Application for a Section B Demonstration Project Grant

For

The Yucaipa Valley Water District Summerwind Conservation Demonstration Project

Prepared by
Yucaipa Valley Water District

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STATEMENT OF WORK

Yucaipa Valley Water District

2004 Water Use Efficiency Proposal to the California Department of Water Resources for a Section B Demonstration Project – Yucaipa Valley Water District Summerwind Conservation Demonstration Project

1.0 Introduction and Project Context

1.1 Relation of Project to CALFED Goals

California's water constraints are well known and well documented by the CALFED program and other sources. Greater population and urbanization will increase demands on the limited water . New housing developments for this growing population will demand water for a wide variety of domestic uses. New residential development also has the potential to impact surface and ground water quality. CALFED's four interrelated program objectives recognize the interrelated nature of problems in the Bay-Delta system. This proposal addresses three of those program objectives, integrating water supply reliability, water quality and ecosystem quality issues within an area that receives water from the Bay Delta system. Demands on the Bay-Delta system can be minimized through better management of water from the Bay-Delta region, local water supply, quality and ecosystem concerns.

New growth and development is making demands on water supply reliability from the Bay-Delta system. However, this new growth provides an opportunity to incorporate measures that reduce water consumption per residential unit resulting in a significant reduction in the growth in new demands, improving water supply reliability from the Bay-Delta system. Additionally, it creates an opportunity to integrate measures minimizing the impact of construction and occupation of residences, protecting surface and groundwater resources and maximizing local ecosystem quality.

1.2 Relevance to Water Supply Management Needs

The San Francisco Public Utilities Commission (SFPUC) recently reported that a 12 percent population growth through 2030 in the City and County of San Francisco could be achieved without a net increase in water demand. This is to be accomplished by incorporating conservation and water recycling in urban infill projects along with continued penetration of conservation devices and tactics in existing housing stock and non-residential structures. Using similar tactics, the

City of Los Angeles has also been able to accommodate a nearly 1 million person increase in population with negligible growth in water supply demand. Development of the application and understanding of new conservation technologies can further this trend.

While continued growth and redevelopment in established urban areas have different conservation options, new subdivisions in urbanizing areas such as the Yucaipa Valley will be required to accommodate projected growth. Developing additional measures to maximize water use efficiency in concert with groundwater resource protection will minimize additional demands and protect scarce water resources. The planning process for these subdivisions will incorporate a mix of measures to address water-use efficiency goals and objectives and protect surface and groundwater resources. These measures will include those that are required or encouraged by water districts, planning and public works departments, or any of a variety of water supply/water quality organizations. To the extent new conservation and water quality control technology can be proven in controlled circumstances, this technology can be transferred to other locations and situations resulting in additional water savings statewide. Such measures can be adopted by water providers through in-tract design standards or imposed through the CEQA and land entitlement process.

The Yucaipa Valley Water District (YVWD) has a rare opportunity to undertake a water conservation and water quality protection demonstration project that would result in information useful to other water agencies, and be valuable to the land development community, those involved in preparing CEQA documents, and the local governments responsible for reviewing and approving subdivision applications and enforcing development terms and conditions.

1.3 Description of Yucaipa Valley Water District

The YVWD is a county water district which provides a blend of imported, local and recycled water, and wastewater services to customers in the rapidly growing areas of the City of Calimesa, the City of Yucaipa, and portions of Riverside County and San Bernardino County as shown on Figures 1 and 2. The District lies at the headwaters of the Santa Ana River watershed and as such, water quality protection for downstream users and the maintenance of riparian habitat in the watershed is of high importance. The District uses an innovative strategy of combining its ample groundwater supply and storage capacity to perform conjunctive use with the full ability to serve its demands from groundwater and nearly all demands from local and imported surface waters as conditions dictate. It also is supplementing this supply through a recycled water system that can utilize raw water from the State Water Project and other surface sources combined with locally generated recycled water. The District's goal is to have

about 20 percent of its total demands serviced through recycled water. Currently, about 14 percent of YVWD's total demand is met by recycled water.

