



HIGH EFFICIENCY TOILET AND URINAL REPLACEMENT PROGRAM

**California Department of Water Resources
2004 Water Use Efficiency Program
Grant Proposal**

**Contra Costa Water District
1331 Concord Ave.
P.O. Box H20
Concord, CA 94524**

January 6, 2005

HIGH EFFICIENCY TOILET AND URINAL REPLACEMENT PROGRAM

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2004 Water Use Efficiency Proposal Solicitation Package

Project Information Form

Applying for:

Urban

Agricultural

1. (Section A) **Urban or Agricultural Water Use Efficiency Implementation Project**

(a) implementation of Urban Best Management Practice, # _____

(b) implementation of Agricultural Efficient Water Management Practice, # _____

(c) implementation of other projects to meet California Bay-Delta Program objectives, Targeted Benefit # or Quantifiable Objective #, if applicable _____

(d) Specify other: _____

2. (Section B) **Urban or Agricultural Research and Development; Feasibility Studies, Pilot, or Demonstration Projects; Training, Education or Public Information; Technical Assistance**

(e) research and development, feasibility studies, pilot, or demonstration projects

(f) training, education or public information programs with statewide application

(g) technical assistance

(h) other: HET and Zero water urinal replacement go beyond requirements of BMPs.

3. Principal applicant (Organization or affiliation):

Contra Costa Water District

4. Project Title:

High Efficiency Toilet and Urinal Replacement Program

5. Person authorized to sign and submit proposal and contract:

Name, title

Walter J. Bishop, General Manager

Mailing address

P.O. Box H20

Concord, CA 94524

Telephone

(925) 688-8034

Fax.

(925) 688-8197

E-mail

wbishop@ccwater.com

6. Contact person (if different):	Name, title.	Chris Dundon, Water Conservation Supervisor
	Mailing address.	P.O. Box H20 Concord, CA 94524
	Telephone	(925) 688-8136
	Fax.	(925) 688-8122
	E-mail	cdundon@ccwater.com

7. Grant funds requested (dollar amount): \$647,446
(from Table C-1, column VI)

8. Applicant funds pledged (dollar amount): \$647,446

9. Total project costs (dollar amount): \$1,314,892
(from Table C-1, column IV, row n)

10. Percent of State share requested (%): 50%
(from Table C-1)

11. Percent of local share as match (%): 50%
(from Table C-1)

12. Is your project locally cost effective?
Locally cost effective means that the benefits to an entity (in dollar terms) of implementing a program exceed the costs of that program within the boundaries of that entity. (a) yes
(If yes, provide information that the project in addition to Bay-Delta benefit meets one of the following conditions: broad transferable benefits, overcome implementation barriers, or accelerate implementation.) (b) no

11. Is your project required by regulation, law or contract? (a) yes
 If no, your project is eligible. (b) no
 If yes, your project may be eligible only if there will be accelerated implementation to fulfill a future requirement and is not currently required.
Provide a description of the regulation, law or contract and an explanation of why the project is not currently required.

12. Duration of project (month/year to month/year): 01/06 to 12/08

13. State Assembly District where the project is to be conducted: 11th and 15th

14. State Senate District where the project is to be conducted: 7th

15. Congressional district(s) where the project is to be conducted: 7th and 10th

16. County where the project is to be conducted: Contra Costa

17. Location of project (longitude and latitude) N 37 degrees 58.808'
W 122 degrees 2.891'

18. How many service connections in your service area (urban)? 100,000

19. How many acre-feet of water per year does your agency serve? 121,651

20. Type of applicant (select one):
- (a) City
 - (b) County
 - (c) City and County
 - (d) Joint Powers Authority
 - (e) Public Water District
 - (f) Tribe
 - (g) Non Profit Organization
 - (h) University, College
 - (i) State Agency
 - (j) Federal Agency
 - (k) Other
 - (i) Investor-Owned Utility
 - (ii) Incorporated Mutual Water Co.
 - (iii) Specify _____
21. Is applicant a disadvantaged community? If 'yes' include annual median household income.
- (a) yes, _____ median household income
 - (b) no

2004 Water Use Efficiency Proposal Solicitation Package

Signature Page

By signing below, the official declares the following:

The truthfulness of all representations in the proposal;

The individual signing the form has the legal authority to submit the proposal on behalf of the applicant;

There is no pending litigation that may impact the financial condition of the applicant or its ability to complete the proposed project;

The individual signing the form read and understood the conflict of interest and confidentiality section and waives any and all rights to privacy and confidentiality of the proposal on behalf of the applicant;

The applicant will comply with all terms and conditions identified in this PSP if selected for funding; and

The applicant has legal authority to enter into a contract with the State.

Signature

Walter J. Bishop, General Manager
Name and title

Date

HIGH EFFICIENCY TOILET AND URINAL REPLACEMENT PROGRAM

1. STATEMENT OF WORK

1.1 Relevance and Importance

Goals and Objectives

The Contra Costa Water District (CCWD) is proposing to implement an innovative water conservation program that will result in sustainable benefits to the Bay Delta System. The goal of the **High Efficiency Toilet and Urinal Replacement Program** is to achieve the installation of 4,000 high efficiency toilets and urinals over a three-year period. The program will be marketed to replace older high volume toilets (3.5 and 5 gallon per flush) with High Efficiency Toilets, which flush an average of 1.0 to 1.2 gallons per flush (gpf). The program will also replace existing urinals using from 1.0 to 2.5 gpf with zero water use urinals, which use no water to flush.

Water savings are estimated to be 2,720 acre-feet over the 20-year life of the fixtures or 136 acre-feet per year.

What are High Efficiency Toilets and Zero-Water Urinals?

