

# **Water Efficient Demonstration Garden**

**Proposition 50  
Water Code Chapter 7  
2004 Water Use Efficiency**

**Grant Application Submitted To The:**

**California Department of Water Resources  
Office of Water Use Efficiency  
1416 Ninth Street, Room 338  
Sacramento, CA 95814  
Attention: Debra Gonzalez (916) 651-7026**

**By The:**

**Santa Clara Valley Water District**

**January 11, 2005**



## Cover Letter

January 11, 2004

Debra Gonzalez  
California Department of Water Resources  
Office of Water Use Efficiency  
PO Box 942836  
Sacramento, California 94236-0001

Dear Ms. Gonzalez:

This proposal seeks grant funding to support a unique and innovative water efficiency demonstration garden. Along with our co-funding support the garden will develop and promote water efficient landscape practices for all customers in the residential, commercial, and institutional sectors.

Please contact us if you have questions or if we can provide additional information.

Thank you for your consideration.

Sincerely,

Hossein Ashktorab, Ph.D.  
Manager, Water Use Efficiency Unit

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# 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 # 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

3. Principal applicant (Organization or affiliation):

Santa Clara Valley Water District

4. Project Title:

Water Efficient Demonstration Garden

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

Name, title

Hossein Ashktorab, Ph.D.,  
Unit Manager

Mailing address

5750 Almaden Expressway,  
San Jose, CA 95118

Telephone

Fax.

(408) 265-2607, ext.2291

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(408) 979-5639

[hashktorab@valleywater.org](mailto:hashktorab@valleywater.org)

6. Contact person (if different):

Name, title.

Jerry De La Piedra, Senior  
Water Conservation Specialist

Mailing address.

5750 Almaden Expressway,  
San Jose, CA 95118

Telephone

Fax.

(408) 265-2607, ext. 2257

E-mail

(408) 979-5639

gdelapiedra@valleywater.org

7. Grant Funds requested (dollar amount): **\$730,000.00**
- 
8. Applicant funds pledged (dollar amount): \$240,865.00
9. Total project costs (dollar amount): \$970,865.00
- 
10. Percent of State share requested (%): 75%
11. Percent of local share as match (%): 25%
- 
12. Is your project locally cost effective?  
*Locally cost effective means that the benefits to an entity (whether in dollar terms or qualitatively) of implementing a program exceed the costs of that program within the boundaries of that entity.*
- (a) yes
- (b) no
13. Is your project required by regulation, law or contract?
- (a) yes
- (b) no
- 
14. Duration of project (month/year to month/year): 12/05 to 12/07
- 
15. State Assembly District where the project is to be conducted: 20,21, 22, 23, 24, 27 & 28
- 
16. State Senate District where the project is to be conducted: 10, 11, 13 & 15
- 
17. Congressional district(s) where the project is to be conducted: 14, 15, 16 & 17
- 
18. County where the project is to be conducted: Santa Clara
- 
19. Location of project (longitude and latitude): -121.87333 / 37.24806  
(Santa Clara Co.)  
Maps of the service areas are attached.
- 
20. How many service connections in your service area (urban)? 407,481 (Santa Clara Co.)
- 
21. How many acre-feet of water per year does your agency serve? 400,000 AF Santa Clara Co.
- 
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

# 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

\_\_\_\_\_  
Name and title

\_\_\_\_\_  
Date

# Statement of Work, Section One: Relevance and Importance

## Goals and Objectives

The Santa Clara Valley Water District (hereinafter referred to as the "District") manages Santa Clara County's wholesale drinking water resources, coordinates flood protection for its 1.7 million residents and provides stewardship for the county's 10 reservoirs and more than 700 miles of streams.

The overall project goal is to design and develop a unique, one-of-a-kind, demonstration garden (hereinafter referred to as "Garden") that promotes water use efficiency in landscaping. The Garden will be an educational resource, test facility, and learning center providing environmentally sound and cost-effective landscaping alternatives. The primary purpose of the Garden is to educate the general public on the use of water wise plants while promoting efficient irrigation technologies and recycled water. The District's Landscape Advisory Committee has endorsed the development of the Garden.



### Overarching Goals:

- Conserve water
- Reduce impacts of over watering (hardscape damage, mosquitoes, etc.)
- Improve environment of Bay-Delta ecosystem
- Provide leadership through example
- Support BMP implementation and other existing programs, such as the District's landscape programs (ET Controllers, Landscape Rebates, Nursery Program, ITAP, Web ITAP, etc.)

### Specific Objectives:

- Develop water efficient landscaping methods: research and innovation;
- Demonstrate water efficient landscaping methods and technologies;
- Educate the public and increase their awareness and skill base;
- Educate landscape professionals with regard to techniques of water efficient landscaping; and
- Contact community organizations concerned with landscape water conservation and seek collaborative efforts.

## Need for the Project

- Growth in population and industry means greater demand for landscaping
- Much of the growth is in relatively dry east and south bay
- The knowledge about water efficient landscaping exists, but is not user-friendly and is not widely disseminated
- Often water efficient landscaping does not achieve the water and cost savings it was designed to due to improper scheduling or maintenance, inappropriate plant selection, or other unforeseen circumstances.

The County's economy is a key element in the Northern California Bay Area, providing approximately 30 percent of all the jobs in the region. "Silicon Valley," with about one of every five of the County's jobs in high technology, continues to attract fast growth industries. Growth in the County is expected to continue, although at slower rates than in the past. The estimated total population in 2000 was 1,737,000. The Association of Bay Area Governments (ABAG) projects that this will rise to 1,930,700 by the year 2020, compared to 1,497,577 in 1990, a 29 percent increase.

Although the County is adding new households, from 520,180 in 1990 to a projected 651,040 by 2020, a 25 percent increase, the rate of household growth will be outpaced by population growth and especially by job growth. The persons per unit is expected to continue to be higher than the historical average, and an increasing number of those employed here will not be residents of the County. This job/housing imbalance is expected to keep housing costs in the area among the highest in the nation.

Table 1 (reproduced from UWMP 2001, Figure 4-9) tabulates the M&I and agricultural water demand projections as well as the conservation projections, resulting in the water demand range. The table shows the important role water conservation plays in balancing supply and demand.

