

Proposal to:

U.S. Department of Interior, Bureau of Reclamation

WaterSMART - Applied Science Grants for Fiscal Year 2022

Notice of Funding Opportunity No. R22AS00165

**INTEGRATED GROUNDWATER WELLFIELD SYSTEM
PROJECT**

Temecula, CA

April 14, 2022



Applicant: Rancho California Water District

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TECHNICAL PROPOSAL

A. Executive Summary

Date

April 14, 2022

Applicant Information

Rancho California Water District
Temecula, Riverside County, California

Project Summary

Rancho California Water District's (Rancho Water/District) Integrated Groundwater Wellfield System Project (Proposed Project) creates better hydrologic data for the Murrieta-Temecula Groundwater Basin, which will be used to develop a new water management tool for improving basin management efficiency. The Proposed Project begins with the installation of new remote sensing equipment on the District's 26 wells within the Pauba Valley in order to generate more accurate and more frequently available groundwater level and well-pumping efficiency data. This information will then be processed by a new water management tool, designed as part of the Proposed Project, to assist Rancho Water staff in making decisions on how to maximize the efficiency of basin management operations in terms of both water production and maintaining the health of the basin. The Proposed Project aligns with the goals of WaterSMART-Applied Science Grants because it increases access to information, improves modeling and forecasting capabilities, improves conjunctive use of surface and groundwater, creates more reliable water supplies, and helps to mitigate water conflicts to improve Reclamations ability to meet its water management objectives. In addition, the project aligns with Executive Order 14008 "Tackling the Climate Crisis at Home and Abroad", which focuses on increasing resilience to climate change. A grant of \$200,000 is requested for implementation of the two-year Proposed Project, and the entire amount will be used to help pay for installation of improved remote sensing equipment and development of the new water management tool.

Project Schedule (*length of time and estimated completion date*)

The Proposed Project can begin immediately upon award of funding and execution of the grant or cooperative agreement, and will be complete within the two-year requirement, no later than August 30, 2024 (based on an August 31, 2022 start date). The overall Project schedule indicating key project milestones and applicable deliverables for each phase of the work is provided in the Project Implementation section of this proposal.

Proximity of Project to Federal Facility

The Proposed Project will not be conducted on Reclamation project lands and does not involve Reclamation facilities. However, the Proposed Project will be completed for the benefit of an area residing within the Colorado River Basin, which satisfies a large portion its water demand through imports from the Colorado River Aqueduct (Reclamation project water).

B. Technical Project Description

Applicant Category

Rancho Water is a water district, which qualifies as a ‘Category A’ applicant under the description provided in the Notice of Funding Opportunity Announcement for the WaterSMART – Applied Science Grants Program.

Detailed Project Description

As an additional step toward maximizing the efficiency of its conjunctive use efforts, Rancho Water intends to implement an Integrated Groundwater Wellfield System Project. The Proposed Project transforms 26 wells within Rancho Water’s Pauba Valley into an interconnected network of monitoring devices and enables the District to see, in real-time, 1) the manner in which groundwater travels throughout the basin following storm events and/or as a result of groundwater recharge activities, and 2) the pumping efficiency of each well within the basin. With this information, Rancho Water can better forecast groundwater availability, make better decisions on when groundwater pumping should take place and from what locations within the basin water should be pumped, and maintain high levels of pumping efficiency by rehabilitating or replacing deteriorating wells in a timelier manner. The overall goal of the Proposed Project is to give the District the ability to fully leverage available groundwater supplies as cost-efficiently as possible and to minimize purchases of expensive imported water, while at the same time, sustaining the health of the basin.

Assessment of groundwater availability and the health of a groundwater basin or a well begins with the collection of accurate water level data. Current common practice is to install in a well a single pressure transducer and to collect a manual reading with electronic water level indicators. However, the manual measurement represents only a single data point, not the multitude of data points that one would find with a range of water levels from static to pumping conditions in the well. The first step in the Proposed Project involves the installation of coupled systems of transducers within Rancho Water’s 26 Pauba Valley wells, which will be placed a fixed distance apart within each well to provide automatic readings of both static and dynamic pumping levels in real time. With these high-accuracy water level measurements being provided on a daily basis, analysis of basin water levels can be performed automatically, without contracting outside consultants or utilizing District staff resources.

With the availability of more accurate, real-time water level data, better information regarding well pumping efficiency can be obtained. Well pumping efficiency testing and analysis typically requires hiring outside contractors and consultants to perform the tests annually or semi-annually. However, with the new coupled system transducers installed, Rancho Water will leverage its existing SCADA system to control operation of its wells remotely and to collect new data for estimating well pumping efficiency on a monthly basis. Though implementation of the Proposed Project, Rancho Water will be able to track efficiency and operating conditions over shorter time intervals, which will allow the District to estimate declines in production from the wellfield on a predictive basis, and to plan for well rehabilitation and/or replacement work that will restore lost water production in a timelier manner.

To develop these forecasting capabilities, the Proposed Project also includes the creation of an advanced water management tool, which will use the new data to identify well-defined basin management alternatives for how the District can fully leverage available groundwater supplies. More specifically, the tool will use the new data to make forecasts that provide options for where

within the basin, at what time, and at what rate pumping should take place in order to maximize groundwater extraction while using as little energy as possible and maintaining the health of the basin (adhering to safe-yield guidelines). The development of this tool involves the following:

Development of a Trend Averaging Algorithm for Automated Static Water Level Calculation

Currently, Rancho Water Operations staff manually measure water levels in production wells on a monthly basis. To take these measurements, the wells are shut off for a set period (typically at least four hours) before the measurements are taken. The water level may still be recovering when it is measured and may be reflecting interference from nearby wells that are still pumping. An accurate static water level is required to determine specific capacity and well efficiency. For this activity, a trend averaging algorithm will be created for using new differential level sensor data, aquifer parameters from an existing groundwater model, the distance from nearby pumping wells, and the recovery trend following the end of pumping to calculate a “true static” water level.

Enabling Index Well Trend Forecasting

Rancho Water completes a yearly water audit that considers well performance and hydrology in the previous year to suggest sustainable pumping volumes in the upcoming year. These pumping volumes are used in a two-year scenario run of the Rancho Water ModFlow model. Using the calculated “true static” water levels, Rancho Water staff can compare water level trends in index wells to the modeled results to verify model results and have a leading indicator on sustainability of pumping. For this activity, leading indicator SQL code will be developed to determine if the operations plans prepared during the water audit are being implemented and if the basin response matches the modeled water level trends.

Development of Loss of Production Diagnostics

Multiple factors can cause a decline in production from a well, including well efficiency decline, declining basin water levels that require a greater pump lift, screen dewatering, and wear on the pump itself. With accurate true static water levels and automatic efficiency calculations, the pump performance can be compared to its original design curve. The well problems can be diagnosed by comparing pump operations to the design curve and trends in the efficiency of the well. For this activity, SQL code will be written to compare the factors causing declines in production and determine which factor has the greatest impact in lost flow rate. This information can then be used by Rancho Water to improve the efficiency and effectiveness of its well rehabilitation efforts.

Development of Virtual Well and Wellfield Production Forecasting

Once the primary drivers of lost production are identified, the impacts of various remediation strategies can be estimated, as well as the impact of rehabilitation on an individual well. As production from an individual well increases with rehabilitation, it will cause additional drawdown in nearby wells. For this activity, code will be developed to estimate an individual well’s response to repair and redevelopment, as well as the impact of the change in flow rate on production from nearby wells.

Development of Rehabilitation and Replacement Return on Investment Calculator

With accurate water level data, automatic well efficiency calculations, and loss of production diagnostics, the return on investment for well rehabilitation can be calculated. By comparing the decline in efficiency over time to changes in true static water levels and aquifer parameters in the existing MODFlow model, the expected recovery of production from rehabilitation can be estimated. For this activity, code will be produced to estimate the flow recovered, or the increase in efficiency with well redevelopment, pump repair, or redesign of the pump operating parameters. The change in power consumption and increase in flow rate will be compared to the average costs for repair and rehabilitation to determine the return on the investment. If significant recovery is not feasible, the tool will provide ROI estimates for replacement of the well.

Once the new water management tool is created, additional software integrations will take place in order to display summaries of the tool's calculations and conclusions on a GIS Web Map Interface and on the District's existing Business Side Software, which houses other important basin information.

