
West Basin Municipal Water District

Proposal for

Landscape Irrigation Management Project

**Proposition 50
Urban Water Use Efficiency Implementation Grant
California Department of Water Resources**

January 11, 2005

Prepared by

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Project Information Form

Applying for

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

Urban Agricultural

- (a) implementation of Urban Best Management Practice, # i, iv, xi.
- (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: _____
- (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

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

3. Principal applicant (Organization or affiliation):

West Basin Municipal Water District

4. Project Title:

West Basin Municipal Water District Landscape Irrigation Management Project

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

Name, title	Art Aguilar, Co-General Manager Rich Nagel, Co-General Manager
Mailing address	17140 S. Avalon Blvd., Ste. 210 Carson, CA 90746
Telephone	310-217-2411
Fax.	310-217-2414
E-mail	arta@wcbwater.org richardn@wcbwater.org

6. Contact person (if different):

Name, title	Gus Meza, Conservation Coordinator
Mailing address	17140 S. Avalon Blvd., Ste. 210 Carson, CA 90746
Telephone	310-660-6209
Fax.	310-217-2414
EMail	gusm@wcbwater.org

7. Grant funds requested (dollar amount): \$ 358,050
(from Table C-1, column VI)
8. Applicant funds pledged (dollar amount): \$ 358,050
9. Total project costs (dollar amount): \$ 716,000
(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.
(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.)
- (a) yes, see Appendix A.
 (b) no
13. Is your project required by regulation, law or contract?
 If no, your project is eligible.
- (a) yes
 (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.*

14. Duration of project (month/year to month/year): Dec 2005 - Nov 2008
 (3 years)
15. State Assembly District where the project is to be conducted:
- | | |
|----------------|-------|
| Paul Koretz | AD 42 |
| Karen Bass | AD 47 |
| Jerome Horton | AD 51 |
| Mervyn Dymally | AD 52 |
| Mike Gordon | AD 53 |
| Betty Karnette | AD 54 |
| Jenny Oropeza | AD 55 |

16. State Senate District where the project is to be conducted: Sheila Kuehl SD 23
Edward Vincent SD 25
Kevin Murray SD 26
Debra Bowen SD 28
17. Congressional district(s) where the project is to be conducted: Henry Waxman USC 30
Diane Watson USC 33
Maxine Waters USC 35
Jane Harman USC 36
Juanita Millender-
McDonald USC 37
Dana Rohrabacher
USC 46
18. County where the project is to be conducted: Los Angeles
19. Location of project (longitude and latitude): 118W17 and 33N50
20. How many service connections in your service area (urban)? 42 MWD connections,
174,092 Residential
Connections
21. How many acre-feet of water per year does your agency
serve? Total – 222,000 acre-feet
22. 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 _____
23. Is applicant a disadvantaged community? If 'yes' include annual median household income. (Provide supporting documentation.)
- (a) yes, _____ median household income
 - (b) no. However, there are several cities, including Hawthorne, Inglewood, Lennox, and West Athens, within the WBMWD service area, that are disadvantaged communities. (See Appendix B)

Statement of Work

Section One: Relevance and Importance

Introduction

West Basin Municipal Water District (WBMWD), working in conjunction with TurfTech Industries, is seeking grant funding for the Landscape Irrigation Management Project (Project). Pre-survey estimates conducted for this grant application indicate that most large urban landscapes, such as school yards, recreational areas, and highway medians are over-irrigated by 100 to 300 percent (see Appendix C for sample pre-survey data). The Project utilizes irrigation scheduling software and rigorously applies proven water conservation management techniques to more efficiently irrigate landscaped areas. The Project will analyze site irrigation practices and characteristics to determine a monthly usage goal, use computer software to calculate monthly irrigation schedules and make recommendations to modify irrigation practices, and utilize the internet to track water use goals and re-evaluate and adjust schedules.

The hallmark of this project is its use of low cost water management techniques - surveys, computer irrigation analysis software, system monitoring and adjustments, and website reporting - to reap significant, long-term water and cost savings. In a prior pilot program conducted in the City of Westminster in Orange County, water demand for municipal irrigation of 60 acres was reduced by 30 percent, resulting in \$31,000 and 59 acre-feet of water in savings (see Water Conservation Tracking Sheet in Appendix D). The savings that will accrue to other municipalities will provide the incentive to actively maintain participation in this practical and affordable approach. The water and cost savings that will accrue to WBMWD will have the added benefits of increasing regional supply reliability and enhancing the region's capacity to reduce water imports from the Bay-Delta in times of drought or emergency. The Project incorporates two California Urban Water Conservation Council (CUWCC) Urban Best Management Practices (BMPs): residential water surveys and large landscape conservation.

There will be two phases to the Landscape Irrigation Management Project: Phase I will focus on large landscape audits in cities and schools with Phase II focusing on residential audits. Phase I will include the following steps:

- Marketing to potential municipal clients.
- Preparation and presentation of pre-survey that compares historical monthly landscape water usage versus the calculated water requirement (base year).

- Conduct "Irrigation Audit" that analyzes each site in detail by controller and irrigation zone to identify its characteristics, functionality, and Distribution Uniformity (DU) that will be used to develop irrigation schedules.
- Process field data through irrigation scheduling software to develop irrigation schedules.
- Establish a conservation-based monthly usage goal.
- Produce a final report that makes recommendations to be implemented in phases that incrementally improves efficiency of the irrigation system.
- Calculate potential savings of water and cost by comparing historical baseline to recommended conservation-based monthly usage goal.
- Provide irrigation scheduling software to client and train irrigation managers on use of software.
- If called for, re-audit zones that have implemented efficiency recommendation and input revised data into Scheduling Engine.
- Develop website for participants to track monthly usage (over 5 years).

