



ATTACHMENT I – General Qualifications
ANNUAL REQUEST FOR QUALIFICATIONS AND EXPERIENCE NO:
ADSP015-00004729

STATE PROCUREMENT OFFICE
Department of Administration
100 North 15th Avenue, Suite 201
Phoenix, Arizona 85007

(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:	Engineering & Geologic Water & Wastewater Services, LLC dba Fluid Solutions
b.	FIRM (OR BRANCH OFFICE) STREET:	2727 N Third Street, Suite 300
c.	FIRM (OR BRANCH OFFICE) CITY:	Phoenix
d.	FIRM (OR BRANCH OFFICE) STATE:	Arizona
e.	FIRM (OR BRANCH OFFICE) ZIP CODE:	85004
f.	YEAR ESTABLISHED:	1998
(g1)	OWNERSHIP - TYPE:	LLC
(g2)	OWNERSHIP - SMALL BUSINESS STATUS:	Yes
h.	POINT OF CONTACT NAME AND TITLE:	Norm Fain, III
i.	POINT OF CONTACT TELEPHONE NUMBER:	602-707-7777
j.	POINT OF CONTACT E-MAIL ADDRESS:	rfain@flusol.com
k.	NAME OF FIRM (If block 1a is a branch office):	



3. PROFILE OF FIRM'S EXPERIENCE AND ANNUAL AVERAGE REVENUE FOR LAST YEAR

a. Approximate No. of Projects	b. Experience	c. Revenue Index Number (see below)
6	Construction Management	1
7	Cost Estimating; Cost Engineering and Analysis; Parametric Costing; Forecasting	1
2	Design-Build - Preparation of Requests for Proposals	1
5	Forensic Engineering	1
6	Hydraulics and Pneumatics	1
1	Infrastructure	1
2	Pipelines (Cross-Country - Liquid and Gas)	1
4	Plumbing and Piping Design	1
4	Rehabilitation (Buildings; Structures; Facilities)	1
1	Sewage Collection, Treatment and Disposal	1
4	Specifications Writing	1
1	Value Analysis; Life-Cycle Costing	1
5	Water Resources; Hydrology; Ground Water	1
6	Water Supply; Treatment and Distribution	1
2	Waste Water Treatment Facility	1
4	Water Well Rehabilitation; Water Well Work	1

PROFESSIONAL SERVICES REVENUE INDEX NUMBER

- | | |
|---|---|
| 1. Less than \$100,000 | 6. \$2 million to less than \$5 million |
| 2. \$100,000 to less than \$250,000 | 7. \$5 million to less than \$10 million |
| 3. \$250,000 to less than \$500,000 | 8. \$10 million to less than \$25 million |
| 4. \$500,000 to less than \$1 million | 9. \$25 million to less than \$50 million |
| 5. \$1 million to less than \$2 million | 10. \$50 million or greater |



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

a. NAME Norm Fain, III	b. ROLE IN THIS CONTRACT Principal Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 30	2. WITH CURRENT FIRM 16
d. LOCATION (City and State) Fluid Solutions, Phoenix, AZ			
e. EDUCATION (DEGREE AND SPECIALIZATION) B. Sc., Civil Engineering Technology Northern Arizona University, 1984		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Engineer, Civil, Arizona (#25969) 1992 Licensed General Engineering Contractor, Arizona (#127525) 1998	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) Associations: Arizona Water Association; Water Environment Federation; American Water Works Association Publications: "Wastewater A Resource"; Arizona/Nevada Academy of Science "The Future of Wastewater in Goodyear Arizona - Treatment and Use"; Water Environmental Federation, American Water Works Association, Arizona Water Pollution Control Association (Arizona Water Association) "Protection of Base Flows of the San Pedro River"; American Public Works Association (Arizona Chapter), Arizona Water Pollution Control Association (Arizona Water Association)			

