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METROPOLITAN WATER DISTRICT OF SOUTHERN CALIFORNIA

*Dawn Chen*  
for EXECUTIVE SECRETARY

March 22, 1996

**To:** Board of Directors (Water Planning and Resources Committee -- Action)  
(Finance and Insurance Committee -- Action)

**From:** General Manager

**Submitted by:** J. W. Malinowski  
Director of Public Affairs and Conservation

**Subject:** Co-Funding Proposal for Single-Family, Residential Indoor/Outdoor Survey Programs

## RECOMMENDATION

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It is recommended that your Board adopt the co-funding matrix (Matrix) for Single-Family, Residential Indoor/Outdoor Survey Programs (Survey Programs) shown in Attachment A. The Matrix would become effective July 1, 1996.

## EXECUTIVE SUMMARY

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In August 1995 your Board approved Metropolitan's funding of Survey Programs at a flat rate of \$25 per survey. This flat rate, which represents approximately 50 percent of total survey cost, resulted in increased interest by member agencies and subagencies in conducting Survey Programs. Recently, however, staff has become concerned about the wide variance of Survey Program designs and the differing abilities of those designs to effectively reduce household water use. The intent of this Board Letter is to address that concern by adopting a minimum standard survey design that insures reliable, verifiable water savings and focuses on the reduction of water use.

The Memorandum of Understanding (MOU) regarding Best Management Practices (BMPs) recommends targeting the top 20 percent of residential water users for home surveys under BMP No. 1. The purpose of the new Survey Program design is to encourage closer adherence to this BMP. The proposed minimum Survey Program design requirements draw a critical distinction between: 1) proactive comprehensive Survey Programs that target residents using excessive water or the top 20 percent of residential water users, and 2) reactive customer service activities that focus primarily on high bill complaints.

The proposed minimum Survey Program requirements also reflect the pay-for-performance, cost-effectiveness philosophy embedded in Metropolitan's Integrated Resources Plan. In place of a per-survey flat rate that recognizes no difference in the conservation effectiveness of different types of Survey Programs, staff proposes a co-funding Matrix which provides specific funding for specific survey activities and accomplishments. A relatively inexpensive customer mail-in verification process is also proposed.

The requirements stipulate, in addition to achieving identifiable water savings (through specific device retrofits and increased landscape irrigation efficiency), that Survey Programs also contain a significant customer education component, leak detection, databasing of survey information, and a method to verify the work performed. In addition, Metropolitan would provide participating agencies with data base software for program tracking, training in the use of that software, and surveyor training.

The proposed new Survey Program design has been reviewed by participating agencies, and their comments have been incorporated into the revised design.

## **DETAILED REPORT**

Two-thirds of the regional urban water demand in Metropolitan's service area is derived from single-family residential users. BMP No. 1 requires that water agencies conduct indoor/outdoor water efficiency surveys (surveys) to a targeted portion of their single-family residential customers on a repeat cycle basis. Surveys typically consist of an hour-long, on-site visit by a trained technician who conducts an in-depth analysis of the residential water use. The technician will normally retrofit the home with low-cost water saving devices, such as showerheads, as needed. An analysis of household water use concludes with a customized report that identifies opportunities for the resident to conserve water.

Currently five agencies are conducting Survey Programs with Metropolitan co-funding. Cumulatively these programs involve approximately 8,300 surveys and a total program cost of about \$415,000. In Fiscal Year 1996/97 it is estimated there will be ten participating agencies conducting 12,000 surveys for a total program cost of \$600,000. In addition, Metropolitan is completing a turnkey pilot Survey Program with three member agencies and eleven subagencies. This pilot involves approximately 6,500 surveys and a variety of different surveying techniques. Until results of the pilot are analyzed (estimated completion December 1997), Metropolitan will make no decision on whether or not to offer further turnkey Survey Programs.

Since the initial signing of the BMP Memorandum of Understanding by Metropolitan in December 1991, major, comprehensive Survey Programs have been conducted

by the City of San Diego (San Diego), the Los Angeles Department of Water and Power (LADWP), and the San Diego County Water Authority (SDCWA). These Survey Programs have been designed to *proactively* approach *targeted* customers with the goal of reducing household water use to levels that are *below historical usage levels*. By contrast, a number of other agencies have conducted *non-targeted, reactive* customer service programs designed primarily to address high bill complaints by identifying spurious peaks in water use and making recommendations to return household water use *to pre-peak levels*.