Phase II will continue Phase I for large landscape irrigation and apply the same approach to residential audits. This phase will include the following steps:

- Hire employees (Water Ambassadors) from disadvantaged communities and train them in basic irrigation auditing and community relation skills.
- Implement Community Outreach Program.
- Perform residential irrigation audits.
- Input audit data into Scheduling Engine (residents will be able to access their individual irrigation schedules through the Web Site).
- Notify residents on or about the first of each month through email or auto-dial to change monthly schedules. Residents will have access to their own usage and savings data. The total savings (large landscape and residential) for WBMWD will be available on the website. If weather conditions require (rain, unusual heat or cold), residents will be notified to modify schedules accordingly.
- Coordinate with Metropolitan Water District of Southern California (MWD)'s Protector Del Agua (PDA) Landscape classes.

When this project is mature, money saved from the Phase I will be reinvested to fund Phase II. WBMWD must apply for funding for the Phase II to initiate this

project, however. In the future, implementing agencies will fund Phase II *entirely* from Phase I conservation savings.

Goals and Objectives

There are multiple goals and objectives for the WBMWD Project.

Several goals indirectly benefit the Bay-Delta region and accomplish the following:

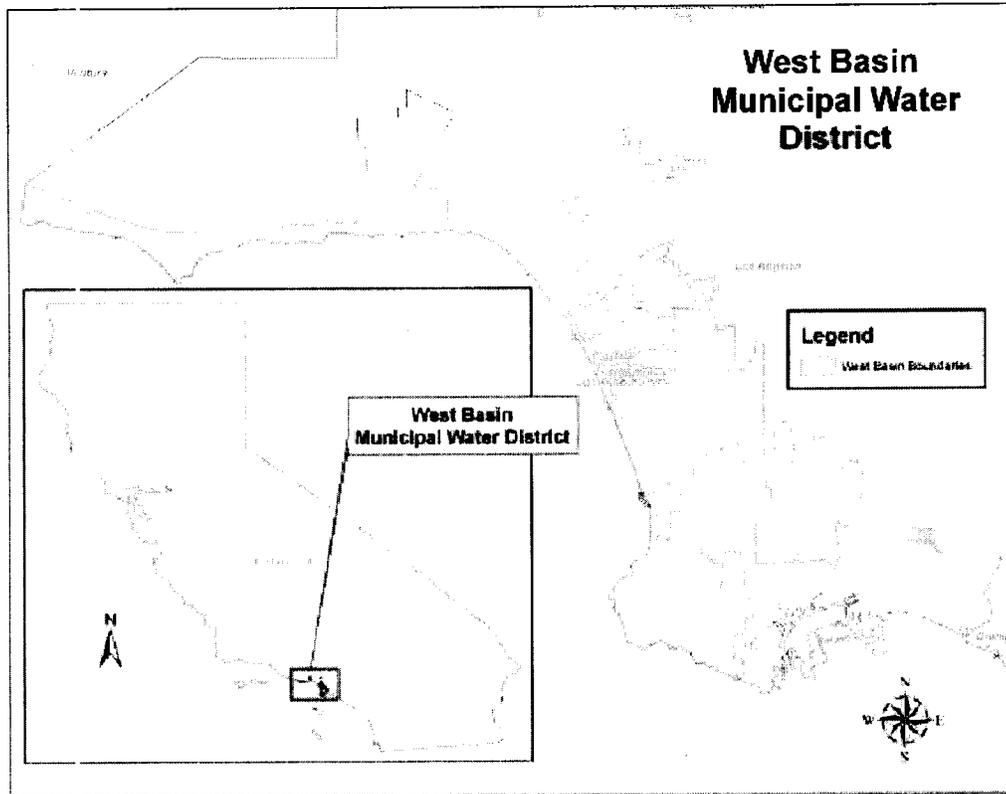
1. Contribute to the California Bay-Delta Program's water supply reliability, water quality, and ecosystem restoration goals by reducing demand on imported water from the Bay-Delta.
2. Expand implementation of water use efficiency projects in the WBMWD service area to increase the capacity of the region to reduce water imports from the Bay-Delta in times of drought and emergency.
3. Meet the objectives of the CUWCC's Memorandum of Understanding (MOU) by implementing BMPs 1, "Water Survey Programs for Single-Family Residential and Multi-Family Residential Customers," and BMP 5 "Large Landscape Conservation Programs and Incentives."

The objectives of the Project benefit both the southern California and the Bay-Delta regions and include the following:

1. Increase water conservation savings by reducing outdoor irrigated water use in the WBMWD service area.
2. Demonstrate water use and cost savings of utilizing irrigation scheduling software combined with proven water management techniques and BMPs to deliver significant water and cost savings.
3. Utilize an outreach program to communicate water and cost saving opportunities for both large landscape irrigators and the residential sector.
4. Implement widespread utilization of the Project approach throughout the WBMWD.

Need for Project

Population growth and environmental restoration needs will continue to place demand pressure on imported water supplies, including those from the Bay-Delta region, the eastern Sierra, and the Colorado River. In addition, local supply will continue to be threatened by groundwater contamination. WBMWD wholesales approximately 222,000 acre-feet per year of imported water to its customers. Without implementation of multi-benefit conservation programs, such as the WBMWD Project, the regions need for additional imported water is expected to increase.