H. RELEVANT PROJECTS

	(1) TITLE AND LOCATION (City and State)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
1.	Eastern Arizona College Water Resources Development Thatcher, AZ (3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Development of a water resource solution for both potable and non-potable needs on campus. The final effort will provide resource redundancy and capacity for campus expansion. Through geophysical mapping, potential well sites were identified, however, none of the sites proved to be viable. The current approach is to purchase an existing well, connect into Graham County Utilities, and design pipeline to deliver potable water to the campus, as well as design and construct a potable and nonpotable storage facility. ROLE: Principal Engineer COST: Completed Phase \$144,315; Current Phase \$161,700. The project was started in February 2014 and should be completed by mid 2015.	XX	Check if project performed with current firm
2.	Marana High School WWTP Rehabilitation Marana, AZ (3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The high school's WWTP was not in compliance with requirements of the issued Aquifer Protection Permit (APP). Project tasks included reviewing historical flow and quality data; preparing process calculations and design report; preparing plans for permitting that entail site, basin, pumping systems and electrical; post design efforts to obtain County Approval to Construct. ROLE: Principal Engineer Cost: \$47,910 The job is 64% complete.	XX	Check if project performed with current firm
3.	Verrado Hydraulic Design Buckeye, AZ (3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The client wishes to install a lake fill system on a new golf course in the Verrado project. Fluid Solutions was selected as a subconsultant to design the hydraulics. The design includes PRV valve, integrated hydraulic float, and joint restraint. ROLE: Project Engineer COST: \$4,460 The job is 72% complete.	XX	Check if project performed with current firm
4.	Wickenburg High School WWTP Evaluation Wickenburg, AZ (3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The school has been experiencing problems with its existing wetlands based treatment plant. General issues include plugging of pipelines, failing wetland cell liners, improvements to carbon supply, and improvements to thin/replace wetland species. Our review identified the following corrective matters: install new septic tank filters, liner repair, and cleaning of existing pipes feeding the wetland cells. The school has requested activity to take place during the summer break. ROLE: Principal Engineer COST: \$7337 The evaluation was completed and recommendation memo was submitted in December 2014.	XX	Check if project performed with current firm
5.	New Municipal Well Gila Bend, AZ (3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The Town has a well field that consists of three wells, a storage reservoir, and a reverse-osmosis treatment plant. The Town desires to install a fourth well. The phases in this project involve geologic investigations and developing drilling specifications; obtaining ADWR drill permit, drilling oversight and sampling; well development and pump testing; and design of the infrastructure, including well pump, well head and transmission lines. The project was started in 2013, but put on hold due to federal funding issues. It restarted in January of 2014 and the well is complete. Only the New Source Approval from the County remains open. ROLE: Principal Engineer COST: \$107,398	XX	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 David Heighway	b. ROLE IN THIS CONTRACT Project Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 24	2. WITH CURRENT FIRM 8
d. LOCATION (City and State) Fluid Solutions, Phoenix, Arizona			
e. EDUCATION (DEGREE AND SPECIALIZATION) B. Sc., Civil Engineering Rose-Hulman Institute of Technology, 1982		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Engineer, Arizona (#46334) 2007 Professional Engineer, Illinois (#062-049139) 1994 Professional Engineer, Indiana (#19700474) 1997	
g. OTHER PROFESSIONAL QUALIFICATIONS (Organizations, Awards, etc.) Associations: Arizona Water Association; American Water Works Association			

