estimated from equipment cost plus installation*

[b] *outdoor water use estimated as average per single family tap during 2005, 2006 and 2007*

[c c] *ustomer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[d] *35% of new construction was assumed to use rainfall sensors*

[e] *estimated as 35% of taps in 2006, with all new construction with 70% irrigation systems installed*

[f] *total water use for outdoor irrigation includes accounting for changes in both rainfall sensors and ET controllers*

Residential ET Controllers Rebates

Residential ET Controller Rebates

Cost Assumptions

cost per unit[a]	$ 375
rebate per unit	$ 120
cost of water per 1000 gallons from PAWSD	4.2

Estimated savings per unit

outdoor water use per irrigator, gal/yr[b]	19,222
watering days per year, before rebate	75
watering days per year, after rebate (20% fewer water days)	60
original efficiency	0.6
improved efficiency	0.85
gallons saved per year/unit	5,126
AF saved per year/unit	0.016
customer payback period w/o incentive, years[c]	17.42
customer payback period w/ incentive, years[c]	11.84

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	20	98	247	369	516	644	775	911	1,032	1,157	1,288	1,424	1,565
new units during year, give away	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, rebate	-	-	-	-	20	20	20	20	-	-	-	-	-
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction[d]	-	78	149	122	128	107	112	116	121	125	130	136	141
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total residential irrigation systems[e]	1,544	1,653	1,862	2,032	2,211	2,361	2,517	2,679	2,848	3,024	3,207	3,397	3,594
total water use for outdoor irrigation systems, gallons[f]	29,540,687	31,079,221	34,030,233	36,434,192	38,835,215	40,824,194	42,890,778	45,045,568	47,394,612	49,835,479	52,379,002	55,025,709	57,779,725
per residential tap water use for outdoor irrigation systems	19,137	18,806	18,280	17,932	17,567	17,292	17,040	16,811	16,639	16,481	16,335	16,201	16,076
total water savings with ET Controllers, gallons		-	-	-	102,520	102,520	102,520	102,520	-	-	-	-	-
total water savings with ET Controllers, AF		-	-	-	0.31	0.31	0.31	0.31	-	-	-	-	-
cumulative savings, AF		-	-	-	0.31	0.63	0.94	1.26	1.26	1.26	1.26	1.26	1.26
total cost to District	$ -	$ -	$ -	$ -	$ 2,400	$ 2,400	$ 2,400	$ 2,400	$ -	$ -	$ -	$ -	$ -
total cost to District per AF replacement water				#DIV/0!	$ 7,629	$ 7,629	$ 7,629	$ 7,629	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
cumulative cost to District	$ -	$ -	$ -	$ -	$ 2,400	$ 4,800	$ 7,200	$ 9,600	$ 9,600	$ 9,600	$ 9,600	$ 9,600	$ 9,600

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; and Amy Vicker, "Water Use and Conservation", June 2002; and calculations via WeatherTRAK

[a] *cost per unit estimated from equipment cost plus installation*

[b] *outdoor water use estimated as average per single family tap during 2005, 2006 and 2007*

[c] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[d] *50% of new construction was assumed to use ET Controllers*

[e] *estimated as 35% of taps in 2006, with all new construction with 70% irrigation systems installed*

[f] *total water use for outdoor irrigation includes accounting for changes in both rainfall sensors and ET controllers*

Residential - Smart House Meters

Smart House Meters

Cost Assumptions

cost per meter [a]	$ 75
cost to utility per audit	$ 75

Estimated savings per meter

total water use per SF customer, gal/yr [b]	52,720
gallons saved per meter [c]	791
AF saved per meter	0.0024

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	-	-	-	15	40	65	90	115	135	155	175	195	215
audit performed during year, rebated	-	-	-	15	25	25	25	25	20	20	20	20	20
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	-	-	-	-	-	-	-	-	-
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total single family taps	4,410	4,566	4,865	5,108	5,363	5,578	5,801	6,033	6,274	6,525	6,786	7,057	7,340
total water savings with whole house audits, gallons		-	-	11,862	19,770	19,770	19,770	19,770	15,816	15,816	15,816	15,816	15,816
total water savings with whole house audits, AF		-	-	0.04	0.06	0.06	0.06	0.06	0.05	0.05	0.05	0.05	0.05
cumulative savings post-2006, AF		-	-	0.04	0.10	0.16	0.22	0.28	0.33	0.38	0.42	0.47	0.52
total cost to District	$ -	$ -	$ -	$ 1,125	$ 1,875	$ 1,875	$ 1,875	$ 1,875	$ 1,500	$ 1,500	$ 1,500	$ 1,500	$ 1,500
total cost to District per AF replacement water				$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908	$ 30,908
cumulative cost to District	$ -	$ -	$ -	$ 1,125	$ 3,000	$ 4,875	$ 6,750	$ 8,625	$ 10,125	$ 11,625	$ 13,125	$ 14,625	$ 16,125

Other Assumptions:

[a] *cost per unit estimated from conversation with*

[b] *water use estimated as average per single family tap during 2007*

[c] *estimated as 1.5% of annual water use per meter (including indoor and outdoor water use)*

Residential Whole House Audits

Cost Assumptions

cost per audit [a]	$ 225
cost to utility per audit	$ 225

Estimated savings per audit

total water use per SF customer, gal/yr [b]	52,720
gallons saved per audit [c]	10,900
AF saved per audit	0.03
	0.2067511

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	-	-	-	15	40	65	90	115	135	155	175	195	215
audit performed during year, rebated	-	-	-	15	25	25	25	25	20	20	20	20	20
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	-	-	-	-	-	-	-	-	-
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total single family taps	4,410	4,566	4,865	5,108	5,363	5,578	5,801	6,033	6,274	6,525	6,786	7,057	7,340
total water savings with whole house audits, gallons		-	-	163,500	272,500	272,500	272,500	272,500	218,000	218,000	218,000	218,000	218,000
total water savings with whole house audits, AF		-	-	0.50	0.84	0.84	0.84	0.84	0.67	0.67	0.67	0.67	0.67
cumulative savings post-2006, AF		-	-	0.50	1.34	2.17	3.01	3.85	4.52	5.18	5.85	6.52	7.19
total cost to District	$ -	$ -	$ -	$ 3,375	$ 5,625	$ 5,625	$ 5,625	$ 5,625	$ 4,500	$ 4,500	$ 4,500	$ 4,500	$ 4,500
total cost to District per AF replacement water				$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727	$ 6,727
cumulative cost to District	$ -	$ -	$ -	$ 3,375	$ 9,000	$ 14,625	$ 20,250	$ 25,875	$ 30,375	$ 34,875	$ 39,375	$ 43,875	$ 48,375

Other Assumptions:

Estimated water savings have been developed based on studies presented by Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from Amy Vicker, "Water Use and Conservation", includes free faucet and shower low flow heads*