Since 1994 the industry standard for toilets has been 1.6 gallons per flush. Toilet technology has improved tremendously over the past 10 years resulting in improved flushing performance. One of these improvements has been the introduction of toilets that flush with less than the 1.6 gpf. These toilets called High Efficiency Toilets (or HETs) flush with less than 1.2 gpf. There are two primary types of HETs: Dual Flush Toilets and 1.0 gpf air assisted toilets. Dual Flush toilets provide the customer with the option to flush with 0.8 or 1.6 gallons. Several studies conducted in the US and Canada have found that the average flush volume of dual flush toilets is 1.2 gallons per flush. The second type of HET is the air-assisted 1.0-gpf toilet. The air-assisted toilets use available water pressure at the home to create air pressure in a tank, which is located inside the toilet tank. This additional air pressure increases the ability of the toilet to flush consistently with 1.0 gallon per flush. See Attachment 5 for a cut sheet describing the toilets.

Also since 1994, the industry standard for urinals has been 1.0 gallon per flush. Older urinals flush 2.0 gpf and some are even higher. Zero water use urinals eliminate the need for any flushing, thus producing at least 1.0 to 2.0 gallons per flush savings. Because the water line is capped off, the savings are very reliable. See Attachment 5 for a cut sheet describing the urinal.

Need for Project

The District's comprehensive resource management plan is known as the Future Water Supply Study (adopted by the CCWD Board in August 1996). Analysis of future customer demands against available supplies showed that new supply sources (and facilities suitable for the expanded capacity) are required over the 50-year planning horizon. The preferred resource alternative identified water transfers as one of the primary ways to obtain the additional supply requirements. Programs that would delay the need for the new supply and/or reduce demand on the supply were analyzed for economic and non-economic benefits.

The proposed program has a significant ability to support CALFED objectives -- specifically water quantity benefits. The High Efficiency Toilet and Urinal Replacement Program directly addresses two key CALFED program elements: 1) The water management program element expressly identifies conservation as one of its goals, and 2) the water use efficiency program element stresses “real water” conservation and the ability to increase in-stream flows for ecosystem health. Generating savings from existing customers satisfies the “real water” test, and the corresponding reduction in Delta diversion on a year-round basis preserves in-stream flows during critical periods.

The water savings result in direct benefits to the Sacramento/ San Joaquin Delta. For every acre-foot of water saved through this project, an acre-foot is available in the Delta for other uses. In addition to the direct water savings, this program will increase the exposure of High Efficiency Toilets and Waterless Urinals to customers and to the plumbing suppliers, thereby increasing the process of market transformation. This transformation to High Efficiency Fixtures may result in even more water savings statewide.

Consistent with Water Management Plans

The **High Efficiency Toilet and Urinal Replacement Program** will support the conservation component of CCWD’s Future Water Supply Plan and the Districts Urban Water Management Plan. The program is consistent with CCWD’s goals to implement the California Urban Water Conservation Council (CUWCC) Memorandum of Understanding Regarding Urban Water Conservation in California (MOU) Best Management Practices (BMPs). CCWD has been implementing the BMPs since 1991 and consistently meets the requirements of the 14 BMPs. The High Efficiency Toilet and Urinal Replacement Program goes BEYOND the requirements of the BMPs and is a logical next step in the District’s Water Conservation Program. The program will increase the savings compared to standard 1.6 gpf toilet and 1.0 gpf urinal programs and will assist in moving the plumbing market towards more efficient fixtures.

1.2 Technical/Scientific Merit, Feasibility

The **High Efficiency Toilet and Urinal Replacement Program** will include two program elements: one for single-family customers and one for multi-family and commercial customers.

Single Family Voucher Program

The single-family program will be designed as a Voucher Program. Eligible single-family customers will receive a voucher, which they can use to receive a free high efficiency toilet at a District chosen supplier. Customers will be allowed to replace all 3.5 gpf and larger toilets. Participants will be directed to pick up their HETs from the selected vendor, and will be given 30 days to install the fixtures. Random inspections will be conducted to assure proper installation.

Multi-Family and Commercial Direct Installation Program

Often multi-family and commercial customers will not participate in a voucher or rebate program due to the cost of installation and simply because it is too much trouble to hire a plumber. CCWD and other water agencies throughout the state have experienced this lack of participation

even when customers are offered fixtures absolutely free. To meet the participation goals, the multi-family and commercial program will be designed to be a direct install program. Customers will receive a free HET and or Zero-Water Urinal complete with free installation.

The District will contract with a consultant who will conduct marketing and administration services, and will hire licensed plumbers to purchase and install the HETs and urinals. Applicants to the program will receive a pre-installation inspection to determine eligibility. The Administrator will then schedule and install the fixtures. After installation, CCWD will conduct post installation inspections at a random number of installations to insure proper installation.

Marketing: Both programs will be marketed in several ways. Primarily, marketing will be done through direct mail to the customer sectors with the highest potential savings. Some of the sectors that will be marketed to include:

- Properties built prior to 1980 (5.0 gpf toilets)
- Properties built prior to 1992 (3.5 gpf toilets)
- Customers with high winter water use (indicates high interior water use)
- Commercial customers with urinals
- Eligible customers who have participated in other CCWD programs (CCWD database with data from past 5 years of programs)
- Low income and non-English speaking customers

These customer sectors are usually the least likely to replace all of their toilets due to the cost involved. By marketing to this type of customer, the program will reduce the incidence of program “free riders.”

Toilet and Urinal Selection: CCWD will solicit proposals for the supply of one or more High Efficiency Toilets and one or more Zero-Water Urinals that meet specific criteria. The High Efficiency Toilets will be required to have an average flush volume of 1.2 gpf or less and meet quality and performance standards. The Urinals must have zero water usage and meet quality standards.

Follow-up: To solicit feedback on the program, participants will be mailed a survey card to obtain their satisfaction with the program and their new High Efficiency Toilet or Urinal. Survey cards will be reviewed by CCWD and CCWD staff will perform any necessary follow-up.

