



ATTACHMENT I – General Qualifications

ANNUAL REQUEST FOR QUALIFICATIONS AND EXPERIENCE NO:  
ADSP015-00004729

STATE PROCUREMENT OFFICE  
Department of Administration  
100 North 15<sup>th</sup> 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:	Tetra Tech Inc. (DIV)
b. FIRM (OR BRANCH OFFICE) STREET:	4801 E. Broadway Blvd., Suite 521
c. FIRM (OR BRANCH OFFICE) CITY:	Tucson
d. FIRM (OR BRANCH OFFICE) STATE:	Arizona
e. FIRM (OR BRANCH OFFICE) ZIP CODE:	85711

f. YEAR ESTABLISHED:	1966
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(g1). OWNERSHIP - TYPE:	Corporation
(g2). OWNERSHIP - SMALL BUSINESS STATUS:	N/A

h. POINT OF CONTACT NAME AND TITLE:	Doug Lantz, PhD, PE, PH
i. POINT OF CONTACT TELEPHONE NUMBER:	(520) 623-7980
j. POINT OF CONTACT E-MAIL ADDRESS:	doug.lantz@tetrattech.com

k. NAME OF FIRM (If block 1a is a branch office):	Tetra Tech, Inc.
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**2. EMPLOYEES BY DISCIPLINE**

a. Discipline Title	b. Function: Primary (P) or Secondary (S)	c. No. of Employees - Firm	d. No. of Employees - Branch
CADD Technician	P	158	1
Civil Engineer	P	721	3
Environmental Scientist	P	247	1
Hydraulic Engineer	P	115	1
Project Manager	P	829	1
Other	P	12,430	2
<b>Total</b>		14,500	9





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

a. NAME Jonathan Elslager, PE, CFM	b. ROLE IN THIS CONTRACT Civil Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 10	2. WITH CURRENT FIRM 10
d. LOCATION <i>(City and State)</i> Tetra Tech (WTR) - Tucson, Arizona			
e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> BS, Civil Engineering, University of Arizona, 2004		f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Civil Engineer, Arizona #49108 Certified Floodplain Manager US-11-06091	
g. OTHER PROFESSIONAL QUALIFICATIONS <i>(Organizations, Awards, etc.)</i>			

Mr. Elslager is professional engineer in Arizona and certified floodplain manager. Mr. Elslager has over 10 years of experience in analysis and design of Water Resource and Flood Control projects including projects in a wide variety of environments across the US. Mr. Elslager's wide range of Hydrologic and Hydraulic experience includes channel, dam and levee design, rehabilitation and certification, stream restoration, scour and sediment transport studies, forensic flooding investigations, Hydrology reports, and FEMA submittals. Mr. Elslager's background is in the utilization of computer/numerical modeling techniques to determine solutions to complex engineering problems in the areas of hydrology, hydraulics, and sediment transport. Mr. Elslager's proficiency in numerous hydrology, hydraulic and sediment transport software programs combined with the added proficiency in the use of GIS and CADD software allow for the graphical integration of numerical modeling results for incorporation into various planning and design documents. Mr. Elslager also has developed final construction documents based on results of computer/numerical modeling including plans and project specifications for projects ranging in size from less than \$10,000 to over \$10 million.

**H. RELEVANT PROJECTS**

1.	(1) TITLE AND LOCATION <i>(City and State)</i> <b>Buckeye Flood Retarding Structure No. 1 Final Design, Maricopa County Flood Control District, Buckeye, Arizona</b>	(2) YEAR COMPLETED	
		Professional Services Ongoing	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Engineer responsible for unsteady HEC-RAS analysis, preparation of construction drawings, special provisions, quantities, and cost estimates for the Phase I and Phase 2A and 2B design. Design included a new Soil-Cement auxiliary spillway and evaluation of the option to use Soil-Cement or RCC to configure a gated closure at the inlet to dam to prevent loss of the floodpool storage in the event of a breached levee in the upstream inlet channel. Design also included the identification of areas that required temporary construction easements to complete the final re-grading of the auxiliary spillway exit channel. During the Design phase an evaluation was also completed of the proposed regional transportation corridors and potential conflict with existing utilities.	<input checked="" type="checkbox"/> Check if project performed with current firm	
2.	(1) TITLE AND LOCATION <i>(City and State)</i> <b>Tucson Drainage Dam Breach Inundation Modeling, Pima County Regional Flood Control, Tucson, AZ</b>	(2) YEAR COMPLETED	
		Professional Services 2014	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Project Manager and Engineer responsible for unsteady HEC-RAS and FLO-2D modeling of a series of cascading dam breach scenarios for the Park Avenue Detention Basins 1, 2, and 3, and the Cherry Field Basin. The modeled area was over 3-square miles and included the city center and surrounding metropolitan area.	<input checked="" type="checkbox"/> Check if project performed with current firm	
3.	(1) TITLE AND LOCATION <i>(City and State)</i> <b>Gravel Pit River Mechanics Study and Headcut Reclamation &amp; Mitigation Design Plans, CEMEX USA Pinal County, Arizona</b>	(2) YEAR COMPLETED	
		Professional Services 2014	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Engineer/Project Manager for a river mechanics study that included Hydrologic Analysis, Hydraulic Analysis, detailed Sediment Transport Analysis, Pit Scour Analysis for Sand and Gravel operations on the Queen Creek Wash in Pinal County. Analyses included the use of one-dimensional and two-dimensional hydraulic analyses and Sediment Transport Modeling effort utilizing Fluvial-12. From this analysis Disturbance Mitigation/Restoration Design plans, Quantities and Cost Estimates.	<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 Scott Estergard	b. ROLE IN THIS CONTRACT Senior Water Resources Planner	c. YEARS EXPERIENCE	
		1. TOTAL 17	2. WITH CURRENT FIRM 3