[b] *water use estimated as average per single family tap during 2007*

[c] *estimated as 25 gallons per day per audit (including indoor and outdoor water use)*

Residential Outdoor Irrigation Audits

Residential Outdoor Irrigation Audits

Cost Assumptions

cost per audit[a]	$ 125
cost to utility per audit	$ 125

Estimated savings per audit

outdoor water use per irrigator, gal/yr [b]	19,222
watering days per year, before audit	75
watering days per year, after	68.0
original efficiency	0.6
improved efficiency	0.75
gallons saved per audit[c]	2,614
AF saved per audit	0.01

Estimated Penetration and Savings

	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	-	-	-	-	25	50	75	100	115	130	145	160	175
new units during year, rebate	-	-	-	-	25	25	25	25	15	15	15	15	15
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	-	-	-	-	-	-	-	-	-
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total residential irrigation systems[d]	1,544	1,653	1,862	2,032	2,211	2,361	2,517	2,679	2,848	3,024	3,207	3,397	3,594
total water use for outdoor irrigation, gallons	29,672,040	31,766,641	35,784,226	39,057,039	42,429,512	45,250,832	48,187,619	51,244,492	54,452,396	57,785,312	61,257,986	64,871,136	68,630,381
per tap water use for outdoor irrigation	19,222	19,222	19,222	19,222	19,193	19,167	19,145	19,125	19,117	19,110	19,104	19,099	19,095
total water savings with outdoor audits, gallons		-	-	-	65,356	65,356	65,356	65,356	39,214	39,214	39,214	39,214	39,214
total water savings with outdoor audits, AF		-	-	-	0.20	0.20	0.20	0.20	0.12	0.12	0.12	0.12	0.12
cumulative savings, AF		-	-	-	0.20	0.40	0.60	0.80	0.92	1.04	1.16	1.28	1.40
total cost to District	$ -	$ -	$ -	$ 3,125	$ 3,125	$ 3,125	$ 3,125	$ 1,875	$ 1,875	$ 1,875	$ 1,875	$ 1,875	$ 1,875
total cost to District per AF replacement water				$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583	$ 15,583
cumulative cost to District	$ -	$ -	$ -	$ 3,125	$ 6,250	$ 9,375	$ 12,500	$ 14,375	$ 16,250	$ 18,125	$ 20,000	$ 21,875	

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; and Amy Vicker, "Water Use and Conservation", June 2002; and calculations via WeatherTRAK

[a] *cost per unit estimated from equipment cost plus installation*

[b] *outdoor water use estimated as average per single family tap during 2005, 2006 and 2007*

[c] *estimated water savings based on Amy Vicker, "Water Use and Conservation"*

[d] *estimated as 35% of taps in 2006, with all new construction with 70% irrigation systems installed*

Commercial Facility Audits

Cost Assumptions

cost per audit	*$ 1,500*
cost to utility per audit	*$ 1,500*

Estimated savings per audit

Average water use per commercial tap, gal/yr (top users) [a]	*219,200*
Average savings per customer (4% per year for 5 years)	*20%*

Estimated Penetration and Savings	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
total audits conducted	*-*	*5*	*9*	*13*	*17*	*19*	*21*	*23*	*25*	*27*	*29*
commerical audits in year	*-*	*5*	*4*	*4*	*4*	*2*	*2*	*2*	*2*	*2*	*2*
Commerical taps	*1,057*	*1,126*	*1,182*	*1,242*	*1,291*	*1,343*	*1,397*	*1,452*	*1,510*	*1,571*	*1,634*
water saved from years audits, gallons	*-*	*43,840*	*35,072*	*35,072*	*35,072*	*17,536*	*17,536*	*17,536*	*17,536*	*17,536*	*17,536*
water saved from past audits, gallons	*-*	*-*	*43,840*	*78,912*	*113,984*	*149,056*	*122,752*	*105,216*	*87,680*	*70,144*	*70,144*
water saved in year, gallons	*-*	*43,840*	*78,912*	*113,984*	*149,056*	*166,592*	*140,288*	*122,752*	*105,216*	*87,680*	*87,680*
water saved, AF	*-*	*0.1*	*0.2*	*0.3*	*0.5*	*0.5*	*0.4*	*0.4*	*0.3*	*0.3*	*0.3*
cumulative savings post-2006, AF	*-*	*0.1*	*0.4*	*0.7*	*1.2*	*1.7*	*2.1*	*2.5*	*2.8*	*3.1*	*3.4*
total cost to District	*$ -*	*$ 7,500*	*$ 6,000*	*$ 6,000*	*$ 6,000*	*$ 3,000*	*$ 3,000*	*$ 3,000*	*$ 3,000*	*$ 3,000*	*$ 3,000*
total cost to District per AF replacement water		*$ 55,754*	*$ 35,842*	*$ 26,844*	*$ 21,541*	*$ 16,815*	*$ 12,055*	*$ 9,880*	*$ 8,577*	*$ 7,853*	*$ 8,993*

Other Assumptions:

Estimated audit costs and water savings have been developed based on studies presented by Amy Vicker, "Water Use and Conservation", June 2002

[a] *Customer use estimated based on top 50 non-institutional water user water use*

Commercial Irrigation Audits

Outdoor Irrigator Audits (including irrigation customers only)

Cost Assumptions

cost per audit	*$ 300*
cost to utility per audit	*$ 300*

Estimated savings per audit

outdoor water use per irrigator, gal/yr	*196,863*
watering days per year, before audit	*75*
watering days per year, after	*69.375*
original efficiency	*0.6*
improved efficiency (from reduction of leaks)	*0.7*
gallons saved per audit	*18,210*
AF saved per audit	*0.06*

Estimated Penetration and Savings	*2006*	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
total audits conducted		*-*	*-*	*5*	*10*	*15*	*20*	*25*	*30*	*35*	*40*	*45*	*50*
audits in the year	*-*	*-*	*-*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*	*5*
irrigation taps	*44*	*46*	*49*	*51*	*54*	*56*	*58*	*61*	*63*	*66*	*68*	*71*	*74*
total water savings with audits, gallons		*-*	*-*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*	*91,049*
total water savings with audits, AF		*-*	*-*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*	*0.28*
cumulative savings post-2006, AF		*-*	*-*	*0.28*	*0.56*	*0.84*	*1.12*	*1.40*	*1.68*	*1.96*	*2.24*	*2.51*	*2.79*
total cost to District	*$ -*	*$ -*		*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*	*$ 1,500*
total cost to District per AF replacement water				*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*	*$ 5,369*
cumulative cost to District	*$ -*	*$ -*		*$ 1,500*	*$ 3,000*	*$ 4,500*	*$ 6,000*	*$ 7,500*	*$ 9,000*	*$ 10,500*	*$ 12,000*	*$ 13,500*	*$ 15,000*

