Water Conservation Plan

Prepared for

Town of Purcellville

Prepared by

CH2MHILL

March 4, 2008

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Water Conservation Plan

Executive Summary

The Town of Purcellville Water Conservation Plan includes a combination of programmatic measures and ordinance requirement measures. The measures were selected from a list of more than 100 measures and evaluated for the water savings and costs. The final list of programmatic water conservation measures to be implemented is shown in Table 1. The final list of ordinance requirement measures is listed in Table 2.

TABLE 1
Programmatic Water Conservation Measures
Purcellville Water Conservation Plan

Measure	Description
Increase Public Education (including xeriscape demonstration)	Purcellville would increase public education efforts to encourage water conservation and provide information on demand management techniques. The education program would work in accordance with other selected conservation measures and thereby increase the implementation. A site should be selected to create a xeriscape landscape for demonstration purposes on Town property.
Distribute Retrofit Kits	During an audit or through direct mail solicitation, a free retrofit kit would be provided to existing older (pre-1990) single-family residences. The kit should contain a low-flow showerhead, toilet leak-detection dye tablets, and low-flow faucet aerators.
Distribute Kitchen Spray Rinse Valves	Provide free replacement of higher-use nozzles with a 1.6-gpm spray nozzles for the rinse and clean operation in commercial kitchens.
Clothes Washer Rebates	Residential customers would be offered incentives to retrofit or use efficient clothes washers. Rebates would be offered only for machines on an approved list maintained by the Town. Rebate amounts would reflect the incremental purchase cost and would be in the range of $100 to $150 per machine replaced
Toilet Rebates	Provide a rebate or voucher for the retrofit of an old high-flush-volume toilet with a 1.6-gal/flush toilet or less. Rebate amounts would reflect the incremental purchase cost and would be in the range of $100 per toilet replaced.
Residential Water Audits	The Town would offer complete water audits (or assessments) for single-family homes. Focus would be on improving indoor and outdoor water use efficiency and identifying and fixing leaks.

TABLE 2
Ordinance Requirement Water Conservation Measures
Purcellville Water Conservation Plan

Measure	Description
Require Efficient Equipment in New Commercial Businesses	The Town would require that new commercial businesses use water-efficient equipment. Applies to dishwashers, ice machines, HVAC equipment, washing machines, etc.
Require High-Efficiency Washing Machines in New Homes	Require all new residential homes to have high-efficiency washing machines. Basis would be an approved list maintained by the Town.
Toilet Retrofit on Resale	Require a certificate of compliance be submitted to Purcellville's Water Conservation program verifying that a plumber has inspected the property and that efficient fixtures where either already there or were installed at the time of sale or before establishing new water service. May need to work with the real estate industry. Only applies to pre-1978 homes.
Require Submetering on New Commercial Buildings	Require that all new commercial buildings in strip-mall-type construction be submetered for water service, and are individually billed.
Require 0.5-gallon/flush or Less Urinals in New Commercial Buildings	Change plumbing code to specify that all new buildings install urinals that use 0.5 gallon per flush or less (including waterless urinals).
Require Rain Sensor Shutoffs on New Irrigation Systems	Require that all new irrigation systems be installed with rain shutoff switches.

The programmatic measures are scheduled to be implemented over a 5-year period. After this period, the measures should be re-evaluated to evaluate whether additional measures could be identified to continue the water conservation program. For several of the programmatic measures, the payback period for the customer-based savings in water and sewer charges was calculated.

The ordinance requirement measures should be implemented as soon as feasible upon implementation of the Town water conservation plan. The savings from these measures will be ongoing, through enforcement, or until they have reached 100 percent market penetration.

The initial screening of the water conservation measures is detailed in a Technical Memorandum (TM) in Appendix A.

The results of the detailed cost and savings analysis and possible implementation mechanisms for each of the water conservation measures are in the Implementation Strategies TM in the Appendix B.

Sample ordinances that other jurisdictions have used to implement plumbing and appliance requirements are contained in Appendix C.

Appendix D contains recommendations for revisions to the Town's Curtailment Ordinance, including renaming of the ordinance as the Drought Response and Contingency Plan.

Water Conservation Measure Summary

The recommended measures were evaluated to identify the cost and savings for each measure, based on a realistic level of implementation. The results of the analysis are shown in Table 3. This summary includes the projected cost for the Town to implement the measure, staff time required to implement the measure, water savings expected from the measure, and future cost savings that the Town is expected to experience based on the recently completed Water Resources Study ($1.49 to $3.25/1,000 gallons).

TABLE 3
Water Conservation Measures Cost and Savings Summary
Purcellville Water Conservation Plan

Measure	Type of Measure	Annual Program Cost (without Labor)	Annual Labor Required (FTE)	5th Year Savings (gallons/ day)	ADD Reduction in 5th Year	MDD Reduction in 5th Year	Unit Cost of Water Savings ($/1,000 gallons)	Annual Cost Savings ($1.49 to $3.25/1,000 gallons)
Increase Public Education	Programmatic	$ 1,510	0.92	0	0.00%	0.00%	$ -	$4,351 to $9,490
Distribute Retrofit Kits	Programmatic	$ 3,940	0.04	8,000	1.10%	0.67%	$ 0.60	$1,632 to $3,559
Distribute Kitchen Spray Rinse Valves	Programmatic	$ 2,280	0.01	3,000	0.41%	0.25%	$ 0.73	$1,849 to $4,033
Washing Machine Rebates	Programmatic	$ 9,300	0.03	3,400	0.47%	0.29%	$ 2.38	$1,468 to $3,203
Toilet Rebates	Programmatic	$ 5,400	0.04	2,700	0.37%	0.23%	$ 2.41	$598 to $1,305
Residential Water Audits	Programmatic	$ 1,640	0.04	1,100	0.15%	0.09%	$ 3.71	$12,726 to $27,758
Require Efficient Equipment in New Commercial Business	Ordinance	$ 1,560	0.04	23,400	3.21%	1.97%	$ 0.14	$3,916 to $8,541
Require High-Efficiency Washing Machines in New Homes	Ordinance	$ 1,550	0.05	7,200	0.99%	0.61%	$ 0.24	$2,774 to $6,050
Toilet Retrofit on Resale	Ordinance	$ 1,550	0.02	5,100	0.70%	0.43%	$ 0.25	$4,079 to $8,897
Require Submetering on New Commercial Buildings	Ordinance	$ 1,565	0.05	7,500	1.03%	0.63%	$ 0.54	$2,719 to $5,931
Require 0.5 gallon/flush or Less Urinals in New Commercial Buildings	Ordinance	$ 1,565	0.05	5,000	0.69%	0.42%	$ 0.81	$2,012 to $4,389
Require Rain Sensor Shutoffs on New Irrigation Systems	Ordinance	$ 1,560	0.04	3,700	0.51%	0.31%	$ 0.90	$4,351 to $9,490
Total		**$ 33,420**	**1.34**	**70,100**	**9.62%**	**5.90%**	**$ 0.62**	**$38,124 to $83,156**

Notes: Labor full-time equivalent (FTE) assumed to be $80,000.
The total savings may reduce slightly if all measures are implemented together, due to overlap.

Appendixes

Appendix A: TM: Water Conservation Goals and Measure Screening

Appendix B: TM: Water Conservation Implementation Strategies

Appendix C: Sample Ordinances for Plumbing Requirements

Appendix D: Proposed Revisions to Curtailment Ordinance

Appendix A
TM: Water Conservation Goals and Measure Screening

Water Conservation Goals and Measure Screening Water Resource Study

PREPARED FOR: Town of Purcellville

PREPARED BY: CH2M HILL

COPIES: File

DATE: March 4, 2008

PROJECT NUMBER: 355269

Contents

Introduction

Background

In January 2007, the Town of Purcellville ("the Town") retained the consultant team of CH2M HILL and GeoTrans to prepare a Water Resource Study. The purpose of this study is to provide recommendations for strategically timed, reliable, and implementable water supply capacity to meet the Town's growing near-term deficit and long-term water resource needs and regulatory requirements. As part of that effort, a Water Conservation Plan will be developed. The recently enacted Chapter 780 of the Virginia Administrative Code includes a section on water conservation. Specifically, 9VAC 25-780-120 states that "As part of a

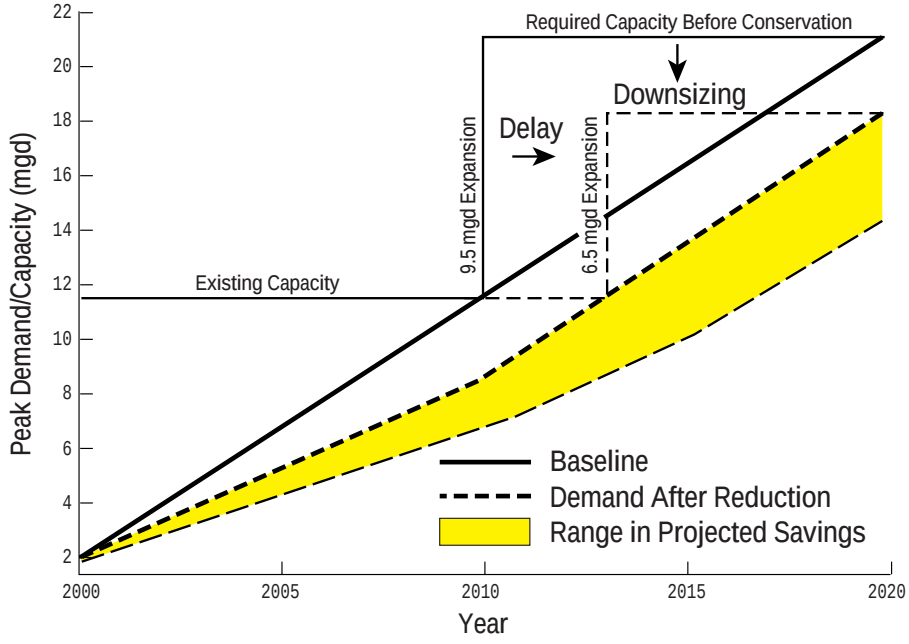
long-term strategy, a water plan shall address conservation as a part of overall water demand management." This technical memorandum (TM) documents the development of overall water conservation goals. This TM also documents a preliminary list of water conservation measures and screening criteria that are proposed to evaluate those measures. Subsequent TMs will evaluate those water conservation measures quantitatively; will develop implementation strategies; and will present a final Water Conservation Plan.

Purpose

In order to develop a suite of water conservation measures and actions which best suit the Town of Purcellville, the Town's priorities and goals for water conservation must be clearly identified. Water conservation has several different, though complimentary, benefits to the Town and to its customers. When conservation lowers peak and/or average demand, the Town avoids or delays costs in development of new capacity and operation of these larger water supply facilities, as shown in the hypothetical example in Figure 1. Conservation can also lower the long-term costs of water and wastewater services to customers through water and wastewater rates, not only for their direct water purchases, but also for services and commodities (power, retail, food, etc.) which rely on water. Conservation also preserves limited natural resources such as surface or ground water supplies, wetlands and the flora and fauna that rely on these resources.

A screening process will be performed to eliminate those measures that are not as well suited to the Purcellville service area as other potential measures in order to reduce the number of possible water conservation measures to a more manageable number. The measures considered to be best suited for Purcellville will be evaluated further to identify the combination of measures that will provide the greatest water savings at the best benefit/cost ratio. This screening does not take into account current conservation activities performed by the Town. Also, the costs and savings of the measures will be evaluated during the quantitative analysis.

FIGURE 1
Example of Downsizing and/or Delaying Water Supply and Treatment Facilities



Goals for a Water Conservation Program

The U.S. Environmental Protection Agency's (EPA) *Water Conservation Plan Guidelines* (1998) identifies several goals for a water conservation program:

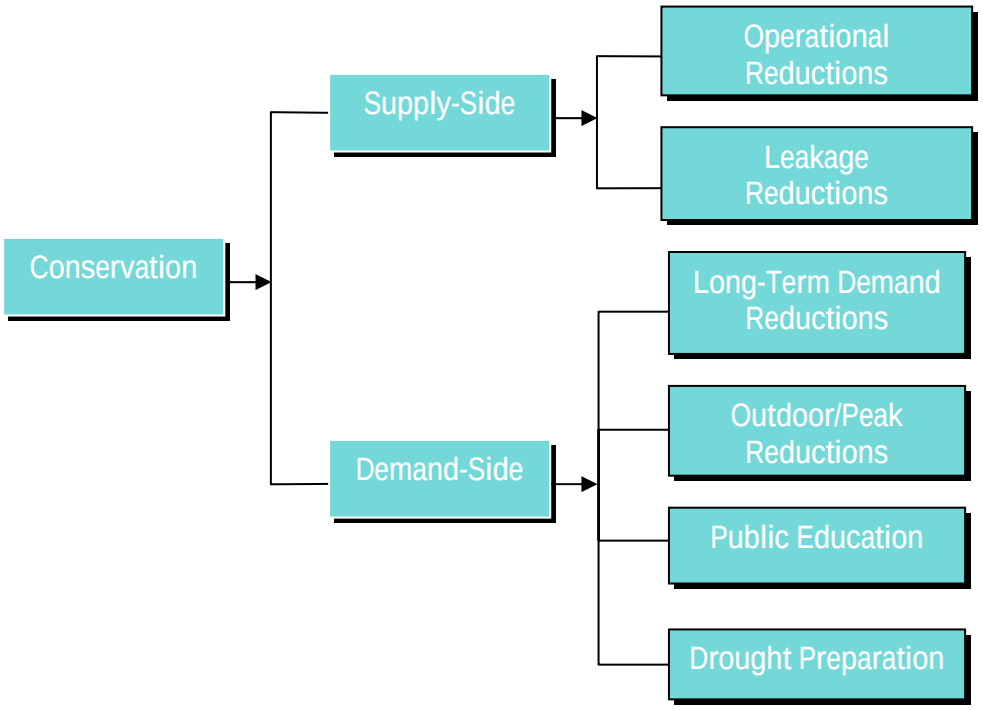
- Postpone or eliminate recommended capital projects for expansion of water supply facilities or the development of new sources
- Improve utilization and extension of the life of existing facilities
- Contain operating costs
- Improve drought or emergency costs
- Educate customers about the value of water
- Improve reliability and margins concerning water supply allocation
- Protect and preserve environmental resources

Specific goals of the Town of Purcellville Water Conservation Program will be developed in this document.

Proposed Water Conservation Program Goals

Water conservation programs can be broken down into two major groups for the purposes of setting goals. The two major groups of water conservation are supply-side conservation and demand-side conservation, as illustrated in Figure 2. Supply-side conservation refers to the water that is used between the withdrawal and customer meters. Demand-side conservation refers to use of water beyond customer meters, representing customer demand. There are subcategories of water conservation within each of those two primary groups. It is within these subcategories that the water conservation program goals are identified. The following figure demonstrates this concept, and the subcategories are explained in more detail in the discussion that follows.

FIGURE 2
Categories of Water Conservation



A set of preliminary goals for the water conservation program were prepared based on an analysis of the billing data performed for TM 1, *Water Demand Projections and Demand Management*. However, the final goals of the Water Conservation Plan will be finalized upon analysis of the conservation measures.

Supply-Side Conservation

Supply-side conservation includes reduction of water loss by the water provider, or anywhere between water being withdrawn for use and passing through the customer meters. This is the responsibility of the water provider, and this kind of water conservation includes leakage reduction, leak repair response times, meter maintenance, and water accounting issues. This also includes water losses that occur during treatment such as backwashing to waste and other practices. A water balance or audit should be performed annually to understand and account for all water after it is withdrawn. The AWWA has adopted a new water audit procedure as the best practice for water utilities to perform. Based on this audit, goals can be set to lower water loss and non-revenue water. TM 1 recommended performing a comprehensive audit to verify water loss calculations.

According to TM 1[1], the Town's water losses were reported to be 4.2 percent in the distribution system. An additional 3.5 percent is accounted for in Town usage which can range from Town Hall usage to well backwash. This overall loss of water is below national averages. AWWA recommends maintaining overall water loss percentage below 10

[1] Water Demand Projections and Demand Management, Technical Memorandum No. 1, Prepared for Town of Purcellville Water Resources Study (CH2M HILL, May 2007)

percent. Therefore, the water conservation goal for supply-side conservation is to maintain losses in the distribution system below 4 percent, and lower losses between withdrawal and pumping to the distribution system (such as the well backwash) to 3 percent or lower.

A comprehensive water audit was previously recommended in TM 1 to verify the estimates of water losses in the distribution system and non-revenue water usage, and to verify that meters are working appropriately.

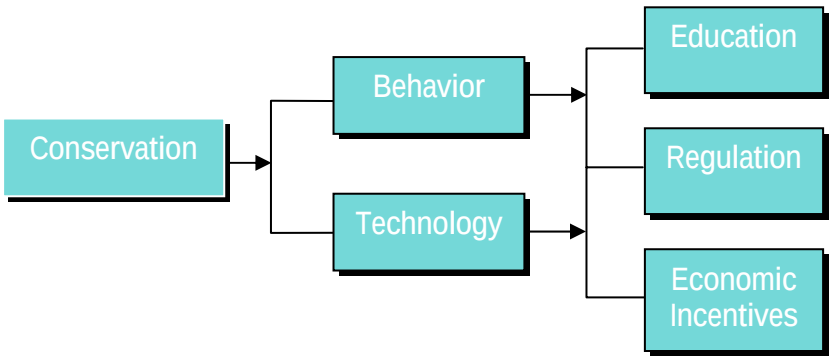
Demand-Side Conservation

Demand-side conservation includes water efficency measures targeted at water users. A successful demand-side water conservation program can accomplish its goals through a combination of three implementation mechanisms:

- Education – school programs, pamphlets, bill stuffers, media advertising, etc.
- Regulation – regulations for low water using fixtures and appliances, outdoor landscaping requirements, etc.
- Economic Incentives – rebates for water efficient appliances, tiered water rate structures, etc.

Water conservation is achieved not only by changing technologies, or changing behaviors, but also through a combination of both. Education efforts form the basis for future conservation by shifting customer attitudes toward the value of water and increasing understanding of conservation alternatives. Regulations can be implemented to affect behaviors, and economic incentives to encourage participation. This is shown in Figure 3.

FIGURE 3
Successful Conservation Programs Utilize a Combination of Implementation Mechanisms



Long-Term Demand Reduction

A comprehensive water conservation program should include measures that include lasting long-term improvements in water use efficiency. These types of measures normally target indoor water uses only, for residential and non-residential customers. Some examples of this kind of water conservation measure include replacement of older fixtures such as toilets, showerheads, or clothes washing machines with newer, more water efficient ones through the use of a rebate or requirement. Because the water savings potential from these kinds of measures are very dependent on the existing water use profile, it is important to set

program goals based on the benefit/cost analysis that will be performed in this project. Long-term goals for these measures will be identified and calculated based on the measures that are selected to be most cost-effective. The effectiveness of these kinds of measures is also very dependent on the level of implementation and investment by the Town. Short-term implementation goals complement the water savings goals to help show progress. For example, the Town of Purcellville should implement 3 to 4 long-term demand reduction measures at a time.

The Town's residential customers use approximately 65 gallons per person per day, according to the analysis presented in TM 1. This number is relatively low, considering that indoor water use can range from 50-100 gallons per person per day, according to literature. However, according to the 2000 US Census, 16 percent of the housing structures in Purcellville were built between 1990 and 1980, with 43.2 percent built before 1980. Even if 10 percent of all the existing homes have been replaced with efficient fixtures, there could still exist a potential for replacement of older fixtures in 49.2 percent of the housing structures in Purcellville. Therefore, a 10 percent reduction in residential per capita consumption should be set as a goal for long term demand reduction of the Town's largest user category.

Outdoor/Peak Water Use Reduction

The seasonal increase in water demand from outdoor water use is the major contributor to the magnitude of peak water demand. Because water plants and pump stations are designed to meet peak demands, any reduction in peak demands can reduce the size of these capital projects. Many long-term demand reduction measures target outdoor use. However, because of the seasonal nature of the savings, they should be identified in a separate category from the other long-term demand reduction measures described in the section above. Again, the water savings goals are based on the current water use trends. These measures can include education as well as device or hardware measures. Implementation goals for these kinds of measures are for the Town to include 3 to 4 device or hardware measures and complement the education measures. Some examples of these are irrigation rain/snow shutoff switches, Smart Irrigation Controllers, and soil moisture sensors. Another way of offsetting peak demands is through the use of alternative water sources for non-potable outdoor uses, such as water reuse.

Normally, the quantity of outdoor water use can be identified based on analysis of the billing data. However, due to the bimonthly nature of the billing data, as well as the limited quantity of data (19 months), no clear seasonal use patterns could be identified. Figures 4 and 5 show the bimonthly per account water use for Residential and Commercial accounts, respectively.

FIGURE 4
Residential Water Use – Bimonthly Galllons per Account per Day

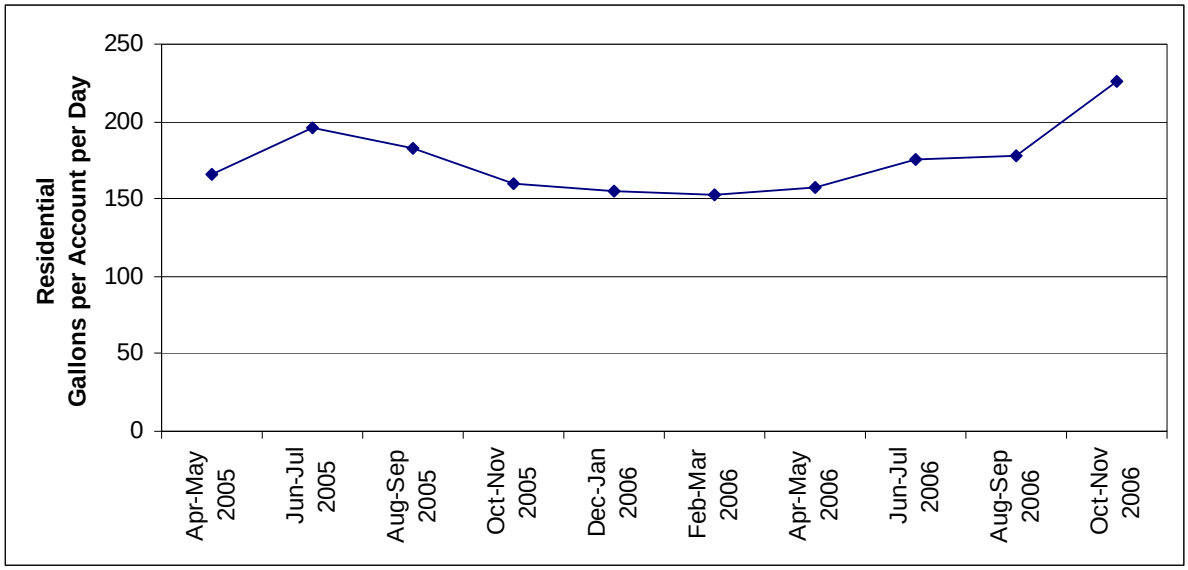
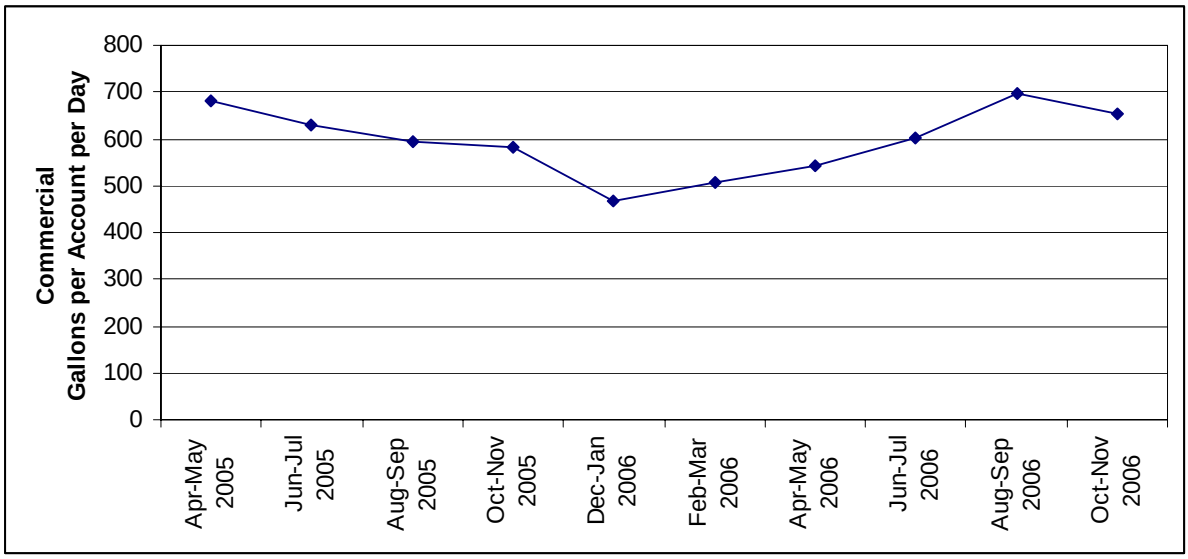


FIGURE 5
Commercial Water Use – Bimonthly Gallons per Account per Day



It is difficult to set a goal for outdoor use reduction due to the lack of quantifiable outdoor water use based on the analysis. However, there are irrigation best practices and technologies that can achieve as much as 10 to 20 percent outdoor water use reduction. Therefore, a 10 percent outdoor water use reduction goal is recommended for both residential and commercial customers.

