



Offer and Acceptance

State of Arizona
State Procurement Office
 100 N. 15th Ave. Suite 201
 Phoenix, AZ 85007

SOLICITATION NO.: ADSP016-00005912 Request
 for Qualifications: 2016 Annual Professional
 Services List

PAGE
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Offeror: Errol L Montgomery & Assoc

OF
1

OFFER

TO THE STATE OF ARIZONA:

The Undersigned hereby offers and agrees to furnish the material, service or construction in compliance with all terms, conditions, specifications and amendments in the Solicitation and any written exceptions in the offer. Signature also certifies Small Business status.

Errol L. Montgomery & Associates, Inc.

Company Name

1550 E Prince Road

Address

Tucson

AZ

85719

City

State

Zip

mcross@elmontgomery.com

Contact Email Address

Mark M. Cross

Signature of Person Authorized to Sign Offer

Mark Cross

Printed Name

President

Title

Phone: 520-881-4912

Fax: 520-881-1609

By signature in the Offer section above, the Offeror certifies:

1. The submission of the Offer did not involve collusion or other anticompetitive practices.
2. The Offeror shall not discriminate against any employee or applicant for employment in violation of Federal Executive Order 11246, State Executive Order 2009-9 or A.R.S. §§ 41-1461 through 1465.
3. The Offeror has not given, offered to give, nor intends to give at any time hereafter any economic opportunity, future employment, gift, loan, gratuity, special discount, trip, favor, or service to a public servant in connection with the submitted offer. Failure to provide a valid signature affirming the stipulations required by this clause shall result in rejection of the offer. Signing the offer with a false statement shall void the offer, any resulting contract and may be subject to legal remedies provided by law.
4. The Offeror certifies that the above referenced organization IS/ IS NOT a small business with less than 100 employees or has gross revenues of \$4 million or less.

ACCEPTANCE OF OFFER

The Offer is hereby accepted.

The Contractor is now bound to sell the materials or services listed by the attached contract and based upon the solicitation, including all terms, conditions, specifications, amendments, etc., and the Contractor's Offer as accepted by the State.

This Contract shall henceforth be referred to as Contract No. ADSP016-00005912

The effective date of the Contract is March 1, 2016

The Contractor is cautioned not to commence any billable work or to provide any material or service under this contract until Contractor receives purchase order, contact release document or written notice to proceed.

State of Arizona
 Awarded this

26th day of February 20 16

Jana DeCotis

Procurement Officer



ATTACHMENT I – General Qualifications

ANNUAL REQUEST FOR QUALIFICATIONS AND EXPERIENCE NO:
ADSP016-00005912

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DEFINITIONS

Architect Services, Engineer Services, Land Surveying Services, Assayer Services, Geologist Services and Landscape Architect Services: Those professional services within the scope of the practice of those services as provided in ARS § 32-101.

Branch Office: A geographically distinct place of business or subsidiary office of a firm that has a key role on the team.

Discipline: Primary technical capabilities of key personnel, as evidenced by academic degree, professional registration, certification, and/or extensive experience.

Firm: Defined in ARS § 32-101(B.19.).

Key Personnel: Individuals who will have major contract responsibilities and/or provide unusual or unique expertise.

SPECIFIC INSTRUCTIONS:

1. Complete this form for each branch office seeking work under this RFQ.
 - a. – e. **Firm (or Branch Office) Name and Address.** Self-explanatory.
 - f. **Year Established.** Enter the year the firm (or branch office, if appropriate) was established under the current name.
 - g. **Ownership.**
 - (g1). *Type.* Enter the type of ownership or legal structure of the firm (sole proprietor, partnership, corporation, joint venture, etc.).
 - (g2). *Small Business Status.* A firm is a small business if the firm has less than 100 employees **or** has gross revenues of \$4 million or less.
 - h.-j. **Point of Contact.** Provide this information for a representative of the firm that the Customer can contact for additional information. The representative must be empowered to speak on contractual and policy matters.
 - k. **Name of Firm.** Enter the name of the firm.
2. **Employees by Discipline.**
 - a. Select disciplines from the List of Disciplines (Function Code) listed on Page 3 of 4 Instructions. For employees that do not qualify for any of the disciplines, select "Other". *Note: The intended searchable database indicated in the RFQ will be populated from the Qualifications Form I Excel attachment only.*
 - b. Each person can be counted only twice; once for his/her primary function and once for his/her secondary function. Primary and secondary functions should be indicated by including a "P" or an "S" in column b after the Description Title is given.
 - c-d. If the form is completed for a firm (including all branch offices), enter the number of employees by disciplines in column c. If the form is completed for a branch office, enter the number of employees by discipline in column d and for the firm in column c.
3. **Profile of Firm's Experience and Annual Average Revenue for Last Year.**
 - a. Enter the approximate number of projects the firm (or branch) has done attributable by Profile Code listed on Page 3 of 4 Instructions over the last year.