H. RELEVANT PROJECTS

	(1) TITLE AND LOCATION (City and State)	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
1.	Copper Rim Elementary School Booster & Tank Evaluation & Rehab Globe, AZ		
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The 33 year old 300,000-gallon water storage tank was in need of repair, ie spot welding, blasting and recoating interior and exterior, and repairing of gauges. After evaluation of the booster station was completed, we concluded mechanical system, electrical system, and control and monitoring improvements were necessary. The booster station rehabilitation is currently progressing. Design portion is 65% complete; Construction portion is 46% complete. ROLE: Project Engineer; COST: \$749,980	XX	Check if project performed with current firm
2.	Quartzsite Elementary School Well & Tank Investigation & Rehab Quartzsite, AZ	2014	
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Following test pumping, a well video, data analysis, and engineering calculations, improvements to the non-potable water system of the school were identified. Wells require capping, cleaning and/or equipping. The existing storage tank needs to be demolished and replaced with a new tank, and piping modified to incorporate the new tank. Booster and Jockey pumps need replacing. ROLE: Project Engineer. COST: Professional Services: \$28610 Construction: \$83,845 (8% complete)	XX	Check if project performed with current firm
3.	Pueblo Del Sol Water Co Well #5 Permitting Sierra Vista, AZ	2014	
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE ADEQ issued a deficiency letter in 2004 which remained unaddressed. Since the original Approval to Construct expired in 2005, the process of permitting the well equipping had to be resubmitted. We collected historic water quality data; submitted the necessary ADWR files; requested variances for slope of slab and casing; updated all plans and drawings; prepared new ATC and AOC forms to ADEQ. ROLE: Project Engineer COST: \$9140	XX	Check if project performed with current firm
4.	Linden Elementary School Septic System Show Low, AZ	2014	
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE The school's septic system failed to meet ADEQ's nitrogen reduction requirements. Fluid Solutions was contracted to meet with ADEQ to determine if calculations could be modified to meet requirements. It was determined that the system's total nitrogen load has to be reduced. While our original contract with the school is complete, we have submitted a report detailing 4 alternatives, ie, no change and face fines and fees, reduce student count, add acreage, or add treatment to the septic system. The estimated construction and engineering costs for treatment range from \$412K to \$531K. We are waiting for the school and state school facilities board to make its decision. ROLE: Project Engineer COST: \$10,705	XX	Check if project performed with current firm
5.	Austin Ranch Water Master Plan; Site Plans, Construction Documents Surprise, AZ		
	(3) BRIEF DESCRIPTION (Brief scope, size, cost, etc.) AND SPECIFIC ROLE Update Water Master Plan originally prepared in 2007 with revised modeling; prepare site plans and construction documents for three well and one water storage facility for City of Surprise approval. Project is 85% complete. ROLE: Project Engineer COST: \$130,054	XX	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 (City and State) Marana High School WWTP Rehabilitation Marana, AZ	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES	CONSTRUCTION (If applicable)

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Marana Unified School District #6	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$47,910	e. TOTAL COST OF PROJECT 64% complete – project will be completed on budget
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f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

The high school expanded in the early 2000's, resulting in the need to expand the ability to treat sewage and reduce the negative impacts on the aquifer. The plant has not performed to its expected level, resulting in regulatory violations and a consent order requiring aquifer protection be restored. Hydraulic capabilities exceed the build-out needs of the school, but sewage flows are at or near zero over half of the time, which contributes to the inability of the plant to meet permit conditions.

The final work product is a design report identifying operational and process modifications. The report is completed and plans are being prepared for permitting.

The design report summarized the following recommendations:

- 1) Install a return activated sludge pumping system that allows for operational adjustments. This will improve both carbonaceous and nitrification capabilities.
- 2) Install an internal recycle system to return nitrified liquor to the anoxic basin to achieve denitrification.
- 3) Upgrade the existing carbon feed system to feed microorganisms during periods the school is not producing carbons.

The estimated Project Capital Cost is \$160,200.

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 (City and State) Well, Storage, and Booster Station Repairs Aguila, AZ	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES 2012	CONSTRUCTION (If applicable) 2013

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Aguila Elementary School District#63	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$583,324	e. TOTAL COST OF PROJECT \$583,324
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g. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

The school needed to develop a reliable potable water supply with redundant storage. We recommended drilling a replacement well, installing redundant piping, and replacing a booster pump motor.

The existing well was constructed in 1968 using thin walled pipe. The alternatives were deepening the existing well or replacing it with a new deeper well. Although deepening the existing well was the less expensive solution there was a strong possibility of compromising the thin casing. The recommended alternative was to drill a new replacement well near the existing well. The estimated cost was \$403,221.

The storage capacity was limited and had no redundancy. Without redundancy, well failure could shut the school down until a well pump could be pulled and replaced. Piping between an existing potable tank and a fire storage tank was designed and constructed for \$174,174.