Other Assumptions:

Estimated audit costs and water savings have been developed based on studies presented by Amy Vicker, "Water Use and Conservation", June 2002

Commercial Waterless
Toilet Rebates

Commercial Waterless Toilet Rebate

Cost Assumptions

cost per unit[a]	$ 1,500
rebate per unit	$ 1,500
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

persons per unit	30
uses per person	1
gallons per unit, before	3.61
gallons per unit, after	0
days/year of use	235
gallons saved per year/unit	25,451
AF saved per year/unit	0.08
customer payback period w/o incentive, years[b]	14.0
customer payback period w/ incentive, years[b]	0.0

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Waterless Toilets in Use	25	25	25	25	35	40	45	50	55	60	65	70	75
new units during year, pilot	-	-	-	-	5	-	-	-	-	-	-	-	-
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	5	5	5	5	5	5	5	5	5
Commerical taps	1,021	1,057	1,126	1,182	1,242	1,291	1,343	1,397	1,452	1,510	1,571	1,634	1,699
total commerical toilets in use [c]	4,084	4,228	4,504	4,730	4,966	5,165	5,372	5,586	5,810	6,042	6,284	6,535	6,796
total water use for commercial toilets, gallons	91,406,584	92,456,131	94,608,226	96,309,733	97,411,053	98,301,760	99,242,700	100,236,563	101,286,143	102,391,513	103,561,259	104,795,797	106,115,390
per commercial tap water use for toilets	89,530	87,470	84,013	81,451	78,458	76,130	73,903	71,772	69,734	67,788	65,925	64,145	62,455
total water savings with rebated HET, gallons		-	-	-	127,253	-	-	-	-	-	-	-	-
total water savings with rebated HET, AF		-	-	-	0.39	-	-	-	-	-	-	-	-
cumulative savings, AF		-	-	-	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39	0.39
total cost to District	$ -	$ -	$ -	$ -	$ 7,500	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
total cost to District per AF replacement water					$ 19,208	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
cumulative cost to District	$ -	$ -	$ -	$ -	$ 7,500	$ 7,500	$ 7,500	$ 7,500	$ 7,500	$ 7,500	$ 7,500	$ 7,500	$ 7,500

Other Assumptions:

High Efficiency (HE) Toilets are defined as those commercial toilets that use no more than 1.2 gallons per flush

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 4 toilets per commercial tap*

Commercial High Efficiency Toilet Rebates

Commercial HE Toilet Rebate

Cost Assumptions

cost per unit[a]	$ 225
rebate per unit	$ 100
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

persons per unit	30
uses per person	1
gallons per unit, before	3.61
gallons per unit, after	1.2
days/year of use	235
gallons saved per year/unit	16,991
AF saved per year/unit	0.05
customer payback period w/o incentive, years[b]	3.2
customer payback period w/ incentive, years[b]	1.8

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
HET in use	700	854	1,142	1,379	1,653	1,891	2,138	2,394	2,659	2,934	3,220	3,516	3,822
new units during year, rebate	-	-	-	-	25	25	25	25	25	25	25	25	25
new units during year, organic	-	10	11	12	13	14	15	16	17	18	19	20	20
new units during year, new construction	-	144	276	225	237	199	207	215	223	232	242	251	261
Commerical taps	1,021	1,057	1,126	1,182	1,242	1,291	1,343	1,397	1,452	1,510	1,571	1,634	1,699
total commerical toilets in use[c]	4,084	4,228	4,504	4,730	4,966	5,165	5,372	5,586	5,810	6,042	6,284	6,535	6,796
total water use for commercial toilets, gallons	91,406,584	92,456,131	94,608,226	96,309,733	97,411,053	98,301,760	99,242,700	100,236,563	101,286,143	102,391,513	103,561,259	104,795,797	106,115,390
per commercial tap water use for toilets	89,530	87,470	84,013	81,451	78,458	76,130	73,903	71,772	69,734	67,788	65,925	64,145	62,455
total water savings with rebated HET, gallons		-	-	-	424,763	424,763	424,763	424,763	424,763	424,763	424,763	424,763	424,763
total water savings with rebated HET, AF		-	-	-	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30	1.30
cumulative savings, AF		-	-	-	1.30	2.61	3.91	5.21	6.52	7.82	9.12	10.43	11.73
total cost to District	$ -	$ -	$ -	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500	$ 2,500
total cost to District per AF replacement water				$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918	$ 1,918
cumulative cost to District	$ -	$ -	$ -	$ 2,500	$ 5,000	$ 7,500	$ 10,000	$ 12,500	$ 15,000	$ 17,500	$ 20,000	$ 22,500	

Other Assumptions:

High Efficiency (HE) Toilets are defined as those commercial toilets that use no more than 1.2 gallons per flush

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 4 toilets per commercial tap*

Commercial Waterless Urinal Rebate

Commercial Waterless Urinal Rebate

Cost Assumptions

cost per unit [a]	$ 400
rebate per unit	$ 400
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

persons per unit	20
uses per person	1.5
gallons per unit, before	1.75
gallons per unit, after	0
days/year of use	235
gallons saved per year/unit	12,338
AF saved per year/unit	0.04
customer payback period w/o incentive, years [b]	7.7
customer payback period w/ incentive, years [b]	0.0

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Waterless Urinials in use	15	15	15	15	20	20	20	20	20	20	20	20	20
new units during year, rebate	-	-	-	-	5	-	-	-	-	-	-	-	-
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Commerical taps	1,021	1,057	1,126	1,182	1,242	1,291	1,343	1,397	1,452	1,510	1,571	1,634	1,699
total commerical urinals in use [c]	2,552	2,643	2,815	2,956	3,104	3,228	3,357	3,491	3,631	3,776	3,927	4,084	4,248
total water use for commercial urinals, gallons	31,305,302	32,416,781	34,548,674	36,285,361	38,047,924	39,579,711	41,172,769	42,829,550	44,552,602	46,341,990	48,205,539	50,143,631	52,159,246
per commercial tap water use for urinals	30,662	30,669	30,679	30,687	30,645	30,653	30,660	30,667	30,674	30,680	30,687	30,693	30,699
total water savings with rebated HET, gallons		-	-	-	61,688	-	-	-	-	-	-	-	-
total water savings with rebated HET, AF		-	-	-	0.19	-	-	-	-	-	-	-	-
cumulative savings, AF		-	-	-	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19	0.19
total cost to District	$ -	$ -	$ -	$ -	$ 2,000	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
total cost to District per AF replacement water				#DIV/0!	$ 10,566	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!	#DIV/0!
cumulative cost to District	$ -	$ -	$ -	$ -	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 2.5 urinals per commercial tap*