A recent report (*Waste Not, Want Not*, Pacific Institute) estimated that the State could reduce urban water use by 2.3 million acre-feet by using "existing technologies and policies." This Project will provide real, sustainable, and significant water and cost savings as the region adapts to imported water and contaminated groundwater supply challenges. It will do this by using existing technologies and policies in WBMWD's service area and changing practices among both large scale irrigators and private single-family homeowners. In this two-phased project, WBMWD will partner with the municipalities in their service area to increase the efficiency of large-scale irrigation practices and then roll the savings into a program to apply the same techniques to residential properties.

When this project is mature, each of these efforts will have the effect of providing indirect benefits to the CALFED Bay-Delta area. The success of the Westminster Pilot Program, indicates that the proposed program will achieve significant water savings. The success of this project will encourage other California municipalities to implement similar programs, expanding Bay-Delta benefits over time.

Over the years, WBMWD has distinguished itself as a pro-active, conservation conscious water agency with one of the nation's largest recycled water programs, the West Basin Recycled Water Project. Non-potable application of recycled water includes irrigation, commercial and municipal use, and industrial processes. WBMWD also has been a leader with its very successful Ultra Low Flow Toilet (ULFT) distribution program that has installed over 50,000 ULFTs in the service area. This proposed grant application gives the WBMWD an opportunity to provide a proven conservation approach to this same Commercial, Industrial, and Institutional (CII) and residential customer base. The District will use this knowledge to continue conducting and improving future programs in its region.

A recent report by the California Department of Water Resources (DWR) estimated that savings of 1.5 to 2.5 million acre-feet of water by urban conservation practices is achievable through the implementation of water use efficiency projects. DWR's estimates were echoed by a recent Pacific Institute report that concluded the state could save 2.0 to 2.3 million acre-feet water through conservation. This underscores the importance of investment in local projects that combine a high probability of success with low cost, especially when compared to the cost of imported water. The Project will be another demonstration of WBMWD's commitment to water use efficiency, as it continues to implement innovative water saving projects.

Consistency with Local or Regional Water Management Plans

The primary objective of this project, applying irrigation efficiency techniques to irrigation practices among large scale irrigators and private single-family homeowners, is consistent with local, regional, and State water management plans. The Project is consistent with the WBMWD and Central Basin Municipal Water District (CBMWD) Urban Water Management Plan (UWMP) and the regional MWD Integrated Resource Plan (IRP). CBMWD is the sister agency of WBMWD. Both of these plans are aligned with CALFED's objectives to reduce demand on Bay-Delta water and increase water supply reliability and WBMWD's mission to provide a safe and reliable water supply at a reasonable cost.

The UWMP, adopted November 2000, explains how both districts anticipate meeting the water needs of their customers through resource management approaches. The UWMP calls for the implementation of water conservation measures to offset growth in water demand among other water management actions.

The UWMP sets the goal of conserving water and requires aggressive implementation of all applicable BMPs in the MOU of the CUWCC. This Project applies the stated water conservation goals of the UWMP by reference to the MOU

and incorporates the following BMPs: residential water surveys and large landscape conservation.

WBMWD is a member agency of the southern California regional water wholesaler, MWD. In 2003, MWD updated its 1996 IRP. The results of the IRP Update analysis demonstrate that the resource targets of the 1996 IRP, factored in with changed conditions – the most significant being higher projected local supplies and greater conservation savings – provide for reliability through 2025. The IRP identified changed conditions for water resource development and updated resource targets through 2025. Water conservation is a critical element in the IRP regional strategy.

Implementation of Water Demand Management Activities from Plans

Demand management, reducing water demand at the point of use, means providing the education and tools necessary to help the homeowner, apartment owner, business owner, and the public reduce the amount of water used on their property. When this style of water management is broadly applied throughout a given region, water use demand is expected to decline, thus increasing water supply reliability and indirectly benefiting the CALFED Bay-Delta region.

The water demand management activities that have been implemented by WBMWD include the following:

- Aggressive implementation of CUWCC BMPs.
- Initiation of the WBMWD water conservation program in 1989. Since then, the program has replaced nearly 50,000 toilets in the ULFT distribution programs to residential customers. It is estimated that a family of four saves about 28 gallons per day by using an ULFT as their primary toilet, while the savings are greater at 48 gallons per day at multi-family properties (apartments).
- Implementation of large landscape conservation to large turf areas requiring year-round irrigation including city and county parks, golf courses, schools, cemeteries, street medians, etc. WBMWD has reduced demand for imported water for irrigation by providing recycled water to these areas.
- Initiation of several public information and education programs including: 1) the annual "Water Harvest Festival" during which WBMWD and CBMWD invite children and their parents to the West Basin Recycling Facility in El Segundo to participate in games and obtain information on recycling and the Districts; 2) California Water Awareness Campaign; 3) "May is Water Awareness Month" during which time water conservation messages are communicated to the commercial, industrial, municipal and public sectors; 4) providing local news media with conservation information through press releases and meet with

editorial boards; and 5) regular visits by school children to the West Basin Water Recycling Plant; and

- Participation in MWD's economic and financial incentives to encourage efficient use of water in its service area.

