

## EXECUTIVE SUMMARY

The City of West Sacramento is requesting \$324,551 in grant funds for an urban Implementation Project, **Parks Irrigation Retrofit** ("Project"), which has direct water use efficiency benefit to the Bay-Delta.

The funds are for the purchase and installation of equipment which will more effectively manage water delivery to the City's existing public landscapes. The outcome will increase the exactness of landscape water use related to weather, soil and plant conditions; will reduce the amount of water used, will reduce the amount of water drawn by the City from the Sacramento River; and will reduce pollution entering the Sacramento River. The Project will bring the irrigation of existing parks and median strips into an integrated computerized, centrally controlled water-efficient system. The City estimates the installation and use of this system will save 73 acre feet (AF) of Sacramento River water per year. The Sacramento River flows directly into the Bay Delta.

The project will meet the CALFED objectives of:

- Reduce existing irrecoverable losses
- Achieve multiple benefits
- Preserve local flexibility
- Build on existing water use efficiency programs

The City of West Sacramento, incorporated in 1987, is developing rapidly within its City limits. By 2020, its present population of 38,000 is expected to be 77,100. The net use of Sacramento River water -- 8,582 AF in 2004 -- is expected to be increased to 13,350 AF per year by 2020. With this projected growth, the City is implementing programs and projects directed toward "smart growth", including those which will reduce water usage. The City's adopted Urban Water Management Plan (2001) contains a variety of actions that conserve water, reduce water waste, utilize treated effluent, and improve facilities which treat and distribute water. This Project is consistent with both smart growth principles and the Water Management Plan. It is also consistent with the City's Parks Master Plan and the City of West Sacramento/City of Sacramento Riverfront Master Plan.

In 2001 the City initiated an advanced irrigation technology to be used in all new public landscaping that is incorporated in development projects. The technology, Rain Master Evolution DX2 Irrigation Controller System with Basic ET Software ("Irrigation System"), was selected through a competitive process by the City to be the preferred technology for water-saving irrigation practices. The City requires its installation in all construction projection containing public landscape. The specifications are on the City website. The cost of purchase and installation of the field equipment is the obligation of the private developer. At the time and at City cost, the City has installed the centralized computer and software associated with the new system. This same equipment will be used for the Project, thereby

avoiding additional new costs. The Rain Master Irrigation System has been operating successfully on approximately 12 acres of newly landscaped public land.

Building on the experience to date, the City wishes to extend this technology to its existing parks and public landscaped area, for a fully integrated water-efficient irrigation system on all public lands. Fifteen public parklands, athletic fields, playgrounds and landscaped medians will be brought into the new system. They total 88.5 acres.

As a disadvantaged community, the City lacks the funds to proceed with the Project. It is for this reason Water Use Efficiency Grant funds are requested.

## **WORK STATEMENT SECTION 1: RELEVANCE AND IMPORTANCE**

### **1.1 Need for the Project**

The City of West Sacramento is located at the confluence of the American and Sacramento Rivers in eastern Yolo County. It has a population of 38,000 with an economy that consists of a combination of residential, commercial and industrial development. (See Maps)

In 1987 the City was incorporated and assumed ownership and responsibility for operation of the water system from East Yolo Community Services District. The District purchased the system in 1983 from the Washington Water and Light Company, a subsidiary of Citizens Utilities Company of California. The City currently serves approximately 10,100 connections through its water supply, treatment, and distribution system.

The City's service area boundary is contiguous with the City limits, and encompasses more than twenty square miles, a large portion of which is undeveloped. The City is bounded on the east and north by the Sacramento River, the west by the Sacramento River Yolo Bypass and the Deep Water Ship Cannel, and the south by Shangri-La Slough just south of Burrows Avenue. The service area is bisected by the Deep Water Ship Channel and Barge Canal.

The City of West Sacramento diverts water from the Sacramento River under two entitlements: an appropriative water right, and a contract with the Bureau of Reclamation for the Central Valley Project. A large portion of the City also lies within the boundaries of the North Delta Water Agency (NDWA), which assures the City the right to divert water to satisfy beneficial uses within that area in accordance with the agreement between the Department of Water Resources and the NDWA.

The City's water is used for municipal, residential, commercial, industrial, and agricultural purposes. (Agricultural use is declining.) It enters the City at the Bryte Bend Water Treatment Plant. The waste water is treated at the City's Waste Water Treatment Plant on South River Road and the effluent, approximately 50% of the diversion, is returned to the Sacramento River 11 miles south of the City. As of 2007, the City will be served by the Sacramento Regional County Sanitation District (SRCSD) waste water treatment plant expansion.

The Sacramento River is the largest river in California with average annual runoff of 22.4 million acre feet and yields 35 percent of the State's water supply. Statewide the multiple demands for water – for residential, agricultural, industrial, and environmental use – increasingly compete against each other. This is particularly true in the Central Valley, including the Sacramento region.

Communities in the Sacramento and Bay-Delta regions are experiencing population growth that is projected to be substantial over the next 20 years. The City of West Sacramento

projects its population will double (77,100) by 2020, and will have significant business and commercial growth. This growth will require additional water drawn from the Sacramento River. The City anticipates it net diversion of water from the river to increase from 8,582 AF in 2004 to 13,350 acre feet (AF) in 2020.

The City is committed to taking actions that reduce the unnecessary diversion from the River, increase the efficient use of the water that is diverted, and reduce polluted runoff. Doing so will benefit the City, the Sacramento region, the Bay-Delta system, and the Statewide water supply.

## 1.2 PROJECT GOALS/OBJECTIVES

The Project will accomplish the following:

- *Increase available water supply by reducing annual water diversions*

This project will retrofit existing City landscapes with an irrigation system that reduces/eliminates water use inefficiencies. As of 2001 this system is required to be installed in the public landscapes of all new developments within the City limits. However, the City has not had the funds to retrofit existing public landscaped areas, such as parks, playgrounds, athletic fields and medians. With the installation of this Project, the City anticipates a savings of 73 annual acre feet (AF) presently being diverted from the Sacramento River for the purposes of public landscape irrigation. This reduced water diversion will increase the available water supply downriver from West Sacramento. (See Monitoring and Assessment Plan Components for explanation of methodology.)

- *Improve water quality*

Over-watering leads to incomplete absorption due to soil saturation. The excess water drains out of the public landscape, across public streets, into the City's storm drain system. The storm drain system discharges into the Sacramento River through multiple outlets in West Sacramento.

