



EXHIBIT A

**City of Tempe
Public Works Department
Water Utilities Division**

**South Tempe WTP
Electrical Power Upgrades
Project No. 3205901
Contract no. C2016-144**

Engineering Services Proposal

Addendum No. 3

Nov. 14, 2016

JACOBS

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Jacobs Engineering Group Inc. (JACOBS) is currently providing construction support for the City of Tempe (CITY) Water Utilities Department – Electrical Power Upgrades project at South Tempe Water Treatment Plant (STWTP) under Contract No. C2016-144. The CITY anticipates additional technical engineering efforts will be required to support the existing design effort. Detail descriptions of these additional “as-needed” efforts are provided as follows.

ADDITIONAL SCOPE OF WORK (Refer to Attachment A for estimated total hours.)

As of the date of this addendum, most of the original budget under C2016-144 has been used in response to submittals for engineering review, Requests for Information (RFIs), project changes, inspections, weekly meetings, construction support and walkdowns.

Due to the change of the incoming service switchgear, and the addition of modern arc flash technology, it is recognized that all arc flash has changed throughout the plant. Tempe wishes, since they have not updated the original arc flash since 2011, that the arc flash and short circuit be updated throughout the plant.

In addition, since the existing documentation for the electrical system is scattered with incomplete and inaccurate information, therefore, a set of site one-lines will be developed with the intention that a set be kept at the site and red-lined when changes are made. In addition, all panels will be reviewed and updated with accurate loading information. This will assure compliance with NFPA 70E and that the plant’s electrical system is well defined and tracked for future modifications and for plant operation and maintenance.

GENERAL ASSUMPTIONS

The following general assumptions have been identified for this scope of work:

- The existing SKM model will be used for the study, but updated.
- Results from the plant walk down performed in Amendment will include as much information as possible for the as-build condition such as loading, cable sizes, relay settings, Manufacturer data, and protection schemes. Data Input into the study will be tagged as validated or not validated,
- The City will provide a technician to open panels and install the arc flash labels.



- The City will provide all the drawings for all past project updates since 2005, and available manufacturing data.
- Any data not verified will revert to the data input for the old study, but tagged as such.
- Relays settings that are not able to be verified will be tagged as not verified.
- This study does not include the solar plant on premise.

LIST OF PROJECT STAGES

The major project stages are outlined as follows:

TASK 0: General Project Management and Kickoff Meeting

This task will cover the kick-off meeting to set project expectations and gather drawings. This task will also cover general project management and set-up in the Jacobs Management system. This task is estimated to take 52 hours at \$8,516.

TASK 1: Development of Plant One Lines

Based on the information gathered from TASK 1, new one-lines will be developed for the plant (estimate 40 one-lines).

This task is estimated to take 704 man hours at a cost of \$80,468 for duration of 8.5 weeks.

Deliverables will be 2 bounded copies of the one-lines in 11" by 17" paper, with one set of Mylar and an electronic file.

TASK 2: Build SKM Model and Run studies

This task will build the SKM model to match the as-build condition with the field data gathered in Task 1. In the study, one lines will be built to facilitate understanding of the model and associated Time Current Characteristics (TCCs).

A short circuit study shall be performed to verify all new equipment duties in the system. The calculations shall comply with IEEE-141, and IEEE-399. The short circuit study shall verify the system electrical equipment is properly rated to withstand and interrupt the expected bolted and arcing faults in the system.



- Arc flash results
- Arc flash Labels

The report is estimated to be approximately 600 pages.

This task is estimated to take 644 man hours at a cost of \$86,156 and duration of 13 weeks. The deliverables will be two hard copies of a stamped report along and an electronic file.

TASK 4: Panel Loading Sheets

This task will provide panel loading sheets which will list the loads and estimate total loading of each panel. This will involve data gathering, and developing panel loading sheets.

This task is estimated to take 236 man hours at a cost of 38,674 over a 7 week period.