Reporting: CCWD will submit quarterly reports listing the activities and associated costs of the program. In addition CCWD will track the annual water usage of a sample of participants and compare to a control group. Because savings for toilet and urinal replacement programs has been well documented in numerous studies over the years, CCWD will track savings to confirm they are consistent with accepted studies.

Project Schedule: The program will be implemented over a three-year period. The estimated start date is January 1, 2006 and will end December 31, 2008. The project will ramp up the number of planned replacements each year. This will allow time for contracting with an administrator and to select the fixtures. Table 1 lists the target number of fixtures to be replaced each year of the project.

Table 1: Target Number of Fixture Replacements

	Year 1	Year 2	Year 3	Total
SF HET	100	500	1500	2100
MF HET	0	300	600	900
CII HET	50	100	200	350
CII Urinal	50	200	400	650
TOTAL	200	1100	2700	4000

Project Plan

The project will include four primary Tasks including: Start Up, Marketing, Administration/ Monitoring and Assessment and Toilet/ Urinal Purchase and installation. Table 2 summarizes each task, the deliverables, schedule and estimated costs.

Table 2: Project Plan

Task Description	Deliverables	Schedule	Total Estimated Costs
<u>Start Up</u> <ul style="list-style-type: none"> Hire & train CCWD staff to implement program Negotiate contract with a plumbing supplier(s) to provide the HET's and Urinals Negotiate contract with consultant for administration, marketing and installation services for the Multi-Family and Commercial HETs and Urinals Develop Voucher for Single Family Program 	<ul style="list-style-type: none"> Signed Agreement with plumbing supplier Signed agreement with consultant Staff trained to implement program Completed and printed voucher 	Year 1	\$ 20,000
<u>Marketing</u> <ul style="list-style-type: none"> Develop marketing list as described above in both the treated water service area and the wholesale service area Design and print marketing materials Mail marketing materials directly to customers. Volume will vary during the year and depend on level of participation. Make direct calls to customers to solicit participation 	<ul style="list-style-type: none"> Completed target customer lists Completed marketing materials Marketing materials sent to customers 	On Going	\$ 80,000

<u>Administration/ Monitoring and Assessment</u> <ul style="list-style-type: none"> • Process and mail vouchers to eligible SF customers • Schedule and conduct pre-install surveys. • Receive and process completed vouchers and invoices from plumbing supplier • Schedule and conduct installations at multi-family and commercial sites • Schedule and conduct post-install inspections • Develop and send satisfaction survey to each participant • Develop and track program data on an MS Access database • Prepare quarterly activity and cost reports • Track sample participant water consumption and estimate savings compared to industry estimates. 	Completed Quarterly Activity Report listing: <ul style="list-style-type: none"> • Paid invoices for SF vouchers • Paid invoices for MF and Commercial Installations • Final post-installation inspection reports verifying proper installation • Number of completed satisfaction surveys received 	On going	\$382,392
<u>Toilet and Urinal Purchase</u> <ul style="list-style-type: none"> • Purchase Toilets and Urinals 	Completed Quarterly Activity Report listing: <ul style="list-style-type: none"> • Number of completed single-family vouchers • Number of multi-family HET installations • Number of Commercial HET installations • Number of Commercial Urinal installations 	On going	\$832,500
			\$1,314,892

Environmental Documentation

The High Efficiency Toilet and Urinal Replacement Program does not meet the definition of a “project” under CEQA because it “will not result in a direct or reasonably foreseeable indirect physical change in the environment” (per CEQA Guidelines, sections 15060(c) and 15378). Additionally, the program qualifies as categorically exempt as a minor change to existing facilities (per CEQA section 15301), which specifically exempts minor changes to interior plumbing.

The project has no components within the jurisdiction of federal environmental laws. Therefore, NEPA requirements do not apply to the project.

1.3 Monitoring and Assessment

Project Monitoring and Evaluation

Baseline data will be gathered for every program participant. Existing number of fixtures and fixture flush volume will be documented. In addition, pre-replacement consumption data for customers who live within the CCWD treated water service area will be collected. This will make up approximately 50% of the program participants, the other half coming from CCWD wholesale customers. Data collected will include three years of pre-program water use history. In addition, CCWD has the ability to analyze specifically those customers who have never participated in another CCWD sponsored conservation program. This will improve the accuracy of the baseline and post program data.

Monitoring will take place in two primary areas including: water consumption and customer satisfaction. Water consumption will be monitored by tracking the annual consumption of participants in the treated water service area for three years prior and up to five years after fixture installation. Interior water use will be extrapolated by using average winter months and comparing to a control group of like customers. By using the winter water use and by comparing to a control group, weather changes will not affect the savings estimates. Success will be measured by reduced interior water consumption.

Customer satisfaction with the fixtures is very important. Because only high quality devices will be used in the program, it is expected that satisfaction will be very high. To monitor customer satisfaction, CCWD will send each participant a short survey within 3 to 6 months of installation. Customer satisfaction with the fixture and the program will be rated. Success will be measured by the number of quality installations and the level of customer satisfaction with the fixtures.

Beginning the second year of the program, CCWD will submit an annual summary report listing the number of participants and the calculated water savings based on previous empirical studies, and estimated savings from consumption monitoring. In addition, the report will list the findings of the customer satisfaction survey.

The estimated cost of monitoring the program and preparing the summary evaluations is included as part of the Administration/ Monitoring and Assessment costs listed in Table 2 above.

2. QUALIFICATIONS OF APPLICANTS AND COOPERATORS

The District is very experienced in managing water conservation programs, and has funded a formal Water Conservation Program since 1989. CCWD is one of the original signatories to the CUWCC MOU in 1991 and continues to implement all urban BMPs. The District continuously monitors the results of its efforts and routinely reports on progress through the annual CUWCC BMP reports, USBR Water Contract Annual Update, and Urban Water Management Plan.