How the Project will Further Implement Existing Water Management Activities or Initiate New Ones

The Project builds upon WBMWD's very successful implementation of large landscape conservation to large turf areas requiring year-round irrigation including city and county parks, golf courses, schools, cemeteries, street medians, etc. In addition to the current water saving practice of irrigating these areas with recycled water, this Project will utilize proven irrigation scheduling software to ensure that city parks, schools, street medians, and other municipal landscaped areas (using potable imported water) are not over-irrigated, therefore generating significant additional water savings.

The irrigation scheduling software is an effective, existing water management tool currently unavailable to municipalities due to budget constraints. The Proposition 50 grant funding will allow the implementation of these techniques in municipal landscaped areas that currently over-irrigate by up to 300 percent. Furthermore, the project will eventually become self-sufficient, as savings realized from Phase I of the Project will fund Phase II. This program meets the local goals of cities, sanitation districts, water quality control boards, water agencies, and environmental groups, which is to conserve water and reduce urban runoff.

SECTION TWO: Technical/Scientific Merit, Feasibility

Phase I of this project will decrease water use by applying generally accepted management techniques to the irrigation practices of the program clients, large municipal water users such as cities, school districts, parks, and transportation departments, who will participate on a voluntary basis. Municipal landscaped areas such as parks, median strips, and schools are usually over irrigated. The techniques employed by this project eliminate over-irrigation by surveying the irrigation system performance, analyzing the needs of irrigated plants, and preparing an appropriate irrigation schedule.

Water delivery is adjusted as the weather and seasons change. Monthly water requirements to efficiently irrigate each site are calculated based on the acreage, as well as local historical weather data, and reference evapo-transpiration (ET_o) obtained from the California Irrigation Management Information System (CIMIS). As mentioned above, a prior pilot program conducted in Orange County for the municipal irrigation of 60 acres, resulted in \$31,000 in savings and 59 acre-feet of

water savings for that municipality in the first year. Major system defects that had been undetected, possibly for years, were identified and corrected; these repairs are expected to produce an additional 20 percent savings in the second year.

To begin this project, baseline monthly irrigation demand is calculated for each client by averaging demand of the corresponding months over the three most recent years, using data that is readily available from local water retailers.

If a facility utilizes mixed-use water meters, the metered water delivery is reduced by an estimated potable usage to obtain the irrigation demand (total usage – estimated potable usage = irrigation usage). Estimated potable usage is calculated as a percentage of total usage based on data obtained from locations that have separate potable and irrigation meters. For example, TurfTech Industries review of school sites that have separate potable and irrigation meters reveals the following average potable usage percentages: 8.5 percent for high schools, 10 percent for middle and junior high schools, and 11 percent for elementary schools.

After the pre-survey is completed, TurfTech Industries performs a complete water audit. Data collected includes soil profile characteristics, DU, and the type of plant material in use. The entire irrigation system is catalogued and correct nozzle recommendations are made to provide the best matched precipitation rates attainable. The goal of this program is to assist the client in obtaining the irrigation industry's generally accepted standard of a 70 percent DU rating for efficient irrigation. DU reflects the evenness of the irrigation and is calculated by comparing the amount of water applied to the least-irrigated portion of the property with the amount of water applied over the entire property. It is measured by capturing the water applied during irrigation into graduated catch cans laid out over a grid.

$$\text{Uniformity Rating} = \frac{\text{Avg of the lowest 25 percent of irrigation readings}}{\text{Avg. reading}}$$

Once the field data is collected, WBMWD's program partner, TurfTech, processes the data through their irrigation requirement software, which will be used as a basis to develop customized irrigation schedules for each site (see Appendix E for sample program input). The software calculates zone runtimes and frequency based on the zone's output, DU, ETo, plant requirements, and the soil's ability to accept and hold water. Multiple cycles for a single zone may be employed to avoid runoff or standing water caused by slopes or heavily compacted soil.

TurfTech also makes recommendations for improving the irrigation systems (hardware, nozzles, etc) that incrementally improve the efficiency and uniformity of the system as the monitoring data is compiled. These recommendations are presented in a three-step process, as outlined below. At each phase, clients will

receive 12 monthly irrigation schedules (see Appendix E for sample Irrigation Schedules).

Step 1:

Generate and provide twelve monthly irrigation schedules (based on cycles per week) utilizing the system's current configuration and DU. Schedules are designed to fit the participating site's "irrigation window" and will not impact site activities.

Step 2:

Recommend low cost system modifications, such as nozzle and sprinkler head adjustments to improve DU, and provide twelve revised monthly irrigation schedules.

Step 3:

If needed, recommend major system modifications (i.e. the addition of a booster pump, division or combination of stations, or upsizing pipe sizes, etc.) and provide twelve monthly irrigation schedules reflecting these modifications. Step 3 is rarely needed and is generally used to prolong the life of an older or outdated hydraulic system until funds are available to replace it.

For a period of one year following the acceptance of the final report, WBMWD and its program partner work closely with maintenance staff to fine-tune and adjust the monthly schedules based on feedback that areas are being over or under irrigated. Additionally, irrigation specialists re-evaluate any areas affected by system modifications and provide adjusted schedules to correct any issues.

Each month, actual use data is recorded from water bills. Subtracting the monthly water consumption from the baseline monthly irrigation demand reveals the quantity of conserved water and financial savings. Financial savings are calculated using the current water rates, which are applicant's avoided costs. They include all variable charges applied to actual units of water consumed (HCF or CCF). Fixed charges, such as the Water Availability charge (meter maintenance/rental fee), are not included in the per unit cost.

