



**PURCHASING ITEM
FOR
COUNCIL AGENDA
Memo No. ER9-002**

1. Agenda Item Number: 44
2. Council Meeting Date: July 31, 2008

TO: MAYOR & COUNCIL
THROUGH: CITY MANAGER

3. Date Prepared: July 3, 2008
4. Requesting Department: Municipal Utilities

5. SUBJECT: Approve Contract Amendment No. 4 to the Engineering Design Services Contract to Black & Veatch for the Surface Water Treatment Plant Expansion, Project No. WA0320-201, in an amount not to exceed \$175,000 and contract total not to exceed \$3,429,410.

6. RECOMMENDATION: Staff recommends that Council approve Contract Amendment No. 4 to the Engineering Design Services Contract to Black & Veatch for the Surface Water Treatment Plant Expansion, Project No. WA0320-201, in an amount not to exceed \$175,000 and contract total not to exceed \$3,429,410.

7. BACKGROUND/DISCUSSION: In April 2004, Council awarded the Engineering Design Services Contract to Black & Veatch for design services related to upgrading Plant capacity from 45 Million Gallons per Day (MGD) to 60 MGD. A portion of the original scope was to have the project team address ways the existing process and new expansion will meet the latest Drinking Water Standards. Since we initiated design in 2004, large fires on the Salt River Watershed significantly changed water quality entering the Plant. As the new systems were installed and brought on line, staff recognized a need to optimize plant processes. Ongoing staff support and training will be included to ensure staff has the data, tools, and training to employ the recommendations resulting from the optimization process.

8. EVALUATION: The Engineering Design Services Contract needs to be adjusted to include these additional process optimization services to assist staff in the operation of the expanded Surface Water Treatment Plant.

9. FINANCIAL IMPLICATIONS:

Original Contract Cost	\$3,170,248
Cost	\$175,000
Contract Change Percentage	5.4%
Savings	N/A
Long Term Costs	N/A
Percent Project Complete	95%

Fund Source

Acct. No.:	Fund Name:	Program Name:	CIP Funded:	Amount:
605.3830.0000.5318	Water Operating	Chemicals	Non-CIP	\$175,000

10. PROPOSED MOTION: Move that Council approve Contract Amendment No. 4 to the Engineering Design Services Contract to Black & Veatch for the Surface Water Treatment Plant Expansion, Project No. WA0320-201, in an amount not to exceed \$175,000 and contract total not to exceed \$3,429,410, and authorize the Mayor to sign the contract documents.

