Attachment 5

Work Plan

Work Plan

Groundwater Recharge Mapping and Water Quality Protection Program

Western Placer County, California

Introduction

The following Work Plan provides specific details regarding the work that will be accomplished using grant funds and local contributions. The completed project will fulfill the objectives of this proposal and can improve groundwater management. The Applicant is proposing the construction of six monitoring wells with ten discrete depth intervals at four locations (known as the East Roseville Parkway, Lincoln Estates, Scarborough, and Walerga well sites).

Figure 1 shows the location of the new monitoring wells in relationship to the existing monitoring well network and where the system will be augmented. The new monitoring wells were positioned to specifically address recharge, use, and poor water quality areas based on existing information. **Table 1** summarizes the proposed monitoring well construction details and its purpose.

The purpose of this Work Plan is to describe the specific work to be accomplished. It includes assessments of environmental conditions, permitting, specific details of the borehole logging, downhole geophysical surveys, monitoring well construction, development, water quality sampling, and groundwater level measurements. The findings of the project work from the new monitoring wells include an analysis of groundwater elevation and groundwater quality data will be documented in a final report. All work will be performed under the direct supervision of a California licensed professional geologist and certified hydrogeologist.

These new monitoring wells will provide lithologic, geophysical, and groundwater monitoring (groundwater elevations and quality) data that will serve many purposes in the basin including filling in areas where groundwater elevation and quality data are sparse, providing information on surface water and groundwater interactions (evaluation of recharge), acting as an early warning system for brackish water intrusion, and providing lithologic and geophysical data to characterize the hydrogeologic system on a local and regional scale. The new information gained will be used by WPC Partners to ensure a viable groundwater supply is available for future needs and to select feasible groundwater management actions. These new monitoring wells will become part of the larger existing monitoring well network for WPCGWMP. They will also be incorporated into the CASGEM program.