Phase I of this project will expand this work to irrigation practices for single-family homeowners in residential neighborhoods of WBMWD's service area. When the project is mature, Phase II will be completely funded by savings realized in Phase I, however, additional grant funding is required to begin implementation of Phase II. The methods, procedures, and equipment used for Phase II are the same as those used during Phase I, however given that Phase II involves a greater number of small, individual parcels of land, more footwork will be required. This makes Phase II of this project cost ineffective from the perspective of individual homeowners. By funding Phase II with savings realized in Phase I, both phases are still cost effective for WBMWD.

WBMWD and its program partner will train 15 to 20 additional staff as "Water Ambassadors" to perform public outreach activities and residential field audits (pre-surveys and detailed site analysis).

Another key difference in Phase II is the method used to provide irrigation schedules to the residential customers. Once the data is processed through the irrigation scheduling software, residents may access their irrigation schedules through the Internet. Using e-mail notifications, the software will inform residents, on or around the first of each month, that it is time to change monthly schedules. If Internet access is not available, auto dial will be used to contact the participants. In addition, residents will be notified to modify irrigation schedules according to varying weather conditions such as rain or extreme heat or cold.

PROGRAM TASKS	DELIVERABLE	IMPLEMENTATION TIME FRAME	TASK COST
Phase I: Municipal, Large Landscape Irrigation Audits (County, City, School Districts)			
Complete Pre-Survey for each customer	List of Participating Agencies	December 2006 - February 2006	\$20,000.00
Present Pre-Survey to customers	Pre-Survey Document	December 2006 - February 2007	\$30,000.00
Perform Irrigation Audits (detailed analysis of each site and data gathering for scheduling software)	Kick-off Meeting	December 2006 - February 2008	\$4,000.00
Provide Irrigation Scheduling Software to Client & Train Irrigation Managers on use of Software	On-Site Work (Target: 900 Acres)	January 2006 - September 2006	\$270,000.00
Re-audit sites that have implemented system efficiency improvement recommendations	Software & Training Session	February 2006 - October 2006	\$18,000.00
Re-audit zones affected by modifications; recommend major system modifications, redesign recommendation profile, re-audit after mods are implemented	Updated Software	June 2006 - May 2007	\$15,000.00
Track, input, analyze monthly usage	Recommendation Report	December 2006 - November 2007	\$20,000.00
Develop Quarterly fiscal and programmatic reports for DWR; develop Final Report	Web-based reports for public viewing	June 2006 - November 2008	\$12,000.00
	Quarterly Reports	Per Prop 50 Requirements	\$6,000.00
	Final Report		\$405,000.00
		Sub-Total (Phase 1)	

PROGRAM TASKS	DELIVERABLE	IMPLEMENTATION TIME FRAME	TASK COST
Phase II: Non-Municipal Landscape Irrigation Audits (residents, private schools, cemeteries, private golf courses)			
Hire/Train "Water Ambassadors" in basic irrigation auditing and community relation skills	Training provided by the South Bay Workforce Investment Board (SBWIB) and Local Adult Education Center	September 2006 - October 2006	\$7,000.00
Implement Community Outreach Program	Local news paper articles, cable television, community service seminars, water bill inserts, community fair booths	November 2006 - November 2008	\$6,000.00
Perform Non-Municipal Irrigation Audits (detailed analysis of each site and data gathering for scheduling software)	On-Site Work (Target: 600 Acres)	December 2006 - November 2008	\$228,000.00
Input audit data into Scheduling Engine	Individual web-based irrigation schedules	December 2006 - November 2008	\$3,000.00
Maintain Website and Notification System	Communication to residents via e-mail or auto-dial (monthly)	December 2006 - November 2008	\$8,000.00
Tie-in to MWD's Protector Del Agua (PDA) Landscape Classes	Provide landscape training seminars with an emphasis on "low water requirement" plants	December 2006 - November 2008	\$5,000.00
Track, input, analyze monthly usage	Web-based reports: Private access for resident's usage/savings Public access for total city/West Basin savings	December 2006 - November 2008	\$14,000.00
Develop Quarterly fiscal and programmatic reports for DWR; develop Final Report	Quarterly Reports	Per Prop 50 Requirements	\$8,000.00
	Final Report		\$277,000.00
		Sub-Total (Phase 2)	
		Total Program Cost	\$882,000.00

Environmental Documentation

WBMWD conducted a preliminary screening and determined that the Project was an action that did not qualify as a "project" as defined in the CEQA Guidelines. A "project" is defined by CEQA in the California Code of Regulations, Title 14, Division 6, Chapter 3, Section 15378.

The WBMWD Project does not have the potential to result in either a direct physical change in the environment, or a reasonably foreseeable indirect physical change in the environment. Therefore, CEQA requirements do not apply.

Compliance with Local, County, State, and Federal Permitting Requirements

There are no permits required for the Project from local, county, state, or federal authorities.

SECTION THREE: Monitoring and Assessment

Introduction

Monitoring and assessment are at the core of the procedures of the Project. As a result, much of this discussion for monitoring and assessment reiterates the methods and procedures.

Periodically, the Program Manager(s) will visually inspect the irrigated acreage to assess adequacy of irrigation and identify over or under watering. In addition, there will be a monthly water usage tracking report that will identify water usage, savings for the month, compliance with Project goals, integrity and proper functioning of the irrigation system, and suggested actions. Adjustments will be made to the irrigation plan according to assessments, and recommendations are presented in a three-step process with each step incorporating feedback from the prior steps, as outlined in Section Two: Technical/Scientific Merit, Feasibility.

