April 6, 2023

Mr. Danny Friend
Director of Operations
Mission Springs Water District
66575 Second Street
Desert Hot Springs, CA 92240

Subject: **Proposal for Professional Hydrogeological Support Services**
Assessment of Mission Springs Water District Well 35

Dear Danny:

KYLE Groundwater, Inc., (KGI) is pleased to present this proposal to Mission Springs Water District (MSWD) for professional hydrogeological services related to assessment of Well 35 which was drilled and constructed in 2007 and subsequently equipped to serve as a source of construction water. It is our understanding that the 600HP motor was removed in 2008, that the pump is still installed within the well, and that the well has been idle since that time. It is our understanding that MSWD would like to assess the current condition of the well and evaluate the feasibility of bringing the well to service as a municipal water supply well. We are proposing a phased approach, whereby each phase is designed to provide early identification of critical issues that could curtail consideration of the well from further investigation. Each phase will become increasingly intrusive and complex as the viability of the well becomes more evident. The following phases of work are recommended and are presented in order of implementation.

I. Conduct preliminary assessment of regulatory and permitting requirements.
II. Perform field diagnostics and preliminary testing of the well.
III. Design and implement a full-scale rehabilitation and redevelopment program.

Our detailed scope of work and cost proposal to perform Phase I through III is as follows, and in Table 1. Fees for pump contractors, downhole surveyors, and laboratory analysis is not included.

SCOPE OF WORK (KGI)

Task A-1 – Project Management and Meetings

KGI will provide general project management and will prepare for and attend up to six (6) meetings with MSWD. It is assumed one meeting will take the form of a field visit to the well site to assess site logistics and regulatory constraints. The purpose of the remaining meetings will be to discuss the results of each

phase of the assessment, and discuss project progress. Meeting agendas will be prepared for all project meetings and meeting minutes will be provided, as necessary.

Phase I – Logistical and Regulatory Review

Task I-1 – Site Inspection and Regulatory Review

Bringing an inactive well to service requires compliance with all current well design and construction standards. Additionally, all current regulatory requirements must be met, including, but not limited to, adherence to minimum setbacks from sanitary hazards and establishment of a 50-foot control zone surrounding the well. KGI will visit the well site to assess construction logistics, along with the feasibility of permitting the well for operation with the California State Water Resources Control Board.

The results of the Phase I regulatory and logistical review, along with recommendations for next steps, should that prove feasible and desirable, will be provided to MSWD in letter format, along with an anticipated approach for Phase II well testing.

Phase II – Field Diagnostics and Preliminary Testing

Task II-1 – Preliminary Downhole Video and Electromagnetic Casing Inspection Surveys

KGI recommends performing dual-cam downhole video and electromagnetic casing inspection surveys for Well 35. The purpose of these surveys will be to assess the current physical condition of the well and determine the feasibility of bringing the well to municipal service. It is assumed that the existing pump will be removed by others to facilitate the downhole surveys. KGI will provide inspection during the surveys, and will review the survey logs upon receipt in an effort to determine the current physical condition of the well, including the degree of any corrosion, mineral encrustation, and/or bacterial activity that may be present. The degree of metal loss and structural integrity of the well casing and screen will be assessed and any areas of significant concern that may require repair will be identified.

Task II-2 – Mechanical Cleaning by Brushing and Removal of Fill

KGI recommends performing limited mechanical cleaning of the well by brushing prior to conducting well capacity testing and groundwater sampling. The brushes would consist of spirally-wound nylon, polypropylene or polyethylene bristles mounted on a 6-inch minimum diameter weighted core. It is recommended that the weighted brushes be attached to the sand line of a rig equipped with a variable-speed rotating arm capable of a minimum 6-foot continuous revolution (i.e., 12-feet of vertical movement) and 10 strokes per minute, thus providing a minimum of 120 feet of vertical movement per minute. This cleaning process shall be conducted throughout the entire wetted portion of the well in such a way as to provide powerful and effective removal of scale, as well as to exert stresses within the near-well zone. For cost estimating purposes it is assumed that cleaning of both the well casing and screen will occur and that two complete passes will be necessary over a period of one to two days. Following mechanical cleaning, accumulated sediment and debris should be removed from the bottom of the well as completely as is considered practical to the reported depth of approximately 1,040 feet bgs.