As the water flows to and through the storm drain system, it will pick soluble and non-soluble substances that affect water quality. It will carry sediment and small rocks from the public landscape and the roads it flows through on its way to the storm drain system. Additionally, soluble substances such as oil accumulated on roadways will dissolve in the excess water as it flows to the storm drain system.

Since storm drain systems are not constructed to tie into wastewater treatment plants, these substances will not be removed from the water prior to discharge into the River. The runoff will affect the quality of the water in the River and the Bay-Delta, and its aquatic flora and fauna.

Eliminating the incidents of over watering -- either from the inability to measure Evapotranspiration ("ET") and reduce the watering amount based on ET information, or from incidents such as broken sprinkler heads -- will reduce the quantity of water flowing through the storm drain system. This will improve water quality in the River and the Bay-Delta.

- *Reduce irrecoverable losses*

In addition to affecting water quality, over watering also leads to irrecoverable losses. Based upon water temperature, humidity, water surface area, and air temperature, a portion of the excess water evaporates. The evaporated water is no longer available for use in the local area. Eliminating the incidents of over watering, either from inefficient measurements of Evapotranspiration or from incidents such as broken sprinkler heads, will reduce the quantity of water evaporating out of the local water supply, reducing irrecoverable losses.

- *Reallocate City staff resources from maintenance activities to enhancement activities*

This project will reduce the staff time necessary to physically check each irrigation site for equipment failures and signs of over watering. It will also reduce the staff time necessary to manually adjust water windows and other parameters. Currently City staff must manually make irrigation adjustments and repairs at each individual public landscape. These staff resources will be reallocated to enhancement activities, such as a tree maintenance program and various capital improvement projects.

The Irrigation System will monitor problems and changing conditions through the Central Computer located at City Hall. When there is a problem, the Central Computer will automatically notify staff through Windows-compatible software package. At the time, the Central Computer will make automatic adjustments to the irrigation system, shutting it down if necessary. This will eliminate the need for staff resources to be present in the field to perform the adjustments or shutdown. Once aware of the actions by the Central Computer -- and the related information -- staff can make manual adjustments to multiple locations from the Central Computer at City Hall, should they be required.

The City estimates that 252 hours will be reallocated annually. At a rate of \$25.08 per hour (salary + benefits), the value of this time is \$6,320.

### **1.3 CONSISTENCY W/LOCAL OR REGIONAL WATER MANAGEMENT PLANS**

- *City of West Sacramento Water Management Plan*

*Goal:* Continue to reduce unnecessary use of the City's water supply, which is water diverted from the Sacramento River.

The current Plan, adopted in 2001, discusses the City's water supply and entitlements; City water use and demand; comparison to supply and demand; and the City's water management programs. The water management programs being implemented include: public education; pipeline replacement and leak repair program; water conservation kits; water reclamation;

requirements for new construction; and urban water shortage contingency plan for various scenarios of water shortage. A copy of the implementation section of the Water Management Plan is contained in Attachment A. This Project is consistent with the City's Urban Water Management Plan. The City is working on the update of the Plan.

Subsequent to the current Plan being developed, the City has incorporated the requirement that the advanced irrigation system described in this grant application be built into the public landscaped land within new developments. This requirement is contained in the City's specifications for construction projects and is available on the City's web site. This feature will be incorporated in the updated Water Management Plan.

The current Urban Water Management Plan was prepared using the same buildout figures for 2020 which have been cited elsewhere in this grant application. Applying these figures to projected water usage and diversion from the Sacramento River, it is projected by 2020 that the City will require 29,750 AF diverted from the River; will return 16,400 AF, for the net use of 13,350 AF within the City limits. These figures do not incorporate the annual savings that will be experienced through the operation of the Project.

Another increment of water usage to be added in the next Water Management Plan update is the preparation for full metering of all water connections in the City. Historically, communities in the Sacramento area have not metered the usage of water. The City is now planning for full metering and will comply with the State law to implement a full metering program no later than 2013.

- *West Sacramento/Sacramento Joint Riverfront Master Plan* – Developing and preserving the West Sacramento/Sacramento Riverfront.

Relevant Goal: "Balance ecological enhancement and resource conservation with recreational development."

Consistency with goal: Reducing the non-point source pollution and erosion resulting from over-watering will help preserve the Riverfront.

The City has long recognized the value of the Sacramento River as the "heart" of the region and a natural resource essential to the region and all of California. The City of West Sacramento and the City of Sacramento adopted a joint Riverfront Master Plan to provide a comprehensive guide for their commitment to improving the riverfront in its entirety, as a shared resource. Both cities are implementing components of the Master Plan as funds become available. For example, the City of West Sacramento is developing increments of the River Walk which will provide public open space and access the length of West Sacramento's riverfront. The first increment was constructed approximately 4 years ago, and

additional increments are being planned. The City has applied for grant funds for the improvement of the Broderick Boat Ramp on the Riverfront.

The City has requested EPA Brownfields Assessment funds to assess the riverfront land south of the Barge Canal prior to its redevelopment into mixed use, with housing, office and retail uses. The land is presently used as petroleum tank farms. The CalEPA Department of Toxic Substances Control (DTSC) is a partner in the grant application. DTSC's interest is to A) directly assist West Sacramento and B) use the experience as a practical example of how they can improve their working relationship within active redevelopment communities. DTSC collaborates closely with staff of the Regional Water Quality Control Board as they participate in the West Sacramento Brownfields Assessment projects. These agencies are already cooperating in a West Sacramento Brownfields Assessment project funded in 2002 and being conducted in another area of West Sacramento (the West Capitol Corridor).

- *City of West Sacramento Parks Master Plan*

Relevant Goal: "Improve existing parks to maximize the utility of existing resources"

Implementing this Project will help ensure that the City is able to provide the highest quality parks possible, maintaining parks and landscapes consistent with best management practices of water conservation and efficient use. In addition to the other Project benefits, the improvements will eliminate the poor field conditions caused by overwatering which interfere with sports activity and public use. The fields are heavily scheduled by a variety of community groups, such as Little League, Pop Warner Football, Youth Soccer, Track and Field Youth Teams, regional sports events, and special community events. When a field or facility becomes unusable, it impacts multiple teams, families and residents.