Public Education and Involvment

A public education program is essential to the success of a water conservation program. The customers should be made aware of the importance of water conservation, and what

they can do to help become more efficient. This includes behavior changes, as well as participating in programs offered by the water utility. Several rules of thumb exist for how much a utility should spend on public education, but at a minimum, staff requirements should be adequate to implement current conservation measures. Beyond that, outreach efforts should include at least one full time employee. Other rules of thumb include $1 per customer spent annually on water conservation educational campaigns.

Another way to get the public involved in water conservation is to include some community involvement in the development of the water conservation plan.

Drought Preparation

Drought preparedness and water curtailment measures are implemented as short-term responses to emergency or drought conditions, and should not be confused with long-term water demand reduction measures. Drought measures include either voluntary or mandatory water restrictions imposed on customers. The goal of a drought preparedness and water curtailment plan is to help mitigate the effects of a drought on water supplies and demands. Emergency conditions can also cause a water shortage, and therefore, many of the actions in a drought preparedness plan can apply to emergency situations. However, drought conditions usually take time to develop, where emergency water shortages happen quickly, so some long term drought management measures may not apply to short-term emergency situations. The Town curtailment plan will be revised and updated as a part of this project. The curtailment plan will identify which measures may apply in a short-term emergency water shortage situation.

Summary of Proposed Goals

The goals identified in this TM will be refined through a more detailed analysis of selected conservation measures for the Town. The proposed goals in this TM are as follows:

- Maintain distribution system losses below 4 percent
- Lower losses between withdrawal and pumping to below 3 percent
- Reduce residential per capita consumption by 10 percent
- Reduce residential and commercial outdoor water use by 10 percent
- Spend $1 per customer annually on water conservation public educational campaigns

Progress and Review of Goals

A review of progress toward water conservation goals should be performed annually. Measuring implementation progress, such as number of rebates or audits performed, is the most effective way to determine if goals are being reached. Water use should be evaluated annually, as well, but can be influenced by the weather. Evaluation of water savings over a five year period is a better way to reduce the short-term effects of extremely wet or dry weather conditions. During this 5-year update, conservation measures should be re-evaluated to determine if they should be continued or replaced by different measures.

Potential Demand-Side Water Conservation Measure Screening

Screening Methodology

Table 1 lists potential water conservation measures. Each potential measure was screened based on four qualitative criteria scored on a scale of 1 to 5, with 5 being the most acceptable. The maximum possible number of points that was be obtained for a measure is 20. Measures with low scores will be eliminated from further consideration, while those with high scores will be further evaluated in the quantitative evaluation phase. Table 2 is attached in spreadsheet format, similar to Table 1, showing how each measure was scored for the four criteria and the aggregate scores determined. The measures were scored in Table 2 and the resulting pass (yes/no) was transcribed to Table 1. CH2M HILL proposes these scores be used for each measure after review by the Town staff to determine which measures to keep and which to discard. The top 10 highest-scoring measures will be presented to the Purcellville Town Council and considered for further analysis. Typically, the top scoring measures will vary across the categories listed in Table 1.

Table 1 is organized by target category, indoor and outdoor, and then by existing and new. The categories of use are single family residential, multi family residential, Commercial/Industrial/Institutional, Water Utility, Town, City, or County, and All. The all category includes system (supply side) measures and measures that apply to all categories such as conservation rate structures. (The details of costs and water savings are not included in this table because they can vary depending on service area and market penetration.) Also, many measures may be listed multiple times with different methods of implementation, such as rebate or requirement, also whether it would apply to existing or new development.

Screening Criteria

- *Technology/Market Maturity* – Is necessary technology available commercially and supported by the local service industry? In this criterion, a device may be screened out if it is not yet commercially available in the region.
- *Service Area Match* - Is the technology appropriate for the area's climate, building stock, or lifestyle? For example, promoting Xeriscape gardens for multi-family or commercial sites may not be appropriate where water use analysis indicates little outdoor irrigation.
- *Customer Acceptance/Equity*- Are customers willing to implement measures? If not, the market penetration rates (and thus the water savings) would be too low to be significant. Measures should also be equitable (i.e., one category of customers should not benefit while another pays the costs without receiving benefits). Customer acceptance may be based on:
    - Convenience;
    - Economics of measure;
    - Perceived fairness; or
    - Aesthetics
    - Financial reward to customer
- *Better Measure Available* – Where the options are equally effective, which is more appropriate (e.g. ease of implementation or unit cost)? This criterion is also used where

extra weight can be placed on measures that would meet the Town of Purcellville's goals. This criterion compares the available measures against one another to choose the best method of achieving a particular water savings. It may be used as a tie-breaker, if needed.

Measures that Passed the Screening

The screening resulted in 21 measures receiving a passing score. Some of these measures can be combined into one measure, which resulted in a consolidated list of 11 measures that are recommended for further analysis. For example, retrofit kits for single family and multi family are listed as one single retrofit kit measure. The listing of measures that passed are as follows:

1. Toilet retrofit-on-resale (residential/commercial)
2. Residential high efficiency clothes washer rebates
3. Require high efficiency clothes washers in new homes
4. Distribute retrofit kits
5. Increase public education (including Xeriscape demonstration)
6. Residential Water Audits
7. Require rain sensor shutoffs on new irrigation systems
8. Distribute kitchen spray rinse valves
9. Require efficient equipment in new commercial
10. Require 0.5 gal/flush or less urinals in new commercial
11. Require submetering on new commercial

Next Steps

The next step in the development of the water conservation program is a detailed evaluation of the measures that passed the screening. This will include a detailed examination of the actual cost, expected market penetration, expected water savings, and expected cost-effectiveness of these 11 measures. The cost of the measures will include not only unit costs, but also the cost and staffing to develop, advertise and administer the measure. Following the comparison of expected cost-effectiveness for each conservation measure, the conservation plan for the Town will be developed.

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
Single Family Residential – Indoor			
Existing Accounts			
1. Require 1.6 gal per flush toilets to be installed at the time of sale of existing homes	requirement at time of resale	Also called a "Retrofit-on-Resale" measure. Work with the real estate industry to require a certificate of compliance is submitted to the Water Provider that verifies that a plumber has inspected the property and efficient fixtures were either already there or were installed at the time of sale, before close of escrow. This will speed up the natural replacement of higher flush toilets that use 3.5 or more gal per flush. (Model after City of Los Angeles and San Diego).	Y
2. Require High Efficiency Toilets (HETs) to be installed at time of sale of existing homes	requirement at time of resale	Work with the real estate industry to require a certificate of compliance be submitted to the Water Provider that verifies that a plumber has inspected the property and efficient fixtures where either already there or were installed at the time of sale, before close of escrow. HET is defined as a toilet that flushes with a volume of less than or equal to 1.28 gal per flush (20% less than current required toilets).	Y
3. Rebates for HETs	rebate	Provide a rebate or voucher for the retrofit of a HET. Rebate amounts would reflect the incremental purchase cost and would be in the range of $50 to $100 per toilet replaced.	N
4. Rebates for high efficiency clothes washers	rebate	Together with local energy companies, if possible, offer rebates for purchase of water efficient machines. Rebates would be scaled to water efficiency as rated by the Consortium for Energy Efficiency Inc.	Y
5. Low income home leak detection and repair	promotes	Use Leak detection equipment to determine whether and where leaks are occurring on the premises. The Water Provider would then provide a plumber to the customer to repair leaks for free to qualifying households (low income).	N
6. Distribute retrofit kits w/low flow showerheads	promotes	During an audit or through direct mail solicitation, a free retrofit kit would be provided to existing older single-family residential homes. The kit could contain a low-flow showerhead; toilet leak-detection dye tablets; a faucet aerator; a sink aerator; a pamphlet on how to conserve water; and other conservation materials.	Y
7. Increase school education programs	promotes	The Water Provider would provide school conservation programs with workbooks and presentations; teaching materials and other educational tools to teach the students the importance of conserving water.	Y

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
8. Rebates for hot water recirculation systems	rebate	Water provider to offer rebate for the installation of a hot water recirculation systems. Evidence of installation will be required for rebate. (example: www.gothotwater.com)	N
Single Family Residential – Outdoor			
Existing Homes			
9. Residential water audits	provides	Water Provider would offer complete water audits for single-family homes. Focus would be on improving indoor and outdoor water use. Adapt techniques refined by EBMUD and others for audit content/procedures.	Y
10. Guide to a self-water audit on the District Retailer's web site or as a mail out	promotes	Water Provider would offer do-it-yourself water audits for single-family homes on their web site. Homeowner would enter data on a form and the web site would compute audit recommendations and projected water and cost savings.	Y
11. Rebates for rain sensor/shut-offs on automatic systems	rebate	Offer a rebate for the installation of these devices with automatic irrigation systems. The Water Provider would inspect irrigation systems to verify installation.	N
12. Turf Buy Back Program	rebate	Water Provider would offer compensation to homeowner that willingly reduces amount of irrigated turf and replace with plant material not requiring irrigation.	N
13. ET[a] controller service (w/weekly updating) by vendor	rebates	Offer rebates for the latest state of the art irrigation controllers. These controllers, similar to currently available commercial units but for homes, rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes.	N
14. Increase public education (expand web site, videos, CD's)	promotes	The Water Provider would increase public education efforts to encourage water conservation and provide information on demand management techniques. The education program would work in accordance with other selected conservation measures and thereby increase the implementation rate and savings of the other measures. The Provider would provide information to create and produce articles and segments in the newspapers, on billboards, and for the radio encouraging and explaining methods and the importance of saving water.	Y
15. Xeriscape demonstration gardens	provides	Donate a portion of public land to create a demonstration garden displaying living examples of low water-using gardens and landscaping. The Water Provider would provide signs and brochures to educate those people visiting the	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
		garden, as well as maintain the garden.	
16. Xeriscape education and staff training at retail garden/irrigation supply houses	provides	Water Providers would sponsor training for staff of stores where plants and irrigation equipment is sold. The purpose would be to educate sales people about the benefits of native (low water use) plants, efficiently irrigated, and the seven step Xeriscape process. This training would take place on a seasonal basis for new employees who have not participated previously.	N
17. Homeowner irrigation classes	provides	Water Providers would sponsor classes at stores where irrigation equipment is sold or other suitable venues. Instruction would be on selection and installation of efficient equipment (drip irrigation, smart controllers, low volume sprinklers, etc.). Proper plant selection would be covered.	N
18. Trigger shut-off valves and hose timers	provides free	The Water Provider would encourage manufacturer's to include trigger shut-off valves with hoses, and then encourage customers to purchase these hoses by offering a rebate on the purchase of a new hose with shut-off valves, or a separate valve which the customer could fit on the customer's current hose.	N
New Homes			
19. New home efficiency rating system	promotes with developers	Do not provide a water meter, under this measure, without the homeowner/contractor having installed demand management plumbing and landscaping fixtures. Each conservation device would be worth a certain number of points, as decided by the Water Provider. An ordinance would be implemented requiring that each new residence have conservation devices meeting a certain minimum number of points, prior to occupancy. Incentives could be reduced development fees.	N
20. Require high efficiency clothes washing machines in new homes	requirement	The Water Providers would educate its customers through bill collection brochures, displays at points of purchase, the media, on the latest clothes washer water conserving technology. The Town would be responsible to ensure that an efficient washer was installed before new home water meter is turned on.	Y
21. Require model homes be landscaped with low water use landscaping	requirement	Enforce a regulation that specifies that at least half of the model homes in a subdivision be landscaped according to Xeriscape principles. Information on Xeriscape would be given to new homebuyers. Grass could still be included in the Xeriscape-designed landscape.	N
22. New home efficiency point system	promotes	Provide annual awards to developers that are "Green Builders" and offer homes for sale that	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
		meet certain criteria. This could be combined with energy efficient homes.	
23. Require new irrigation systems to be installed by a Town certified contractor	requirement	Water provider would require the installation of all new irrigation systems to be completed by a Certified contractor that has undergone proper training. Permits would not be issued to contractors that are not certified. Take advantage of national certification programs from the Irrigation Association and the Green Industry Association.	N
24. Insulate hot water piping	requirement	Change building codes as necessary to require installation of hot water pipe insulation on new residences only.	N
25. Require HETs in all new homes	requirement	Water provider would be responsible to ensure that a HET was installed before new home water meter is turned on.	N
26. Require hot water recirculation systems in new homes	requirement	Water provider would be responsible to ensure that a hot water recirculation system was installed before new home water meter is turned on. (example: www.gothotwater.com)	N
27. Pressure regulation design to save water for new areas	requirement	Require installation of pressure regulators to all homes, new and existing, where the unregulated pressure is higher than 80 psi.	N
28. Promote water efficient plantings at new homes	promotes	Provide targeted information for planting water-efficient landscaping, including avoiding strip turf sections that are difficult to water efficiently and using native plants that do not require supplemental watering. Information would be provided in brochures with the water bill, or mailed. Informational displays at Provider offices and nurseries could also be provided.	N
29. Landscape requirements for new homes (turf limitations/ regulations)	requirement	Require the use of low-water-using or native plants for landscaping purposes. Proof of compliance would be necessary to obtain a water connection on all new residential projects. Non-compliers would face a surcharge on their water bill until they complied. Specific requirements would be developed for this measure.	N
30. Regulations for rain sensor/shut-offs on automatic systems	requirement	Require the installation of these devices with automatic irrigation systems in new construction. The Water Provider would inspect irrigation systems and fine those that do not have a rain shut-off device installed.	Y
31. Restrictions on the percent of irrigated area allowed for new	requirement	Water Provider would enforce an ordinance that would allow only a certain percentage of a residential lot to be irrigated.	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
irrigation systems			
32. ET[a] controller service (w/weekly updating) by vendor	requirement	Water Provider would require the use of the latest state of the art irrigation controllers. These controllers, similar to currently available commercial units but for homes, rely on a signal from a central weather station that modifies irrigation times at least weekly (preferably daily) as the weather changes.	N
33. Developer financed off-site conservation projects	requirement	Water Providers would require developers of new homes to contribute money to the water conservation program to help generate the water needed to supply their project. New water supply development costs could be used to justify these programs.	N
34. Rainwater harvesting (tanks)	provides rebates	Encourage customers to collect rainwater for non-consumptive use such as outdoor irrigation. Provide a one time rebate based on the capacity of the system.	N
Multi-Family Residential – Indoor			
Existing Accounts			
35. Offer incentives for replacement of clothes washers in coin-operated laundries	–rebate	Apartment managers with community laundry rooms would be offered incentives to retrofit or use efficient clothes washers. The rebate would either go to the manager or the washing machine leasing company. This rebate would be larger than the residential rebate due to the higher cost of commercial laundry machines.	N
36. Distribute retrofit kits w/low flow showerheads	requirement	During an audit or through direct mail solicitation, provide free retrofit equipment to building managers. Managers would sign an agreement agreeing to install the devices.	Y
37. Incentives for retrofitting sub-metering	rebate	Rescind any regulations that prohibit sub-metering of multi-family buildings, if applicable. Sub-metering would be encouraged through water audits and direct mail promotions, and possibly incentives to building owners. Rebate would go toward the installation of submetering devices to convert non-submetered buildings.	N
38. Regulations on sub-metering procedures (to protect tenant)	requirement	Provide regulations on how tenants can be metered and billed for water service to ensure equity. This would be targeted to eliminate “ratio” billing and promote billing based on actual use.	N
39. Require 1.6 gal flush toilets to be installed at the time of sale of condos/multi-family buildings	requirement at time of sale	Work with real estate industry to require a certificate of compliance be submitted to the Water Provider verifying a plumber has inspected the condo/duplex or other multi-family property and efficient fixtures were either already there or	Y

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
		installed at the time of sale, before close of escrow. (Model after Los Angeles and San Diego)	
New Development			
40. Require sub-metering multifamily units	requirement	Require all new multi-family units to provide sub-meters on individual units. Acceptable methods of metering and billing would be specified to the building owners.	N
41. Require efficient clothes washers in common laundry rooms	requirement	New apartment complexes over a certain size would be required to provide a common laundry room equipped with efficient washing machines.	N
42. Require HETs in new units	requirement	Town would be responsible to ensure that a HET was installed before new unit water meter is turned on.	N
Multi-Family Residential – Outdoor			
Existing Accounts			
43. Public relations campaign to set irrigation timers back in the fall	promotes	Water Providers would notify customers through direct mail to curtail or stop irrigating in the late fall.	N
44. Residential Homeowners Association water audits	provides	Water Provider would offer complete water audits for HOAs and multi-family complexes. Focus would be on improving indoor and outdoor (common area) water use. Adapt techniques refined by EBMUD and others for audit content/procedures.	N
45. Rebates for high-tech irrigation controllers	rebate	Provide a rebate for advanced irrigation controllers that have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor.	N
46. Retrofit existing irrigation systems with high-tech controllers	requirement	Water provider would require the use of advanced irrigation controllers for all previously existing established systems, controllers will have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor.	N
47. ET[a] controller service (w/weekly updating) by vendor	promotes with private companies	Use the latest state of the art irrigation controllers. These controllers rely on a signal from a central weather station that modifies irrigation times at least weekly as the weather changes. Water Provider would provide a rebate for the controller.	N
New Development			
48. Regulations for rain sensor/shut-offs on automatic irrigation systems	requirement	Require the installation of rain sensors with automatic irrigation systems in new construction. The Water Provider or building department would inspect irrigation accounts (or randomly inspect large summer volume users) and fine those that	Y

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
		do not have a rain shut-off device installed.	
49. New home efficiency rating system	requirement	Do not provide a water meter, under this measure, without the contractor having installed demand management plumbing and landscaping fixtures. Each conservation device would be worth a certain number of points, as decided by the Water Provider. An ordinance would be implemented requiring that each new building have conservation devices meeting a certain minimum number of points, prior to occupancy.	N
50. New home efficiency point system	promotes	Provide annual awards to developers that are "Green Builders" and offer apartments for rent for condominiums for sale that meet certain criteria. This could be combined with energy efficient homes.	N
51. Pressure regulation design for new areas	requirement	Require pressure regulators on all new and existing buildings where unregulated pressure is higher than 80 psi.	N
52. Require high-tech irrigation controllers for new irrigation systems	requirement	Water provider would require the use of advanced irrigation controllers that have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor.	N
53. Landscape requirements for new landscaping systems (turf limitations/ regulations)	requirement	Require the use of low-water-using or native plants for landscaping purposes. Proof of compliance would be necessary to obtain a water connection on all new residential projects. Non-compliers would face a surcharge on their water bill until they complied.	N
54. Require efficient irrigation system design standards	requirement	Require installation of irrigation systems that are efficient and installed by trained/certified contractors.	N
55. Developer financed off-site development conservation projects	promotes with private companies	Water Providers would require developers of new homes to contribute money to the water conservation program to help generate the water needed to supply their project.	N
Commercial/Industrial/Institutional – Indoor			
Existing Accounts			
56. Commercial water audits and feasibility reports	provides	The Water Provider would target high water using accounts for this commercial water audit program. Accounts that agree to participate in the program also agree to make a good faith effort to install cost-effective water conserving equipment. Incentives could be offered to increase participation and effectiveness.	N
57. Rebates for replacing high use	rebate	Selectively provide rebates to businesses to convert to efficient toilets only where toilets are	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
commercial toilets		subject to high use, such as restaurants, theaters, etc.	
58. Rebates for replacing high use commercial urinals with 0.5 gal/flush urinals	rebate	Selectively provide rebates to businesses to convert to efficient urinals only where urinals are subject to high use, such as restaurants, theaters, stadiums etc.	N
59. 1.6 gal flush toilets direct installation for high use commercial sites	provides	Water Provider would provide each account with an incentive package for replacing existing toilets with 1.6 gal/flush commercial toilets.	N
60. Require 1.6 gal flush toilets to be installed at the time of sale	requirement at time of sale	Work with the real estate industry to require a certificate of compliance be submitted to the Water Provider that verifies that a plumber has inspected the property and efficient fixtures where either already there or were installed at the time of sale, before close of escrow. (Model after City of Los Angeles and San Diego).	Y
61. Offer incentives for replacement or lease of clothes washers in coin-operated laundries	rebate	Laundromat managers would be offered incentives to retrofit or use efficient clothes washers. The rebate would either go to the manager or the washing machine leasing company.	N
62. Require car washes to recycle water	requirement	Pass a regulation that requires all existing drive-through car washes to install equipment to recycle water by a certain date.	N
63. Require or offer rebates for meters on cooling towers	requirement or rebate	Offer a rebate to buildings that install submeters to measure the make-up and bleed-off water of the facility cooling towers. Provide educational brochures and a phone contact of a knowledgeable person to provide conservation information.	N
64. Cooling tower regulations	requirement	Prohibit discharge of cooling tower blow down unless the TDS of the water is at least a certain level (that would ensure 5-10 cycles of concentration). Model regulations after the State of Arizona.	N
65. Cooling Tower water audits	provides	Water Provider would offer complete water audits for Commercial accounts with cooling towers. Focus would be on improving colling tower water use.	N
66. Restaurant low flow spray rinse nozzles	provides free	Provide free installation of 1.6 gpm spray nozzles for the rinse and clean operation in restaurants. Coordinate with Health Department as necessary.	Y
67. Focused water audits for	provides	Provide free water audits to hotels and motels. Standardize the types of services offered to	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
hotels/motels		reduce costs. Included would be bathrooms, kitchens, ice machines, cooling towers, landscaping, and irrigation systems and schedules. The hotels could promote to their customers that they are water efficient.	
68. WAVE Program (sponsored by US EPA) for hotels	promotes	Provide hotels with information about the US EPA's WAVE program. This program encourages hotels to do their own water audit and then analyze their water use with the software provided. The software identifies water saving projects and computes paybacks. Hotels that agree to participate in the program also agree to install cost-effective water conserving equipment.	N
69. Hotel retrofit (w/financial assistance)	rebate	Following a free water audit the Town would offer the hotel a rebate for equipment identified that would save water. Provide a rebate schedule for certain efficient equipment such as air-cooled ice machines so hotels could apply without an audit.	N
70. Employee education program	provides	Conduct a workshop for high water use account managers explaining the latest water conserving - plumbing fixtures and describing the water savings that could be achieved through implementation.	N
71. Award program for water savings by businesses	provides	Providers would sponsor an annual awards program for businesses that significantly reduce water use. They would receive a plaque, presented at a lunch with the mayor.	N
72. Capacity buy-back for process improvements	rebate	Set-up a low interest loan or grant program to buy back capacity from large users who install water efficient equipment. The customer would propose a project (possibly as the result of a water audit) and the Water Provider would estimate the water savings and calculate a rebate based on their avoided costs for new capacity. Customer would receive an upfront payment upon signing a contract to install the equipment.	N
73. Industrial/Institutional toilet replacement incentives	rebate	Provide rebates to businesses to convert to efficient toilets for all toilets in an account, regardless of its use.	N
74. Rebates for X-Ray recycling units	provides	Conduct a brief audit of x-ray machines to identify machines where the process water or filter solution is or could be recycled. Offer rebates for water-recycling equipment.	N
75. Replace inefficient water using equipment	rebate	Provide a rebate for a standard list of water efficient equipment. Included would be icemakers, efficient dishwashers, cooling towers to replace once through cooling, irrigation controllers, and	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
		certain process equipment.	
New Accounts			
76. Require car washes to recycle water	requirement	Pass a regulation that required all new drive-through car washes to recycle water, in order to get a water meter.	Y
77. Require efficient (such as horizontal axis) clothes washers	requirement	Efficient machine clothes washers would be required in all coin-operated Laundromats and common laundry rooms. The machine would have to meet a certain water efficiency level as rated by the Consortium on Energy Efficiency, Inc.	N
78. Rebates for waterless urinals	rebate	Encourage commercial accounts to retrofit existing public restrooms with waterless urinals. Provide educational brochures presented with water bills, rebates and coupons.	N
79. Promotion and/or rebates for laundry recycle systems at commercial laundries	rebate	Either during an audit or through educational brochures presented with the water bill, provide information on recycling water use in laundries. Provide rebates to decrease the payback period.	N
80. Self-closing faucets	requirement	Require non-residential accounts to install automatic (infrared sensor) or manual self-closing faucets for all new customer or high use restrooms.	N
81. Commercial Account Submetering	requirement	Water provides would require all commercial accounts to remove master meter and install a meter for each commercial unit.	Y
82. Require efficient process equipment for selected businesses (restaurants, hotels/motels, office sanitation)	requirement	Require new facilities to install water efficient equipment in new facilities, such as those listed.	Y
83. Prohibit once through cooling and non-recycling fountains, other non efficient water features	requirement	Prohibit certain obvious wastes of water in new facilities, such as those listed.	N
84. Require HETs in new commercial units	requirement	Building departments would be responsible to ensure that a 6/3 dual flush or 4-liter toilet was installed before new unit occupancy.	N
85. Require 0.5 gal/flush or less urinals in new buildings	requirement	Require that new building be fitted with 0.5 gal/flush urinals rather than the current standard of 1.0-gal/flush models.	Y