CCWD also has extensive experience administering water use efficiency grant projects:

- CCWD implemented the Straight Flush CII ULFT Replacement Program, which was grant funded by the DWR (Contract #460000-1583). The program was completed in 2003 and resulted in more than 1,000 commercial toilets installed. Invoices and reports were submitted in a timely manner.
- CCWD in partnership with Electric Gas Industries Association (EGIA) implemented a DWR grant funded Regional Washer Rebate Program in 2001. This grant-funded program resulted in CCWD replacing more than 2,000 high efficiency washers. Invoices and reports were submitted in a timely manner.
- CCWD implemented a Water Budget Notification Project funded by the USBR. The grant provided \$60,000 towards the project. The project was completed on time and within budget. Subsequently, in 2003, CCWD received the USBR Commissioners Awarded for Conservation for its Water Budget Program.

The District staff responsible for managing this program have a combined experience of more than 40 years of professional water conservation experience. The project managers will be Ms. Kelly Warren, Water Conservation Specialist and Mr. Ray Cardwell, Water Conservation Specialist. The project will be supervised by Mr. Chris Dundon, Water Conservation Coordinator. See Attachment 3 for the Resumes.

There are also external cooperators who are necessary for the successful implementation of the program. First, there are the District's municipal customers who will provide specific customer information appropriate to the marketing and savings assessment activities. These include the City of Martinez, California Cities Water (Bay Point), City of Pittsburg, City of Antioch, and Diablo Water (Oakley). Next, use of the District's competitive selection procedures will determine a qualified administrator and supplier for the toilets.

3. OUTREACH, COMMUNITY INVOLVEMENT, AND ACCEPTANCE

The program has a broad base of support – from customers, local community service organizations, and environmental groups. The five municipal raw water customers will be actively involved with identifying the best candidates for retrofit within their retail service area. See Attachment 4 for letters of support from CCWD municipal customers and environmental groups. There is no known opposition to the program.

4. INNOVATION

Numerous toilet replacement programs have been implemented by water agencies over the past ten years. However, the **High Efficiency Toilet and Urinal Replacement Program** is innovative as it goes beyond current industry requirements and opens the door to a considerable amount of potential water savings statewide.

Fixture Specification

The program will specify high quality Dual Flush Toilets, 1.0 GPF Air Assisted Toilets and Zero-Water Urinals.

- The Dual Flush Toilets will have a maximum average flush volume of 1.2 gallons per flush. These fixtures are 23% to 32% more efficient than the required 1.6 gallon per flush toilets.
- The Air Assisted Toilets will have a flush volume of 1.0 gallon per flush. These fixtures are more than 35% more efficient than the required 1.6 gallon per flush toilets.
- The Zero-Water Urinals will eliminate all water use. These fixtures use zero water compared to the required 1.0 gallon per flush urinals.

These fixtures are described above in section 1.1 and in Attachment 5.

Beyond the BMP

The current BMP 14- Residential ULFT Replacements and BMP 9A- CII ULFT Replacements require water agencies to provide incentives for customers to replace existing 3.5 gallon per flush or larger toilets with ULFTs, which flush 1.6 gallons per flush. The proposed program goes beyond the BMP requirements by providing incentives for the installation of High Efficiency Toilets and Zero-Water Urinals.

Market Transformation

Currently less than 1 percent of toilets sold in California are HETs or Zero-Water Urinals. Implementing this program will begin a market transformation for the fixtures. This project will educate plumbing sales people, plumbing contractors and homeowners that HETs and Zero-Water Urinals can be very water efficient and high quality. Once market transformation begins, additional savings will occur naturally, without the need for incentive dollars.

5. BENEFITS AND COSTS

The **High Efficiency Toilet and Urinal Replacement Program** will result in direct water quantity benefits to the Bay-Delta System. The section below describes the project costs and benefits to both the Bay-Delta System and to the District. The Costs and Benefit Tables follow this section.

Project Costs (Budget)

Table C-1 displays the estimated three-year cost for the project to be \$1,314,892. The labor portion is Contra Costa Water District staff-time and the benefits are calculated at 34% of the labor cost. Consulting services include the cost of a consultant to administer the multi-family and commercial portions of the program and the cost of a licensed plumber to install the fixtures at multi-family and commercial sites. The IDC Rate of 53% recovers the indirect costs of the District's supporting services from its various departments, including General Management, General District Activities, Finance, and Human Resources. The equipment cost includes the estimated cost of purchasing the toilets and urinals.

Annual Operations and Maintenance Costs

There are no annual operations and maintenance costs for the project.

Total Annual Project Costs

Table C-3 displays the total annual project costs, which are estimated to be \$110,774 per year.

Capital Recovery Factor

Table C-4 shows the Capital recovery factor of 0.0872. This is determined based on the estimated toilet and urinal life of 20 years.

Project Annual Physical Benefits

The project will result in 2,720 acre-feet of water savings over the 20-year life of the fixtures and an average of 136 acre-feet per year in direct water quantity benefits to the Bay-Delta System. The water quantity benefits are described in table C5 and are shown in table C6. Attachment 1 displays the water savings calculations and assumptions for each of the fixtures.

The water savings directly benefit the Bay Delta System because CCWD receives all of its water supply directly out of the Bay Delta. The water source for CCWD is 100% Bay Delta water- Old River near Discovery Bay and Rock Slue in Knightson. Wastewater from Central Contra Costa Sanitary District is discharged in the San Francisco Bay. Therefore, all water saved through the program directly benefits the Bay-Delta.