#### **1.4 REGIONAL OR STATEWIDE PROJECTS COMPLEMENTED OR ENHANCED**

Communities throughout California are beginning to test out this technology as a tool for water use efficiency. Within the immediate area, the same technology is being used by municipal water utilities within the City of Davis, the Solano County Water Agency, and the City of Vacaville. As each additional community installs this technology, there is greater savings of the source water, and regional and Statewide water conservation is enhanced.

*City of Davis* – In 1991, the City of Davis implemented this same Rain Master Irrigation System and has been successfully operating it and saving large annual water quantities. The original installation phase included approximately 20 public landscapes. To date, approximately 200 public landscapes are outfitted with the system. Davis City staff estimates that under the automated system, approximately 40% less water is used versus the older manual system. This estimate is based on calculations using general assumptions about water usage; prior to implementing this system, the City of Davis did not meter its public

landscapes. The Davis City staff estimates it is currently saving thousands of acre feet of water annually.

*City of West Sacramento*

The City initiated this Irrigation System in 2001, in new developments. Presently it is being used on approximately 10 acres of landscaped medians in the newly developed areas of West Sacramento. The experience of the City staff is that the program has been operating very well, alerting the staff to problems as they occur and shutting down the water delivery to the particular point that has a water use problem. The Central Computer and software previously purchased for the startup of the system will be used with the Project, avoiding duplication of equipment and cost. The Project will be able to be implemented and move into operation more rapidly, due to the experience gathered to date.

**WORK STATEMENT SECTION 2: TECHNICAL/SCIENTIFIC MERIT, FEASIBILITY**

**2.1 METHODS, PROCEDURES, EQUIPMENT, AND FACILITIES**

To achieve the goals listed in Section 1, the City of West Sacramento will retrofit existing parks and other public landscapes with the Rain Master Evolution DX2 Irrigation Controller System with Basic ET Software (“Irrigation System”). The Irrigation System consists primarily of three (3) components listed below. The third component is already in place and the Project will install components 1 and 2.

1. An Evolution Weather Center II (Weather Center)
2. Irrigation Controllers equipped with radio transmitters and receivers
3. A Central Computer, located at City Hall, with Basic ET Software installed

• *Methods*

Rain Master’s Evolution DX2 Irrigation Controller System with Basic ET Software (“Irrigation System”) ensures that the City’s public landscapes only receive as much water as they need, precisely when they need it. This improves the efficiency with which the City’s irrigation system utilizes water. Improving West Sacramento’s water use efficiency reduces the water quantities necessary to maintain its public landscapes and improves water quality in the Sacramento River and the California Bay-Delta. These improvements are achieved through monitoring weather and irrigation system conditions and utilizing multi-directional communication between the Weather Center, Irrigation Controllers, and Central Computer to adjust water use.

The Weather Center acts as the hub of the Irrigation System’s communication. It directly measures the total volume of water entering and leaving the root system by tracking Evapotranspiration (ET) and rainfall and utilizing water usage statistics obtained from the

Irrigation Controllers. The Weather Center transmits this information to the Central Computer. This data is automatically entered into a database on the Central Computer.

Through the Basic ET software application, the Central Computer automatically analyzes the data received from the Weather Center and determines the appropriate adjustments and/or actions needed to ensure efficient use of water. In the event an adjustment must be made to the irrigation scheduling and water windows, the Central Computer communicates these commands to the Weather Center, which then transmits the commands to the appropriate irrigation controllers. In the event action is necessary to repair system failures, such as broken sprinkler heads, the Central Computer generates an alarm to notify the City staff operator of the problem. At the same time the alarm is generated, the Central Computer, through the Weather Center, instructs the irrigation controller operating the broken sprinkler head to shut off water to that sprinkler.

The quantity of water used in irrigating the public landscapes will be reduced primarily by eliminating over watering. The Irrigation System, by accurately accounting for Evapotranspiration, will provide an equivalent quality of landscape irrigation utilizing a lesser quantity of water. Over time, it is likely that the Irrigation System will provide a higher quality of landscape irrigation utilizing a lesser quantity of water.

Secondarily, the Irrigation System will eliminate the unnecessary water volumes applied to the public landscapes in events such as broken sprinklers. Under the older irrigation system, if a sprinkler broke, it could be hours or days before the problem was identified, the water shut off, and the sprinkler repaired. Under the automated Irrigation System, the Central Computer will almost instantaneously send a command to the Irrigation Controller operating the broken sprinkler to shut off water to that sprinkler. Simultaneously, an alarm will be generated on the Central Computer notifying staff that the sprinkler needs repair. Virtually no unnecessary water will flow through the broken sprinkler. Additionally, if the sprinkler break occurs on a Friday night, and repairs are not possible for two or three days, the Irrigation System tracks the lost irrigation and compensates once the broken sprinkler has been repaired.

- *Procedures*

Following is a general description of the Irrigation System's installation procedures. Additional detail is provided in the Plans and Specifications provided in Attachment B.

The Weather Center is located within 300 feet of an Irrigation Controller (specific one not determined yet) which then becomes the Central Irrigation Controller. The Weather Center is installed on a concrete pad wired to the Central Irrigation Controller through conduit placed 18 inches below the surface. The Central Irrigation Controller is equipped with a radio transmitter/receiver and will serve as the Weather Center's communications link to the rest of the Irrigation Controllers throughout the System. One Weather Center was installed previously south of the Barge Canal/Deep Water Channel and is operating with the Irrigation

System installed in the City's newest developments. The Project will install a second Weather Center north of the Barge Canal/Deep Water Channel, where most of the 15 Project sites are located, and where a different microclimate exists. (The map provided in Attachment C indicates the landscapes which are currently operating the Irrigation System.)

The Irrigation Controllers throughout the Irrigation System, including the Central Irrigation Controller, are installed in control boxes. The control boxes are mounted on concreted pads or affixed to walls, depending upon the installation site selected for each Irrigation Controller. For this project, the control boxes utilized under the old irrigation system will serve as the control boxes for the automated Irrigation System.

Field Technicians from United Green Tech will uninstall the existing irrigation controllers, and replace them with the automated Irrigation Controllers. All of the automated Irrigation System's controllers are equipped with the same radio transmitter/receiver with which the Central Irrigation Controller is equipped. The Field Technicians will wire the Irrigation Controllers, as detailed in the Plans and Specifications, and test the communication between the Irrigation Controllers, the appropriate Weather Center, and the Central Computer at City Hall.