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- b. Enter the appropriate Profile Codes from Instructions Pages 3 of 4 that represent the type of work the firm (or branch) has done over the last year.
 - c. Using the Revenue Index Number on Page 3 of 6 Form, indicate the approximate revenue the firm has earned over the last year per Profile Code entered into the table.
4. **Resumes of Key Personnel Proposed for This Contract.** Complete this section for each key person who will participate in this contract.
- a. Self-explanatory.
 - b. Self-explanatory
 - c. Total years of relevant experience (block c1), and years of relevant experience with current firm, but not necessarily the same branch/office (block c2).
 - d. Name, City and State of the firm where the person currently works, which must correspond with one of the firms (or branch office or a firm, if appropriate) listed in Section 1.
 - e. Provide information on the highest relevant academic degree(s) received. Indicate the area(s) of specialization for each degree.
 - f. Provide information on current relevant professional registration(s) and in which State(s) they are current.
 - g. Provide information on any other professional qualifications relating to this contract, such as education, professional registration, publications, organizational memberships, certifications, training, awards, and foreign language capabilities.
 - h. Provide information on no more than five (5) projects in the last year which the person had a significant role that demonstrates the person's capability relevant to her/his proposed role in this contract. These projects do not necessarily have to be any of the projects presented in Section 5 for the project team if the person was not involved in any of those those projects or the person worked on other projects that were more relevant than the team projects in Section 5. Use the check box provided to indicate if the project was performed with any office of the current firm. If any of the professional services or construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description and Specific Role.
5. **Example Projects Which Best Illustrate Firms Qualification for this contract.** Select project where multiple team members worked together, if possible, that demonstrate the team's capability to perform work similar to that required for this contract. Complete one Section 5 for each project. List no more than five (5) projects.
- a. Title and Locations of project or contract. For an indefinite delivery contract, the location is the geographic scope of the contract.
 - b. Enter the year completed of the professional services (such as planning, engineering study, or design), and/or the year completed if construction. If any of the professional services or the construction projects are not complete, leave Year Completed blank and indicate the status in Brief Description of Project and Relevance to This Contract (block f).
 - c. Project Owner or user, such as a government agency or installation, an institution, a corporation or private individual.
 - d. Provide the original budget or not to exceed dollar amount for the project.
 - e. Provide the Total Cost of the Project. If any of the professional services or construction projects is not complete, indicate the percentage complete and whether this project will be on budget, over or under budget.
 - f. Brief Description: Indicate scope, size, and length of project, principle elements and special features of the project. Discuss the relevance of the example project to this contract.
6. **Additional Information.** Use this section to provide additional information you feel may be necessary to describe your firm's qualifications for this contract.
7. **Annual Average Professional Services Revenues of Firm for Last 3 Years.** Complete this block for the firm or branch office for which this form is completed. In column a, enter an approximate percentage of total work attributable to State, Federal or Municipal Work. In column b, enter an approximate percentage of total work attributable to Non-Government work. Percentages should take into consideration work completed over the last 3 years.



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8. **Authorized Representative.** An authorized representative of the firm or branch office must sign and date the completed form. Signing attests that the information provided is current and factual. Provide the name and title of the authorized representative who signed the form.

List of Disciplines (Function Codes) for Question 2

- | | | |
|---------------------------|--|--------------------------|
| Aeronautical Engineer | Environmental Engineer | Mining Engineer |
| Agricultural Engineer | Environmental Scientist | Nuclear Engineer |
| Archeologist | Fire Protection Engineer | Petroleum Engineer |
| Architect | Geodetic Surveyor | Photogrammetrist |
| Architectural Engineering | Geographic Information System Specialist | Project Manager |
| Biologist | Geological Engineer | Sanitary Engineer |
| CADD Technician | Geologist | Soils Engineer |
| Chemical Engineer | Hydrographic Surveyor | Structural Engineer |
| Civil Engineer | Hydraulic Engineer | Technician/Analyst |
| Construction Manager | Hydrologist | Transportation Engineer |
| Construction Inspector | Industrial Engineer | Water Resources Engineer |
| Control Systems Engineer | Landscape Architect | |
| Cost Engineer/Estimator | Mechanical Engineer | |
| Ecologist | Metallurgical Engineer | |
| Electrical Engineer | | |

List of Experience Categories (Profile Codes for Question 3)

- | | |
|---|--|
| Acoustics, Noise Abatement | Dams (<i>Concrete; Arch</i>) |
| Aerial Photography; Airborne Data and Imagery Collection and Analysis | Dams (<i>Earth; Rock</i>); Dikes; Levees |
| Activity Centers | Desalinization (<i>Process and Facilities</i>) |
| Air Pollution Control | Design-Build - Preparation of Requests for Proposals |
| Airports; Navajds; Airport Lighting; Aircraft Fueling | Digital Elevation and Terrain Model Development |
| Airports; Terminals and Hangars; Freight Handling | Digital Orthophotography |
| Agricultural Development; Grain Storage; Farm Mechanization | Dining Halls; Clubs; Restaurants |
| Animal Facilities | Dredging Studies and Design |
| Anti-Terrorism/Force Protection | Design & Planning Structured Parking Facilities |
| Area Master Planning | Detention Security Systems |
| Auditoriums and Theaters | Disability / Special Needs |
| Automation; Controls; Instrumentation | Ecological and Archeological Investigations |
| Barracks; Dormitories | Educational Facilities; Classrooms |
| Bridge Design: Bridges | Electrical Studies and Design |
| Cartography | Electronics |
| Cemeteries (<i>Planning and Relocation</i>) | Elevators; Escalators; People-Movers |
| Chemical Processing and Storage | Energy / Water Auditing Savings |
| Child Care/Development Facilities | Energy Conservation; New Energy Sources |
| Codes; Standards; Ordinances | Environmental Impact Studies, Assessments or Statements |
| Cold Storage; Refrigeration and Fast Freeze | Fallout Shelters; Blast-Resistant Design |
| Commercial Building (<i>Low Rise</i>); Shopping Centers | Fire Protection |
| Community Facilities | Fisheries; Fish Ladders |
| Communications Systems; TV; Microwave | Forensic Engineering |
| Computer Facilities | Garages; Vehicles Maintenance Facilities; Parking |
| Conservation and Resource Management | Gas Systems (<i>Propane; Natural, Etc.</i>) |
| Construction Management | Geodetic Surveying: Ground and Airborne |
| Construction Surveying | Heating; Ventilating; Air Conditioning |
| Corrosion Control; Cathodic Protection Electrolysis | Highways; Streets; Airfield Paving; Parking Lots |
| Cost Estimating; Cost Engineering and Analysis; Parametric Costing; Forecasting | Historical Preservation |
| Cryogenic Facilities | Hospital and Medical Facilities |
| Construction Materials Testing | Hotels; Motels |
| | <i>Housing (Residential, Multi-Family; Apartments; Condominiums)</i> |