Evaluation of the existing booster pump revealed that the newest pump worked well, but the older pump was in decline and should be replaced. The older pump was retained for short-term emergency use, and can be fully rebuilt, providing the school with a spare pump motor in the future. Pump modifications totaled \$5929.



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

a. TITLE AND LOCATION (City and State) Well Abandonment Services Maricopa and Gilbert, AZ		b. YEAR COMPLETED	
		PROFESSIONAL SERVICES	CONSTRUCTION (If applicable)
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER Meritage Homes	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$22,585	e. TOTAL COST OF PROJECT 50% complete – project will be completed on budget	

f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

Well abandonment rules are governed by ADWR. There are three distinct phases.

Phase 1 is submitting a Change of Ownership to ADWR for the existing well (if the land was purchased from another party).

Phase 2 consists of obtaining a "Drill Card" form ADWR, preparing a diagram of the existing well construction; preparing a cross-section depicting groundwater strata, review of aquifer water quality conditions, a video log of the well; determining approach for abandoning the well, preparing a set of bidding documents, and preparing the Notice of Intention to Abandon a Well.

The final phase is oversight of the construction to abandon the well which includes review of construction for conformance with contract documents and preparation of record drawings of completed work.

The Gilbert well was successfully abandoned in 2013 and the process has just begun for the Maricopa well.

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 (City and State) Buckeye Hills Shooting Range Design Services for Water System Buckeye, AZ		b. YEAR COMPLETED	
		PROFESSIONAL SERVICES 2013	CONSTRUCTION (If applicable)
23. PROJECT OWNER'S INFORMATION			
c. PROJECT OWNER Maricopa County	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$23,066	e. TOTAL COST OF PROJECT \$23,066	

g. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

We were subconsultant to Hoskin-Ryan Consultants for design, permitting and construction services for the water system disinfection improvements at the Buckeye Hills Shooting Range operated by Maricopa County. The system used a tablet chlorinator at the well, but due to warm weather and large unused storage volume, there was little or no chlorine residual at the users tap. The objective was to develop a solution to maintain a disinfection residual at the water tap while insuring the operating system remains sanitary.

Specific tasks included verification of separation of the existing fire and potable water distribution systems and collecting data from existing booster and well pumps; preparation of a design report and plans suitable for permitting with County Environmental Services, detailing the disinfection approach for both the well and tank sites; permitting services to obtain Approval to Construct and Approval of Construction, including Operations & Maintenance Manual and Record Drawings of the completed project; and site progress reviews, substantial completion and final completion reviews.



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

a. TITLE AND LOCATION (City and State) Austin Ranch Water Master Plan Update, Site Plans, and Construction Documents Surprise, AZ	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES	CONSTRUCTION (If applicable)

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER Courtland Homes	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$112,455	e. TOTAL COST OF PROJECT
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f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)

Fluid Solutions completed a water master plan for the Austin Ranch development in 2008. A participating developer subsequently dropped out of the project requiring modifications and updates to the master plan. Major changes included location of storage tanks, pipe sizes, system pressures, and reliability of distribution of water. A summary of required tasks includes updating storage needs for each phase of the project including average, maximum, and peak day data; updating storage needs for each phase, updating water resources based on new drilling data, and updated capital costs and recommendations. Water modeling using WaterGEMS was completed for each phase. Site plans and construction drawings for three well sites and one water storage facility were prepared for submittal to the City of Surprise. There have been two change of scopes adding \$17,600 to the original budget. We are in discussions now regarding a third change of scope. Project was begun in the fourth quarter of 2013 and is expected to be completed in the first quarter of 2015. The job is 80% complete, pending the possible third change of scope.

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 (City and State)	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES	CONSTRUCTION (If applicable)

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT
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g. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)



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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.)