Goals

The Proposed Project is designed to create new data that will be leveraged for the development of a water management tool, which allows the District to fully leverage available groundwater supplies as efficiently as possible in order to minimize its reliance on costly imported water and to maintain the health of the basin. Specific project goals include:

1. Installing improved remote sensing equipment on Rancho Water's wells, which generates more accurate and more frequently available static water level data,
2. Integrating the sensing equipment with the District's existing SCADA system to enable remote data collection more frequent well pumping efficiency calculation,
3. Using newly available static water level and well pumping efficiency data to create a water management tool, which:
 - a. Tracks changes in static water levels and in well pumping efficiencies,
 - b. Performs diagnostics for finding the causes of reduced well production,
 - c. Identifies the basin-wide impacts of potential strategies for recovering lost production,
 - d. Calculates a return on investment for specific lost production recovery strategies including well repair, rehabilitation, and replacement
 - e. Improves well production forecasting resulting from well deterioration, rehabilitation and/or replacement, and
 - f. Verifies the accuracy of and improves forecasting abilities of the basin's existing groundwater model, and
4. Performing additional software integrations, which will allow the tool's calculations and results to be displayed on a GIS Web Map Interface and on the District's existing Business Side Software, which houses other important basin asset information.

With new information made available through implementation of the Proposed Project, Rancho Water can better forecast groundwater availability, and make better decisions on when, where, and

at what rate pumping should take place in order to fully leverage groundwater supplies as efficiently as possible while minimizing purchases of expensive imported water and sustaining the health of the local groundwater basin.

C. Project Location

Rancho California Water District (Rancho Water/District) provides water for urban and agricultural uses to the City of Temecula, portions of the City of Murrieta, and unincorporated southwestern Riverside County lands. Rancho Water comprises nearly 100,000 acres in the southwestern portion of Riverside County, California. The District serves approximately 150,000 water users and is located about 85 miles southeast of the City of Los Angeles, 40 miles south of City of Riverside and 65 miles north of the City of San Diego (as shown in Figure 1).

The Proposed Project enhances the reliability and efficient use of groundwater supplies within the Murrieta-Temecula Groundwater Basin, which is located within the upper portion of the Santa Margarita River (SMR) Watershed. The SMR watershed covers an area of approximately 742 square miles and extends from the Pacific Ocean north along the drainage of the SMR to near Temecula where it widens and extends to the east between the San Jacinto Mountains on the north and the Palomar Mountain range on the south.

D. Data Management Practices

The primary data that will be compiled and collected for the Proposed Project includes well water level data and well pumping efficiency data. All primary data generated for the Proposed Project will be collected by Rancho Water using its existing SCADA system. The District will then program the SCADA system to make the data available to a new water management tool for storage, which will be developed by a consultant to be hired by Rancho Water. The new, consultant-developed tool will use the primary data to create secondary information including: 1) changes in static water levels and in well pumping efficiencies, 2) diagnostics for finding the causes of reduced well production, 3) identification of basin-wide impacts of potential strategies for recovering lost production, 4) a return on investment calculation for specific lost production recovery strategies including well repair, rehabilitation, and replacement, 5) well production forecasting data resulting from well deterioration, rehabilitation and/or replacement, and 6) verification of the accuracy of the basin's existing groundwater model. Once the consultant-developed tool creates the secondary information, it will be summarized graphically on a web-accessible geographic information system and in Rancho Water's existing business side



Figure 1

software. All data, including spatial data, created through implementation of the Proposed Project will be developed in industry standard formats compatible with standard information system platforms.

E. Evaluation Criteria

1. Benefits to Water Supply Reliability

- **Description of water management issues addressed by Proposed Project**

The Proposed Project addresses issues arising from: 1) water supply shortfalls caused by climate change and drought, and 2) the rising costs for importing water.

All of California, including the Rancho Water’s service area, is at high risk of experiencing drought conditions in any given year. The state recently endured its worst drought in recorded history, and given the results of climate change modeling efforts, it is expected that severe drought events will reoccur frequently into the future. As of April 2022, according to the U.S. Drought Monitor every county in the State of California is experiencing some level of drought, including Riverside County, which is where Rancho Water’s service area is located.

Rancho Water is impacted by drought conditions not only in its own service area, but also by dry conditions in northern California and the Colorado River Watershed. This is because the District is heavily reliant on water supplies imported through the Metropolitan Water District of Southern California (MWD).

Approximately two-thirds of the District’s annual demand is met with MWD imports, which are sourced mainly from northern California through the State Water Project (SWP) and from the Colorado River Watershed through the Colorado River Aqueduct (CRA). While northern California is in the midst of a severe, historic drought, a water shortage on the Colorado River was declared in August 2021 for the first time in history.

Based on the current dry conditions in northern California, MWD’s annual allocation of water from the SWP will likely be reduced to zero this year, which forces the water wholesaler to rely more heavily on Colorado River supplies and on groundwater storage reserves to make up for lack of SWP supplies. Moreover, if dry conditions in the Colorado River Watershed persist, MWD will likely be faced with supply shortages through the CRA, which would place additional pressure on its limited storage reserves.

Responding to these dry conditions, in late March 2022, California’s governor ordered water suppliers to implement more aggressive conservation measures as water supplies dry up. And as the water supply situation worsens, it is expected that MWD will move closer to enforcing



its Water Supply Allocation Plan (WSAP), which will allocate available water supplies to agencies throughout southern California, including Rancho Water. This would limit the volume of imported water that Rancho Water could purchase through MWD, and increase pressure on the District's local groundwater basin.

In addition to drought, rising costs for limited imported water supplies is an issue impacting Rancho Water. As of April 2022, treated import water costs approximately \$1,100 per acre foot, which is the most expensive source of supply and is about five times more expensive than producing local groundwater.

The Proposed Project is intended to make more efficient use of local supplies to help mitigate the impacts of reduced imported water supply availability and rising imported water costs.

- ***Description of HOW water management issues are addressed by Proposed Project***

Each year, Rancho Water sets an annual budget for local groundwater extraction based on “safe-yield” calculations. The goal in setting this annual budget is to extract as much local groundwater as possible from the basin without causing negative impacts to basin health.

It is in the best interests of the District to fully leverage the local groundwater supply not only because it is the least expensive source of supply, but also because it has proven to be more reliable than imported supplies, which are more often subject to curtailments related to drought or environmental issues.

In addition, other agencies reliant on northern California and Colorado River supplies benefit from Rancho Water's use of its local supplies. For each acre foot of water extracted by the District from its local groundwater basin, it purchases one less acre foot of imported water, which remains at its source for use by others.

The Proposed Project improves the quality of the groundwater basin data available to the District, and results in the development of a basin management tool, which helps Rancho Water to fully leverage available local supplies by extracting 100% of its annual groundwater budget.

Following are descriptions of how the Proposed Project contributes to specific water management objectives:

- ***Water Supply Reliability***

The Proposed Project increases water supply reliability because it allows the District to fully leverage its local water supplies, which tend to be more reliable than imported supplies, which are oftentimes subject to drought-related or environmental issue-related curtailments. In addition, other agencies reliant on northern California and Colorado River supplies also benefit from Rancho Water's use of its local supplies because for each acre foot of water extracted by the District from its local groundwater basin, it purchases one less acre foot of imported water, which remains at its source for use by others.

- ***Management of Water Deliveries***

With improved hydrologic information provided by the Proposed Project for the local groundwater basin, the District can more effectively manage both local surface water and untreated import water delivered to the basin through its groundwater recharge facilities. Furthermore, the Proposed Project improves water management through more cost-effective water management practices. By recharging and recovering inexpensive and locally

available surface water supplies and/or relatively inexpensive untreated import water, the District realizes considerable cost savings over the alternative of importing fully treated water supplies. The use of these less expensive supplies reduces District water supply costs and mitigates rate increases for its customers.

- *Water Marketing Activities*

The Proposed Project facilitates water marketing activities by providing better information about how water travels throughout the basin. With this new knowledge, Rancho Water will be better equipped to implement an effective water banking program in the future. According to basin storage capacity data recently developed, this future water banking program could store up to 100,000 acre feet of water for use during dry years by agencies throughout the region. The Proposed Project brings the District one step closer to implementing the water banking program.