d. LOCATION *(City and State)*  
Tetra Tech (WTR) - Phoenix, Arizona

e. EDUCATION <i>(DEGREE AND SPECIALIZATION)</i> MEng – Water Resources	f. PROFESSIONAL TRAINING - REGISTRATIONS
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g. OTHER PROFESSIONAL QUALIFICATIONS *(Organizations, Awards, etc.)*  
Mr. Estergard has over 17 years of experience in water resource planning and environmental impact assessment. His expertise includes detailed knowledge of aspects of plan formulation and Federal water resource policy with focus in ecosystem restoration and flood risk management. He has led interdisciplinary study teams working with local communities and stakeholder groups to develop, evaluate, and recommend solutions to water resource problems. He has extensive knowledge of developing planning reports of varying types and complexities – Initial Appraisals, Reconnaissance Reports (905(b)), Feasibility Reports, Preliminary Restoration Plans, and Technical Decision Documents and is certified as having completed the USACE Planning Community of Practice requirements as an Expert Planner. For 14 years prior to joining Tetra Tech, Mr. Estergard was with the U.S. Army Corps of Engineers (Los Angeles and Rock Island Districts). Project experience includes watershed studies and feasibility studies addressing flood risk management, ecosystem restoration, groundwater recharge, stream bank stabilization, and navigation.

**H. RELEVANT PROJECTS**

1.	(1) TITLE AND LOCATION <i>(City and State)</i> El Rio Medio Ecosystem Restoration Feasibility Study, Pima County, Arizona	(2) YEAR COMPLETED
		Professional Services Ongoing
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Tetra Tech is currently working with the U.S. Army Corps of Engineers- Los Angeles District and Pima County Regional Flood Control District on a feasibility study along the Santa Cruz River. As a senior planner Mr. Estergard has overseen a sensitivity analysis of HEC-RAS modeling, evaluated refinements to restoration alternatives to reduce flood risks, updated cost estimate and design documents, and feasibility report materials.	<input checked="" type="checkbox"/> Check if project performed with current firm
2.	(1) TITLE AND LOCATION <i>(City and State)</i> Tres Rios del Norte Ecosystem Restoration Feasibility Study, Pima County, Arizona	(2) YEAR COMPLETED
		Professional Services 2007-2010
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Mr. Estergard was the lead planner and study manager from 2008-2010 for this \$7 million feasibility study along an 18-mile, effluent-dominated reach of the Santa Cruz River near Tucson, Arizona. Local sponsors include Pima County, the City of Tucson, and the Town of Marana. The feasibility study is investigating opportunities for ecosystem restoration, water supply, flood risk management and recreation. As lead planner during this time Mr. Estergard was responsible for plan formulation and evaluation, trade off analysis, preparation of the Draft Feasibility Report/DEIS, and overall study coordination and management. The Draft report identifies a combined ecosystem restoration and groundwater recharge plan with recreation features.	<input checked="" type="checkbox"/> Check if project performed with current firm
3.	(1) TITLE AND LOCATION <i>(City and State)</i> Little Colorado River (LCR) Flood Risk Management Study, Planning Charette, Winslow, Arizona	(2) YEAR COMPLETED
		Professional Services 2012
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Tetra Tech assisted the Corps of Engineers in the facilitation and documentation of a planning charette, and development of post charette reports for LCR at Winslow Study. A 3-day planning charette including nearly 50 stakeholders was held in May 2012. Tetra Tech provided facilitation in brainstorming sessions including planning, design and hydraulic engineering disciplines and developed a Post Charette Report which documents the study objectives and develops a preliminary set of flood risk management alternatives for additional analysis. Measures and alternatives developed in the charette were screened based on available information and conceptual designs and preliminary estimates of cost for each of the remaining alternatives were developed. Alternatives considered included levee rehabilitation, new levees, upstream detention, channelization, and elevation of residential structures. Mr. Estergard was Project Manager and Senior Planner for the project.	<input checked="" type="checkbox"/> Check if project performed with current firm