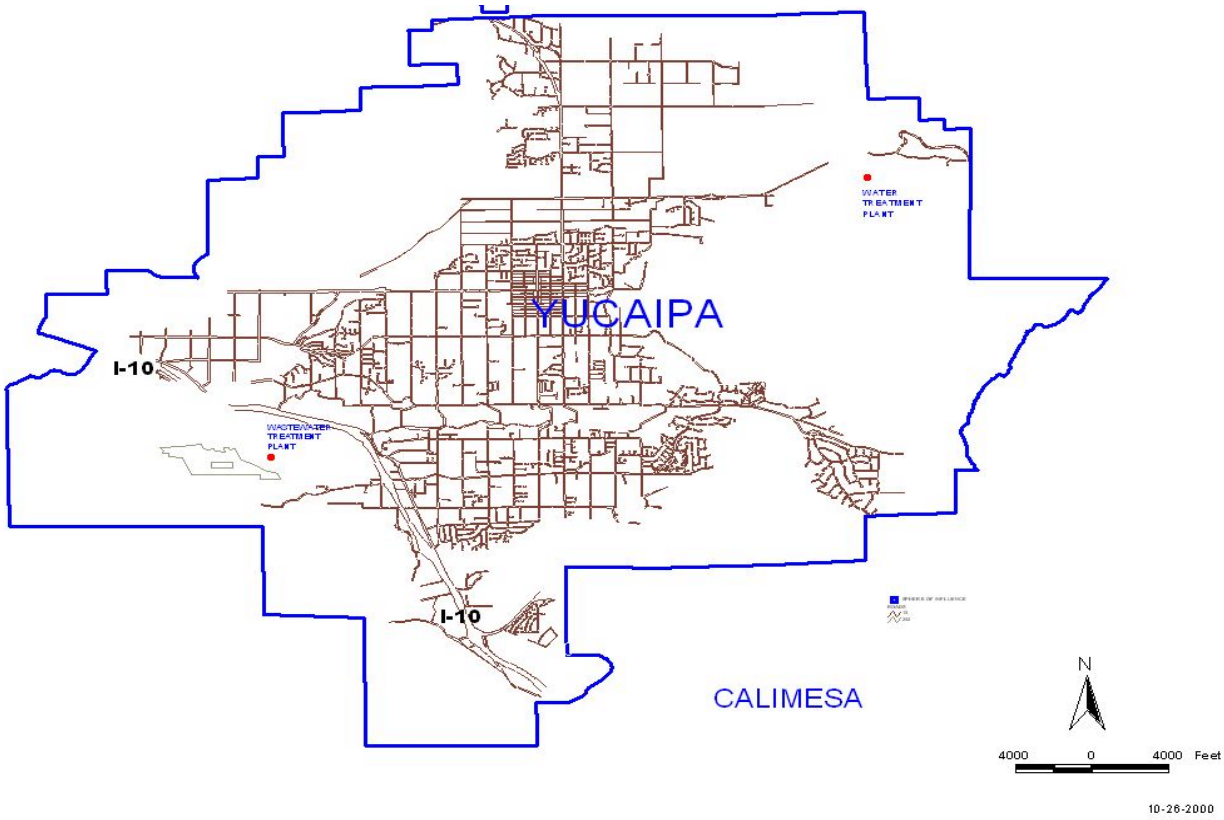
Figure 1 Yucaipa Vicinity Map

2.0 Project Objective, Description, Hypothesis and Tasks

2.1 Project Objective

The objective of pursuing a grant from the Department of Water Resources (DWR) is to establish a program to evaluate over an extended period of time the reduction in potable water demand and the benefit to regional water quality that can be realized by integrating evapotranspiration-based irrigation control systems and water quality enhancement techniques in developing communities as compared to communities not using these techniques. The purpose of the grant is to implement and evaluate an integrated strategy for management of

Figure 2 – Yucaipa Valley Water District



water resources that would reduce the risk from drought, protect and improve water quality, and improve local water security by reducing dependence on imported water. Results would provide other jurisdictions with more reliable information about potential water savings and water quality enhancements through application of these techniques. This proposal would complement the efforts of the California Urban Water Conservation Council, which is evaluating the efficacy of incentive programs of the EBMUD and MWDSC to retrofit ET-based controllers into existing communities under a Proposition 13 grant from DWR.