- *Drought Management Activities*

The Proposed Project helps Rancho Water to better manage drought by allowing it to fully leverage local supplies while reducing its reliance on imported water supplies from northern California and the Colorado River Watershed during times of reduced water supplies. During a severe drought when imported water supplies are not available, maximizing its use of local supplies would allow the District to ensure water is available for the health and safety needs of its population of more than 150,000 people.

- *Conjunctive Use of Surface and Groundwater*

The Murrieta-Temecula Groundwater Basin is physically connected to both imported water pipelines and to Vail Dam via the Vail Lake Pipeline. During wet years when surplus import water is available, it can be pumped through the Vail Lake Pipeline directly to groundwater recharge facilities or into the lake and stored temporarily before being released for recharge. Likewise, in years when local runoff is plentiful, surplus local water can be captured behind the dam, and then released through the pipeline for recharge. New information provided by the Proposed Project will help the District make more efficient use of surface water recharged into the Murrieta-Temecula Groundwater Basin through its groundwater recharge facilities.

- *Water Rights Administration*

The Murrieta-Temecula Groundwater Basin has been governed under court jurisdiction since 1928, as part of the Santa Margarita River Watershed system. Since then, court judgments have been issued directing the use and allocation of groundwater in the region. These judgments involved years power struggles by multiple parties, including the Federal government (U.S. Marine Corps Camp Pendleton) over water use in the basin, citing that court judgments did not fully meet the needs of the parties for effective water management. Finally, the “*Cooperative Water Resource Management Agreement between Camp Pendleton and Rancho California Water District*” (CWRMA), was reached and executed in March 2002. This agreement requires Rancho Water to maintain flows within the Santa Margarita River and remains in place today to govern not only water flow in the river, but also, overall production within the Murrieta-Temecula Basin. By increasing Rancho Water’s understanding of the groundwater basin’s characteristics, the Proposed Project can help the District to fully leverage its groundwater supplies without compromising its obligations under CWRMA.

- *Watershed Health*

New information provided by the Proposed Project enables the District to maximize local groundwater production without exceeding safe-yield limits. By maintaining these safe-yield limits, the Proposed Project further ensures the District’s capability to maintain required surface water flows within the Santa Margarita River, which benefits the health of the Santa Margarita Watershed.

- *Restore natural features or use a nature-based feature to reduce water supply and demand imbalances or the risk of drought or flood*

The use of groundwater basins for managed water supply storage is often referred to as “Groundwater Based Natural Infrastructure” or “Green Infrastructure” since natural features are used to manage water supplies for multiple benefits. The Murrieta-Temecula Groundwater Basin is a natural feature managed by Rancho Water for multiple uses such as urban, agricultural, and recreational water demands, and can therefore be considered Green Infrastructure. The Proposed Project optimizes water management activities within this Green Infrastructure to reduce any potential demand imbalances.

- *Conservation and Efficiency*

The Proposed Project maximizes Rancho Water’s use of local water supplies and decreases the District’s dependence on supplies imported from both northern California and the Colorado River Watershed. Reduced imported water demand within the District’s service area leads to water conservation due to additional water that remains at northern California and the Colorado River Watershed sources for use by others.

- ***Description of extent to which the Proposed Project benefits water management objectives***

- *Water Supply Reliability*

The ability of Rancho Water to extract its entire local groundwater budget in any given year is dependent on both knowledge of groundwater levels at specific locations within the basin and on knowledge of the pumping efficiency of extraction wells at those locations. Based on water level data and well pumping efficiency data currently available to Rancho Water, the District is not always able to extract 100% of its annual budget. For example, in 2017 Rancho Water was able to extract only 73% of its 27,737 acre-foot groundwater budget. This means the District missed an opportunity to take advantage of approximately 7,500 acre-feet of available local supplies, and was forced to replace those supplies with imported supply purchases. This is a significant missed opportunity, not only in terms of being able to maximize the reliability of the District’s local supplies, but also in terms of its impacts on the reliability of imported supplies. If the District is able to use local water to avoid purchasing 7,500 acre-feet of water from imported sources, that water will remain at those sources and be available for satisfying the needs of more than 120,000 people residing outside the District for an entire year (calculated based on 55 gallons per person per day).

- *Management of Water Deliveries*

With the ability to extract 100% of its annual local groundwater budget, the District can maximize use of less-expensive supplies and manage its water supplies more cost-effectively. For example, if the District would have had access to information provided by the Proposed Project back in 2017, it would have been able to extract an additional 7,500

acre-feet of available local supplies and to avoid 7,500 acre feet in expensive imported water supply purchases. To put the 7,500 acre-foot number in perspective, consider the difference in cost between local and imported supplies. Right now, local water is approximately \$950 per acre-foot less expensive for the District to produce than it is to purchase treated import water. So, if the District were to lose access to 7,500 acre feet of local water this year, it would have to spend an additional \$7,125,000 to replace it with treated import supplies.

- *Water Marketing Activities*

New information created by the Proposed Project about the local groundwater basin moves the District one step closer to being able to implement a groundwater banking program, which would build water storage during wet years for use during dry years. Based on recent estimates, the Murrieta-Temecula Groundwater Basin has a total available storage capacity of approximately 100,000 AF. This amount of water is significant, and could facilitate water marketing and transfers to satisfy the needs of other agencies during times of drought.

- *Drought Management Activities*

During a severe drought emergency during which imported water supplies were unavailable, Rancho Water would rely on local groundwater to provide enough water to its residents for health and safety needs. The Proposed Project enables the District to maximize its use of local groundwater supplies, thereby ensuring it is able to satisfy the health and safety needs of its entire population of more than 150,000 water users. In addition, the new information created by the Proposed Project about the groundwater basin moves the District one step closer to being able to implement a groundwater banking program, which would build water storage during wet years for use during dry years. Based on recent estimates, the Murrieta-Temecula Groundwater Basin has a total available storage capacity of approximately 100,000 AF. During a drought emergency in which water was provided only for health and safety needs, this amount of water could sustain the District's entire population for years.

- *Conjunctive Use of Surface and Groundwater*

Because Rancho Water's Vail Dam is physically connected to both imported water pipelines and the Murrieta-Temecula Groundwater Basin, the District has significant conjunctive use capabilities. During wet years when surplus import water is available, it can be pumped from imported water pipelines directly to recharge facilities or through the Vail Lake Pipeline and into the lake where it is stored temporarily before being released to the District's groundwater recharge facilities. Likewise, in years when local runoff is plentiful, surplus local water can be captured behind the dam, and then released for groundwater recharge. New information provided by the Proposed Project will help the District make more efficient use of recharged import water and local water. Depending on the year, this amount of water can exceed 25,000 acre feet.

- *Water Rights Administration*

The CWRMA Agreement made between the District and Marine Corps Base Camp Pendleton requires Rancho Water to maintain flows within the Santa Margarita River by releasing 5,000 acre-feet per year into the river. By increasing the District's understanding of the groundwater basin's characteristics, and enabling the District to

maximize groundwater supplies, the Proposed Project further ensures the District's capability to meet the requirements of CWRMA.

- *Watershed Health*

By further ensuring that Rancho Water can satisfy the 5,000 acre-foot per year release required by the CWRMA Agreement, the Proposed Project helps maintain surface water flows within the Santa Margarita River, which benefits the health of the Santa Margarita Watershed.

- *Restore natural features or use a nature-based feature to reduce water supply and demand imbalances or the risk of drought or flood*

The Murrieta-Temecula Groundwater Basin is a natural feature managed by Rancho California Water District for multiple uses such as urban, agricultural, and recreational water demands, and it can therefore be considered Groundwater Based Natural Infrastructure or Green Infrastructure. The Proposed Project optimizes water management activities within this Green Infrastructure to maximize water supplies available for reducing demand imbalances.

- *Conservation and Efficiency*

The Proposed Project maximizes Rancho Water's use of local water supplies and decreases the District's dependence on supplies imported from both northern California and the Colorado River Watershed. In 2017, if Rancho Water would have had access to information provided by the Proposed Project, it could have avoided 7,500 in imported water supply purchases, which would have conserved that amount of water, making it available for use by others.