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4.	(1) TITLE AND LOCATION <i>(City and State)</i> ADOT Water Quality Manual, Phoenix, Arizona	(2) YEAR COMPLETED	
		Professional Services Ongoing	Construction (if applicable)
	(3) BRIEF DESCRIPTION <i>(Brief scope, size, cost, etc.)</i> AND SPECIFIC ROLE Tetra Tech is currently under contract to ADOT (Environmental Services) to develop a Water Quality Manual. The manual will combine all water quality related guidance, operation standards, and protocols into a single concise document to provide guidance to ADOT personnel. The manual will include guidance on surface and groundwater requirements, best management practices, legal requirements, and a step by step approach for complying with current policies and regulations.	<input checked="" type="checkbox"/> Check if project performed with current firm	



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a. NAME Doug Lantz, PhD, PE, PH	b. ROLE IN THIS CONTRACT Project Manager/Hydraulic Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 26	2. WITH CURRENT FIRM 17

d. LOCATION (*City and State*)  
Tetra Tech (WTR) – Phoenix, Arizona

e. EDUCATION ( <i>DEGREE AND SPECIALIZATION</i> ) PhD Watershed Management, University of Arizona, 1998; MS Watershed Management University of Arizona, 1989; BS Watershed Management, University of Arizona, 1986	f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Engineer: Arizona # 28850 (Also registered in WA, OR, ID, CA, MD, NM and OK) Registered Professional Hydrologist, No. 1479, American Institute of Hydrology, 1998
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g. OTHER PROFESSIONAL QUALIFICATIONS (*Organizations, Awards, etc.*)  
Mr. Lantz has 26 years of applied project experience in the areas of hydrology, hydraulics, and civil design for flood control, dam rehabilitation. He has been involved in planning and design of NRCS dam rehabilitation in Arizona, New Mexico, Washington, Oregon, Nebraska, and Oklahoma. He is currently managing the NRCS National Design IDIQ (AG-3A75-C-12-0007), the NRCS National Planning IDIQ contract (AG-3A75-S-10-0001) and previously managed a Dam Rehabilitation Planning IDIQ for the Oklahoma State Office (53-7335-6-31), and an A-E Services IDIQ for the New Mexico State Office (53-8C30-03-873).

**H. RELEVANT PROJECTS**

1.	(1) TITLE AND LOCATION ( <i>City and State</i> ) Buckeye Flood Retarding Structure No. 1 Buckeye, Arizona	(2) YEAR COMPLETED	
		Professional Services Ongoing	Construction (if applicable)
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Tetra Tech is currently under contract with the Flood Control District of Maricopa County to provide design and construction services for Buckeye FRS No. 1, a 7-mile long NRCS assisted dam that provides flood protection for the Town of Buckeye and surrounding agricultural area. Dr. Lantz is Project Manager for a multi-disciplinary team and is responsible for all aspects of the \$2.5 million on-call contract with the District.	<input checked="" type="checkbox"/>	Check if project performed with current firm
2.	(1) TITLE AND LOCATION ( <i>City and State</i> ) Florence Flood Retarding Structure Florence, Arizona	(2) YEAR COMPLETED	
		Professional Services 2011	Construction (if applicable)
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Tetra Tech provided planning, design, and preconstruction services to the FAWFCD and the NRCS Arizona State Office for rehabilitation of the Florence FRS, a five-mile long earthen dam that provides flood protection to the Town of Florence, Arizona. Doug was the Project Manager responsible for all aspects of the project including field survey and mapping, hydrology and hydraulics, economics, construction plans, specifications and design report.	<input checked="" type="checkbox"/>	Check if project performed with current firm
3.	(1) TITLE AND LOCATION ( <i>City and State</i> ) Tres Rios del Norte Ecosystem Restoration Feasibility Study Pima County, Arizona	(2) YEAR COMPLETED	
		Professional Services 2013	Construction (if applicable)
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE The Los Angeles District is conducting feasibility level analyses for ecosystem restoration along an 18-mile, effluent-dominated reach of the Santa Cruz River near Tucson, Arizona. Local sponsors include Pima County, the City of Tucson, and the Town of Marana. The project is evaluating 10 project alternatives with up to 4,000 acres of restoration including cottonwood-willow forest, mesquite-bosque, emergent wetland, and Sonoran scrub-shrub. The project also includes flood damage reduction efforts to protect portions of Interstate 10 from erosion or slope failure in connection with a large gravel pit that could be captured by the river. Dr. Lantz was the Project Manager and Hydraulic Engineer and was responsible for (1) plan formulation to develop, describe, and evaluate alternatives, (2) GIS development and analysis of alternatives to provide inputs for hydrogeomorphic habitat modeling, (3) hydraulic analysis of restoration alternatives using HEC-RAS and GeoRAS, (4) preliminary water budgeting analyses, (5) conceptual design and cost estimating for restoration plantings, water delivery infrastructure, bank protection, grade controls, and impoundment structures for benefit-cost analysis and incremental analyses, (6) coordination with the Corps study team and the local sponsors, and (7) preparation of the feasibility report and appendices for hydraulics, economics, design, and cost estimating.	<input checked="" type="checkbox"/>	Check if project performed with current firm