The Irrigation System also requires the installation of Flow Sensors and Master Valves. These components are required to enable control of the sprinklers by the Irrigation Controllers. The Flow Sensors and Master Valves are installed 18" to 24" inches below the public landscape surface. United Green Tech will use a Pacific Parks Landscaping to install the Flow Sensors and Master Valves. A copy of the price quote from Pacific Parks Landscaping is provided in Attachment B.

A City staff person is designated as the System Operator and is in charge of monitoring the Irrigation System through the Central Computer. The System Operator will spend approximately two (2) hours per day monitoring the System. He/she will arrive for work in the morning and check the Central Computer for alarms that have been issued since the previous work day. The System Operator will delegate maintenance tasks to other staff members based upon these alarms. Maintenance staff will make all necessary repairs to the Irrigation System based upon the Central Computer's alarms. Throughout the workday, the System Operator will check the Central Computer for any new alarms and delegate maintenance/repair tasks accordingly. These procedures are being followed now, for the public landscapes in the new developments.

On a monthly and quarterly basis the System Operator will run reports from the Central Computer. These reports are described in greater detail in Monitoring and Assessment section of the grant application.

- *Equipment*

Below is a composite list of the equipment/materials necessary to implement the methods described above. This list is limited to the equipment necessary for the Project. The materials list provided in the Plans and Specifications (Attachment B) breaks out this list by the specific items that will be installed at each individual landscape.

Total Materials List:

- 15 Radio Boards (12, 18, 24, 30, 36, or 48 stations depending upon the number of irrigation stations at the landscape where the board is installed)
- 2 Hardwire Boards
- 16 Radio and Dome Antennas
- 17 Flow Sensors and Master Valves with Flow Boards
- 5,450' Flow Sensor Cable (installed in 1" conduit)
- 1,000' Communication Cable
- 16 PROMAX Receivers
- 2 Phone Repeater's (for communication with satellites within 1 mile)
- Weather Center

- *Facilities*

The Project will be installed on the existing irrigation system that serves existing public landscaped parklands and median strips. Fifteen City sites, covering 88.5 acres, will be retrofit. Individual sites range from 21 acres to 4 acres, and all are within the City limits of the City of West Sacramento. They include large community parks, neighborhood parks, and special facilities. The individual sites include multiple athletic fields, playgrounds, open lawn areas, informal play areas, and shade trees.

1. Riverwalk Park: 4 acres, on Sacramento Riverfront between Tower and I Street bridges.
2. Broderick Boat Ramp Park: 4 acres, located at A Street at the Sacramento River.
3. Bryte Park: 21 acres, located at Todhunter at Carrie Street (includes Golden State Middle School athletic fields used by the City and community.)
4. Alyce Norman/Bryte Playfields: 17 acres, located at Todhunter at Carrie Street (includes Alyce Norman School play fields used by the City and community)
5. Elkhorn Park: 5.2 acres, located at Cummins Way at Greenwood Avenue.
6. Westfield Park: 7 acres, located at Poplar Avenue at Oxford Street.
7. Westacre Park: 5 acres, located at Evergreen Avenue at Westacre Road.
8. Memorial Park: 4 acres, located at Regent, Alabam, Euclid and Delaware streets.
9. Sam Combs Park: 4.5 acres, located at Stone Boulevard at Jefferson Boulevard/
10. Touchstone Park: 4 acres, located at Linden Avenue near Independence Avenue..
11. Linden Park: 4 acres, located at Linden Avenue at Summerfield Drive.
12. Summerfield Park: 8.9 acres, located at Linden Avenue near Diane Drive.

13. Meadowdale Park: 4 acres, located at West Capitol at Interstate 80.
14. Stillwater and Reed Median Strip
15. Harbor Blvd at Reed and Rice Median Strip

The Central Computer and software controlling the system is located at the City Hall. The project will utilize the equipment which was purchased and installed at the time the City required this Rain Master Irrigation System to be used in new developments which include public landscaping. The existing control boxes in the various locations will be used for the Project.

A map showing the park site locations is in Attachment C.

## 2.2 TASK LIST/SCHEDULE

- *Budget, Tasks, and Timeline*

This project consists of four (4) overall tasks: 1) Administration; 2) Install Irrigation System; 3) Monitoring and Assessment; and, 4) Report Preparation. The Irrigation System will be installed by United Green Tech, utilizing Pacific Parks Landscaping; and, will be completed within the first year. Administration, Monitoring and Assessment, and Report Preparation will be ongoing throughout the term of the grant; and, will be conducted by City staff. The Year 1 total budget is \$299,312; Years 2 and 3 are \$12,619. See Attachment D which contains the discrete yearly Budget and the Task List and Timeline.

- *Deliverable Items*

United Green Tech will deliver a fully operational automated irrigation system to all of the public landscapes to be retrofitted through this project. The City of West Sacramento will provide DWR with quarterly reports evaluating the project's success.

- *Start/end dates*

Assuming State/City contract execution on 12/1/2005, the Installation process will be completed by 12/1/2006. Reporting will be provided quarterly through 11/30/2008 and/or in accordance with DWR grant administration requirements.

- *Projected costs for each task*

The costs for each task are detailed in the Budget provided in Attachment D and the Cost/Benefit Table C1 provided in Attachment E.

## 2.3 PLANS AND SPECIFICATIONS

- *Types/quantities of materials*

A composite materials list is provided earlier in this section. Please see Attachment B for a complete list of materials broken out by individual public landscapes and a line item materials budget. The total budget for installation is \$286,693 (\$260,630 + a 10% contingency).

- *Dimensions*

The Plans and Specifications provided in Attachment B include the dimensions of the equipment that will be installed with this grant.

- *Locations*

A list of the facilities included in this project is provided earlier in this section. The map provided in Attachment C shows the locations of the public landscape where the Irrigation System will be installed.

- *Registered Civil Engineer's certification statement*

A statement certifying this project's technical feasibility is provided in Attachment F.

## **2.4 ENVIRONMENTAL DOCUMENTATION**

The environmental compliance documentation is provided in Attachment G.

CEQA environmental certification is Class 2 Exempt since the Project consists of replacement or reconstruction of existing facilities where the new facilities will be located on the same site or place and will have the same purpose and capacity as the original structure. Appropriate form will be included.