See Attached Sheet

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:	9%
b. Percentage of Total Work Attributable to Non-Government Work:	91%

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

Signature: [Handwritten Signature]

Date: December 11, 2014

Name: Norm Fain III

Title: Member

Environmental Compliance Services

Permitting Compliance

- Arizona Aquifer Protection Permits (APP)
- Reuse Permits
- Arizona Pollution Discharge Elimination Permits (AZPDES)
- Arizona Underground Water Storage Permits
- Permit Reviews & Renewals

Regulatory Compliance

- Federal Regulations (CWA, SDWA, RCRA, CERCLA)
- Source Water Protection
- Compliance Analysis, Plans, and Implementation

Investigation and Remediation

- Environmental Site Assessments
- Site Characterization Investigations for Hazardous Substance Releases
- Soil and Groundwater Remediation

Third Party Technical Review

Review Services

- Environmental Issues
- Hydrologic Conditions
- Value Engineering

Expert Witness Services

- Litigation Support
- Cost/Contamination Responsibility Allocation
- Technical Review & Opinion
- Contaminant Transport Modeling
- Water Rights
- Groundwater/Surface Water Interactions
- Hydrology/Hydrogeology/
Geomorphology

Contracting Services

Construction Services

- Turn-key Solutions
- Design/Build Capabilities

Water Resource Management

Water Rights

- Applications and Registrations
- Annual Reporting
- Adjudication Support
- Water Use Contract Negotiations

Resource Planning

- Assured Water Supply and Water Adequacy Studies
- Municipal Service Area Supplies and Rights
- Hydrologic/Hydraulic Modeling
- Conservation Plans
- Demand Studies
- Water Budget Analysis
- Groundwater Recharge
- River System Analysis

Supply Development

- Well Location using Surface Geophysics
- Well Site Identification, Well Design, and Aquifer Testing
- Spring Analysis and Collection System Design
- Surface Water Analysis
- Water Rights Appraisal
- Physical/Legal Availability Analysis
- Water Rights Conversion
- Rate Analysis and Development

System Planning and Management

- Master Planning
- Distribution System Modeling and Mapping
- Disinfection System Modeling
- Operations Optimization

Supply Augmentation

- Reclaimed Water Reuse/Recharge
- Reuse/Recharge Master Planning
- Development Guidelines
- Reuse Distribution
- Water Balance and Storage Requirements
- Groundwater Recharge and Recovery Pilot Studies and Facilities Design

Engineering Services

Water System Analysis

- Distribution Modeling
- Disinfection Modeling
- Plant-In-Service Inventory and Valuation
- Operations Optimization

Water System Design

- Wells, Spring Collection, and Surface Water Intakes
- Pipelines and Booster Stations

Water Treatment Design

- Well Head Treatment
- Surface Water Treatment
- Membrane Filtration
- Disinfection
- Corrosion Control

Wastewater System Analysis

- Static & Dynamic Collection System Modeling
- Collection System Master Planning
- Plant-In-Service Inventory and Valuation

Wastewater System Design

- Gravity Sewers
- Lift Stations & Force Mains
- Odor Control Systems

Wastewater Treatment Design

- Mechanical Treatment Systems
- Natural Systems, Lagoons & Wetlands
- Nutrient Removal
- Septage Receiving
- Biosolids Treatment
- Odor Control Systems
- Individual Septic Based Systems
- Corrosion Control and Remediation



Specialization:

Civil and Sanitary Engineering with focus on Water and Wastewater Treatment, Reuse, Recharge, Collection Distribution, and Master Planning

Thirty years experience providing civil and sanitary engineering services for public and privately owned projects. Experience in evaluation, design, rehabilitation, and construction services for water and wastewater systems. Mr. Fain is the founding member of Fluid Solutions, founded in 1998. Prior to 1998, experience included other consulting firms, Morton Salt, and Shamrock Water Company.