ATTACHMENTS: Location Map, Contract Amendment 4

APPROVALS

11. Requesting Department

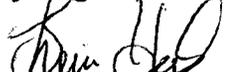
13. Department Head


Robert Mulvey, Assistant Municipal Utilities Director


Dave Siegel, Municipal Utilities Director

12. City Engineer

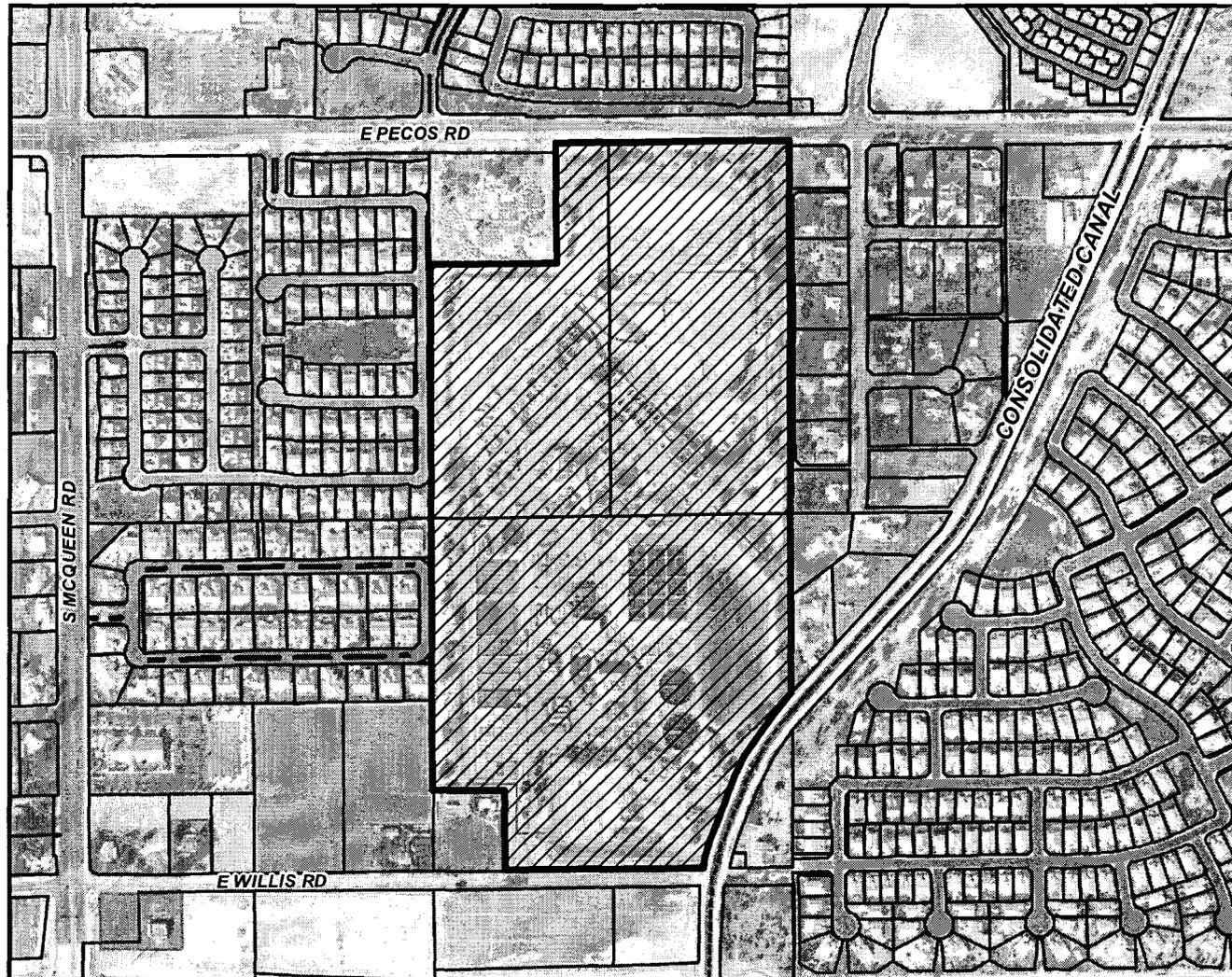
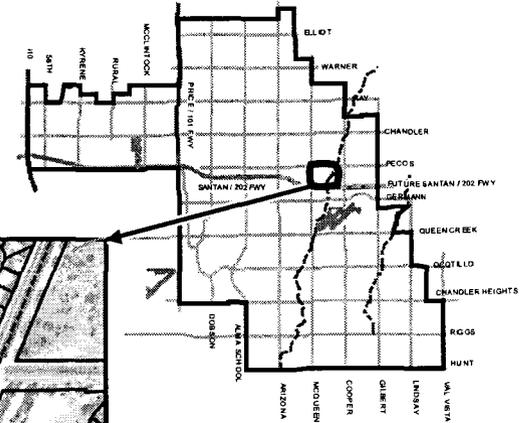
14. City Manager


Sheina Hughes, Assistant Public Works Director/City Engineer


W. Mark Pehtz



SURFACE WATER TREATMENT (SWTP) EXPANSION PROJECT PROJECT NO. WW0320-201



MEMO NO. ER09-002

 PROJECT AREA





Chandler Arizona

AMENDMENT NUMBER 4

Project Name: Surface Water Treatment Plant Expansion
Project No.: WA0320-201

This Amendment No. 4 to that certain Agreement Between the City Of Chandler (CITY) and Black & Veatch Corporation, a Delaware Corporation licensed to do business in the state of Arizona, for Surface Water Treatment Plant Expansion dated May, 3, 2004 is entered into this _____ day of _____, 2008.