**Table 1 – Projected Demand and Conservation**

**Figure 4-9**  
**Projected Water Demand and Conservation Projections**  
(af/year)

Year		2000	2005	2010	2015	2020
M&I Demand	Lower	356,466	374,503	392,616	408,137	423,836
	Most likely	371,153	390,205	409,348	426,221	443,205
	Upper	394,021	413,213	433,736	459,331	486,178
Agricultural Demand		60,169	56,309	52,462	48,624	44,799
Conservation Savings		-10,345	-26,560	-38,478	-45,819	-52,715
Total Demand	Lower	406,290	404,252	406,600	410,942	415,920
	Most likely	420,977	419,954	423,332	429,026	435,289
	Upper	443,845	442,962	447,720	462,136	478,262

## **Consistency with Water Management Plans and Integrated Water Resources Planning Study**

Integrated Water Resources Planning Study (2003). The Integrated Water Resources Planning (IWRP) document, developed with input from local stakeholders, is the district's primary water supply management planning tool. The IWRP identifies maintaining a diversified water portfolio as an important element in meeting long-term water reliability, and local programs such as water use efficiency are recommended ways to diversify future investments. The IWRP analysis includes risk scenarios, and it then uses conservation to meet reliability targets. As such, the Garden would directly support the IWRP objectives by developing and disseminating water efficient landscape methods. IWRP 2003 recommendations include a goal of 92,000 acre-feet in water conservation savings by year 2020 (as measured from a 1992 datum, the start of the district's water conservation programs) and 20,000 acre-feet of recycled water by year 2010.

Urban Water Management Plan (2001). The Garden project is consistent with the conservation activities in the UWMP, in particular with the landscape conservation derived from implementing residential and large landscape conservation (e.g., BMPs 1 and 5). The UWMP provides a detailed description of the conservation activities at the District. The District's Water Conservation Program has been developed in large part to comply with the BMP commitments, as defined in the 1991 Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). The program targets residential, commercial/industrial, and agricultural water use. The District enjoys a special cooperative partnership with the water retailers in regional implementation of the BMPs. Several program elements have been developed in partnership with local retail water suppliers and the City of San Jose.

Other Landscape Planning Activities. The District is currently developing a master plan / conceptual design for the demonstration garden with the assistance of a technical consultant. To assure consistency existing landscape plans and programs and to guide the design of the Garden, at least the following reports and data have been reviewed by the District and by the landscape consultant currently preparing the Garden's plan:

- Guadalupe Gardens Master Plan – Final Report. This collaborative effort provides the plan for development of overall Guadalupe Gardens—including specific land use and improvements.
- Guadalupe River Park and Flood Protection Projects. Guadalupe Gardens and the proposed Demonstration Garden are situated within the greater Guadalupe River Park, which is a major redevelopment effort that combines flood control with recreation access and other amenities.
- Current Trends in Water Efficient Landscaping. Both irrigation equipment and landscape materials will be selected with the best current state of knowledge.
- Similar Gardens in the Region/State. Reviewing existing demonstration gardens will allow the garden to complement what exists, to add what is missing from existing facilities, and to learn from strengths and weaknesses of the other gardens.

- Literature Available from the District on Water Use Efficiency. In-house expertise is tapped and internal coordination is assured.
- Applicable FAA Requirements due to proximity to an airport.

## Implementation of Water Demand Management Activities

Table 2 (reproduced from UWMP 2001, Figure 4-7) provides a brief summary of implemented water demand activities in the past. The table shows the demand reductions resulting from both active and passive conservation. Using 1992 (the first year of the District's conservation program) as a baseline, year 2020 water demand in Santa Clara County is estimated to be approximately 67,000 to 72,000 af/year less than it would have been in the absence of water conservation activity. Changing the baseline year to 1997 (consistent with that used in the demand projection) reduces the range to approximately 53,000 to 58,000 af/year. Active savings account for 41 percent to 46 percent of the total projected demand reduction.

**Table 2 – Demand Management Projections**

Figure 4-7  
Demand Management Projections Summary

Demand Component/ Conservation Program	Demand Reduction 1992-2020 (af/year)	Demand Reduction 1998-2020 (af/year)	Percent Attributed to Active Demand Reduction	Percent Attributed to Passive Demand Reduction
Residential Toilets	24,300	17,600	26%	74%
Residential Washers <sup>1</sup>	2,000-7,200	1,900-7,200	4-80%	20-96%
Residential Showers	7,000	4,200	3%	97%
Residential Faucets	4,000	1,600	0%	100%
Residential Leaks	2,300	2,300	100%	0%
Residential Landscape	9,200	8,800	100%	0%
CI <sup>2</sup> (all uses except toilets)	9,800	9,000	100%	0%
CI Toilets	7,400	6,200	9%	91%
Agricultural	1,000	1,000	100%	0%
<b>Total</b>	<b>67,000-72,000</b>	<b>53,000-58,000</b>	<b>41-46%</b>	<b>54-59%</b>

<sup>1</sup> The wide range for these figures is due to uncertainty regarding whether an efficiency standard for clothes washers will be adopted by the U.S. Department of Energy. Without a standard, 80 percent of savings will be active; with a standard only 4 percent will be active.

<sup>2</sup> Commercial/Industrial/Institutional

## Further Implementation and Addition of Conservation Activities

This program helps further the implementation of landscape conservation activities and it will add a great deal of expertise to current activities. For example, BMP 5 calls for agencies to commence assigning reference evapotranspiration-based (ETo) water use budgets to accounts with dedicated irrigation meters and providing water-use audits to accounts with mixed-use meters by July 1, 1999. Through the Irrigation Technical Assistance Program (ITAP), since 1995 the District has offered and provided large landscape water audits to sites in the County with 1 acre or more of landscaping. A pre-screening mechanism was also incorporated which determines whether the site is over its ETo budget prior to conducting a full-scale audit. Landscape managers are provided with water-use analyses, scheduling information, in-depth irrigation evaluation, and recommendations for affordable irrigation

upgrades. Each ITAP site receives a detailed report upon completion of the audit. An annual report is generated to recap the previous year's efforts. To generate several reporting and monitoring options, water use history, meter numbers, account numbers, and site contacts and addresses are captured for each site in a specialized database.

This highly successful and well-received program has conducted over 600 audits to date. This program is achieving potential water savings of 1921 af/year. These audits will be credited towards the new BMP requirement. The District's staff is currently working on a comprehensive program to develop ETo-based water-use budgets for dedicated irrigation meters by using aerial images and GIS techniques.

The Garden addresses shortfall of previous work in that it provides demonstration of the latest methods in practice and it provides the vehicle to disseminate the knowledge and skills among a broad audience of professionals in the landscape industry, property managers in general, and the general public. The Garden will build on programs the District has previously implemented, including educational outreach and workshops. Rather than just talk about something (i.e. water-wise gardening) we will now have an example—a place people can go see what drought-tolerant plant looks like and what a water efficient garden looks like (i.e., a beautiful garden).

The District has shown and will continue to show steady commitment to conservation activities. The proposed garden is one way the district is furthering implementation and adding to conservation activities over time.