- *Explain how the project compliments similar efforts in the area where it is located*

The Proposed Project provides significant benefits to both local and regional water supply reliability, and therefore compliments other local and regional efforts. For example, the regional water wholesaler, Metropolitan Water District of Southern California (MWD), works to maximize the region's conjunctive use of groundwater to increase flexibility in how water resources are managed for its 20-million person service area (which includes Rancho Water's service area). Specifically, MWD's most recent Integrated Water Resources Plan (IWRP) identifies conjunctive use as an adaptive water management strategy necessary for ensuring water supply reliability throughout the region. Both the District's service area and Vail Dam are located in close proximity to MWD's Lake Skinner and Diamond Valley Lake Reservoirs, as well as main distribution lines providing water to San Diego County, which are key MWD assets for regional storage and distribution. At this time, the District is actively reviewing with MWD the potential for a partnership involving the use of the Murrieta-Temecula Groundwater Basin as a component of their regional water storage infrastructure. Therefore, the Proposed Project is consistent with MWD's IWRP and represents a potential significant addition to regional conjunctive use efforts.

2. Need for the Project and Applicability of Project Results

- *Will the project result in an applied science tool(s) or information that is readily applicable, and highly likely to be used by water resource managers in the West?*

The Proposed Project leverages remote sensing equipment to generate more accurate groundwater basin data, which will be used to create a useful water management tool that

helps Rancho Water operate the Murrieta-Temecula Groundwater Basin more effectively and efficiently. The tool will be easily applicable to any groundwater basin, and given the anticipated benefits of the Proposed Project, it is highly likely that other water resource managers in the West will want to develop a similar tool for use in their areas.

- ***Explain who has expressed the need and describe how and where the need for the project was identified.***

Rancho Water is the primary beneficiary of the Project; however, benefits realized through Proposed Project implementation are also regional in nature. Because the project reduces Rancho Water's imported water demand from northern California and the Colorado River Watershed, every agency dependent on those sources benefits from the in terms of increased water supply reliability. The project is consistent with Rancho Water's Integrated Resources Plan (IRP) and Water Facilities Master Plan (WFMP), the Upper Santa Margarita Watershed's Integrated Regional Water Management Plan (IRWMP) and MWD's Integrated Water Resources Plan (IWRP). Furthermore, these local and regional Plans are both consistent with the California Water Plan (CWP) and its roadmap for good water management:

- Rancho Water's 2005 Regional IRP was prepared to assist the District in developing a long-term water supply strategy that can meet demands now until 2050. The IRP was developed using a multi-objective approach, integrating both demand- and supply-side options. Among the objectives developed for the IRP are three that the Proposed Project can help to accomplish, including: Reliably Meet Demands, Maximize Local Control, and Provide Sustainable Supply.
- Acting upon the District's Mission Statement to deliver reliable water services to its customers and communities in a prudent and sustainable manner, the 2015 WFMP describes water resource management goals and implementation strategies. The fourth goal listed in the WFMP is to "enhance the reliability/sustainability of the District's water supply." Strategies recommended for accomplishing this goal include: maximizing use of water in the Murrieta-Temecula Groundwater Basin and in Vail Lake through improvements to the District's recharge and recovery facilities. Activities accomplished through implementation of the Proposed Project represent significant improvements to the District's local water used and its recharge and recovery efforts.
- The 2014 Upper Santa Margarita Watershed IRWMP was a regional effort involving multiple local agencies. Of the IRWMP's six main goals, the first two are to increase the diversification of the water supply portfolio and to maximize groundwater potential. Objectives described for accomplishing these goals include increasing knowledge of groundwater supply potential and increasing local supply development. The Proposed Project enhances groundwater management for the Murrieta-Temecula Groundwater Basin, and helps the Region to more efficiently leverage local water resources.
- MWD, works to maximize the region's conjunctive use and increase flexibility in how water resources are managed for its 20-million person service area (which includes Rancho Water's service area). MWD's most recent Integrated Water

3. Project Implementation

The Proposed Project can begin immediately upon entering into a Financial Assistance Agreement with Reclamation, and can be completed within the required timeframe. For more detailed, technical information regarding Proposed Project implementation, please see the Detailed Project Description on pages 4 through 6 of this proposal.

- ***Project Objectives, Methodology & Approach***

The Proposed Project enhances Rancho Water’s existing groundwater basin management activities through the creation of new hydrologic data and the development of a tool, which processes the new data to inform the District on ways it can fully leverage available local groundwater resources while minimizing production costs and maintaining safe yields. The method used for implementing the Proposed Project will consist of the following main activities:

Activity 1: Install Differential Level Sensors

Install and calibrate a coupled system of transducers that will be placed a fixed distance apart within each of 26 wells to provide automatic readings of both static and dynamic pumping levels in real time through the District’s existing SCADA system.

Activity 2: Develop Automated Well Efficiency Calculations

Integrate newly installed equipment with existing SCADA system, and use SCADA to control operation of wells remotely and to collect sufficient data for estimating well efficiency on a monthly basis.

Activity 3: Develop Trend Averaging Algorithm for Automated Static Water Level Calculation

Create trend averaging algorithm for using new differential level sensor data, aquifer parameters from an existing groundwater model, the distance from nearby pumping wells, and the recovery trend following the end of pumping to calculate a “true static” water level.

Activity 4: Enable Index Well Trend Forecasting

Using the calculated “true static” water levels, compare water level trends in index wells to the modeled results to verify results of existing water model to develop a leading indicator on sustainability of pumping. Develop leading indicator SQL code to determine if the operations plans prepared during the water audit are being implemented and if the basin response matches the modeled water level trends.

Activity 5: Develop Loss of Production Diagnostics

Create SQL code to compare factors causing declines in well production and determine which factor has greatest impact in lost flow rate. Use information to improve the efficiency and effectiveness of its well rehabilitation efforts.

Activity 6: Develop Virtual Well and Wellfield Production Forecasting

Develop code to estimate individual wells’ response to repair and rehabilitation, as well as the impact of the change in flow rate on production from nearby wells.

Activity 7: Develop Rehabilitation and Replacement ROI Calculator

Produce code for estimating flow recovered, or increase in efficiency with well rehabilitation, pump repair, or redesign of the pump operating parameters. Compare change in power consumption and increase in flow rate to average costs for repair and

rehabilitation to determine the ROI. If significant recovery is not feasible, the provide ROI estimates for replacement of the well.

Activity 8: Create Web Map Interface and Integrate with Business Side Software

Create web map interface and perform necessary software integrations for connecting the interface to Ranch Water’s existing business side software.

- **Work Plan**

Following is the proposed Project’s Work Plan. The Proposed Project will be completed within a two-year timeframe, by August 30, 2024 (based on an August 31, 2022 start date).

Project Tasks/Milestones	Est. Project Schedule	
	Start	End
Task 1: Grant Agreement Execution - Execute grant agreement.	8/31/22	8/31/22
Task 2: Grant Reporting & Invoicing - Report to and invoice Reclamation.	2/28/22	8/30/24
Task 3: Professional Services Procurement - Advertise Request for Proposals for groundwater modeling services; review quotes submitted to Rancho Water; award professional services contract.	8/31/22	11/30/22
Task 4: Install Differential Level Sensors - Install and calibrate coupled system of transducers on each well.	12/1/22	1/30/23
Task 5: Develop Automated Well Efficiency Calculations – Develop step test procedures to calculate and collect well efficiency data.	2/1/23	10/1/23
Task 6: Develop Trend Averaging Algorithm for Automated Static Water Level Calculation - Create trend averaging algorithm to use new and existing data for calculating “true static” water level.	2/1/23	10/1/23
Task 7: Enable Index Well Trend Forecasting – Develop leading indicator SQL code to determine if basin response matches the modeled water level trends.	2/1/23	10/1/23
Task 8: Develop Loss of Production Diagnostics – Write SQL to compare factors causing declines in production and determine which factor has greatest impact in lost flow rate.	2/1/23	10/1/23
Task 9: Develop Virtual Well and Wellfield Production Forecasting – Develop code to estimate an individual well’s response to repair and redevelopment, as well as the impact of the change in flow rate on production from nearby wells.	2/1/23	10/1/23
Task 10: Develop Rehabilitation and Replacement Return on Investment Calculator – Produce code to estimate the flow recovered, or the increase in efficiency with well rehabilitation, pump repair, redesign, or replacement. Compare change in power consumption and increase in flow rate to average costs for each option to determine return on the investment.	2/1/23	10/1/23
Task 11: Create Web Map Interface and Integrate with Business Side Software – Summarize calculations and conclusions resulting	10/2/23	1/2/24