Commercial Ultra Low Flow Urinal Rebates

Commercial Ultra Low Flow Urinal Rebate

Cost Assumptions

cost per unit [a]	$ 100
rebate per unit	$ 50
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

persons per unit	20
uses per person	1.5
gallons per unit, before	1.75
gallons per unit, after	0.75
days/year of use	235
gallons saved per year/unit	7,050
AF saved per year/unit	0.02
customer payback period w/o incentive, years [b]	3.4
customer payback period w/ incentive, years [b]	1.7

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
LF Urinials in use	500	600	784	937	1,123	1,286	1,455	1,630	1,812	2,000	2,195	2,397	2,605
new units during year, rebate	-	-	-	-	25	25	25	25	25	25	25	25	25
new units during year, organic	-	10	11	12	13	14	15	16	17	18	19	20	20
new units during year, new construction	-	90	173	141	148	124	129	134	140	145	151	157	163
Commerical taps	1,021	1,057	1,126	1,182	1,242	1,291	1,343	1,397	1,452	1,510	1,571	1,634	1,699
total commerical urinals in use [c]	2,552	2,643	2,815	2,956	3,104	3,228	3,357	3,491	3,631	3,776	3,927	4,084	4,248
total water use for commercial urinals, gallons	27,965,364	28,371,213	29,207,331	29,867,025	30,380,947	30,762,477	31,163,216	31,584,215	32,026,566	32,490,297	32,978,761	33,492,121	34,038,707
per commercial tap water use for urinals	27,391	26,841	25,936	25,259	24,470	23,824	23,206	22,615	22,050	21,510	20,994	20,500	20,034
total water savings with rebated HET, gallons		-	-	-	176,250	176,250	176,250	176,250	176,250	176,250	176,250	176,250	176,250
total water savings with rebated HET, AF		-	-	-	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54	0.54
cumulative savings, AF		-	-	-	0.54	1.08	1.62	2.16	2.70	3.24	3.79	4.33	4.87
total cost to District	$ -	$ -	$ -	$ -	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250
total cost to District per AF replacement water				#DIV/0!	$ 2,311	$ 2,311	$ 2,311	$ 2,311	$ 2,311	$ 2,311	$ 2,311	$ 2,311	$ 2,311
cumulative cost to District	$ -	$ -	$ -	$ -	$ 1,250	$ 2,500	$ 3,750	$ 5,000	$ 6,250	$ 7,500	$ 8,750	$ 10,000	$ 11,250

Other Assumptions:

Low Flow (LF) Urinals are defined as those commercial toilets that use no more than 0.75 gallons per flush

Estimated water savings have been developed based on studies presented by H2ouse.com; California Urban Water Conservation Council, "BMP Costs and Savings Study", July 2000; and Amy Vicker, "Water Use and Conservation", June 2002

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 2.5 urinals per commercial tap*

Commercial Pre-Wash Spray Nozzle Give Aways

Commercial Pre-Rinse Spray Valves Giveaway

Cost Assumptions

cost per unit[a]	$ 75
rebate per unit	$ 75
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

Number of units per location	1
minutes per unit	240
gallons per minute per unit, before	3.5
gallons per minute per unit, after	1.24
days/year of use	275
gallons saved per year/unit	149,160
AF saved per year/unit	0.46
customer payback period w/o incentive, years[b]	0.12
customer payback period w/ incentive, years[b]	0.00

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	20	32	44	56	68	80	92	104	116	128	140	152	164
new units during year, give away	-	12	12	12	12	12	12	12	12	12	12	12	12
new units during year, organic	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, new construction	-	-	-	-	-	-	-	-	-	-	-	-	-
Commerical taps	1,021	1,057	1,126	1,182	1,242	1,291	1,343	1,397	1,452	1,510	1,571	1,634	1,699
total commerical sprays in use [c]	337	349	372	390	410	426	443	461	479	498	518	539	561
total water use for sprays, gallons	74,844,900	75,801,990	79,281,020	81,783,303	84,501,999	86,497,874	88,645,181	90,949,977	93,418,562	96,051,095	98,866,918	101,866,971	105,058,622
per commercial tap water use for pre-wash spray	73,308	71,714	70,402	69,166	68,061	66,989	66,011	65,123	64,317	63,590	62,937	62,352	61,833
total water savings with pre-wash spray, gallons		1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920	1,789,920
total water savings with pre-wash spray, AF		5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49	5.49
cumulative savings, AF		5.49	10.98	16.48	21.97	27.46	32.95	38.45	43.94	49.43	54.92	60.41	65.91
total cost to District	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900	$ 900
total cost to District per AF replacement water	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164	$ 164
cumulative cost to District	$ 900	$ 1,800	$ 2,700	$ 3,600	$ 4,500	$ 5,400	$ 6,300	$ 7,200	$ 8,100	$ 9,000	$ 9,900	$ 10,800	

Other Assumptions:

prewash spray rinsing reduces flow while increasing spray pressure to reduce water use while improving cleaning efficiency

Estimated water savings have been developed based on studies presented by Amy Vicker, "Water Use and Conservation", June 2002, www.WEBstaurant.com

[a] *cost per unit estimated from equipment cost plus installation*

[b] *Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier*

[c] *estimated as 1/3 of commercial taps*

Commercial/Irrigator Rainfall Sensor Rebate

Commercial Rain Sensor Rebate

Cost Assumptions

cost per unit [a]	$ 150
rebate per unit	$ 50
cost of water per 1000 gallons from PAWSD	$ 4.20

Estimated savings per unit

outdoor water use per irrigator, gal/yr [b]	98,431
watering days per year, before rebate	75
watering days per year, after rebate (7.5% fewer water days)	69.375
efficiency	0.6
gallons saved per year/unit	7,382
AF saved per year/unit	0.02
customer payback period w/o incentive, years [c]	4.84
customer payback period w/ incentive, years [c]	3.23

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	5	18	43	64	91	114	138	162	188	214	241	269	298
new units during year, give away	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, rebates	-	-	-	-	5	5	5	5	5	5	5	5	5
new units during year, new construction [d]	-	13	25	21	22	18	19	20	20	21	22	23	24
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total commercial irrigation systems [e]	959	996	1,069	1,127	1,189	1,241	1,295	1,351	1,409	1,470	1,533	1,598	1,666
total water use for outdoor irrigation, gal/yr [f]	94,235,227	97,345,961	103,312,557	108,173,079	113,132,389	117,273,171	121,585,435	126,076,041	130,752,123	135,613,861	140,683,157	145,961,077	151,455,965
per tap water use for outdoor irrigation, gal/yr [f]	98,279	97,692	96,681	95,954	95,144	94,508	93,904	93,332	92,789	92,275	91,787	91,323	90,884
total water savings with rain sensors, gallons		-	-	-	36,912	36,912	36,912	36,912	36,912	36,912	36,912	36,912	36,912
total water savings with rain sensors, AF		-	-	-	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11	0.11
cumulative savings, AF		-	-	-	0.11	0.23	0.34	0.45	0.57	0.68	0.79	0.91	1.02
total cost to District	$ -	$ -	$ -	$ -	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250	$ 250
total cost to District per AF replacement water					$ 2,207	$ 2,207	$ 2,207	$ 2,207	$ 2,207	$ 2,207	$ 2,207	$ 2,207	$ 2,207
cumulative cost to District	$ -	$ -	$ -	$ -	$ 250	$ 500	$ 750	$ 1,000	$ 1,250	$ 1,500	$ 1,750	$ 2,000	$ 2,250