Savings estimates for the High Efficiency Toilets are based on the CUWCC estimates in Exhibit 6 of the Memorandum of Understanding for Urban Water Conservation. Savings are then adjusted by 23% for the differenced between ULFT and HET water savings. The adjustment is based on a comprehensive study conducted by the Canada Mortgage and Housing Corporation (CMHC) and Veritec Consulting of Ontario, Canada (available from the CUWCC). This study found the following:

- Average flush volume before with inefficient fixtures (ave) = 3.72 gpf
- Average flush volume after installation of dual flush fixture (ave) = 1.11 gpf
- **Savings from a dual flush toilet are estimated to be 23% to 32% more than savings from a ULFT when replacing a 3.5 gallon per flush toilet.**

Zero-Water Urinal water savings are estimated to be 40 gallons per day per replacement. This assumes the savings are 2 gallons per flush by replacing a standard 2.0-gallon per flush urinal. It assumes 20 flushes per day, which is the average of restaurants and commercial buildings (15 flushes per day) and schools (25 flushes per day). It also assumes the urinals will be used 293 days per year, which is the average of office days (220) and restaurant days (365).

The water quantity benefits will also be very sustainable. Because the program results in fixtures being installed, the water savings are considered ‘hard savings’ and are very sustainable. In addition, because the specific fixtures will be selected based on their quality, the savings will be very reliable as well.

Project Annual Local Monetary Benefits:

By saving water through this project, CCWD benefits by avoiding the costs associated with using that water. Table C-6 displays the average avoided cost of water for the CCWD treated water service area and the CCWD raw water service area. The program will be implemented equally

throughout the Districts retail service area and its wholesale service area. The avoided cost also assumes 20% of the savings will offset current supply costs and 80% will offset future supply costs. Therefore, the avoided cost primarily reflects the Districts future water costs. Attachment 2 provides detail of the avoided cost of water calculation.

Project Local Monetary Benefits and Project Costs

Table C7 compares the annual project cost to the annual benefit to CCWD. The annual benefit of \$39,715 is approximately 36% of the annual project cost of \$110,744.

Applicants Cost Share and Description

The High Efficiency Toilet and Urinal Replacement Program promotes the most advanced water use efficiency technology available for these fixtures. The cost of the program is more than the traditional ULFT replacement program due to the higher fixture costs and the need for installation at multi-family and commercial sites. Based on Contra Costa Water District's avoided cost for the program, its minimum cost share for the program would be approximately 36%. However, to be more competitive for grant funds, the District proposes to fund 50% of the program costs. This project has the potential to begin a market transformation for these fixtures, which could eventually result in additional statewide water savings. See Attachment 2 for the Avoided Cost of Water calculation.

Other Bay-Delta Water Supply Benefits

Water quantity benefits are the primary benefit from this project.

Bay-Delta In-stream Flow and Timing Benefits

Savings from this project result in a reduction in Delta diversion on a year-round basis. Savings are relatively sustainable because no behavior change is required after participating in the program. This will preserve in-stream flows throughout the year, which includes during critical periods.

Other Bay-Delta Water Quality and Environmental Benefits

One direct benefit of this project that cannot easily be quantified is an increase in sales of High Efficiency Toilets (HETs) beyond the program participants. Currently HETs make up less than 1% of the toilet sales in California. However in Great Britain and Australia, HETs make up more than 40% of all toilet sales. Therefore, the potential for increased sales of HETs is substantial. This project will begin to transform the California market from 1.6 gpf toilets to HETs. This project will educate plumbing sales people, plumbing contractors and homeowners that HETs can be very water efficient and high quality. Once market transformation begins, additional savings will occur naturally, without the need for incentive dollars.

Costs and Benefits Tables

Table C- 1: Project Implementation Costs (Budget)

Table C- 2: Annual Operations and Maintenance Costs

Table C- 3: Total Annual Project Costs

Table C-4: Capital Recovery Factor

Table C- 5: Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits)

Table C- 6: Project Annual Local Monetary Benefits

Table C- 7: Project Local Monetary Benefits and Project Costs

Table C- 8: Applicant's Cost Share and Description

Project Costs and Benefits Tables C-1 through C-8 are included below. Attachments 1 and 2 document the Water Savings and Avoided Cost of Water calculations and assumptions used in the tables.

ATTACHMENTS

- 1: WATER SAVINGS CALCULATIONS AND ASSUMPTIONS**
- 2: AVOIDED COST OF WATER CALCULATIONS AND ASSUMPTIONS**
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ATTACHMENT 1:
Water Savings Calculations and Assumptions

Water Savings Summary

	Unit Savings (gpd)	Unit Savings (AF/yr)	Years of Savings	Unit Life Savings (AF)	Total Fixtures Replaced	Total Annual Savings (AF/yr)	Total Life Savings (AF)
SF HET	23.06	0.0258	20	0.52	2100	54.25	1085
MF HET	41.70	0.0467	20	0.93	900	42.04	841
CII HET	44.28	0.0424	20	0.85	350	14.84	297
CII Urinal	40.00	0.0383	20	0.77	650	24.89	498
TOTAL	-	-			4000	136.02	2720

Single Family HET

a	b	c	d= c*365 / 325851	e	f = e X d
Device	SF ULFT Savings (gpd)	23% add savings from HET (gpd)	Annual Savings (AF/ year)	Years of Savings	Life Savings (AF)
SF HET	18.75	23.0625	0.0258	20	0.52

a: Device

b: savings from CUWCC Exhibit 6 ULFT savings

c: HET Savings Study- Canada Mortgage and Housing Corporation (CMHC) and Veritec Consulting of Ontario, Canada

d: 365 days per year usage

e: life of savings

f: cumulative savings

Multi-Family HET Water Savings

a	b	c	d= c*365 / 325851	e	f = e X d
Device	MF ULFT Savings (gpd)	23% add savings from HET (gpd)	Annual Savings (AF/ year)	Years of Savings	Life Savings (AF)
MF HET	33.9	41.697	0.0467	20	0.93