Numerous large-scale residential subdivisions in California are implementing one or another "voluntary" water-saving and water quality protection techniques into their design, although the inclusion of these techniques is often a concessionary device to facilitate project approvals. There is a lack of reliable data that can verify the benefits of these actions. This proposal helps address that problem by conducting a controlled study. To address the ever-growing concerns regarding water supply and quality in developing areas, the YVWD proposes to conduct a controlled study of a large-scale residential subdivision that utilizes advance irrigation control technology, a number of water quality control means to reduce the consumption of potable water, and the amounts of pollutants and contaminants in waters discharged by the project.

2.2 Project Description

The project outlined in this grant proposal will capitalize on the opportunity presented by the Summerwind Ranch subdivision to compare water demand and water quality in two adjacent communities of approximately 3,000 residential units, using different conservation and water quality control technology. Summerwind Ranch is to be developed by Suncal Communities, which also developed the existing Beaumont project directly adjacent and south of Summerwind Ranch as shown on Figure 3. Both projects have almost identical geographic, climatic, and geologic conditions as well as similar patterns of development offering an ideal opportunity for a truly comparative study of water use and disposition of urban residential runoff in the environment. The setting also allows the proponents to carefully control all but specific variables in the design and implementation of the water distribution and wastewater/stormwater management system and its associated applications.

Current regulation affecting both projects requires implementation of the following methods of controlling and treating stormwater and nuisance water runoff:

- Stormwater detention facilities;