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a. NAME Adam Raczynski, PE, CFM	b. ROLE IN THIS CONTRACT Civil Engineer	c. YEARS EXPERIENCE	
		1. TOTAL 8	2. WITH CURRENT FIRM 8

d. LOCATION (*City and State*)  
Tetra Tech (WTR) – Phoenix, Arizona

e. EDUCATION ( <i>DEGREE AND SPECIALIZATION</i> ) M.S. Civil Engineering, University of Arizona, 2008 B.S. Civil Engineering, University of Arizona, 2007	f. PROFESSIONAL TRAINING - REGISTRATIONS Professional Civil Engineer: Arizona # 52933 Certified Floodplain Manager, US-06-06088
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g. OTHER PROFESSIONAL QUALIFICATIONS (*Organizations, Awards, etc.*)  
Mr. Raczynski is professional engineering in the state of Arizona. He is also a certified floodplain manager. His principal fields of expertise are water resources; hydrologic/hydraulic analysis and design; and site development, with emphasis in water-distribution systems. Mr. Raczynski also has background and expertise in the use of computer/numerical modeling techniques solve complex engineering problems in the areas of hydrology, hydraulics, and sediment transport. Mr. Raczynski is proficient in numerous software programs including FLO-2D, HEC-RAS, HEC-HMS, HEC-1, and SITES. He also has extensive experience with field survey including both survey-grade and mapping grade global positioning systems (GPS).

**H. RELEVANT PROJECTS**

	(1) TITLE AND LOCATION ( <i>City and State</i> )	(2) YEAR COMPLETED	
		Professional Services	Construction (if applicable)
1.	Buckeye Flood Retarding Structure No. 1, Final Design, Flood Control District of Maricopa County, Buckeye, Arizona	Ongoing	
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Project engineer responsible for updating previously developed HEC-1 modeling to evaluate the site specific PMP at FRS No. 1. Work included a separate spreadsheet analysis of the Green & Ampt loss method for shallow soils in mountainous sections of the watershed. Additional work included unsteady flood routing (HEC-RAS), auxiliary spillway integrity analysis (SITES), civil design, and cost estimating.	<input checked="" type="checkbox"/>	Check if project performed with current firm
2.	(1) TITLE AND LOCATION ( <i>City and State</i> ) San Xavier Flood Hazard Study, Indian Health Service Tucson, Arizona	2014	
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Project Manager. The intent of the study is to identify and quantify the potential for flooding and erosion hazards along the Santa Cruz River and major washes caused by a 100-year flood and by a 500-year floods. Additional work includes quantifying the likelihood of potential damage to existing critical facilities by future floods and conceptually quantifying the design measures that are needed to mitigate such damage.	<input checked="" type="checkbox"/>	Check if project performed with current firm
3.	(1) TITLE AND LOCATION ( <i>City and State</i> ) United States Army Corps of Engineers Periodic Levee Inspection, Albuquerque, Chicago, and Huntington District	2009-2014	
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Performed field investigation, hydrologic and hydraulic investigation, and data collection/organization for the Periodic Levee Inspections in Arizona, California, Colorado, Indiana, Illinois, Kentucky, New Mexico, West Virginia for the United States Army Corps of Engineers. The inspections included design and as-built condition reviews, field investigation of existing levee conditions, and determining the level of protection provided by the levee. The investigation included the use of the Levee Inspection System (LIS) ArcGIS Extension and mapping grade GPS.	<input checked="" type="checkbox"/>	Check if project performed with current firm
4.	(1) TITLE AND LOCATION ( <i>City and State</i> ) Floodplain Analysis Rio Nuevo CLOMR/LOMR-F/LOMR Tucson, Arizona	Ongoing	
	(3) BRIEF DESCRIPTION ( <i>Brief scope, size, cost, etc.</i> ) AND SPECIFIC ROLE Design Engineer. Prepared a CLOMR for Rio Nuevo and letter of map revision for fill (LOMR-F) for the Gadsden Property within the Rio Nuevo site. The work included preparation of hydraulic analyses of existing conditions and the effects of the proposed fill of the University of Arizona Science Center, construction of the Cushing Street Bridge, floodwall for the River Park Inn (with adjacent properties), and fill at the Gadsden Property along the Santa Cruz River. Currently preparing a LOMR for the as-built conditions constructed Cushing Street Bridge, floodwall, and fill. The work includes the compilation of all required technical documentation for submittal to FEMA.	<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.)*

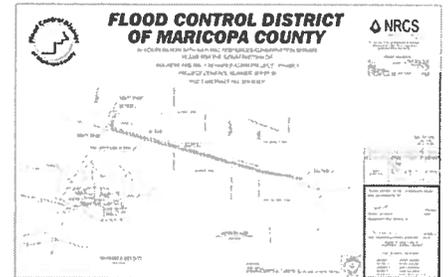
a. TITLE AND LOCATION <i>(City and State)</i>	b. YEAR COMPLETED	
<b>Buckeye Flood Retarding Structure No. 1 Rehabilitation Project</b> Maricopa County, Arizona	PROFESSIONAL SERVICES Ongoing	CONSTRUCTION <i>(If applicable)</i> 2014