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Hotels; Motels
Hydraulics and Pneumatics
Hydrographic Surveying
Industrial Buildings; Manufacturing Plants
Industrial Processes; Quality Control
Industrial Waste Treatment
Intelligent Transportation Systems
Infrastructure
Irrigation; Drainage
Judicial and Courtroom Facilities
Laboratories; Medical Research Facilities
Land Surveying
Landscape Architecture
Libraries; Museums; Galleries
Lighting (*Interior; Display; Theater, Etc.*)
Lighting (*Exteriors; Streets; Memorials; Athletic Fields, Etc.*)
Labs - General
Labs – Research – Dry
Labs – Research – Wet
LEED Accredited A/E
LEED Independent 3rd Party Building Commissioning
Mapping Location/Addressing Systems
Materials Handling Systems; Conveyors; Sorters
Metallurgy
Materials Testing
Measurement / Verification / Conservation Water Consumption Savings
Mining and Mineralogy
Medical Related
Modular Systems Design; Fabricated Structures or Components
Mold Investigation
Museums
Nuclear Facilities; Nuclear Shielding
Office Buildings; Industrial Parks
Outdoor Recreation
Petroleum and Fuel (*Storage and Distribution*)
Photogrammetry
Pipelines (*Cross-Country - Liquid and Gas*)
Phase I Environmental
Prisons & Correctional Facilities
Plumbing and Piping Design
Prisons and Correctional Facilities
Product, Machine Equipment Design Pneumatic Structures, Air-Support Buildings Power Generation, Transmission, Distribution Public Safety Facilities
Radar; Sonar; Radio and Radar Telescopes
Radio Frequency Systems and Shielding's
Railroad; Rapid Transit
Recreation Facilities (*Parks, Marinas, Etc.*)
Refrigeration Plants/Systems
Rehabilitation (*Buildings; Structures; Facilities*)
Research Facilities
Resources Recovery; Recycling
Roof Infrared Imaging to Identify Water Leaks

Roofing
Safety Engineering; Accident Studies; OSHA Studies
Security Systems; Intruder and Smoke Detection
Seismic Designs and Studies
Sewage Collection, Treatment and Disposal
Soils and Geologic Studies; Foundations
Solar Energy Utilization
Solid Wastes; Incineration; Landfill
Special Environments; Clean Rooms, Etc.
Structural Design; Special Structures
Surveying; Platting; Mapping; Flood Plain Studies
Sustainable Design
Swimming Pools
Storm Water Handling and Facilities
Specifications Writing
Toxicology
Testing and Inspection Services
Traffic and Transportation Engineering
Topographic Surveying and Mapping
Towers (*Self-Supporting and Guyed Systems*)
Tunnels and Subways
Traffic Studies
Transportation
Urban renewals; Community Development
Utilities (*Gas and Steam*)
Value Analysis; Life-Cycle Costing
Warehouse and Depots
Water Resources; Hydrology; Ground Water
Water Supply; Treatment and Distribution
Wind Tunnels; Research/Testing Facilities Design
Waste Water Treatment Facility
Water Well Rehabilitation; Water Well Work
Zoning; Land Use Studies



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(If a firm has branch offices, complete for each specific branch office seeking work.)

1. **Annual Request for Qualifications**

a. FIRM (OR BRANCH OFFICE) NAME:	Errol L. Montgomery & Associates, Inc.
b. FIRM (OR BRANCH OFFICE) STREET:	1550 East Prince Road
c. FIRM (OR BRANCH OFFICE) CITY:	Tucson
d. FIRM (OR BRANCH OFFICE) STATE:	Arizona
e. FIRM (OR BRANCH OFFICE) ZIP CODE:	85719
f. YEAR ESTABLISHED:	1984
(g1). OWNERSHIP - TYPE:	Corporation
(g2) OWNERSHIP - SMALL BUSINESS STATUS:	Small Business
h. POINT OF CONTACT NAME AND TITLE:	Mark Cross, President
i. POINT OF CONTACT TELEPHONE NUMBER:	520-881-4912
j. POINT OF CONTACT E-MAIL ADDRESS:	mcross@elmontgomery.com
k. NAME OF FIRM (If block 1a is a branch office):	



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4. Resumes of Key Personnel Proposed for this Contract *(Complete one Section #4 for each key person.)*