Project Tasks/Milestones	Est. Project Schedule	
	Start	End
from implementation of Tasks 4 through 10 in a web accessible geographic information system and in Rancho Water’s existing business side software.		
Task 12: Dissemination of Results - Participate in Reclamation-sponsored webinar and make results of the Proposed Project available to regional stakeholders.	1/3/24	8/30/24

- **Staff Qualifications**

Rich Ottolini, Rancho Water’s Water Operations Manager will be leading Proposed Project implementation. Mr. Ottolini has over 20 years of groundwater basin management experience evaluating various water resource scenarios to provide reliable water supplies. He has utilized water modeling, including groundwater models, to evaluate water conditions and analyze various solutions to water supply issues. As part of his current position as the Water Operations Manager, he is responsible for providing direction to the groundwater modeling efforts for the Murrieta-Temecula Valley Groundwater Basin. The other primary Rancho Water staff member involved in the project is Jacob Wiley, Assistant General Manager of Engineering/Operations. Mr. Wiley has vast experience in groundwater basin engineering projects, including conjunctive use projects, and has paid a crucial role in the efficient management of the local groundwater basin. Other Rancho Water staff involved in the project include operations staff that will be involved in the installation of new remote sensing equipment on wells and the integration of the equipment with the District’s existing SCADA system.

Together, these Rancho Water employees will facilitate the work of a groundwater consulting firm, which will be hired by the District to create the new data and develop the new basin management tool. District staff has extensive experience with working with groundwater consulting firms, and the firm hired to perform the work will have extensive knowledge of groundwater management and a proven track record in helping water utilities accomplish their groundwater development and protection goals. Specifically, the firm chosen will be consist of staff who possess doctoral degrees related to groundwater modeling and who are professional geologists and hydrogeologists experienced with high-profile geohydrologic investigations, groundwater basin evaluations, well-siting investigations, and artificial recharge.

All project team members have accomplished projects similar in scope to the Proposed Project in the past either as a lead or team member. The project team is capable of proceeding with tasks within the proposed work plan immediately upon entering into a financial assistance agreement.

- ***Products Resulting from Proposed Project***

The following table describes the products that will result from the Proposed Project

Product	Description
Integrated Wellfield Network	Twenty-six wells within the Pauba Valley will be outfitted with new remote sensing equipment and connected to the District’s existing SCADA system. Installation of the equipment and collection of its data using the SCADA will result in an Integrated Wellfield Network.
Groundwater Management Tool	Data produced by the Integrated Wellfield Network will enable the creation of a Groundwater Management Tool, which will provide valuable information that guides the District’s management of the groundwater basin.
Web-Based Map Interface	Results of calculations made by the Groundwater Management Tool will be displayed on a web-based map interface, which will be accessible through the District’s existing business side software.

4. Dissemination of Results

The approach chosen for disseminating the results of the Proposed Project is an effective approach because it targets for direct communication the partners and resource managers within the western United States who hold the largest stake in the project’s water supply reliability benefits. These partners and resource managers represent local, regional, and Federal agencies, as well as Indian Tribes, that have a special interest in the water resources of the Upper Santa Margarita Watershed.

- ***Internal Communication***

Results of the Proposed Project will be communicated by District staff who are involved in project implementation to the District’s Management Team, its Engineering & Operations Committee, and its Board of Directors during regularly scheduled meetings. While Manager Meetings are held weekly, Engineering & Operations Committee and Board of Directors meetings are held on a monthly basis.

- ***Communication with Regional Stakeholders & Water Managers***

Results of the Proposed Project will be communicated by District staff to the Upper Santa Margarita Watershed’s Watermaster and its Steering Committee that is now comprised of agencies from surrounding areas including the United States Marine Corps Base Camp Pendleton, Eastern Municipal Water District, Fallbrook Public Utility District, Metropolitan Water District of Southern California, Pechanga Band of Luiseno Mission Indians, Western Municipal Water District, and Rancho California Water District.

- ***Communication Reclamation and the Public***

Rancho Water will participate in a Reclamation sponsored webinar. The District will inform Reclamation about Proposed project accomplishments, final results of the identified tasks, and any lessons learned. Rancho Water understands that this presentation may be open to the public as a webinar and may be recorded and made available on the WaterSMART website.

5. Presidential and Department of the Interior Priorities

A. Climate Change

The Proposed Project is an important addition to Rancho Water's groundwater basin management activities, which support Executive Order 14008 by increasing resilience to the impacts of climate change and protecting public health. Examples in which the Proposed Project contributes to climate change adaptation and resiliency, include:

- ***Increased Resiliency to Drought Caused by Climate Change***

The Proposed Project helps Rancho Water to better manage drought caused by climate change because it allows the District to fully leverage more-reliable local supplies while reducing its reliance on imported water supplies from northern California and the Colorado River Watershed. During a severe drought when imported water supplies are not available, maximizing its use of local supplies would allow the District to ensure water is available for the health and safety needs of its population of more than 150,000 people. In addition, other agencies reliant on northern California and Colorado River supplies also benefit from Rancho Water's use of its local supplies because for each acre foot of water extracted by the District from its local groundwater basin, it purchases one less acre foot of imported water, which remains at its source for use by others.

Another way the Proposed Project improves resiliency to drought caused by climate change includes its contribution to groundwater banking. With new information created by the project, Rancho Water will be better equipped to implement an effective water banking program in the future. According to basin storage capacity data recently developed, this future water banking program could store up to 100,000 acre feet of water for use during dry years by agencies throughout the region. Completion of the Proposed Project brings the District one step closer to implementing the water banking program, which could drastically improve regional drought resiliency by providing a reliable source of water for human health and safety during times of reduced supplies.

Furthermore, the project supports advancements in conjunctive use of ground and surface water, which is an essential strategy for combatting drought caused by climate change. It is widely accepted that, as a result of climate change, storm events in the southwestern United States have become less frequent, but more intense. Because of this, surplus water available during wet years tends to come in great quantities and all at once. This creates challenges for water agencies that rely on stormwater capture as a source of supply, particularly those that rely on groundwater basins for storage. This is because high inflow rates associated with intense storm events tend to exceed the recharge capacities of groundwater basins, which means most of the water produced by storms is lost to surface runoff.

While Rancho Water faces similar challenges with recharging its local groundwater basin during extreme storm events, the District is able to leverage Vail Dam and its associated recharge and recovery facilities to capture stormwater while maximizing groundwater recharge. For example, during large storm events, RCWD can both capture local stormwater behind Vail Dam and convey surplus stormwater available through Metropolitan via the Vail Lake Pipeline and Pump Station directly to recharge facilities and/or to the lake at higher rates of flow. Water stored behind Vail Dam can be released to recharge facilities at reduced rates of flow that do not exceed the groundwater basins recharge capacity. This allows the

District to optimize stormwater capture and to maximize its groundwater storage capabilities. The Proposed Project is a crucial and necessary component of these recharge and recovery facilities because it will allow the District to maximize recovery of both native and recharged water through the creation of more accurate hydrologic data and through the development of enhanced hydrologic data analytics.

- ***Reductions to Natural Hazard Risks Caused by Climate Change***

Wildfires

According to scientists, climate change has made the U.S. West warmer and drier in the past 30 years and will continue to make weather more extreme, increasing both the frequency and severity of wildfires. As described above, the Proposed Project increases drought resiliency, providing a more reliable source of water for use by firefighters to combat wildfire.

Floods

Based on an article published in the American Geophysical Union Journal, climate change experts predict once-in-a-century storms will become 20% more severe and up to three times more frequent, leading to potential floods. Not only does Rancho Water's Vail Dam prevent catastrophic flooding events from occurring along Temecula Creek within unincorporated areas of Riverside County and the city of Temecula, California, but also it can store surplus stormwater imported through Metropolitan that could have caused flooding elsewhere. The Proposed Project is an important contributor to the system used by the District manage flood waters stored behind Vail Dam, which are distributed to groundwater recharge areas for later extraction, because it improves the efficiency of water extraction from the basin.