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; and Amy Vicker, "Water Use and Conservation", June 2002; and calculations via WeatherTRAK

[a] cost per unit estimated from equipment cost plus installation

[b] outdoor water use estimated as average per large commercial/irrigation tap during 2005, 2006 and 2007 (which is approximately 50% of 50 largest non-institutional water users)

[c] Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier

[d] 35% of new construction was assumed to use rainfall sensors

[e] estimated as 90% of taps in 2006, with all new construction with 100% irrigation systems installed

[f] total water use for outdoor irrigation includes accounting for changes in both rainfall sensors and ET controllers

Commercial/Irrigator ET Controller Rebate

Commercial ET Controller Rebate

Cost Assumptions

cost per unit [a]	$ 1,000
rebate per unit	$ 250
cost of water per 1000 gallons from PAWSD	$ 3.67

Estimated savings per unit

outdoor water use per irrigator, gal/yr [b]	98,431
watering days per year, before rebate	75
watering days per year, after rebate (20% fewer v	60
original efficiency	0.6
improved efficiency	0.7
gallons saved per year/unit	21,874
AF saved per year/unit	0.067
customer payback period w/o incentive, years [c]	12.46
customer payback period w/ incentive, years [c]	9.34

Estimated Penetration and Savings	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
units in use	5	28	71	106	148	184	222	260	300	341	384	429	475
new units during year, give away	-	-	-	-	-	-	-	-	-	-	-	-	-
new units during year, rebates	-	-	-	-	5	5	5	5	5	5	5	5	5
new units during year, new construction [d]	-	23	43	35	37	31	32	34	35	36	38	39	41
PAWSD Service Area Population	10,119	10,625	11,156	11,714	12,300	12,792	13,304	13,836	14,389	14,964	15,563	16,185	16,832
total commercial irrigation systems [e]	959	996	1,069	1,127	1,189	1,241	1,295	1,351	1,409	1,470	1,533	1,598	1,666
total water use for outdoor irrigation, gal/yr [f]	94,235,227	97,345,961	103,312,557	108,173,079	113,132,389	117,273,171	121,585,435	126,076,041	130,752,123	135,613,861	140,683,157	145,961,077	151,455,965
per tap water use for outdoor irrigation, gal/yr [f]	98,279	97,692	96,681	95,954	95,144	94,508	93,904	93,332	92,789	92,275	91,787	91,323	90,884
total water savings with ET Controllers, gallons		-	-	-	109,368	109,368	109,368	109,368	109,368	109,368	109,368	109,368	109,368
total water savings with ET Controllers, AF		-	-	-	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34	0.34
cumulative savings, AF		-	-	-	0.34	0.67	1.01	1.34	1.68	2.01	2.35	2.68	3.02
total cost to District	$ -	$ -	$ -	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250	$ 1,250
total cost to District per AF replacement water				$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725	$ 3,725
cumulative cost to District	$ -	$ -	$ -	$ 1,250	$ 2,500	$ 3,750	$ 5,000	$ 6,250	$ 7,500	$ 8,750	$ 10,000	$ 11,250	

Other Assumptions:

Estimated water savings have been developed based on studies presented by H2ouse.com; and Amy Vicker, "Water Use and Conservation", June 2002; and calculations via WeatherTRAK

[a] cost per unit estimated from equipment cost plus installation

[b] outdoor water use estimated as average per commercial/irrigation tap during 2005 and 2006

[c] Customer payback period is based on the current cost of 1000 gallons of water in the lowest tier

[d] 60% of new construction was assumed to use ET Controllers

[e] estimated as 90% of taps in 2006, with all new construction with 100% irrigation systems installed

[f] total water use for outdoor irrigation includes accounting for changes in both rainfall sensors and ET controllers

Public Education and Training Programs

Customer Education, Outreach and Training

Activities	Annual Cost	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018
Water Fair (discounted w/ two partners)	$ 2,300.00	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300	$ 2,300
K-12 Education	$ 2,050.00	$ 2,050	$ 2,050	$ 2,050	$ 2,050	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000	$ 2,000
K-12 Teacher Education and Training	$ 7,580.00	$ -	$ 7,580	$ 3,790	$ 3,790	$ 3,790	$ -	$ -	$ 3,790	$ 3,790	$ 3,790
Messaging Campaigns/Public Relations (multi-media)	$ 6,080.00	$ 6,080	$ -	$ -	$ -	$ -	$ -	$ 6,080	$ -	$ -	$ -
Customer Surveys and Focus Groups	$ 13,800.00	$ -	$ -	$ -	$ -	$ -	$ 13,800	$ -	$ -	$ -	$ -
Homeowner Education and Training	$ 4,100.00	$ -	$ -	$ 4,100	$ 4,100	$ 2,050	$ -	$ 2,050	$ 2,050	$ 4,100	$ 4,100
Commercial/Irrigator Education and Training	$ 4,100.00	$ -	$ -	$ 4,100	$ 4,100	$ 2,050	$ -	$ 2,050	$ 2,050	$ 4,100	$ 4,100
Property Manager/HOA Education and Training	$ 2,050.00	$ -	$ -	$ 2,050	$ 2,050	$ 2,050	$ -	$ 2,050	$ 2,050	$ 2,050	$ 2,050
Homebuilder/Developer Education and Training	$ 2,050.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ 2,050	$ 2,050	$ 2,050
Xeriscape Demonstration Gardens Improvements	$ 3,940.00	$ -	$ 3,940	$ -	$ -	$ -	$ -	$ -	$ 3,940	$ -	$ -
Web Site Tools and Posting		$ 7,700	$ 2,430	$ 9,720	$ 9,450	$ 9,720	$ 9,450	$ 14,720	$ 9,450	$ 9,720	$ 9,450
Web Site Re-Programming	$ 5,000.00	$ 5,000	$ -	$ -	$ -	$ -	$ -	$ 5,000	$ -	$ -	$ -
Customer Water Use	$ 4,680.00	$ -	$ -	$ 4,680	$ 4,680	$ 4,680	$ 4,680	$ 4,680	$ 4,680	$ 4,680	$ 4,680
Local Precipitation/ET	$ 2,340.00	$ -	$ -	$ 2,340	$ 2,340	$ 2,340	$ 2,340	$ 2,340	$ 2,340	$ 2,340	$ 2,340
Newsletter/Happenings	$ 2,160.00	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160	$ 2,160
Rebate/Progam Information	$ 270.00	$ 270	$ 270	$ 270	$ 270	$ 270	$ 270	$ 270	$ 270	$ 270	$ 270
Self Audit Tools	$ 270.00	$ 270	$ -	$ 270	$ -	$ 270	$ -	$ 270	$ -	$ 270	$ -
Customer Tracking	$ 4,320.00	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -	$ -
		$ 18,130	$ 18,300	$ 28,110	$ 27,840	$ 23,960	$ 27,550	$ 31,250	$ 29,680	$ 30,110	$ 29,840