WHEREAS the parties have determined that it is necessary and desirable for DESIGN CONSULTANT to perform additional services for CITY;

NOW THEREFORE, the parties agree as follows:

1. Section 3, of the above referenced Agreement, is hereby; amended by adding additional scope of work described in more detail in Exhibit A attached hereto and incorporated herein by reference.
2. Section 5, of the above referenced Agreement, is hereby; amended by increasing the total contract price by an amount not to exceed the sum of One Hundred Seventy-Five Thousand dollars, (\$175,000) all payable in accordance with Exhibit B, for a total contract price not to exceed the sum of Three Million Four Hundred Twenty Nine Thousand Four Hundred Ten dollars, (\$3,429,410).
3. Section 6 of the above referenced Agreement is hereby amended by increasing the Contract Time by One Hundred Twenty (120) days for a total Contract Time of One Thousand Five Hundred Thirty Eight (1,538) days from the original Notice to Proceed date to the anticipated end of construction.
4. All other terms and conditions of the above referenced Agreement shall remain unchanged and in full force and effect.

IN WITNESS WHEREOF, the parties have hereunto subscribed their names this _____ day of _____, 2008.

CITY OF CHANDLER:

By: _____
MAYOR Date

APPROVED AS TO FORM:

City Attorney by: mm

ATTEST:

City Clerk

DESIGN CONSULTANT:

By: Don Meyer
Title: Vice President

ATTEST: (If corporation)

Liam Nelson, Manager Finance & Admin
Secretary

WITNESS: (If Individual or Partnership)

SEAL

Amendment No. 4 cont.

Project No. VVW0302-201

THESE CHANGES RESULT IN THE FOLLOWING ADJUSTMENTS OF CONTRACT PRICE AND TIME

ORIGINAL CONTRACT AMOUNT		\$ 3,170,248
CURRENT CONTRACT PRICE PRIOR TO THIS AMENDMENT (Including previous amendments)		\$ 3,254,410
NET INCREASE / DECREASE (Resulting from this amendment)		\$ 175,000
REVISED CONTRACT PRICE (Including this amendment)		\$ 3,429,410
AMENDMENT PERCENTAGE (Of original contract price)		5.5%
CONTRACT TIME PRIOR TO THIS AMENDMENT (Including previous amendments)		1,418
		(Days or Date)
NET INCREASE/DECREASE (Resulting from this amendment)		120
		(Days or Date)
REVISED CONTRACT TIME (Including this amendment)		1,538
		(Days or Date)
THIS AMENDMENT No. _____	Does not Require Council Approval: Less than \$30,000*	_____
	More than \$30,000 but less than 10% of Contract*	_____
THIS AMENDMENT No. <u>X</u>	Requires Council Approval Greater than \$30,000*	<u>X</u>
	Greater than 10% of Contract *	_____
*Including City Manager approved Amendments		
ORIGINAL CONTRACT COUNCIL DATE: 4/22/04 ITEM NO.: 25, if applicable		
COUNCIL APPROVAL: _____ ITEM NO: _____, if applicable		

CC: City Clerk User Dept Project Mgr Consultant Project Anaylst File

EXHIBIT A SCOPE OF WORK

DESIGN CONSULTANT shall provide following additional services associated with the design and operation of the facilities to optimize the plant operations

GROUP 400 – ADDITIONAL SERVICES

Group 400 includes additional services to support the operations of the newly constructed expansion facilities and to enhance the design of these new facilities to optimize the plant operations.