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
Commercial/Industrial/Institutional – Outdoor			
Existing Accounts			
86. Irrigation audits of large turf areas	provides	Provide outdoor audit of top 20 percent of high water-using landscape facilities. The auditor would determine how irrigation practices are undertaken, present the results of the audit, and provide recommendations for the facility to conserve water including irrigating during appropriate times, not irrigating upon pavement and use evapo-transpiration programs, if available. Encourage irrigation conservation methods through the media.	N
87. Rebates for high-tech irrigation controllers for irrigation accounts	rebate	Provide a rebate for advanced irrigation controllers that have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor.	N
88. Surcharge on water bill for irrigation accounts to fund rebate programs	requirement	Add a surcharge on the water bill for summer water use (such as $0.10/1000 gallons). Use the money to fund rebate programs for irrigation equipment upgrades.	N
89. Assignment of irrigation budgets, tracking and water bill feedback to irrigation customers	provides	Prepare a landscape irrigation water budget for each account that has a separate irrigation meter. Budget would reflect normal monthly water requirements. Put the budget on the water bill with a comparison of actual to budget.	N
90. Financial fees for water use exceeding water budget	requirement	Link the water budget above to a rate schedule that penalizes the account holder for exceeding its water budget.	N
91. Training landscape maintenance persons	provides	Provide a free workshop to train landscape maintenance workers on setting irrigation time clocks; how to find and repair simple leaks; and proper turf care (fertilizing, mowing, thatch removal, etc.). Provide inspection of public landscapes accompanied by the maintenance workers as a training device.	N
92. ET[a] controller service (w/weekly updating) by vendor	promotes with private companies	Water Provider would provide a rebate for the latest state of the art irrigation controllers. These controllers rely on a signal from a central weather station that modifies irrigation times at least weekly as the weather changes.	N
93. Financial incentives, rebates for irrigation upgrades	rebate	Provide rebates for selected types of irrigation equipment upgrade. Model after EBMUD or Contra Costa Water District, California.	N
New Accounts			
94. Regulations for rain sensor/shut-offs on	requirement	Require the installation of rain sensors with automatic irrigation systems in new construction. The Water Provider or building department would	Y

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
automatic systems		inspect irrigation accounts (or randomly inspect large summer volume users) and fine those that do not have a rain shut-off device installed.	
95. Require dedicated irrigation meters	requirement	Require that new accounts that plan a substantial amount of irrigated landscape have dedicated landscape meter and be charged on a separate rate schedule that recognizes the high peak demand placed on the system by irrigators.	N
96. ET[a] controller service (w/weekly updating) by vendor	*Town*- promotes with private companies	Require new sites fitted with state of the art irrigation commercial controllers that automatically adjust for changes in the weather.	N
97. Require high-tech irrigation controllers for new irrigation systems	requirement	Water provider would require the use of advanced irrigation controllers that have at least a water-budgeting feature and multiple start times and a rain sensor/soil moisture sensor.	N
98. Load shedding rate option for accounts w/ET[a] controller service	provides	Allow the Water Provider to manage and adjust the irrigation schedule of irrigation accounts with ET Controllers. Adjustment would be done remotely.	N
99. Landscape requirements for new landscaping systems (turf limitations/ regulations)	requirement	Draft and encourage adoption of an ordinance to require landscaping of new nonresidential properties to use only native or water conserving species. Provide personnel to educate those affected by the ordinance and ensure effective implementation once the ordinance is adopted.	N
100. Require efficient irrigation system design standards	requirement	Require installation of irrigation systems that are efficient and installed by trained/certified contractors.	N
101. Assignment of irrigation budgets, tracking and water bill feedback	provides	Provide each large irrigation customer with a monthly irrigation water budget. The budget would account for landscape type, landscape area, irrigation method, and reflect the normal monthly climate. Put the water budget information on the water bill for the customer	N
102. Financial fees for water use exceeding budget	requirement	Modify water rates for irrigation customers to put, say a 5-cent/KL surcharge on the water bill. Use this money to fund irrigation equipment upgrade rebates, model after the City of Pleasanton, California.	N
Water Utility, Town, City, County – Indoor			
103. Replacement of inefficient toilets, showers, faucets	provides	Water provider would cover the cost of replacing inefficient toilets, showers and faucets in public buildings within its service area. Subsidy could cover devices only and/or installation, depending upon financial need.	N

TABLE 1
Potential Conservation Measures for Initial Screening

Measure			Pass
Device or Program	**Distribution Method & Implementation**	**Description**	**Yes or No?**
104. Installation of waterless urinals, dual flush toilets	provides	Water Provider would selectively retrofit public restrooms with state of the art plumbing fixtures such as waterless urinals and dual flush toilets.	N
105. Town/County Department water reduction goals	provides	Water Provider would provide water use reduction goals for metered Town and County accounts. Assistance in the form of audits and employee education would be offered.	N
106. Town/County and Utility building facility water audits	provides	Water Provider would offer free commercial water audits to public building managers.	N
Water Utility, Town, City, County – Outdoor			
107. Xersicape landscaping of Town/County/Utility facilities where appropriate	provides	Appropriate and publicly visible sites would be selected for Xeriscape demonstration gardens. Garden would be professionally designed and managed. Signs and brochures would explain plant material choices. Garden would be promoted and tours offered through the public education program. Provider could use this garden to provide a virtual tour on their web site (see Alameda County Water District in California).	Y
108. ET[a] controller service (w/weekly updating) by vendor	promotes with private companies	Require on new and provide rebates for existing sites fitted with state of the art irrigation commercial controllers that automatically adjust for changes in the weather. Applies to school play fields, parks, sports fields, golf courses, etc.	N
109. Irrigation scheduling with ET data	provides	Provide irrigation audits and irrigation schedules to large irrigators, such as parks, school fields, and golf courses.	N
Water Utility, Town, City, County – System and All			
110. System water audits	provides	Audit the water distribution system every year and identify the amount of water projected to be lost through leakage.	N
111. Leak detection	provides	Use leak detection equipment to find leaks and, upon locating them, repair the leaks as soon as possible.	N
112. Adjust water rates tiers	provides	Adjust water rates tiers of residential rate structure to trigger at lower levels of consumption. This would promote more efficient water use by customers.	N
113. Set water rates based on conservation pricing	provides	Encourage more efficient use of water by shifting demand from peak periods to off-peak periods. The surcharge rate approach is depicted by a higher rate being charged during the season (peak) for all consumption above a set threshold.	N

[a] ET = Evapotranspiration-the amount of water required by plants for healthy growth; ET Controllers automatically compensate for changing weather.

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
	Single Family Residential – Indoor								
	Existing Accounts								
1	Require 1.6 gal/flush toilet to be installed at the time of sale	requirement at time of resale	5	4	4	3	16	Y	Retrofit on resale can be difficult to implement because of political difficulties from real estate community.
2	Require HET to be installed at time of sale	requirement at time of resale	4	4	4	4	16	Y	Retrofit on resale can be difficult to implement because of political difficulties from real estate community. HET availability would increase with a requirement more than with a rebate.
3	Rebates for HETs	rebate	4	3	3	4	14	N	HETs are not widely available, but they are widely manufactured. The availability would not increase as much with a rebate as it would with a requirement.
4	Rebates for high efficiency clothes washers	rebate	5	4	4	4	17	Y	This measure has been implemented successfully elsewhere many times.
5	Low income home leak detection and repair	promote	3	2	3	3	11	N	Helps to create equity, but has low water savings.
6	Distribute retrofit kits w/low flow showerheads	promote	5	3	4	4	16	Y	Easy way to create savings, but must target older homes.
7	Increase school education programs	sponsor	5	4	4	4	17	Y	Arguably one of the best public education methods is through school-age children.
8	Residential hot water recirculation - rebate	rebate	3	3	3	3	12	N	Savings is relatively low, and technology is fairly new. This measure is being implemented elsewhere, with mixed results.
	Single Family Residential - Outdoor								
	Existing Accounts								
9	Residential water audits	provide	4	5	4	3	16	Y	Great PR and customer service measure, helps find leaks most often.
10	Guide to a self-water audit on District Retailer's web site or as a mail-out	promote	5	5	4	3	17	Y	Great PR and non-intrusive way to help customers find and repair leaks and learn about how they use water.
11	Rebates for rain sensor/shut-offs on automatic systems	rebate	5	3	3	3	14	N	Simple, inexpensive device compatible with almost all irrigation controllers.
12	Turf Buy Back Program	rebate	3	2	3	2	10	N	Expensive, low savings. Is being implemented in Las Vegas.
13	ET controller service (w/weekly updating) by vendor	rebate	2	2	3	2	9	N	Pricey for customers, requires subscription service.
14	Increase public education (expand web site, videos, CD's)	promote	5	4	4	4	17	Y	Great way to show that water conservation is important to the Town.
15	Xeriscape demonstration gardens	provide	5	4	3	3	15	N	Help people see that you don't need huge amounts of water to have a beautiful garden.

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	**Method / Incentive**	**Technology/ Market Maturity**	**Service Area Match**	**Customer Acceptance/ Equity**	**Better Measure Available?**	**Score**	**Pass (≥16)**	
16	Xeriscape education and staff training at retail garden/irrigation supply houses	provide	5	4	3	3	15	N	Help people see that you don't need huge amounts of water to have a beautiful garden.
17	Homeowner irrigation classes	provide	5	4	3	3	15	N	Most people overwater their lawn. Education can overcome this.
18	Trigger shut-off valves and hose end timers	provide free	5	3	3	4	15	N	Teach customers about preventing water waste.
	New Homes								
19	New home efficiency rating system	promote	4	3	4	4	15	N	Requires cooperation with local homebuilders and developers.
20	Require high efficiency clothes washing machines	requirement	5	4	4	3	16	Y	Potential problem of higher up-front cost of high efficiency appliances.
21	Require model homes be landscaped with low water use landscaping	requirement	5	3	3	3	14	N	Low audience for these.
22	New home efficiency point system	promote with developers	4	3	4	4	15	N	Requires cooperation with local homebuilders and developers.
23	Require new irrigation systems to be installed by a Town certified contractor (one who has taken a certification course by the Town)	requirement	4	3	4	3	14	N	Certification is the way to help eliminate water waste through poor design/installation/maintenance.
24	Insulate hot water piping	requirement	5	4	3	3	15	N	Keeps water in pipes warmer, so less is wasted waiting for water to warm up. This kind of code change would be difficult to implement, due to the number of parties involved. Water savings depends on local climate.
25	Requirement for HETs in all new homes	requirement	4	4	4	3	15	N	HETs are certified by EPA for performance in WaterSense program. Water savings in new homes would not be as much as if we replace existing homes due to existing plumbing codes being efficient already.
26	Residential hot water recirculation - require for new homes	requirement	3	3	3	3	12	N	Savings is relatively low, and technology is fairly new. This measure is being implemented elsewhere, with mixed results.
27	Pressure regulation design for new areas	requirement	5	3	3	3	14	N	Can help reduce water use from leaks and stadard uses through lower pressure.
28	Promote water efficient plantings at new homes	promote	5	3	3	4	15	N	Water efficient plants are pretty, too.
29	Landscape requirements for new homes (turf limitations/ regulations)	requirement	5	3	3	4	15	N	Intrusive to homeowners

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
30	Regulations for rain sensor/shut-offs on automatic systems	requirement	5	4	4	4	17	Y	Simple, inexpensive device compatible with almost all irrigation controllers.
31	Restrictions on the amount of irrigated area for new irrigation systems	requirement	5	3	3	3	14	N	Intrusive to homeowners
32	ET controller service (w/weekly updating) by vendor	requirement	2	2	2	2	8	N	Pricey for customers, requires subscription service.
33	Developer financed off-site conservation projects	requirement	4	3	3	3	13	N	Used in extreme cases when water supplies are severely limited.
34	Rainwater harvesting (tanks) and irrigation systems	rebate	4	3	4	4	15	N	Useful in regular rainfall years. Rebate is to encourage inclusion in new construction due to high installation cost, would not be as effective for existing homes.
	Multi-Family Residential - Indoor								
	Existing Accounts								
35	Offer incentives for replacement of clothes washers in coin-operated laundries	rebate	5	2	3	3	13	N	Costly to Town, low savings. Low number of coin-op laundry rooms in multifamily complexes. Use of laundry rooms in multifamily complexes is not high, thus annual water savings would be low.
36	Distribute retrofit kits w/low flow showerheads	requirement	5	4	4	3	16	Y	Target older neighborhoods, low cost to Town.
37	Incentives for retrofitting sub-metering	rebate	5	3	3	3	14	N	Costly to retrofit and submeter.
38	Regulations on sub-metering procedures (to protect tenant)	requirement	4	3	4	3	14	N	Usually goes with measure 37.
39	Require 1.6 gal/flush toilet to be installed at the time of sale	requirement at time of sale	5	4	3	4	16	Y	Retrofit on resale can be difficult to implement because of political difficulties from real estate community.
	New Development								
40	Require sub-metering multifamily units	requirement	4	3	3	3	13	N	Requires high growth of multifamily units.
41	Require efficient (such as horizontal axis) clothes washers	requirement	5	3	4	3	15	N	Most new washers are more efficient.
42	Require HETs for new homes	requirement	4	4	4	3	15	N	HETs are not widely available, but they are widely manufactured. There needs to be large growth in multifamily accounts for this to be effective.
	Multi-Family Residential - Outdoor								
	Existing Accounts								
43	Public relations campaign to set irrigation timers back in the fall	promote	5	3	3	3	14	N	Very hard to get people to go out and change their irrigation controllers.
44	Residential (HOA) water audits	provide	4	3	3	3	13	N	Public education can be better for multifamily units.

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
45	Rebates for high-tech irrigation controllers	rebate	3	3	3	3	12	N	Not as much savings, due to smaller landscapes.
46	Retrofits for high-tech irrigation controllers	requirement	3	3	3	3	12	N	Not as much savings, due to smaller landscapes.
47	ET controller service (w/weekly updating) by vendor	promotes through private vendors	2	2	2	2	8	N	Pricey for customers, requires subscription service.
	New Development								
48	Regulations for rain sensor/shut-offs on automatic irrigation systems	requirement	5	4	4	4	17	Y	Simple, inexpensive device compatible with almost all irrigation controllers.
49	New home efficiency ratings	requires of developers	4	4	3	3	14	N	Requires cooperation with local homebuilders and developers.
50	New home efficiency point system	promote with developers	4	4	3	3	14	N	Requires cooperation with local homebuilders and developers.
51	Pressure regulation design for new areas	requirement	5	2	3	3	13	N	Can help reduce water use from leaks and stadard uses through lower pressure.
52	Require high-tech irrigation controllers on new systems	requirement	3	3	3	3	12	N	Not as much savings, due to smaller landscapes.
53	Landscape requirements for new landscaping systems (turf limitations/regulations)	requirement	5	3	3	3	14	N	Intrusive to homeowners
54	Require efficient irrigation system design standards	requirement	4	3	3	3	13	N	Requires costly enforcement
55	Developer financed off-site development conservation projects	promotes with private companies	4	3	3	3	13	N	Are usually only cost effective when supplies are very expensive or not otherwise available.
	Commercial/Industrial/Institutional - Indoor								
	Existing Accounts								
56	Commercial water audits and feasibility reports	provide for free	4	3	3	3	13	N	Participation is usually low.
57	Rebates for replacing high use commercial toilets with 1.6 gal/flush	rebate	5	3	3	3	14	N	Commercial use must be very high for good cost-effectiveness.
58	Rebates for replacing high use commercial urinals with 0.5 gal/flush	rebate	4	2	3	3	12	N	Commercial use must be very high for good cost-effectiveness.
59	1.6 gal/flush toilet direct installation for high use commercial sites	provide	5	4	3	3	15	N	Commercial use must be very high for good cost-effectiveness.
60	Require 1.6 gal/flush toilet to be installed at the time of sale	requirement at time of sale	5	4	4	3	16	Y	Retrofit on resale can be difficult to implement because of political difficulties from real estate community.

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	**Method / Incentive**	**Technology/ Market Maturity**	**Service Area Match**	**Customer Acceptance/ Equity**	**Better Measure Available?**	**Score**	**Pass (≥16)**	
61	Offer incentives for replacement or lease of clothes washers in coin-operated laundries	rebate	5	3	3	3	14	N	Commercial use must be very high for good cost-effectiveness.
62	Require car washes to recycle water	requirement	5	3	4	3	15	N	Commercial use must be very high for good cost-effectiveness. Also, the car wash already recycles their water, thus this measure does not apply.
63	Require or offer rebates for meters on cooling towers	requirement or rebate	5	3	3	3	14	N	Commercial use must be very high for good cost-effectiveness.
64	Cooling tower regulations	requirement	5	3	3	3	14	N	Commercial use must be very high for good cost-effectiveness.
65	Cooling tower water audits	provide free	4	3	3	3	13	N	Commercial use must be very high for good cost-effectiveness.
66	Restaurant low flow spray rinse nozzles	provide free	5	4	4	3	16	Y	Very inexpensive measure.
67	Focused water audits for hotels/motels (showers and toilets only)	provide for free	5	2	3	2	12	N	Commercial use must be very high for good cost-effectiveness.
68	WAVE Program (US EPA) for hotels	promotes	4	2	3	2	11	N	Commercial use must be very high for good cost-effectiveness.
69	Hotel retrofit (w/financial assistance)	rebate	5	2	3	2	12	N	Commercial use must be very high for good cost-effectiveness.
70	Employee education program	provide	5	3	3	4	15	N	Low savings.
71	Award program for water savings by businesses	sponsors	5	3	3	3	14	N	Requires high overhead costs.
72	Capacity buy-back for process improvements	rebate	3	3	2	3	11	N	Low savings.
73	ICI 1.6 gal/flush toilet replacement incentives	rebate	5	4	3	3	15	N	Commercial use must be very high for good cost-effectiveness.
74	Rebates for X-Ray recycling units	provide	4	2	3	3	12	N	Commercial use must be very high for good cost-effectiveness.
75	Replace inefficient water using equipment	rebate	4	3	3	3	13	N	Commercial use must be very high for good cost-effectiveness.
	New Accounts								
76	Require car washes to recycle water	requirement	5	4	3	4	16	Y	Ordinances capture new users without much more up front costs to use efficient equipment.
77	Require efficient (such as horizontal axis) clothes washers	requirement	5	3	3	4	15	N	Commercial use must be very high for good cost-effectiveness.
78	Rebates for waterless urinals	rebate	4	4	3	3	14	N	Better implemented as a requirement.

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
79	Promotion and/or rebates for laundry recycle systems at commercial laundries	rebate	4	3	3	3	13	N	Low savings, new technology.
81	Commercial Account Submetering	requirement	4	4	4	4	16	Y	Creates accountability for individual businesses to save water.
80	Self-closing faucets	requirement	4	3	4	3	14	N	Not reliable savings.
82	Require efficient process equipment for selected businesses (restaurants, hotels/motels, office sanitation)	requirement	4	5	3	4	16	Y	Ordinances capture new users without much more up front costs to use efficient equipment.
83	Prohibit once through cooling and non-recycling fountains, other non efficient water features	requirement	4	2	3	3	12	N	Commercial use must be very high for good cost-effectiveness.
84	Require for HETs for all new buildings	requirement	4	4	3	3	14	N	Commercial use must be very high for good cost-effectiveness.
85	Require 0.5 gal/flush or less urinals in new buildings	requirement	4	5	3	4	16	Y	Ordinances capture new users without much more up front costs to use efficient equipment.
	Commercial/Industrial/Institutional - Outdoor								
	Existing Accounts								
86	Irrigation audits of large turf areas	provides	5	3	3	3	14	N	Expensive overhead costs.
87	Rebates for high-tech irrigation controllers for irrigation accounts	rebate	3	3	3	4	13	N	Expensive overhead costs.
88	Surcharge on water bill for irrigation accounts to fund rebate programs	requirement	3	3	3	3	12	N	Equity issue.
89	Assignment of irrigation budgets, tracking and water bill feedback to irrigation customers	provide	4	3	3	3	13	N	Requires enforcement and high overhead costs.
90	Financial penalties for water use exceeding budget	requirement	4	3	3	3	13	N	Requires enforcement and high overhead costs.
91	Training landscape maintenance persons	provides	4	3	3	3	13	N	Low savings.
92	ET controller service (w/weekly updating) by vendor	promotes with private companies	2	2	2	2	8	N	Pricey for customers, requires subscription service.
93	Financial incentives, rebates for irrigation upgrades	rebate	4	3	3	3	13	N	High costs.
	New Accounts								

Table 2
Potential Conservation Measures and Results of Screening for Town of Purcellville

Updated: 3/4/2008

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
94	Regulations for rain sensor/shut-offs on automatic systems	requirement	5	4	4	4	17	Y	Simple, inexpensive device compatible with almost all irrigation controllers.
95	Require dedicated irrigation meters	requirement	5	3	3	3	14	N	Not proven to save water.
96	ET controller service (w/weekly updating) by vendor	promotes with private companies	2	2	2	2	8	N	Pricey for customers, requires subscription service.
97	Require high-tech irrigation controllers on new systems	requirement	3	3	3	3	12	N	Requires enforcement and high overhead costs.
98	Load shedding rate option for accounts w/ET controller service	provides	2	2	2	2	8	N	Requires enforcement and high overhead costs.
99	Landscape requirements for new landscaping systems (turf limitations/ regulations)	requirement	4	3	3	3	13	N	Requires enforcement and high overhead costs.
100	Require efficient irrigation system design standards	requirement	4	3	3	3	13	N	Requires enforcement and high overhead costs.
101	Assignment of irrigation budgets, tracking and water bill feedback	provides	4	3	3	3	13	N	Requires enforcement and high overhead costs.
102	Financial penalties for water use exceeding budget	requirement	4	3	3	3	13	N	Requires enforcement and high overhead costs.
	Public Works & Utilities Department - Indoor								
103	Replacement of inefficient toilets, showers, faucets in Gov't facilities	provides	5	3	4	3	15	N	Low savings due to low number of facilities.
104	Installation of waterless urinals, dual flush toilets in Gov't facilities	provides	4	3	4	3	14	N	Low savings due to low number of facilities.
105	Town government water reduction goals	provides	5	3	4	3	15	N	Low savings due to low number of facilities.
106	Town government building facility water audits	provides	4	3	4	3	14	N	Low savings due to low number of facilities.
	Public Works & Utilities Department - Outdoor								
107	Increase Xeriscape landscaping of Town government & Utility facilities where appropriate	provides	5	3	4	4	16	Y	Great way to show that water conservation is important to the Town, and demonstrate how everyone can participate in their own garden and landscapes.
108	ET controller service (w/weekly updating) by vendor	promotes with private companies	5	3	2	3	13	N	Pricey, requires subscription service. Unproven savings.
109	Irrigation scheduling with ET data	provides	2	3	2	2	9	N	Pricey, requires subscription service. Unproven savings.

Potential Conservation Measures and Results of Screening for Town of Purcellville

	Measure		Criteria						Notes
	Device or Program	Method / Incentive	Technology/ Market Maturity	Service Area Match	Customer Acceptance/ Equity	Better Measure Available?	Score	Pass (≥16)	
	Water Utility – System								
110	System water audits	provides	5	3	3	3	14	N	Already recommended.
111	Leak detection	provides	5	3	4	3	15	N	Town water loss is low already.
	All Customers								
112	Adjust Water Rates Tiers	provide	4	4	3	3	14	N	Rates are set already.
113	Set water rates based on conservation pricing	provides	4	4	3	3	14	N	Rates are set already.

Appendix B
TM: Water Conservation Implementation Strategies

Appendix B: Water Conservation Implementation Strategies
Water Resource Study

PREPARED FOR: Town of Purcellville

PREPARED BY: CH2M HILL

COPIES: File

DATE: January 23, 2008

PROJECT NUMBER: 355269

Contents

Introduction

This Technical Memorandum (TM) summarizes the results of the water conservation measure analysis for the Town of Purcellville and provides descriptions of possible implementation strategies for each water conservation measure. The water conservation measures were screened from a list of over 100 possible water conservation measures. That screening process was described in the TM entitled *Water Conservation Goals and Measure Screening* (CH2M HILL, October 9, 2007). The water conservation measures that were evaluated are as follows:

1. Toilet retrofit-on-resale (residential/commercial)
2. Toilet Rebates

3. Residential high efficiency clothes washer rebates
4. Require high efficiency clothes washers in new homes
5. Distribute retrofit kits
6. Increase public education (including Xeriscape demonstration)
7. Residential Water Audits
8. Require rain sensor shutoffs on new irrigation systems
9. Distribute kitchen spray rinse valves
10. Require efficient equipment in new commercial
11. Require 0.5 gal/flush or less urinals in new commercial
12. Require submetering on new commercial

A description of each of these measures is given in the *Water Conservation Goals and Measure Screening TM* and is also presented in Table 1 below.

TABLE 1
Water Conservation Measure Descriptions

Measure	Description
Toilet Retrofit on Resale	Require a certificate of compliance be submitted to Purcellville's Water Conservation program that verifies that a plumber has inspected the property and efficient fixtures where either already there or were installed at the time of sale or before establishing new water service. May need to work with the real estate industry. Only applies to pre-1978 homes.
Toilet Rebates	Provide a rebate or voucher for the retrofit of an old high flush volume toilet with a 1.6 gal/flush toilet or less. Rebate amounts would reflect the incremental purchase cost and would be in the range of $100 per toilet replaced.
Clothes Washer Rebates	Residential customers would be offered incentives to retrofit or use efficient clothes washers. Rebates would be offered only for machines on an approved list maintained by the Town. Rebate amounts would reflect the incremental purchase cost and would be in the range of $100 to $150 per machine replaced
Require High Efficiency Clothes Washers in New Homes	Require all new residential homes to have high efficiency clothes washers. Basis would be an approved list maintained by the Town.
Distribute Retrofit Kits	During an audit or through direct mail solicitation, a free retrofit kit would be provided to existing older (pre-1990) single-family residential homes. The kit should contain a low-flow showerhead; toilet leak-detection dye tablets, and low flow faucet aerators.
Increase Public Education (including Xeriscape demonstration)	Purcellville would increase public education efforts to encourage water conservation and provide information on demand management techniques. The education program would work in accordance with other selected conservation measures and thereby increase the implementation. A site should be selected to create a Xeriscape landscape for demonstration purposes on Town property.
Residential Water Audits	Purcellville would offer complete water audits (or assessments) for single-family homes. Focus would be on improving indoor and outdoor water use efficiency and identifying and fixing leaks.
Require Rain Sensor Shutoffs on New Irrigation Systems	Require that all new irrigation systems be installed with rain shutoff switches.