Education

B.Sc., Civil Engineering
Technology, Northern Arizona
University, 1984

Professional Registration

Professional Engineer, Arizona
(#25969)

Licensed General Engineering
Contractor, Arizona
(#137525)

Professional Associations

Arizona Water Association
Water Environment Federation
American Water Works Association

Total Years Experience: 30

Years with Fluid Solutions: 16

Publications:

"Wastewater, A Resource",
Arizona/Nevada Academy of Science

"The Future of Wastewater in
Goodyear, Arizona - Treatment and
Use", Water Environment Federation /
American Water Works Associations /
Arizona Water Pollution Control
Association (Arizona Water
Association)

"Protection of Base Flows of the San
Pedro River", American Public Works
Association - Arizona Chapter / Arizona
Water Pollution Control Association
(Arizona Water Association)

Relevant Project Experience

Hydraulic Analysis & Cost Analysis, Central Arizona Water Conservation District

Engineering Manager. Performed and managed hydraulic analysis and capital and life cycle cost analysis for the Central Arizona Water Conservation District for the purpose of recharging excess water for future recovery as water supplies dictate.

Utility Assistance, Multiple Projects

Utility assistance includes integrity evaluation, reconstruction costs for system valuation, master planning, system integrity evaluation for rate studies, and utility formation for water and wastewater systems. Utility master plans and development guidelines have been prepared for individual projects through entire communities.

Water Resource Development, Storage and Booster Stations, Multiple Projects

Engineering Manager. Evaluation, design, and rehabilitation of new and existing wells to meet client needs. Development of springs, stream and canal intakes, and lakes. Projects include work for State of Arizona, Counties, Cities, Towns, Mines, Golf Courses, and Developers. Wells ranging from 100 feet to over 3000 feet deep. Submersible and vertical turbine well pumps. Storage facilities ranging from 10,000 gallon tanks through 10,000,000 gallons in capacity. Booster stations from less than 10 gpm through 83,000 gpm.

Analysis and Design of Water Treatment Systems for Drinking Water and Process Water

Engineering Manger. Evaluation of water quality for safe drinking water and for process water needs. Technologies include blending, adsorption, ion exchange, coagulation/flocculation, filtration, and disinfection. Design of facilities to meet specific water qualities removing select chemical characteristics as necessary for the desired use of the water.

Water and Wastewater Systems Odor and Corrosion Control, Multiple Projects

Engineering Manager. Odor and corrosion control and remediation facilities have been completed for both water and wastewater systems. Improvements have ranged from chemical and biochemical odor mitigation



solutions to odorous and corrosive gases in both water and wastewater supplies.

Analysis and Design of Wastewater Collection, Treatment, Reuse and Recharge Systems

Collection system design, planning, modeling, and flow testing for various sized communities. Sewers have ranged in size from 4-inch low pressure systems to 54-inch gravity systems.

Treatment efforts are based on the end use of the effluent. Treatment methods include mechanical systems, natural systems, and septic systems for wastewaters ranging from industrial to domestic. Treatment plants have ranged from 2,000 gallons per day to 21 million gallons per day.

Reuse, recharge and discharge are the typical methods of disposal. Reuse systems may assist in disposal of water treatment plant brines when mixed with with class A+ effluents for consumptive use on vegetation and recreational lakes. Recharge systems have included evaluation of deep wells, vadose zone wells, and infiltration systems. Successful designs of surface and subsurface infiltration systems throughout Arizona.

Experience in planning, modeling, master planning and design of various systems ranging from small subdivisions to entire Cities.

Construction and Construction Management of Infrastructure Installation

Engineering Manager. Performance of construction services including contractor meetings, questions, shop drawing reviews, record drawings, and field reviews. Capabilities also include providing full service design build solutions integrating our design and construction capabilities.

Construction Capabilities

Construction capabilities include turn-key and design build solutions for clients in both water and wastewater systems. Recent design-build experience includes wastewater treatment plants, water treatment plants, wells, storage tanks, and pipelines.

Expert Witness & Legal Support

Expert witness and legal support has been provided for both water and wastewater projects. Historic projects included nuance odor compliant resolution, utility condemnation dispute resolution, infrastructure improvements dispute resolution and testimony in condemnation cases.



DAVID A. HEIGHWAY, P.E., PROJECT ENGINEER

Specialization:

Civil and Sanitary Engineering
with focus on Water and
Wastewater Distribution,
Collection, and Master Planning

Twenty-four years of civil and sanitary engineering experience providing public- and privately-owned water, wastewater, and storm water projects to meet Local, State, and Federal requirements.