Assumptions

Cost of saved water estimated from Colorado Springs Utilities Water Conservation Plan, December 2007

Water Rate Increase Analyses

Water Rate Increases

	Estimated Penetration and Savings												
		10%	*2007*	*2008*	*2009*	*2010*	*2011*	*2012*	*2013*	*2014*	*2015*	*2016*	*2017*	*2018*
	w/o education or new restrictions													
0.05	*5% rate hike savings, AF*		-	-	-	*13.12*	*13.77*	*14.46*	*15.04*	*15.64*	*16.27*	*16.92*	*17.18*	*17.87*
0.1	*10% rate hike savings, AF*		-	-	-	*26.24*	*27.55*	*28.93*	*30.09*	*31.29*	*32.54*	*33.84*	*34.36*	*35.75*
0.2	*20% rate hike savings, AF*		-	-	-	*52.47*	*55.10*	*57.86*	*60.17*	*62.58*	*65.08*	*67.69*	*68.71*	*71.50*
		25%		-										
	w/ education; w/o new restrictions													
0.05	*5% rate hike savings, AF*		-	-	-	*32.80*	*34.44*	*36.16*	*37.61*	*39.11*	*40.68*	*42.30*	*42.95*	*44.69*
0.075	*7.5% rate hike savings, AF*					*49.19*	*51.66*	*54.24*	*56.41*	*58.67*	*61.02*	*63.46*	*64.42*	*67.03*
0.1	*10% rate hike savings, AF*		-	-	-	*65.59*	*68.87*	*72.32*	*75.22*	*78.22*	*81.35*	*84.61*	*85.89*	*89.37*
0.2	*20% rate hike savings, AF*		-	-	-	*131.19*	*137.75*	*144.65*	*150.43*	*156.45*	*162.71*	*169.22*	*171.78*	*178.74*
		65%												
	w/ education; w/o new restrictions													
0.05	*5% rate hike savings, AF*			-	-	*85.27*	*89.54*	*94.02*	*97.78*	*101.69*	*105.76*	*109.99*	*111.66*	*116.18*
0.1	*10% rate hike savings, AF*			-	-	*170.54*	*179.07*	*188.04*	*195.56*	*203.38*	*211.52*	*219.98*	*223.32*	*232.36*
0.2	*20% rate hike savings, AF*			-	-	*341.08*	*358.15*	*376.08*	*391.12*	*406.76*	*423.04*	*439.97*	*446.64*	*464.73*

Assumptions

Cost of saved water estimated from "Effectiveness of Residential Water Conservation Price and Non-Price Programs", AWWARF, 1998, "The Simple Analytics of Demand Hardening", C. Howe, C. Goemans, AWWA Journal, Oct. 2007.

** water savings estimated using product of projected treated water sales for the year, percent of rate hike, and price elasticity*

PAWSD Water Conservation Plan Cost/Benefit Analysis

Measures and Programs		Year 2009		2010		2011		2012		2013		2014	
Residential	b/c ratio	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF
Homeowner Education	$ 4,500	$ 9,065	2.0	$ 9,150	2.0	$ 14,055	3.1	$ 13,920	3.1	$ 11,980	2.7	$ 13,775	3.1
HEToilet Rebate	$ 2,399	$ 6,650	2.8	$ 6,650	2.8	$ 6,650	2.8	$ 6,650	2.8	$ 6,650	2.8	$ -	-
Washing Machine Rebates	$ 4,453	$ 3,325	0.7	$ 3,325	0.7	$ 3,325	0.7	$ 3,325	0.7	$ 3,325	0.7	$ -	-
Rainfall Sensor GiveawayRebates	$ 5,651	$ -	-	$ 375	0.1	$ 500	0.1	$ 625	0.1	$ 625	0.1	$ 625	0.1
ET Controller Giveaway/Rebates	$ 7,629	$ -	-	$ 2,400	0.3	$ 2,400	0.3	$ 2,400	0.3	$ 2,400	0.3	$ -	-
Whole House Audit	$ 6,727	$ 3,375	0.5	$ 5,625	0.8	$ 5,625	0.8	$ 5,625	0.8	$ 5,625	0.8	$ 4,500	0.7
Outdoor Irrigation Audits	$ 15,583	$ -	-	$ 3,125	0.2	$ 3,125	0.2	$ 3,125	0.2	$ 3,125	0.2	$ 1,875	0.1
Monitoring and Verification Costs		$ 2,500		$ 2,500		$ 2,500		$ 2,500		$ 2,500		$ 1,500	
sum		$ 24,915	6.0	$ 33,150	7.0	$ 38,180	8.1	$ 38,170	8.1	$ 36,230	7.6	$ 22,275	4.0
cummulative water savings			6.0		13.0		21.1		29.2		36.8		40.8
average cost per acre foot saved	$ 4,972												
Commercial/Irrigation/Municipal													
Commerical Customer Education	$ 4,500	$ 9,065	2.0	$ 9,150	2.0	$ 14,055	3.1	$ 13,920	3.1	$ 11,980	2.7	$ 13,775	3.1
Commercial Facility Audits	$ 12,935	$ 7,500	0.1	$ 6,000	0.2	$ 6,000	0.3	$ 6,000	0.5	$ 3,000	0.5	$ 3,000	0.4
Commercial/Irrigation Outdoor Audits	$ 5,369	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3
High Efficiency Toilet Rebates	$ 1,918	$ -	-	$ 2,500	1.3	$ 2,500	1.3	$ 2,500	1.3	$ 2,500	1.3	$ 2,500	1.3
Ultra Low Flow Urinal Rebates	$ 2,311	$ -	-	$ 1,250	0.5	$ 1,250	0.5	$ 1,250	0.5	$ 1,250	0.5	$ 1,250	0.5
Rainfall Sensor GiveawayRebates	$ 2,207	$ -	-	$ 250	0.1	$ 250	0.1	$ 250	0.1	$ 250	0.1	$ 250	0.1
ET Controller GiveawayRebates	$ 3,725	$ -	-	$ 1,250	0.3	$ 1,250	0.3	$ 1,250	0.3	$ 1,250	0.3	$ 1,250	0.3
Spray Nozzle Give Aways	$ 164	$ 900	5.5	$ 900	5.5	$ 900	5.5	$ 900	5.5	$ 900	5.5	$ 900	5.5
Monitoring and Verification Costs		$ 1,500		$ 3,000		$ 3,000		$ 3,000		$ 3,000		$ 3,000	
sum		$ 20,465	7.9	$ 25,800	10.3	$ 30,705	11.5	$ 30,570	11.6	$ 25,630	11.2	$ 27,425	11.6
cummulative water savings			7.9		18.3		29.8		41.4		52.7		64.2
average cost per acre foot saved	$ 2,480												
Subtotal WC Costs		$ 45,380		$ 58,950		$ 68,885		$ 68,740		$ 61,860		$ 49,700	
CWCB Grant		$ 1,380		$ 13,950		$ 22,885		$ 21,740		$ 13,860			
total WC costs		$ 44,000		$ 45,000		$ 46,000		$ 47,000		$ 48,000		$ 49,700	
WC Budget													
$		**$ 44,000**		**$ 45,000**		**$ 46,000**		**$ 47,000**		**$ 48,000**		**$ 49,700**	
FTEs		**0.15**		**0.45**		**0.65**		**0.65**		**0.65**		**0.75**	
saved water			13.96		17.31		19.62		19.69		18.88		15.52
cummulative water savings	$ 2,896		13.96		31.27		50.89		70.57		89.46		104.97
Other Municipal Activitites and Budgets													
Leak Detection Services (0.25 % per yr of unaccounted for water per $10000 spent)													
$		$ 4,000		$ 4,000		$ 4,000		$ 4,000		$ 4,000		$ 4,000	
FTE		0.01		0.01		0.01		0.01		0.01		0.01	
saved water			0.73		0.77		0.81		0.84		0.88		0.91
cummulative water savings	$ 4,496		0.73		1.51		2.32		3.16		4.03		4.95
Meter Replacement and AMR Installation (increasing billing accuracy, augmentation requirements and leak detection)(10 % per year of unaccounted for water for each of 500 replacement meters per year)													
$		$ 150,000		$ 150,000		$ 150,000		$ 150,000		$ 150,000		$ 150,000	
FTE		1		1		1		1		1		1	
saved water			4.70		4.70		4.75		4.75		4.75		4.75
cummulative water savings	$ 31,870		4.70		9.41		14.16		18.91		23.65		28.40
Water Rate Assessment (5 % rate increase every fifth year)													
$				$ 35,000		$ -		$ -		$ -		$ -	
FTE		0.05		0.15		0.05		0.05		0.15		0.05	
saved water					32.8		27.5		21.7		15.0		7.8
cummulative water savings	$ 336		-		32.8		60.3		82.0		97.1		104.9