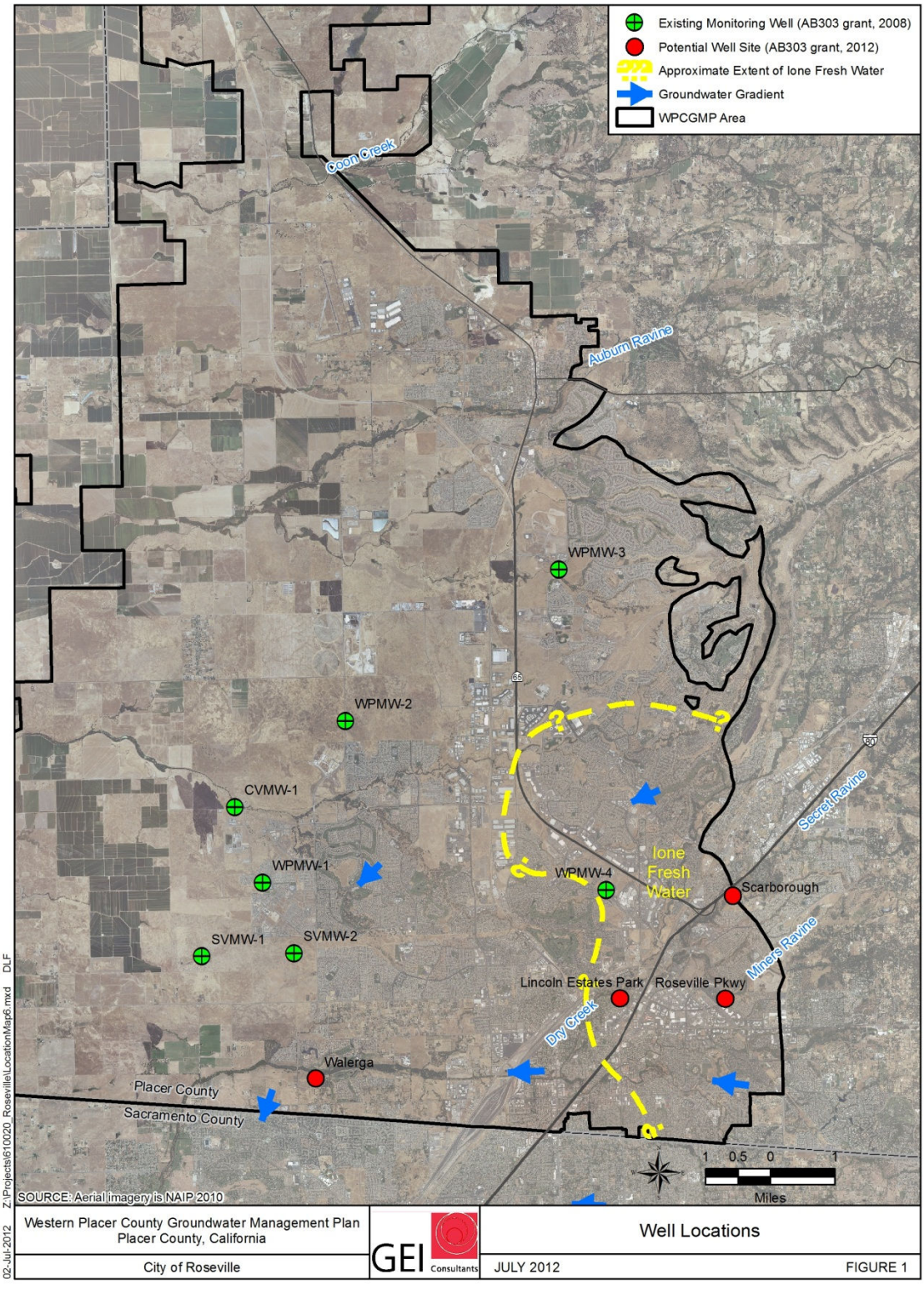

Figure 1 – Monitoring Well Locations

Table 1
Monitoring Well Construction Summary

Well Site Name	Monitoring Well Name	Well Screen Depth	Formation Monitored	Purpose
Walerga	WPCMW-5A	80-100	Laguna/Turlock	Whether Shallow Aquifer is Affected by Municipal Pumping
	WPCMW-5B	630-650	Lower Mehrten	Brackish Water Intrusion
Scarborough	WPCMW-6A	25-65	Alluvium	Secret Ravine GW Recharge
Roseville Parkway	WPCMW-7A	20-40	Alluvium	Miners Ravine GW Recharge
	WPCMW-8A	20-40	Alluvium	Miners Ravine GW Recharge
	WPCMW-8B	120-140	Lower Mehrten	Miners Ravine GW Recharge
Lincoln Estates	WPCMW-9A	20-40	Alluvium	Dry Creek GW Recharge
	WPCMW-10A	20-40	Alluvium	Dry Creek GW Recharge
	WPCMW-10B	120-140	Upper Mehrten	Dry Creek GW Recharge
	WPCMW-10C	240-260	Ione	Brackish Water Intrusion

Work Plan and Project Deliverables

The detailed Work Plan for the Groundwater Recharge Mapping and Water Quality Protection Program includes the following activities:

- Site Specific Monitoring Well Siting
- Environmental Documentation
- Permitting
- Monitoring Well Design
- Bidding and Contracts
- Monitoring Well Construction
- Construction Management Services
- Groundwater Level Monitoring and Water Quality Sampling
- Monitoring Well Completion Report
- Project Management
- DWR Quarterly Reports
- Quality Assurance/Quality Control

- Distribution of information to WPC Partners and interested parties

These activities have been organized into six project tasks, described in detail in this Work Plan:

Task 1 – Project Administration and Management

Task 2 – Land Easement

Task 3 – Environmental Documentation and Permits

Task 4 – Project Evaluation, Design, and Construction

Task 5 – Well Completion Report Preparation

Task 6 – Construction Management

Each Task identifies project deliverables designed to demonstrate progress of the Program, and to document accomplishments and findings of the Program.

Task 1 – Project Administration and Management

This task focuses on the efforts needed to execute the project from an administrative and management perspective. Generally, this task will consist of budgeting, management, agency coordination, management of design and construction phases, grant administration, and project reporting.

The Applicant will provide communications to DWR regarding project status throughout project duration. Progress reports will be submitted to DWR quarterly and discussed via teleconference as deemed necessary by DWR. The progress reports will include a summary of activities for the last quarter, activities for the upcoming quarter, and a review of budget and schedule status.

The progress of the project will be proven through submittals of project documents to DWR for review and approval. These include:

- CEQA assessment and documentation
- Monitoring well plans and specifications
- Construction bid results and contractor selection
- Monitoring Well Permits and Water Well Drillers Reports
- Monitoring Well Completion Report

DWR will be provided an opportunity to review and comment on all project deliverables. DWR comments will be addressed before finalizing the Program reports.

A final Project Close-out Report will be prepared at the conclusion of the project to document that the work corresponded to this Work Plan, any deviations, project findings, project completion related to schedule and budget, and submittal of all data collected. The reports will be submitted to DWR in hard copy and electronic format.