## **Statement of Work, Section Two: Technical/Scientific Merit, Feasibility**

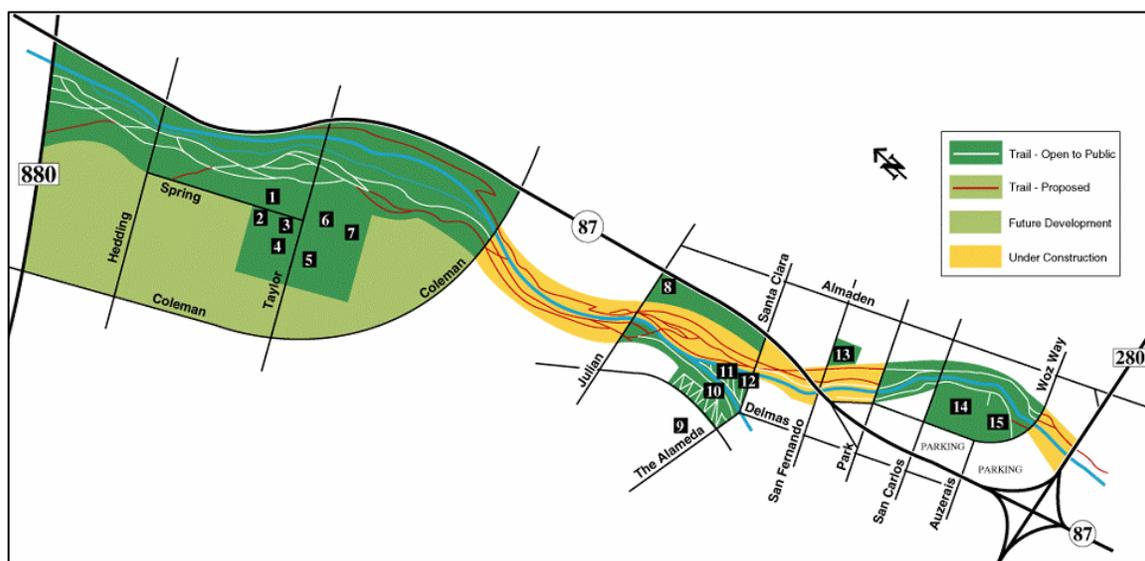
### **Methods, Procedures, Equipment, and Facilities**

All irrigation water will utilize recycled water, except where potable water is used for demonstration purposes. The following tasks are basic inclusions for the conceptual garden design.

- A. **Water-Wise Plants.** The primary purpose of the garden is to promote and educate the general public on the use of drought tolerant plants commonly available. There is a need to show residential homeowners and commercial landscape managers how easy it can be to become efficient in their water usage while beautifying their landscapes.
  - 1. The garden will promote a large variety of drought tolerant plants.
  - 2. A preference will be placed on locally native species.
  - 3. Plants will be clearly labeled with both common and botanical names.
  - 4. Plants will be portrayed in an environmental setting that mimics residential and light commercial landscaping.
- B. **Irrigation Efficiency.** Efficiencies of various equipment and their applications will be promoted, with an emphasis on state-of-the-art technologies.
  - 1. Landscaping and proper irrigation with the incorporation of hydro zones and microclimates.
  - 2. Maintenance of irrigation systems and solutions to common irrigation problems.
  - 3. Side by side comparisons of landscapes with and without efficient systems. This will provide an opportunity to demonstrate relative water usage and potential savings; sub metering can be used to demonstrate water usage. Additional components will include composting, soils, mulching, etc.
  - 4. Irrigation equipment appropriate for plant material. This will include irrigation controllers, sprinklers, drip and sub-surface irrigation, etc.
  - 5. Weather-based ET irrigation controllers will be used to control all or part of the irrigation systems throughout the garden. A CIMIS weather station will be a central feature for the weather-based irrigation scheduling.
  - 6. Visible hands-on demonstrations of watering taking place will be included in at least one level of complexity, including interactive components as suggested below.

- C. **Education.** The main purpose of the garden is to provide an effective means of educating the public on the advantages of incorporating water-efficiency in landscaping.
1. Informational kiosks and/or computerized displays providing interactive elements with information and literature on various aspects of the garden may be included. Sample garden planting tips, landscape design tips, and sample irrigation schedules may also be incorporated.
  2. Elements of the garden should be clearly labeled with interpretive signage. Signs will be informative, unique, and descriptive. May include information on plant spacing, planting and irrigation.
  3. Weed resistance, shade resistance, labor and cost savings, and irrigation benefits of native and other drought tolerant plants.
  4. The garden will promote the use of recycled water as a viable and important component of efficient landscaping (primarily for commercial sites).
  5. Several themed landscape displays showing low water use solutions to typical everyday landscape design issues.
- D. **Turf Selection and Maintenance.** Turf represents a large portion of the American landscape. Turf watering requirements are often overestimated, with applied irrigation water often doubling that of the recommended watering budget. An objective of the garden is to encourage a change in the general public's perception on what makes landscapes attractive and to promote the use of appropriate turf species and alternate groundcovers.
1. Small demonstration plots to display various varieties of turf for high to low use applications, for example, playing fields to ornamental grasses. The garden will include which turf to use for each application to maximize water use reduction, along with recommended watering schedules. Plots can be individually metered to illustrate water usage.
  2. The maintenance of turf, for example, proper mowing height, dethatching, and aeration. The type of irrigation systems to use and their maintenance
  3. The lawn substitutes and groundcover alternatives.

The project is located at Guadalupe Gardens in San Jose, California. The primary location for the garden is located south of Taylor Street and north of Coleman Avenue, in undeveloped or temporary areas only (Figure 1).



**Figure 1 – Location Map**

## **Task List and Deliverables**

### TASK 1

Planning and Design (Design is near completion)

The District has hired a consultant who developed a conceptual design and budget for the demonstration garden (forthcoming final report January 2005). Although The District has hired a consultant to do the Master Design, we currently have very limited funding to do the construction. The resulting information will be the basis for the eventual budget and plans for the garden.

The consultant has prepared a project base map from the existing engineer's survey, dated 2004, supplemented with additional information supplied by the District. The Base Map is in digital format usable as an AutoCAD base map for working drawings.

The consultant conducted a site visit to assess site features and identify site opportunities and constraints. The engineer's survey provided by the District will be crosschecked in the field to confirm the general locations of utilities, significant trees and other natural features. In addition, Consultant noted natural access points and desirable and undesirable views.

**Horticultural Soils Test.** The consultant coordinated with Soil and Plant Laboratory Inc. to conduct soils tests to confirm health and nutrient conditions for future planting. Information collected will include percolation rate, soil PH, salinity, and soil fertility analysis.