NEPA environmental certification is Categorical Excluded Project But Subject to 24 CFR Part 58.5 and 58.6. Forms for 58.5 and 58.6 are in the Attachment.

## **WORK STATEMENT SECTION 3; MONITORING AND ASSESSMENT**

### **3.1 OVERVIEW OF THE MONITORING AND ASSESSMENT PLAN**

*Documenting water savings and other benefits* – The Rain Master Irrigation Management System has a built-in tracking and reporting system. The system provides the following reports that staff will use to track water savings and other benefits:

- *Water Usage Reports* – Reports of water usage based on Station GPM data in computer and by flow meter readings, if applicable.
- *Flow Meter Reports* – Reports of Flow Meter usage.
- *Satellite Events Reports* -- Reports on all activities that occurred at selected Satellite Controllers, for selected days.
- *Satellite Alarm Reports* – Reports on all alarms that occurred in Satellite Controllers.
- *Central Alarms* – Reports on all alarms that occurred at Central, such as problems in communication, and other Central activities.

- *Rain Reports* – Reports on daily rainfall for selected Weather Centers and selected dates.
- *Evapotranspiration (ET) Reports* – Reports of daily ET readings for selected Weather Centers and selected dates.
- *Program Reports* – Reports on each Controller selected, showing all programs. The programs selected can be Valid Programs, All Modified Programs or All Programs. The data includes all information about Water Days, Start Cycles, Station Run Times and all set up information, for each program. These can be printed for a hard copy in each controller if desired.
- *System Transaction Reports* – Reports of all transactions in computer, for either current month or last month. Facilitates trouble shooting of system by reviewing each event that happened each day for the entire month.

- *Tracking progress*

City staff will track the information provided in the system reports on a daily basis. Quarterly, this data will be compiled and analyzed to evaluate the project's success. Based upon this analysis, a report to DWR will be prepared incorporating the printed system reports and documenting the water savings (acre-feet).

Parks and Recreation Services staff timesheets will be used to track the hours reallocated to enhancement activities. The number of hours will be multiplied by \$25.08 (salary + benefits) to determine the value of the reallocated time.

- *Determining project success*

The Project Goals/Objectives portion of the Work Statement – Section 1 quantifies the City's estimates related to the goals it intends to achieve through this project. That section of the grant application details both the City's estimates of the current conditions and the projected conditional improvements resulting from project implementation. Project success will be determined based upon meeting and/or exceeding these projected conditional improvements.

The water usage reduction is quantified at 73 AF, providing weather conditions similar to the last 3 years occur. The water quality goal, *i.e.*, the reduction of runoff and pollution prevention is not quantifiable. The reduction in unrecoverable losses also is not quantifiable. Successful water quality improvements and irrecoverable losses reductions will be determined based upon reduced instances where maintenance needs go undetected for extended time periods leading to over watering. The staff time savings, *i.e.*, 252 hours, for reallocation is quantifiable.

### 3.2 MONITORING AND ASSESSMENT PLAN COMPONENTS

- *Description of how pre-project conditions and data baseline determined*

Using Utility Records over the past three (3) years, the City calculated its mean water consumption at each of the sites that will receive the Irrigation System through this Project. The cubic foot water consumption was then converted to acre-feet. Then, a water quantity savings rate of 30% (supplied by United Green Tech and verified by the City of Davis experience) was applied to the acre foot water consumption.

$$10,942,100 \text{ ft}^3 \text{ (mean water consumption)} = 244 \text{ AF (mean consumption/43,560)}$$
$$244 \text{ AF} \times 30\% = 73 \text{ AF}$$

Using estimates, based upon historical staff time sheets, of the number of hours Parks and Recreation Services staff spends physically visiting every site included in this project to check the integrity of the current irrigation system, the City calculated the value of time savings that would occur and enable staff to be reallocated to enhancement projects. The estimated time reallocation is 252 hours. At a value of \$25.08 (salary + benefits), the value of this time is \$6,320.

- *Estimated accuracy of data that will be produced*

The data generated by the Irrigation System software has a 3% statistical margin of error.

- *Explanation of how data collected will be used to evaluate success relative to goals/objectives*

City staff will use the Irrigation System's water usage and flow meter reports to quantify the total consumption, converted from gallons to acre-feet, used at the public landscapes included in this grant application. These figures will be compared to the data provided in the Utility Billing Statements for a comparable period. The difference between the historical data provided by the Utility Records and the data provided by the Irrigation System's reports will equal the actual water quantity savings for that period. Successful achievement of the Water Quantity Savings Goal will be determined based upon the meeting or exceeding the 73 acre foot per year water quantity savings (providing external conditions, such as weather and use, remain comparable.)

The City will use the Irrigation System's alarm reports to evaluate the success of the Water Quality Improvement Goal. Successful elimination of instances where an irrigation system failure results in period of over watering will indicate successful achievement of this goal.

The City will use records concerning the labor costs of monitoring and maintaining the current irrigation system compared to the labor costs associated with monitoring and maintaining the automated system to evaluate the project's success related to reallocating City staff labor away from maintenance and repair activities and toward landscape

enhancement activities, such as a tree maintenance program and various capital improvement projects.

- *How external factors (weather, social condition, etc..) are accounted for*

The irrigation system monitors weather factors and makes automatic adjustments for weather events. The City has notified its residents and users of the Project sites and requested public comments to determine the initial social conditions in which this project will be implemented. There are no adverse social conditions that will affect the Project and its outcome. Through the implementation process and the term of the grant, the City will regularly inform its residents of the project's progress and success. This notification will include avenues for public comment. This will be conducted as described in the Outreach/Community Investment/Acceptance section of the grant application.

- *Info on how data & other info will handled, stored, & reported; how it will be made accessible to DWR/others*

The Central Computer automatically saves all system alarms and reports generated from data collected from the Weather station and irrigation controllers. The daily reports the City runs will be saved in this fashion. The quarterly reports the City compiles will be printed and saved in hard copy in the Parks and Recreation Department. Public outreach documents will inform the public of the availability of these reports and provide instruction as to how they may be obtained for review.

- *Estimate cost of monitoring/assessment* – Over the 3-year period of the grant project, monitoring/assessment will cost \$22,265.