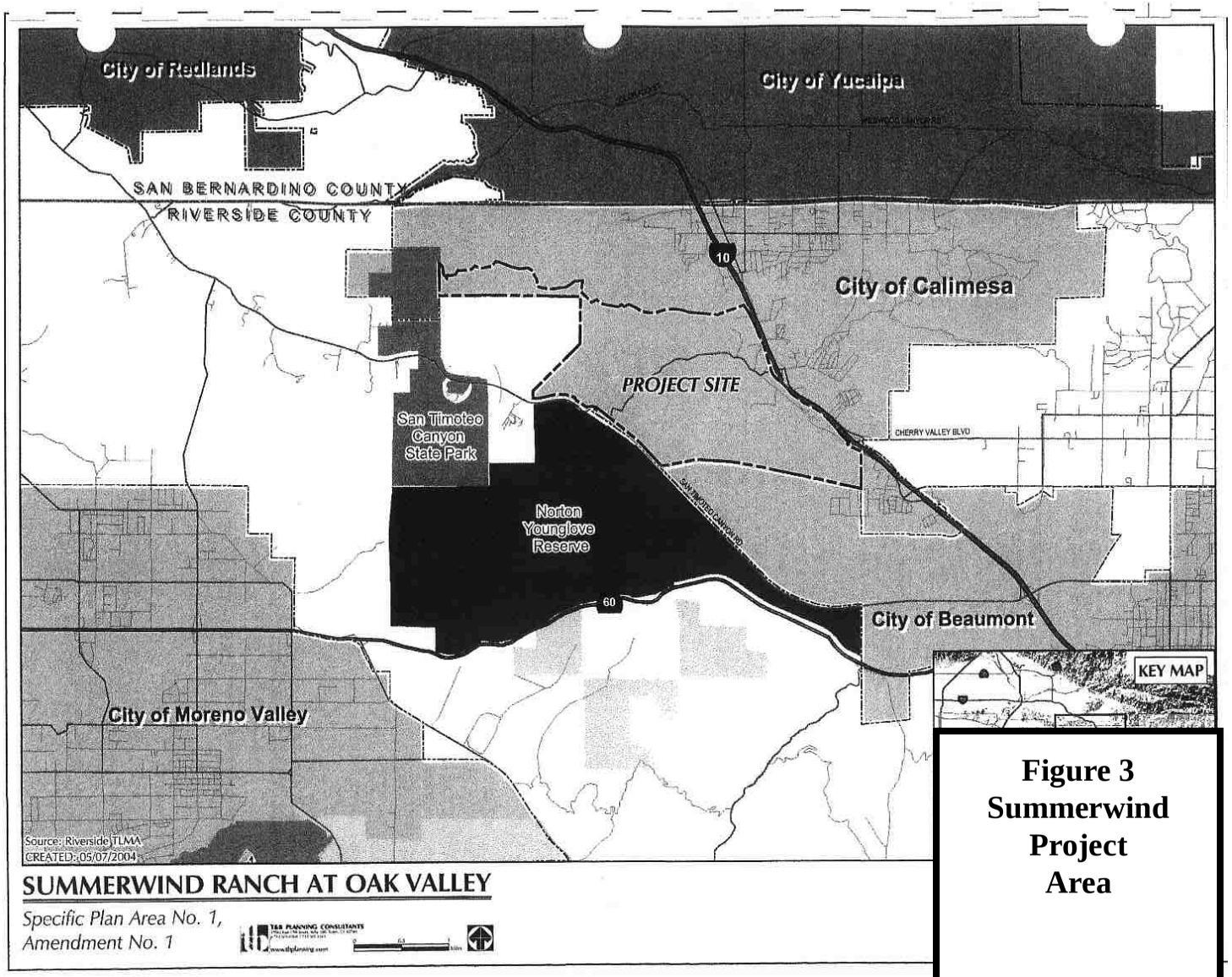


Figure 3
Summerwind Project Area

- First flush/nuisance water runoff sediment and oil separation;
- Installation and permanent maintenance of conventional landscape and irrigation on all manufactured slope areas.

Current policy in the Beaumont project encourages, but does not require, use of reclaimed water for irrigation of public landscape areas.

All the above measures are currently being implemented in the Beaumont project and will be enhanced and studied in the Yucaipa Valley Water District's service area as part of the Summerwind Ranch Project. Suncal Communities has agreed to cooperate in the implementation and comprehensive study of a number of additional techniques for both water savings and water quality control in the Summerwind Ranch project, and to provide partial funding for the incremental cost of those techniques.

The techniques to reduce water use that would be implemented as part of the water distribution system for the Summerwind Ranch subdivision would include the following:

- Design and implementation of the landscape technique known as Natural Slope Restoration for the project's perimeter slopes that are adjacent to open space areas. These slopes would not be irrigated and, once established using this proven technique, would require little maintenance, other than periodic thinning for fire prevention purposes. This contrasts with the Beaumont project which has utilized conventional landscaping requiring supplemental irrigation.

- Implementation of an on-site weather station and master ETo-based irrigation control system for all parks, common areas, and parkways, including park and school playing fields, all of which would be irrigated with reclaimed water.

- Establishment of the requirement that merchant builders install a Weather Reach® or equivalent ETo-based irrigation control system in each residence to automatically control each individual homeowner's private irrigation system using remote information from the project's weather station.

- The District will install and operate a weather station and serve as the weather controller for the District's service area, allowing for expansion of this system to future projects. The estimated cost for the weather station is $6,000, plus a weather server $2,500 and $200 per month paging service.

- Construction of a wastewater treatment plant to treat wastewater to a tertiary level, combined with a recycled water distribution system to provide landscape irrigation water to all residences within the project. This results in a dual plumbed project anticipated to reduce potable water demands by more that 50 percent. This is fully funded by the District and through developer fees and is not budgeted as part of this application or cost share proposal.

The enhanced water quality techniques that would be incorporated at Summerwind Ranch include the following:

- Construction of stormwater detention ponds to control discharge of stormwater and any associated sediment transport from the subdivision during major rain events.

- Minimization of fertilizer application on the Natural Slope Restoration areas, combined with elimination of irrigation in those areas, to reduce introduction of nitrates and other chemicals present in treated water (both potable and reclaimed).

