

EXHIBIT A
CITY OF TEMPE
PUBLIC WORKS DEPARTMENT
PUBLIC WORKS BUILDINGS
ELECTRICAL DISTRIBUTION SYSTEM EVALUATION PROJECT
PHASE II

SCOPE OF WORK

January 12, 2011

Project Overview

Brown and Caldwell (BC) is performing Electrical Distribution System Evaluations (EDSE) for 43 Public Works Facilities (PWFs) and, when required, Arc Flash Hazard Analysis Reports (AFHAR). During Phase I BC visited 2) PWFs, conducted 19 EDSEs and 6 AFHARs. One of the sites was found to be demolished and one site requires further investigation. Phase II will complete the EDSEs and AFHARs for the remaining PWFs. A complete list of PWFs and scope status is shown in Table 1. Phase II will amend the Phase I report with the remaining sites. Each PWF is divided into a separate section and includes an evaluation of the existing EDS components (based on visual inspection), a single line diagram (SLD) of the EDS, an Arc Flash Hazard Analysis Report (AFHAR) evaluation, and a condition assessment matrix. For those sites determined not to require further arc flash hazard analysis, the EDS equipment will be labeled per Article 110.16 of the 2008 National Electrical Code.

The Arc Flash Hazard Analysis Study will be conducted in accordance with the procedures stated in National Fire Protection Association (NFPA) 70E and Institute of Electrical and Electronic Engineers (IEEE) Standard 1584. Arc Flash labels shall be provided for equipment as specified in the 2005 National Electrical Code (NEC) Article 110.16. Equipment shall include Service Entrance Section (SES), Motor Control Centers (MCC), Switchgear, Switchboards, Panelboards, Industrial Control Panels and Transformers.

Results of the Arc Flash Hazard Analysis are used to define the Arc Flash protection boundary and the incident energy levels in the work areas of the power distribution system as defined by the Scope of Work. Upon completion of the Arc Flash Study, power distribution equipment cabinet labels will be installed that specify the hazard levels, the work distances and the Personal Protective Equipment (PPE) clothing needed to perform work on the energized equipment.

PPE will be recommended based upon the guidelines in NFPA 70E with safe working distances identified for energized equipment and the calculated Arc Flash boundary.

BC will provide a scope of work, schedule, and cost proposal for each task or subtask assigned during the contract period. A Notice to Proceed document from the City of Tempe (COT) Project Manager will be required before any work is charged to the contract.

Task 100 - Contract Management

A project kick-off meeting will be conducted at a COT facility after Notice to Proceed is received by BC. The meeting will be used to identify the BC on-site escorts and to discuss the project schedule.

Brown and Caldwell

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BC will develop and submit monthly pay requests in COT standard format. A monthly progress report will be attached to the pay request stating the progress on each task performed for that month. BC will provide a breakdown of all labor costs for each task and allowances; the breakdown will include previous paid to date amounts and budget remaining.

BC will submit monthly progress reports to the Project Team. The progress report will state progress on each task performed for that month, a description of additional tasks assigned during that month, and what the intended expected progress is for the following month.

BC will facilitate on a quarterly basis a 2-hour progress update to inform COT of the progress of all assigned tasks, review of the task schedules and task budgets. The progress update will include an evaluation of completed task and BC's performance.

A Draft Report meeting will be conducted at a COT facility upon completion of the individual reports by BC. The final study will include a report summary and all of the individual EDSE and AFHAR reports. The report summary will include a tabulated Condition Assessment report for all the facilities which will include:

1. Site location
2. Adverse condition found
3. Condition rating (1-5)

BC will present the draft reports to the COT and discuss any relevant or pertinent issues not previously discussed. COT will have 2 weeks to tabulate all review comments and forward to BC. BC will require 2 weeks to develop the final reports. The Draft Report meeting will also include identifying the Phase 2 AFHA scope.

Upon final completion of the reports a Final Report Deliverable meeting will be held at a COT facility. BC will review the changes made to the reports based on COT review comments. The meeting agenda will also include review of the Phase 2 scope and fee.

Additional coordination meetings may be conducted by phone or in person as needed to discuss relevant project concerns or coordination issues.