Staff proposes a co-funding Matrix that identifies specific funding for specific survey activities. Those activities include: 1) retrofitting fixtures with water-saving hardware (e.g., low-flow showerheads, faucet aerators, etc.), 2) providing valuable non-device conservation intervention (e.g., evaluation of landscape irrigation effectiveness, development of irrigation schedules, etc.), and 3) identifying leaks, educating the customer, and databasing of extensive household survey information. Copies of Single-Family Residential Program Design Requirements 1996-1997, which gives details of the program requirements, are available in the Office of the Executive Secretary.

To verify information reported on completed surveys and, in certain special circumstances, to establish device installation rates, the proposed program design requirements include implementation of a relatively inexpensive customer mail-in postcard.

Implementation of the proposed program design requirements will require maintenance of accurate and detailed records. For some Survey Programs this is already being done and should cause no significant increase in workload. For other Survey Programs, the tabulation of various device installations, non-device interventions, water savings calculations, and various household characteristics will necessitate greater effort. To facilitate this effort and to assure each Survey Program is providing the necessary information in a standardized format, Metropolitan will offer sessions for surveyor training, and it will provide the necessary tracking software and training for its use.

For agencies having a comprehensive survey program, this matrix allows the opportunity to secure Metropolitan co-funding for offering maximum services to customers.

Attachment

## ATTACHMENT A

## ***The Met Co-Pay Matrix for Single-Family Surveys***

Survey, Leak Det. & Database	Installed Showerhead	Installed Aerator	Installed Toilet Displ. Device	Irrigation Evaluation (w/o timer)	Irrigation Evaluation (with timer)	Installed ULFT
\$12.50	\$5	\$1	\$3	\$8	\$18	\$60

### ***Surveys***

Copies of the Single-Family Residential Design Requirements 1996-1997 are available in the office of the executive secretary.

### ***Showerheads***

Showerhead pre-flow test must demonstrate the retrofit of a 3.0 gpm or greater existing showerhead.

If agency purchased showerheads from Metropolitan, subtract \$1 per showerhead.

### ***Faucets***

Faucet pre-flow test must demonstrate the retrofit of a 2.6 gpm or greater existing faucet.

### ***TDDs***

Toilet Displacement Devices may only be installed in toilets with a flush volume of 3.5 gpf or more and when no ULFT retrofit is anticipated.

### ***ULFTs***

ULFTs must replace non-ULFTs.

### ***Irrigation Evaluations***

Irrigation system evaluations and watering schedules are only eligible for co-payment if the household has at least 1,000 square feet of irrigated landscape and the schedule includes a complete analysis of the resident's irrigation water management which takes weather (ET<sub>o</sub>), plants, soils and irrigation systems into consideration. The analysis will produce an irrigation schedule which balances the changing requirements of the landscape with the capabilities of the irrigation system. Wherever possible, calculation of water savings for adherence to irrigation schedule will be provided.

# Single-Family Residential Survey Program Design Requirements 1996-1997

## 1. *Proactive Targeting of Program Participants.*

In order to qualify for co-funding, a Single-Family Residential Survey Program (Survey Program) must include proactive targeting of program participants. The funding values in the Metropolitan Co-Funding Matrix (Matrix) assigned to device retrofit and landscape irrigation evaluation are based on water savings identified from analysis of LADWP's Home Survey Program<sup>1</sup> and the Conservation Credits Program incentive of \$154 per acre foot of water conserved. The value assigned to leak identification, customer education and databasing of survey information is based largely on judgment, recognizing that: a) effective household conservation correlates closely with customer education, b) one-on-one customer interaction during the survey process is the most cost-effective mode of education, and c) careful recording of survey information provides important data for program effectiveness review and for the improvement of end-use demand forecasting.

There are many variables that can affect the water savings and the cost of a Survey Program. Some variables are fixed; others can be fleeting. Some of the more salient variables are discussed below.