Total	Year 2009	2010	2011	2012	2013	2014
$	$ 198,000	$ 234,000	$ 200,000	$ 201,000	$ 202,000	$ 203,700
FTE	1.21	1.61	1.71	1.71	1.81	1.81
saved water	19.39	55.58	52.73	46.98	39.55	29.00
cummulative water savings	19.39	74.98	127.70	174.68	214.23	243.23
Total Cumulative Cost to PAWSD Including FTE Cost	$ 260,920	$ 578,640	$ 867,560	$ 1,157,480	$ 1,453,600	$ 1,751,420
State Funding Needed	$ 1,380	$ 13,950	$ 22,885	$ 21,740	$ 13,860	$ -
Cummulative State Funding Needed	$ 1,380	$ 15,330	$ 38,215	$ 59,955	$ 73,815	

PAWSD Water Conservation Plan Cost/Benefit Analysis

Measures and Programs	2015		2016		2017		2018		
Residential	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF	Cost	Saved Water AF	
Homeowner Education	$ 15,625	3.5	$ 14,840	3.3	$ 15,055	3.3	$ 14,920	3.3	29.4
HEToilet Rebate	$ -	-	$ -	-	$ -	-	$ -	-	13.9
Washing Machine Rebates	$ -	-	$ -	-	$ -	-	$ -	-	3.7
Rainfall Sensor GiveawayRebates	$ 625	0.1	$ 625	0.1	$ 625	0.1	$ 625	0.1	0.9
ET Controller Giveaway/Rebates	$ -	-	$ -	-	$ -	-	$ -	-	1.3
Whole House Audit	$ 4,500	0.7	$ 4,500	0.7	$ 4,500	0.7	$ 4,500	0.7	7.2
Outdoor Irrigation Audits	$ 1,875	0.1	$ 1,875	0.1	$ 1,875	0.1	$ 1,875	0.1	1.4
Monitoring and Verification Costs	$ 1,500		$ 1,500		$ 1,500		$ 1,500		
sum	$ 24,125	4.4	$ 23,340	4.2	$ 23,555	4.2	$ 23,420	4.2	
cummulative water savings		45.1		49.3		53.6		57.8	
average cost per acre foot saved									
Commercial/Irrigation/Municipal									
Commerical Customer Education	$ 15,625	3.5	$ 14,840	3.3	$ 15,055	3.3	$ 14,920	3.3	29.4
Commercial Facility Audits	$ 3,000	0.4	$ 3,000	0.3	$ 3,000	0.3	$ 3,000	0.3	3.4
Commercial/Irrigation Outdoor Audits	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3	$ 1,500	0.3	2.8
High Efficiency Toilet Rebates	$ 2,500	1.3	$ 2,500	1.3	$ 2,500	1.3	$ 2,500	1.3	11.7
Ultra Low Flow Urinal Rebates	$ 1,250	0.5	$ 1,250	0.5	$ 1,250	0.5	$ 1,250	0.5	4.9
Rainfall Sensor GiveawayRebates	$ 250	0.1	$ 250	0.1	$ 250	0.1	$ 250	0.1	1.0
ET Controller GiveawayRebates	$ 1,250	0.3	$ 1,250	0.3	$ 1,250	0.3	$ 1,250	0.3	3.0
Spray Nozzle Give Aways	$ 900	5.5	$ 900	5.5	$ 900	5.5	$ 900	5.5	54.9
Monitoring and Verification Costs	$ 3,000		$ 3,000		$ 3,000		$ 3,000		
sum	$ 29,275	11.9	$ 28,490	11.7	$ 28,705	11.7	$ 28,570	11.6	
cummulative water savings		76.1		87.8		99.5		111.1	
average cost per acre foot saved									
Subtotal WC Costs	$ 53,400		$ 51,830		$ 52,260		$ 51,990		
CWCB Grant									
total WC costs	$ 53,400		$ 51,830		$ 52,260		$ 51,990		
WC Budget									
$	**$ 53,400**		**$ 51,830**		**$ 52,260**		**$ 51,990**		
FTEs	**0.75**		**0.75**		**0.75**		**0.75**		
saved water		16.29		15.88		15.92		15.86	
cummulative water savings		121.26		137.14		153.07		168.93	
Other Municipal Activitites and Budgets									
Leak Detection Services (0.25 % per yr of unac									
$	$ 4,000		$ 4,000		$ 4,000		$ 4,000		
FTE	0.01		0.01		0.01		0.01		
saved water		0.95		0.96		1.00		1.04	
cummulative water savings		5.89		6.86		7.86		8.90	
Meter Replacement and AMR Installation (incr									
$	$ 150,000		$ 150,000		$ 150,000		$ 150,000		
FTE	1		1		1		1		
saved water		4.75		4.64		4.64		4.64	
cummulative water savings		33.15		37.79		42.43		47.07	
Water Rate Assessment (5 % rate increase eve									
$	$ 40,000		$ -		$ -		$ -		
FTE	0.05		0.15		0.05		0.05		
saved water		40.7		33.8		25.8		17.9	
cummulative water savings		145.6		179.4		205.2		223.1	