KGI personnel will provide part-time inspection during mechanical cleaning and bailing of the well to monitor the progress of the task and to verify that the proper procedures and equipment are employed.

Task II-3 – Post-Cleaning Downhole Video Survey

KGI will provide full-time inspection and review of a post-cleaning dual-cam downhole video survey as a means of assessing and documenting the condition of the well following mechanical cleaning.

Task II-4 – Preliminary Redevelopment by Focused Intake Pumping and Swabbing

In an effort to open up well screen openings and provide a more representative evaluation of well capacity, a brief program of well redevelopment is recommended. The goal of this step is to remove as much residual material from the well as is considered practical, maximizing well capacity and efficiency. This task should consist of focused intake pumping through a double-surge block at rates of up to 500 to 900 gallons per minute (gpm) while simultaneously swabbing the entire length of well screen in 10-foot increments. KGI will provide part-time inspection services during redevelopment by focused intake pumping and swabbing throughout the perforated interval. For the length of screen in this well it is anticipated that up to 28 hours of redevelopment time will be necessary to accomplish this over a period of 4 days. However, KGI will review data collected during the development process and provide real-time recommendations regarding the need for more or less development.

Task II-5 – Well Capacity Testing

KGI will provide full-time inspection during a step-drawdown pumping test with the focused intake tooling, the purpose of which is to assess well capacity. It is assumed that the test will be 8 hours in duration and will consist of four (4) discrete pumping rates. During testing, static and pumping water levels, totalizer flowmeter readings, and sand production will be measured at specified intervals. Toward the end of testing, KGI personnel will collect groundwater samples and submit them to a State-certified laboratory for analysis of Title 22 constituents.

Task II-6 – Reporting and Rehabilitation Work Plan

Data collected from the downhole surveys, well capacity testing, and groundwater sampling will be analyzed following completion. KGI will use the results of the diagnostics to make recommendations regarding well production potential, including estimated instantaneous pumping rate, short- and long-term drawdown characteristics, well efficiency, and anticipated groundwater quality.

The results of the Phase II assessment, along with recommendations for next steps will be provided to MSWD in letter format along with a detailed work plan for well rehabilitation, redevelopment, and testing, should that prove feasible and desirable.

Phase III – Rehabilitation, Redevelopment, and Testing

Based on the results of the Phase I and II assessments, it may be decided to proceed with rehabilitation, redevelopment, and testing of Well 35. The exact scope of that work will not be known until preliminary well assessment tasks have been completed, and as such, the following scope of work is assumed based on those tasks typically necessary for a well of this age and materials of construction.

1. Mobilization.
2. Chemical cleaning (surfactant and dispersant).
3. Chemical cleaning (acid treatment).
4. Redevelopment by focused intake pumping.
5. Installation of a redevelopment test pump.
6. Redevelopment by pumping and surging.
7. Aquifer testing.
8. Removal of the redevelopment test pump.
9. Post-rehabilitation video survey.
10. Well disinfection.
11. Demobilization and site cleanup.

Task III-1 – Construction Coordination and Support

KGI will provide construction management support, including Contractor submittal review, response to RFIs and RFCs, change order review, project schedule review, Contractor progress payment request review for accuracy, and regular construction updates.

Task III-2 – Chemical Treatment (Surfactant and Polymer Dispersant)

KGI personnel will provide full-time inspection during pre-development pumping and application of non-ionic surfactant and dispersant polymer to verify that the type, volume, and concentrations of chemicals utilized are consistent with the work plan, that proper dispersal techniques are employed by the Contractor, and that proper chemical removal and disposal techniques are used (as necessary).