Task 441 – Actiflo Design Enhancements

DESIGN CONSULTANT shall provide the following design enhancements to benefit the plant process:

- Task 441a – Filter Aid Alum Feed: Design a chemical feed system to feed alum as a filter aid. Includes alum pumps, neat feed line with backpressure at feed point and loop pump suction header for redundancy and improvements.
- Task 441b – Plate Settler Polymer Feed: Design a chemical feed system to feed plate settler polymer from the pretreatment building. Includes using the gravity thickener polymer system as the base feed and providing a separate line and means of controlling feed into the plate settler. An alternative would be to enhance the existing drum system provided outdoors.
- Task 441c – Instrumentation Additions: Design additional instrumentation for process feedback for monitoring the Actiflo performance. Includes adding flow through turbidimeters in the microsand pump gallery from common SET flume after both trains and draining to the floor drains. Includes adding turbidity analyzer on RWPS 2 to monitor post pressed turbidity. Tap off of pump header prior to alum, and drain to wetwell or new SAN line.

Task 442 – Process Optimization

Process optimization shall be conducted at the Chandler Surface Water Treatment Plant (CSWTP) with the following two goals: 1) maximize overall treatment efficiency throughout the plant, and 2) minimize treatment costs. These goals are interrelated. Overfeeding alum during coagulation, for example, adversely affects settled and filtered water quality, increases the rate of filter headloss, and increases sludge production. All of these results increase treatment cost beyond the increased cost associated with unnecessarily high chemical use. Optimizing chemical doses and operation of the plant shall save money and make it easier for operators to achieve water treatment goals.

The work shall be organized into the following tasks:

- Task 442a – Evaluate coagulant doses
- Task 442b – Evaluate filtration
- Task 442c – Evaluate TOC treatment goals to limit disinfectant byproduct (DBP) formation
- Task 442d – Evaluate residuals
- Task 442e – Evaluate polymer use
- Task 442f – Ongoing Miscellaneous Process Support

Task 442a – Evaluate Coagulant Doses

Alum is fed for coagulation at the presedimentation basin, the conventional treatment trains, and the Actiflo trains. Cationic polymer is also fed in the conventional train to aid coagulation. Overfeeding alum or polymer can have a detrimental impact on water quality and filter performance, increase the amount of sludge that must be handled, and increase treatment costs throughout the plant. Alum doses were optimized for Actiflo using full-scale data and jar test results. This evaluation resulted in a chart operators can use to select the optimum alum dose based on influent turbidity. Hence, alum doses can be adjusted to match influent water quality and thus avoid overfeeding or underfeeding alum. A similar evaluation shall be conducted for the conventional treatment trains and presedimentation. Full-scale data shall be evaluated, and jar tests shall be conducted to determine the following:

- Optimum combination of alum and polymer doses for conventional treatment based on influent water quality conditions.

- The optimum combination of alum doses at the presedimentation basin and the conventional train to remove turbidity and minimize sludge production.

Task 442b – Evaluate filtration

The GAC filters at CSWTP serve two functions: filtration to remove particles and turbidity, and adsorption to remove TOC and control DBP formation. This task shall address filter performance. Ideal filter operation produces water with low turbidity and particle counts while maximizing filter productivity. Full-scale data and testing shall be used to achieve the following:

- Optimize backwash procedures to maximize filter productivity.
- Evaluate the effect of filter run time on filter productivity.
- Evaluate the effect of filter run time on filtered water turbidity and particle counts.
- Recommend filter backwash procedures and filter run targets based on the above evaluations.