Geotechnical Boring and Monitoring Well. The consultant will contract with Lowney Associates to have a geotechnical boring done at the demonstration garden site. This core sample will show the underlying soil composition, soil stratification and depth of water table. As part of this boring sample, the consultant will create a permanent monitoring well that can be incorporated into the garden's demonstration curriculum to show the relationship of seasonal fluctuations of ground water depth to plant health and irrigation water needs.

## TASK 2

### Site Work

Site work needed to prepare the site for the garden includes grading and soil preparation. Storm water and drainage conveyance will also be built and integrated into the existing system. The pedestrian pathways in the garden will be surveyed, graded, and constructed.

## TASK 3

### Base Planting and Irrigation

The first step in this task is the installation of the irrigation equipment according to the landscape design produced in the planning process. Then, plants will be selected and planted—again in accordance with the master plan. The various mulches that are demonstrated will be applied to the garden. The turf demonstration will be a combination of sod application and seed growth. Finally the remaining area will be prepared.

## TASK 4

### Education and Community Outreach Materials

- Education materials need to be developed for site visitors
- Guide to references and other sources
- Program for tours and a series of demonstrations
- Plan for publicity, including grand opening and ongoing communications

## TASK 5

### Monitoring, Assessment, and Reporting

- Track the number of visitors. Foot traffic can be tracked with an automatic counter. The docents and instructors can track Tours and class attendance.

- Survey visitors to elicit feedback and evaluate the programs
- Continually measure and display water use at various locations. This provides a means to monitor water use on site as well an educational tool.

## TASK 6

### Operation & Maintenance

- Irrigation system monitoring and maintenance
- Landscape maintenance
- Seasonal demonstrations
- Ongoing public outreach

### Schedule

Table 3 shows the schedule dates and associated budget for the task list. Figure 2 shows the time line for the development of the Garden project.

**Table 3 – Schedule**

Task	Start Date	End Date	Budget
Planning and Design	1-Dec-2005	1-Jun-2006	Staff hours
Site Work	1-Jun-2006	1-Dec-2006	\$ 360,000
Base Planting and Irrigation	1-Dec-2006	1-Jun-2007	\$ 270,000
Education and Community Outreach Materials	1-Dec-2005	1-Jun-2007	\$ 100,000
Monitoring, Assessment, and Reporting	1-Dec-2005	1-Jun-2007	\$ 70,000
			\$ 800,000

**Figure 2 -- Timeline**

Task	D-05	J-06	F-06	M-06	A-06	M-06	J-06	J-06	A-06	S-06	O-06	N-06	D-06	J-07	F-07	M-07	A-07	M-07
Planning and Design																		
Site Work																		
Base Planting and Irrigation																		
Education and Community Outreach Materials																		
Monitoring, Assessment, and Reporting																		

Annual operation and maintenance costs (not eligible to be paid out of the grant) include landscape labor, materials, and outreach and community involvement. These costs are estimated to be \$72,000 per year on an ongoing basis. The schedule and timeline above concern the development of the garden (not O&M) and the proposed funding needs tied to grant fund distribution.

### Preliminary Plans and Specifications

Not applicable. There are no structures on the site.

### Environmental Documentation

Not applicable. This is not a “project” as defined by CEQA.

## **Statement of Work, Section Three: Monitoring and Assessment**

### **Pre-Project Conditions and Baseline**

Pre-project conditions at the site of the garden include an undeveloped lot within the boundaries of Guadalupe River Park. In the surrounding area, among other attractions, is the existing Guadalupe Gardens.

“Guadalupe Gardens is located south of the San Jose International Airport (and adjacent to the river park) where homes were removed because of noise 10-15 years ago. The master plan for this area was developed by the City of San Jose and a Citizen's Task Force in the early 1990's, but final FAA and City Council approval is pending. The areas of the Gardens completed at this time are the Heritage Rose Garden, Historic Orchard, Courtyard Garden, and the Taylor Street Rockscape. The Friends of Guadalupe River Park & Gardens also maintain a Garden Center at 715 Spring Street which provides meeting space, a library of horticultural materials, offices, and a center for volunteer activities.” (URL: [www.grpg.org](http://www.grpg.org)).

Regarding the pre-project conditions in the area of demonstration gardens, there exist several more limited programs:

- Water Efficient Landscaping Workshops are offered by the District each spring;
- The Going Native Garden Tour shows residential gardens planted with native and water efficient plants;
- Water-Wise House Calls are offered by the District to county residents;
- The Irrigation Technical Assistance Program (ITAP) performs site audits and helps large landscape owners conserve water irrigating their landscapes;
- For landscape professionals, the District in collaboration with Cal Poly, San Luis Obispo – Irrigation Training and Research Center (ITRC), offers landscape water auditing and water budget training classes;
- Irrigation training workshops are offered for professionals; and
- Web-based water budget database (WEB ITAP).

Regarding pre-project conditions at landscape areas—the ultimate target for conservation activities—the presumption is that there has been relatively less adoption of water wise landscaping in the residential sector.

### **Monitoring Methodology and Data**

Monitoring the Garden's activities will include tracking the number of visitors, tours, special events, and media exposure. The program will generate feedback from

visitors including residential customers, landscape professionals, affiliated organizations, and interaction within the Guadalupe Gardens and Guadalupe River Park.

Water use will be monitored continually and displayed at many locations within the Garden not only for educational purposes, but also to monitor actual water use at various locations and demonstrations.

### **How to Evaluate Success**

To evaluate success ideally, we would want to track all the ultimate conservation savings and environmental benefits that derive originally from the Garden project. Although doing this comprehensively would be extremely resource intensive and it would challenge defensible evaluation methodologies, it is possible to measure and evaluate indicators of success.

For example, a potential method for the independent evaluator to use would be to track the number of visitors, tours, and classes for a specified period. Should the independent evaluator conclude it is the most appropriate method and feasible, surveys could be given to participants and visitors to assess their reaction and learning experience. Care would be taken to minimize response bias and to maximize response rate with the use of random selection and in-person contact at exit.

The proposal includes a line item to conduct an independent evaluation study of the effectiveness of the Gardens. Although methods would be determined at the time the evaluator is selected, we expect that a survey might lead to informative results. We also expect process evaluation methods to be a possible evaluation method; the process from awareness of the garden to ultimate water savings could be assessed with a standardized interview instrument.

The ability to attract partnerships and/or cooperation from affiliated organizations should be considered a measure of success.