**23. PROJECT OWNER'S INFORMATION**

c. PROJECT OWNER	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT
Flood Control District of Maricopa County		

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

Buckeye FRS No. 1 is a 7.1-mile-long NRCS assisted earthen embankment dam in Buckeye, Arizona. The dam is classified as an unsafe/deficient, high-hazard dam by ADWR due to the presence of transverse cracks and an inability to safely pass the inflow design flood. Tetra Tech is the prime consultant for a multi-disciplinary team that is providing services to the Flood Control District of Maricopa County under a \$2.5-million on-call contract (FCD 2009C005) awarded in 2009. The design for Buckeye FRS No. 1 has been executed through a series of work assignments that are briefly summarized below:



Work Assignment No. 1 - Design Criteria Report, Geotechnical and H/H Appraisal Reports, Site-Specific PMP Analysis, geotechnical investigations, and alternatives analysis for transportation issues and principal outlet modifications. Completed November 2011.

Work Assignment No. 2 – Geotechnical/geophysical investigations and analyses; preliminary hydrology and hydraulics, and alternatives for auxiliary spillway revetment. Completed in December 2011.

Work Assignment No. 3 - Phase 1 final design for a 2-mile-long section of the dam west of Johnson Road. Project features include a 48-foot-deep central filter, access ramps, removal of an abandoned irrigation outlet, and hydroseed and rock mulch on embankment slopes. Completed December 2013.

Work Assignment No. 4 - Phase 2 final design for the remaining 5-mile-long section of earthen embankment. Features include a central filter, dam raise, access ramps, irrigation outlet removal, spillway modifications, east end closure structure, hydroseed, rock mulch, and landscape restoration. Tetra Tech is currently working toward a 100% design submittal.

Work Assignment No. 5 – Geophysical investigations and analysis of potential subsidence and earth fissuring. Completed April 2013.

Work Assignment No. 6 - Seismic reflection surveys. Completed September 2012.

Work Assignment No. 7 - Supplemental geotechnical investigations and auxiliary spillway analyses. Completed in July 2013.

Work Assignment No. 8 - Phase 1 Construction Services.

Work Assignment No. 9 - Supplemental geotechnical investigations and civil design.





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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>	b. YEAR COMPLETED	
Florence Flood Retarding Structure, Planning and Design Florence, Arizona	PROFESSIONAL SERVICES 2010	CONSTRUCTION <i>(If applicable)</i> 2010

**23. PROJECT OWNER'S INFORMATION**

c. PROJECT OWNER Florence Area Watershed Flood Control District, NRCS Arizona State Office	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$527,000	e. TOTAL COST OF PROJECT \$527,000
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**f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)**

Tetra Tech prepared planning studies, preliminary design studies, and final design for the Florence Flood Retarding Structure for the NRCS Arizona State Office and the Florence Area Watershed Flood Control District (FAWFCD). The planning level work included development and analysis of alternatives to decommission or rehabilitate an existing 5-mile-long, 25-foot-high earthen dam that provides flood control to the Town of Florence, Arizona and surrounding agricultural areas. Tasks included work plan development, public involvement, geotechnical analysis, hydrology, hydraulics, design, cost estimating, economics, Landrights Workmap, and preparation of the Supplemental Watershed Plan/Environmental Assessment (Plan/EA). Hydrologic analyses included the principal spillway hydrograph, stability design hydrograph, and freeboard hydrograph in accordance with TR-60. Environmental analyses included a biologic assessment, impacts of alternatives, and preparation of the Environmental Assessment (EA) in accordance with NEPA requirements. Tetra Tech prepared a public participation plan and organized/facilitated public meetings during the feasibility phase.



Tasks under preliminary design included field survey and photogrammetry, revised hydrologic analyses and flood routing, and coordination with the NRCS for geotechnical investigations, and geotechnical analysis. This phase also included transposition of the results from a nearby site-specific probable maximum precipitation study for use at Florence. Hydrologic modeling included SITES and WinTR-20. Hydraulic analysis included 1-dimensional unsteady routing using HEC-RAS and 2-dimensional routing using FLO-2D. Tetra Tech conducted auxiliary spillway stability and integrity analyses in accordance with NRCS criteria using the earthen spillway erosion technology in the SITES program. The recommended rehabilitation plan includes a soil-cement sill to prevent headcutting and erosion in the auxiliary spillway, and placement of riprap along the face of the dam to prevent erosion from auxiliary spillway flows.

Tetra Tech completed the final design phase that included construction drawings (AutoCAD), specifications, Design Engineer's Report, bid schedule, cost estimates, construction performance time estimate, O&M Manual, jurisdictional delineation, and permit applications. The estimated construction cost was \$2.2 million. The design was reviewed and approved by the NRCS at the state and national level, and was also approved by the Arizona Department of Water Resources (ADWR) – Dam Safety Bureau. In 2010, Tetra Tech provided preconstruction services, including review of contract documents, responses to contractor requests for information, and bidding support.