- Implementation of a three-stage stormwater treatment system. The first stage would involve installing storm drain inlet filters to minimize the introduction of silt and sediments to the storm drain system at the source. The second stage would involve the use of sediment separation structures at the storm drain discharge locations to remove any remaining sediment and oil byproducts from nuisance water and first-flush stormwater and to prevent discharge into the open space and creek areas. The last stage would involve the use of water treatment bio-swales to "polish" nuisance water runoff and first-flush stormwater runoff by creating natural filters with plants designed to remove artificial chemicals and dissolved nutrients (e.g., fertilizers) from the waters before they enter the regional drainage basin or habitat mitigation areas. The second and third stage elements here are listed as an optional task in the budget.

It is anticipated that implementation of the identified techniques would realize a water-use savings of between 50 percent and 60 percent over potable water consumption at Summerwind Ranch as compared to Beaumont, the control project and nearly 20 percent of gross water demands overall[1]. It is expected that

[1] Based on the preliminary water supply assessment for the project, the ETo control portion of the project would save 325 acre-feet (af) over a project with traditional controls, reducing overall project demands from 1,948 af to 1,624 af. This is based upon an assumed 25 percent water savings rate as applied to irrigated areas of the development. In Summerwind the savings would accrue to irrigated areas served by

the quantity of dry-weather runoff would also be reduced and its quality improved as compared to that of the adjacent property. The exact extent of water supply and water quality savings/improvements will be documented with testing over time.[2] This evaluation will be facilitated by the fact that both projects occupy separate drainage basins that conjoin immediately downstream from the two subdivisions, thus providing the ability to easily assess and compare each project's runoff. YVWD also provides water service to both developments for easy comparison of consumption data.

Results from study of conservation savings and water quality improvement will be analyzed for cost effectiveness at a household, subdivision, and district level. The costs and benefits will also be shared statewide through the outreach strategy to provide information of statewide value with respect to the implementation of water conservation and water quality protection measures.

2.3 Research Hypothesis

Utilization of natural landscape techniques, ETo based irrigation controllers and advanced surface water control systems can yield cost-effective water savings that can be successfully applied statewide.

2.4 Project Tasks and Monitoring

The following work tasks would be undertaken during the demonstration project. In compliance with the requirements of the grant program, quarterly reports would be provided during the specified months to provide information on grant performance and the products developed.

Task 1 – Complete Project Planning

Under this task, the experimental project design would be completed and specifications for water consumption analysis and water quality sampling would be developed. It is anticipated that District staff would perform water consumption analysis tasks, and compare monthly water consumption readings for the Summerwind vs. Beaumont projects. Master meter reads for open spaces

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potable and reclaimed water. Reclaimed water savings would allow reclaimed water to displace other potable uses of water outside of Summerwind, for additional reduction in demand of potable supplies. See Table 2, Appendix 1.

[2] Literature review supports water savings for ETo based controllers vs. traditional controllers of from 10-50 percent, depending upon site and situation. Studies by the Utah Division of Water Resources reported a 14 percent savings for residential application and a 28 percent savings for institutional irrigation using the controllers proposed herein. Total ETo in the Yucaipa area is at least 56.37" based upon the UC Riverside CIMIS station and therefore, with high irrigation demands, a reasonably high degree of water savings are expected.

would be taken for all meters serving open space. The District would evaluate whether all Beaumont and Summerwind residential meters should be analyzed in the study period or whether there are sufficient labor savings to justify analysis on a sample basis without compromising statistical significance. Water quality sampling protocols (constituents and number of samples) would be established as well in conjunction with staff of the California Regional Water Quality Control Board, Santa Ana region. It is anticipated that every first flushing rainstorm event would be sampled within a winter season with at least three other samples during wet weather in the rainy season. At least two dry-weather samples during the dry season per year would also be taken. The sampling period is expected to last for three years in order to allow landscaping to mature sufficiently that long-term savings and water quality effects can be assessed.

The irrigation control weather station would also be evaluated in this task to assess whether its design and location would lend it to becoming part of the CIMIS network.