In addition, the Applicant will implement procedures to maximize effective project management by:

1. Selection of a technically competent project team
2. Using systematic cost/schedule control system
3. Preparation of plans and specifications to specify the work materials, products, and execution
4. Establish quality control procedures
5. Standard review checking procedures

Throughout the project and at its conclusion the Applicant will update the WPC Partners at their regular quarterly meetings as to the progress of the work and findings. The quarterly meetings are open to the public and will be advertized on the City of Roseville's website.

Task Deliverables

- Agendas and minutes for all project meetings
- Quarterly progress reports and invoices
- Interim project deliverable assessments and reports
- Final Project Close-out Report

Task 2 – Land Easements

Three of the monitoring well properties (Walerga, East Roseville Parkway, and Lincoln Estates) are owned entirely by the City of Roseville or Cal Am so no access agreements or land transfers are required. One well site (Scarbourgh park site) is owned by the City of Rocklin. The City of Rocklin has provided an easement and access agreement to the City of Roseville and PCWA. A copy of the agreement is provided in Attachment 4.1 of this grant application.

No lands will be purchased for this project.

To complete the easement and access agreement with the City of Rocklin, a land surveys will be needed to prepare a property description. A California licensed surveyor will provide the property descriptions and mark the property boundaries.

The land survey will be funded directly by this project. The Applicant will provide local contributions to process the easement and access agreement. The Applicant, City of Rocklin, along with Cal Am will provide the land for monitoring well construction as part of the local contribution to the project.

Task Deliverables

- Right-of-entry agreement

Task 3 – Environmental Documentation and Permits

The primary objective of this task is to prepare environmental documentation and obtain permits required for the construction of monitoring wells at the four locations shown on **Figure 1**. Environmental compliance for the Program will require the preparation of an Initial Study (IS) to assess the level of assessment required. Cultural and biological resources will be assessed by City of Roseville's staff. Upon completion of the IS a site visit will then be held with DWR to review each

site to determine the level of CEQA analysis required. It is anticipated that environmental compliance for the Program will require the preparation of Categorical Exemptions for each monitoring well location under the Information Collection provision of Article 19, Section 15306 (Class 6), which allows for basic data collection and resource evaluation activities that do not result in a serious or major disturbance to an environmental resource. The Applicant plans to prepare these Categorical Exemptions and will submit a copy to DWR for review and comment. If deemed necessary by the Applicant or DWR the applicant may prepare a Mitigated Negative Declaration if a higher level of environmental assessment is required. Upon their approval a copy of the Categorical Exemptions or Mitigated Negative Declarations will be filed with the State Clearinghouse where the documents will be made available for a 30-day public comment period. Any comments received will be sent to DWR and if necessary addressed in the final Categorical Exemptions or Mitigated Negative Declaration. After this period, the Applicant will prepare and send to its Board of Directors a Notice of Determination to adopt the environmental documentation.

Any mitigation measures proposed will be tracked by the Applicant and documented to DWR.

Environmental compliance documentation for the National Environmental Protection Agency (NEPA) is not expected to be necessary.

Depending on monitoring well location, a single permit will be necessary from the City of Roseville and Placer County for the construction of each of the monitoring wells at the four locations. The water well drilling contractor will prepare and obtain all necessary permits to construct the monitoring wells as part of the Task 4, described below.

National Pollutant Discharge Elimination System (NPDES) permits are not anticipated to be required as water from the wells will not be discharged to surface water or land.

The Environmental Documentation costs are to be funded by the Applicant.

Task Deliverables

- Initial Study and Categorical Exemptions (or Mitigated Negative Declaration) for each of the proposed monitoring well locations
- Well permits for each proposed monitoring well

Task 4 – Project Evaluation, Design, and Construction

The purpose of this task is to complete preparation of plans and specifications for construction of the monitoring wells, solicitation of bid proposals from contractors and selection of a contractor, and construction and testing of the monitoring wells. The Project Evaluation, Design, and Construction costs will be funded through AB303 grant funds. Long-term monitoring cost will be part of the Applicant and WPC Partners contribution to the project.

Subtask 4.1— Design, Bidding, and Contractor Selection

The monitoring wells will be constructed in accordance to carefully prepared plans and specifications. The plans and specifications will be prepared to construct the monitoring wells as listed in **Table 1** and in accordance with California Well Standards Bulletin 74-90 and 74-81,

County and City well ordinances, and in general accordance with ASTM D5092-04(2010)e1 and D5521 covering monitoring well construction and development. The plans and specifications will contain:

- Bid Schedules
- Summary of work
- Temporary facilities
- Acceptable drilling equipment
- Sanitary seal requirements
- Handling of drilling fluid
- Borehole diameters
- Geophysical logging
- Borehole reaming
- Well casing and screen materials; length, diameter, slot size, and ASTM specification
- Filter-pack gradation
- Acceptable construction methods
- Well development
- Water quality sampling
- Security vaults and bollards
- Site clean-up

The plans and specifications will be combined with the Applicant's General Conditions, and DWR's Grant Agreement to complete the Bid Document. A complete copy of the Bid Documents will be provided to DWR for review. The City of Roseville's Board of Director's will be informed about the bidding process and requested to provide approval to bid the work.