TABLE 1
Water Conservation Measure Descriptions

Measure	Description
Distribute Kitchen Spray Rinse Valves	Provide free replacement of higher use nozzles with a 1.6 gpm spray nozzles for the rinse and clean operation in commercial kitchens.
Require Efficient Equipment in New Commercial	Purcellville would require that new commercial businesses use water efficient equipment. Applies to dishwashers, ice machines, HVAC equipment, clothes washers, etc.
Require 0.5 gallon/flush or Less Urinals in New Commercial	Change plumbing code to specify that all new buildings install urinals that use 0.5 gallon per flush or less (including waterless urinals).
Require Submetering on New Commercial	Require that all new commercial buildings in strip-mall type construction be submetered for water service, and are individually billed.

Notes: The documentation of the selection of these measures is in the *Water Conservation Goals and Measure Screening TM*.

Water Conservation Measure Evaluation Summary

The water conservation measures were evaluated based on the actual cost, expected market penetration, expected water savings, and expected cost-effectiveness. The cost of the measures includes not only unit costs of materials, but also the cost and staffing to develop, advertise and administer each measure. A summary of the criteria and assumptions used in evaluating each measure is listed in Table 2 below. The Public Education measure was not evaluated for cost-effectiveness because the resulting water savings is hard to identify. However, the cost for implementation of the Public Education measure is included. A recommended public education program will be described in the Implementation section of this TM.

TABLE 2
Water Conservation Measure Evaluation Criteria and Assumptions

Measure	Rebate or Unit Cost of Materials	Market Penetration by End of Program	Program Length (years)	Participants	Unit Water Savings (gallons/day)
Toilet Retrofit on Resale	$ -	80% replacement of pre-1980 toilets	indefinite	445 homes	23 per toilet
Toilet Rebates	$ 100.00	10% replacement of pre-1990 toilets	5	152 toilets	18 per toilet
Clothes Washer Rebates	$ 150.00	10% replacement of existing washers	5	221 washers	15.4 per washer
Require High Efficiency Clothes Washers in New Homes	$ -	100% of new washers sold	indefinite	1875 washers	15.4 per washer
Distribute Retrofit Kits	$ 10.00	75% of pre-1990 homes	5	1144 kits	7 per kit

TABLE 2
Water Conservation Measure Evaluation Criteria and Assumptions

Measure	Rebate or Unit Cost of Materials	Market Penetration by End of Program	Program Length (years)	Participants	Unit Water Savings (gallons/day)
Residential Water Audits	$ -	10% of existing residential customers	5	221 customers	5 per audit
Require Rain Sensor Shutoffs on New Irrigation Systems	$ -	100% of new irrigation systems	indefinite	1500 irrigation systems	9 per sensor
Distribute Kitchen Spray Rinse Valves	$ 100.00	25% of existing valves	5	30 valves	100 per valve
Require Efficient Equipment in New Commercial	$ -	100% of new commercial customers	indefinite	375 customers	250 per customer
Require 0.5 gallon/flush or Less Urinals in New Commercial	$ -	100% of new commercial customers	indefinite	2000 urinals	10 per urinal
Require Submetering on New Commercial	$ -	100% of new commercial customers	indefinite	2000 customers	15 per account

Notes: Requirement measures will be analyzed over 20 years.
The Rebate or Unit Cost of Materials does not include labor, but is shown in Table 3.
According to 2000 Census Demographic Profile (included in Appendix), 59 % (763) of homes are pre-1990 and 43 % (556) of homes are pre-1980.
Average of two toilets (and bathrooms) per single family home is assumed.
Retrofit on Resale 80% market penetration is based on a 4% annual housing turnover rate for 20 years.
New accounts were estimated to be approximately 125 new single family customers annually and 25 new non-residential customers.

The cost effectiveness of the water conservation measures were evaluated over a 20-year time period, which is within the life of many of the devices and appliances. The cost effectiveness is expressed as a cost of water saved in dollars per thousand gallons ($/1,000 gal). This allows for comparison of the conservation measures with current water production O&M costs and the capital cost of new water supplies. Table 3 lists the results of the evaluation, including implementation cost, expected water savings and cost-effectiveness. If all evaluated measures are implemented, the total water savings would be 70,100 gallons per day after the 5th year (9.62% reduction in ADD and 5.9% reduction in MDD), at a cost of $171,300 over 5 years, and FTE requirements of 1.34. However, all the measures are intended to be run together, because there is overlap between some measures, such as toilet rebate and toilet retrofit on resale.

TABLE 3
Water Conservation Cost Effectiveness Evaluation Results

Measure	5-Year Cost (without Labor)	Annual Labor Required (FTE)	5th Year Savings (gallons/day)	ADD Reduction in 5th Year	MDD Reduction in 5th Year	Unit Cost of Water Savings ($/1,000 gallon)
Toilet Retrofit on Resale	$ 8,500	0.02	5,100	0.70%	0.43%	$ 0.25
Toilet Rebates	$ 27,000	0.04	2,700	0.37%	0.23%	$ 2.41
Clothes Washer Rebates	$ 46,500	0.03	3,400	0.47%	0.29%	$ 2.38
Require High Efficiency Clothes Washers in New Homes	$ 8,500	0.05	7,200	0.99%	0.61%	$ 0.24
Distribute Retrofit Kits	$ 19,700	0.04	8,000	1.10%	0.67%	$ 0.60
Increase Public Education	$ 7,500	0.92	-	-	-	-
Residential Water Audits	$ 8,200	0.04	1,100	0.15%	0.09%	$ 3.71
Require Rain Sensor Shutoffs on New Irrigation Systems	$ 8,500	0.04	3,700	0.51%	0.31%	$ 0.90
Distribute Kitchen Spray Rinse Valves	$ 11,400	0.01	3,000	0.41%	0.25%	$ 0.73
Require Efficient Equipment in New Commercial	$ 8,500	0.04	23,400	3.21%	1.97%	$ 0.14
Require 0.5 gallon/flush or Less Urinals in New Commercial	$ 8,500	0.05	5,000	0.69%	0.42%	$ 0.81
Require Submetering on New Commercial	$ 8,500	0.05	7,500	1.03%	0.63%	$ 0.54
Total	**$ 171,300**	**1.34**	**70,100**	**9.62%**	**5.90%**	**$ 0.62**

Notes: Labor FTE assumed to be $80,000.
Not all measures are intended to be run together, due to overlap.

Implementation Strategies

For each of the water conservation measures listed below, a short description of possible implementation strategies is provided. The water conservation measures must be implemented successfully if they are to achieve the desired market penetration rate and associated water savings. They were evaluated on an expected level of implementation which was assumed to be a realistic but optimistic level of market penetration.

Many of the evaluated water conservation measures include hot water savings, which saves energy. In these cases, it may be possible to partner with the local gas or electric utility to fund and/or promote the water conservation measure.

Toilet Retrofit-on-resale (Residential)

The Town would require that, prior to transfer of ownership, each single family residential property must meet current internal water conservation standards. The Town would implement and administer a Water Conservation Certificate program. The property owner must comply with the requirement's provisions in order to obtain a validated Water Conservation Certificate before the close of escrow. An example of a Water Conservation Certificate from Marin County, California (www.marinwater.org) is included in the Appendix. The installation of the following is required to meet current standards:

- Toilets not to exceed 1.6 gallons per flush
- 2.5 gallon per minute showerheads
- 2.2 gallon per minute faucet aerators

Exemptions may be allowed in certain pre-defined cases (certain fixtures in historic district homes, etc.).

Successful marketing of retrofit on resale benefits can be learned from the experience of other municipalities that have implemented this type of program. The Town should approach and encourage the real estate business, lenders, and escrow institutions to participate in development of policy leading to implementation of the program. Be prepared to cite successes achieved by others and the enhanced water saving benefits.

An alternative implementation strategy would be to require the Water Conservation Certificate at time of application for new water service to the Town.

According to information obtained by the Town Attorney, this requirement would only apply to houses built before 1978. This accounts for approximately 43% of the single family homes in Purcellville (2000 Census).

Toilet Rebates

The Town would offer rebates of up to $100 to its customers for the replacement of high flush volume (3.5 gallons per flush and greater) toilets with low flush volume toilets (1.6 gallons per flush and less).

During the analysis of this measure, the payback period was calculated based on the Town's water rates. Assuming that the toilet cost is $100, installation is $100, and the Town rebate is $100, using the lowest tier water rate of $3.78/1000 gallons, the payback period is

approximately 4 years. If savings from sewer charges are included at $7.61/1000 gallons, the payback period is reduced to less than 1.5 years.

The rebate can be administered as a check written directly to the customer or as a credit on their account.

Charlottesville, Virginia has offered $100 toilet rebates since 2002. In the 5 years since the program started, they have replaced 2,465 toilets at a cost of $244,100.

Residential High Efficiency Clothes Washer Rebates

The Town would offer rebates of $150 to its customers for the purchase of qualified Energy Star® high efficiency clothes washers. These machines use up to one-third less water and 50 percent less energy relative to most other new washers. For additional information on Energy Star® appliances, go to www.energystar.gov.

During the analysis of this measure, the payback period was calculated based on the Town's water rates. Assuming that the washer cost is $400 and the Town rebate is $150, using the lowest tier water rate of $3.78/1000 gallons, the payback period based on water savings alone is just over 11 years, and less if energy savings are factored in. If savings from sewer charges are included at $7.61/1000 gallons, the payback period is reduced to less than 4 years.

The rebate can be administered as a check written directly to the customer or as a credit on their account.

Require High Efficiency Clothes Washers in New Homes

The Town would require that all new homes would have qualified Energy Star® high efficiency clothes washers. These machines use up to one-third less water and 50 percent less energy relative to most other new washers. For additional information on Energy Star® appliances, go to www.energystar.gov.

The Town would work with the local builders to ensure that this requirement is being followed.

Distribute Retrofit Kits

Homes built before 1980 generally do not have low flow showerheads, low flush toilets, or faucet aerators. Even some homes built after 1980 may not have these devices because of a lack of plumbing code enforcement. The national plumbing code has required 1.6 gallons per flush (gpf) toilets, 2.5 gallons per minute (gpm) showerheads, and 2.5 gpm faucets since approximately 1992. To promote indoor water conservation, water utilities would give single-family homeowners retrofit kits with sufficient equipment and instructions to retrofit two bathrooms. Retrofit kits would contain easy-to-install low flow showerheads, faucet aerators, and toilet tank leak detection tablets. Alternatively, the program could only focus on distributing low-flow showerheads, since that is the device that has the most potential for savings.

The Town would first publicize the program through bill stuffers and news media coverage in the target area, and purchase sufficient retrofit kits to cover only that portion of the

service area that has pre-1992 homes. As an option, water utilities may want to coordinate their conservation effort with the local energy utility companies, since rising energy prices may lead to a renewed effort to get a high penetration of low-flow showerheads. A third option would be for water utilities to distribute showerheads upon request and at fairs, through schools, and other exhibits.

For the mass distribution option, after publicizing the program, the Town could contract for delivery of the kits, providing three attempts to contact the owner via phone and door-to-door canvassing with a free installation offer. This mass distribution option should provide a much higher market penetration than distribution through direct requests from customers in response to a publicity program.[1]

Increase Public Education (including Xeriscape demonstration)

This measure serves to tie all other measures together, and is one of the most important components of the Town's overall Conservation Program. It would not only address specific measures, but also cultural/social aspects of establishing or enhancing a water conservation ethic among water customers. Most importantly, this program would convey to the public an understanding of why water conservation is important and why the combined efforts of the Town's households and commercial establishments can be significant.

The San Antonio Water System in Texas has received many awards for its public education program, and has many ideas on its website, www.saws.org. The California Urban Water Conservation Council, www.cuwcc.org, also has a large amount of good information available.

Programs could include theatrical productions, poster contests for schoolchildren, T-shirt design contests, speakers for employee and community groups, presentations and tours with hands-on demonstrations, radio and television time, and printed educational material, such as bill inserts. This program also would include expanding the school education program with a web site, videos, and teaching materials.

Further utilization of the "Water Use It Wisely" Campaign offered through the Metropolitan Washington Council of Governments (MWCOG) could also have many benefits. The Town would benefit from the consistent message that is provided throughout the MWCOG area, the materials are ready-made and can be easily customized with the Town's contact information. The information can be incorporated into the Town's website, as well. There is some upfront cost to use the "Water Use It Wisely" program, but the Town should be eligible for discounts through MWCOG (www.mwcog.org).

An example of another regional program is the Hampton Roads Water Efficiency Team (HRWET). It is made up of members of the Hampton Roads Planning District Commission (HRPDC. More information can be found at their website (www.hrwet.org).

A public information specialist should be designated to devote part time to public education throughout the service area. Additional staff may be involved to help by educating the public through a speakers bureau, tours, bill insert, creating displays at fairs and nurseries, giving presentations, and creating low water-requiring or Xeriscape gardens.

[1] Vickers, Amy. Handbook of Water Use and Conservation. 2001. WaterPlow Press.

A visible location should be selected to create a Xeriscape demonstration garden. Perhaps at Town Hall, or a popular park would be an appropriate location. Literature should be made available to educate citizens about the benefits of practicing the seven Xeriscape principles, which incorporate low water using and drought tolerant plant selection. More information about Xeriscape can be found at www.xeriscape.org.

Residential Water Audits

The Town would offer an outdoor water survey to existing residential customers with high water use. Surveys should target the top 25 percent (upper quartile) of water users to ensure significant water savings. It is important to target high water users; otherwise the survey may not produce the savings needed to justify the program. Each residential survey would last approximately one and one-half hours.

Four marketing strategies could be used to implement the residential water audits. The first involves scheduling appointments with high water users. The second involves canvassing neighborhoods with known high water use and offering surveys door-to-door during the late afternoon and evenings. The third is a combination of the two methods. The top water users would be solicited and asked to call in and make an appointment for a survey. In addition the surveyors would canvass homes as time permits when in the neighborhood. This would keep the surveyor busy and efficient and increase participation. The fourth strategy that could be used involves customers receiving forms and instructions and completing their own home water use survey and receiving, upon submittal, a customized report back through the mail or over the Internet.

Trained staff or an outside contractor would perform the surveys. Surveys would be conducted in good weather when lawn watering and car washing activities are likely to be more visible. Before the survey begins, the surveyor would provide material explaining the services to participants. The audit would emphasize the outdoor survey, but include a minimal indoor survey, so that the customer has a complete picture of water saving opportunities and knows if any leaks are found.

The surveyors would orally describe the survey findings and recommendations to the customers using the written report as an outline. The measure incentives are the free survey, water conservation literature, and giveaways such as low-flow showerheads, aerators, shut-off nozzles, moisture meters, and watering schedules. These incentives would be advertised in the program literature used to publicize the program.

The audit can be a customer-performed self audit like the Metropolitan North Georgia Water Planning District (www.northgeorgiawater.org) or an in-home audit such as the one performed by the Town of Cary (www.townofcary.org).

Require Rain Sensor Shutoffs on New Irrigation Systems

A rain sensor is an electric device that measures rainfall and that overrides the irrigation cycle of an irrigation system, turning it off when a predetermined amount of rain has fallen. Criteria would be developed to determine the amount of rain that must fall before the irrigation system must automatically turn off. The Town would require rain sensors to be installed in new developments served by in-ground irrigation systems.

The Town of Cary, North Carolina, is an example of a utility that has these regulations. They can be downloaded from their web site at www.townofcary.org. Other examples include the State of Florida and the Metropolitan North Georgia Water Planning District.

Distribute Kitchen Spray Rinse Valves

The Federal Energy Policy Act of 2005 includes minimum efficiency standards for the pre-rinse spray valves utilized in most food service establishments for pre-rinsing dishes, pans, and pots. These spray valves account for a significant amount of water use in these types of facilities. The new standard stipulates that all new manufactured valves will have a maximum flow of 1.6 gallon per minute (gpm). Presently older food service establishments (i.e. restaurants, hospitals, hotels, schools, grocery stores and churches) still utilize the 2.2 and 2.6 gpm spray valves. Studies in Texas and California have shown many valves have flowrates up to 7 gpm. There is significant potential for savings, due to the fact that these low flow nozzles have only recently become mandatory, along with the long life of the higher-flow nozzles. Most likely, they have not been changed out, except in the case of a renovation or new construction since 2005.

There have been several pilot studies on the acceptance and water savings of direct install low-flow spray nozzle replacement programs. The California Urban Water Conservation Council (CUWCC) and Puget Sound Energy (PSE) have completed such studies. CUWCC found that on average there was an annual water savings in excess of 3,000 gallons per month, per account, after the installation of the low-flow spray valves. CUWCC conducted retention and satisfaction studies on the low-flow spray nozzle finding that 95% of the install were still intact and 93% of customers were satisfied with the new fixtures.

CUWCC found that direct install programs were most effective, ensuring that the new valves were being installed. Purcellville's water conservation technician would oversee the owner's installation of the $100 spray valve, paid for by the Town, and inform them on the proper use of the valves. The focus of this measure would be narrowed to older food service establishments for the most effective savings, since they would likely have the oldest valves with the highest flowrates.

Require Efficient Equipment in New Commercial

The Town would require that all new commercial customers to the Town include efficient equipment in their businesses. The Town would utilize current research and documentation to identify these products, and provide this information to the prospective commercial customers. Examples of this type of equipment are as follows:

- Use of air-cooled instead of water-cooled equipment such as ice machines
- Use of recirculating instead of one-pass cooling and heating systems
- Use of efficient industrial and commercial washers and rinsers
- Use of solenoid and automatic control valves on water lines
- Investigate the feasibility of recycling industrial water and separating waste streams
- Use of High efficiency washing machines
- Use of High efficiency toilets and urinals

The City of Austin, Texas has an extensive program about efficient equipment for commercial customers. They have conducted research and have lists of approved efficient equipment available at their website (www.ci.austin.tx.us/watercon/).

Require 0.5 gal/flush or Less Urinals in New Commercial

When the 1992 plumbing code was enacted requiring toilet manufacturers to produce toilets that flush a maximum of 1.6 gallons per flush, the same has occurred with urinals, where the maximum allowed water use was reduced from an average of three gallons per flush to 1 gallon per flush. Additional water savings can be achieved by requiring the installation of high-efficiency urinals through modified building codes/ordinances for new residential and commercial construction. This program would require high-efficiency urinals (HEUs).

High-efficiency urinals work with an extremely low volume of water per flush (0.5 gallon per flush is the most common, but there are models that use 1 pint per flush) and can be easily installed in all restroom applications. Most of the major urinal manufacturers have several models of 0.5 gallon per flush urinals that cost approximately the same as standard 1.0 gallons per flush. Waterless urinals qualify as high efficiency urinals. Waterless urinals are typically shaped the same as other urinals, except they utilize a special valve or liquid trap that allows the urinal to function without water. This layer prevents sewer gases from escaping from the sewer into the restroom through the urinal drain. Subsequently, the liquid waste then flows down a central tube and then down into the conventional drain line. Monthly maintenance costs for waterless urinals can range from $50 to $200, depending on the manufacturer. Reviews of waterless urinals across the country have been mixed.

According to recent discussions with manufacturers, conventional urinals cost about the same as 0.5 gpf HEUs, so for new construction installing the HEUs offers an immediate payback. However, existing urinals cannot usually be retrofitted to 0.5 gallon per flush simply by replacing the flush valve. In most cases, the porcelain must also be replaced due to the outlet orifices for the water into the urinal. Therefore, this measure only targets new construction and remodeling.

Require Submetering on New Commercial

The Town would require that all new commercial multi-tenant buildings be submetered for water. This submetering could be through individual meters that are read and billed by the Town, or they could be behind a master meter for the building, and the building owner sends bills to the tenants. Submetering will offer building tenants a new tool to improve their water efficiency and participate in demand response. Tenants would have to agree in their leases to be submetered. Being metered for actual usage provides incentive to be an efficient user of water.

This would be a requirement for all new commercial multi-tenant buildings, but an alternate implementation tool would be to offer a rebate. Denver Water offers a $40 rebate to install each submeter in a new commercial multi-tenant building.

Summary and Next Steps

The water conservation measures are sorted by unit cost of water saved in Table 4. The Public Education is listed first because it is necessary in tying the other measures and getting the message out to the Town's customers. The remaining water conservation measures are listed in order of lowest cost of water to highest. The total provides the limit to what is practically achievable if all measures are implemented, in terms of cost and water savings for the Town. The annual cost savings is shown based on the range of costs the Town is expected to experience in the future based on the recently completed Water Resources Study ($1.49 to $3.25/1,000 gallons).

TABLE 4
Water Conservation Measures Sorted by Increasing Cost-Effectiveness

Measure	Type of Measure	Annual Program Cost (without Labor)	Annual Labor Required (FTE)	5th Year Savings (gallons/ day)	ADD Reduction in 5th Year	MDD Reduction in 5th Year	Unit Cost of Water Savings ($/1,000 gallon)	Annual Cost Savings ($1.49 to $3.25/1,000 gallons)
Increase Public Education	Education	$ 1,510	0.92	0	0.00%	0.00%	$ -	$12,726 to $27,758
Require Efficient Equipment in New Commercial	Regulation	$ 1,560	0.04	23,400	3.21%	1.97%	$ 0.14	$3,916 to $8,541
Require High Efficiency Clothes Washers in New Homes	Regulation	$ 1,550	0.05	7,200	0.99%	0.61%	$ 0.24	$2,774 to $6,050
Toilet Retrofit on Resale	Regulation	$ 1,550	0.02	5,100	0.70%	0.43%	$ 0.25	$4,079 to $8,897
Require Submetering on New Commercial	Regulation	$ 1,565	0.05	7,500	1.03%	0.63%	$ 0.54	$4,351 to $9,490
Distribute Retrofit Kits	Incentive	$ 3,940	0.04	8,000	1.10%	0.67%	$ 0.60	$1,632 to $3,559
Distribute Kitchen Spray Rinse Valves	Incentive	$ 2,280	0.01	3,000	0.41%	0.25%	$ 0.73	$2,719 to $5,931
Require 0.5 gallon/flush or Less Urinals in New Commercial	Regulation	$ 1,565	0.05	5,000	0.69%	0.42%	$ 0.81	$2,012 to $4,389
Require Rain Sensor Shutoffs on New Irrigation Systems	Regulation	$ 1,560	0.04	3,700	0.51%	0.31%	$ 0.90	$1,849 to $4,033
Clothes Washer Rebates	Incentive	$ 9,300	0.03	3,400	0.47%	0.29%	$ 2.38	$1,468 to $3,203
Toilet Rebates	Incentive	$ 5,400	0.04	2,700	0.37%	0.23%	$ 2.41	$598 to $1,305
Residential Water Audits	Incentive	$ 1,640	0.04	1,100	0.15%	0.09%	$ 3.71	$12,726 to $27,758
Total		**$ 33,420**	**1.34**	**70,100**	**9.62%**	**5.90%**	**$ 0.62**	$38,124 to $83,156

Notes: Labor FTE assumed to be $80,000.
The total savings may reduce slightly if all measures are implemented together, due to overlap.

The next step in the development of the water conservation program for the Town of Purcellville is a compilation of the proposed water conservation plan for the Town. This plan will include an executive summary of the selected water conservation plan and its components. It will also include both TMs prepared for this effort.