Task 2 (Optional task) – Evaluate Option of Community College Curricula, 4-Year Undergraduate Curricula, and Graduate Curricula to Select a Monitoring Program Participant

Rather than using District forces to evaluate water consumption and quality data, the District would attempt to interest nearby universities to participate in the project by performing monitoring and analysis functions. This would allow the project to be integrated into an academic curriculum, providing learning opportunities, additional outreach and publication possibilities in technical and academic journals. To ensure continuity and quality, under the supervision of a YVWD staff member and a senior academic advisor, students would conduct the monitoring activities, gaining the opportunity to develop an understanding of the importance of managing water demand and water quality. Students participating in the monitoring would also have an opportunity to understand the different techniques that can be applied to reduce demand and to protect water quality, to apply different instruments and measurement methods, and to learn professional skills that will be transferable to future jobs and/or fieldwork.

A survey of accredited academic institutions in Southern California would be made to identify those institutions with curricula that would support the monitoring effort and an interest in participating. Crafton College is located in the Yucaipa Valley and its proximity could be advantageous, especially during periods of inclement weather when monitoring would be required. However, as a junior college, it may not have academic programs that could support the monitoring effort. California State University San Bernardino is also proximate to

the site, but may not have curricula that would support the monitoring program. The University of California at Riverside is close by, and has academic programs that include water resources and water quality which may also provide potential opportunity.

Task 3 – Develop and Implement Outreach Strategy

An outreach effort would be designed and implemented to publicize the study among groups who would likely be interested in results of the study. These groups include neighboring water districts experiencing growth in residential and other construction including:

- Beaumont Cherry Valley Water District - Member of Beaumont Basin Water Master & Member of San Timoteo Watershed Management Authority
- City of Banning - Member of Beaumont Basin Water Master
- City of Beaumont - Member of Beaumont Basin Water Master & Member of San Timoteo Watershed Management Authority
- Yucaipa Valley Water District - Member of Beaumont Basin Water Master & Member of San Timoteo Watershed Management Authority
- South Mesa Mutual Water Company - Member of Beaumont Basin Water Master & Member of San Timoteo Watershed Management Authority
- San Gorgonio Pass Water Agency - State Water Contractor serving the Pass area and the Calimesa portion of the Yucaipa Valley Water District
- San Bernardino Valley Municipal Water District - State Water Contractor serving the San Bernardino Valley area and the Yucaipa portion of the Yucaipa Valley Water District
- Western Heights Mutual Water District - Local mutual water company

Local ratepayers would be informed through District newsletters and articles on the District's website.

Outreach would also be made to major developers in the area to inform them of the study:

- Sun Cal Corporation
- Simmons Construction
- William Lyons Homes

Finally, a statewide outreach would be defined to reach water supply and planning groups that could ultimately disseminate the information to be applied

in the field in future. Groups to be contacted and informed would include but not be limited to:

- California Urban Water Conservation Council
- DWR's Public Information Committee
- Water Education Foundation
- Association of Environmental Professionals
- American Planning Association
- Association of California Water Agencies
- California Bay-Delta Authority
- California Association of Realtors
- Building Industry Association

Task 4 – Monitor Summerwind Ranch Water Management Implementation

Based upon the sampling design protocols developed in Task 1, water quality sampling would begin downstream of the two developments once construction is completed. Water use in the Summerwind Ranch subdivision would be monitored on a monthly basis by District staff. All of the monitoring data would be compared with comparable water use and water quality data from the Beaumont subdivision. Over a minimum period of three years, a solid database would be developed that demonstrates the effectiveness of the water conservation and water quality protection measures applied at Summerwind Ranch. Relevant results from these activities would also be used to feed into the cost benefit analysis described in Task 6. This task (4) is budgeted at a level where staff and consulting services are used to accomplish the tasks. If Task 2 was funded and a college program was successfully recruited, it is expected that some cost savings may result in this task.