Upon completion of the Bid Documents the documents will be released for competitive bid. A 30-day period will be provided. During the bidding period a pre-bid meeting will be held to allow contractors to view each site and ask questions regarding the scope of work. All bids will be returned to the Applicant for review and selection of a contractor to perform the work. The Board of Directors will approve the selection and a Notice of Award will be published. Upon approval of contract submittals, including insurance, a Health and Safety Plan, and receipt of approved Well Construction Permits a Notice to Proceed will be issued.

Subtask 4.2—Well Construction

Before mobilization of the drilling equipment the Applicant and selected consultant will arrange a meeting with the drilling Contractor to coordinate activities and to discuss the work procedure. All permit conditions including water handling and disposal will be discussed. This will facilitate the work process. Personnel present at this meeting will be those present during drilling activities.

Prior to the start of work each day a tailgate health and safety meeting will be held to discuss the potential hazards, job site conditions and safety.

The boreholes will be drilled using the mud rotary drilling method. An 8-inch pilot borehole will be drilled to the depths listed on **Table 1**. During the drilling of each borehole, a geologist will collect

and classify samples of the cuttings from the circulation system and prepare written and graphic well logs to show the depth of the water-bearing units and nonwater-bearing strata. The samples will be logged in accordance with the Unified Soil Classification System per ASTM D2488. In addition to sample and analysis activities, a field log of the contractor's activities will be maintained along with documentation of the penetration rates and drilling fluid properties. During pilot hole drilling a geologist will be onsite continuously. The City of Roseville will be appraised of the progress by daily e-mails describing the progress of the work and preliminary findings. DWR will be notified at the start of each borehole drilling to allow their geologists an opportunity to view the drill cuttings.

At the completion of the borehole drilling, a geologist will witness the geophysical logging of the test hole, and interpret the logs in the field. The logging suite will consist of electrical resistivity and spontaneous potential (guard tool) and a caliper log. Gamma ray logging will not be performed as it generally does not provide useful data in the northern portion of California. A caliper log provides an indication of where loose permeable materials are present. Also borehole diameter does affect the electric logs. The caliper log will also be used to assess the necessary volume of filter pack and concrete for the sanitary seal. The lithologic and geophysical logs will be used to prepare a final design for each monitoring wells to adjust the position of the well screens to the aquifers. A California licensed professional geologist will review the logs and approve of the final design.

The contractor may be requested to ream portions of the borehole to either 12-inches to accommodate a dual-level monitoring well construction or 14-inches in diameter to accommodate a triple-level monitoring well construction within the same borehole. Following the reaming the remaining pilot hole will be cleaned out to its total depth. Following the reaming and cleaning process the drilling fluid will be thinned out to allow the well casing and screen to be installed and placement of the gravel pack.

The monitoring wells will be constructed of 2-inch diameter well casing and screen, Schedule 40 or 80 (depending upon the depths), with a 0.032 slotted screen and an 8 x 16 filter pack. Centralizers will be placed on the well screens to center them within the borehole. A minimum of a 20-foot neat cement sanitary seal will be placed above the filter pack. The filter pack and neat cement will be placed using a tremie pipe. During construction of the monitoring wells a geologist will be onsite continuously to confirm compliance with the plans and specifications and to prepare as-built drawings of the constructed wells. County and City well inspectors will be notified prior to placement of the seals.

The top of the well will be protected by an above ground steel lockable security vault, which will be imbedded in concrete. A 4 x 4 foot concrete slab will be poured to surround the vault. Four bollards will be placed around the slab to protect them from vehicular damage. Caps will be placed on top of the wells and the vault will be locked.

The development of the wells is a very important task because it serves to remove drilling fluid remnants from the borehole wall and in the annular space. The monitoring wells will be developed using swab, bailer, and air-lift methods. Upon completion of the development a temporary pump will be installed into the well to complete the development process and purge the well for water quality sampling. The water shall have a turbidity of less than 5 NTU at the completion of pump development and prior to water quality sampling. A geologist will be onsite to witness the turbidity and to collect water quality samples.

All drill cutting and development fluids will be contained and transported from the site to leave the sites in their original approximate condition.