Deliverables

- Project Kick-off Meeting
- Monthly Pay Requests
- Monthly Progress Reports
- Draft Report Review Meeting
- Final Report Deliverable Meeting

Task 200 - Electrical Distribution System Evaluation

BC will provide an EDSE report for 43 COT Public Work Facilities. The project facilities and their associated buildings include:

Table 1 Public Work Facilities

Community Services		
ESCBLD Escalante building_SITE	EDSE - Complete	AFHAR - Phase II
NTMG North Tempe Multi Gen Ctr	EDSE - Phase II	AFHAR - Phase II
TCABLDG Tempe Center for Arts	EDSE - Phase II	AFHAR - Phase II
Tempe Library Complex - Pyle Adult Center - Library - Museum - Edna Vihel Community Center	EDSE - Phase II	AFHAR - Phase II
WSMG West Side Multi Gen Fac	EDSE - Phase II	AFHAR - Phase II
Fire		
FIREST-1 - FIRE ADMIN - Fire Station #1	EDSE - Complete	AFHAR - Phase II
FIREST-2 Fire Station 2	EDSE - Complete	AFHAR - Phase II
FIREST-3 Fire Station 3	EDSE - Complete	AFHAR - Complete
FIREST-4 Fire Station 4	EDSE - Complete	AFHAR - Complete
FIREST-5 Fire Station 5	EDSE - Complete	AFHAR - Complete
FIREST-6 Fire Station 6	EDSE - Complete	AFHAR - Complete
FRMNT fire Maint. Facility	EDSE - Complete	AFHAR - Phase II
FTRAIN Fire Training Facility - Apparatus / Storage Building - Burn / Skill Building - Fire Training Building	EDSE - Complete	AFHAR - Phase II
Golf Courses		
KNGC Ken McDonald Golf Course - Maintenance Building - Pump Station #1 - Pump Station #2 - Proshop - Restaurant - Pump Station #3	EDSE - Partial	AFHAR - Phase II
RHGC Rolling Hills Golf Course - Maintenance Building - Pro Shop - Restaurant	EDSE - Phase II	AFHAR - Phase II
Historic Properties		
BBHOUSE Benjamin B Moeur House	EDSE - Complete	AFHAR - None
EHOUSE Eisendrath House - East Building - West Building	EDSE - Complete	AFHAR - None
ERHOUSE Elias Rodriguez House	EDSE - Complete	AFHAR - None
HKTHOUSE Hackett House	EDSE - Complete	AFHAR - None
PETHOUSE Peterson House	EDSE - Complete	AFHAR - None

Table 1: Public Work Facilities

Municipal Complexes		
525 Building - Municipal Office-Tenant Space	EDSE - Phase II	AFHAR - Phase II
<u>MUNBLD City Hall</u> - City Hall Tower - Garden Area Offices - Parking Garage	EDSE - Phase II	AFHAR - Phase II
Performing Arts Complex	EDSE - Phase II	AFHAR - Phase II
TTCTR Tempe Transp. Center	EDSE - Phase II	AFHAR - Phase II
Non-Owned		
<u>McClintock Sports Facility</u> - Pool / Bath House - Service Area	EDSE - Phase II	AFHAR - Phase II
Orchid House Office Space	EDSE - Phase II	AFHAR - Phase II
Police and Courts		
<u>APACHEPD Apache Police Sub-Strn</u> - Central Plant - Large Vehicle Storage - Police Substation Building - Property and Evidence Building	EDSE - Complete	AFHAR - Complete
<u>KWNCORRAL Kiwanis Police Substation</u> - Equine Facility - South PD Briefing Building	EDSE - Complete	AFHAR - Phase II
SOUTHDPD Tempe South Police Sub	EDSE - Phase II	AFHAR - Complete
<u>Tempe Police/Court Complex</u> - GR Police Parking Garage - Police Building 1 NTPD - Police Building 2	EDSE - Phase II	AFHAR - Phase II
COURTS Court Building	EDSE - Phase II	AFHAR - Phase II
MARINA Rio Salado Marina	EDSE - Phase II	AFHAR - Phase II
Service Yards		
BELLBUTTE Bell Butte Radio Fac	EDSE - Phase II	AFHAR - Phase II
<u>EVBO and Maintenance Facility</u> - Admin - Maintenance Building - Fuel Building - Natural Gas Fueling - Wash Building - Guard House	EDSE - Phase II	AFHAR - Phase II
<u>HARDYD Hardy Maintenance yard</u> - Office Building - Police Property Building - Parks Field Service - Warehouse	EDSE - Phase II	AFHAR - Phase II
HPCC Household Product Col Ctr	EDSE - Complete	AFHAR - None
<u>KWNMNT Kiwanis Park Maint</u> - Maintenance Building - Vehicle Maintenance South	EDSE - Complete	AFHAR - Phase II