Relevant Project Experience

Water

Water distribution system design and modeling have been completed on mains from 2- to 66-inch diameter.

Water Treatment Facilities for groundwater and surface water have been designed for facilities from 35 gpm to 14.0 MGD.

Residuals disposal using land application and landfilling have been designed.

Wastewater

Wastewater experience includes analysis, planning and design of wastewater collection systems, pump stations, treatment facilities, and disposal/reuse facilities.

Collection systems: 8-inch to 48-inch, including areas with existing buildings

Pump stations: 100 gpm to 3.2 MGD.

Force Mains: 4-inch to 24-inch.

Wastewater Treatment Facilities include new construction and upgrades for mechanical treatment facilities ranging from 10,000 gpd to 2.5 MGD.

Effluent disposal projects include discharge reuse and reclamation.

Biosolids disposal includes land filling and land application projects.

Individual systems for commercial facilities without access to public sewers.

San Carlos Unified School District, High School Campus Master Plan, 2010

The school's expanding High School Campus required improvements to the water infrastructure. This included redundancy in the well supply and storage tanks. The Master Planning provided a framework for the District to make improvements to the infrastructure. A pilot well was designed and drilled to provide water quality data for the underground water supply.

Stanfield Elementary School District #24, Stanfield, Pinal County, Arizona, Water Storage Tank Replacement, 2009

Stanfield had two storage tanks with one reaching the end of its useful life. A replacement tank was designed to provide the redundancy and storage volume required. Changes in seismic codes required modification of the remaining existing storage tank to allow the two tanks to work hydraulically together.

Palo Verde Elementary School District #49, Palo Verde, Maricopa County, Arizona, Water Well Rehabilitation and Water System Improvements, 2009

Palo Verde Elementary School had problems with the sediment from their well plugging their RO system filters. The well was modified to screen the majority of the sediment. The water storage tank was cleaned and

Education

B.Sc., Civil Engineering

Rose-Hulman Institute of
Technology

Professional Registration

Professional Engineer, Arizona
(#46334), Illinois (#062-049139),
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Professional Associations

Arizona Water Association

American Water Works Association

Total Years Experience: 24

Years with Fluid Solutions: 8



disinfected with a back-up booster pump installed for redundancy. During the upgrades, the hydropneumatic tank required replacement. All work was completed without interrupting the school calendar.

American West Quarter Horse Ranch, Rio Verde, Maricopa County, Arizona

An investigation of the existing water and septic system was completed to identify the areas where improvements were needed to convert the water system to a Public Water Supply. Improvements were designed to allow this upgrade so that the Ranch could host public events throughout the year.

Valencia Water Company, Buckeye, Maricopa County, Arizona

Mr. Heighway was involved with numerous projects for Valencia Water Company in 2006 and 2007. These included providing blending plans for Schult and Sonoran Vista, Design of the Arizona Machinery Water Well and Storage Tank, and Water System Model Updates.

Saddle Mountain Unified School District #90, Design-Build of 0.42 MGD WWTP with Recharge and Reuse

Modification of the initial design and construction of a complete mix, multi-stage biological nutrient removal treatment plant that had been abandoned by the initial contractor during construction of the high school. This project updated the design to meet newer regulatory standards.

Stanfield Elementary School District #24, Stanfield, Pinal County, Arizona, Septic System Improvements

Failing leach pits caused Stanfield Elementary to be out of compliance with environmental regulations. Fluid Solutions designed and installed a septic system with effluent pumps, a new septic system for the pre-school buildings, and a replacement leach field for the cafeteria and library buildings. Reuse of existing facilities to the extent possible helped minimize costs to the school.

Palo Verde Elementary School District #49, Palo Verde, Maricopa County, Arizona, Grinder Station Improvements

Improvements were designed into the control systems of the grinder station to reduce or eliminate the frequency at which these pumps were failing. No failures have been reported since completion of this upgrade.