a. NAME Mark Cross	b. ROLE IN THIS CONTRACT Technical oversight	c. YEARS EXPERIENCE	
		1. TOTAL: 36	2. WITH CURRENT FIRM: 27
d. LOCATION <i>(City and State)</i> Tucson, AZ			
e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> B.S., Geology, Northern Arizona University (1979) M.S., Hydrology, University of Arizona (1983)		f. PROFESSIONAL TRAINING - REGISTRATIONS <i>Registered Professional Geologist #19193, AZ</i> <i>Registered Professional Geologist #4471, CA</i> <i>Certified Professional Hydrogeologist #249, CA</i>	
g. OTHER PROFESSIONAL QUALIFICATIONS <i>(Organizations, Awards, etc.)</i> 2007–present: External Advisory Committees for the University of Arizona Water Resources Research Center and the Water Sustainability Program 1999: Honorary plaque from Tucson Regional Water Council for contributions to Advisory Council 1999: Certificate of appreciation from ADWR for outstanding community service on the Tucson AMA Regional Recharge Committee			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION <i>(City and State)</i> Tonopah Desert Recharge Project (Tonopah, Maricopa County, AZ)	(2) YEAR COMPLETED: 2015
		Professional Services: 2015 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: Planned, managed, and provided technical oversight for hydrogeologic characterization studies, groundwater flow modeling, and technical reports to support the design and permitting of large-scale recharge and recovery facilities. The Tonopah Desert facility has the largest permitted capacity of any recharge project in Arizona. Recharge operations, which began in January 2006, have demonstrated that the facility is capable of storing the maximum permitted annual volume. Most recently, we updated the recovery plan based on the inclusion of water treatment, refined recovery wellfield layout, and recommended for field investigations to characterize the deep aquifer. Code 4 - \$500,000 to less than \$1,000,000	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION <i>(City and State)</i> CAP Recovery Wellfield Siting Study (Pinal County, AZ — Countywide)	(2) YEAR COMPLETED: 2009
		Professional Services 2009 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: Managed and provided technical oversight for a hydrogeologic assessment, an inventory and ranking of existing wells for potential use as recovery wells, and the conceptual design of a new wellfield for recovering stored CAP water. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION <i>(City and State)</i> Water Supply Investigations & APP Support for the Willow Springs South Ranch Village Project (Oracle, AZ)	(2) YEAR COMPLETED: 2010
		Professional Services 2010 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: Conducted hydrogeologic investigations (characterization, aquifer testing, and groundwater modeling) to demonstrate an Assured Water Supply and provide technical oversight for design and permitting of an effluent recharge facility. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
4.	(1) TITLE AND LOCATION <i>(City and State)</i> Water Supply Acquisition Study & Program Implementation (AZ — Central / Western)	(2) YEAR COMPLETED
		Professional Services Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager: Managed a consulting team for a study that entailed developing a water supply inventory, valuing and ranking water assets, and preparing a water acquisition strategy and plan; managed hydrogeologic investigations and technical feasibility assessments for selected high-priority water assets. Ongoing. Code 4 - \$500,000 to less than \$1,000,000	<input checked="" type="checkbox"/> Check if project performed with current firm
5.	(1) TITLE AND LOCATION <i>(City and State)</i> Effluent Recharge Feasibility & Siting Study for Liberty Utilities (Sierra Vista, AZ)	(2) YEAR COMPLETED
		Professional Services Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Technical Oversight: Provided technical oversight and support for a Phase 1 program for identifying, screening, and ranking candidate sites for recharging treated effluent by surface infiltration and injection; constructed two monitoring wells to comply with the facility's Aquifer Protection Permit. Ongoing. Code 4 - \$500,000 to less than \$1,000,000	<input checked="" type="checkbox"/> Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract *(Complete one Section #4 for each key person.)*

a. NAME Leslie Katz	b. ROLE IN THIS CONTRACT Project management, technical oversight	c. YEARS EXPERIENCE	
		1. TOTAL: 31	2. WITH CURRENT FIRM: 26
d. LOCATION <i>(City and State)</i> Tucson, AZ			
e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> B.S., Geology, University of Arizona (1983) M.S., Hydrology, University of Arizona (1987)		f. PROFESSIONAL TRAINING - REGISTRATIONS Registered Professional Geologist #28245, AZ	
g. OTHER PROFESSIONAL QUALIFICATIONS <i>(Organizations, Awards, etc.)</i> 2008: Contractor of the Year — award from Arizona Public Service (Cholla Power Plant) for successfully managing and completing a large-scale, fast-track wellfield relocation project that was critical to ongoing plant operations			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION <i>(City and State)</i> North Indian Bend Wash (Scottsdale, AZ)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: Managed and provided long-term technical leadership, from the initial characterization of VOC contamination through the final remedy design and implementation; analyzed data from various fluid movement, depth-specific sampling, and zonal testing programs to characterize conditions in a deep alluvial aquifer; oversaw a modeling effort to evaluate alternative remedial actions and a 5-Year Review of remedy effectiveness. Ongoing. Code 7 - \$5 million to less than \$10 million (last 5 years only)	<input checked="" type="checkbox"/>	Check if project performed with current firm
2.	(1) TITLE AND LOCATION <i>(City and State)</i> Cholla Power Plant Wellfield (St. Joseph City, AZ)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: Managed a comprehensive field program to characterize hydrogeologic and water quality conditions; led the installation and testing of 12 production wells and 20 monitoring wells; developed and implemented a long-term monitoring program. Ongoing. Code 6 - \$2 million to less than \$5 million (last 5 years only)	<input checked="" type="checkbox"/>	Check if project performed with current firm
3.	(1) TITLE AND LOCATION <i>(City and State)</i> Industrial Wellfield Conversion (San Manuel, AZ)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Lead: As part of a site closure process, managed a large-scale field program to install new production wells and abandon old ones with the goal of creating a sustainable, high-quality water supply for future municipal and industrial uses; implemented interval-specific testing to identify zones with poor water quality and monitoring to evaluate surface water / groundwater interactions. Ongoing. Code 5 - \$1 million to less than \$2 million (last 5 years only)	<input checked="" type="checkbox"/>	Check if project performed with current firm
4.	(1) TITLE AND LOCATION <i>(City and State)</i> U.S. Air Force Plant 44, Tucson Airport Area Superfund Site (Tucson, AZ)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager: Designed and oversaw a field program that entailed installing nine unit-specific monitoring wells at critical locations to characterize the vertical distribution of VOCs and 1,4-dioxane and verify plume containment; oversaw modeling analyses of flow, particle pathways, and fate and transport of VOCs and 1,4-dioxane in groundwater to evaluate plume-containment strategies and demonstrate the achievement of Remedial Process Optimization goals. Ongoing. Code 4 - \$500,000 to less than \$1 million (last 2.5 years only)	<input checked="" type="checkbox"/>	Check if project performed with current firm
5.	(1) TITLE AND LOCATION <i>(City and State)</i> West-Cap, Tucson Airport Area Superfund Site (Tucson, AZ)	(2) YEAR COMPLETED: 2013	
		Professional Services: 2013	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Technical Oversight: Designed two multiple-completion monitoring wells to evaluate VOC fate, transport, and remediation; oversaw well installation; conducted monitoring; reported on overall site conditions and data interpretation; provided a critical review of the remedial design work plan. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/>	Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract (Complete one Section #4 for each key person.)