## **SECTION 4: QUALIFICATIONS OF APPLICANT AND COOPERATORS**

### **4.1 APPLICANT QUALIFICATIONS**

The City has an outstanding record of implementing smart growth projects, and has received grant awards from EPA, CalEPA, and the Sacramento Area Council of Governments (SACOG) for brownfields assessment projects and for major transportation projects related to the SACOG principles of community design (i.e., smart growth). In addition the City has an excellent history of using federal and state grant funds to assist with high priority projects in the community, such as: alternative transportation projects, affordable housing projects and programs, public infrastructure improvements, and increased public safety services/facilities. This experience demonstrates that the City will carry out the project in full compliance with federal and state funding requirements, and will meet the obligations of the grant.

Examples of the City’s ten year federal and state grant experience are listed below.

Funding Source	# of Grants	Total Grant \$
HUD/CDBG	21	\$4,980,000
HUD/HOME	5	\$3,650,000
HUD/202	1	\$5,179,000
US DOJ	14	\$2,451,149
ISTEA/TEA	3	\$1,015,855
Federal STP	6	\$2,396,854
RSTIP	2	\$538,000
Federal Section 130	2	\$4,015,031
EPA	2	\$367,000
FEMA	5	\$599,414
SACOG	4	\$21,797,430
<b>TOTAL</b>	<b>65</b>	<b>\$46,989,733</b>

With all grants, the City has not had any “adverse audit findings” or had to comply with any special “high risk” terms.

**4.2 COOPERATOR QUALIFICATIONS**

United Green Tech was founded in 1986 and is experienced in the installation, technical support, and field service of over 9,000 landscape products, including the Irrigation System in this grant project.

**4.3 PROJECT MANAGER RESUMES**

*Bob Johnston, Parks and Recreation Services Director* – Mr. Johnston has extensive experience and is currently supervises the administration of the City’s Parks and Recreation Services Department. Prior to working for West Sacramento, Mr. Johnston was the Director of Leisure Services for Park City, Utah, where he was responsible for, among other responsibilities, administering a \$6,000,000 annual budget, supervising 30 full time employees, and developing and administering departmental strategic plans. As Parks and Recreation Services Director for the City of West Sacramento, he will have overall supervisory responsibility for the activities conducted with this grant.

*Gary Valine, Park Superintendent* – Mr. Valine has extensive experience in Landscape and Personnel Management, Construction, Landscape Equipment Operation, Landscape Maintenance Budgeting, and Landscape Maintenance Materials Purchasing. Over the past 14 years, he has served as the City of West Sacramento’s Park Chief, Park Maintenance Manager, and Park Superintendent. Mr. Valine will be responsible for supervising the staff, including the System Operator, responsible for operating and maintaining the Irrigation System.

#### 4.4 ROLES OF EXTERNAL COOPERATORS

*United Green Tech* – United Green Tech, founded in 1986, was selected as the vendor to provide the equipment, software, installation and training for the water efficiency system which is being implemented in the City. They were selected through a competitive bid process which the City conducted. A copy of the staff report recommending United Green Tech is included in Attachment H.

*Tony Yarish, District Manager* – Mr. Yarish has over 20 years of experience installing and maintaining irrigation systems for private and municipal water users. As United Green Tech's District Manager for Northern California, he will be responsible for the overall supervision of the installation and on-going maintenance of the irrigation system installed for the City of West Sacramento.

*Donald D. Franklin, Technical Services Supervisor – United Green Tech of Northern California:* Please see Attachment H for a copy of Mr. Franklin's resume. He will be responsible for supervising the field technician teams that will install the new irrigation system at the City's public landscapes and provide technical support on-call. Mr. Franklin has extensive experience developing and managing the database systems that make this irrigation system possible, installing the system, and providing the on-call technical support that will help ensure the project's ultimate success relative to achieving the City's Bay-Delta and local goals.

#### 4.5 PREVIOUS WATER USE EFFICIENCY GRANT PROJECTS

The City of West Sacramento has not implemented any previous Department of Water Resources Water Use Efficiency Grant Project. This will be the City's first.

It has initiated the use of this water use efficiency irrigation system in new developments, the specifications of which are built into all public improvements which are required of developers at the time of development. The specifications are on the City's website. The purpose of this grant project is to retrofit existing public landscape areas so that the entire City public landscaped lands will be served by one integrated system, with central controls and maximum water use efficiency.

#### 4.6 DOCUMENTATION OF DISADVANTAGED COMMUNITY STATUS

The City of West Sacramento qualifies for "Disadvantaged Community Status" based upon its annual median household income compared to the State of California. The most recent median household income data for the City is the 2000 US Census, data provided by the U.S.

Census Bureau. It documents that the City's median household income is 66.8% of that of the State of California. The documentation is in Attachment I.

**Comparison of State and West Sacramento  
Median Household Income**

<b>2000 Census, U.S. Census Bureau</b>	<b>California</b>	<b>Yolo County</b>	<b>City of West Sacramento</b>
Median Household Income (HHI)	\$47,493	\$40,769 (85.8% of CA Median HHI)	\$31,718 (66.8% of CA Median HHI)
80% of Median HHI	\$37,994	n/a	n/a

**SECTION 5: OUTREACH, COMMUNITY INVOLVEMENT, AND ACCEPTANCE**

**5.1 PLAN FOR PUBLIC OUTREACH TO AFFECTED GROUPS/INDIVIDUALS**

It is the City's policy to involve affected groups and individuals (stakeholders) in the planning and decision making related to major community projects. The Automated Irrigation Management System Implementation Project includes a community outreach, investment, and acceptance (outreach) component to keep local stakeholders involved in the project development and implementation process.

During the project's implementation and completion, the City will provide regular updates to the local stakeholders. The updates will be on the City's web site, as well as given directly to the organizations using the park facilities. Presentation at City Council meetings regarding the project's progress will be on the Agenda for those meetings, which are posted on the City's website. Public comment periods are provided at these meetings. City staff will make presentations at meetings of the Parks and Recreation Commission and the Housing Advisory Commission.

Notifications and meeting materials will be provided in formats accessible to all parties wishing to participate. Translations will also be provided as appropriate. (Twenty six languages, other than English, are the primary language spoken by the City's many immigrant residents.) City staff includes native speakers and translators of languages indigenous to the community. Assisted listening devices are available at all City Council meetings upon request by participants.