Task III-3 – Chemical Treatment (Acid)

KGI personnel will provide full-time inspection during mixing, application, neutralization, and removal of HCT Well-Klean Pre-Blend and sodium bicarbonate chemical products to verify that the type, volume, and concentrations of chemicals utilized are consistent with the work plan, that proper dispersal techniques are employed by the Contractor, and that proper chemical neutralization, removal, and disposal techniques are used (as necessary).

Task III-4 – Final Redevelopment by Pumping and Surging

The final phase of well redevelopment consists of pumping and surging with a temporary test pump and motor to be furnished by the Contractor. During the final development process, pumping will begin at low rates, with no surging, slowly building to the maximum specified pumping rate (typically 1.5x the anticipated design pumping rate). Gentle surging will then begin at lower rates, becoming increasingly

aggressive as development progresses. Tests for sand production and specific capacity will be performed throughout the process to measure the progress of development. Once specific capacity approaches a maximum, sand production approaches a minimum, and well performance criteria are met, development is considered complete and the aquifer pumping test phase can begin.

KGI will provide part-time inspection during final well development. Typically, approximately 30 hours of final well redevelopment is sufficient to properly redevelop a well of this anticipated depth. However, this can vary based on many factors, and as such, KGI will review data collected during final development and provide real-time recommendations regarding the need for additional development time.

Task III-5 – Aquifer Pumping Tests

KGI will provide full-time inspection during an 8-hour step-drawdown pumping test, the purpose of which is to allow calculation of well efficiency and determine an appropriate rate for the constant rate pumping test. During the test, static and pumping water levels, totalizer flowmeter readings, and sand production, will be measured at specified intervals.

Following the step-drawdown test, KGI will provide part-time inspection during the 24-hour constant rate drawdown test, the purpose of which is to determine a recommended instantaneous pumping rate, allow calculation of short- and long-term pumping dynamics, and establish an optimal pump intake setting. As with the step drawdown test, totalizer flowmeter readings and sand production will be measured at specified intervals. Recovering water levels will be measured for a period of 4 hours following cessation of pumping.

Task III-6 – Post-Rehabilitation Downhole Video Survey

KGI will provide full-time inspection and review of a post-testing dual-cam downhole video survey as a means of assessing and documenting the condition of the well following rehabilitation.

Task III-7 – Well Disinfection

KGI wil7l provide full-time inspection services during final disinfection of the well structure to verify that suitable chemicals, concentrations, and methods of mixing and emplacement are employed.

Task III-8 – Analyze Aquifer Pumping Test Data and Prepare Letter Summary Report

A summary of the well rehabilitation, redevelopment, and testing process will be provided in a comprehensive letter report. Data collected from the aquifer pumping tests will be analyzed immediately following completion. KGI will use the results of the analysis to make recommendations regarding optimal operational parameters, including instantaneous pumping rate, short- and long-term drawdown characteristics, well efficiency, and recommended pump intake setting. Analysis, results, and recommendations will be presented to MSWD in letter format with appropriate charts, figures, and data.

Task III-9 – Drinking Water Source Assessment and Protection (DWSAP) Program Documents

DWSAP documents will be prepared using the latest forms available from the California Division of Drinking Water. Preparation of the DWSAP documents requires identification of all Potentially Contaminating Activities (i.e., PCAs) within two-, five- and ten-year protection zones. These protection zones will be delineated using the modified calculated fixed-radius method, taking in to account local groundwater flow direction, anticipated well construction details and pumping capacity, and aquifer parameters. Protection zones will be presented in map form along with identified PCAs. Those PCAs that are identified as posing the greatest environmental risk to the proposed well (if any) will be provided in a ranked vulnerability inventory and assessed within the DWSAP documents. The DWSAP documents will be submitted to MSWD in electronic (i.e., PDF) format for forwarding to DDW. Much of the information and data needed to prepare the DWSAP documents is contained within our in-house database. Additional information, as needed, will be requested once the work has begun.