Attachment

Table DP-1. Profile of General Demographic Characteristics: 2000

Geographic area: Purcellville town, Virginia

[For information on confidentiality protection, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total population	**3,584**	**100.0**
SEX AND AGE		
Male	1,734	48.4
Female	1,850	51.6
Under 5 years	310	8.6
5 to 9 years	382	10.7
10 to 14 years	326	9.1
15 to 19 years	216	6.0
20 to 24 years	102	2.8
25 to 34 years	482	13.4
35 to 44 years	707	19.7
45 to 54 years	426	11.9
55 to 59 years	148	4.1
60 to 64 years	115	3.2
65 to 74 years	183	5.1
75 to 84 years	139	3.9
85 years and over	48	1.3
Median age (years)	34.7	(X)
18 years and over	2,410	67.2
Male	1,116	31.1
Female	1,294	36.1
21 years and over	2,331	65.0
62 years and over	430	12.0
65 years and over	370	10.3
Male	152	4.2
Female	218	6.1
RACE		
One race	3,516	98.1
White	3,187	88.9
Black or African American	267	7.4
American Indian and Alaska Native	3	0.1
Asian	30	0.8
Asian Indian	14	0.4
Chinese	3	0.1
Filipino	8	0.2
Japanese	1	-
Korean	1	-
Vietnamese	-	-
Other Asian [1]	3	0.1
Native Hawaiian and Other Pacific Islander	1	-
Native Hawaiian	1	-
Guamanian or Chamorro	-	-
Samoan	-	-
Other Pacific Islander [2]	-	-
Some other race	28	0.8
Two or more races	68	1.9
Race alone or in combination with one or more other races: [3]		
White	3,251	90.7
Black or African American	305	8.5
American Indian and Alaska Native	12	0.3
Asian	46	1.3
Native Hawaiian and Other Pacific Islander	2	0.1
Some other race	37	1.0

Subject	Number	Percent
HISPANIC OR LATINO AND RACE		
Total population	**3,584**	**100.0**
Hispanic or Latino (of any race)	82	2.3
Mexican	28	0.8
Puerto Rican	13	0.4
Cuban	5	0.1
Other Hispanic or Latino	36	1.0
Not Hispanic or Latino	3,502	97.7
White alone	3,139	87.6
RELATIONSHIP		
Total population	**3,584**	**100.0**
In households	3,553	99.1
Householder	1,253	35.0
Spouse	778	21.7
Child	1,293	36.1
Own child under 18 years	1,127	31.4
Other relatives	104	2.9
Under 18 years	39	1.1
Nonrelatives	125	3.5
Unmarried partner	40	1.1
In group quarters	31	0.9
Institutionalized population	-	-
Noninstitutionalized population	31	0.9
HOUSEHOLD BY TYPE		
Total households	**1,253**	**100.0**
Family households (families)	956	76.3
With own children under 18 years	574	45.8
Married-couple family	778	62.1
With own children under 18 years	463	37.0
Female householder, no husband present	144	11.5
With own children under 18 years	96	7.7
Nonfamily households	297	23.7
Householder living alone	251	20.0
Householder 65 years and over	98	7.8
Households with individuals under 18 years	603	48.1
Households with individuals 65 years and over	253	20.2
Average household size	2.84	(X)
Average family size	3.28	(X)
HOUSING OCCUPANCY		
Total housing units	**1,292**	**100.0**
Occupied housing units	1,253	97.0
Vacant housing units	39	3.0
For seasonal, recreational, or occasional use	5	0.4
Homeowner vacancy rate (percent)	0.8	(X)
Rental vacancy rate (percent)	2.4	(X)
HOUSING TENURE		
Occupied housing units	**1,253**	**100.0**
Owner-occupied housing units	972	77.6
Renter-occupied housing units	281	22.4
Average household size of owner-occupied units	2.97	(X)
Average household size of renter-occupied units	2.38	(X)

- Represents zero or rounds to zero. (X) Not applicable.

[1] Other Asian alone, or two or more Asian categories.

[2] Other Pacific Islander alone, or two or more Native Hawaiian and Other Pacific Islander categories.

[3] In combination with one or more of the other races listed. The six numbers may add to more than the total population and the six percentages may add to more than 100 percent because individuals may report more than one race.

Source: U.S. Census Bureau, Census 2000.

Table DP-2. Profile of Selected Social Characteristics: 2000

Geographic area: Purcellville town, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
SCHOOL ENROLLMENT		
Population 3 years and over enrolled in school	**1,124**	**100.0**
Nursery school, preschool	95	8.5
Kindergarten	70	6.2
Elementary school (grades 1-8)	588	52.3
High school (grades 9-12)	253	22.5
College or graduate school	118	10.5
EDUCATIONAL ATTAINMENT		
Population 25 years and over	**2,225**	**100.0**
Less than 9th grade	100	4.5
9th to 12th grade, no diploma	174	7.8
High school graduate (includes equivalency)	522	23.5
Some college, no degree	533	24.0
Associate degree	146	6.6
Bachelor's degree	565	25.4
Graduate or professional degree	185	8.3
Percent high school graduate or higher	87.7	(X)
Percent bachelor's degree or higher	33.7	(X)
MARITAL STATUS		
Population 15 years and over	**2,574**	**100.0**
Never married	548	21.3
Now married, except separated	1,646	63.9
Separated	55	2.1
Widowed	156	6.1
Female	131	5.1
Divorced	169	6.6
Female	130	5.1
GRANDPARENTS AS CAREGIVERS		
Grandparent living in household with one or more own grandchildren under 18 years	**39**	**100.0**
Grandparent responsible for grandchildren	16	41.0
VETERAN STATUS		
Civilian population 18 years and over	**2,389**	**100.0**
Civilian veterans	368	15.4
DISABILITY STATUS OF THE CIVILIAN NONINSTITUTIONALIZED POPULATION		
Population 5 to 20 years	**1,007**	**100.0**
With a disability	60	6.0
Population 21 to 64 years	**1,926**	**100.0**
With a disability	199	10.3
Percent employed	62.8	(X)
No disability	1,727	89.7
Percent employed	82.9	(X)
Population 65 years and over	**363**	**100.0**
With a disability	166	45.7
RESIDENCE IN 1995		
Population 5 years and over	**3,299**	**100.0**
Same house in 1995	1,360	41.2
Different house in the U.S. in 1995	1,912	58.0
Same county	1,011	30.6
Different county	901	27.3
Same state	296	9.0
Different state	605	18.3
Elsewhere in 1995	27	0.8

Subject	Number	Percent
NATIVITY AND PLACE OF BIRTH		
Total population	**3,599**	**100.0**
Native	3,514	97.6
Born in United States	3,472	96.5
State of residence	1,810	50.3
Different state	1,662	46.2
Born outside United States	42	1.2
Foreign born	85	2.4
Entered 1990 to March 2000	22	0.6
Naturalized citizen	57	1.6
Not a citizen	28	0.8
REGION OF BIRTH OF FOREIGN BORN		
Total (excluding born at sea)	**85**	**100.0**
Europe	40	47.1
Asia	12	14.1
Africa	-	-
Oceania	-	-
Latin America	11	12.9
Northern America	22	25.9
LANGUAGE SPOKEN AT HOME		
Population 5 years and over	**3,299**	**100.0**
English only	3,194	96.8
Language other than English	105	3.2
Speak English less than "very well"	22	0.7
Spanish	30	0.9
Speak English less than "very well"	4	0.1
Other Indo-European languages	70	2.1
Speak English less than "very well"	18	0.5
Asian and Pacific Island languages	5	0.2
Speak English less than "very well"	-	-
ANCESTRY (single or multiple)		
Total population	**3,599**	**100.0**
Total ancestries reported	*3,758*	*104.4*
Arab	-	-
Czech[1]	20	0.6
Danish	14	0.4
Dutch	83	2.3
English	441	12.3
French (except Basque)[1]	70	1.9
French Canadian[1]	7	0.2
German	675	18.8
Greek	29	0.8
Hungarian	29	0.8
Irish[1]	567	15.8
Italian	186	5.2
Lithuanian	8	0.2
Norwegian	32	0.9
Polish	94	2.6
Portuguese	7	0.2
Russian	8	0.2
Scotch-Irish	129	3.6
Scottish	85	2.4
Slovak	-	-
Subsaharan African	77	2.1
Swedish	51	1.4
Swiss	-	-
Ukrainian	18	0.5
United States or American	421	11.7
Welsh	54	1.5
West Indian (excluding Hispanic groups)	22	0.6
Other ancestries	631	17.5

-Represents zero or rounds to zero. (X) Not applicable.

[1]The data represent a combination of two ancestries shown separately in Summary File 3. Czech includes Czechoslovakian. French includes Alsatian. French Canadian includes Acadian/Cajun. Irish includes Celtic.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-3. Profile of Selected Economic Characteristics: 2000

Geographic area: Purcellville town, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
EMPLOYMENT STATUS		
Population 16 years and over	**2,533**	**100.0**
In labor force	1,805	71.3
Civilian labor force	1,802	71.1
Employed	1,756	69.3
Unemployed	46	1.8
Percent of civilian labor force	2.6	(X)
Armed Forces	3	0.1
Not in labor force	728	28.7
Females 16 years and over	**1,353**	**100.0**
In labor force	855	63.2
Civilian labor force	855	63.2
Employed	835	61.7
Own children under 6 years	**370**	**100.0**
All parents in family in labor force	222	60.0
COMMUTING TO WORK		
Workers 16 years and over	**1,738**	**100.0**
Car, truck, or van - - drove alone	1,497	86.1
Car, truck, or van - - carpooled	101	5.8
Public transportation (including taxicab)	5	0.3
Walked	35	2.0
Other means	9	0.5
Worked at home	91	5.2
Mean travel time to work (minutes)[1]	30.0	(X)
Employed civilian population 16 years and over	**1,756**	**100.0**
OCCUPATION		
Management, professional, and related occupations	745	42.4
Service occupations	246	14.0
Sales and office occupations	528	30.1
Farming, fishing, and forestry occupations	-	-
Construction, extraction, and maintenance occupations	115	6.5
Production, transportation, and material moving occupations	122	6.9
INDUSTRY		
Agriculture, forestry, fishing and hunting, and mining	-	-
Construction	124	7.1
Manufacturing	71	4.0
Wholesale trade	45	2.6
Retail trade	263	15.0
Transportation and warehousing, and utilities	71	4.0
Information	146	8.3
Finance, insurance, real estate, and rental and leasing	104	5.9
Professional, scientific, management, administrative, and waste management services	208	11.8
Educational, health and social services	340	19.4
Arts, entertainment, recreation, accommodation and food services	117	6.7
Other services (except public administration)	98	5.6
Public administration	169	9.6
CLASS OF WORKER		
Private wage and salary workers	1,218	69.4
Government workers	391	22.3
Self-employed workers in own not incorporated business	143	8.1
Unpaid family workers	4	0.2

Subject	Number	Percent
INCOME IN 1999		
Households	**1,250**	**100.0**
Less than $10,000	53	4.2
$10,000 to $14,999	22	1.8
$15,000 to $24,999	117	9.4
$25,000 to $34,999	125	10.0
$35,000 to $49,999	157	12.6
$50,000 to $74,999	308	24.6
$75,000 to $99,999	220	17.6
$100,000 to $149,999	194	15.5
$150,000 to $199,999	45	3.6
$200,000 or more	9	0.7
Median household income (dollars)	62,108	(X)
With earnings	1,084	86.7
Mean earnings (dollars)[1]	66,193	(X)
With Social Security income	278	22.2
Mean Social Security income (dollars)[1]	10,987	(X)
With Supplemental Security Income	22	1.8
Mean Supplemental Security Income (dollars)[1]	7,823	(X)
With public assistance income	23	1.8
Mean public assistance income (dollars)[1]	2,896	(X)
With retirement income	208	16.6
Mean retirement income (dollars)[1]	19,819	(X)
Families	**960**	**100.0**
Less than $10,000	24	2.5
$10,000 to $14,999	-	-
$15,000 to $24,999	69	7.2
$25,000 to $34,999	60	6.3
$35,000 to $49,999	116	12.1
$50,000 to $74,999	248	25.8
$75,000 to $99,999	201	20.9
$100,000 to $149,999	191	19.9
$150,000 to $199,999	42	4.4
$200,000 or more	9	0.9
Median family income (dollars)	69,211	(X)
Per capita income (dollars)[1]	24,112	(X)
Median earnings (dollars):		
Male full-time, year-round workers	50,815	(X)
Female full-time, year-round workers	34,808	(X)

Subject	Number below poverty level	Percent below poverty level
POVERTY STATUS IN 1999		
Families	**25**	**2.6**
With related children under 18 years	16	2.6
With related children under 5 years	13	5.6
Families with female householder, no husband present	**16**	**12.9**
With related children under 18 years	16	18.8
With related children under 5 years	13	50.0
Individuals	**150**	**4.2**
18 years and over	114	4.8
65 years and over	18	5.0
Related children under 18 years	28	2.3
Related children 5 to 17 years	18	2.0
Unrelated individuals 15 years and over	70	17.2

-Represents zero or rounds to zero. (X) Not applicable.

[1]If the denominator of a mean value or per capita value is less than 30, then that value is calculated using a rounded aggregate in the numerator. See text.

Source: U.S. Bureau of the Census, Census 2000.

Table DP-4. Profile of Selected Housing Characteristics: 2000

Geographic area: Purcellville town, Virginia

[Data based on a sample. For information on confidentiality protection, sampling error, nonsampling error, and definitions, see text]

Subject	Number	Percent
Total housing units	**1,288**	**100.0**
UNITS IN STRUCTURE		
1-unit, detached	888	68.9
1-unit, attached	252	19.6
2 units	16	1.2
3 or 4 units	45	3.5
5 to 9 units	87	6.8
10 to 19 units	-	-
20 or more units	-	-
Mobile home	-	-
Boat, RV, van, etc	-	-
YEAR STRUCTURE BUILT		
1999 to March 2000	131	10.2
1995 to 1998	218	16.9
1990 to 1994	176	13.7
1980 to 1989	206	16.0
1970 to 1979	56	4.3
1960 to 1969	92	7.1
1940 to 1959	211	16.4
1939 or earlier	198	15.4
ROOMS		
1 room	-	-
2 rooms	8	0.6
3 rooms	39	3.0
4 rooms	126	9.8
5 rooms	133	10.3
6 rooms	280	21.7
7 rooms	221	17.2
8 rooms	230	17.9
9 or more rooms	251	19.5
Median (rooms)	6.8	(X)
Occupied housing units	**1,254**	**100.0**
YEAR HOUSEHOLDER MOVED INTO UNIT		
1999 to March 2000	357	28.5
1995 to 1998	387	30.9
1990 to 1994	214	17.1
1980 to 1989	134	10.7
1970 to 1979	67	5.3
1969 or earlier	95	7.6
VEHICLES AVAILABLE		
None	65	5.2
1	332	26.5
2	617	49.2
3 or more	240	19.1
HOUSE HEATING FUEL		
Utility gas	-	-
Bottled, tank, or LP gas	197	15.7
Electricity	670	53.4
Fuel oil, kerosene, etc	362	28.9
Coal or coke	-	-
Wood	11	0.9
Solar energy	-	-
Other fuel	14	1.1
No fuel used	-	-
SELECTED CHARACTERISTICS		
Lacking complete plumbing facilities	7	0.6
Lacking complete kitchen facilities	-	-
No telephone service	14	1.1

Subject	Number	Percent
OCCUPANTS PER ROOM		
Occupied housing units	**1,254**	**100.0**
1.00 or less	1,231	98.2
1.01 to 1.50	20	1.6
1.51 or more	3	0.2
Specified owner-occupied units	**935**	**100.0**
VALUE		
Less than $50,000	5	0.5
$50,000 to $99,999	8	0.9
$100,000 to $149,999	300	32.1
$150,000 to $199,999	198	21.2
$200,000 to $299,999	383	41.0
$300,000 to $499,999	27	2.9
$500,000 to $999,999	7	0.7
$1,000,000 or more	7	0.7
Median (dollars)	188,000	(X)
MORTGAGE STATUS AND SELECTED MONTHLY OWNER COSTS		
With a mortgage	756	80.9
Less than $300	5	0.5
$300 to $499	3	0.3
$500 to $699	28	3.0
$700 to $999	55	5.9
$1,000 to $1,499	253	27.1
$1,500 to $1,999	253	27.1
$2,000 or more	159	17.0
Median (dollars)	1,534	(X)
Not mortgaged	179	19.1
Median (dollars)	393	(X)
SELECTED MONTHLY OWNER COSTS AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	214	22.9
15.0 to 19.9 percent	140	15.0
20.0 to 24.9 percent	157	16.8
25.0 to 29.9 percent	137	14.7
30.0 to 34.9 percent	62	6.6
35.0 percent or more	222	23.7
Not computed	3	0.3
Specified renter-occupied units	**269**	**100.0**
GROSS RENT		
Less than $200	-	-
$200 to $299	-	-
$300 to $499	73	27.1
$500 to $749	86	32.0
$750 to $999	52	19.3
$1,000 to $1,499	47	17.5
$1,500 or more	4	1.5
No cash rent	7	2.6
Median (dollars)	595	(X)
GROSS RENT AS A PERCENTAGE OF HOUSEHOLD INCOME IN 1999		
Less than 15.0 percent	30	11.2
15.0 to 19.9 percent	63	23.4
20.0 to 24.9 percent	32	11.9
25.0 to 29.9 percent	33	12.3
30.0 to 34.9 percent	34	12.6
35.0 percent or more	61	22.7
Not computed	16	5.9

-Represents zero or rounds to zero. (X) Not applicable.

Source: U.S. Bureau of the Census, Census 2000.

MARIN MUNICIPAL WATER DISTRICT
ULTRA LOW FLOW TOILET (ULFT) CERTIFICATE

Marin Municipal Water District ULFT Certification • P.O. Box 994 • Corte Madera, CA 94976-0994
415-945-1527 (phone) 415-945-1403 (fax)

Please Note: The reverse side of this form contains additional information and instructions. All owners of residential properties located within MMWD's service area are required to complete and submit this form at the time of application for water service at their property, whether it is a new, increased, or modified water service, to certify that all toilets at their property are compliant with MMWD Ordinance 403.

INCOMPLETE CERTIFICATES WILL NOT BE PROCESSED OR RETURNED

1. PROPERTY INFORMATION:

Owner: _____
First Name Last Name

Address: _____
Street No. Street Name

_____
City State Zip Code

Other: _____
MMWD Water Service Number Parcel Number

2. TOILETS :

Number of toilets replaced as a result of MMWD Ordinance 403*……. _____ (A)

Number of ULFTs already at this property (before notification of MMWD Ordinance 403)……. _____ (B)

Total number of toilets at this property……... _____ (A+B)

**** Please submit a copy of your sales receipt(s) for toilets replaced as a result of MMWD Ordinance 403.***

3. CERTIFICATION:

By signing this form, I certify, under the penalty of perjury, that I am the owner of the above-referenced property and that each toilet at this property is in compliance with MMWD Ordinance 403 (MMWD Code Section 11.60.056.C.3), requiring owners of residential properties to replace non-efficient toilets with ultra low flow toilets that use no more than 1.6 gallons per flush, within six months of the water service application date. It is understood that the District reserves the right to perform verification inspections as deemed necessary to ensure that the toilets at this property are in compliance with MMWD Ordinance 403.

X_____ _____ _____
Signature of Property Owner Printed Name of Property Owner Date

SUMMARY OF
MARIN MUNICIPAL WATER DISTRICT
WATER CONSERVATION ORDINANCE NO. 403
REQUIRING INSTALLATION OF ULTRA LOW FLOW TOILETS (ULFTs)
AT RESIDENTIAL PROPERTIES

Marin Municipal Water District Ordinance 403 (MMWD Code Section 11.60.056.C.3) requires any residential building, situated in the District's service area and built before January 1, 1994 that applies for water service, whether it is a new, increased, or modified residential water service, to be certified as having ultra low flow toilets installed. The owner of the residential property is responsible for certifying that all toilets at the property are in compliance with MMWD Ordinance 403 within six months of the water service application date.

What do I need to do?

1. Determine if the toilets at your property are ULFTs, and replace them if they are not.
2. Sign and submit an Ultra Low Flow Toilet Certificate to MMWD within six months from the water service application date.

Do I need to replace my toilet?

A ULFT uses 1.6 gallons of water per flush or less. To determine if your toilet is a ULFT look for a "1.6 gpf" label between the tank and the bowl. Toilets with this label are ULFTs. If you can't find this label, lift the tank lid and check the underside of it for a manufacture date (stamped into the porcelain). Use the table below to determine if your toilet is a ULFT. Finally, ULFTs have serpentine-shaped traps, often visible from the side of the toilet. Contact MMWD at 415-945-1527 for additional assistance.

Year Toilet Was Manufactured	Gallons-per-Flush	Ultra Low Flow?
Pre-1990	3.5 or more	No
1990 - 1993	1.6 – 3.5	Uncertain (contact MMWD)
1994 and later	1.6	Yes

Does MMWD recommend a particular toilet?

No. MMWD encourages property owners to check with MMWD at 415-945-1527 for a list of toilets with high performance ratings, and to consider installing high-efficiency toilets (HETs), which use at least 20 percent less water than ULFT 1.6 gallon per flush models.

What if I don't comply?

Property owners who fail to comply within the six-month time period may be charged non-compliance fees for the period of non-compliance.

How can I get help?

Visit www.marinwater.org, or call the MMWD Water Conservation Office at 415-945-1527.

After completing this certificate submit it, along with sales receipts if new toilet(s) were installed, by mail or fax to:

Marin Municipal Water District
ULFT Certification
P.O. Box 994
Corte Madera, CA 94976-0994

415-945-1403 (fax)

Toilet Rebate Program Evaluation
Town of Purcellville

Background data

2	#	toilets per house
2.86	#	Estimated number of people per household
763	#	Estimated number of pre-1990 single family homes
1,526	#	Estimated number of pre-1990 toilets in single family homes
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Low Flow Toilet

6.8	#/day	flushes per day for average toilet (from EPA WaterSense toilet specification)
4.25	gpf	Average use for pre 1990 toilet, gallons per flush (range is 3.5-5.0 gpf)
1.6	gpf	Use per low flow toilet (1.6 gpf) (conservative, as it does not consider high-efficiency toilets)
18	gpd/toilet	Typical Water Savings from measure: gpd per residential toilet

Program Variables

10%		Estimated market penetration (% participating out of total potential)
152		Number of Planned Installations
20		Anticipated life span for replaced toilets in years
5		Number of year that program will run
30		Number of units to be installed per year 2% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.20	$ 80,000	$ 16,000	See summary, below
Rebate amount per toilet		$ 100	$ 15,200	Town can adjust rebate amount if desired
Administration			$ 7,500	Allowance, see below
Consulting or Contracting			$ -	
Processing cost per rebate		$ 20	$ 3,040	Allowance
Total Program Costs (5 years)			**$ 43,000**	
Estimated Water Savings				
Estimated annual water savings after 5th year			990,000	gallons per year
Estimated water savings after 5th year			2,700	gpd
Total water savings over life of program			17,840,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$2.41	$/1000 gallons saved
Reduction in ADD after 5th year			0.37%	% of ADD
Reduction in MDD after 5th year			0.23%	% of MDD

Customer Payback Analysis

Toilet Cost	$ 100	
Installation	$ 100	(assumes installation cost of $200,
Rebate	$ 100	but only half use a plumber)
Total Customer Cost	$ 100	
Water Savings, gpd/toilet	18	
Water Rate, $/1,000 gal	$3.78	
Daily Savings, $ (W only)	$0.07	
Annual Savings, $ (W only)	$24.86	
Payback Period, years	**4.02**	
Sewer Rate, $/1,000 gal	$7.61	
Daily Savings, $ (W+S)	$0.21	
Annual Savings, $ (W+S)	$74.92	
Payback Period, years	**1.33**	

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 7,500	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
2	Hours staff time per rebate
304	Hours staff time for total number of planned replacements
384	Total hours of staff time
48.0	Total days of staff time (5 years)

Toilet Retrofit on Resale Program Evaluation
Town of Purcellville

Background data

2	#	toilets per house
2.86	#	Estimated number of people per household
1288	#	Estimated # of structures
43.2	#	Estimated percent of pre-1980 homes
556	#	Estimated number of pre-1980 single family homes
1,113	#	Estimated number of pre-1980 toilets in single family homes
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Low Flow Toilet

6.8	#/day	flushes per day for average toilet (from EPA WaterSense toilet specification)
5	gpf	Average use for pre 1980 toilet, gallons per flush
1.6	gpf	Use per low flow toilet (1.6 gpf) (conservative, as it does not consider high-efficiency toilets)
23	gpd/toilet	Typical Water Savings from measure: gpd per residential toilet

Program Variables

4%		Estimated average annual housing turnover rate
43%		% of houses turned over are pre-1980
890		Number of Planned Installations — 80% replacement of pre-1980 toilets
20		Anticipated life span for replaced toilets in years
20		Number of year that program will run
45		Number of units to be installed per year — 4.0% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.09	$ 80,000	$ 7,000	See summary, below, only needed first 5 years
Rebate amount per toilet		$ -	$ -	Town can adjust rebate amount if desired
Administration			$ 30,000	Allowance, see below
Consulting or Contracting			$ -	
Processing cost		$ -	$ -	Allowance
Total Program Costs (20 years)			**$ 38,000**	$ 8,500 5-year cost
Estimated Water Savings				
Estimated annual water savings after 5th year			1,860,000	gallons per year
Estimated water savings after 5th year			5,100	gpd
Total water savings over life of program			150,210,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.25	$/1000 gallons saved
Reduction in ADD after 5th year			0.70%	% of ADD
Reduction in MDD after 5th year			0.43%	% of MDD

Customer Payback Analysis

Toilet Cost	$ 100	
Installation	$ 100	(assumes installation cost of $200,
Rebate	$ -	but only half use a plumber)
Total Customer Cost	$ 200	
Water Savings, gpd/toilet	23	
Water Rate, $/1,000 gal	$3.78	
Daily Savings, $	$0.09	
Annual Savings, $	$31.90	
Payback Period, years	**6.27**	
Sewer Rate, $/1,000 gal	$7.61	
Daily Savings, $ (W+S)	$0.26	
Annual Savings, $ (W+S)	$96.12	
Payback Period, years	**2.08**	

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
0.5	Hours staff time per toilet
89	Hours staff time for total number of planned replacements (5 years)
169	Total hours of staff time
21.1	Total days of staff time

Clothes Washer Rebate Program Evaluation
Town of Purcellville

Background data

2,215	#	Number of single family accounts, assume 1 washer per account
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per High Efficiency Washer

15.4	Typical Water Savings from measure: gpd per residential clothes washer (from 13.3 to 8.5 water factor, 1170 gal/yr savings per wf)