A Description of How Pre-Project Conditions and Data Baselines will be Determined

WBMWD and its program partner will conduct a pre-survey to establish a base year usage and to identify any potential savings. Base year usage is calculated by averaging out two to four years of monthly historical consumption. Irrigation requirements are calculated based on local ETo.

These data baselines are calculated in the following manner:

- **Baseline monthly irrigation demand** is calculated by averaging 2 to 4 years of monthly water consumption history (obtained from the local water retailer).

If a facility utilizes mixed-use water meters, the metered water delivery is reduced by an estimated potable consumption to obtain the baseline monthly irrigation usage (average total usage- estimated potable usage = average irrigation usage). Estimated potable usage is calculated as a percentage of total usage based on data obtained from locations that have separate potable and irrigation meters. For example, TurfTech's review of school sites that have separate potable and irrigation meters reveals the following average potable usage percentages: 8.5 percent for high schools, 10 percent for middle and junior high schools, and 11 percent for elementary schools.

- **Monthly water requirements** to efficiently irrigate each site are calculated based on the acreage, local historical weather data and reference ETo data obtained from CIMIS. A crop specific coefficient is also factored in to further reduce the ET requirements.
- **Potential quantity of conserved water and potential financial savings** are determined by subtracting the monthly water requirements from the baseline monthly irrigation demand. Financial savings are calculated using the current water rates, which include all variable charges applied to actual units of water consumed (HCF or CCF). Fixed charges, such as the Water Availability charge (meter maintenance/rental fee), are not included in per unit costs.

Assumptions

To determine potential water savings this project assumes that clients provide accurate acreage data during the pre-survey stage. It also assumes that the irrigation system operates at the industry's generally accepted standard of 70 percent DU rating for efficient irrigation. Both of these assumptions are verified as a normal part of project implementation. Efficiency improvement recommendations for zones not obtaining a DU rating of 70 percent are made. After the recommendations are implemented the zone will be re-surveyed and the irrigation schedules will be appropriately modified.

Estimates of water savings are based on mathematical calculations. In the experience of WBMWD's partner, almost all irrigation managers err on the side of over-watering for fear of dehydration. The pilot program conducted in Westminster bears this out: Westminster had been conservation conscious before employing this program, yet was able to conserve an additional one acre-foot per acre after employing the program, for a value of \$31,000 on 60 acres of turf. This project assumes similar savings in water volume for 1,500 acres.

At application date, eleven months before public outreach activities have begun, letters of intent from six agencies (see Appendix F), totaling approximately 250 acres

have been received. Those letters are contingent on the Project being funded by this grant program.

Anticipated Accuracy of the Data to be Produced

The data collected following implementation of the irrigation schedules will rely on water use patterns taken from user water bills. These are anticipated to measure actual and past water use as accurately as logistically possible. Potential errors include changes in water use being attributed to improper implementation of irrigation schedules or system malfunction. The tracking mechanism of the program will enable these problems to be quickly identified and corrected. In the experience of WBMWD's Program Partner, actual water savings meet or exceed projected savings more than 90 percent of the time.

WBMWD appreciates the water savings that can be achieved through conducting this type of program. While the technology has been successfully utilized in the private sector at locations such as cemeteries this grant will allow the water savings to be comprehensively monitored in both municipals and residential sectors. Besides water savings, this Project will bring greater awareness of water conservation goals and practices to the local community. Conserving water and spreading public knowledge helps to ensure that this important resource taken from fragile ecosystems like the Bay Delta will not be wasted.

Monitoring and Assessment

Water usage data will be compiled monthly in a water usage tracking report that will identify water usage, savings for the month, compliance with project goals, integrity and proper functioning of the irrigation system, and suggested further actions. The data will be compiled in spreadsheet form. The results are used both for program tracking and for presentation to the client to keep the client engaged in the program goals. See Appendix D for a sample data sheet taken from the Westminster pilot program.

Monthly water usage will be compared to both baseline use and the conservation level targets identified during the pre-survey to determine compliance with the program and to fine-tune the irrigation schedules. Program Manager(s) will investigate significant discrepancies to determine whether the difference can be attributed to the irrigation schedule or other factors. To enhance the success rate of the program, monthly site surveys will also be conducted to assess adequacy of irrigation and identify over or under irrigation of landscapes, as well as to investigate any suspected leaks or other malfunctions with irrigation equipment.

Project success will be determined by the decrease in water expense when compared to baseline use. The spreadsheet report calculates the avoided expense by

multiplying the unit water cost by the difference of actual demand and baseline demand. The spreadsheets are designed to highlight non-attaining stations.

Weather variations are accounted for in the estimated water demand, which incorporates CIMIS data (historical weather data that is corrected for current weather conditions). Site inspections will identify variances in seasonal or daily usage, turf conditions and allow adjustments to be made to irrigation schedules to compensate for varying types and levels of usage (human usage).

Data will be collected and analyzed as described above. The data will be entered into software designed by TurfTech Industries, stored on a secure web server, and compiled into quarterly reports for submission to DWR under the rules of this grant program. Individual water records will be kept private by WBMWD. During Phase II of the Project, participating residents can access their respective data by logging into a web site operated by TurfTech Industries. The cumulative data will also be made available to the public through WBMWD's website.

Per the requirements of the grant program, WBMWD will submit annual reports of the benefits and costs for five years after the completion of the project.