Participation in the events at the garden and visitors are key criteria of success. Does the demonstration garden within the overall Guadalupe Gardens attract participants, vendors, and drawings to its events? For example, the Spring in Guadalupe Gardens Event in 2004 attracted the following as vendors, participants, and/or donors to a prize drawing (Table 4):

**Table 4 -- Spring Event Participants: Guadalupe Gardens 2004**

Affordable Sunrooms	Alive n Silk
Bay Nature	Blackbird Hill Nursery
Blossom Floral Shop	C&C Decorative Design
Capitol Wholesale Nursery	Carman's Nursery
Children's Discovery Museum	Common Ground
d.p. Fong Galleries	David Anderson Grower
Don Cravalho	Eco Energies
Electric Auto Association	Eternal Garden

Evelyn DiVita	Evelyn DiVita
Family Life Wellness Center	FFA/Westmont HS
Glenna Harris Weavers Guild	GreenTeam
Greenwaste Recovery	History San Jose
Jamba Juice	John E Stowell Dahlia Society
Julie Black, Junior Miss American Rose	Lover's Roses
Lucid Landscape Design	Lucy Perez
Manny's Roses	Manthey's Nursery
Master Composters of Santa Clara County	Master Gardeners of Santa Clara County
Mushroom Compost	Norcal Waste Systems
Onishi Florist	Our City Forest
Pacific Rim Seeds & Plants	Paradise Art & Garden
Pfister's Perennials	REgrid Power
San Jose Composts	San Jose Conservation Corps
SCC Household Hazardous Waste	SCC Rose Society
Seasons	Seed Art
Sheshe Miracles	Silicon Valley Habitat for Humanity
SJ Holistic Health Center	Skooters Ice Cream Parlor
Solar Cookers International	South Bay Heritage Rose Group
Summer Winds Nursery	Terra Sole Nurseries
Totally Organic Products	Valley's Pride Organics
Watershed Watch	Wildlife Center of Silicon Valley
Willow Glen Books	Yamagami's Nursery

### **Accounting for External Factors**

Variations in weather provide opportunities for developing and testing landscaping methods and technologies. However, in assessing the effectiveness of the Gardens, one needs to control for such variation. For example, month-to-month, or year-to-year comparisons of water use need to account for rainfall and temperature to be commensurate.

Likewise, very hot dry weather may stimulate awareness and interest among water customers, motivating them to pursue more water efficient landscapes.

### **Data Storage and Reporting**

Reporting and recordkeeping will be as follows:

- Water use records from the garden will be kept and summarized in periodic reports
- A maintenance site log will be maintained to track repairs and changes in methods

- A tour log will be maintained to compile questions from the public and ideas for future research
- Periodic reports will provide tracking information

### **Costs of Monitoring and Evaluation**

This proposal includes a \$50,000 line item for monitoring and evaluation in the first year. A \$20,000 line item has been included for reporting.

# Qualifications of Applicants and Cooperators

## Resume of Project Manager/s

Resumes of key SCVWD staff participating in this project are attached to the back of this proposal. In addition, the District has a number of staff members with expertise in the following areas:

Karen Morvay, Conservation Specialist

Jerry De La Piedra, Conservation Specialist (Landscape programs)

Kevin Galvin, Conservation Specialist

Jeannine Larabee, Conservation Specialist (Landscape programs)

## Role of External Cooperators

Guadalupe Gardens has a number of cooperative efforts that will be integrated into this project:

- Wastewater agencies
- Recycled water agencies
- Landscape organizations
- Parks associations
- Municipal governments
- Non-Profit Groups (Friends of Guadalupe Gardens)

To conserve water and meet future demand for recycled water, the district pursues partnerships with area cities, water retailers and wastewater treatment facilities to expand the county's recycled water systems. In addition, water retailers and the district have a cooperative partnership that helps retailers fulfill the Best Management Practices of the CUWCC 1991 MOU. Besides these entities, some of the most vital district partnerships are with the residential, commercial and agricultural customers who conserve by updating water use devices and implementing water efficient practices.

The City of San Jose –South Bay Water Recycling Collaborative Effort was established to develop a partnership with South Bay Water Recycling that provides the most efficient services and expands recycled water use within and beyond the San Jose and Santa Clara recycled water service area.

The district collaborates with universities and state agencies to provide large landscape managers and agricultural water users with professional workshops that help them increase irrigation efficiency. These partnerships also support the California Irrigation Management Information System, which provides growers and landscape managers with climatic data to make efficient irrigation scheduling decisions. The district's board of directors has created eight advisory committees that

assist in developing policies to guide district operations. The Landscape Advisory Committee, which assists the board in developing landscape guidelines for water conservation, supports the Garden project.

### Previous Water Use Efficiency Grants

The district relies on grants from state and federal agencies to help fund program expansion and vital research. The following table summarizes recent grant activity that funds water use efficiency programs and studies (Table 5).

**Table 5 – Previous Grant Activity**

Program	\$ Amount FY 01/02	\$ Amount FY 02/03	\$ Amount FY 03/04	\$ Amount FY 04/05
<b>Regional Irrigation and Fertilizer Management Program</b> - Regional Prop 13 grant - SCVWD is the lead agency in this five county regional program to disseminate technical assistance in the areas of agricultural irrigation and fertilizer management.			\$450,000	\$450,000
<b>Residential Clothes Washer Rebates (EGIA)</b> - Regional CALFED grant - SCVWD participated in this regional grant program to promote the purchase of high-efficiency clothes washers.	\$675,000			
<b>Landscape and Agricultural Area Measurements</b> - CALFED grant - A multi-spectral image mapping project to design optimum water budgets and promote irrigation efficiency.	\$406,000			
<b>Commercial Clothes Washer Rebates (Energy Solutions)</b> - Regional CPUC grant - Regional grant to promote high-efficiency clothes washers through rebates.		\$150,000		
<b>Dedicated Landscape Meters</b> - DWR Prop 13 grant - Promotes the retrofitting of mixed use landscape meters with dedicated landscape meters.		\$100,000		
<b>Water Softener Rebate Program</b> - DWR Prop 13 grant - This program offers a financial incentive to residents who replace their old timer-based water softeners with efficient, demand-based ones.		\$60,000		
<b>Pre-Rinse Sprayers (CUWCC)</b> - Regional CPUC grant - Regional program that provides free efficient pre-rinse spray valves to restaurants and commercial kitchens.		\$60,000		
<b>Commercial, Industrial and Institutional Water Use Surveys</b> - DWR funded - This program offered free water use surveys for businesses, recommending improvements.		\$100,000		
<b>ET Controllers (EBMUD)</b> - Regional DWR Prop 13 grant - This regional program offers funding for weather-based irrigation controller retrofits.			\$475,000	
<b>Residential Clothes Washer Rebates (EGIA)</b> - Regional DWR Prop 13 grant - This regional program promotes the purchase of high-efficiency clothes washers for residents.			\$618,750	

<b>Irrigation Retrofits</b> - DWR Prop 13 grant - This project is targeted at installing upgraded irrigation hardware for sites previously identified as having high, unrealized conservation potential.			\$100,000	
<b>Pre-Rinse Sprayers</b> - Regional CPUC grant - This regional program offers free high-efficiency pre-rinse spray valves for restaurants and commercial kitchens.			\$75,000	
<b>CII Washers (Energy Solutions)</b> - Regional CPUC grant - This regional program promotes high-efficiency clothes washers through rebates.			\$100,000	
<b>CII Innovative Retrofits</b> - DWR Prop 13 grant - This program promotes innovative high-efficiency equipment, such as High-Efficiency Toilet installations and medical equipment rebates.			\$496,000	

**Totals (\$Thousands)      \$1,081      \$470      \$2,315      \$450**

**Disadvantaged Community**

Not applicable.