1.1 **Turf (Irrigated Landscape) / Top 20% of Water Users.** The San Diego study<sup>2</sup> suggests that net water savings among participating households *with no turf* were estimated to be approximately 12.4 gallons per household per day. However,

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<sup>1</sup> Chesnutt, Thomas W., Casey N. McSpadden, and David M. Pikelney. What is the Reliable Yield from Residential Home Water Survey Programs? The Experience of the Los Angeles Department of Water and Power. Executive Summary, June 1995.

<sup>2</sup> Bamezai, Anil and Thomas W. Chesnutt. The 1992 City of San Diego Residential Water Audit Program: Evaluation of Program Outcomes and Water Savings. December 1994.

net water savings among residences *with turf* were estimated to be approximately 26.1 gallons per day. On the other hand, an analysis of the net water savings among the highest 20 percent of water users in the program showed an estimated water savings of 26 gallons per day. Most likely, the highest water users will have turf.

The Los Angeles study<sup>3</sup> distinguishes a two-tier water savings potential of households with turf. It determined that if a household had turf, then an average of 12.5 gpd were gained from an outdoor efficiency survey. An additional 13.7 gpd were saved if the irrigation system was automatic, (i.e., the system had a timer).

**1.2 Climate/Microclimate.** Average consumption in hotter inland areas of California is estimated at over 500 gallons per household per day as compared to only 360 gallons per household per day in coastal areas. Because an agency may have several different climate zones within its service territory, it would be reasonable to target those higher water using zones which offer the greatest potential for water savings.

**1.3 Rate Structure.** The Los Angeles study demonstrates very dramatically the effects of rate structure on the water savings related to a home survey. In 1993, LADWP introduced a new, two-tiered rate structure. Net conservation jumped to 88 gpd in 1993, up from 8.9 gpd in 1991, and 25.7 gpd in 1990.

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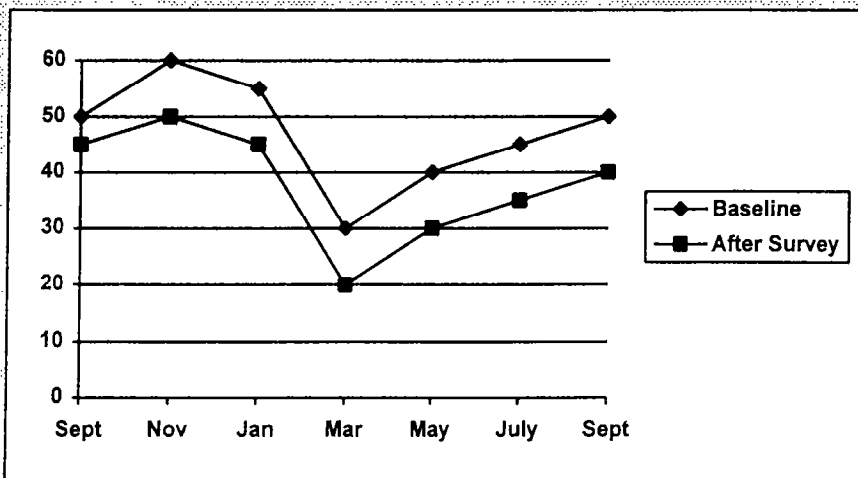
<sup>3</sup> Chesnutt, Thomas W., Casey N. McSpadden, and David M. Pikelney. What is the Reliable Yield from Residential Home Water Survey Programs? The Experience of Los Angeles Department of Water and Power.

The Effects of Targeting

Effects of a Proactively Targeted Conservation Program

By integrating pro-active targeting, a holistic review and evaluation of residential water use, the installation of conservation devices, the implementation of non-device interventions, and customer education, Survey Programs can reduce the household's *baseline* water consumption, as is illustrated in Figure 1.