The Estimated Costs Associated with the Implementation of the Monitoring and Evaluation Plan

WBMWD estimates that it will cost \$450 per acre to implement this project. Of this, approximately \$355 per acre will be used for monitoring and evaluation, which includes the initial analysis and data gathering for each site. There is little distinction between post-implementation monitoring and evaluation and the implementation of the actual plan, as each step continually monitors progress and incorporates feedback based on previous steps.

This project does not involve the installation of capital equipment requiring an operations budget or maintenance. For that reason, the costs that might be considered for Operations and Maintenance (O&M), such as site inspections and observation of the condition of client equipment, are allocated to salaries, monitoring and assessment in Table C-1 and are not double counted as O&M costs in Table C-2. As a result Table C-2 does not have O&M costs explicitly listed.

The monitoring, evaluation and reporting aspect of this project will demonstrate to municipalities locally and throughout the state that the implementation of irrigation management practices such as these can produce substantial savings, both in terms of water conservation and the associated financial savings.

Qualifications of the Applicants and Cooperators

Resumes of Project Managers

See Appendix G for resumes.

Role of External Cooperators

WBMWD will work in conjunction with a program partner, TurfTech Industries, a local turf and water management consulting firm that has developed the software and methods to be used. TurfTech will co-manage the project, analyzing historical water usage, performing irrigation audits, and creating tailored irrigation schedules using their customized software.

Other external cooperators in Phase I will include "clients," which are large municipal water users such as cities, school districts, parks, and transportation departments that have volunteered to participate in the program. Specifically, irrigation managers and others responsible for irrigation will cooperate with WBMWD and TurfTech Industries to carry out the program at their respective sites. These individuals will participate in a training session and implement the recommended modifications as they perform their typical job responsibilities.

In Phase II, WBMWD and TurfTech will work in conjunction with the South Bay Workforce Investment Board (SBWIB), a not-for-profit community based employment agency, to hire and train additional staff to serve as "Water Ambassadors." In this phase, the Water Ambassadors will solicit the cooperation of residents within the WBMWD service area to participate in the program. These aspects are further outlined in the section entitled "Outreach, Community Involvement, and Acceptance."

Previous Water Use Efficiency Grant Projects

In 2003, WBMWD's sister agency, CBMWD, was awarded a Proposition 13 grant for a Water Use Efficiency Program entitled "Enhanced Rebates for CII Water Saving Devices." The project goal is to install 2,600 urinals over three years that will save over 300 acre-feet per year. WBMWD and CBMWD share the same, highly-motivated management and staff. Therefore, CBMWD's success can be used as an indicator of WBMWD's future performance.

In the first year of implementation, this project is on target. CBMWD and its program vendor are currently implementing an effective direct install Waterfree Urinal Program, as well as marketing the program throughout CBMWD Basin's

service area. Within the first quarter of the project timeline, over 300 devices have been installed and another 200 are scheduled for installation. The installed devices are already saving 35 acre-feet per year. This is a great example of how Proposition 13 funding is being effectively utilized to conserve water from the Bay-Delta area.

The marketing campaign also has been effective. In July 2003, CBMWD hosted a "kick-off" luncheon, promoting the program to local mayors, water directors and business leaders. CBMWD also hosted a plumber's workshop to invite local plumbers to participate in the installation of the devices. The program continues to be successfully marketed to the Commercial, Industrial, and Institutional (CII) sector. WBMWD plans to apply similar marketing approaches to this project.

Outreach, Community Involvement, and Acceptance

This Project has significant outreach opportunities. WBMWD has developed its conservation program with the 17 cities that serve as the water retailers for the service area. The conservation program is strongly supported and accepted by these retail agencies. The retail agencies have agreed to help promote the Project and to provide staff support as necessary. There is no known opposition to the program, and WBMWD does not foresee any third-party impacts. The following agencies have already agreed to participate and have provided letters of support attached to this application: Carson, Inglewood, Lawndale City, Lawndale School District, Lomita, and Rolling Hills Estates.

The Outreach Plan will coordinate both Phase I and Phase II of the Project. Phase I of the Outreach Plan for large landscape audits of cities and schools will include a press conference announcing the availability of the program, advertising through member agency and municipal newsletters and publications, local cable television spots, and publicity through local papers. Program advertising will feature dual messages: the value of conserving water to municipal customers within the WBMWD service area and the environmental and economic benefits of the program.

WBMWD will incorporate information about this project into existing public information and education programs, such as 1) the annual "Water Harvest Festival" where WBMWD and CBMWD invite children and their parents to the West Basin Recycling Facility in El Segundo to participate in games and obtain information on recycling and the Districts; 2) California Water Awareness Campaign; 3) "May is Water Awareness Month" that communicates water conservation messages to the commercial, industrial, municipal and public sectors; and 4) providing local news media with conservation information through press releases and meet with editorial boards.

Phase II of the Outreach Plan for residential audits will include the hiring and training of staff members ("Water Ambassadors") in basic irrigation auditing and community relations skills. There will be 15 to 20 Water Ambassadors who will be responsible for door-to-door outreach targeting single-family homes, including one-on-one conversations, as well as newsletters, flyers, bill stuffers, and door hangers. These staff members also will speak at community events, schools and local cable networks to educate the community on current water issues and encourage residents to participate in the program.