a. NAME: Tim Leo	b. ROLE IN THIS CONTRACT Project management, technical oversight	c. YEARS EXPERIENCE	
		1. TOTAL: 26	2. WITH CURRENT FIRM: 7
d. LOCATION (City and State) Tucson, AZ			
e. EDUCATION (DEGREE AND SPECIALIZATION) B.S., Geology, Bradley University (1983) M.S., Hydrology, University of Arizona (1988)		f. PROFESSIONAL TRAINING - REGISTRATIONS Registered Professional Geologist #33257, AZ Registered Professional Geologist #6163, CA Certified Professional Hydrogeologist #344, CA	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) Courses: Optimization Modeling Short Course, Stochastic Modeling with Groundwater Vistas, Monitored Natural Attenuation, Fracture Flow Short Course, MT3D Computer Modeling Short Course			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION (City and State) Los Reales Landfill WQARF Site (Tucson, AZ)	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Evaluated the performance of a pump-and-treat system and the feasibility of various remedial alternatives; analyzed long-term site data; developed / calibrated a new groundwater model and used it to project the future effectiveness of pump-and-treat system under declining water table conditions; and recommended strategies for transitioning to a long-term groundwater monitoring remedy. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION (City and State) U.S. Air Force Plant 44, Tucson Airport Area Superfund Site (Tucson, AZ)	(2) YEAR COMPLETED
		Professional Services Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Modeling Lead: Directed the development of a three-dimensional flow-and-transport model to determine the relative historical contribution of TCE to supply wells in and near this Superfund site; reviewed models developed by other consultants. Ongoing. Code 4 - \$500,000 to less than \$1 million (last 2.5 years only)	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION (City and State) Broadway Pantano Landfill — Environmental Technical Support (Tucson, AZ)	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Reviewed and prepared comments on behalf of the City of Tucson Department of Environmental Services on the draft remedial investigation report for the landfill operable unit at the Broadway-Pantano Landfill site. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm
4.	(1) TITLE AND LOCATION (City and State) Environmental Technical Support for El Camino Del Cerro Landfill (Tucson, AZ)	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Technical Reviewer: Reviewed and provided comments on behalf the County on the draft remedial investigation report for the El Camino Del Cerro Landfill. Code 1 - Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm
5.	(1) TITLE AND LOCATION (City and State) Tailings Seepage Analysis for Confidential Mining Client (AZ)	(2) YEAR COMPLETED: 2013
		Professional Services: 2013 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Manager: Managed a comprehensive hydrogeologic investigation that entailed inventorying seeps and springs, measuring seep flow rates, characterizing water quality (for seepage, surface water, and groundwater), characterizing groundwater flow, developing a conceptual hydrogeologic model, and evaluating potential NPDES / APP compliance issues. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract (Complete one Section #4 for each key person.)

a. NAME Gary Woodard	b. ROLE IN THIS CONTRACT Senior water policy / economics consultant	c. YEARS EXPERIENCE	
		1. TOTAL: 32	2. WITH CURRENT FIRM: 3
d. LOCATION (City and State) Tucson, AZ			
e. EDUCATION (DEGREE AND SPECIALIZATION) B.S., Chemistry, University of Michigan (1976) M.P.P., Public Policy, University of Michigan (1981) J.D., Law, University of Michigan (1981)		f. PROFESSIONAL TRAINING - REGISTRATIONS	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) Awards for technical communication, Southwest Hydrology (2005–2008); Education & Public Service Award, Universities Council on Water Resources (2005); USGS Shoemaker Award for Communications Product Excellence (Web, 2005); plus many others; Served as president of the National Board of Directors, Universities Council on Water Resources; first chairman and founding member of the Santa Cruz Valley Water District; founder / director of the Water Conservation Alliance of Southern Arizona			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION (City and State) Residential Water Demand Trends Study (Pima County, AZ)	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Led an analysis of factors of long-term declines in residential water demand for a consortium of water providers and regulators; studied triggers of water-conserving behavior in existing homes; investigated trends in water efficiency in new homes; designed and supervised the construction of a dynamic simulation model. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION (City and State) Residential Water Demand Trends Study (Maricopa County, AZ)	(2) YEAR COMPLETED: 2015
		Professional Services: 2015 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Led an analysis of factors of long-term declines in residential water demand for a consortium of water providers and regulators; studied triggers of water-conserving behavior in existing homes; investigated trends in water efficiency in new homes; designed and supervised the construction of a dynamic simulation model. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION (City and State) Water Demand Forecasting for High-Tech Industry (AZ)	(2) YEAR COMPLETED
		Professional Services Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Examined factors of water demand for semiconductor fabrication; identified key trends and technology shifts in the manufacturing process; estimated potential impacts on water demand. Ongoing. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm
4.	(1) TITLE AND LOCATION (City and State) Planning Alternatives for the Verde River Watershed (Yavapai County, AZ)	(2) YEAR COMPLETED: 2013
		Professional Services: 2013 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Participated in an assessment of alternatives for protecting Verde River water supplies for humans and the environment; examined water supply and demand characteristics for individual communities; projected impacts of development and passive conservation on future demands; examined water conservation options and their feasibility for specific communities. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm
5.	(1) TITLE AND LOCATION (City and State) Water Demand Model and Effluent Reuse Planning for New Development (NV)	(2) YEAR COMPLETED: 2015
		Professional Services: 2015 Construction (if applicable)
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Project Lead: Modeled water demand at build-out for a confidential client; estimated the seasonality of demand and opportunities for effluent reuse; investigated trends in water-efficient fixtures, appliances, and landscapes in new housing; developed a graphical model dashboard to support scenario analysis. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm



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4. Resumes of Key Personnel Proposed for this Contract *(Complete one Section #4 for each key person.)*

a. NAME Dennis Hall	b. ROLE IN THIS CONTRACT Project manager, technical oversight	c. YEARS EXPERIENCE	
		1. TOTAL: 38	2. WITH CURRENT FIRM: 29
d. LOCATION <i>(City and State)</i> Phoenix, AZ			
e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> B.S., Geology, Northern Arizona University (1979) M.S., Hydrology, University of Arizona (1983)		f. PROFESSIONAL TRAINING - REGISTRATIONS <i>Registered Professional Geologist #23687, AZ</i> <i>Registered Professional Geologist #4999, CA</i>	
g. OTHER PROFESSIONAL QUALIFICATIONS <i>(Organizations, Awards, etc.)</i> <i>Board member, Arizona Hydrological Society</i>			