Program Variables

10%	Estimated market penetration (% participating out of total potential)
221	Number of Planned Installations
20	Anticipated life span for replaced washers in years
5	Number of year that program will run
44	Number of units to be installed per year 2% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.16	$ 80,000	$ 12,500	See summary, below
Rebate amount per washer		$ 150	$ 33,150	Town can adjust rebate amount if desired
Administration			$ 7,500	Allowance, see below
Consulting or Contracting			$ -	
Processing cost per rebate		$ 20	$ 4,420	Allowance
Total Program Costs (5 years)			**$ 59,000**	
Estimated Water Savings				
Estimated annual water savings after 5th year			1,240,000	gallons per year
Estimated water savings after 5th year			3,400	gpd
Total water savings over life of program			24,820,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$2.38	$/1000 gallons saved
Reduction in ADD after 5th year			0.47%	% of ADD
Reduction in MDD after 5th year			0.29%	% of MDD

Customer Payback Analysis	
Washer	
Washer Cost	$ 400
Rebate	$ 150
Total Customer Cost	$ 250
Water Savings, gpd/washer	15
Water Rate, $/1,000 gal	$3.78
Daily Savings, $	$0.06
Annual Savings, $	$21.23
Payback Period, years	**11.78**
Sewer Rate, $/1,000 gal	$7.61
Daily Savings, $ (W+S)	$0.18
Annual Savings, $ (W+S)	$63.97
Payback Period, years	**3.91**

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 7,500	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per rebate
221	Hours staff time for total number of planned replacements
301	Total hours of staff time
37.6	Total days of staff time

High Efficiency Clothes Washer Requirement Prc **Background data**
Town of Purcellville

125	#	Estimated annual number of new single family accounts
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per High Efficiency Washer

15.4	Typical Water Savings from measure: gpd per residential clothes washer (from 13.3 to 8.5 water factor, 1170 gal/yr savings per wf)

Program Variables

75%	Estimated percent of participants (don't already have a washer)
1875	Number of Planned Installations
20	Anticipated life span for washers in years
20	Number of year that program will run
94	Number of units to be installed per year

Item		Unit Cost	Totals		
Cost over the life of the program					
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance	
Labor (FTE)	0.24	$ 80,000	$ 19,000	See summary, below, only needed first 5 years	
Rebate amount per washer			$ -		
Administration			$ 30,000	Allowance, see below	
Consulting or Contracting			$ -		
Processing cost per rebate			$ -	Allowance	
Total Program Costs (20 years)			**$ 50,000**	$ 8,500 5-year cost	
Estimated Water Savings					
Estimated annual water savings after 5th year			2,630,000	gallons per year	
Estimated water savings after 5th year			7,200	gpd	
Total water savings over life of program			210,600,000	gallons, over 20 year analysis	
Program Benefits					
Unit cost of savings (over 20 years)			$0.24	$/1000 gallons saved	
Reduction in ADD after 5th year			0.99%	% of ADD	
Reduction in MDD after 5th year			0.61%	% of MDD	

Customer Payback Analysis	
Washer	
Washer Cost	$ 400
Rebate	$ -
Total Customer Cost	$ 400
Water Savings, gpd/washer	15
Water Rate, $/1,000 gal	$3.78
Daily Savings, $	$0.06
Annual Savings, $	$21.23
Payback Period, years	**18.84**
Sewer Rate, $/1,000 gal	$7.61
Daily Savings, $ (W+S)	$0.18
Annual Savings, $ (W+S)	$63.97
Payback Period, years	**6.25**

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per washer
375	Hours staff time for total number of planned replacements (5 years)
455	Total hours of staff time
56.9	Total days of staff time

Retrofit Kit Distribution Program Evaluation
Town of Purcellville

Background data

763	#	Number of pre-1990 structures
2	#	Estimated number of bathrooms per house
1,526	#	Estimated number of total bathrooms with pre-1990 fixtures
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Retrofit Kit

7.0	Typical Water Savings from measure: 2 gal/day from each of 2 faucet aerators, 3 gal/day from showerhead

Program Variables

75%		Estimated market penetration (% participating out of total potential)
1144		Number of Planned Installations
20		Anticipated life span for showerheads in years
5		Number of year that program will run
229		Number of units to be installed per year

15% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.19	$ 80,000	$ 15,300	See summary, below
Cost of retrofit kit		$ 10	$ 11,440	Typical kit contains showerhead, two faucet aerators, toilet leak tablets
Administration			$ 7,500	Allowance, see below
Consulting or Contracting			$ -	
Processing cost			$ -	Allowance
Total Program Costs (5 years)			**$ 35,000**	
Estimated Water Savings				
Estimated annual water savings after 5th year			2,920,000	gallons per year
Estimated water savings after 5th year			8,000	gpd
Total water savings over life of program			58,460,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.60	$/1000 gallons saved
Reduction in ADD after 5th year			1.10%	% of ADD
Reduction in MDD after 5th year			0.67%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 7,500	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
0.25	Hours staff time per kit
286	Hours staff time for total number of planned replacements
366	Total hours of staff time
45.8	Total days of staff time

Residential Water Audits Program Evaluation
Town of Purcellville

Background data

2,215	#	Number of residential accounts
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Retrofit Kit

5.0	Typical Water Savings from measure: 5 gpd from finding and fixing leaks

Program Variables

10%	Estimated market penetration (% participating out of total potential)
222	Number of Planned Installations
20	Anticipated life span in years
5	Number of year that program will run
44	Number of units to be installed per year 2% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.27	$ 80,000	$ 21,800	See summary, below
Cost of retrofit kit			$ -	
Administration			$ 7,500	Allowance, see below
Consulting or Contracting			$ -	
Processing cost			$ -	Allowance
Total Program Costs (5 years)			**$ 30,000**	
Estimated Water Savings				
Estimated annual water savings after 5th year			400,000	gallons per year
Estimated water savings after 5th year			1,100	gpd
Total water savings over life of program			8,080,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$3.71	$/1000 gallons saved
Reduction in ADD after 5th year			0.15%	% of ADD
Reduction in MDD after 5th year			0.09%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 7,500	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
2	Hours staff time per audit
443	Hours staff time for total number of planned audits
523	Total hours of staff time
65.4	Total days of staff time

Public Education Program Evaluation
Town of Purcellville

Background data

2,215	#	Number of residential accounts
2.86	#	Estimated number of people per household
6,335	#	Estimated number of current population
125	#	Estimated annual number of new single family accounts
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings

0.0	Typical Water Savings: cannot be determined

Program Variables

100%	Estimated market penetration (% participating out of total potential)
176698	Number of People
20	Anticipated life span in years
20	Number of year that program will run
8835	Number of people targeted per year

Item		Unit Cost	Totals			
Cost over the life of the program						
Marketing and advertising (posters, etc)		$ -	$ -	Allowance		
Labor (FTE)	18.45	$ 80,000	$ 1,475,800	See summary, below	73,790.83	
Cost of retrofit kit			$ -			
Administration			$ 30,000	Allowance, see below		
Consulting or Contracting			$ -			
Processing cost			$ -	Allowance		
Total Program Costs (20 years)			**$ 1,506,000**		$ 7,500	5-year cost
Estimated Water Savings						
Estimated annual water savings after 5th year			0	gallons per year		
Estimated water savings after 5th year			0	gpd		
Total water savings over life of program			0	gallons, over 20 year analysis		
Program Benefits						
Unit cost of savings (over 20 years)			#DIV/0!	$/1000 gallons saved		
Reduction in ADD after 5th year			0.00%	% of ADD		
Reduction in MDD after 5th year			0.00%	% of MDD		

Check

Dollar per person	$ 8.35
Scaling Factor	1
Annual Cost	$ 73,790
5-year Cost	$ 368,950
20-year Cost	$ 1,475,800

Administrative costs

Annual Marketing	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
0.2	Hours staff time per customer
35340	Hours staff time for total number of planned audits
35420	Total hours of staff time
4427.5	Total days of staff time

Spray Rinse Valve Distribution Program Evaluati **Background data**
Town of Purcellville

240	#	Number of commercial accounts
50%	#	Estimated percent of nonresidential accounts with spray rinse valves
120	#	Estimated number of spray rinse valves to be replaced
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Spray Rinse Valve

100.0	Typical Water Savings from measure, studies show 100 to 300 gal/day savings

Program Variables

25%	Estimated market penetration (% participating out of total potential)	
30	Number of Planned Installations	
20	Anticipated life span	
5	Number of year that program will run	
6	Number of units to be installed per year	5% per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.06	$ 80,000	$ 4,600	See summary, below
Cost of spray rinse valve		$ 100	$ 3,000	Typical valve cost between $75 and $125
Administration			$ 7,500	Allowance, see below
Consulting or Contracting			$ -	
Processing cost			$ -	Allowance
Total Program Costs (5 years)			**$ 16,000**	
Estimated Water Savings				
Estimated annual water savings after 5th year			1,100,000	gallons per year
Estimated water savings after 5th year			3,000	gpd
Total water savings over life of program			21,900,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.73	$/1000 gallons saved
Reduction in ADD after 5th year			0.41%	% of ADD
Reduction in MDD after 5th year			0.25%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 7,500	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per valve
30	Hours staff time for total number of planned replacements
110	Total hours of staff time
13.8	Total days of staff time

Rain Sensor Requirement Program Evaluation
Town of Purcellville

Background data

150	#	Estimated annual number of new accounts
50%	#	Estimated percent of new accounts with irrigation systems
75	#	Estimated annual number of new irrigation systems
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Sensor

10	Typical Water Savings from measure: can skip 2-3 irrigation cycles per month at 200 gallons per cycle, 6 months/year

Program Variables

100%	Estimated percent of participants
1500	Number of Planned Installations
20	Anticipated life span in years
20	Number of year that program will run
75	Number of units to be installed per year

Item		Unit Cost	Totals		
Cost over the life of the program					
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance	
Labor (FTE)	0.82	$ 80,000	$ 65,800	See summary, below	
Rebate amount per washer			$ -		
Administration			$ 30,000	Allowance, see below	
Consulting or Contracting			$ -		
Processing cost per rebate			$ -	Allowance	
Total Program Costs (20 years)			**$ 97,000**	$ 8,500	5-year cost
Estimated Water Savings					
Estimated annual water savings after 5th year			1,350,000	gallons per year	
Estimated water savings after 5th year			3,700	gpd	
Total water savings over life of program			108,000,000	gallons, over 20 year analysis	
Program Benefits					
Unit cost of savings (over 20 years)			$0.90	$/1000 gallons saved	
Reduction in ADD after 5th year			0.51%	% of ADD	
Reduction in MDD after 5th year			0.31%	% of MDD	

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per system
1500	Hours staff time for total number of planned replacements
1580	Total hours of staff time
197.5	Total days of staff time

Efficient Commercial Equipment Requirement Pr **Background data**
Town of Purcellville

25	#	Estimated annual number of new nonresidentail accounts
75%	#	Estimated percent of new accounts with commercial equipment
19	#	Estimated annual number of new irrigation systems
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Account Equipment

250	gpd	Typical Water Savings include equipment such as icemakers, cooling towers, dishwashers, clothes washers, etc.

Program Variables

100%	Estimated percent of participants
375	Number of Planned Installations
20	Anticipated life span in years
20	Number of year that program will run
19	Number of units to be installed per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	0.82	$ 80,000	$ 65,800	See summary, below
Rebate amount per washer			$ -	
Administration			$ 30,000	Allowance, see below
Consulting or Contracting			$ -	
Processing cost per rebate			$ -	Allowance
Total Program Costs (20 years)			**$ 97,000**	$ 8,500 5-year cost
Estimated Water Savings				
Estimated annual water savings after 5th year			8,540,000	gallons per year
Estimated water savings after 5th year			23,400	gpd
Total water savings over life of program			684,380,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.14	$/1000 gallons saved
Reduction in ADD after 5th year			3.21%	% of ADD
Reduction in MDD after 5th year			1.97%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
4	Hours staff time per system
1500	Hours staff time for total number of planned replacements
1580	Total hours of staff time
197.5	Total days of staff time

Efficient Urinal Requirement Program Evaluation **Background data**
Town of Purcellville

25	#	Estimated annual number of new nonresidentail accounts
4	#	Estimated number of urinals per nonresidential account
100	#	Estimated annual number of new urinals
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Account Equipment

10	gpd	Typical Water Savings include equipment such as icemakers, cooling towers, dishwashers, clothes washers, etc.

Program Variables

100%	Estimated percent of participants
2000	Number of Planned Installations
20	Anticipated life span in years
20	Number of year that program will run
100	Number of units to be installed per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	1.08	$ 80,000	$ 86,700	See summary, below
Rebate amount per washer			$ -	
Administration			$ 30,000	Allowance, see below
Consulting or Contracting			$ -	
Processing cost per rebate			$ -	Allowance
Total Program Costs (20 years)			**$ 118,000**	$ 8,500 5-year cost
Estimated Water Savings				
Estimated annual water savings after 5th year			1,830,000	gallons per year
Estimated water savings after 5th year			5,000	gpd
Total water savings over life of program			146,000,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.81	$/1000 gallons saved
Reduction in ADD after 5th year			0.69%	% of ADD
Reduction in MDD after 5th year			0.42%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per system
2000	Hours staff time for total number of planned replacements
2080	Total hours of staff time
260.0	Total days of staff time

Commercial Submetering Requirement Program **Background data**
Town of Purcellville

25	#	Estimated annual number of new nonresidentail accounts
4	#	Estimated average number of subunits per nonresidential account
100	#	Estimated annual number of new submetered accounts
0.729	mgd	Average day demand (ADD) for 2012 (5th year of program)
1.189	mgd	Maximum day demand (MDD) for 2012 (5th year of program)

Unit Savings per Account Equipment

15	gpd	Typical Water Savings, 10-20 gal/day

Program Variables

100%	Estimated percent of participants
2000	Number of Planned Installations
20	Anticipated life span in years
20	Number of year that program will run
100	Number of units to be installed per year

Item		Unit Cost	Totals	
Cost over the life of the program				
Marketing and advertising (posters, etc)		$ -	$ 1,000	Allowance
Labor (FTE)	1.08	$ 80,000	$ 86,700	See summary, below
Rebate amount per washer			$ -	
Administration			$ 30,000	Allowance, see below
Consulting or Contracting			$ -	
Processing cost per rebate			$ -	Allowance
Total Program Costs (20 years)			**$ 118,000**	$ 8,500 5-year cost
Estimated Water Savings				
Estimated annual water savings after 5th year			2,740,000	gallons per year
Estimated water savings after 5th year			7,500	gpd
Total water savings over life of program			219,000,000	gallons, over 20 year analysis
Program Benefits				
Unit cost of savings (over 20 years)			$0.54	$/1000 gallons saved
Reduction in ADD after 5th year			1.03%	% of ADD
Reduction in MDD after 5th year			0.63%	% of MDD

Administrative costs

Evaluating Results	$ 1,000	Track savings (annual cost)
Train Employees	$ 500	Employee training/meetings (annual cost)
Total annual admin cost	$ 1,500	
Total admin cost over life of program	$ 30,000	

Labor Estimation Background

40	Hours staff time to set up program (funding, rules, procedures)
40	Hours staff time to advertise program
1	Hours staff time per system
2000	Hours staff time for total number of planned replacements
2080	Total hours of staff time
260.0	Total days of staff time

Appendix C
Sample Ordinances for Plumbing Requirements

Article 7: Plumbing and Mechanical Regulations

Division 4: Other Water-Conserving Plumbing Standards

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0401 Purpose of Water-Conserving Plumbing Standards

The purpose of this division is to reduce sewer flows and decrease the use of imported, potable water in the City by establishing water-conserving plumbing standards for plumbing fixtures.
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0402 When the Water-Conserving Plumbing Standards Apply

The provisions of this division apply to the installation of water-conserving plumbing fixtures in any structure served by the City of San Diego Water Utilities Department.
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0403 Definitions for this Division

The following definitions are applicable to this division.

Bathroom Alteration mean any alteration of or addition to a bathroom in any structure for which Section 129.0402 would require a plumbing permit for replacement of a toilet.

Bathroom Alteration Retrofit Certificate means a certificate that certifies that any responsible person who has completed a bathroom alteration has replaced any existing plumbing fixture in the altered bathroom with a water-conserving plumbing fixture.

Change of Ownership means a transfer, sale, or exchange of the fee interest in any real property.

Existing Plumbing Fixture means the following:

(1) any toilet manufactured to use more than 3.5 gallons of water per flush;

(2) any urinal manufactured to use more than one gallon of water per flush;

(3) any showerhead manufactured to have a flow capacity of more than 2.5 gallons of water per minute;

(4) any faucet that emits more than 2.2 gallons of water per minute; or

(5) any residential reverse osmosis system that does not have a shutoff valve.

Existing Structure means either of the following:

(1) any structure served by the City of San Diego Water Utilities Department and equipped with toilets manufactured to use more than 3.5 gallons of water per flush, or urinals manufactured to use more than 1 gallon of water per flush; or

(2) any structure served by the City of San Diego Water Utilities Department and equipped with showerheads that have a flow capacity of more than 2.5 gallons of water per minute, faucets that emit more than 2.2 gallons of water per minute, or residential reverse osmosis systems that do not have a shutoff valves.

Retrofit means to replace any existing plumbing fixture in an exiting structure with a water-conserving plumbing fixture.

Transfer of Responsibility to Retrofit Certificate means a certificate filed by a transferor of any existing structure before a change of ownership that certifies that the transferor and the transferee mutually agree that responsibility for compliance with Section 147.0301 is assumed by the transferee of the existing structure.

Ultra-Low Flush Toilet Rebate Program means a City-sponsored water conservation program that offers a financial incentive to water customers who replace a toilet that is manufactured to use more than 1.6 gallons of water per flush with a toilet manufactured to use no more than 1.6 gallons of water per flush.

Water Conservation Certificate means a certificate filed by a transferor or transferee of any structure or existing structure before a change of ownership that certifies any structure or existing structure is equipped or retrofitted only with water-conserving plumbing fixtures or toilets manufactured to use no more than 3.5 gallons of water per flush.

Water-Conserving Plumbing Fixture means:

(1) any toilet manufactured to use no more than 1.6 gallons of water per flush, that meets performance standards established by American

Society of Mechanical Engineers Standards A112.19.2-1990 and A112.19.6-1990;

(2) any urinal manufactured to use no more than 1 gallon of water per flush, that meets performance standards established by American Society of Mechanical Engineers Standards A112.19.2-1990 and A112.19.6-1990;

(3) any showerhead manufactured to have a flow capacity of no more than 2.5 gallons of water per minute;

(4) any faucet that emits no more than 2.2 gallons of water per minute; or

(5) any residential reverse osmosis system that has a shutoff valve.

(Amended 9-24-2002 by O-19105 N.S.)

§147.0404 Regulations to Retrofit upon Change of Ownership

(a) Before a change of ownership, the transferor of any existing structure shall replace any existing plumbing fixture with a water-conserving plumbing fixture.

(b) Before a change of ownership, the transferor and the transferee of any existing structure may agree to transfer responsibility for compliance with this division to the transferee in accordance with Section 147.0408. If the transferee assumes responsibility for retrofitting, the transferee shall complete the retrofit within at least 90 calendar days of the change of ownership.

(c) The transferor and the transferee of any existing structure may agree to have compliance with this division included as a condition of escrow, have the responsibility for retrofitting assumed by the transferee, and have the retrofit paid for from the proceeds of the sale of the existing structure.

(1) If the transferor and the transferee agree to have compliance with this division included as a condition of escrow, the escrow agent shall retain a sufficient sum of money, agreed upon by the transferor and the transferee, to be retained from the proceeds of the sale to complete the retrofit.

(2) The transferee shall complete the retrofit within at least 90 calendar days of the close of escrow.

(3) After the transferee has completed the retrofit, the transferee shall submit proof of completion of the retrofit to the escrow agent. The escrow agent may release the retained funds from the proceeds of the sale upon receiving reasonable, satisfactory proof of completion of the retrofit from the transferee.

(4) The Building Official shall establish administrative regulations for the procedures to be followed by the transferor, the transferee, and the escrow agent for complying with Section 147.0404(c).

(d) The transferor of any existing structure shall not be required to retrofit when a change of ownership occurs as a result of the following:

(1) A court order, including an order by a probate court in the administration of an estate;

(2) A foreclosure or voluntary or involuntary bankruptcy;

(3) The exercise of eminent domain;

(4) The administration of a deceased person's estate, guardianship, conservatorship, or trust;

(5) One title co-holder of real property transferring, selling, or exchanging with one or more other title co- holders;

(6) A transfer, without consideration, from one family member to another family member; or

(7) A decree of dissolution of marriage, a decree of legal separation, or from a property settlement agreement incidental to such a decree.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0405 Retrofit upon Bathroom Alteration

Upon bathroom alteration, the responsible person shall replace any existing plumbing fixture in the bathroom being altered with a water-conserving plumbing fixture.
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0406 Retrofit Exemptions

The Building Official may grant an exemption to the provisions of this division to any person if the Building Official determines that any of the following conditions exists:

(a) A water-conserving plumbing fixture would be installed in an existing structure that has been identified by a local, state, or federal government entity as an historical site, and an historically accurate water-conserving plumbing fixture is not available;

(b) Installation of a water-conserving plumbing fixture would require modifications to plumbing system components located beneath a finished wall or surface; or

(c) The unique configuration of a building drainage system or portions of a public sewer, or both, require a greater quantity of water to flush the system in a manner consistent with public health.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0407 When a Plumbing Permit Is Required for Water-conserving Plumbing Fixture Installation

Any person who installs a water-conserving plumbing fixture pursuant to Section 147.0404 in any single dwelling unit, or in any multiple dwelling unit with 8 or fewer units, shall not be required to obtain a plumbing permit pursuant to Section 129.0402, unless the installation requires an alteration or replacement of drainage, waste, vent, or supply-plumbing pipes.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0408 Self-verification

(a) Before a change of ownership, the transferor and the transferee of any structure or any existing structure shall complete the following procedures:

(1) The transferor shall sign a Water Conservation Certificate certifying that the transferor has complied with the requirements of this division or is exempt from retrofitting pursuant to Section 147.0406.

(2) After signing the Water Conservation Certificate, the transferor shall forward the Water Conservation Certificate to the transferee for review and signature.

(3) The transferee shall sign the Water Conservation Certificate, thereby acknowledging awareness and understanding of the requirements of this division.

(4) After the transferee has signed the Water Conservation Certificate, the transferor shall file the Water Conservation Certificate with the Building Official.

(5) If the structure or existing structure goes through escrow, the transferor also shall file a copy of the Water Conservation Certificate with the escrow agent before the close of escrow.

(b) In the event the transferor and transferee of an existing structure agree that the transferee shall have responsibility for the retrofit upon change of ownership pursuant to Section 147.0404(b), before the change of ownership, the transferor and the transferee shall complete the following procedures:

(1) The transferor and the transferee shall sign a Transfer of Responsibility to Retrofit Certificate certifying that the transferee has assumed responsibility for the retrofit.

(2) After the transferor and the transferee have signed the Transfer of Responsibility to Retrofit Certificate, the transferor shall file the Transfer of Responsibility to Retrofit Certificate with the Building Official.

(3) If the existing structure goes through escrow, the transferor also shall file a copy of the Transfer of Responsibility to Retrofit Certificate with the escrow agent before the close of escrow.

(4) Upon completing the retrofit, the transferee shall sign a Water Conservation Certificate certifying that the transferee has complied with the requirements of this division.

(5) Within at least 30 calendar days of the completion of the retrofit, the transferee shall file the signed Water Conservation Certificate with the Building Official.

(c) If the transferor and the transferee have agreed to have compliance with this division included as a condition of escrow, have the responsibility for retrofitting assumed by the transferee, and have the retrofit paid for from the

proceeds of the sale of the existing structure pursuant to Section 147.0404(c), the transferor and the transferee shall complete the following procedures:

(1) The transferor and the transferee shall sign a Transfer of Responsibility to Retrofit Certificate certifying that the transferee has assumed responsibility for the retrofit.

(2) After the transferor and the transferee have signed the Transfer of Responsibility to Retrofit Certificate, and before the close of escrow, the transferor shall file the Transfer of Responsibility to Retrofit Certificate with the Building Official and a copy thereof with the escrow agent.

(3) Upon completing the retrofit, the transferee shall sign a Water Conservation Certificate certifying that the transferee has complied with the requirements of this division.

(4) Within at least 30 calendar days of the completion of the retrofit, the transferee, or the escrow agent on the transferee's behalf, shall file the signed Water Conservation Certificate with the Building Official.

(d) The transferor of any structure that is in compliance with the requirements of this division shall not be required to file a Water Conservation Certificate with the Building Official before a change of ownership pursuant to Section 147.0408 if a Water Conservation Certificate has been filed with the Building Official by a previous owner of the structure.

(e) Upon completing the retrofit of a bathroom pursuant to Section 147.0405, the responsible person shall complete the following procedures:

(1) The responsible person shall sign a Bathroom Alteration Retrofit Certificate certifying that the responsible person has complied with the requirements of Section 145.0405.

(2) Within at least 30 calendar days following completion of any bathroom alteration, the responsible person shall file the signed Bathroom Alteration Retrofit Certificate with the Building Official.

(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

§147.0409 Agents of a Transferor

Nothing in this division is intended to create any duty upon the agent of a transferor or a transferee of any structure or any existing structure, unless otherwise mutually agreed to in writing.
(Added 12-9-1997 by O-18451 N.S.; effective 1-1-2000.)