The drilling contractor will complete a Water Well Drillers Report documenting the location, lithology, and as-built construction details and submit copies to DWR and the local well permitting agencies. The City of Roseville will use these logs to add these new wells to the CASGEM program.

Subtask 4.3—Water Quality Sampling

Water quality samples will be collected from each monitoring well to assess the chemical nature of the water. Field sampling personnel will calculate the amount of water to purge the well three times and will confirm that volume has been exchanged prior to the collecting the samples. The field personnel will also monitor for pH, temperature, dissolved oxygen, and electrical conductivity to confirm that these parameters stabilize prior to collecting the samples. The samples will be analyzed, in a similar fashion to previous monitoring wells for general minerals, drinking water metals, and hydrogen and oxygen isotopes. Isotopes were previously used by DWR to assess whether the groundwater is of high Sierra Mountain origin to further confirm whether the areas are a groundwater recharge area. The samples will be collected into laboratory prepared sample bottles, labeled, and placed into cooled ice chests for transportation to the laboratory with a chain-of-custody. Upon receipt of the analysis a California licensed professional geologist or engineer will review the results for any inconsistencies and query the laboratory, if necessary, to resolve the inaccuracy.

Subtask 4.4—Surveying

Upon completion of the monitoring wells their location and elevations of the top of each monitoring well (reference point) will be surveyed by a California licensed land surveyor. The survey will be accurate to within plus or minus 3-inches horizontally and ¾-inch vertically.

Subtask 4.5—Long-Term Monitoring

It is fairly common for groundwater levels within the monitoring well to change during construction, development, and shortly thereafter. To ensure the groundwater level measurements are accurate the groundwater levels will be measured on monthly intervals for one quarter after the wells are fully developed. The depth to static groundwater level will be obtained at each well using an electric water level sounder with a cable graduated in increments of 0.01 foot.

During this period the City of Roseville will collaborate with its WPC Partners to relocate existing transducers into the new monitoring wells. Transducers have been previously purchased and have been used in prior investigations and are now available to be moved to investigate new areas. The existing transducers will be relocated and set initially to collect groundwater level measurements on a daily basis, but the frequency may be adjusted to obtain more detailed measurements to check for recharge, pumping well drawdown, surface water/groundwater interaction, and seasonal changes in water levels. The transducers will be hung in the wells and then during the monthly groundwater measurements described above will be checked for function and accuracy and if necessary replaced.

Groundwater levels in the monitoring wells will be measured for the first year on a quarterly basis by the City of Roseville and its WPC Partners. In subsequent years groundwater measurements will at a minimum be measured on a biannual basis to provide data for the CASGEM program.

Annually, groundwater quality samples from those monitoring wells designed for monitoring salt water intrusion will be collected and analyzed for total dissolved solids. The samples will be

obtained by placing bailers into the well opposite the well screen section then allowed to rest for about five days to allow the aquifer to re-establish flow through the well. The bailers will be retrieved thereafter with representative samples of the groundwater in the aquifer. Samples from all wells will be collected biannually to coincide with preparation of the Biannual Status of the Basin Report.

The costs for the initial quarter of groundwater level monitoring and placement and calibration of the transducers will be funded through AB303 grant funds. Long-term monitoring costs will be part of the Applicant and WPC Partners contribution to the project.

Task Deliverables

- Plans and specifications for monitoring well construction
- Bid results and contractor selection
- Notification to DWR of the start of borehole drilling
- Water Well Drillers Reports

Task 5 – Well Completion Report Preparation

The results of Task 4 will be summarized in a Monitoring Well Completion Report (MWCR). The MWCR will present the lithologic log of the pilot hole, copies of the geophysical logs, the as-built well construction details, development records, water quality analytical reports, survey coordinates, and groundwater level measurements. The report will analyze the information and contain geologic sections showing the subsurface presence of formations, aquifers and aquitards. The water quality analysis will also be plotted on the sections to show the distribution in the subsurface. The analysis will also include isotope information and whether high Sierra Mountain type of water is present in the aquifers. The report will also provide recommendations for groundwater management opportunities based on the findings of the program.

Costs to prepare and distribute the MWCR will be funded through AB303 grant funds. The Applicant and WPC Partners will contribute time and costs to review the draft and final reports.

Task Deliverables

- Draft Monitoring Well Completion Report
- Final Monitoring Well Completion Report

Task 6 – Construction Management

Construction Management includes coordination of all permits, subcontractor, and engineering services to coordinate and construct the monitoring wells.

Task Deliverables

- Weekly to daily e-mail correspondence providing the status of the work and any required action items to progress the work smoothly