ADDITIONAL FEE ESTIMATE

A fee estimate for all services under this Scope of Work is provided in Exhibit A. Our fee proposal is broken down by task and includes estimated hours by labor category for each task. Based on our understanding of the project, we propose to complete Tasks 0 through 4 scope of work reimbursed on an hourly not to exceed basis per the Labor Rates by Labor Category identified in Attachment A. The allowance for this work is estimated to be \$325,186. Direct costs are also identified in the total amount of \$5,400. Direct costs labeled DC1 and DC2 in Exhibit A are intended to cover outside reproduction and printing for major deliverables including arc flash labels and courier services only and not for day-to-day in house copying and printing.

Invoices shall include documentation supporting all actual Labor and Expense costs incurred for the reporting period, such as, personnel by name, job title, applicable hourly rate, hours expended, date/mileage for travel and receipts for all other expenses.

Additional services other than those specified herein, or those required above the amount identified for tasks may be added through a Contract Addendum with the City. A 10% contingency in the amount of \$32,519 is also included in the overall estimate, however will not be used without written approval from the city.



ATTACHMENT

A – Anticipated Project Fees.

B.-Project schedule

CITY OF TEMPE WATER UTILITIES DEPARTMENT
 South Tempe WTP Electrical Power Upgrades
 Power Systems Analysis, relay, and panel plant spreadsheets

ATTACHMENT A, Addendum 3 - Anticipated PROJECT FEES

Description	Consultant Hours								Total Hours	Total Cost
	PIC	Project	Electrical	Senior	Junior	AutoCAD		Cost Est.		
	MOP	Manager	QA/QC	EE	EE	Designer	Admin	Scheduler		
BILLABLE RATES	\$ 208.00	\$ 185.00	\$ 160.00	\$ 185.00	\$ 75.00	\$ 95.00	\$ 77.00	\$ 150.00		
GENERAL INITIAL PROJECT MANAGEMENT AND KICKOFF	4	16		16				16	52	\$8,516
TOTAL OF TASK 0	4	16	0	16	0	0	0	16	52	\$8,516
DEVELOPMENT OF PLANT ONE LINES (12 WEEKS)-40 one lines	2	30	40	120	20	480		12	704	\$80,488
TOTAL OF TASK 1	2	30	40	120	20	480	0	12	704	\$80,488
BUILD SKM MODEL AND RUN STUDIES (15 weeks)	2	30						16	48	\$7,768
DEVELOPMENT OF SKM MODEL TO MATCH AS-BUILTS (6 weeks)			60	240					300	\$49,200
DEVELOPMENT OF 80 SKM ONE-LINES(3 weeks)			40	60	8		1		109	\$16,977
DEVELOPMENT OF 40 TCC (3 weeks)			10	120	8				138	\$22,000
RUN SHORT CIRCUIT STUDY			10	30					40	\$6,550
RUN ARC FLASH STUDY			10	40	8		1		59	\$8,877
TOTAL OF TASK 2	2	30	130	480	24	0	2	18	694	\$111,372
REPORT (ESTIMATED 600 PAGES)- 18WEEKS	2	30						12	44	\$7,168
BODY OF CALCULATION			15	40	8				63	\$9,800
SUMMARY/ RECOMMENDATIONS/ DEVIATIONS			15	40					55	\$9,000
ATTACHMENT ONE-LINES (40 MAIN)			15	4	20				39	\$4,580
ATTACHMENT TCC (APPROX 50)			15	10	30		1		56	\$6,377
ATTACHMENT SHORT CIRCUIT RESULTS			15	10	30				55	\$6,300
ATTACHMENT ARC FLASH RESULTS			15	10	14		1		40	\$5,177
ATTACHMENT DATA INPUT SHEETS			15	4	20		1		40	\$4,837
CITY REVIEW OF REPORT AND RESUBMITTAL (4 WEEKS)			15	40	4		1		60	\$9,377
PUBLISH TWO HARD COPIES IN 3 RING BINDERS (1 WEEK)			0	8	4		20		32	\$3,160
PUBLISH ARC FLASH LABELS AND HELP TO FIELD INSTALL			0	80		80			160	\$20,800
TOTAL OF TASK 3	2	30	120	246	130	80	24	12	644	\$86,156
DEVELOP PANEL LOADING SHEETS (ASSUME 50 PANELS) (4 WEEKS)	1	1						4	6	\$974
DATA GATHERING			20	60					80	\$13,100
DEVELOP PANEL LOADING SHEETS			30	120					150	\$24,600
TOTAL OF TASK 4	1	1	50	180	0	0	0	4	236	\$38,874
									0	\$0
TOTAL HOURS TASKS 1-4	11	107	340	1,052	174	560	26	60	2,330	
TOTAL COST TASKS 1 THROUGH 4										\$325,186
CONTINGENCY 10%										\$32,519
SUBTOTAL TASKS 1 THROUGH 4 WITH CONTINGENCY										\$357,705
COSTS										
DC1 - REPRODUCTION AND PRINTING										\$5,200
DC2 - COURIER SERVICES										\$200
TOTAL OTHER DIRECT COSTS										\$5,400
										\$363,105