# **Outreach, Community Involvement, and Acceptance**

## **Coordination with Local Entities**

The District worked with the Landscape Advisory Committee (LAC) to decide which components should be incorporated into a demonstration garden, including the use of recycled water, with the idea of constructing the demonstration garden at Guadalupe Gardens. Staff also worked with Guadalupe River Park and Gardens and attended Tech Committee Meetings. Also, will coordinate with local nurseries, landscape organizations, master gardeners, native plant society, California Landscape Contractor's Association, etc. to solicit help and donations. Also, will work with the City of San Jose Parks Department and their Environmental Services Department.

## **Plan for Public Outreach**

The Garden outreach program will build on the model developed for ITAP. For example, ITAP reaches the community through advertising in Tri-County Apartment Association's monthly Apartment Management magazine and the San Jose Mercury News; colorful flyers at the biannual Home & Garden Show, the Northern California Turf & Landscape Council (NCTLC), and the Turf & Landscape Expo; retailer outreach through direct mailing of personalized letters to high-water-use customers; and through city newsletters and business newsletters.

## **Interested Parties and Level of Support**

The Landscape Advisory Committee has shown continued interest and support for the Garden project, and it represents a wide variety of related interests. The membership includes seven categories with representatives from:

1. Golf courses, cemeteries, turf producers, schools, parks, sod producers
2. Educators and horticulturists
3. Nurseries
4. City/County Public Works
5. Landscape Contractors
6. Irrigation Designers and Suppliers
7. Landscape Architects and other designers

## **Third Party Impacts**

We do not foresee significant negative third party impacts for the Garden project.

## **Number of People Receiving Benefits**

The most immediate beneficiaries will be the visitors to the Garden. However, the knowledge and support visitors take away to the community will magnify the number of beneficiaries to a very large extent. Further, through media products, the gardens can be brought into millions of homes via print media, radio, television, videos, and Internet products.

Many thousands of visitors enjoy the various amenities in Guadalupe River Park every year. Further, the park is growing and greatly increasing its capacity, ease of access and attractiveness, as described in the Guadalupe River Park Master Plan (2002). These streams of visitors provide a natural visitor base for those that visit Guadalupe Gardens and the conservation garden once constructed. In addition, the public outreach activities will draw visitors for tours, unstructured visits, workshops, and other educational events.

Visitors to the Gardens and consumers of its products are not the only beneficiaries. The entire Bay Delta ecosystem benefits from reduced water demand and reduce contamination from runoff. In other terms, the benefits are widely received.

## **Opposition to the Project**

The only issue so far has been money. There is currently little money budgeted for the project. The Master Plan that is being finalized will be for approximately four acres with a projected total cost of between \$3-5 million. Because the District doesn't have the funds for this, the consultant recommended completing the project in phases, obviously at a lesser cost per phase. However, the District's board of directors will still need to approve funding, as there isn't enough in the budget to complete Phase 1. However, this grant funding will increase the likelihood of Phase 1 moving forward.

# Innovation

## Innovative Technologies and Methodologies

Innovation generated by the Garden will be twofold. First is the innovation in landscape maintenance and design for water conservation. Second is the innovative utilization of the demonstration facility to educate and disseminate water conservation methods.

With regard to landscape maintenance and design, the state-of-the art methods, equipment, and designs will not just be demonstrated, but further developed. For example, new irrigation equipment may require innovative methods of operation for efficient operation. Knowledge of water efficient plant is not enough by itself to produce an effective special use landscape area—for commercial, recreational, or residential use. The Garden provides an ideal environment for generating innovative ideas and testing them “in the ground.”

Education and dissemination at the Garden will take place in an innovative network that: 1) brings visitors and experts to the Garden to work and learn, and 2) sends the Garden’s demonstrations and its knowledge into living rooms, garden shops, executive offices throughout the region. Unlike simple demonstrations, the garden will not be simply plants in the ground and a brochure. Landscape professionals will come to learn the technical and practical aspects of designing, planting, and maintaining water efficient landscapes. Residential customers come to other events to see attractive design ideas and to learn what they can expect from water efficient gardens. Researchers and product developers will come to test and measure the effectiveness of innovative ideas.

At the same time, the Garden will generate a wealth of knowledge that can be broadcast to customers via print media, videos, television, radio, and the Internet. It will be both a virtual and physical demonstration garden. The Garden will cultivate a presence in garden shops, hardware stores, landscape contractors’ trucks, on property manager’s desks, and in living rooms.

# Benefits and Costs

## Qualitative Description of Benefits

Benefits to water customers. For residential customers, the Garden will provide the educational resources needed to design and grow water efficient landscapes. Observing the examples of vegetation materials and turf comparisons and the accompanying explanations will give the customer the tools to think through changes to their own yards and gardens. The information will also provide customers what they need to ask for from their contractors—if they do not “do-it-yourself.” Commercial customers similarly are able to gain the knowledge and experience to make informed choices—including the cost and cost savings associated with water efficient landscapes. The Gardens can also be an avenue to further technical resources such as those provided by the District in the ITAP program.

Benefits to landscape professionals. Technical and field training for landscape professionals will enable them to successfully plan and maintain water efficient landscapes. Plants selection, trimming, fertilizing, and irrigation require a new knowledge set and skill set. Training landscape professionals, whether designers or maintenance contractors, has the added benefit of transferring water savings to part or ultimately to their entire customer base.

Benefits to water and wastewater agencies, governments, community organizations, and environmental and resource groups. The Garden will be a major resource to all organizations that touch on landscaping and irrigation. Water and wastewater agencies can use the facility to train their personnel and to develop program for their service territory. A coordinated approach will allow agencies to avoid a situation where they are developing duplicate materials, the cost of which could be shared. Retail customers can be referred to the Garden for further information.