Notice to inform the public and request comments/questions on the grant application were posted on the City's web site and on a rotational basis on the government channel for Charter Cable operating in West Sacramento. The Project was presented at the Housing Advisory Commission meeting in January. A copy of Web Site notice and letters received are contained in Attachment J.

## **5.2 LOCAL GROUPS/ORGANIZATION (STAKEHOLDERS) NOTIFIED OF THE PROJECT**

Direct contact by city staff was made to several organizations that use the parks/open spaces on a regular basis. Organizations contacted are:

- Washington Unified School District  
Contact: Patrick Campbell, Superintendent
- Sports Organizations using the facilities  
Such as:
  - West Sacramento Girl's Softball League  
Contact: Augustine Grandoz
  
  - Washington Little League  
Contact: Robert Martinez
  
  - West Sacramento Soccer League  
Contact: Sarah Najarro

In addition, direct contact was made with the North Delta Water Agency, of which West Sacramento is a member.

- North Delta Water Agency  
Contact: Robert Clark, Executive Director

## **5.3 LEVELS OF SUPPORT/OPPOSITION BY NOTIFIED GROUPS/ORGANIZATIONS**

The notified groups support the Project and understand its value for water conservation. They also appreciate the fact that it will improve the condition of the fields and facilities, with the elimination of overwatering. The North Delta Water Agency supports the project and is familiar with the technology as a water conserving measure.

## **5.4 IDENTIFIED POTENTIAL 3<sup>RD</sup> – PARTY IMPACTS**

The impact on third parties, in this case the users of the parks, is seen as positive, once the Project is completed. The installation/retrofit process will not result in any service disruptions in and around the public landscapes that are the subject of this project.

### **5.5 Training, Employment, and other social/economic benefits**

This Project will include ongoing training and support for the City staff in the operation of the Irrigation System. There will be no additional employment created as a result of the project. Its implementation will allow the City to reallocate staff time for other much needed work within the Park and Recreation Services Department.

The major social/economic benefit of this Project, aside from the water use reduction and improvement to water quality, is that it will improve the facilities which are used by sports and community organizations throughout the City.

West Sacramento has a population with a low median household income; it's immigrant population is large and diverse -- at least 26 languages other than English are the primary language of the families: and the amenities and opportunities for these families are limited. For many, sports and organized activity is the vehicle for their children to remain interested in school, to be assimilated into the community, to learn acceptable group and personal behavior, to learn athletic skills, and to learn the benefits of self-discipline and achievement. With limited public funds, much of the sports activity is conducted by volunteers, after school. The community sports organizations count on the fields and facilities being usable and in good condition. With the present irrigation system in the existing facilities, there are times when a facility cannot be used, due to overwatering. The Project will remove that problem.

### **5.6 OPPOSITION TO THE PROPOSED PROJECT**

There is no opposition to the Project.

## **SECTION 6: INNOVATION**

- *Use of the "water budget" irrigation method*

This type of irrigation system is an automated technology for implementing and monitoring the "water budget" irrigation method, which has been the subject of research and information dissemination by national universities, agricultural research centers, and government agencies. This type of system tracks the percentage of moisture maintained within the root zone on a per station basis. To do so, the system monitors monthly plant crop characteristics, soil types, slope, precipitation, distribution uniformity, root zone depth, and management allowable depletion. Based on this information, the software, installed on the Central Computer at City Hall, automatically determines watering frequency, run times, and days. This prevents runoff, deep percolation, and all other forms of water loss.

The water budget irrigation method seeks to balance the amount of water entering a landscape with the amount of water leaving the landscape through plant transpiration. As evidence of its innovative value, the *Water Conservation Fact Sheet* (published by the British Columbia Ministry of Agriculture, Food and Fisheries) details the procedures and calculations necessary to implement the water budget irrigation method. A copy of the Fact Sheet is provided in Attachment K. The Fact Sheet recommends use of Water Budget Worksheet to enter collected data and calculate results.

To effectively implement this method manually would require extensive staff time and would be accessible only to larger communities and water agencies with requisite staff capacity. The Rain Master system makes the water budget irrigation method accessible to much smaller communities and water agencies. While the upfront costs are relatively high, the system collects the data and automatically performs the calculations necessary to effectively implement the water budget irrigation method.

**SECTION 7: COSTS**

The total cost of the Project is \$324,551.

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

*Administration*

The City's cost for Administration represent the costs related to the staff person in charge of monitoring for compliance with all requirements of the grant contract. This includes supervising the staff responsible for analyzing data related to monitoring and assessing the project's success relative to its goals. The Administration Line Item has been determined as detailed below.

- |                         |  |
|-------------------------|--|
| 1. Salaries, wages      | 1 hr/week @ \$37.94/hr x 156 weeks (3 years) = |
| \$5,918.64              |  |
| 2. Fringe Benefits      | \$651.11 annually x 3 years = \$1,953.33       |
| 3. Supplies (office)    | \$100 annually x 3 years = \$300               |
| 4. Total Administration | Salaries, wages + Fringe Benefits + Supplies = |
| \$8,171.97              |  |

*Materials/Installation/Implementation*

The cost for Materials/Installation/Implementation cover the costs for the equipment that will be installed at the public landscapes, as described in the Work Statement Section 2 and the United Green Tech Materials list (Plans & Specifications). This line item also includes the cost of labor to install the irrigation system at the selected public landscapes. Please see the United Green Tech materials list provided in Attachment N with the Plans and Specifications.

*Monitoring and Assessment*

The cost for Monitoring and Assessment represents that staff costs related to analyzing the data gathered, as described in the Monitoring and Assessment Section of this grant application. The Monitoring and Assessment Line Item has been determined as detailed below.

$$390 \text{ hrs/year} \times 3 \text{ years} \times \$19.03/\text{hr} = \$22,265.10$$

*Report Preparation*

The cost for Report Preparation represents the cost for preparing the reports, as explained in the Monitoring and Assessment Section of the Grant Application, based upon the data gathered and analyzed. The Report Preparation Line Item has been determined as detailed below.

$$130 \text{ hrs/year} \times 3 \text{ years} \times \$19.03 = \$7,421.70$$

*Total Costs*

The Total Project Costs (\$324,551) are the sum of the Total Administrative Costs, the Materials/Installation/Implementation Costs, the Monitoring and Assessment Costs, and the Report Preparation Costs.