a: Device

b: savings from CUWCC Exhibit 6 ULFT savings

c: HET Savings Study- Canada Mortgage and Housing Corporation (CMHC) and Veritec Consulting of Ontario, Canada

d: 365 days per year usage

e: life of savings

f: cumulative savings

Commercial HET Water Savings

a	b	c	$d = c * 312 / 325851$	e	$f = e * d$
Device	CII ULFT Savings (gpd)	23% add savings from HET (gpd)	Annual Savings AF/ year	Years of Savings	Life Savings (AF)
CII HET	36	44.28	0.0424	20	0.85

a: Device

b: savings from CUWCC Exhibit 6 ULFT savings

c: HET Savings Study- Canada Mortgage and Housing Corporation (CMHC) and Veritec Consulting of Ontario, Canada

d: 312 days per year is the average of 260 and 365. (working days for office buildings and full year for restaurants)

e: life of savings

f: cumulative savings

Zero Water Use Urinals Water Savings

a	b	$c = b * 312$	d	$e = c * d$	$f = e / 325851$
Device	Average savings (gpd)	Average Annual savings (gpy)	Years of savings	Life Savings (gallons)	Life Savings (AF)
Zero Water Urinals	40	12480	20	249600	0.77

a: Device

b: CUWCC cost and savings study estimate. Average of 20 flushes per day -restaurants, office and schools. Assumes replacing 2 gpf with zero water urinals X 20 flushes per day

c: Use 312 days per year, which is the average of 260 and 365. (working days for office buildings and full year for restaurants)

d: life of savings

e: cumulative savings in gallons

f: cumulative savings in acre-feet

**ATTACHMENT 2:
Avoided Cost of Water Calculations and Assumptions**

Avoided Cost of Water

Variable Cost Components	Variable cost of Current Supply in TWSA	Variable cost of Future Supply in TWSA	Variable cost of Current Supply in RSWA	Variable cost of Future Supply in RSWA	Grant Terms
	20%	80%	25%	75%	
Supply Cost	\$44	\$150	\$44	\$223	(a) Avoided Water Supply Cost
Raw Water Pumping, O&M	\$31	\$31	\$31	\$31	(b) Energy
Treatment O&M	\$141	\$141	\$0	\$0	(d) Labor
Treated Water Pumping, O&M	\$74	\$74	\$0	\$0	(e) Treated Water Pumping, O&M
TOTAL	\$290	\$396	\$75	\$254	

Summary

	TWSA	RWSA	Average
(a) Avoided Water Supply Cost	\$128.80	\$178.25	\$153.53
(b) Energy	\$31.00	\$31.00	\$31.00
(d) Labor	\$141.00	\$0.00	\$70.50
(e) Treated Water Pumping, O&M	\$74.00	\$0.00	\$37.00
	\$374.80	\$209.25	\$292.03

Costs are allocated assuming 50% of installations are in TWSA and 50% in RWSA

Costs assume 20% of the savings will be with Current Supply and 80% will be with Future Supply

Current supply cost has been reduced from \$61 to \$44 due to Slide Park and M & I deficit settlements

Variable supply cost is estimated to be \$150 per acre-foot beginning in 2011.

Treated water pumping, O&M and treatment estimated from current 2005 costs

ATTACHMENT 3:

Resumes

Christopher P. Dundon

PRESENT POSITION:

Water Conservation Supervisor, Contra Costa Water District

- Manage \$1.2 million dollar per year Water Conservation Program, which includes survey programs, incentive programs, public information and education programs for all customer types.
- Manage Conservation Incentive Program, which has resulted in the replacement of more than 32,000 toilets, 23,000 showerheads, 6,000 clothes washers, 500 Pre-rinse spray nozzles, and other devices with high efficiency models
- Manage the Conservation Survey Program, which has provided on-site surveys to more than 10,000 single family, 27,000 multi-family, 1,300 commercial and 1600 large landscape customers
- Manage USBR award winning Landscape Water Budget Program
- Prepare annual Conservation Budget
- Prepare Annual USBR Report and CUWCC BMP Report
- Represent the District on the CUWCC Steering Committee and CalFed Water Use Efficiency Public Advisory Committee and CUWA Conservation Committee

WORK HISTORY:

1999 – Present	Water Conservation Supervisor Contra Costa Water District, Concord, California
1991 – 1999	Water Conservation Specialist Contra Costa Water District, Concord, California
1988 – 1991	Landscape Architect, Carducci Associates, San Francisco, CA

EDUCATION AND PROFESSIONAL REGISTRATION

- B.S. Landscape Architecture, 1987, University of California at Davis
- Licensed California Landscape Architect
- Certified Water Auditor, Irrigation Association
- Certified Conservation Practitioner, American Water Works Association

Raymond T. Cardwell

- SUMMARY:**
- Bachelor of Science Degree in Environmental & Systematic Biology
 - 15 years of experience in environmental resources management.
 - Certified Landscape Auditor (Irrigation Association), Water Conservation Practitioner Level 1 (CA-NV American Water Works Association)

EDUCATION: **Bachelor of Science in Environmental & Systematic Biology, 1982**
California State Polytechnic University, San Luis Obispo, California

Major Courses of Study included:

Biology	Special Studies in Natural Resources
Chemistry	Environmental Education
Botany	Solid and Hazardous Waste Management
Natural Resource Management	Soil and Water Resources

EXPERIENCE: **Contra Costa Water District, July 1995 to Present**
Water Conservation Specialist, Concord, California

- Responsible for implementing and managing a variety of water conservation programs to the public, including establishment of standards for measurement and assessment for low flow toilet, high-energy-efficient washers, and commercial, industrial and institutional rebate programs. Developed and promoted conservation workshops, and commercial water surveys evaluating water conservation measures to implement, including cooling tower upgrades and commercial toilet retrofits.
- California Urban Water Conservation Council sub-committee member; recommending technical solutions to commercial industrial and institutional issues.
- Assisted in the development of California Urban Water Conservation Councils Guidebook for commercial institutional, and industrial water conservation program implementation (BMP 9).
- Contra Costa Water District's liaison to the Contra Costa Green Business Program certifying businesses as Green Businesses in Contra Costa County that incorporate an exemplary level of resource management.