Figure 1 – Illustration of the Effects of a Survey on Water Use



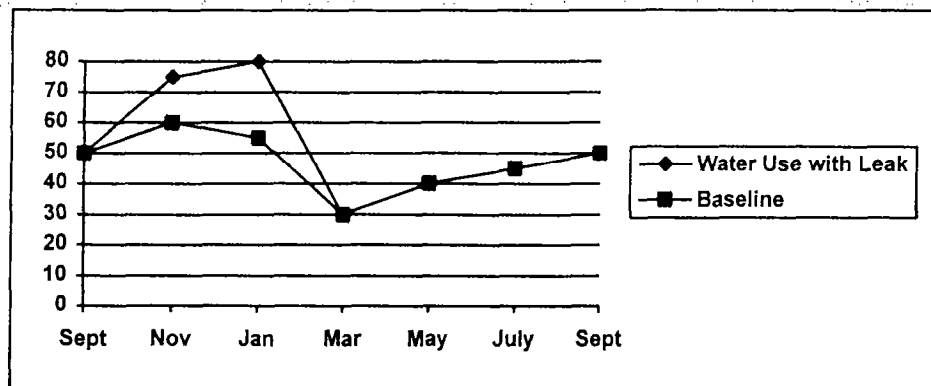
## Effects of a Non-Targeted, Reactive Customer Service Program

In contrast, a high bill response program (customer service program) typically responds only to a recent increase in a customer's water use. Once on site, the technician identifies the source of the increase (often a leak) and makes recommendations to bring the household water use down to its original level (see Figure 2). The overall baseline water use is not necessarily reduced. Nor does this customer necessarily have any additional conservation potential. The customer's water use may be too low for there to be an opportunity for significant cost-effective conservation. That's not to say the water savings achieved by identifying the cause of the increase is not important (it certainly is to the customer), nor that it does not represent any conservation benefit. However, it is Metropolitan's position that a program that is designed to:

1. respond to high bill complaints (i.e., it is not targeted),
2. focus on the cause of recent high water use, and
3. not present comprehensive water-use surveys that include as many conservation interventions as possible, and
4. does not include a thorough customer education process

is a customer service program and not a conservation program. As a customer service program it represents a normal agency operating cost. It is designed to provide local benefit, not regional benefit. Consequently, under the principles of Metropolitan's Integrated Resources Plan, it does not qualify for Metropolitan co-funding.

Figure 2 -- Illustration of the Effects of Leak Detection on Water Use





### 2. Survey Leak Detection and Education Requirements

#### 2.1 Indoors

- a) complete inspection for leaks at all hose bibs, toilets, showers/diverter valves, tubs, etc.
- b) identification and measurement of leaks and calculation of water savings for leak repair
- c) measurement of existing flow rate of showerheads
- d) retrofit of low-flow showerheads and calculation of related water savings
- e) measurement of existing flow rate of all faucets
- f) retrofit of low-flow faucet aerators and calculation of related water savings
- g) measurement of existing flush value of toilets
- h) calculation of water savings by retrofitting with a ultra-low-flush toilet
- i) identification of all other water-use activities/devices (evaporative cooler, RO purifier, washing machine, dishwasher, water softener, etc.) and calculation of related water savings to be had if conservation practices/devices are employed

#### 2.2 Outdoors

- a) complete inspection for leaks at all hosebibs, irrigation system, meter, etc.
- b) identification of leaks and calculation of water savings for leak repair
- c) identification of all other water-use activities/devices (car washes, pools, spas, etc.) and calculation of related water savings to be had if conservation practices/devices are employed

#### 2.3 General

- a) surveys must be completed by an on-site, trained technician.
- b) surveys must include leak detection for the total household.
- c) survey information is databased according to Metropolitan's minimum requirements (see next page)
- d) survey participants are targeted for participation.
- e) water efficiency education materials are distributed to all participating households.
- f) all findings and calculations of achieved and potential water savings will be presented in writing to all residents
- g) all findings and calculations of achieved and potential water savings will be databased and available for examination
- h) regional message is incorporated into the program
- i) the resident's past water consumption is provided to evaluate water use
- j) verification policy is followed

### 3. Database Design Requirements

Databases should contain the following information:

- a) What is the Dwelling Type? (detached single-family, condo, townhouse, etc.)
- b) Number of adults?
- c) Number of seniors?
- d) Number of children?
- e) Number of teenagers?
- f) Number of people who stay home most days?
- g) How many toilets?
- h) What is the flush volume of each toilet?
- i) Do any toilets have leaks? If so, quantify.
- j) Were toilet displacement devices or ulft's retrofitted? If so, how much water per flush will be saved by the retrofit?
- k) How many flushes per day?
- l) How many showers?
- m) How many showers taken per day?
- n) What is typical shower time?
- o) What is the flow rate of each showerhead?
- p) Were any showerheads retrofitted with low-flow showerheads? If so, how many?
- q) Were showerheads left with the customer? If so, how many?
- r) Do any of the showers/baths leaks? If so, quantify.
- s) How many kitchen faucets?
- t) How many bathroom faucets?
- u) Do the faucets leak? If so, quantify.
- v) What is the flow rate for each faucet?
- w) Were aerators installed or left with customer? If so, how many were installed and how many were left?
- x) Is there a dishwasher?
- y) How many times per week do they run the dishwasher?
- z) Is there a clothes washer? If so, what is the typical load (small, med., large)?
- aa) How many loads of laundry per week?
- bb) Does the unit have irrigated landscape? If so, how many square feet is it?
- cc) Is the lawn watered seasonally or year-round?
- dd) What is the predominant type of turf, and how many square feet?
- ee) What kinds of other shrubs and ground cover are present?
- ff) Is there a pool? If so, what is its surface area?
- gg) Do they use a pool cover?
- hh) Is there a spa? If so, what is its surface area?
- ii) Do they use a spa cover?
- jj) Are vehicles washed on the premises?
- kk) Is there a swamp cooler?
- ll) Is there a Reverse Osmosis Water Purifier?
- mm) Is there some other significant water use at the site? If so, how often?
- nn) What is the monthly water use of the household (show 12 months)?

### **4. Verification Policy**

In order to verify the installation of the conservation devices and the implementation of irrigation schedules, the following verification policy shall be adhered to by all participating agencies.

**4.1 Installations by technicians:** Metropolitan will provide immediate co-payment of all installations made by technicians (Surveyors/Auditors) and reported in quarterly reports submitted to Metropolitan. Postage-paid postcards (see attached sample) will be left with each customer for confirmation of device installation. Results of these postcards will be shared with Metropolitan at the end of the program (or the end of Term) but the co-payment amount remains the same.

**4.2 Customer Self-Installation.** Some residential programs have been reluctant to perform the actual installation of conservation devices due to perceived liability issues. As a result, two popular alternatives which encourage customer installation of conservation devices include: 1) leaving devices with the customer and 2) providing rebates. Device drop-offs and rebates can be incorporated into Survey Programs and be eligible for co-funding as long as verification policies are implemented.

Metropolitan will provide co-payment for devices left with the customer only at the end of the program upon verification of customer installation. At minimum, the agency will leave a postage-paid postcard with each customer. At the end of the program, the agency will demonstrate to Metropolitan the results of the postcards. For example, of the postcards received, if 80 percent verify installation of the showerheads left in the home, Metropolitan will provide co-payment for 80 percent of the showerheads left for self-installation. Co-payment percentages for each device will be determined independently. Agencies have the option of implementing more stringent verification policies, such as telephone verification calls or on-site verification visits if they wish.

Sample Verification Postcard

Thank you for your interest in learning how to use water efficiently!  
Please help us to improve our program by completing and mailing this card.

Please check (✓) the appropriate category:	Installed by Surveyor	Installed by self	Not Installed
Low-flow Showerhead(s)	_____	_____	_____
Faucet Aerator (s)	_____	_____	_____
Toilet Device(s)	_____	_____	_____

**Leaks:**  
 Did the Surveyor show you how to read the water meter? Y N  
 Did the Surveyor discover any water leak(s) in your household? Y N  
 If yes, will you fix the leak(s)? Y N  
**For customers with irrigation systems:**  
 Did the Surveyor evaluate your irrigation system? Y N  
 If yes, did he/she provide you with a recommended watering schedule? Y N  
 If yes, will you follow the new schedule? Y N (circle one)  
 Does the schedule suggest more, the same or less water use? More Same Less

Customer Signature: \_\_\_\_\_ Date: \_\_\_\_\_

Customer Name \_\_\_\_\_  
 Address: \_\_\_\_\_  
 City/Zip: \_\_\_\_\_  
 Tracking Number: \_\_\_\_\_

Water Agency XYZ  
 123 Water Lane  
 Aguapopolis, California 90000

Call us at 1-800-CONSERV if you have any questions