February 5, 2008

AN ORDINANCE

AN ORDINANCE TO AMEND THE CODE OF DEKALB COUNTY, GEORGIA, CHAPTER 25 PERTAINING TO INEFFICIENT PLUMBING FIXTURES REPLACEMENT PLAN AND FOR OTHER PURPOSES.

The DeKalb County Governing Authority makes and adopts the following findings and conclusions in the adoption and approval of this ordinance:

WHEREAS, the Governing Authority of DeKalb County is authorized to adopt such ordinances or regulations for the governing and policing of the county for the purpose of protecting and preserving the health, safety, and welfare of the citizens of the county; and

WHEREAS, Article 9, Section 2, Paragraph 3(a) (7) of the Georgia Constitution gives the Governing Authority the authority to provide for distribution of water to its citizens and the Governing Authority believes that enactment of this Inefficient Plumbing Fixtures Replacement Plan will help to ensure that its citizens are provided with a continuous supply of potable water for domestic service and fire protection; and

WHEREAS, the Water Supply and Conservation Management Plan adopted by the Georgia General Assembly in 2003 requires the Governing Authority to speed up the conversion of older, inefficient plumbing fixtures to current lower flow models; and

WHEREAS, the water resources in the Metropolitan North Georgia Water Planning District and DeKalb County continue to diminish and the Governing Authority must take reasonable and effective measures to conserve DeKalb County's water resources; and

WHEREAS, water conservation is not only essential to meeting DeKalb County's water demands, it is also a cost-effective way to assure sufficient water supplies for DeKalb County's residents; and

WHEREAS, the drought in the State of Georgia and in DeKalb County has reached epic proportions and the Governing Authority must take reasonable and effective measures to protect DeKalb County's water supply to its residents; and

WHEREAS, the availability of sufficient water is a fundamental necessity and a serious public health issue, thus it is the obligation of the Governing Authority to take the necessary steps to ensure that potable water remains available to its citizenry now and in future years; and

WHEREAS, buildings and homes constructed in DeKalb County after January 1, 1993 are required to be built with water conserving plumbing fixtures like ultra low flow toilets that use a maximum of 1.6 gallons per flush and showerheads that emit a maximum of 2.0 gallons per minute. Buildings and homes constructed prior to 1993 do not necessarily contain these water conserving plumbing fixtures and therefore vitally needed water is being wasted by the use of outdated plumbing fixtures that do not conserve this precious natural resource; and

WHEREAS, water resources may continue to decrease and droughts may continue to occur and the availability of a continuous adequate supply of water for domestic service and fire protection will be a serious issue in the coming years. The requirements set forth in this Inefficient Plumbing Fixtures Replacement Plan will conserve desperately needed water resources so that the citizens of DeKalb County continue to have adequate water for their use.

NOW THEREFORE, BE IT ORDAINED BY THE GOVERNING AUTHORITY OF DEKALB COUNTY, GEORGIA, AND IT IS HEREBY ORDAINED BY THE AUTHORITY OF SAME, that Chapter 25 of the Code of DeKalb County, Georgia, is hereby amended to read as follows:

PART I. ENACTMENT

Chapter 25, Article II, of the Code of DeKalb County, Georgia, is hereby amended by amending Sections 25-45 through Section 25-60 as follows:

Sec. 25-45. Inefficient Plumbing Fixtures Replacement Plan.

Section 25-45 through Section 25-49 shall be known as the "DeKalb County Inefficient Plumbing Fixtures Replacement Plan".

Sec. 25-46. Definitions.

For the purposes of sections 25-45 through 25-49, certain terms and words are hereby defined. Where words are not herein defined, but are defined in section 1-2, those words shall have the meaning as defined therein. Unless otherwise defined herein, words related to construction shall be as defined in this code and in the latest adopted applicable editions of the Georgia codes applicable to building construction adopted pursuant to state law. The following words, terms and phrases, when used in sections 25-45 through 25-49, shall have the meanings ascribed to them in this section, except where the context clearly indicates a different meaning:

Apartment means one or more rooms intended for occupancy as a separate living quarter with cooking, sleeping and bathroom facilities provided within the dwelling where the occupants have no ownership interest in the dwelling but rather occupy the dwelling as tenants paying rental payments to a landlord.

Architectural or Historic Restrictions means a building or structure that has been identified by this code, or a state or federal government entity as a historic site or is one hundred (100) years or older and has special historic or esthetic interest or value.

Certificate of Compliance means a written form in which a home inspector, Department of Watershed Management inspector, or a licensed plumber pursuant to the laws of the State of Georgia asserts under penalty of perjury, that all structures on the property only contain water conserving plumbing fixtures and that all other kinds of plumbing fixtures have been removed from all structures on the property.

Commercial Qualifying Property means all land except residential qualifying property in unincorporated DeKalb County containing a structure(s) constructed prior to 1993, including apartments.

Extreme Economic Hardship means a cost to comply with the requirements of this ordinance that exceeds one thousand (1000) dollars per toilet in a single family residential building or two thousand (2000) dollars per toilet for a commercial building.

Residential Qualifying Property means any land in unincorporated DeKalb County containing a structure(s) constructed prior to 1993 that is an attached or detached single family dwelling or

dwelling unit as those terms are defined by section 27-31. Residential qualifying property does not include apartments as that term is defined in this section..

Qualifying Property means any land in unincorporated DeKalb County containing a structure(s) constructed prior to 1993 and includes commercial and residential qualifying property.

Water Conserving Plumbing Fixtures means ultra low-flow toilets (ULFTs) that use a maximum of 1.6 gallons per flush; urinals that use a maximum of 1.0 gallon per flush; showerheads that emit a maximum of 2.5 gallons per minute; lavatory faucets that emit a maximum of 2.0 gallons per minute; kitchen faucets that emit a maximum of 2.2 gallons per minute.

Sec. 25-47. Purpose, Scope, and Policy.

(a) The County is authorized to adopt ordinances for the purpose of protecting and preserving the health, safety, and welfare of the citizens of the County.

(b) Article 9, Section 2, Paragraph 3(a)(7) of the Georgia Constitution gives the County the authority to provide for distribution of water to its citizens and the governing authority believes that enactment of this Inefficient Plumbing Fixtures Replacement Plan will help to ensure that its citizens are provided with a continuous supply of potable water for domestic service and fire protection.

(c) The drought in the State of Georgia and in DeKalb County has reached epic proportions and this Inefficient Plumbing Fixtures Replacement Plan designed to ensure that the County takes reasonable and effective measures to protect DeKalb County's water supply to its residents.

(d) The availability of sufficient water is a fundamental necessity and a serious public health issue and this Inefficient Plumbing Fixtures Replacement Plan designed to provide beneficial public regulations to ensure that potable water remains available to the citizens of DeKalb County now and in future years.

(e) Buildings and homes constructed in DeKalb County after January 1, 1993 are required to be built with water conserving plumbing fixtures like ultra low flow toilets that use a maximum of 1.6 gallons per flush and showerheads that emit a maximum of 2.0 gallons per minute. Buildings and homes constructed prior to 1993 do not necessarily contain these water conserving plumbing fixtures and therefore the continued use of these outdated plumbing fixtures contravenes the Governing Authority of DeKalb County's obligation to protect DeKalb County's water supply to its residents; and

(f) Droughts may very well continue to occur and the availability of an adequate supply of water for domestic service and fire protection will be a serious issue in the coming years.

(g) The requirements set forth in this Inefficient Plumbing Fixtures Replacement Plan will conserve desperately needed water resources so that the citizens of DeKalb County continue to have adequate water for their use.

Sec. 25-48. Inefficient Plumbing Fixtures Replacement Plan Requirements.

(a) *Disclosure requirements.* Any person selling qualifying property after the applicable effective date of this ordinance shall disclose the requirements of this ordinance to. potential purchasers prior to the execution of any contract to purchase and sell such property.

(b) *Forms.* The chief executive officer or designee shall promulgate all forms and administrative processes required by the enactment of the DeKalb County Inefficient Plumbing Fixtures Replacement Plan.

(c) *Purchaser's Responsibility.* No person who purchases qualifying property after the applicable effective date of this ordinance shall be allowed to obtain water service from DeKalb County until such time as that person has attached a certificate of compliance to the application for water service.

(d) *Effective date.* This ordinance shall become effective for sales of residential qualifying property on June 1, 2008 and shall become effective for sales of commercial qualifying property on January 1, 2009.

(e) *Exemptions.* The following transactions or types of real property are exempt from compliance with the requirements set forth in sections 25-45 through 25-49:

(1) Any real property in unincorporated DeKalb County containing a structure that was constructed after January 1, 1993;

(2) Any real property that is being advertised for foreclosure; or

(3) Any qualifying property that will not be inhabited but instead will be demolished after sale provided that prior to demolition the purchaser shall not be allowed to obtain water service for the qualifying property unless such water service is solely for demolition or construction related purposes;

(4) Any qualifying property that is sold or conveyed between spouses, or between parents and their children, including conveyances during the administration of the estate of such spouse, parent or child; or

(5) Any qualifying property that, because of its architectural or historic restrictions, plumbing configurations, and/or drainage system configurations, would cause the owner to suffer extreme economic hardship.

(f) *Duty.* Nothing in this ordinance is intended to or shall be construed to create any duty upon the agent of any transferee of any qualifying property; unless otherwise mutually agreed to in writing.

Sec. 25-49. Criminal Penalties.

(a) Any person who does anything prohibited or fails to do anything required by the DeKalb County Inefficient Plumbing Fixtures Replacement Plan set forth in sections 25-45 through 25-49, upon citation and conviction of the violation in a court of competent jurisdiction, shall be subject to the penalties in accordance with section 1-10.

(b) Upon a second and subsequent conviction within a twelve (12) month period measured from the date of the first conviction of any violation of the DeKalb County Inefficient Plumbing Fixtures Replacement Plan set forth in sections 25-45 through 25-49, the court shall impose a fine of not less than two hundred and fifty (250.00) dollars in addition to any other penalty or punishment imposed by the court.

(c) Upon a third and subsequent conviction within a twelve (12) month period measured from the date of the first conviction of any violation of the DeKalb County Inefficient Plumbing Fixtures Replacement Plan set forth in sections 25-45 through 25-49, the court shall impose a fine of not less than five hundred (500.00) dollars in addition to any other penalty or punishment imposed by the court.

(d) The penalties provided in this section are not cumulative and shall not prohibit DeKalb County from pursuing any other civil or criminal remedies authorized by this code, state, or federal law.

Sec. 25-50 – 25-60. Reserved.

PART II. EFFECTIVE DATE

This ordinance shall become effective as set forth in section 25-48 after adoption by the Board of Commissioners and approval by the Chief Executive Officer.

PART III. SEVERABILITY

Should any section or provision of this ordinance be declared by a court of competent jurisdiction to be invalid or unconstitutional, such decision shall not affect the validity of the ordinance as a whole nor any part thereof other than the part so declared to be invalid or unconstitutional. All ordinances or resolutions, or parts thereof, in conflict with this ordinance are repealed.

ADOPTED by the DeKalb County Board of Commissioners, this _____ day of _____, 2008.

KATHIE GANNON
Presiding Officer
Board of Commissioners
DeKalb County, Georgia

APPROVED by the Chief Executive Officer of DeKalb County, this _____ day of _____, 2008.

VERNON JONES
Chief Executive Officer
DeKalb County, Georgia

ATTEST:

Michael J. Bell
Ex-Officio Clerk

APPROVED AS TO FORM:

William J. Linkous III
County Attorney

APPROVED AS TO SUBSTANCE:

Francis T. Kung'u
Director of Watershed Management

MARINA COAST WATER DISTRICT

ORDINANCE NO. 40

AN ORDINANCE AMENDING CHAPTER 3.36
OF THE
DISTRICT CODE
Be it ordained by the Board of Directors of
Marina Coast Water District
as follows:

Section 1. Authority. This ordinance is enacted pursuant to Sections 375, 375.5 and 30000 and following of the California Water Code.

Section 2. Findings.

A. This ordinance is considered for action by the Board of Directors at a regularly scheduled and noticed meeting. The agenda was posted in accordance with County Water District law with opportunity for public review in advance of the meeting and public comment during consideration of the ordinance by the Board. The District has followed the procedures for notice, public participation and adoption set forth in Section 375 of the California Water Code.

B. The protection, conservation, and replenishment of the underground water supplies is one of the main functions of a County Water District. (Atchinson Etc. Ry Co. V. Kings Co. Water District, (1956) 47 Cal. 2d 140, 146). The District has the power to perform all acts necessary to carry out fully the provision of the County Water District Law (Water Code 31001), may establish rules and regulations for the distribution and use of water (Water Code 31024), may undertake a water conservation program to reduce water use (Water Code 31035), and may commence and maintain actions and proceedings to prevent interference with or diminution of any natural subterranean supply of water which may (a) be used or useful for any purpose of the District, (b) be of common benefit to the land or its inhabitants, or (c) endanger the inhabitants or land (Water Code 31082).

Wasteful water use practices in the area served by the District constitute a potential threat to, and an unacceptable diminution of the District's underground water supplies. The prevention of water waste is an economically and environmentally feasible way to protect, conserve and prevent unacceptable diminution of the District's underground water supplies.

D. Contamination, seawater intrusion, or failure of the water system infrastructure may lead to a potable water shortage emergency in the District's groundwater supplies.

E Based upon the above findings, the District legal counsel advises, and the Board finds, that actions taken pursuant to this ordinance are categorically exempt from CEQA according to 14 California Code of Regulations 15301 and 15307.

Section 3. Purpose Of Ordinance. The purpose of this ordinance is to amend the District Code, Chapter 3.36 to include water conservation requirements for New Construction and provide a revised Water Shortage Contingency Plan.

Section 4. General Provisions. Chapter 3.36 of the District Code is hereby amended as follows:

(i)Chapter 3.36

WATER CONSERVATION

Sections:

3.36.010 Purpose.

The purpose of this chapter is to establish standards and procedures for water conservation, to reduce or eliminate the waste of water in the District, and enable implementation of the District's Water Shortage Contingency Plan. (Amended during 3.02 supplement: Ord. 25 § 3, 1993; Resolution No. 2005-40 amended the WSC Plan.)

3.36.020 Application.

A. This chapter shall apply within the District, and compliance with the provisions of this chapter shall be a condition of water service within the District and in all areas outside the District to which the District provides water service.

B. The District shall work cooperatively with the Fort Ord Reuse Authority and other land use jurisdictions within the Ord Community Service area including the Cities of Seaside, Del Rey Oaks, Marina, and Monterey; and UCMBEST; CSUMB; US Army; and the County of Monterey to facilitate the adoption of ordinances and regulations to conserve water, including inspection of installations made pursuant to this chapter. (Ord. 25 § 5, 1993)

C All references to *Standard Specifications* contained in this chapter shall refer to the latest versions of the District *Standard Plans And Specifications For Construction Of Domestic Water, Sewer, And Recycled Water Facilities* and *Procedures, Guidelines And Design Requirements.*

3.36.030 Mandatory restrictions on water waste.

A. Repair of Plumbing, Sprinkler and Irrigation System. Any owner, manager, or person responsible for the day-to-day operation of any premises shall within seventy-two (72) hours after such person first learns of such leaks, breaks, or defects, initiate steps to repair any leaking,

broken or defective water pipes, faucets, plumbing fixtures, other water service appliances, sprinklers, watering or irrigation systems, or distribution systems which cause or may cause water waste and shall thereafter diligently and promptly pursue such repair work to completion, unless a variance is obtained from the District.

B. Watering/Irrigation.

1. No person shall water grass, lawns, groundcover, shrubbery, and open ground between the hours of 10 AM and 5 PM except as provided below:

a. Persons may water between the hours of 10 AM and 5 PM using any of the following three methods:

i. Drip irrigation;
ii. By hand, using a bucket; and/or
iii. By hand, using a hose with an automatic shutoff nozzle.

b. The General Manager may grant an administrative variance for methods other than those included in "a" above if:

i. The person requesting the variance is now using, or will use as a condition to the granting of the variance, water-conserving irrigation practices approved by the General Manager that minimize water evaporation losses, and that assure that no substantial amount of water is permitted to run off the area of application. Recycled Water use shall be in accordance with *Chapter 4.28 Recycled Water*.

ii. As a condition of granting a variance, the General Manager may require the water user to post, at locations conspicuous to view, notices of the variance.

c. In lieu of granting a variance, the General Manager may, at his/her discretion, refer a variance request directly to the Board for its decision.

2. No person shall allow grass, lawns, groundcover, shrubbery, and open ground to be watered at any time while it is raining.

3. No person shall use, suffer, or permit the use of water for agricultural irrigation in a manner or to an extent which substantially conflicts with or deviates from best management practices in the County of Monterey or which allows water to run to waste.

C. Washing of Vehicles. No person shall use a water hose to wash any car, truck, boat, trailer, bus, recreational vehicle, camper, aircraft, tractor, or any other vehicle, or any portion thereof, unless the hose is equipped with an automatic shutoff nozzle.

D. Cleaning of Structures. No person shall use water through a hose to clean the exterior of any building or structure unless such hose is equipped with a shutoff nozzle.

E. Cleaning of Surfaces. No person shall use water through a hose to clean any sidewalk, driveway, roadway, parking lot, or any other outdoor paved or hard surfaced area, except where necessary to protect public health or safety. The use of water from a bucket for cleaning food, grease, oil, or other stains or spillage from surfaces is permissible.

F. Water Spillage. No person shall cause, suffer, or permit water to spill into streets, curbs, or gutters. No person shall use any water in any manner that results in runoff beyond the immediate area of use. Every person is deemed to have under his/her control at all times his/her water distribution lines and facilities, and to know the manner and extent of his/her water use and excess runoff.

G. Swimming Pools and Spas. No person shall empty and refill a swimming pool or spa except to prevent or repair structural damage or to comply with public health regulations. All pools and spas shall be covered to prevent evaporative losses when not in use.

H. Fountains. No person shall use water to operate or maintain levels in decorative fountains, unless such water is recirculated in the fountain.

I. Visitor-Serving Facilities. The owner and manager of each hotel, motel, restaurant, convention and other visitor-serving facility shall ensure that such facility displays, in places visible to all customers, placards or decals approved by the District, promoting public awareness of the need for water conservation and/or advising the public that waste of water is prohibited.

J. Public And Quasi-Public Entities. All public and quasi-public entities shall display, in visible locations in all restrooms, kitchens, and dining areas, placards or decals approved by the District, promoting public awareness of the need for water conservation and/or advising the public that waste of water is prohibited. Placement of placards or decals by a quasi-public entity of a type not specifically mentioned in this chapter shall not be required unless the General Manager gives written notice to the entity that this chapter is applicable to the entity so notified and that placement of placards or decals is required.

K. Restaurants. Restaurants in the District shall not serve water to restaurant customers, except upon request of the customer.

L. Commercial Car Washes. No person in charge of the operation of any commercial car wash facility shall suffer or permit the washing of any boat or vehicle in such facility or on its premises, other than by the following methods.

1. Use of mechanical automatic car wash facilities utilizing water recycling equipment;

2. Use of a hose that operates on a timer for limited time periods and shuts off automatically at the expiration of the time period;

3. Use of a hose equipped with an automatic shutoff nozzle; and/or

4. Use of bucket and hand washing.

M. Construction.

1. No potable water may be used for compacting or dust control purposes in construction activities where there is a reasonably available source of recycled or other non-potable water approved by the California State Department of Health Services and appropriate for such use.

2. All water hoses used in connection with any construction activities shall be equipped with an automatic shutoff nozzle when an automatic shutoff nozzle can be purchased or otherwise obtained for the size or type of hose in use.

N. Use of Hydrants. No person may tap into any fire hydrant for any purpose other than fire suppression or emergency aid, without first obtaining written approval from the District Engineer or his/her designee.

O. Agricultural Dust Control. No potable water may be used for dust control purposes in agricultural activities where there is a reasonably available source of recycled or other non-potable water appropriate for such use.. Recycled Water use shall be in accordance with *Chapter 4.28 Recycled Water*.

P. Maintenance/Training. No person shall use water for routine water system flushing for normal maintenance, routine sewer system flushing for normal maintenance, and/or fire personnel training except as approved in advance in writing by the General Manager, District Engineer, or his/her designee.

Q. Indiscriminate Use. No person shall cause, suffer, or permit the indiscriminate running of water not otherwise prohibited above which is wasteful and without reasonable purpose.

R. Public Health and Safety. These regulations shall not be construed to limit water use which is immediately necessary to protect public health or safety.

S. New Construction.

1. In all New Construction, the following applies:

a. Only High Efficiency Toilets (HET) that meet the District's *Standard Specifications* shall be installed. Dual flush toilets qualify as HET.

b. There shall be one control valve, or one set of hot and cold valves required for each Low Flow Showerhead which shall be defined to provide no more than 2.5 gallon per minute.

c. A Hot Water Recirculation System or Point-of-Use Hot Water Heater shall supply water to hot water fixtures further than ten linear feet of pipe away from the hot water heater.

d. All urinals installed will be Zero Water Use Urinals, in that they shall not use water to flush waste.

e. All residential units equipped with clothes washer connections shall have installed High Efficiency (HE) Clothes Washer(s) meeting District *Standard Specifications*.

2. All New Construction shall conform with District *Standard Specifications* for *Landscaping and Irrigation Systems* and the requirements of the State of California Model

Landscape Ordinance, Title 23, Division 2, California Code of Regulations Chapter 2.7 or applicable local ordinances superseding the state ordinance.

T. New Additions, Renovations, or Remodels. This sub-section includes but is not limited to projects in which the replacement or addition of plumbing-fixtures is included.

1. All new additions, renovations, or remodels that involve any plumbing fixture additions and require District review and approval must install:

a. Ultra Low Flow Toilets (ULFT), High Efficiency Toilets (HET), or zero water use urinals (in place of water use urinals); and,

b. Low Flow Showerheads with a maximum flow capacity of 2.5 gallons per minute; and,

c. New additions, renovations, or remodels must also include the retrofitting of all existing toilets and showerheads with low flow showerheads, ULFT's or HET's.

2. All renovations/remodels that do not require plan checks by the District, but do involve a change in a toilet must replace at least that toilet with an ULFT or a HET. All renovations/remodels that do not require plan checks by the District, but do involve the change of a showerhead must replace at least that showerhead with a Low Flow Showerhead.

U. Retrofitting Existing Hotels/Motels and Apartment Buildings. All existing hotels/motels, and apartment buildings shall, within six and twelve (12) months, respectively, following the effective date of the ordinance codified in this chapter, be retrofitted with Low Flow Showerheads.

V. Retrofitting Upon Change of Ownership or Use.

1. All existing residential structures shall, at the time of ownership change, be retrofitted, if not already so, with HET's or ULFT's with a maximum tank size, flush volume, or flush system volume of 1.6 gallons per flush. Low Flow Showerheads with a maximum flow capacity of 2.5 gallons per minute shall be installed.

2. All existing commercial and industrial structures shall, at the time of ownership change or change of use, be retrofitted, if not already so, with HET's or ULFT's with a maximum tank size, flush volume, or flush system of 1.6 gallons per flush. Low Flow Showerheads with a maximum flow capacity of 2.5 gallons per minute shall be installed. High Efficiency Clothes Washing Machines using a maximum of 8.5 gallons of water per cubic foot of laundry, shall also be installed. All urinals will be retrofitted to zero water use urinals.

W. Metering.

1. New Construction.

a. Newly constructed multifamily dwelling units, including condominiums, and detached units (carriages houses/granny units) will be metered individually as of the effective date of the ordinance codified in this chapter.

b. Newly constructed motel/hotel units of less than one thousand (1000) square feet will be exempt from the requirement to individually meter.

c. Newly constructed hotel/motel units greater than or equal to one thousand (1000) square feet shall be separately metered.

d. Newly constructed time-share units will be separately metered.

2. Conversion of Existing Structures. The following existing units shall be individually metered upon conversion:

a. Multifamily units converted into condominiums or timeshare units;

b. Motel/hotel units converted into multifamily units, time-share units or condominiums;

c. Time-share units converted into multifamily units, condominiums or motel/hotel units;

d. Condominium units converted into multifamily units, time-share units or motel/hotel units.

3. Other Multifamily Water Uses. All other uses within multifamily dwelling complexes, such as irrigation systems and laundry rooms, shall be metered separately, subject to the approval of the District Engineer or his/her designee.

4. Meter Location. Meters shall be located at the property boundary or the public utility easement. Exact meter locations are subject to District Engineer approval or his/her designee.

5. Meter Type and Size. The District shall approve the size and type of meters required. The Owner shall pay for the meters and construct their connections in accordance with the District's *Standard Specifications*. (Ord. 33 § (4)(B)—(F), 1998; Ord. 25 § 6, 1993)

3.36.035 Water Shortage Contingency Plan

The District maintains a Water Shortage Contingency Plan in conformance with the Water Code Section 10632. Provisions of that Plan will be enforced through this Chapter.

3.36.040 Enforcement and administration.

The General Manager and all officers and employees of the District, including all exofficio officers and employees, shall enforce all the provisions of this chapter. The General Manager shall implement and administer this chapter. The General Manager shall report to the Board of Directors all factors which affect the implementation of this chapter and shall maintain a separate

file of violations of this chapter and a file of any requests for variances from this chapter. (Ord. 25 § 7, 1993)

3.36.050 Violations and notices.

A. If any person fails or refuses to comply with this chapter, the General Manager or his/her agent shall provide that person with written notice of the violation and an opportunity to correct the noncompliance. The written notice shall:

1. Be posted or presented at the site of the noncompliance;

2. State the time, date, and place of violation;

3. State a general description of the violation;

4. State the means to correct the violation;

5. State a date by which correction is required; and,

6. State the possible consequences of failing to correct the violation.

7. A copy of the written notice shall be mailed to the address of the violation, to the party who is billed for the water, or to the Owner of the property, as appropriate.