The Planning Phase contract value was \$207,700 for geotechnical analyses, hydrology/hydraulics, economics, and design of alternatives. The Preliminary Design contract value \$175,000. The Final Design contract value was \$145,000. All work was completed within project schedules that were adjusted in accordance with scope modifications.



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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>	b. YEAR COMPLETED	
<b>Tres Rios del Norte Restoration Study</b> Pima County, Arizona	PROFESSIONAL SERVICES 2013	CONSTRUCTION <i>(if applicable)</i>

**23. PROJECT OWNER'S INFORMATION**

c. PROJECT OWNER	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT	e. TOTAL COST OF PROJECT
U.S. Army Corps of Engineers LA District – Phoenix Office	\$1,508, 450	

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

The Tres Rios del Norte Ecosystem Restoration study is a joint partnership between the U.S. Army Corps of Engineers, the City of Tucson, the Town of Marana, and the Pima County Regional Flood Control District. Because of severe ecosystem degradation, the sponsors of the study wished to restore habitat values along an 18-mile, effluent-dominated reach of the Santa Cruz River that runs through Tucson, Marana, and unincorporated Pima County. The study also addresses many water and related land resource issues, such as flood damage reduction, water supply, and recreation within the floodplain and riparian zone of this important river corridor.

The study considered 10 project alternatives with as many as 4,000 acres of ecosystem restoration that includes cottonwood-willow forest, mesquite-bosque, emergent wetland, and Sonoran riparian scrub-shrub habitat types. The alternatives were evaluated on the basis of environmental outputs and estimated costs, and a Recommended Plan with 1,360 acres of restored habitat was selected. The study includes a water supply plan that will provide features such as basins, multiple channels, and t-berms for recharge of treated effluent into the riverbed. The study also includes grade controls, levee modifications, and structural bank protection to accommodate the increased vegetation and to prevent flood and erosion damages to the proposed project. As well as a comprehensive recreation plan that includes parks, river trails, bridge crossings over rivers, tributaries and roads, and interpretive signage.

Tetra Tech, Inc. provided planning and engineering services in support of the feasibility study under contract to the Los Angeles District.

**Plan Formulation Services** Plan formulation kicked-off with a series of inter-agency workshops that included the Corps, the local sponsors, the U.S. Fish and Wildlife Service, the Arizona Department of Game and Fish, and Saguaro National Park. The workshops were held to gain local input on proposed alternatives and measures for ecosystem restoration, water supply, recreation, and flood damage reduction. Tetra Tech facilitated the workshops and the collected information was used to develop and describe restoration alternatives that were evaluated by the Engineer Research and Development Center (ERDC) on the basis habitat output (using HGM) and conceptual cost estimates. Formulation of the Recommended Plan required development of a restoration plan (NER), a recreation plan (NED), and a water supply plan (NED). The individual plans were then combined into a comprehensive Combined Plan (NER/NED) that was evaluated in terms of incremental restoration benefits, NED benefits, and by means of a trade off trade off analysis between the two.

**Hydrologic and Hydraulic Services** Tetra Tech provided expert hydrologic, hydraulic, and sediment transport consulting services to ensure that a balance is achieved between water availability, long-term domestic and municipal needs, flood issues, long term sediment transport impacts, groundwater interactions and recharge opportunities, and ecosystem water needs. The effort included hydraulic analysis of restoration alternatives using HEC-RAS and GeoRAS, water budgeting analyses, and inputs to groundwater modeling being done by the Los Angeles District.

**Conceptual Design and Cost Estimating** Tetra Tech prepared conceptual designs and cost estimates for restoration plantings, water delivery infrastructure, bank protection, levee modifications, grade controls, and impoundment structures for incremental evaluation of the 10 alternatives. Tetra Tech also prepared conceptual designs for recreation features such as underpass ramps, bridge crossings, trailheads, and interpretive signs; and water supply features such as recharge basins, in channel t-berms, multiple low flow systems, and inflatable rubber dams. The cost estimate for the Recommended Plan was prepared using MCACES and include comprehensive estimates for restoration plan (NER), recreation plan (NED), water supply plan (NED), and the Combined NER/NED plan.

**Geographical Information System (GIS)** The GIS component is a critical tool in the plan formulation and selection process. Tetra Tech developed and maintained GIS databases for each alternative using a broad series of land-use, ecosystem restoration features, and habitat area maps. The GIS database for the Recommended Plan includes existing and proposed habitat features; existing and proposed structural features including as bank protection, levee modifications, and grade controls; proposed recreation features; and proposed water supply



ATTACHMENT I – General Qualifications

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Phoenix, Arizona 85007

features. The GIS component has also been an important tool in evaluating and mitigating floodplain impacts from proposed alternatives.