- ***Improved Climate Resilience through Sustainable Infrastructure Development***

The overall loss of snowpack in California associated with climate change has negatively impacted statewide groundwater supplies, and passage of California's Sustainable Groundwater Management Act (SGMA) in 2014 created a statewide framework for the long-term protection of groundwater resources. California's Department of Water Resources (DWR) enforces SGMA, and encourages implementation of best management practices for maintaining sustainable groundwater basins. For example, DWR encourages practices that prevent:

1. Chronic lowering of groundwater levels,
2. Significant and unreasonable reduction of groundwater storage,
3. Significant and unreasonable land subsidence, and
4. Depletions of interconnected surface water.

Among these practices, groundwater recharge is among the most important for sustainable groundwater management, as increasing the amount of recharge can help improve conditions in overdrafted basins, or allow for additional pumping in basins that are not experiencing chronic declines in groundwater levels. The Proposed Project supports SGMA because it is designed to support Rancho Water's efforts to maximize groundwater recovery without depleting local surface supplies or causing land subsidence.

B. Disadvantaged or Underserved Communities

Section 1015 of the Cooperative Watershed Act defines disadvantaged community as a community with an annual median household income that is less than 100 percent of the statewide annual median household income for the state. According to the 2019 Census ACS 1-year survey, **the median household income for California was \$80,440 in 2019**, the latest figures available. Rancho Water’s service area consists of several census block groups, which represent communities having Median Household Incomes (MHI) that were below this statewide average in 2019. The following table shows 2019 data for Census Block Groups that fit the above definition of disadvantaged communities.

Census Block Group Number	MHI	% of Statewide MHI	Population	Number of Households
06065.43254.1	\$77,679	97%	1,288	409
06065.51200.1	\$60,529	75%	4,188	1,416
06065.43250.5	\$71,098	88%	3,269	1,123
06065.43220.2	\$67,348	84%	1,877	664
06065.43266.2	\$72,279	90%	5,149	1,737
06065.43216.1	\$68,875	86%	1,681	743
06065.43216.2	\$56,250	70%	2,098	808
06065.49600.1	\$65,875	82%	2,124	730
TOTAL			21,674	7,630

These disadvantaged communities will benefit from the Proposed Project in terms of water supply reliability. The Proposed Project makes more efficient use of available groundwater supplies, which will be available for maintaining public health within these communities during all water supply conditions, including drought years.

C. Tribal Benefits

The Proposed Project supports the Pechanga Band of Luiseno Mission Indians’ (Pechanga) resilience to climate change and associated drought impacts. Pechanga is a Federally recognized Indian tribe with a reservation of over 6,000 acres located adjacent to Rancho Water’s service area. Pechanga and Rancho Water have had a groundwater management agreement in place since 2006 to address concerns with over-pumping in the groundwater basin. In addition, the United States Congress enacted the Pechanga Band of Luiseno Mission Indians Water Rights Settlement Act (Pechanga Act) in 2016 as part of the WIIN Act. This Act successfully concluded decades of conflict and uncertainty over water rights and years of negotiations through a comprehensive settlement that resolves the Band’s water-rights claims and secures sufficient water to meet their current and future water needs while protecting the legitimate interests of Rancho Water and its customers. The Proposed Project helps further resolve potential conflict over local groundwater supplies by helping to ensure the efficient use of available groundwater supplies, which reduces pressure on the groundwater basin in which both Rancho Water and Pechanga have an interest. In addition, the project helps Reclamation to fulfill the Pechanga Act and Federal Government’s responsibility to uphold its Tribal Water Rights trust responsibilities.

PROJECT BUDGET

A. Funding Plan and Letters of Commitment

Non-Reclamation Share of Project Costs

The current estimated non-Federal contribution is \$221,119.18.

A portion of the non-Federal share of the Proposed Project costs will be funded through use of District staff-time. The value of the staff-time dedicated to implementation of the Proposed Project is estimated at \$121,319.18. This amount includes base pay, fringe benefits, and indirect costs. In addition, Rancho Water’s existing budget for groundwater basin enhancement activities will help pay for the Proposed Project. An additional \$99,800.00 will be contributed to the Proposed Project through use of this budget. No third-party contributions will be used to pay for the project, and at this point, no pre-award costs are expected.

The following Tables 1 and 2 summarize the project funding sources:

Table 1. Summary of Non-Federal and Federal Funding Sources	
Funding Sources	Funding Amount
Non-Federal Entities	
1. Rancho Water Staff Time	\$121,319.18
2. Rancho Water’s Existing Budget	\$99,800.00
<i>Non-Federal Subtotal</i>	\$221,119.18
Other Federal Entities	
1. None	\$ 0.00
<i>Other Federal Subtotal</i>	\$ 0.00
Requested Reclamation Funding (<i>maximum amount of request</i>)	\$200,000.00
<i>Total Project Funding</i>	\$421,119.18

Table 2. Total Project Cost Table	
Source	Amount
Costs to be reimbursed with Federal funding	\$200,000.00
Costs to be paid by the applicant	\$221,119.18
Value of third-party contributions	\$0.00
Total Project Costs	\$421,119.18

Letters of Commitment

The District is committed to providing at least \$221,119.18 for implementation of the Proposed Project. No third-part funding will be used to pay for the project, and therefore, no Letters of Commitment are provided with this proposal. The District’s share of the project budget is available upon award announcement.

B. Budget Proposal

The District’s budget proposal is shown in Table 3 on page 26 of this proposal; the District requests Reclamation funding in the amount of \$200,000.00, 47.5% of the Proposed Project cost.

C. Budget Narrative

Salaries and Wages

The District’s Water Operations Manager, Rich Ottolini, will function as the Project Manager. In addition, the District’s Assistant General Manager of Engineering/Operations, Maintenance Projects Manager, Electrical Services Supervisor, Well & Pump Foreman, Senior Electrical Controls/Services Technician, Water Use Efficiency & Grants Manager, and Management Analyst will assist in implementation of the Proposed Project tasks.

As shown in Tables 3 and 4, costs for tasks requiring District labor are calculated based on estimated staff hours to be worked and actual hourly rates. It is anticipated that hours worked on the project by District staff will be spent on administration of the grant award and on collaborating with and overseeing the contractors/consultants who will be performing the bulk of the work described for each of task.

The number of hours worked by District staff are based on estimated level of involvement and duration of the task based on the schedule shown on page 17 and 18 of this proposal. Rates reflect current rates and do not include fringe benefits or indirect costs. While rates generally increase each Fiscal Year, the amount is not known until the budget is approved each year.

Fringe Benefits

A Fringe Benefits rate is applied to Total Salaries and Wages for employees of Rancho Water. A base hourly rate plus additional rates for fringe benefits is included in the budget. As per a provisional 21/22 Indirect Cost Negotiation Agreement, Fringe Benefits are charged at 97.75%. This rate is Federally-approved and is a provisional rate for billing purposes. Total Fringe Benefits

is \$32,349.35. Indirect Costs allowed in the Indirect Cost Negotiation Agreement are computed separately as discussed below.

Travel

There are no travel costs included for the Project.

Equipment

There are no equipment costs included for the Project.