Task 442c – Evaluate TOC Treatment Goals

TOC contains the precursors that react with chlorine to form DBPs. The regulated DBPs of concern at CSWTP are total trihalomethanes (TTHMs) and five haloacetic acids (HAA5). The tools for removing TOC at CSWTP are adsorption to powdered activated carbon (PAC) in the presedimentation basin, removal during coagulation, and adsorption to GAC in the filter beds. The amount of TOC removed by each process is affected by TOC removal in upstream processes. TOC removal by PAC shall affect TOC removal during coagulation, which shall in turn affect TOC removal by GAC. There is a cost associated with TOC removal by each process. The goals of this task shall be: 1) to determine TOC treatment goals required at CSWTP to limit DBP formation in accordance with the Stage 2 Disinfectant/Disinfection Byproduct Rule, and 2) to find the integrated use of all of the treatment processes that meets TOC treatment goals with the least cost. This task shall encompass the following work:

- Simulated distribution system (SDS) tests shall be conducted to determine the relationship between TOC concentration and DBP formation in the Chandler distribution system. The result of the SDS tests shall be used to determine TOC treatment goals.
- Jar testing shall be conducted to evaluate the effect of a range of PAC doses in the presedimentation basin on TOC removal.
- TOC removal by enhanced coagulation shall be evaluated with and without PAC pretreatment.
- Mathematical modeling shall be conducted to project the effect of PAC treatment and enhanced coagulation on removal of TOC in the GAC filters and the effect on GAC bedlife.
- The effects of enhanced coagulation and PAC addition on sludge production shall be evaluated.
- Water quality and treatment costs shall be projected for each option to determine the best combination of PAC, coagulant dose, and GAC replacement frequency.

Task 442d – Evaluate Residuals

The primary components of solid residuals at the CSWTP are the sludge volumes produced in the presedimentation basin and the conventional and Actiflo clarifiers. The plate settler, gravity thickener, and solar ponds are used to thicken the sludge. The goals for solid residuals are to optimize chemical doses to minimize the amount of solids generated then thicken the sludge to the extent practical to reduce the volume that must be hauled offsite. The primary components of liquid residuals are filter backwash water and supernatant from the plate settler, gravity thickener, and belt press. The goals for liquid residuals are to optimize filter productivity to minimize the volume of backwash water that must be handled then to equalize the rate of return flow to prevent flow spikes at the head of the plant. CSWTP has two equalization basins to dampen the effect of recycle of liquid residuals. Many plants set a goal for recycle flow of 10% of plant flow. Plant flow data evaluated during Actiflo startup revealed that recycle flows frequently ranged from 15 to 20 percent of plant flow causing sudden surges in loading rates on all treatment processes. The amount of return flow can be reduced by optimizing backwash procedures and improving use of equalization basins. This task shall include the following investigations:

- Conduct tests to determine the optimum polymer types and doses for the plate settler, gravity thickener, and belt press.

- Calculate sludge production from each process and evaluate the capacities of the gravity thickener, plate settler, belt press, and solar ponds to handle projected solids loads.
- Recommend operating procedures for the gravity thickener, plate settler, belt press, and solar ponds based on test results and capacity evaluations.
- Evaluate the effect of backwash optimization on return flows.
- Evaluate flow equalization in Equalization Basins 1 and 2 and recommend operating procedures for each to best equalize return flows.

Task 442e – Evaluate polymer use

Different types of polymers are fed at several processes in the plant: the Actiflo trains, conventional treatment trains, plate settler, gravity thickener, and belt press. The fate of any residual concentrations of these polymers, potential impacts of their interaction, and their effects on downstream processes is the focus of this task. The work in this task shall include the following:

- Develop a profile of polymer concentrations through the plant to evaluate the existence and fate of residual polymer concentrations.
- Evaluate the type and dose of polymer at each process.
- Evaluate the potential for any adverse effects on treatment from the presence of residual polymer concentrations or the interaction of the various types of polymers.

Task 442f – Ongoing Miscellaneous Support and Training

On-going support for process analysis and training shall be provided for the WTP to assist with additional process related issues that may arise. The goal of the miscellaneous support is to ensure that the plant staff has the data, tools, and training to employ the recommendations resulting from the process optimization study and/or other issues that may arise (ie, miscellaneous coordination with Intel management and engineering staff).

EXHIBIT B
FEE SCHEDULE