ID	Task Name	Duration	Start	Finish
1	TASK 0 - GENERAL PM AND KICKOFF	176 days	Mon 12/21/16	Mon 8/14/17
2	TASK 1 - ONE LINES	80 days	Mon 1/9/17	Fri 3/31/17
3	TASK 2 BUILD SKM MODEL AND RUN STUDIES	76 days	Mon 1/9/17	Fri 4/21/17
4	TASK 2.A	36 days	Mon 1/9/17	Mon 2/27/17
5	TASK 2.B	15 days	Tue 2/28/17	Mon 3/20/17
6	TASK 2.C	15 days	Tue 3/21/17	Mon 4/10/17
7	TASK 2.D	4 days	Tue 4/11/17	Fri 4/14/17
8	TASK 2.E	5 days	Mon 4/17/17	Fri 4/21/17
9	TASK 3 - REPORT AND PUBLISH	90 days	Mon 4/24/17	Fri 8/25/17
10	TASK 3.A	20 days	Mon 4/24/17	Fri 5/19/17
11	TASK 3.B	15 days	Mon 4/24/17	Fri 5/26/17
12	TASK 3.C	10 days	Mon 5/15/17	Fri 6/9/17
13	TASK 3.D	10 days	Mon 5/22/17	Fri 6/16/17
14	TASK 3.E	10 days	Mon 6/12/17	Fri 6/23/17
15	TASK 3.F	5 days	Mon 6/26/17	Fri 6/30/17
16	TASK 3.G	20 days	Mon 7/3/17	Fri 7/28/17
17	TASK 3.H	8 days	Mon 7/31/17	Mon 8/7/17
18	TASK 3.I	14 days	Tue 8/8/17	Fri 8/25/17
19	TASK 4 - PANEL LOADING	46 days	Mon 8/14/17	Mon 9/18/17
20	TASK 4.A	21 days	Mon 8/14/17	Mon 7/10/17
21	TASK 4.B	25 days	Tue 7/11/17	Mon 8/14/17

Dec 11 '16 S M T W T F S S
 Dec 18 '16 S M T W T F S S
 Dec 25 '16 S M T W T F S S
 Jan 1 '17 S M T W T F S S
 Jan 8 '17 S M T W T F S S
 Jan 15 '17 S M T W T F S S
 Jan 22 '17 S M T W T F S S
 Jan 29 '17 S M T W T F S S

Project: South Tampa WTP Electrical | Date: Mon 1/17/16

Task Split

Progress Milestone

Summary Project Summary

External Tasks External Milestone

Deadline

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