TABLE 3. BUDGET PROPOSAL

Budget Item Description	Computation			Non-Federal Share	Reclamation Share	Total Cost
	Cost	Unit	Quantity			
SALARIES AND WAGES						
Water Operations Manager	\$95.92	per hour	92	\$ 8,824.55	\$ -	\$ 8,824.55
Assistant General Manager - Engineering/Operations	\$109.62	per hour	19	\$ 2,082.78	\$ -	\$ 2,082.78
Maintenance Projects Manager	\$64.53	per hour	40	\$ 2,581.28	\$ -	\$ 2,581.28
Electrical Services Supervisor	\$57.17	per hour	100	\$ 5,717.10	\$ -	\$ 5,717.10
Well & Pump Foreman	\$44.44	per hour	100	\$ 4,443.80	\$ -	\$ 4,443.80
Electrical Controls/Services Technician Senior	\$49.38	per hour	100	\$ 4,937.90	\$ -	\$ 4,937.90
Water Use Efficiency & Grants Manager	\$72.47	per hour	48	\$ 3,478.56	\$ -	\$ 3,478.56
Management Analyst	\$51.40	per hour	20	\$ 1,028.00	\$ -	\$ 1,028.00
SUBTOTAL			519	\$ 33,093.97	\$ -	\$ 33,093.97
FRINGE BENEFITS						
	<i>Basis</i>	<i>% of Basis</i>				
As per Federally approved Indirect Cost Rate Agreement, 97.75% of Salaries & Wages	\$ 33,093.97	97.75%	1	\$ 32,349.35	\$ -	\$ 32,349.35
SUBTOTAL				\$ 32,349.35	\$ -	\$ 32,349.35
TRAVEL						
NONE						
SUBTOTAL				\$ -	\$ -	\$ -
EQUIPMENT						
NONE				\$ -	\$ -	\$ -
SUBTOTAL				\$ -	\$ -	\$ -
SUPPLIES/MATERIALS						
Pressure Transducers						
SUBTOTAL	\$650.00	each	52	\$ 33,800.00	\$ -	\$ 33,800.00
CONTRACTUAL						
Well Equipment Installation Contractor	\$ 65,000.00	per contract	1	\$ 65,000.00	\$ -	\$ 65,000.00
SCADA Software Integration Contractor	\$ 30,000.00	per contract	1	\$ -	\$ 30,000.00	\$ 30,000.00
Groundwater Management Tool Contractor	\$135,000.00	per contract	1	\$ -	\$ 135,000.00	\$ 135,000.00
Business Side Software Integration Contractor	\$ 35,000.00	per contract	1	\$ -	\$ 35,000.00	\$ 35,000.00
SUBTOTAL				\$ 65,000.00	\$ 200,000.00	\$ 265,000.00
OTHER						
Environmental & Regulatory Compliance Costs	\$ 1,000.00	per review	1	\$ 1,000.00	\$ -	\$ 1,000.00
SUBTOTAL				\$ 1,000.00	\$ -	\$ 1,000.00
TOTAL DIRECT COSTS				\$ 165,243.32	\$ 200,000.00	\$ 365,243.32
APPROVED INDIRECT COSTS						
	<i>Basis</i>	<i>% of Basis</i>				
As per Federally approved Indirect Cost Rate Agreement, overhead for G&A, 168.84% of Salaries & Wages	\$ 33,093.97	168.84%	1	\$ 55,875.86	\$ -	\$ 55,875.86
SUBTOTAL				\$ 55,875.86	\$ -	\$ 55,875.86
TOTAL INDIRECT COSTS				\$ 55,875.86	\$ -	\$ 55,875.86
TOTAL PROJECT COSTS				\$ 221,119.18	\$ 200,000.00	\$ 421,119.18

Table 4. Salaries and Wages					
Employee	Task	Activity	Hours	Rate	Total Direct Costs
Water Operations Manager	3	Professional Services Procurement	4	\$95.92	\$8,824.55
	5	Develop Automated Well Efficiency Calculations	12		
	6	Develop Trend Averaging Algorithm for Automated Static Water Level Calculation	12		
	7	Enable Index Well Trend Forecasting	12		
	8	Develop Loss of Production Diagnostic	12		
	9	Develop Virtual Well and Wellfield Production Forecasting –	12		
	10	Develop Rehabilitation and Replacement Return on Investment Calculator	12		
	11	Create Web Map Interface and Integrate with Business Side Software	12		
	12	Dissemination of Results	4		
SUBTOTAL			92	\$95.92	\$8,824.55
Assistant General Manager - Engineering/Operations	3	Professional Services Procurement	1	\$109.62	\$2,082.78
	5	Develop Automated Well Efficiency Calculations	3		
	6	Develop Trend Averaging Algorithm for Automated Static Water Level Calculation	3		
	7	Enable Index Well Trend Forecasting	3		
	8	Develop Loss of Production Diagnostic	3		

	9	Develop Virtual Well and Wellfield Production Forecasting –	3		
	10	Develop Rehabilitation and Replacement Return on Investment Calculator	2		
	11	Create Web Map Interface and Integrate with Business Side Software	1		
SUBTOTAL			19	\$109.62	\$2,082.78
Maintenance Projects Manager	3	Professional Services Procurement	2	\$64.53	\$5,717.10
	5	Develop Automated Well Efficiency Calculations	6		
	6	Develop Trend Averaging Algorithm for Automated Static Water Level Calculation	6		
	7	Enable Index Well Trend Forecasting	6		
	8	Develop Loss of Production Diagnostic	6		
	9	Develop Virtual Well and Wellfield Production Forecasting –	6		
	10	Develop Rehabilitation and Replacement Return on Investment Calculator	6		
	11	Create Web Map Interface and Integrate with Business Side Software	2		
SUBTOTAL			40	\$64.53	\$2,581.28
Electrical Services Supervisor	4	Install Differential Level Sensors	100	\$57.17	\$5,717.10
SUBTOTAL			100	\$57.17	\$5,717.10
Well & Pump Foreman	4	Install Differential Level Sensors	100	\$44.44	\$4,443.80
SUBTOTAL			100	\$44.44	\$4,443.80

Electrical Controls/Services Technician Senior	4	Install Differential Level Sensors	100	\$49.38	\$4,937.90
SUBTOTAL			100	\$49.38	\$4,937.90
Water Use Efficiency & Grants Manager	1	Grant Agreement Execution	8	\$72.47	\$ 3,478.56
	2	Grant Reporting & Invoicing	40		
SUBTOTAL			48	\$72.47	\$ 3,478.56
Management Analyst	2	Grant Reporting & Invoicing	20	\$51.40	\$ 1,028.00
SUBTOTAL			20	\$51.40	\$ 1,028.00
TOTAL			519		\$33,093.97

Materials and Supplies

The Proposed Project will require 52 pressure transducers to be installed on 26 wells. Based on the District’s experience with purchasing these materials, they are estimated to come at a cost of \$650.00 each, for a total cost of \$33,800.00.

Contractual/Construction

Rancho Water contracts exceeding \$10,000 in value are all procured using a competitive method consistent with CFR 200.320 *Methods of procurement to be followed*. A total of four contracts exceeding this amount will be executed for implementation of the Proposed Project. The contracts are for: 1) Installation of new well-level monitoring equipment, 2) Integration of the new monitoring equipment with the District’s existing SCADA system, 3) Creation of the new groundwater management tool to include the web-based GIS interface, and 4) Integration of the new groundwater management tool with the District’s existing business-side software.

Based Rancho Water’s staff’s prior experience with these types of contracts and conversations with consultants who have experience with these types of activities, the combined cost for the Proposed Project’s four contracts is anticipated to be \$265,000.00. Work performed by the contractor(s)/consultant(s) under the four contracts is described in detail in the Detailed Project Description included on pages 4 through 6 of this proposal. All four contracts will be executed after the grant award date. Following is a summary of the work to be carried out by each consultant.

Contract for installing new well-level monitoring equipment (\$65,000)

Contractor to install and calibrate a coupled system of transducers within each of 26 wells to provide automatic readings of both static and dynamic pumping levels in real time through the District's existing SCADA system.

Contract for Integration of the new monitoring equipment with the District's existing SCADA system (\$30,000)

Consultant to assist District staff with work required for integrating the new monitoring equipment with the District's existing SCADA system to enable data collection and automatic and more frequent well pumping efficiency calculation.

Contract for creation of the new groundwater management tool to include the web-based GIS interface (\$135,000)

Consultant to assist District staff with creating a water management tool that uses newly available data to:

- a. Track changes in static water levels and in well pumping efficiencies,
- b. Perform diagnostics for finding the causes of reduced well production,
- c. Identify the basin-wide impacts of potential strategies for recovering lost production,
- d. Calculate a return on investment for specific lost production recovery strategies including well repair, rehabilitation, and replacement
- e. Improve well production forecasting resulting from well deterioration, rehabilitation and/or replacement, and
- f. Verify the accuracy of and improves forecasting abilities of the basin's existing groundwater model
- g. Create GIS web interface where the tool's calculations and results can be displayed

Contract for Integration of the new groundwater management tool with the District's existing business-side software (\$35,000)

Consultant to assist District staff with performing additional software integrations, which will allow the tool's calculations and results to be loaded onto the District's existing Business Side Software, which contains other important groundwater basin and asset management data.