H. RELEVANT PROJECTS

1.	(1) TITLE AND LOCATION <i>(City and State)</i> APP Support & Monitoring for the Solana Generating Station (Gila Bend, AZ)	(2) YEAR COMPLETED: 2015
		Professional Services: 2015 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager / Technical Oversight: Managed and provided technical oversight for hydrogeologic investigations associated with an Aquifer Protection Permit for a 280 megawatt concentrating solar power plant; designed a monitoring network; installed a production well after characterizing salinity conditions and identifying target completion zones. Code 3 - \$250,000 to less than \$500,000	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION <i>(City and State)</i> Characterization & Impact Analysis for EIS (Grand Canyon, AZ)	(2) YEAR COMPLETED: 2012
		Professional Services: 2012 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Technical Oversight: Provided senior technical oversight for an evaluation of regional hydrogeologic conditions to project the potential of uranium mining on groundwater, springs, and soils on a million acres of federal land adjacent to Grand Canyon National Park. Code 4 - \$500,000 to less than \$1 million	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION <i>(City and State)</i> APP Support for Proposed Solar Power Plants (Glendale & Holbrook, AZ)	(2) YEAR COMPLETED: 2010
		Professional Services: 2010 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager / Technical Oversight: Managed and provided senior technical oversight for hydrogeologic investigations in support of an Aquifer Protection Permit for a proposed solar power plant that would use compressed air energy storage (CAES) technology. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
4.	(1) TITLE AND LOCATION <i>(City and State)</i> Water Supply Investigations for the Adaman Irrigation Water & Drainage District	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager / Technical Oversight: Designed and provided technical oversight for the construction and testing of four high-capacity production wells to replace wells eliminated by the widening of State Route 303. Code 2 - \$100,000 to less than \$250,000	<input checked="" type="checkbox"/> Check if project performed with current firm
5.	(1) TITLE AND LOCATION <i>(City and State)</i> Well Feasibility Evaluation for the Grand Canyon National Park Airport (Tusayan, AZ)	(2) YEAR COMPLETED: 2014
		Professional Services: 2014 Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Technical Guidance: Provided technical guidance for an evaluation of locations for a deep production well based on data from a controlled source audio-frequency magnetotellurics (CSAMT) survey. Code 1 – Less than \$100,000	<input checked="" type="checkbox"/> Check if project performed with current firm



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5. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> Groundwater Remediation at the North Indian Bend Wash Superfund Site (Scottsdale, AZ)	b. YEAR COMPLETED ONGOING	
	PROFESSIONAL SERVICES ONGOING	CONSTRUCTION <i>(If applicable)</i>

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Motorola Solutions, Inc.	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT Multiple ongoing contracts since 1983	e. TOTAL COST OF PROJECT Over \$5,000,000 for the past 5 years
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f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

Located in the Salt River and Paradise Valley groundwater basins, NIBW was added to the EPA's Superfund list in the early 1980s after VOCs were detected at several municipal supply wells. Soil and groundwater characterization efforts uncovered a regional plume caused by multiple historical industrial facilities after VOCs were detected at several municipal supply wells. Working initially on behalf of Motorola and later representing the entire group of participating companies, M&A has been integrally involved in the project since its inception, providing hydrogeologic investigation, remediation, and strategic management services. We have played a key role in developing, gaining regulatory approval for, and implementing all aspects of the remedy. M&A provides ongoing support to evaluate and optimize the remedial actions.

- Evaluated aquifer properties, VOC distributions, and the potential for vertical contaminant migration at individual source areas and within the regional plume
- Developed capture / containment approaches for various components of the groundwater remedy using models and other analytical tools
- Identified potential source areas based on historical facility data and VOC concentrations in vadose zone sediments and the uppermost aquifer
- Designed and implemented long-term programs for monitoring water levels and water quality to track VOC migration; evaluated monitoring data to verify plume containment and compliance
- Selected favorable drilling sites for remedial extraction wells by evaluating hydrogeologic, water quality, and land ownership data, along with groundwater flow model projections; designed and oversaw the construction and testing of three large-diameter extraction wells
- Developed a strategy for pumping remedial extraction and municipal supply wells to optimize plume containment
- Implemented vadose zone models at various source areas to assess the potential threat to groundwater from VOCs and the need for continuing SVE
- Developed or helped develop several groundwater flow, particle tracking, and solute transport models to achieve remedial design / action objectives
- Used the models to evaluate groundwater and contaminant movement, to assess plume containment under a range of extraction regimes, and to compare the effectiveness of remedial alternatives
- Updated and recalibrated the flow-and-transport model to assess remedy performance as part of a 5-Year Review process
- Used the updated model to project the hydraulic capture of the operating groundwater remedy and assess optimization approaches



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5. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> Hydrogeologic Investigations at the Cholla Power Plant (Joseph City, AZ)	b. YEAR COMPLETED: ONGOING	
	PROFESSIONAL SERVICES: ONGOING	CONSTRUCTION <i>(If applicable)</i>

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Arizona Public Service/ Pinnacle West Capital Corporation	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT Multiple ongoing projects since 2005	e. TOTAL COST OF PROJECT: Over \$2,000,000 in last 5 years
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g. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

When a long-term land lease was terminated, threatening Cholla's wellfield, M&A provided a range of services to ensure that the plant would maintain continuity for its water supply. In addition to relocating production wells, M&A conducted analyses to support land-condemnation negotiations, implemented a comprehensive monitoring program, and developed a flow model to help assess pumping impacts and optimize wellfield operations. Under an expedited deadline, M&A not only shifted production to other wells, but we also helped APS expand the wellfield and develop redundancy to provide reliable backups. In addition, we helped replace the monitoring network, to the extent possible, on APS land and supported land-condemnation negotiations.