**Report Preparation** Tetra Tech completed the Alternative Formulation Briefing (AFB) Feasibility Report and technical appendices for hydraulics, design, and cost estimating and participated in the AFB Conference with the Los Angeles District, South Pacific Division (SPD), and Headquarters Tetra Tech assisted the Los Angeles District in responding to review comments from the South Pacific Division and Headquarters and is currently working towards completion of the Draft Feasibility Report and associated appendices for public and agency review. The documents will be used by the sponsors and watershed stakeholders to make decisions regarding plan selection and trade-offs.

**Coordination** Tetra Tech coordinated with an inter-disciplinary study team that included Los Angeles District personnel, local sponsors, agencies, and consultants. Tetra Tech assisted the Los Angeles District in more than 40 local sponsor coordination meetings for plan formulation, coordination, and review of products. In each of these meetings, Tetra Tech worked with the District on the agenda, provided technical information for discussion and review, and provided written notes for meeting documentation.



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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.)*

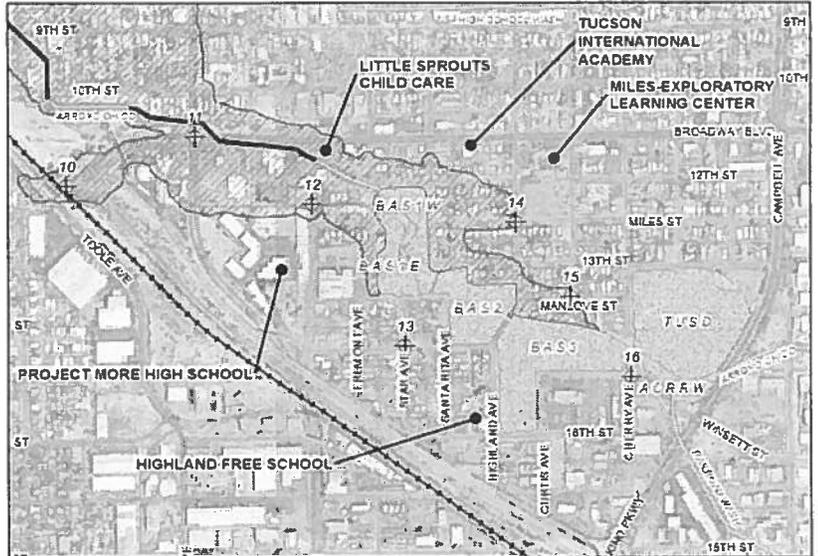
a. TITLE AND LOCATION <i>(City and State)</i> <b>Tucson Drainage Dam Breach and Inundation Mapping</b> Tucson, Arizona	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES 2014	CONSTRUCTION <i>(If applicable)</i>

**23. PROJECT OWNER'S INFORMATION**

c. PROJECT OWNER Pima County Regional Flood Control District, AZ	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$26,066	e. TOTAL COST OF PROJECT \$26,066
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**h. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)**

Tetra Tech prepared dam breach analyses and inundation mapping for the Tucson Drainage Area - Park Avenue Detention Basin complex under contract to the Pima County Regional Flood Control District (PCRFCD). The complex includes three inline basins (Basin 1, Basin 2, and Basin 3) along Arroyo Chico between Park Avenue and Cherry Avenue, and one offline basin located in Tucson Unified School District's (TUSD) Cherry Field. Basins 1, 2, and 3 are defined by four embankments that are classified as high-hazard jurisdictional dams by the Arizona Department of Water Resources (ADWR). An Emergency Action Plan (EAP) for the detention basin complex is required under Arizona Administrative Code (AAC) R12-15-1221. In accordance with ADWR guidelines, inundation maps were developed for the sunny-day breach, a significant spillway event, and the inflow design flood (see note 1) with a breach.



In the sunny-day event, the four in-line embankments were breached sequentially from upstream to downstream with water surface elevations set at the crest of the emergency spillways. For the inflow design flood, the embankments were breached from upstream to downstream as each of the basins filled and reached the maximum water-surface elevation. The breach analyses were performed using the Advanced Interconnected Channel and Pond Routing (AdICPR) model for quasi-unsteady flow. Breach parameters for each of the four embankments were estimated using the National Weather Service BREACH model. The resulting dam-breach hydrographs were initially routed using 1-dimensional unsteady flow methods (HEC-RAS) but the final product was based on a 2-dimensional analysis (FLO-2D) that better represented the sheet flow and backwater effects through the urban area. Flood Inundation maps for inclusion in the EAP were developed for a 2-mile-long section of urban Tucson between the Park Avenue Detention Basin and Interstate-10. They included the inundation areas, locations of schools and day-care centers, and a table of hydraulic parameters (maximum flow depth, time to maximum flow depth, and maximum velocity) at key locations. A separate set of working maps with topographic contours and maximum water-surface elevation contours were prepared for use by the District.