Thank you for considering our proposal and please do not hesitate to contact me at 626.379.7569 or russell.kyle@kylegroundwater.com should you have any questions or concerns. We welcome the opportunity to continue our mutually beneficial working relationship with MSWD.

Sincerely,

Russell John Kyle, PG, CHG
President / Principal Hydrogeologist

MISSION SPRINGS WATER DISTRICT
Cost Proposal for Proposal for Professional Hydrogeological Support Services
Assessment of Mission Springs Water District Well 35

		Principal Hydrogeologist	Project Hydrogeologist	Staff Hydrogeologist	GSI Technician	Project Coordinator	Clerical	Labor	Direct Costs	Total Cost
	Hourly Rate:	$195	$145	$135	$120	$105	$80			
A.	**PROJECT MANAGEMENT AND MEETINGS**									
A-1	Provide General Project Management and Attend up to Six (6) Project Meetings, Including Site Walk	8	8					$ 2,720	$ 270	$ 2,990
I.	**PHASE I - LOGISTICAL AND REGULATORY REVIEW**									
I-1	Conduct Site Logistical and Investigation and Regulatory Review, Prepare Letter Report	6	8	6	4			$ 3,620	$ -	$ 3,620
II.	**PHASE II - FIELD DIAGNOSTICS AND PRELIMINARY TESTING**									
II-1	Inspect Downhole Video and Electromagnetic Casing Inspection Surveys	2	3	8				$ 1,905	$ 96	$ 2,001
II-2	Inspect Mechanical Cleaning by Brushing, Removal of Accumulated Sediment and Debris	2	4	8				$ 2,050	$ 191	$ 2,241
II-3	Inspect and Review Post-Cleaning Downhole Video Survey	1	3	4				$ 1,170	$ 96	$ 1,266
II-4	Inspect Preliminary Redevelopment by Focused Intake Pumping and Swabbing	2	12	24				$ 5,370	$ 382	$ 5,752
II-5	Inspect Well Capacity Testing (8-hour step drawdown), Including Laboratory Coordination, Sampling, and Sample Delivery	2	2	16			1	$ 2,920	$ 96	$ 3,016
II-6	Evaluate Survey Data, Perform Condition Assessment, Evaluate Well Performance and Groundwater Quality, and Prepare Detailed Work Plan for Recommended Next Steps	8	12	16	2			$ 5,700	$ -	$ 5,700
III.	**PHASE III - REHABILITATION, REDEVELOPMENT, AND TESTING**									
III-1	Contractor Coordination and Support	4		8				$ 1,860	$ -	$ 1,860
III-2	Inspect Chemical Treatment with Surfactant and Polymer Dispersant	2	9	24				$ 4,935	$ 287	$ 5,222
III-3	Inspect Chemical Treatment with Acid Solution	2	9	24				$ 4,935	$ 287	$ 5,222
III-4	Inspect Final Redevelopment by Pumping and Surging	2	6	24				$ 4,500	$ 287	$ 4,787
III-5	Inspect Aquifer Pumping Tests (8-hour step drawdown, 24-hour constant rate, 4-hour recovery)	3	8	32				$ 6,065	$ 287	$ 6,352
III-6	Inspect and Review Post-Rehabilitation Downhole Video Survey	1	3	4				$ 1,170	$ 96	$ 1,266
III-7	Inspect Well Disinfection	1	3	8				$ 1,710	$ 96	$ 1,806
III-8	Analyze Test Data and Prepare Summary Letter Report and Recommendations	8	12	16	2			$ 5,700	$ -	$ 5,700
III-9	Prepare Drinking Water Source Assessment and Protection (DWSAP) Documents	12		20	8			$ 6,000	$ -	$ 6,000
	TOTAL HOURS AND COST:	***66***	***102***	***242***	***16***		***1***	***$ 62,330***	***$ 2,471***	***$ 64,801***