- Launched an exploration program to identify the best locations for new production wells
- Assessed hydrologic and water quality conditions, including fracture density, to support the siting and design of production wells
- Designed and implemented a borehole drilling, logging, and testing program to characterize fracturing and assess potential yields from the sandstone aquifer
- Designed, installed, and tested 11 new production wells and modified two existing wells
- Deployed downhole explosives in selected boreholes to enhance fracture connectivity and increase yields to more than 3,000 gpm in some wells
- Selected and managed the contractors who installed the distribution system, wellhead, and pumping infrastructure under extremely tight deadlines
- Designed, installed, and tested about 20 monitoring wells in the shallow alluvial and the deeper sandstone aquifers
- Equipped monitoring wells with data loggers and pressure transducers to continuously record the aquifers' response to pumping and streamflow runoff
- Evaluated water level and pumping data to develop recommendations for operating the wellfield more efficiently and sustainably
- Supported an evaluation of the potential for well casings and pumps to deteriorate because of water quality issues, including dissolved gases
- Equipped monitoring wells with data loggers and pressure transducers to continuously record the aquifers' response to pumping and streamflow runoff
- Equipped selected monitoring wells with continuous electrical conductivity probes to track changes in response to pumping
- Sampled production and monitoring wells to evaluate water quality
- Developed a groundwater flow model to simulate drawdown impacts from historical pumping and to identify operational strategies that would minimize the decline of water levels and the migration of poor-quality water
- Reviewed regional models to evaluate the validity of their assumptions and projections in wellfield area



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5. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> Zone 4 Wellfield Evaluation & Replacement Well Installation (Glendale, AZ)	b. YEAR COMPLETED: 2010	
	PROFESSIONAL SERVICES: 2010	CONSTRUCTION <i>(If applicable)</i>

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER City of Glendale	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$96,000	e. TOTAL COST OF PROJECT \$61,100
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h. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

The City of Glendale's Oasis Water Treatment Plant was constructed in 2007 to supply to its Zone 4 distribution area. This phased project will eventually serve up to 30 mgd at full buildout in 2025. Under Phase 1, which was completed in 2007, facilities were constructed to treat about 10 mgd of surface water that is delivered to the plant via the Arizona Canal. Completed in 2011, Phase 2 was implemented to increase plant capacity by 10 mgd and ensure a reliable supply during canal dry-ups and periods of surface water shortage. It required augmenting supplies with groundwater. M&A served on a multidisciplinary team led by CH2M Hill to develop this groundwater supply. We began by evaluating and ranking 11 existing City wells that could potentially be used to supply this water; ranking criteria included distance from the treatment plant, registered production capacity, site dimensions, and anticipated configuration and condition. We then conducted field investigations at the four most viable wells to assess their physical condition, potential yield, site-specific aquifer properties, and logistical factors. M&A also assessed options for using these wells to supply the treatment plant, considering factors such as capacity, capital and O&M costs, risk, logistical issues, and water quality. We found that replacing the wells would incur the highest initial cost but offered the highest production potential, lowest O&M cost, and lowest overall risk. We ultimately developed specifications for four replacement wells and oversaw their drilling, installation, testing and development...

- Used the results of reconnaissance investigations, downhole video surveys, and various analyses to prioritize wells for further field investigations
- Identified sensitive well site issues (historic preservation areas, noise, and inconvenience to commercial, residential, and adjacent city service areas) and coordinated mitigation plans
- Developed and ranked alternatives for activating the Zone 4 wellfield based on several factors, including relative capital and O&M costs
- Prepared a report with recommendations for wellfield activation, and presented the results to City decision makers
- Evaluated downhole video surveys and borehole geophysical logs
- Prepared a construction report for the replacement wells
- Designed four high-capacity replacement wells up to about 1,700 feet in depth based on the zonal test results, lithologic descriptions and sieve analysis of drill cuttings, and borehole geophysical logs
- Provided field oversight for well construction
- Selected intervals for zonal testing in the pilot borehole, monitored water quality parameters, and collected samples for lab analyses
- Specified procedures for decommissioning selected old wells; oversaw and approved decommissioning
- Managed contractors who installed and operated test pumps, conducted video surveys, and performed minor well rehabilitation
- Prepared technical specifications for drilling, constructing, developing, and testing the new supply wells
- Prepared submittals for well and de minimus discharge permits
- Modeled the potential impacts of pumping on nearby wells to help site potential new wells



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(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> Well Feasibility Evaluation for the Grand Canyon National Park Airport (Tusayan, AZ)	b. YEAR COMPLETED: 2014	
	PROFESSIONAL SERVICES: 2014	CONSTRUCTION <i>(If applicable)</i>

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER ADOT / Grand Canyon National Park Airport	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT: \$61,600	e. TOTAL COST OF PROJECT \$63,800
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i. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

The Grand Canyon National Airport is currently served by privately owned wells in the nearby town of Tusayan. To eliminate dependency on this external water source, ADOT wanted to locate a new production well on airport property. This well would need to meet an estimated demand of about 30 gpm from the R-aquifer, which occurs about 2,400 feet below land surface at airport. M&A conducted a feasibility study and evaluated locations for a deep production well. At the client's request, subsurface hydrogeologic features were identified using controlled source audio-frequency magnetotellurics (CSAMT), a geophysical tool. M&A teamed with Zonge International, Inc., to acquire and process the CSAMT data.

Based on the results of the CSAMT survey and hydrogeological data, M&A recommended preferred well locations.