Foreseeing the need for additional staff, WBMWD and TurfTech Industries have partnered with SBWIB, a non-profit community based employment agency, with the

intent of hiring 15 to 20 "high risk," young adults who live in disadvantaged communities. Recognizing that water management in southern California is an industry with potential for very large growth, the SBWIB intends to be a leader in providing trained personnel to the industry while simultaneously giving a second chance to individuals who have failed to complete high school. Working with the SBWIB, WBMWD and TurfTech Industries are developing an employee-training program that will be a model for other corporations to follow. To participate in the program as part-time employees, individuals will be required to enroll in an adult education center to complete the education required to successfully receive their General Educational Development (GED). Upon receiving their GED, they will be hired on a full-time basis by TurfTech Industries or possibly by one of the cities or water agencies participating in this project. This aspect of the program provides an added benefit to the local community and can be expected to bring additional attention to the water conservation goals of the Project.

Innovation

Water conservation is often viewed as intangible—potential water savings and financial savings are either not clear to those with the authority to make decisions, or spending money in order to conserve water is not a priority for city managers. This Project is innovative because it expands and implements a proven private sector analysis technique on a scale that has the potential to offer significant, risk-free savings to municipalities. Furthermore, involving high-level city staff holds irrigation managers accountable to their supervisors.

Research has proven that cities generally do not take these steps to reduce water usage and cost. By using grant funds to analyze potential savings and implement effective water conservation practices, the Project will demonstrate actual savings realized by comparing historical water consumption with post-implementation water consumption. This allows decision makers to view legitimate data revealing water savings and tangible financial savings generated by applying conservation practices to their own landscape. Through this approach, it is extremely likely that the Project clients will continue to apply the landscape irrigation management techniques when the Project is complete.

The Project is also innovative because it collects, processes and distributes information in a uniquely motivating manner. The Pre-survey provides an initial report identifying over-usage and potential savings, creating incentive for city staff to implement the program to produce savings. Monthly reports present conservation updates to responsible staff to enable them to maintain the program to continue conservation savings. Monthly reports are also provided to high-level city staff; providing Project data to persons with authority holds Irrigation Managers and other city staff accountable for properly executing the irrigation schedules. The reports are distributed to responsible parties through email and telephone updates. Phase II will roll out a custom website, from which residential clients can securely retrieve their conservation and scheduling data.

Because WBMWD has a varied mix of cities in the densely populated southwestern portion of Los Angeles County, there will be ample opportunity for implementation of this Project and expansion in the future. This approach is widely applicable throughout the state, requiring minimal capital or O&M costs. Moreover, the approach relies on proven irrigation techniques and readily available technology (i.e., Microsoft Excel and the Internet), and there is a financial incentive for cities throughout the state to participate.

Benefits/Costs

For documentary evidence of this project's benefits and costs, please refer to the following tables which can be found in Appendix H:

- C-1 Project Costs (Budget)
- C-2 Annual Operations and Maintenance Costs
- C-3 Total Annual Project Costs
- C-5 Project Annual Physical Benefits (Qualitative/Quantitative)
- C-6 Project Annual Local Monetary Benefits, Water Rates Chart
- C-7 Project Local Monetary Benefits and Project Costs
- C-8 Applicant's Cost Share and Description

In addition, please refer to the results from the pilot project in Appendix D. That municipal irrigation project, conducted in Westminster, CA, conserved over 59 acre-feet for 60 acres of irrigated land. That result is the basis for this project's estimate of a projected conservation of 1 acre-foot of water per acre of land. This estimate is reasonable because the proposed location for this implementation project has similar climate, land use patterns, and landscaping practices. That estimate may even be conservative, because the data from which Westminster's baseline was calculated reflected ongoing water conservation efforts.

Applicant: West Basin Municipal 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	Project Costs \$ (I)	Contingency % (ex. 5 or 10) (II)	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	\$406,200	5	\$426,510	\$213,255	\$213,255	3	0.3741	\$159,557
Fringe benefits	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
Supplies	\$59,800	5	\$62,790	\$31,395	\$31,395	3	0.3741	\$23,490
Equipment	\$53,000	5	\$55,850	\$27,825	\$27,825	3	0.3741	\$20,819
Consulting services	\$0	5	\$0	\$0	\$0	3	0.3741	\$0
Travel	\$50,000	5	\$52,500	\$26,250	\$26,250	3	0.3741	\$19,640
Other	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(a) Total Administration Costs	\$569,000		\$597,450	\$298,725	\$298,725			\$223,506
(b) Planning/Design/Engineering Equipment	\$0	10	\$0	\$0	\$0	3	0.3741	\$0
(c) Purchases/Rentals/Rebates/Vouchers	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(d) Materials/Installation/Implementation	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(e) Implementation Verification	\$0	5	\$0	\$0	\$0	3	0.3741	\$0
(f) Project Legal/License Fees	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(g) Structures	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(h) Land Purchase/Easement	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
Environmental								
(i) Compliance/Mitigation/Enhancement	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(j) Construction	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(k) Other (Specify)	\$0	0	\$0	\$0	\$0	3	0.3741	\$0
(l) Monitoring and Assessment	\$101,000	5	\$106,050	\$53,025	\$53,025	3	0.3741	\$39,673
(m) Report Preparation	\$12,000	5	\$12,600	\$6,300	\$6,300	3	0.3741	\$4,714
(n) TOTAL	\$682,000		\$716,100	\$358,050	\$358,050			\$257,893
(o) Cost Share - Percentage				50	50			

¹ - excludes administration O&M.

Applicant:

West Basin Municipal 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)
\$267,893	\$0	\$267,893

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

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

Applicant:

West Basin Municipal 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 data are available ²
	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	Decreased		3 years		Please see attached narrative.
Local			3 years	Not applicable.	This project will conserve over 4500 Acre-feet of water over its lifetime.

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.