*Note 1) In 2004, Tetra Tech prepared an incremental damage assessment for the Park Avenue Detention Basin and determined that the Inflow Design Flood (IDF) could be based on the USACE's Standard Project Flood (SPF) in lieu of the PMF. The incremental damage assessment was reviewed and approved by ADWR and the SPF was used as the basis of design for the detention basin complex.*



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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) <b>Design of Queen Creek Channel Mitigation Measures</b> Pinal County, Arizona	b. YEAR COMPLETED	
	PROFESSIONAL SERVICES 2004-2013	CONSTRUCTION (if applicable) 2013

23. PROJECT OWNER'S INFORMATION

c. PROJECT OWNER CEMEX	d. ORIGINAL BUDGET/NTE AMOUNT OF PROJECT \$221,600	e. TOTAL COST OF PROJECT \$221,600
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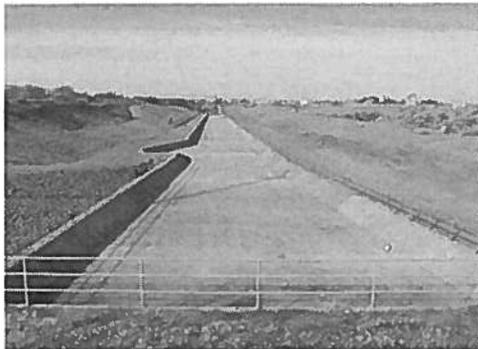
f. BRIEF DESCRIPTION OF PROJECT AND RELEVANCE TO THIS CONTRACT (include scope, size, and length of project)



In February of 2005 a high-flow runoff event of extremely long duration compromised the structural integrity of the Schnepf Road Bridge over Queen Creek, located in Pinal County, Arizona just upstream of the in-stream sand and gravel pit. Subsequent to that flow event, the bridge was considered unsafe and was condemned by Pinal County. In May 2007, Tetra Tech prepared a River Mechanics Study which included Hydrology, HEC-RAS and FLO-2D hydraulics and sediment transport modeling for the study reach of Queen Creek which documented the potential for an existing headcut to propagate from downstream of Schnepf Road upstream toward the Schnepf Road Bridge crossing. Subsequent flow events exacerbated the headcutting, creating a low-flow dominant-discharge channel which had somewhat abruptly migrated towards the Schnepf Road Bridge crossing.



As a part of a legal agreement between local sand-and-gravel operators and Pinal County, CEMEX hired Tetra Tech to design a channel improvement that would mitigate further potential for lateral channel migration or additional vertical profile changes along Queen Creek, west of Schnepf Road. In 2009, on behalf of CEMEX, Tetra Tech prepared four alternatives that would provide the necessary level of protection to safeguard the newly constructed RCBCs at Schnepf Road.



The preferred alternative, selected by all stakeholders, was the construction of a concrete-lined channel, extending downstream from Schnepf Road and terminating with an articulated concrete block revetment spillway at the upstream brink of the CEMEX legacy pit. This alternative was selected because it was felt that it would provide the most reliable design, from a cost and long-term functionality standpoint. After detailed analysis of the preferred alternative, a concrete lining was chosen as the most cost effective and efficient lining material for the channel, and because of the fluctuating water levels in the downstream pit an articulated concrete block revetment was chosen as the appropriate materials for constructing the termination structure. Completion of construction was completed in 2014. Since completed, the improvements will prevent future degradation, headcutting, and lateral bank migration along the project reach of Queen Creek.



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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.)

Tetra Tech (WTR)

The WTR group is known for their development of new techniques for risk assessment and contaminant transport, developing the cutting edge water models and IT systems used worldwide, producing innovative designs for river geomorphology, dam and levee design and flood protection, and supporting a science-based approach to water quality policy across the U.S

Introduction to Tetra Tech

Based in Pasadena, CA, Tetra Tech is a full-service engineering and science firm with a substantial global presence. We help our clients conceptualize and execute innovative solutions to their most difficult problems. From front-end science and planning to design, construction management and operations, Tetra Tech's global service network, facilitated by our Initiatives program that coordinates resources for specific markets and provides best-in-class experts with worldwide project experience. They deliver a high level of integrated services for the full project life-cycle in five service areas: water, natural resources, the environment, infrastructure, and energy. ENR magazine ranks Tetra Tech a national and international leader in several markets.

Tetra Tech' Global Reach

Tetra Tech has offices and operational infrastructure throughout the United States, Canada, and abroad. With 14,000 employees at 330 offices in more than 120 countries on six continents, Tetra Tech's technical knowledge and hands-on site work is broad and deep. Our staff is supported by a uniform administrative and management system that project teams can access immediately to ensure work is completed effectively.

Tetra Tech has expanded its geographic presence significantly in recent years through strategic acquisitions and internal growth, especially in Canada, Latin America, and Australia. We also have considerable operations in Asia, Europe, and the Middle East.

**ENR** Tetra Tech Rankings  
Engineering News-Record

- 1** Water
- 1** Environmental Management
- 1** Environmental Science
- 1** Solid Waste
- 1** Treatment/Desalination
- 1** Wind Power
- 5** Hazardous Waste
- 7** Design Firms

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:	54
b.	Percentage of Total Work Attributable to Non-Government Work:	46

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

Signature: \_\_\_\_\_

Date: December 19, 2014

Name: Ike Pace, PE Title: Regional Office Manager