Task 5 (Optional task)– Evaluate Clearinghouse Information Dissemination

One of the challenges facing project planners, CEQA practitioners, and individuals involved in project review and compliance with terms and conditions is that applicable information about water conservation, recycling, and water quality protection such as would be developed in this project is not readily available. While Handbooks of BMPs and other publications have been developed and are available via the web, there is no known centralized source of information that would aid the land development community in reducing water demand and protecting water quality. As part of the grant, the YVWD would explore the possibility of setting up a clearinghouse for such information through one or more of the water supply and planning groups as noted in Task 3, or through another institution that may be identified. This could include the

development of a "one-stop shop" website that could be relevant throughout the state, and potentially elsewhere in the region. As part of this evaluation, appropriate institutional arrangements would be studied for the clearinghouse, and potential sources of funding (e.g., foundations, public sector, public-private partnership, etc.) would be identified. This evaluation is presented as an optional task which would be integrated into the outreach effort in Task 3, as the water supply and planning entities could help provide guidance on effective methods to accomplish this function.

Task 6 – Define and Conduct a Cost Benefit Analysis of the Techniques

Over the life of the project, a cost benefit analysis would be developed that tracks the associated costs and benefits to households, the subdivision, and the YVWD over time. Tracking data at designated intervals over the project cycle would document the costs and benefits of the various technologies and activities that will accrue over time. Applying a range of technical, economic, and social values would determine the costs and benefits. This analysis would conform to California Urban Water Conservation Council Guidelines on cost-effectiveness analysis

Task 7 – Submission of Quarterly Fiscal and Programmatic Reports and Prepare Draft and Final Report

At the conclusion of the sampling period, results and findings of the study program would be documented in a draft and final report. This would provide a comprehensive analysis of the project outcomes and cost benefit evaluation of all implemented techniques for reduction in water use and protection of surface and groundwater quality. Issues relative to application and operation of the technologies would be identified. The information presented in the Final Report could be used as a basis for development of new BMPs for publication by the California Urban Water Conservation Council or development standards for land use jurisdictions and water supply agencies and water quality control mitigation techniques for Regional Water Quality Control Boards.

The draft report will be provided to DWR for review and comment. It would also be made available to entities involved in the outreach process and would be placed on the YVWD website so that the community has an opportunity to review the findings and recommendations in the document and provide comment. After a 60-day review period comments on the draft would be addressed and a Final Report will be prepared.

2.5 Organization and Staffing

The lead agency for this grant application is the YVWD. Depending upon funding for Task 2 a secondary agency would be an accredited college with established programs in environmental sciences that would be identified during the project. Suncal Communities will contribute to the incremental unfunded cost of the facilities, unless additional grant money can be located for that purpose.

The YVWD lead will be Matt Harward, Deputy Manager of Water Resources. Mr. Harward will have primary responsibility for overseeing the grant. He will be responsible for ensuring the technical quality of the results of the different tasks. He will also be responsible for contract administration, including project accounting and submittal of invoices. In addition, other YVWD personnel and qualified consultants will be involved in the effort Additional YVWD staff which would be available to the project would be:

- Brent Anton, Engineering Project Manager
- Jeremy Costello, Engineering Technician
- Jack Nelson, Assistant General Manager

2.6 Project Costs and Benefits

The grant seeks funding for 90 percent of the cost of implementation of the following capital items:

- The incremental cost of installation of Restored Natural Slopes and their initial maintenance.
- The capital cost of design and construction of the master homeowners association irrigation control facilities, including the weather station and controllers, and remote control (wireless) irrigation control valves.
- The entire cost of implementation of the Weather Reach® residential irrigation control system.
- The entire design and construction cost of implementing stages 2 and 3 of the water quality system.
- Additionally, the grant would provide funding for consultant costs for implementing the Statement of Work

YVWD staff labor costs for implementing the Statement of Work would be funded by the District with the District also sharing 10% of consultant and miscellaneous costs.

The cost of completing each of the proposed tasks and the resulting cost share is summarized in Table 1. In addition, Table C-1 and Table C-5 using the DWR templates are also provided with respect to project costs and benefits. The total proposed grant request is $1,100,610 with a local cost share of $143,390 for a total project cost of $1,244,000. If optional costs as noted in the Statement of Work were deleted, the total cost would be reduced to $990,920.