B. Each person who receives a written notice of violation shall pay to the District an administrative fee of twenty-five dollars ($25.00) for the first notice and fifty dollars ($50.00) for each subsequent notice. To encourage cooperative water conservation, the General Manager may waive payment of the fee for the first or second notice.

C. If a person fails to correct the violation within the time specified in the written notice, the General Manager shall take one or more of the following actions:

1. Give the person one or more additional written notices of the violation;

2. Refuse to initiate water service to the site of the violation, if water service has not yet begun or has been discontinued;

3. Terminate water service to the site of the violation, in accordance with the District's ordinances and procedures for terminating water service;

4. Abate the violation as a nuisance in accordance with Section 3.36.060 of this chapter;

5. Impose a use fee of four (4) times the regular water rate for each unit (hcf) of water that the District estimates is wasted. (Ord. 25 § 8, 1993)

3.36.060 Nuisances, abatement, injunctive relief.

A. Any violation of this chapter is declared to be a public nuisance.

B. The District may summarily abate the public nuisance and the District's attorney may, upon order of the Board of Directors, bring civil suit or other action to enjoin or abate the nuisance.

C. In a civil proceeding brought to abate a nuisance or to obtain injunctive relief under this chapter, any person who creates or maintains a public nuisance in violation of this chapter shall be liable for the costs of abatement, including but not limited to the following:

1. Costs of investigation;

2. Costs of labor and parts to repair any affected water system or premises, to bring such water system or premises into compliance with this chapter, or to install facilities necessary to assure compliance with this chapter;

3. Court costs;

4. Attorneys fees and costs, including the fees and costs of experts employed by the attorney; and,

5. Costs of monitoring compliance.

D. If any person causes, suffers, or permits a public nuisance to continue after written notice is given to such person by the District directing such person to cease the nuisance, and such continuation goes beyond the time set for abatement in the notice, then such person shall be liable to the District for the following:

1. The costs of abatement set forth above;

2. Any other costs of enforcement imposed by the court; and

3. A civil penalty of fifty (50) percent of those costs (subsections (D)(1) and (2) of this section), payable to the District. (Ord. 25 § 9, 1993)

a. Effective Date. This Ordinance shall take effect 60 days following adoption,

b. Publication and Posting. Within 15 days after adoption, the District shall publish, in a newspaper published in Monterey County and circulated within the district, a summary of this ordinance with the names of those directors voting for and against adoption, and shall post in the district office a certified copy of the full text of this ordinance as adopted along with the names of those directors voting for and against adoption.

c. Notice of Exemption. The Secretary is authorized and directed to give due notice of exemption of this ordinance from the provisions of CEQA, pursuant to Title 14, California Code of Regulations, section 15062.

d. Existing Charges. Existing fees and charges in effect when this ordinance is adopted shall remain in effect unless specifically changed by this ordinance.

e. Severability. If any section, subsection, sentence, clause, or phrase of this ordinance is for any reason held to be unconstitutional or invalid, or superseded by some other provision of law, such provisions shall be severed from and shall not affect the validity of the remaining provisions of this ordinance. The Board hereby declares that it would have passed this ordinance and each section, subsection, sentence, clause, or phrase thereof irrespective of the fact that any other part thereof be unconstitutional or invalid, or superseded by some other provision of law. The parts of this ordinance which are not unconstitutional, invalid, or superseded shall remain in full force and effect and shall be enforced according to their terms.

f. Interpretation. Words and Phrases used in this ordinance shall be read conjunctively with and shall have the same meaning as in prior District ordinances and the District Code, unless specifically changed by this ordinance or unless the context requires some other construction. If there is any inconsistency between this ordinance and prior provisions, this ordinance shall control.

On motion of Director Scholl, seconded by Director Gustafson; the foregoing Ordinance is enacted and shall take effect upon adoption by the following roll call of the Board:

Ayes: Scholl, Brown, Gustafson, Moore, Nishi

Nays: None

Absent: None

Abstained: None

By *Thomas P. Moore*
Thomas P. Moore, President

ATTEST:

Michael D. Armstrong
Michael D. Armstrong, Secretary

CERTIFICATE OF SECRETARY

The undersigned hereby certifies that the foregoing Ordinance was approved by the Board of Directors at their regular meeting on June 22, 2005.

Michael D. Armstrong
Michael D. Armstrong, Secretary

Appendix D
Proposed Revisions to Curtailment Ordinance

Water Curtailment Plan Ordinance Revisions Water Resource Study

PREPARED FOR: Town of Purcellville

PREPARED BY: CH2M HILL

COPIES: File

DATE: March 4, 2008

PROJECT NUMBER: 355269

Contents

Introduction

The purpose of this Memorandum is to review the Town's current Curtailment Plan and recommend revisions. The current ordinance was adopted in March 2006. It was designed to correspond to the levels defined in the Metropolitan Washington Water Supply and Drought Awareness Plan adopted by the Metropolitan Washington Council of Governments (MWCOG) in June 2000. The Virginia Drought Assessment and Response Plan, adopted in March 2003, contains the same drought response levels as the MWCOG plan.

Renaming the Curtailment Plan Ordinance to the Drought Response and Contingency Plan

A first recommended revision of the Curtailment Plan is to rename it as the Town of Purcellville Drought Response and Contingency Plan. That terminology brings it into line with requirements of the recently enacted the Virginia Department of Environmental Quality (DEQ) regulations on Local and Regional Water Supply Planning (9 VAC 25-780). The new Virginia DEQ regulations require development of a Drought Response and Contingency Plan, as summarized in Exhibit 1 below. The Town's existing Water Curtailment Plan Ordinance largely complies with the requirements of the DEQ regulations. However, for consistency it is recommended that the ordinance be renamed to "Drought Response and Contingency Plan", with further refinements explained below.

EXHIBIT 1
Summary of Drought Response and Contingency Plan Requirements

A A. A program that includes community water systems and self-supplied users who withdraw more than an average of 300,000 gallons per month of surface water and/or ground water shall contain drought response and contingency plans.

1. Drought response and contingency plans shall be structured to address the unique characteristics of the water source that is being utilized and the nature of the beneficial use of water.

2. Drought response and contingency plans shall contain, at minimum, the following three graduated stages of responses to the onset of drought conditions:

   a. Drought Watch stage responses are generally responses that are intended to increase awareness, in the public and private sector, to climatic conditions that are likely to precede the occurrence of a significant drought event. Public outreach activities shall be identified to inform the population served by a community water system of the potential for drought conditions to intensify and potential water conservation activities that may be utilized.

   b. Drought Warning stage responses are generally responses that are required when the onset of a significant drought event is imminent. Voluntary water conservation activities shall be identified with the goal of reducing water use by 5-10%.

   c. Drought Emergency stage responses are generally responses that are required during the height of a significant drought event. Mandatory water conservation activities shall be identified with the goal of reducing water use by 10-15%.

3. Drought response and contingency plans shall include references to local ordinances, if adopted, and procedures for the implementation and enforcement of drought response and contingency plans.

Source: 9VAC 25-780-130. Drought Response and Contingency Plans

Town Water Curtailment Plan Ordinance Review

The Town's current plan has four levels. The names of these four levels are the same as MWCOG's plan including Normal, Watch, Warning, and Emergency. Each of these levels has an associated trigger to help the Town decide when to move up to the next level. The current triggers are shown in Table 1 below.

TABLE 1
Town of Purcellville Current Water Curtailment Plan
Curtailment Level Triggers

Water Curtailment Level	Triggers
Normal Wise Water Use	• Water supply adequate to meet all demands (demand <75% of capacity) • NOAA drought index neutral to DO • All Town Facilities operating within normal parameters
Watch Voluntary Water Conservation	• Level in Hirst Reservoir – Back lake draining to front lake 4.5 feet below normal pools and front lake full with no overflow • All wells functioning properly at normal levels • NOAA drought index D1, moderate drought • Current demand between 75% and 85% of system capacity on average for a week

TABLE 1
Town of Purcellville Current Water Curtailment Plan
Curtailment Level Triggers

Water Curtailment Level	Triggers
	• Current demand requires the use of any Town water supplies above the safe yield capacity for more than two consecutive days • Announce voluntary water conservation recommendations
Warning Voluntary Water Conservation and some Mandatory Restrictions	• Level in Hirst Reservoir – Back Lake draining to front lake 4.5 feet below normal pool and front lake 1.5 feet below spillway and/or some wells not functioning properly or with moderate draw-down • Tank out of service for maintenance • NOAA drought index D2, severe drought • Current demand between 85% and 95% of system safe yield on average for a week • Current demand requires the use of any Town water supplies above the safe yield capacity for more than two consecutive days.
Emergency Mandatory Water Restrictions	• Level in Hirst Reservoir – Back lake draining to front lake 4.5 feet below normal pools and front lake 3 feet below spillway • One or more wells not functioning properly or with extreme draw-down • Storage drawn below 65% of total capacity • Major waterline break • Current Demand at or above 95% of system safe yield on average for a week • NOAA drought index D3, extreme drought, or greater

Each of the levels has actions associated with it. The definition of each of these four levels has led to some confusion by the Town residents. This confusion is related to the Warning level containing a mixture of voluntary and mandatory actions. These actions are shown in Table 2 below.

TABLE 2
Town of Purcellville Current Water Curtailment Plan
Curtailment Level Actions

Category	Restrictions/Actions
Normal Wise Water Use	• Public/businesses asked to use water wisely. • Focus on Wise Water Use
Watch Voluntary Water Conservation	• Public/businesses asked to review their water usage and be aware of and limit high water use practices that needlessly waste water, e.g., over watering lawns, washing sidewalks, and driveways. If they haven't fully implemented the Wise Water Use Program, they are asked to do so. • Residents are asked to water on even or odd days based on their address. If their address is an even number they should water on even numbered days of the month, if their address is odd, they should water on odd numbered days of the month. • Daily and weekly water levels checked at the reservoir and monthly drought outlook. • Emphasis on water conservation outside the home or office. • Reminders about year round wise water uses.

TABLE 2
Town of Purcellville Current Water Curtailment Plan
Curtailment Level Actions

Category	Restrictions/Actions
Warning Voluntary Water Conservation and some Mandatory Restrictions	• Public/businesses should conserve water on both a voluntary and Mandatory Restriction basis. There are no penalties or sanctions for failure to follow the voluntary measures, however, if conditions worsen one or more of these measures could become mandatory and enforceable. The mandatory restrictions will be enforced if necessary. Signs may be posted in public locations with notification of "Voluntary and Mandatory water restrictions in effect" and press releases will be issued to the media. • Reservoir and wells will be monitored daily and reports generated weekly Mandatory Restrictions include: • Residents are required to water on even or odd days based on their address. If their address is an even number they should water on even numbered days of the month, if their address is odd, they should water on odd numbered days of the month. • Developers and/or residents will not be permitted to install seed or sod during the "Warning" level unless they have committed to providing regular lawn watering without Town water even after the establishment of the lawn for the duration of the Town being at Warning or Emergency Ordinance Levels. Drought bond is in an amount designated by the Fee Schedule. • No use of non-potable water meters. (meters will be turned off) • No community car washes. • No watering of lawns on rainy days. • Pool "topping off" should follow the odd/even day program listed above and pool should be covered when not in use. • High water users, those that consistently use more than 1,000 gal/day, shall prepare curtailment plans demonstrating how they shall respond to emergency situations and present to Town. • No use of any outside fountains, or decorative water structures. • Requested Conservation elements include: No watering lawns, washing cars or other outside objects during Voluntary Water Restrictions. • Restaurants/cafeteria/other food establishments shall provide water only by the patron's request. • No use of fire hydrants except for health and public service use. • No fire department training and no flushing of lines for development purposes unless determined necessary by Town Council or their representatives. Voluntary Restrictions include: • Reduce or stop non-essential washing such as washing cars, homes, driveways, sidewalks, etc. • Reduce of stop watering lawns • Limit watering of bushes and other plants carefully and conservatively or use gray water • Reduce other non-essential water uses as much as possible
Emergency Mandatory Water Restrictions	• Public/businesses are required to conserve. Penalties/sanctions are enforceable pursuant to Town Ordinance for failure to comply with restrictions as listed. • Signs may be posted in public with notification of "Mandatory water restrictions in effect" and press releases will be issued to the media. • Reservoir and wells will be monitored daily and reports generated weekly Mandatory Restrictions include:

TABLE 2
Town of Purcellville Current Water Curtailment Plan
Curtailment Level Actions

Category	Restrictions/Actions
	• All Mandatory Restrictions listed for the Warning Level • High water users, those that consistently use more than 1,000 gal/day, shall have prepared curtailment plans demonstrating how they shall respond to emergency situations and shall implement it (as provided in the Town Water Conservation and Curtailment Plan) • No car washing or outside washing. Commercial carwashes will be permitted to operate if they can demonstrate that they recycle at least 50% of the water used during the car washing process. • No lawn watering, including school ball fields. Limit watering to vegetable gardens and use gray water for water shrubs and plants. • No "topping off" of swimming pools. Cover when not in use.

Recommended Revisions to Water Curtailment Plan Ordinance

In order to clarify the actions associated with the levels in the plan, some revisions are recommended to the ordinance. However, the bulk of the ordinance should remain as it currently exists. The modified ordinance is included in the Attachment with the changes shown.

It is recommended that the Town retain the four MWCOG and Virginia State Response Levels: Normal, Watch, Warning, and Emergency. This will help with consistency with the surrounding communities, and ensure compliance with the levels prescribed in DEQ's regulations on Local and Regional Water Supply Planning (9 VAC 25-780). For example, the Town of Leesburg uses the same four MWCOG and State of Virginia levels in their Drought Plan.

The actions in each level should be modified such that mandatory actions are not mixed with voluntary actions. This could be accomplished by moving the mandatory actions from the Warning level to the Emergency level. The Warning level would become a completely voluntary level. Public information would become very important during this Warning level. This change will correspond to the recommendations in the MWCOG plan as well as the State of Virginia that mandatory restrictions only be included in the Emergency level.

The triggers should be adjusted, such that the mandatory restrictions in the Emergency level begin to take effect sooner than currently. The triggers related to demand versus capacity could be reduced by 5% to achieve this result.

The resulting recommendations are reflected in the markup of the existing Town ordinance, in the Attachment.

Attachment – Revisions to Water Curtailment Plan Ordinance

TOWN OF PURCELLVILLE
IN
LOUDOUN COUNTY, VIRGNIA

ORDINANCE NO. 06-02-01 **PRESENTED: ~~February 14, 2006~~**
ADOPTED: ~~March 14, 2006~~

An Ordinance: AMENDING CHAPTER 82, ARTICLE IV, SECTIONS 236 THROUGH 241; OF THE TOWN CODE OF THE TOWN OF PURCELLVILLE

BE IT ENACTED AND ORDAINED BY THE COUNCIL OF THE TOWN OF PURCELLVILLE THAT CHAPTER 82, ARTICLE IV, SECTIONS 236 THROUGH 241 OF THE TOWN CODE OF THE TOWN OF PURCELLVILLE BE AMENDED AS FOLLOWS:

ARTICLE IV. ~~WATER EMERGENCY~~ DROUGHT RESPONSE AND CONTINGENCY ORDINANCE

Sec. 82-236. Purpose.

The purpose of this Ordinance is to provide for a plan for the response to drought conditions by reduction and curtailment of water usage through voluntary and mandatory restrictions as outlined in the Town of Purcellville ~~**Water Conservation and Curtailment**~~ Drought Response and Contingency Plan during water supply emergencies.

Sec. 82-237. Scope.

This Ordinance shall apply to all Town of Purcellville water system customers and water users.

Sec. 82-238. Definitions.

For the purposes of this Ordinance, the following words and phrases shall have the following meanings:

Table I. Definitions and Triggers

~~WATER CURTAILMENT~~DROUGHT RESPONSE LEVEL	TRIGGERS
Normal Wise Water Use	• Water supply adequate to meet all demands (demand <~~75~~ 70% of capacity) • NOAA drought index neutral to DO • All Town Facilities operating within normal parameters
Watch Voluntary Water Conservation	• Level in Hirst Reservoir – Back lake draining to front lake 4.5 feet below normal pools and front lake full with no overflow • All wells functioning properly at normal levels • NOAA drought index D1, moderate drought • Current demand between ~~75~~ 70% and ~~85~~ 80% of system capacity on average for a week • Current demand requires the use of any Town water supplies above the safe yield capacity for more than two consecutive days • Announce voluntary water conservation recommendations
Warning Voluntary Water Conservation ~~and some Mandatory Restrictions~~	• Level in Hirst Reservoir – Back Lake draining to front lake 4.5 feet below normal pool and front lake 1.5 feet below spillway and/or some wells not functioning properly or with moderate draw-down • Tank out of service for maintenance • NOAA drought index D2, severe drought • Current demand between ~~85~~ 80% and ~~95~~ 90% of system safe yield on average for a week • Current demand requires the use of any Town water supplies above the safe yield capacity for more than two consecutive days.
Emergency Mandatory Water Restrictions	• Level in Hirst Reservoir – Back lake draining to front lake 4.5 feet below normal pools and front lake 3 feet below spillway • One or more wells not functioning properly or with extreme draw-down • Storage drawn below ~~65~~ 70% of total capacity • Major waterline break • Current Demand at or above ~~95~~ 90% of system safe yield on average for a week • NOAA drought index D3, extreme drought, or greater

Table II. Categories and Restriction

Category	Restrictions/Actions
Normal Wise Water Use	• Public/businesses asked to use water wisely. • Focus on Wise Water Use
Watch Voluntary Water Conservation	• Public/businesses asked to review their water usage and be aware of and limit high water use practices that needlessly waste water, e.g., over watering lawns, washing sidewalks, and driveways. If they haven't fully implemented the Wise Water Use Program, they are asked to do so. • Residents are asked to water on even or odd days based on their address. If their address is an even number they should water on even numbered days of the month, if their address is odd, they should water on odd numbered days of the month. • Daily and weekly water levels checked at the reservoir and monthly drought outlook. • Emphasis on water conservation outside the home or office. • Reminders about year round wise water uses.
Warning Voluntary Water Conservation ~~and some Mandatory Restrictions~~	• Public/businesses should conserve water on both a voluntary and Mandatory Restriction basis. There are no penalties or sanctions for failure to follow the voluntary measures, however, if conditions worsen one or more of these measures could become mandatory and enforceable. The mandatory restrictions will be enforced if necessary. Signs may be posted in public locations with notification of "Voluntary and Mandatory water restrictions in effect" and press releases will be issued to the media. • Reservoir and wells will be monitored daily and reports generated weekly ~~• Mandatory Restrictions include:~~ ~~⇒ Residents are required to water on even or odd days based on their address. If their address is an even number they should water on even numbered days of the month, if their address is odd, they should water on odd numbered days of the month.~~ ~~⇒ Developers and/or residents will not be permitted to install seed or sod during the "Warning" level unless they have committed to providing regular lawn watering without Town water even after the establishment of the lawn for the duration of the Town being at Warning or Emergency Ordinance Levels. Drought bond is in an amount designated by the Fee Schedule.~~ ~~⇒ No use of non-potable water meters. (meters will be turned off)~~ ~~⇒ No community car washes.~~ ~~⇒ No watering of lawns on rainy days.~~ ~~⇒ Pool "topping off" should follow the odd/even day program listed above and pool should be covered when not in use.~~ ~~⇒ High water users, those that consistently use more than 1,000 gal/day, shall prepare curtailment plans demonstrating how they shall respond to emergency situations and present to Town.~~ ~~⇒ No use of any outside fountains, or decorative water structures.~~ ~~⇒ Requested Conservation elements include: No watering lawns, washing cars or other outside objects during Voluntary Water Restrictions.~~ ~~⇒ Restaurants/cafeteria/other food establishments shall provide water only by the patron's request.~~ ~~⇒ No use of fire hydrants except for health and public service use.~~ ~~⇒ No fire department training and no flushing of lines for development purposes unless determined necessary by Town Council or their representatives.~~ • Voluntary Restrictions include: ⇒ Reduce or stop non-essential washing such as washing cars, homes, driveways, sidewalks, etc.

	⇒ Reduce of stop watering lawns ⇒ Limit watering of bushes and other plants carefully and conservatively or use gray water ⇒ Reduce other non-essential water uses as much as possible
Emergency Mandatory Water Restrictions	• Public/businesses are required to conserve. Penalties/sanctions are enforceable pursuant to Town Ordinance for failure to comply with restrictions as listed. • Signs may be posted in public with notification of "Mandatory water restrictions in effect" and press releases will be issued to the media. • Reservoir and wells will be monitored daily and reports generated weekly • Mandatory Restrictions include: ⇒ Developers and/or residents will not be permitted to install seed or sod during the "Warning" level unless they have committed to providing regular lawn watering without Town water even after the establishment of the lawn for the duration of the Town being at Warning or Emergency Ordinance Levels. Drought bond is in an amount designated by the Fee Schedule. ⇒ No use of non-potable water meters. (meters will be turned off) ⇒ No community car washes. ⇒ No use of any outside fountains, or decorative water structures. ⇒ Requested Conservation elements include: No watering lawns, washing cars or other outside objects during Voluntary Water Restrictions. ⇒ Restaurants/cafeteria/other food establishments shall provide water only by the patron's request. ⇒ No use of fire hydrants except for health and public service use. ⇒ No fire department training and no flushing of lines for development purposes unless determined necessary by Town Council or their representatives. ⇒ High water users, those that consistently use more than 1,000 gal/day, shall have prepared curtailment plans demonstrating how they shall respond to emergency situations and shall implement it (as provided in the Town Water Conservation and Curtailment Plan) ⇒ No car washing or outside washing. Commercial carwashes will be permitted to operate if they can demonstrate that they recycle at least 50% of the water used during the car washing process. ⇒ No lawn watering, including school ball fields. Limit watering to vegetable gardens and use gray water for water shrubs and plants. ⇒ No "topping off" of swimming pools. Cover when not in use.

Sec. 82-239. Waiver of restrictions.

Upon prior written request by an individual, business or other water customer or user, the Town Council or their assigned representatives, may permit less than full compliance with any of the provisions of this Ordinance if good cause can be shown, including evidence that the applicant is affected in a substantial manner not common to other businesses or persons generally. No waiver shall be granted by the Town Council or their assigned representatives unless the Council determines that the public health, safety and welfare will not be adversely affected by the waiver. All waivers granted by the Town Council or their assigned representatives shall be reported at its next regular or special meeting.

Sec. 82-240. Application of restrictions and prohibitions; termination.

Nothing in this Ordinance shall require the Town Council to invoke the voluntary restrictions or mandatory prohibitions of the water shortage alert, water shortage restriction, or water shortage emergency in any specific order. Any alert, restriction, or emergency declared by the Town Council, or the Town Manager for any of the triggers as discussed above shall be in effect from the time stated and shall continue in effect until terminated by the Town Council or Public Works Committee, respectively.

Any level of the Water Curtailment Plan shall be implemented by the Town Manager or Director of Utilities when any of the appropriate triggers are met with appropriate notice to Town Council. The Town Council and Public Works may enforce restrictions outside the trigger points when these restrictions are found necessary to conserve, extend or replenish the Town water supply to protect health, safety or welfare of the public. The Town Council or Public Works Committee or their assigned representatives will determine when the Emergency, Warning and Watch levels will be lifted.

Sec. 82-241. Penalties; Injunction.

(a) Any person who violates or fails to comply with any of the mandatory provisions of the current Town of Purcellville Water Conservation and Curtailment Plan and this Ordinance shall be charged with a class 3 misdemeanor as provided by law.
(b) The fine for violation of this ordinance shall be no less than $100 for the first offence, $200 for the second offence, and $300 for the third offence or a fine to be determined at the courts discretion.
(c) At the discretion of the Town Council, individual residential customers shall be limited to three hundred gallons of water per day (300gpd), or their average water use during the winter months, whichever is higher. Excess water use will be billed at twice that of the regularly charged rate.
(d) Each day that one or more of the provisions in the Town's "Water Emergency Ordinance" is violated shall constitute a separate offense.

If any individual is convicted of three or more distinct violations of any of the provisions of the "Water Emergency Ordinance" the Town Council and/or their designee, shall, upon due notice to the customer, discontinue water service to the premises where such violation occurs. Services discontinued under such circumstances shall be restored only upon payment of a reconnection charge, hereby established at $200.00, and other costs incurred by the Town of Purcellville in discontinuing service. In addition, suitable assurance must be given to the Town Council and/or their designee, that the same action shall not be repeated while the "Water Emergency Ordinance" is in effect. Compliance with this Ordinance may also be sought through injunctive relief in the district court.

(e) Any police officer of the Town of Purcellville may issue a summons to a person he/she reasonably believes to be in violation of this Ordinance.

(f) The imposition of a fine or penalty for a violation of any of the mandatory provisions of this Ordinance shall not excuse the violation or permit the violation to continue.

(g) Any violation of this Ordinance may be restrained, corrected or abated by injunction or other appropriate proceeding.

Sec. 242 – 243 are hereby reserved.

PASSED THIS

_____
, Mayor

ATTEST:

_____
, Clerk of Council