Benefits to water supply and reliability. Landscape irrigation is a major component of water demand and a sector where conservation practices are often not widespread or inconsistent. Further human behavior is a large component of conservation in addition to technological fixes. Timers need to be adjusted, sprinklers tested, adjusted and repaired, and soil moisture needs to be monitored. These characteristics have been the source of challenges in achieving widespread conservation savings that can be relied upon for years to come. With the emphasis on modern methods, plant health, and maintenance, the objective is to achieve not just immediate savings, but continued savings over time as conservation methods become standard practice. The fact that landscape irrigation needs peak in the summer gives conservation savings in this sector particular leverage in terms of benefits. Summer peak needs are at the low point of seasonal rainfall in the region. Summer savings reduce the likelihood of shortage during the time when it is most needed. Further, since many components of the supply system are sized at a maximum capacity, peak demand reduction can have substantial infrastructure benefits.

Landscape water conservation is consistent with CALFED objectives strongly because it is a major source of irrecoverable losses. Losses to evaporation are large in landscape applications because of its distribution and exposure to seasonal high

temperatures and winds. Percolation into groundwater is recoverable only in those basins with developed groundwater storage. Landscape conservation also reduces the runoff of freshwater into saltwater bodies.

Benefits to water quality. Landscape runoff is a significant vehicle for contaminant transportation into sewer drains, creeks, and rivers. Fertilizer, pesticides, animal waste, motor oil and other road dirt all can be carried by runoff.

Insect control. Further, with concern over West Nile Virus growing, reducing runoff can eliminate one more potential source of breeding environments.

Benefits to ecosystems. More generally, reducing water demand has the potential to allow more water to support natural ecosystems, including not just the local environments, but the whole Bay Delta region.

### **Quantified Benefits**

Water savings on site could be quantified potentially if one assumed a conventional garden development rather than the demonstration garden. Since the land is currently undeveloped, such calculations would find analytically derived savings rather than empirical estimates.

Water savings off site is the ultimate objective of the program. Since total savings will depend on the rates of visitation and adoption of conservation measures, it is difficult to quantify the ultimate savings derived from the program.

Savings achieved by a given site will depend on the type of garden or turf area they develop. At one extreme, replacement of turf with artificial grass reduces water demand by 100 percent (assuming no water needs for cleaning). Alternatively, savings can be achieved from small adjustments or repairs.

### **Project Implementation Cost Table**

For this Section B proposal, the two elements of the Project Implementation Cost Table that are required in the PSP are presented below: Table C-1 Project Costs (Budget) and Tale C-5 Project Annual Physical Benefits (Quantitative and Qualitative Description of Benefits).

Tables 6 and 7 provide the line items and staff labor items that are the basis for the summary number entered into the required Table C-1.

**Table 6 - Line Items in Proposed Budget**

	<b>Item</b>	<b>Quantity</b>	<b>Cost/Unit</b>	<b>Cost</b>
<b><u>Planning and Design</u></b>				
1 -	Landscape design and plan development			\$ 65,000
	Subtotal			\$ 65,000
<b><u>Site Work</u></b>				
1 -	grading/ soil preparation	5	\$ 10,000	\$ 50,000
2 -	storm water/drainage	1,000	\$ 150	\$ 150,000
3 -	pathway construction	1,000	\$ 80	\$ 80,000
4 -	misc.			\$ 80,000
	Subtotal			\$ 360,000
<b><u>Base Planting and Irrigation</u></b>				
1 -	plants	2,000	\$ 50	\$ 100,000
2 -	mulch	500	\$ 100	\$ 50,000
3 -	irrigation equipment	5	\$ 10,000	\$ 50,000
4 -	turf demo	2,000	\$ 10	\$ 20,000
5 -	remaining area preparation			\$ 50,000
	Subtotal			\$ 270,000
<b><u>Education and Community Outreach Materials</u></b>				
1 -	Education/ plant signage	100	\$ 500	\$ 50,000
2 -	Education and outreach materials development			\$ 50,000
	Subtotal			\$ 100,000
<b><u>Monitoring, Assessment, and Reporting</u></b>				
1 -	Monitoring and assesment			\$ 50,000
2 -	Report preparation			\$ 20,000
	Subtotal			\$ 70,000
<b><u>Total Capital Cost</u></b>				\$ 800,000
<b><u>Operation &amp; Maintenance</u></b>				
1 -	landscape labor	80	\$ 25	\$ 2,000
2 -	landscape materials			\$ 2,000
3 -	outreach and community involvement			\$ 2,000
	Subtotal per month			\$ 6,000
<b><u>Total Operation &amp; Maintenance (per year)</u></b>				\$ 72,000
<b><u>Total Cost in First Year</u></b>				\$ 872,000
<b><u>Total Cost in Subsequent Years</u></b>				\$ 72,000
<b><u>Total Cost in Previous Years</u></b>				\$ 65,000

**Table 7 -- SCVWD Staff Labor**

<b>Position</b>	<b>Hours</b>	<b>Budget Item</b>	<b>Salary, Fringe</b>	<b>Total Cost</b>
SCVWD: Water Use Efficiency Unit Manag	100	Salaries, wages	\$ 63.73	\$ 6,373
		Fringe benefits	\$ 73.79	\$ 7,379
SCVWD: Water Conservation Specialist 1	300	Salaries, wages	\$ 36.66	\$ 10,998
		Fringe benefits	\$ 42.44	\$ 12,733
SCVWD: Water Conservation Specialist 2	300	Salaries, wages	\$ 40.47	\$ 12,141
		Fringe benefits	\$ 46.86	\$ 14,057
Subtotal		Salaries, wages		\$ 29,512
Subtotal		Fringe benefits		\$ 34,169
<b>Total</b>	<b>700</b>			<b>\$ 63,681</b>

Overhead rate @ 115.78%. FY 2002 SCVWD's Federal Office of Management and Budget (OMB) Circular A-87 Overhead Rate. SCVWD uses a 2-year cycle application of its OMB A-87 Overhead Rate.