The grant for the demonstration project described in this proposal would result in multiple benefits statewide, to DWR, the development community, water supply and quality agencies, and local governments. It would also benefit the YVWD and the individuals that purchase homes in the Summerwind Ranch subdivision. Following is a summary comparison of the proposed demonstration project in relation to the criteria established for the DWR grant program.

2.7 Summary Relevance and Importance

The proposed demonstration project is extremely relevant because it would result in a coordinated body of knowledge about the application of water demand reduction and water quality protection measures that can benefit the development community, CEQA practitioners, planning and water agencies, and other organizations statewide. The project would help reduce demand for water to accommodate growth in the YVWD and it would improve the quality of runoff from the Summerwind Ranch subdivision. The comprehensive outreach effort that would be conducted as part of the demonstration project would benefit the residents in the Summerwind Ranch subdivision, and provide valuable information to individuals in all aspects of the land development community throughout California. Certain measures to be demonstrated may benefit reduced water demand for urban infill projects, but the biggest benefit would be to help future subdivisions reduce their demand for water supplies. The demonstration of measures to enhance water quality also has statewide application and would result in cleaner water in streams and other receiving waters with attendant public health and environmental benefits.

2.8 Summary Technical/Scientific Merit/Feasibility

The proposed demonstration project applies existing technologies and water management techniques in a very comprehensive fashion. The proposed scope of work is feasible and would have scientific merit as a result of demonstrating the different techniques not only to the YVWD but also to other interested parties throughout the state. Monitoring of water use and water quality in adjacent subdivisions would be undertaken using approved protocols.

2.9 Summary Monitoring and Assessment Elements

The proposed demonstration project includes a focused assessment of the water demand reduction and water quality protection measures that could be applied in settings similar to Summerwind Ranch in developing areas throughout the state. The project also includes a comprehensive monitoring program that would be undertaken during construction of the Summerwind Ranch subdivision and after the dwellings are occupied. It would involve the use of water-use and water quality monitoring protocols that would incorporate accepted standards and would be subject to review by the Regional Board and other appropriate agencies. The monitoring effort would be directed by a registered engineer working directly for the YVWD and conducted in cooperation with an accredited academic institution or qualified consultants. The results of the monitoring would be subject to review in the draft Final Report and it would include the results of a comprehensive assessment of the water demand reduction and water quality protection techniques applied in the Summerwind Ranch subdivision.

2.10 Outreach/Community Involvement/Acceptance

The proposed project has a strong component of outreach through the life of the project. The strategy for outreach includes a range of stakeholders and provides comprehensive opportunities to transfer findings from the study to future developments statewide and beyond.

2.11 Innovation

The proposed demonstration project is innovative because it would involve a holistic assessment of techniques used to reduce water demands and to protect water quality. It is also innovative because it would provide extensive exchange of information about the benefits and costs of the techniques to a broad audience.

2.12 Benefits and Costs

The proposed demonstration project would develop several layers of information about benefits and costs over time, which would be conveyed in simple terms to a range of stakeholders. It is believed that the circumstances for this study – with a control subdivision and a pilot site - provides a unique opportunity to measure the costs and benefits at a household, subdivision, and watershed levels. The application of the water conservation measures in the Summerwind Ranch subdivision should achieve a minimum 15-30 percent applied water reduction when compared with the adjoining Beaumont subdivision. The water quality benefits could be of the same or even greater level. The homeowners in the Summerwind Ranch subdivision would benefit as

a result of a heightened awareness of water conservation and protection of water quality. They would also benefit from reduced costs of water supply.

2.13 Qualifications of the Applicants

A very experienced team of skilled professionals would undertake the proposed demonstration project. This team has experience in all aspects of water demand reduction, use of recycled water, and application of measures to protect water quality. As necessary, qualified consultants will be engaged to accomplish tasks of outreach, water quality sampling, cost benefit analysis and report preparation.