Administrative Analyst, April 1990 to July 1995

Marin Municipal Water District, Corte Madera, California

- Established water conservation programs for Marin County residents in response to the drought, including low flow toilet rebate programs, commercial industrial and institutional rebate programs. Responsible for assessing water entitlements for established businesses in response to a water moratorium.

Kelly I. Warren

WORK HISTORY

2000 – Present Water Conservation Specialist
Contra Costa Water District, Concord, California

1997 – 2000 Staff Assistant
City of Fresno, Water Conservation Program, Fresno, California

1995 – 1997 Senior Administrative Clerk
City of Fresno, Building & Safety Engineering Section, Fresno, California

1991 – 1995 Administrative Clerk II
City of Fresno, Water Conservation Program, Fresno, California

WORK EXPERIENCE

Administer Residential Water Conservation Programs in the following:

- Market, plan, coordinate and implement Residential Programs
- Prepare flyers, newspaper advertisements, pamphlets and letters
- Conduct Single Family interior and exterior surveys
- Conduct Multi-Family interior surveys
- Project Manager for Ultra Low Flow Toilet Rebate program
- Project Manager for Ultra Low Flow Toilet Multi-Family distribution
- Project Manager for High Efficiency Washing Machine Rebate Program
- Provide supervision to permanent and temporary Water Conservation Workers
- Compiled and produced procedure manual for Single Family and Multi-Family Surveys
- Project Manager for the Water Conservation Access database
- Plan, prepare, setup, and maintain exhibits and/or booths at local community events
- Maintain quality customer service for residential customers
- CUWCC Residential Sub-Committee co-chair

COMPUTER SKILLS

- Microsoft Office Programs: Word, Works, Access, Excel, Power Point, Outlook Express
- Corel Office Programs: Word Perfect, Quattro Pro, Presentations
- Additional Programs: Photo House, Explorer, Netscape

AWARDS RECEIVED

- Employee of the Quarter for the Division and the Department, October – December 1995
- Recognition of Team Work Award, 1997 and 1998

CERTIFICATES RECEIVED

- Water Conservation Practitioner – Level I

ATTACHMENT 4:
Letters of Support

ATTACHMENT 5:

Product Cut Sheets

NOTE: These product cut sheets are provided to show examples of the technology only. CCWD will solicit proposals for the supply of one or more High Efficiency Toilets and one or more Zero-Water Urinals to determine the models that will be used in the program. The High Efficiency Toilets will be required to have an average flush volume of 1.2 gpf or less and meet quality standards. The Urinals must have zero water usage and meet quality and performance standards.

Applicant: Contra Costa Water District

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Section A projects must complete Life of investment, column VII and Capital Recovery Factor Column VIII. Do not use 0.

Table C-1: Project Costs (Budget) in Dollars)

	Category (I)	Project Costs \$ (II)	Contingency % (ex. 5 or 10) (III)	Project Cost + Contingency \$ (IV)	Applicant Share \$ (V)	State Share Grant \$ (VI)	Life of investment (years) (VII)	Capital Recovery Factor (VIII)	Annualized Costs \$ (IX)
	Administration ¹								
	Salaries, wages	\$84,701	0	\$84,701	\$42,351	\$42,351	20	0.0872	\$7,386
	Fringe benefits ²	\$28,799	0	\$28,799	\$14,400	\$14,400	20	0.0872	\$2,511
	Supplies	\$0	0	\$0	\$0	\$0	20	0.0872	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0	\$0
	Consulting services	\$324,000	0	\$324,000	\$162,000	\$162,000	20	0.0872	\$28,253
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other (Indirect Costs ³)	\$44,892	0	\$44,892	\$22,446	\$22,446	0	0.0000	\$0
(a)	Total Administration Costs	\$482,392		\$482,392	\$241,196	\$241,196			\$38,150
(b)	Planning/Design/Engineering	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	832500	0	\$832,500	\$416,250	\$416,250	20	0.0872	\$72,594
(d)	Materials/Installation/Implementation	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(e)	Implementation Verification	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(f)	Project Legal/License Fees	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(g)	Structures	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(h)	Land Purchase/Easement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(i)	Environmental Compliance/Mitigation/Enhancement	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(j)	Construction	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(k)	Other (Specity)	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(l)	Monitoring and Assessment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(m)	Report Preparation	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(n)	TOTAL	\$1,314,892		\$1,314,892	\$657,446	\$657,446			\$110,744
(o)	Cost Share -Percentage				50	50			

1- excludes administration O&M.

2- Firnce Benefits = 34% of Direct Labor

3- Indirect Costs = 54% of Direct Labor

Applicant:

Contra Costa Water District

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-2: Annual Operations and Maintenance Costs

Operations (1) (I)	Maintenance (II)	Other (III)	Total (IV) (I + II + III)
\$0	\$0	\$0	\$0

(1) Include annual O & M administration costs here.