## Project Implementation Cost Table

**Table C-1: Project Costs (Budget)**

**Applicant: Santa Clara Valley 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 <sup>1</sup>								
	Salaries, wages	\$29,512	5	\$30,988	\$30,988	\$0	0	0.0000	\$0
	Fringe benefits	\$34,169	5	\$35,877	\$35,877	\$0	0	0.0000	\$0
	Supplies	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Equipment	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Consulting services	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Travel	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
	Other	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(a)	Total Administration Costs	\$63,681		\$66,865	\$66,865	\$0			\$0
(b)	Planning/Design/Engineering	\$65,000	0	\$65,000	\$65,000	\$0	0	0.0000	\$0
(c)	Equipment Purchases/Rentals/Rebates/Vouchers	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(d)	Materials/Installation/Implementation	\$730,000	5	\$766,500	\$36,500	\$730,000	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 (Specify)	\$0	0	\$0	\$0	\$0	0	0.0000	\$0
(l)	Monitoring and Assessment	\$50,000	5	\$52,500	\$52,500	\$0	0	0.0000	\$0
(m)	Report Preparation	\$20,000	0	\$20,000	\$20,000	\$0	0	0.0000	\$0
(n)	<b>TOTAL</b>	\$928,681		\$970,865	\$240,865	\$730,000			\$0
(o)	Cost Share -Percentage				25	75			

1- excludes administration O&M.

**Table C-5: Project Costs (Budget)**

**Applicant: Santa Clara Valley 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 <sup>1</sup>				Quantitative Benefits - where data are available <sup>2</sup>
	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 <sup>3</sup> Indirect <sup>4</sup> or Both	Quantified Benefits (in-stream flow and timing, water quantity and water quality)
Bay Delta	Reduced demand for water. Reduced runoff contaminants.	Reduction of demand in peak season. Benefits potentially wide spread--wherever landscape irrigated	For landscape conservation with hardware and continued follow up, savings can be maintained indefinitely. Life of equipment can be 10 years or more. Savings derived from educating landscape contractors and customers may decline rapidly without follow up.	The project will result in both direct and indirect benefits. Savings will be achieved by visitors starting with the Garden's development (direct). There is a large indirect component in that the education experience may last over time and that information will be widely disseminated.	0
Local	Reduced demand for water. Reduced runoff contaminants.	Reduction of demand in peak season. Benefits potentially wide spread--wherever landscape irrigated	Savings from major hardware upgrades is expected to be for 10 years with maintenance follow up.	<b>Not applicable.</b>	

<sup>1</sup> The qualitative benefits should be provided in a narrative description. Use additional sheet.

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

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

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

**HOSSEIN ASHKTORAB**  
Santa Clara Valley Water District  
5750 Almaden Expressway  
San Jose, CA 95118-3614  
(408) 265-2600

***EDUCATION:***

Ph.D., University of California, Davis, 1989. Plant, Soil and Water Science.  
Master of Science, California State University, Chico, 1981. Irrigation.  
Bachelor of Science, University of Mazandaran, 1979. Agriculture Engineering.

***PROFESSIONAL EXPERIENCE:***

*Unit Manager*, Water Use Efficiency Unit, Santa Clara Valley Water District, Jan. 2001- Present

Responsible for managing the District's Water Use Efficiency Unit, providing technical direction, coordinating its activities with other District units, and external stakeholders including 11 water retailers. The water conservation program is a long-term commitment of the District, which provides the highest quality programs and educational opportunities to residents, businesses and agriculture in Santa Clara County.

Managing the implementation of all 14 BMPs required by the Memorandum of Understanding Regarding Urban Water Conservation in California (MOU). In addition, managing the adopted Water Conservation Plan (including an agriculture water conservation program) to comply with US Bureau of Reclamation mandate as required by the Central Valley Project Improvement Act (CVPIA).

Manage and participate in the development, implementation and administration of the water conservation and water recycling programs with more than \$9 million annual budget in Santa Clara County. Additionally, managed numerous grant funded programs, which, in FY 03/04 alone, totaled over \$2.8 million.

Develop partnership with local and regional cities, including various water conservation programs with City of San Jose, with more than \$3 million cost-sharing budget.

Participate and engage in the recycled water partnership such as the South Bay Water Recycling cost sharing agreement for the \$50 million in projects in the Santa Clara County.

Participate and coordinate with local, regional and statewide water conservation and recycling organizations. Member of CUWA water conservation committee and CUWCC steering committees.

Responsible for implementation of CALFED grants for the District Agricultural and Urban Water Use Efficiency programs. Developed proposals and received grant fund for two District's water recycling projects from Proposition 13 grant funding.

In partnership with the Santa Clara County Farm Bureau, UC Cooperation Extension, Department of Agriculture, Department of Water Resources, and Santa Clara County Natural Resource Conservation Service, developed and conducted nine Agricultural Irrigation and Nutrient Management seminars for the County growers and interested groups

*Water Conservation Specialist*, Water Conservation & Recycling Unit, Santa Clara Valley Water District, Jan. 1997 - Jan.2001

Developed and managed water conservation programs including programs for agricultural and large landscape water users.

Technical staff to District Landscape Water Advisory Committee, and District Agriculture Water Advisory Committee.

***RESEARCH AND TEACHING EXPERIENCE:***

Researcher/ Assistant professor, University of California, Davis. June 96 - Dec 1997.

Crop water requirement and water management  
3-D Aerodynamic latent heat flux research studies  
Field research study on irrigation systems and evaluations.

Assistant Professor, Dept. of Irrigation Eng., Shiraz University. Sept.93-June 96.

Lectured on urban water use and conservation  
Lectured on crop water requirements and evapotranspiration.  
Lectured on irrigation systems and design.  
Directed related laboratories and field trips.

Associate Land Water Use Analyst, California Department of Water Resources, Dec. 1986-Sep. 1993.

Technical coordinator for the Assembly Bill 325 Task Force Advisory Committee in 1991 and 1992 and facilitated the development of the State Landscape Water Conservation Model Ordinance. Assisted water agencies, cities and counties to develop and implement landscape water conservation guidelines and ordinances.

As a member of the State Water Conservation Advisory Committee, participated in the development of the Best Management Practices (BMPs) in water conservation.

Participated in the negotiation with the agricultural stakeholders and U.S. Bureau of Reclamation for the State Department of Water Resources Drought Water Bank. Developed a new method using nonlinear regression model to estimate crop water requirement values for major crops in the Delta's agricultural area which was the bases for the negotiation of the irrigation water use.

Supported agencies in the development of their water management plan, implementation and evaluation of various water conservation programs such as the ULF toilet replacement, toilet displacement devices, low flow shower heads and outdoor water audits.

Developed a new method using nonlinear regression model to estimate historical ETo values in the Delta's agricultural area.

Member of the 1989 and 1992 Xeriscape Conferences Steering Committee and chaired the Award Subcommittee meetings.

Research Assistant, University of California, Davis. September 1981-May 1982 and April 83-Dec.86

Field laboratory investigations related to the separation of soil evaporation and transpiration of tomato plants. Studied the evaporation rate under different plant growth stages and soil moisture contents using highly sensitive Lysimeter.

Collected and interpreted weather station data at U.C. Davis field station. Worked extensively with instruments, soil moisture and particle size analysis.