- Compiled and reviewed published literature on the hydrogeology of the airport area
- Proposed profile lines for the CSAMT survey and verified their locations in the field to ensure the survey's success
- Assessed the feasibility of installing a well in the R-aquifer
- Reviewed and interpreted CSAMT profiles
- Prepared a site evaluation report summarizing the results of the survey and recommending preferred well locations



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5. EXAMPLE PROJECTS WHICH BEST ILLUSTRATE PROPOSED TEAM'S QUALIFICATIONS FOR THIS CONTRACT

(Present no more than five (5) projects. Complete one Section 5 for each project.)

a. TITLE AND LOCATION <i>(City and State)</i> Analyzing Trends in Residential Water Demand (Pima County, AZ)	b. YEAR COMPLETED: 2015	
	PROFESSIONAL SERVICES: 2015	CONSTRUCTION <i>(If applicable)</i>

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Southern Arizona Water Utilities Association, Tucson Water, Bureau of Reclamation, Metro Water, Community Water Company of Green Valley, CAP, ADWR	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT: \$94,000	e. TOTAL COST OF PROJECT: \$94,000
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j. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

Long-term declines in household-level water demand in Pima County have created uncertainty for municipal providers, wholesalers, wastewater facilities, and regulators. This trend poses numerous planning challenges, as it impacts decisions about implementing capital improvements, acquiring new supplies, setting rates, designing conservation programs, and using reclaimed water. M&A is providing expertise to evaluate the principal causes, likely extent, and long-term effects of this declining residential demand. Over a dozen potential factors of declining demand were reviewed, with three indoor demand factors and three outdoor factors receiving detailed analysis. The indoor factors we examined included clothes washers, which have become more efficient and widespread; seasonal populations, which are growing; and "house flipping," which results in the conversion of older appliance and fixtures to new, more efficient ones. The outdoor factors we analyzed have included the replacement of evaporative coolers with refrigerative air conditioning and the triggers for these conversions. We also examined the effects of changing landscape tastes on irrigated turf and trends in backyard swimming pool use, size, and covers.

This project was featured an *Arizona Daily Star* article: http://azstarnet.com/news/local/our-water-demand-is-dropping-as-our-love-of-turf/article_51348b8f-6fd4-590a-89cc-0961da6dde16.html

Services included:

- Investigating the factors that underlie the declining water demand
- Estimating rates of future change
- Developing a dynamic simulation model to forecast demand and test scenarios



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6. ADDITIONAL INFORMATION

a. PROVIDE ANY ADDITIONAL INFORMATION YOU FEEL MAY BE NECESSARY TO DESCRIBE YOUR FIRMS QUALIFICATIONS. (ATTACH ADDITIONAL SHEETS AS NEEDED.)

M&A offers services in the areas of Water Supply & Recharge, Environmental Hydrogeology, Water Policy & Economics, and Mining Hydrogeology. We also offer capabilities in groundwater flow modeling and instrumentation and monitoring.

Water Supply & Recharge: We have over 30 years of experience developing sustainable water supplies — including Assured & Adequate Water Supplies — for municipal, industrial, and irrigation purposes in Arizona’s most hydrologically complex and arid environments. Our services include characterizing hydrogeologic conditions, identifying potential sources and optimal sites for new groundwater supplies, designing programs for installing wells, establishing sustainable yields, and optimizing pumping regimes. We also offer a range of design, construction oversight, and testing services for new wellfields. In addition, M&A is a leader in developing aquifer recharge and recovery solutions for CAP water, surface water, and effluent. We can assess the technical feasibility of recharge at selected locations and rank sites in the context of hydrogeologic conditions, costs, and other key criteria.

Environmental Hydrogeology: M&A has extensive experience assessing and remediating subsurface contamination (in groundwater, the vadose zone, and soils) at federal and state Superfund sites. We specialize in developing models to project contaminant behavior and evaluate effective remedial strategies in complex hydrogeologic environments. Our experience spans both traditional pump-and-treat and soil-vapor extraction to innovative, *in situ* remediation approaches.

Water Policy & Economics: M&A helps clients develop their water resources portfolio to ensure the long-term viability of their facilities, projects, and communities by considering policy, economic, and technical factors. We also offer unique capabilities in water demand analysis and forecasting and have models to forecast water demand for many major municipalities. In addition, we provide a sound technical foundation for negotiations and legal proceedings involving water rights, stream adjudications, and other water-related disputes.

Mining Hydrogeology: M&A provides testing, monitoring, and modeling support to clients who want to develop new mining operations or expand existing ones. We have experience conducting hydrogeologic investigations to support the EIS process, developing data and analyses that not only document existing conditions but also project impacts to water resources and the environment.

Hydrologic Modeling: M&A has one of the largest, most experienced modeling teams in the Southwest. We use hydrologic models for a range of applications: to predict the impacts of pumping on surface water and groundwater resources, to assess recharge feasibility, and to identify dewatering requirements. Our models also allows us to predict the source, fate, and transport of vadose zone and groundwater contamination; evaluate alternate mitigation strategies; design remedial actions; and allocate environmental liability for litigation support. We use a variety of modeling tools, including MODFLOW, MODFLOW-USG, MODPATH, FEFLOW, PEST, MODFLOW-SURFACT, and others.

In addition, we have extensive experience developing Leapfrog geologic models and GoldSim dynamic simulation models.

Instrumentation & Monitoring: M&A designs systems for measuring and recording water levels, barometric pressure, flow rates, injection rates, and water-quality parameters in groundwater, as well as for measuring and recording various environmental indicators at the surface and in the vadose zone. We collect and store sensor data using dataloggers and make data available on demand or at scheduled intervals via telemetry and manual downloads. We can also host web-based, user-friendly data portals so facility operators and managers can access real-time field data.

7. ANNUAL AVERAGE PROFESSIONAL SERVICES REVENUES OF FIRM FOR LAST 3 YEARS

a.	Percentage of Total Work Attributable to State, Federal and Municipal Government Work:	< 5%
b.	Percentage of Total Work Attributable to Non-Government Work:	>95%

8. AUTHORIZED REPRESENTATIVE. The foregoing is a statement of facts.

Signature: Mark M. Cross

Date: December 21, 2015

Name: Mark Cross Title: President