**Annual O/M (Table C2)**

The Annual Operations and Maintenance Costs include the staff costs related to operating the Central Computer and Repairing the Irrigation System when the Central Computer generates and alarm that repair is necessary. These costs also include the cost of materials necessary to make repairs. The Annual Operations and Maintenance Costs have been determined as detailed below.

1. Operations            520 hrs/year x \$19.00/hr = \$9,880
2. Maintenance        208 hrs/year x 13 sites x \$17.25/hr = \$46,644
3. Other (materials)    \$12,000

**Total Annual Project Costs (Table C3)**

The Total Annual Project Costs have been calculated automatically utilizing the Benefit Cost Tables provided on the Department of Water Resources web site for the Grant Program.

**Capital Recovery Factor (Table C4)**

The estimated life of the Irrigation System Components is 10 years. The corresponding Capital Recovery Factor from Table C4 has been applied to the budget line items in Table C1.

## SECTION 8: BENEFITS

### **Project Annual Physical Benefits (Table C5)**

The City of West Sacramento receives its water supply from the Sacramento River. All of the physical benefits are to the Sacramento River, which feeds directly into the California Bay-Delta. Therefore, all of the physical benefits directly benefit the California Bay-Delta. The following physical benefits will be achieved through this project:

1. Water Quantity – Increase available water supply by reducing the annual water diversions used for existing public landscape irrigation.
2. Water Quality – Improve water quality by reducing excess runoff into the Sacramento River.
3. Irrecoverable Losses – Reduce irrecoverable losses that occur through the evaporation of over-watered irrigation sites.

Qualitative descriptions of the above benefits have been provided in the Work Statement Section 1 of this grant application.

The projected water quantity benefits have been quantified using the following methodology.

- The City's Utility Records were reviewed for the recorded annual water consumption at the 15 public landscape sites which are to retrofitted in the Project.
- The City calculated the annual average water usage, in cubic feet, over the past 3 years for the sites. The 3-year average was 10,647,367 ft<sup>3</sup>.
- This estimate was then divided by 43,560 to convert to annual acre-feet. (244 AF)
- The acre-foot estimate was then multiplied by 0.30 to determine the projected annual reduction in water diversions. The City used 0.30 in this estimate because the manufacturer's estimate is that the Irrigation System reduces water use by at least 30% annually. This is corroborated by the City of Davis' experience since 1991 (estimated reductions of approximately 40%). The estimated reduction in the use of Sacramento River water is 73 AF, providing the external conditions remain similar to those of the last three years.

Attachment L contains the data and calculations used to determine the baseline for the Water Quantity Improvements.

### **Project Annual Local Monetary Benefits (Table C6)**

The City estimates the Project will save the City \$20,555 in local funds.

The City serves as the Water Agency for users within its City Limits. It diverts water from the Sacramento River and distributes it to all water users for municipal and private consumption.

- In 2004 the City diverted 14,739 AF from the River. 6,151 AF was returned, through the Waste Water Treatment Plant. The City's net use of Sacramento River water for 2004 was 8,582.
- The City's 2004 Operations and Maintenance cost for the diversion and treatment of the water before it is distributed through the West Sacramento water system is \$2,872,935.
- Dividing the 2004 O & M budget by the net AF used, the cost per acre-foot of water diverted from the Sacramento River is \$195. Energy costs are included in the \$195 per AF.
- The Project is estimated to reduce the use of irrigation water at the 15 sites by 30%, which is 73 AF.
- Multiplying the 73AF by the \$195 cost per treating AF, the avoided cost of diverting water (water supply costs) is \$1,387. This figure includes the energy cost associated with diverting and treating the water.
- The water used at the Project sites (public landscapes) included in this project does not flow to the wastewater treatment plant. There are no avoided wastewater treatment costs.
- The City estimates that 252 labor hours will be reallocated from maintenance to enhancement. At a rate of \$25.08 (salary + benefits) the value of this labor is \$6,320.

#### **Project Local Monetary Benefits and Costs (Table C7)**

The comparison of monetary benefits to costs has been calculated automatically utilizing the Benefit Cost Tables provided on the Department of Water Resources web site for the Grant Program. The result is that the Annual Monetary Costs exceed the Annual Monetary Benefits by \$92,076. The Annual Monetary Costs for the project are \$112,631. The Annual Monetary Benefits are \$20,555.

#### **Applicant's Cost Share and Description (Table C8)**

Based upon the data provided in Qualifications of Applicant and Cooperators Section of this Grant Application, the City of West Sacramento's Median Household Income is 66.8% of California's, which categorized it as a disadvantaged community. (Source, 2000 US Census.) With this level of household income, the City is exempt from the Cost Share Requirement.

In this Project the City will utilize the Central Computer and software which has previously been purchased and installed for use with the newly developed landscape areas. It also is utilizing the existing control boxes, and staff training has occurred to some degree with the institution of the new system. These contributions are not reflected in the Project budget, but they assist in keeping the Project costs lower than they would be otherwise.

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Applicant:

**City of West Sacramento**

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

**Table C-6 Project Annual Local Monetary Benefits**

ANNUAL LOCAL BENEFITS	ANNUAL QUANTIT	UNIT OF MEASUREMENT	ANNUAL MONETARY BENEFITS
(a) Avoided Water Supply Costs (Current or Future)	14235	\$	\$14,235
(b) Avoided Energy Costs	0		\$0
(c) Avoided Waste Water Treatment Costs	0		\$0
(d) Avoided Labor Costs	252	HOURS	\$6,320
(e) Other (describe)	0		\$0
(f) Total [(a) + (b) + (c) + (d) + (e) ]			\$20,555

\*\$19 per acre foot of water diverted. This is the cost to the City of diverting the water from the Sacramento River. It includes the cost of

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

(a) Total Annual Monetary Benefits [(Table C-6, row (f))	\$20,555
(b) Total Annual Project Costs (Table C-3, column III)	\$112,631

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

Applicant's cost share %: (from Table C-1, row o, column V)	<b>0</b>
---	----------

Describe how the cost share (based on relative balance between Bay-Delta and Local Benefits) is derived. (See Section A-7 for description)

Provide Description in a narrative form.

The City is a disadvantaged Community and, therefore, exempt from the Cost Share Requirement. The City's Cost Share is \$0. Please Section 4.6: Documentation of Disadvantaged Community Status in the grant application narrative for additional detail.

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