Table C-3: Total Annual Project Costs

Annual Project Costs (1) (I)	Annual O&M Costs (2) (II)	Total Annual Project Costs (III) (I + II)
\$110,744	\$0	\$110,744

(1) From Table C-1, row (n) column (IX)

(2) From Table C-2, column (IV)

Table C- 4: Capital Recovery Table (1)

Life of Project (in years)	Capital Recovery Factor
1	1.0600
2	0.5454
3	0.3741
4	0.2886
5	0.2374
6	0.2034
7	0.1791
8	0.1610
9	0.1470
10	0.1359
11	0.1268
12	0.1193
13	0.1130
14	0.1076
15	0.1030
16	0.0990
17	0.0954
18	0.0924
19	0.0896
20	0.0872
21	0.0850
22	0.0830
23	0.0813
24	0.0797
25	0.0782
26	0.0769
27	0.0757
28	0.0746
29	0.0736
30	0.0726
31	0.0718
32	0.0710
33	0.0703
34	0.0696
35	0.0690
36	0.0684
37	0.0679
38	0.0674
39	0.0669
40	0.0665
41	0.0661
42	0.0657
43	0.0653
44	0.0650
45	0.0647
46	0.0644
47	0.0641
48	0.0639
49	0.0637
50	0.0634

(1) Based on 6% discount rate.

Applicant: **Contra Costa Water District**

THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-5 Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits)

	Qualitative Description - Required of all applicants ¹				Quantitative Benefits - where c
	Description of physical benefits (in-stream flow and timing, water quantity and water quality) for:	Time pattern and Location of Benefit	Project Life: Duration of Benefits	State Why Project Bay Delta benefit is Direct ³ Indirect ⁴ or Both	Quantified Benefits (in-stream flow and timing, water quantity and water quality)
Bay Delta	The primary physical benefit to the Bay Delta system is water saved. The program will produce hard savings that can be sustained for 20 years. Water quality benefits will also occur due to the reduced diversions.	Water quantity benefit will occur equally throughout the year. The location of the benefit is the Bay Delta.	The projected life of the benefits is 20 years, which is based on the projected life of the High Efficiency Toilets and Urinals.	The Bay Delta benefits are direct primarily because CCWD draws its water directly from the Delta. Any water saved by CCWD remains in the Delta to be used by others (urban, ag, environment)	The estimated savings are 136 Acre Feet of water per year for 20 years (see Attachment 1)
Local	There are no local quantity benefits from the water saved because any water saved is then available to other delta users. However, there are monetary benefits to CCWD as shown on table C6.	na	na	Not applicable.	na

¹ The qualitative benefits should be provided in a narrative description. Use additional sheet.

² Direct benefits are project outcomes that contribute to a CALFED objective within the Bay-Delta system during the life of the project.

³ Indirect benefits are project outcomes that help to reduce dependency on the Bay-Delta system. Indirect benefits may be realized over time.

⁴ The project benefits that can be quantified (i.e. volume of water saved or mass of constituents reduced) should be provided.

Applicant:	Contra Costa Water District
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THE TABLES ARE FORMATTED WITH FORMULAS: FILL IN THE SHADED AREAS ONLY

Table C-6 Project Annual Local Monetary Benefits

ANNUAL LOCAL BENEFITS	ANNUAL QUANTITY	UNIT OF MEASUREMENT	ANNUAL MONETARY BENEFITS	Unit cost (af)
(a) Avoided Water Supply Costs (Current or Future Source)	136	acre feet	\$20,879	\$154
(b) Avoided Energy Costs	136	acre feet	\$4,216	\$31
(c) Avoided Waste Water Treatment Costs	0	acre feet	\$0	\$0
(d) Avoided Labor Costs	136	acre feet	\$9,588	\$71
(e) Other (treated water pumping O&M)	136	acre feet	\$5,032	\$37
(f) Total [(a) + (b) + (c) + (d) + (e)]			\$39,715	\$292

Table C-7 Project Local Monetary Benefits and Project Costs

(a) Total Annual Monetary Benefits [(Table C-6, row (f))]		\$39,715
(b) Total Annual Project Costs (Table C-3, column III)		\$110,744

36%

Table C-8 Applicant's Cost Share and Description

Applicant's cost share %: (from Table C-1, row o, column V)	50
Describe how the cost share (based on relative balance between Bay-Delta and Local Benefits) is derived. (See Section A-7 for description.)	
<p>The High Efficiency Toilet and Urinal Replacement Program promotes the most advanced water use efficiency technology available for these fixtures. The cost of the program is more than the traditional ULFT replacement program due to the higher fixture costs and the need for installation at multi-family and commercial sites. Based on Contra Costa Water District's avoided cost for the program, its minimum cost share for the program would be approximately 36%. However, to be more competitive for grant funds, the District proposes to fund 50% of the program costs. This project has the potential to begin market transformation for these fixtures which could eventually result in considerable statewide water savings. See Attachment 2 for the Avoided Cost calculation.</p>	

Avoided Cost of Water

Variable Cost Components	Variable cost of Current Supply in TWSA	Variable cost of Future Supply in TWSA	Variable cost of Current Supply in RSWA	Variable cost of Future Supply in RSWA	Grant Terms
	20%	80%	25%	75%	
Supply Cost	\$44	\$150	\$44	\$223	(a) Avoided Water Supply Cost
Raw Water Pumping, O&M	\$31	\$31	\$31	\$31	(b) Energy
Treatment O&M	\$141	\$141	\$0	\$0	(d) Labor
Treated Water Pumping, O&M	\$74	\$74	\$0	\$0	(e) Treated Water Pumping, O&M
TOTAL	\$290	\$396	\$75	\$254	

Summary

	TWSA	RSWA	Average
(a) Avoided Water Supply Cost	\$128.80	\$178.25	\$153.53
(b) Energy	\$31.00	\$31.00	\$31.00
(d) Labor	\$141.00	\$0.00	\$70.50
(e) Treated Water Pumping, O&M	\$74.00	\$0.00	\$37.00
	\$374.80	\$209.25	\$292.03

Costs are allocated assuming 50% of installations are in TWSA and 50% in RSWA

Costs assume 20% of the savings will be with Current Supply and 80% will be with Future Supply

Current supply cost has been reduced from \$61 to \$44 due to Slide Park and M & I deficit settlements

Variable supply cost is estimated to be \$150 per acre-foot beginning in 2011.

Treated water pumping, O&M and treatment estimated from current 2005 costs