Total	2015		2016		2017		2018		
$	$ 247,400		$ 205,830		$ 206,260		$ 205,990		
FTE	1.81		1.91		1.81		1.81		
saved water		62.66		55.32		47.33		39.42	
cummulative water savings		305.89		361.22		408.55		447.96	
Total Cumulative Cost to PAWSD Including FT	$ 2,092,940		$ 2,398,090		$ 2,698,470		$ 2,998,580		
State Funding Needed	$ -		$ -		$ -		$ -		
Cummulative State Funding Needed									

Appendix E

Public Notice

NOTICE OF PUBLIC COMMENT PERIOD AND HEARING

The Pagosa Area Water and Sanitation District is seeking comments on its draft Water Conservation Plan. The Plan is an update to the District's current Water Conservation and Drought Management Plan.

The Plan may be viewed at:

PAWSD Administrative Offices
100 Lyn Ave.

Pagosa Lakes POA Administrative Offices
230 Port Ave.

Archuleta County Administrative Offices
449 San Juan St.

Town of Pagosa Springs Town Hall
551 Hot Springs Blvd.

Sisson Library
811 San Juan St.

The Plan may also be downloaded from the District's web site, www.pawsd.org

Comments will be accepted until October 7th, 2008. Comments may be submitted by email, mail, phone, fax or by visiting the PAWSD offices at 100 Lyn Avenue, P.O. Drawer 4610, Pagosa Springs, CO 81157, (970) 731-2691, (970) 731-2693 [Fax], or info@pawsd.org.

The PAWSD Board of Directors will hold a Public Hearing at 6:30 pm October 14, 2008 located at PAWSD Administrative Offices. Public comment will also be heard at the October 14th Public Hearing.

This public notice was posted at PAWSD Administrative Offices, Town of Pagosa Springs Town Hall, Archuleta County Courthouse and Sisson Library.

Pagosa Area Water and Sanitation District Presents…

H2WHOA!
A WATER CONSERVATION OPEN HOUSE

WHEN? Wednesday August 13, 2008 5-7 pm

WHERE? PAWSD Offices, 100 Lyn Avenue

WHAT? Experience the **NEW** Water Conservation Plan *up close and personal*! Consultants and staff will be on hand to answer questions and take comments on the plan, and to provide information and materials on what YOU can do to conserve!

WHAT ELSE? Cookies, the best water in Colorado (and other beverages), and FUN STUFF for kids!

PAWS DISTRICT WATER CONSERVATION PROGRAM
Pagosa Area Water and Sanitation District

Get the nerve to conserve…
Come on down to PAWSD!

For more information call PAWSD at 731-2691 or email info@pawsd.org

PAGOSA AREA WATER AND SANITATION DISTRICT

ARCHULETA COUNTY

STATE OF COLORADO

NOTICE IS HEREBY GIVEN THAT a Regular Meeting and Public Hearing of the Board of Directors of the Pagosa Area Water and Sanitation District have been scheduled for Tuesday, October 14, 2008, at 6:30 p.m. Notice is further provided that a Work Session is scheduled for 5:30 p.m. The Meeting and Work Session will be held at the District's administrative offices located at 100 Lyn Avenue, Pagosa Springs, Colorado. The proposed Agenda is as follows:

1. Call to Order
2. Approval of Consent Agenda
   Minutes – 09/08/08 Special Meeting and 09/09/08 Regular Meeting
   Staff Reports
   Projects Update
   Investment Report as of September 30, 2008
   Services Agreements - BBC Research & Consulting, MWH Americas, Inc., Briliam Engineering Services LLC, Harris Water Engineering, Inc., Davis Engineering Service, Inc., Aqua-Hab, Inc., Ecosphere Environmental Service
   Fee Deferral Agreement – Jeff and Adelaide Greer
   Meadows IV Well Plug and Abandon Pilot Project
   Town of Pagosa Springs – Bond Issued for Work in Public Right-of-Way
3. Public Comment
4. Public Hearing – Consideration of Adoption of Water Conservation Plan and Drought Management Plan
5. Report on Automatic Meter Reading Program with Datamatic
6. Ratification of Approval of Proposal from Southwest Contracting, Inc. for EFI Pressure Reducing Station
7. Ratification of Approval of Proposal from Davis Engineering Service, Inc. for Continued Work Towards Elimination of Highlands Lagoon and Consideration of Engineering Proposals
8. Ratification of Change Order from Weeminuche Construction Authority for Enlargement of Stevens Reservoir Project
9. Consideration of Requests for Payment of Availability to Tap Fees
   Ann Doubek
   Barbara Mason and Nancy Olsen
   Robert and Robyn Harrington
   Brooke Kitchens
10. Consideration of Request from Whispering Eagles for Additional Connection and Transfer of Equivalent Units
11. Consideration of Intergovernmental Agreement to Defer and Amortize Payment of Certain Fees Upper San Juan Health Service District
12. Consideration of Request from Housing Solutions for the Southwest to Delay Assessment of Equivalent Units until Building Permit
13. Consideration of Request from Larry Simmons to Transfer Connection Permit
14. Consideration of Request for Main Line Extension Permit from May Two, LLC
15. Consideration of Proposals for Improvements to Xeriscape Garden
    Ross Enterprises
    High Plains Nursery
16. Report on Colorado Water Conservation Board Loan
17. Discussion of Draft 2008 Amended Budget and Draft 2009 Proposed Budget
18. Water and Wastewater Connections Update
19. Any Other Business Brought Before the Board Will Be Duly Considered.

PAGOSA AREA WATER AND SANITATION DISTRICT
By /s/ Carrie S. Weiss
For the Board of Directors

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