Third-Party In-Kind Contributions

There are no third-party in-kind contributions included for the Proposed Project.

Environmental and Regulatory Compliance

The District understands that the introduction of federal funding may prompt a review under applicable Federal environmental laws. Included in the budget is an estimated line item cost of \$1,000 for the potential environmental compliance effort. This amount is based on conversations the District has had with the local area Reclamation office. The Proposed Project will be groundwater modeling work and will have no direct significant impact on the environment.

Other Expense

There are no “other” expenses included for the Proposed Project.

Indirect Costs

The Indirect Cost rate of 168.84% includes General/Administration Overhead as a percentage of total Rancho Water labor cost. Fringe Benefits are included separately under “Fringe Benefits” using the rate of 97.75%. These rates are Federally-approved and are provisional rates for billing purposes. Total estimated indirect costs for the Proposed Project are \$55,875.86.

Total Costs

The total Proposed Project cost is equal to \$421,119.18. The applicant’s cost share is \$221,119.18 and Reclamation’s share is \$200,000.00.

ENVIRONMENTAL AND CULTURAL RESOURCES COMPLIANCE

The Proposed Project is a water supply reliability effort that enhances an existing groundwater model. No environmental and regulatory issues are posed through its implementation. Following are answers to questions provided in the Funding Opportunity Announcement.

- **Will the Proposed Project impact the surrounding environment (e.g. soil (dust), air, water [quality and quantity], animal habitat)?** *(Describe all earth-disturbing work and any work that will affect air, water, or animal habitat in the project area. Explain the impacts of such work on the surrounding environment and any steps that could be taken to minimize the impacts)* Proposed Project activities do not include any surface disturbance, nor do they impact the surrounding environment.
- **Are you aware of any species listed or proposed to be listed as a Federal threatened or endangered species, or designated critical habitat in the project area?** No species listed or proposed to be listed as a Federal endangered or threatened species, or designated critical habitats are known to reside within the Proposed Project area.
- **Are there wetlands or other surface waters inside the project boundaries that potentially fall under CWA jurisdiction as “Waters of the United States”?** No, the Proposed Project will not affect wetlands or Waters of the United States. No associated impacts will occur and no mitigation is required.
- **When was the water delivery system constructed?** The majority of the water delivery system was constructed by the late 1980s; however, some infrastructure continues to be constructed today as the service area is being built out.
- **Will the project result in any modification of or effects to individual features of an irrigation system (e.g., head gates, canals, or flumes)?** No, the Proposed Project will not result in any modification of or effect to individual features, such as head gates, canals, or flumes, of an irrigation system.
- **Are any buildings, structures, or features in the irrigation district listed or eligible for listing on the National Register of Historic Places?** There are no buildings, structures, or features listed or eligible for listing on the National Register of Historic Places within the Proposed Project sites. There are, however, at least 10 buildings in the Old Town Historic District of the City of Temecula, which is within the RANCHO WATER service area. These buildings are in the well-developed Old Town area and the Proposed Project would not affect them.
- **Are there any known archeological sites in the Proposed Project area?** No, there are no known archeological sites in the Proposed Project area.
- **Will the project have a disproportionately high and adverse effect on low income or minority populations?** No, the Proposed Project will not have any adverse effects on low income or minority populations.
- **Will the project limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands?** No, the Proposed Project will not limit access to and ceremonial use of Indian sacred sites or result in other impacts on tribal lands.
- **Will the project contribute to the introduction, continued existence, or spread of noxious weeds or non-local invasive species known to occur in the area?** No, the Proposed Project will not contribute to the introduction, continued existence, or spread of noxious weeds or non-local invasive species known to occur in the area.

REQUIRED PERMITS / APPROVALS

No permits or approvals are required for the Proposed Project.

OVERLAP OR DUPLICATION OF EFFORT STATEMENT

There is no overlap between the Proposed Project and any other active or anticipated proposals or projects in terms of activities, costs, or commitment of key personnel. Moreover, this proposal is not in any way duplicative of any proposal or project that has been or will be submitted for funding consideration to any other potential funding source—whether it be Federal or non-Federal.

LETTERS OF PROJECT SUPPORT



Craig D. Miller
General Manager

Mike Gardner Division 1 **Gracie Torres** Division 2 **Brenda Dennstedt** Division 3 **Laura Roughton** Division 4 **Fauzia Rizvi** Division 5

April 7, 2022

Rancho California Water District
Robert Grantham, General Manager
42135 Winchester Rd.
Temecula, CA 92589

Subject: Western Municipal Water District Expresses Strong Support for Implementation of Rancho California Water District's Integrated Groundwater Well Field System Project

Dear Robert Grantham:

On behalf of Western Municipal Water District (Western), I would like to express my strong support for Rancho California Water District's (Rancho Water's) Integrated Groundwater Well Field System Project (Proposed Project), and its application for WaterSMART grant funding.

Western understands that the goal of the Proposed Project is to develop and leverage new data to build a groundwater management tool, which will help Rancho Water optimize its management of the Murrieta-Temecula Groundwater Basin.

Specifically, the Proposed Project consists of 1) improving existing wireless telemetry equipment installed on wells to create a networked system, which provides new real-time groundwater level and well efficiency data, 2) creating a mathematical model that analyzes the new data and evaluates basin management alternatives, and 3) integrating the model outputs with an end-user facing software module, which displays the modeled data in an easy to understand format.

Ultimately, the project will allow the Rancho Water to fully leverage local water supplies while minimizing energy use, which will reduce reliance on costly imported water.

For these reasons, Western is supportive of Rancho Water's Proposed Project and their WaterSMART grant application. If you have any questions, please reach out to me at 951.571.7242 or cmiller@wmwd.com.

Sincerely,



CRAIG D. MILLER
General Manager



April 12, 2022

Rancho California Water District
Robert Grantham, General Manager
42135 Winchester Rd.
Temecula, CA 92589

Subject: Eastern Municipal Water District Expresses Strong Support for Implementation of Rancho California Water District's Integrated Groundwater Well Field System Project

Dear Robert Grantham:

On behalf of Eastern Municipal Water District, I would like to express my strong support for Rancho California Water District's (Rancho Water) Integrated Groundwater Well Field System Project (Proposed Project), and its application for WaterSMART grant funding.

Eastern Municipal Water District understands that the goal of the proposed project is to develop and leverage new data to build a groundwater management tool, which will help Rancho Water optimize its management of the Murrieta-Temecula Groundwater Basin.

Specifically, the proposed project consists of 1) improving existing wireless telemetry equipment installed on wells to create a networked system, which provides new real-time groundwater level and well efficiency data, 2) creating a mathematical model that analyzes the new data and evaluates basin management alternatives, and 3) integrating the model outputs with an end-user facing software module, which displays the modeled data in an easy-to-understand format.

Ultimately, the project will allow the Rancho California Water District to fully leverage local water supplies while minimizing energy use, which will reduce reliance on costly imported water.

Board of Directors
Philip E. Paule, President | Randy A. Record, Vice President | Jeff Armstrong | Stephen J. Corona | David J. Slavson

2270 Trumble Road • P.O. Box 8300 • Perris, CA 92572-8300
T 951.928.3777 • F 951.928.6177 | www.emwd.org

Mr. Robert Grantham: Integrated Groundwater Well Field System Project
April 12, 2022
Page 2

Again, it is my pleasure to support the Integrated Groundwater Well Field System Project.

Sincerely,



Lanaya Voelz Alexander, P.E.
Assistant General Manager
Planning, Engineering, Construction
Eastern Municipal Water District

EASTERN MUNICIPAL WATER DISTRICT

OFFICIAL RESOLUTION

Because of the timing of Rancho Water’s Board Meetings, an official Resolution is not available at this time. However, an official resolution, meeting Reclamation’s requirements, will be adopted by the District’s Board of Directors, and submitted before Reclamation’s deadline.

CONFLICT OF INTEREST DISCLOSURE

No actual or potential conflict of interest exists at the time of this proposal's submission.

UNIFORM AUDIT REPORTING STATEMENT

Rancho California Water District was required to submit a Single Audit report for the most recently closed fiscal year. The District’s Employer Identification Number (EIN) associated with that report is 95-2415751. The report is available through the Federal Audit Clearinghouse website.