Table 1 - Public Work Facilities		
<u>PRISTYD Priest Yard</u> - Building A - Building B - Building C - Building D / Vehicle Maintenance Building - Building E / Container Shop - Building F / Vehicle Wash Building - Building G / Radio Building - Building L / Modular Offices	EDSE – Phase II	AFHAR – Phase II
TBUTTE Hayden Butte Radio Facility	EDSE – Phase II	AFHAR – Phase II
TRAFMNT Traffic Maintenance Facility	EDSE – Phase II	AFHAR – Phase II
Sports Complexes		
<u>Diablo Stadium</u> - Minor League Building - Stadium - Stadium Maintenance Building - Multi-Use Building	EDSE – Phase II	AFHAR – Phase II
<u>HW Hardy Warner SITE</u> - HWRSTRM & HWCONCES - Restroom North - State Park & Restroom	EDSE - Complete	AFHAR – Phase II
<u>Kiwanis Park Sports Facility</u> - Batting Range Concession - Lake Boat Concession - Ballfield Concession - Recreation Center - Tennis Complex - Lounge - Tennis Complex - Restrooms	EDSE – Phase II	AFHAR – Phase II

At each of the remaining sites, a visual inspection will be conducted on all EDS components and results of those inspections will be documented as well as a detailed description of the EDS. Adverse conditions identified during the visual inspection will be tabulated into a condition assessment matrix and recommended corrective actions will be provided. Any conditions found to be hazardous to personnel will immediately be brought to the attention of the COT escort and a Daily Inspection Report will be submitted to the COT Project Manager within 24 hours.

Information will be gathered in the field to develop a SLD of the EDS. The SLD will be generated in Computer Aided Design (CAD) software using BC CAD Standards. A hard copy will be included in the report. Each component of the EDS will be given a unique identifier using the key developed during the COT Water Utilities Arc Flash project.

An evaluation will be conducted to determine if the facility will require an Arc Flash Hazard Analysis. For those sites identified as not requiring further analysis, the EDS components shall be labeled per Article 110.16 of the 2008 NEC. Adverse safety conditions identified during the field investigation will immediately be brought to the attention of the COT representative. A daily field inspection report will follow the notification and be forwarded to the COT Project Manager within 24 hours.

Deliverables

- Individual Draft Reports for each Facility combined in one binder – 1 hard copy.

- Individual Final Reports for each Facility combined in one Binder – 1 hard copy, 1 electronic copy. (BC shall maintain the hard copy until completion of all phases).

Task 300 – Arc Flash Hazard Assessment Report

BC will provide an Arc Flash Hazard Assessment Report to include a short circuit study, a protective device coordination study and an Arc Flash Analysis Study.

The overall project objectives of this task are to provide electrical engineering services in order to achieve the following:

- Determine if the installed equipment bussing is rated equal or greater than the available fault current at each bus.
- The EDS is selectively coordinated based upon the Arc Flash priority.
- Update the electrical equipment with identification labels to meet Arc Flash requirements per NFPA 70E.

The AFHAR will be conducted in accordance with the procedures stated in NFPA 70E and the IEEE Standard 1584. Arc Flash labels shall be provided for equipment as specified in the 2008 NEC Article 110.16. Equipment shall include SES, MCC, Switchgear, Switchboards, Panelboards, Industrial Control Panels and Transformers.

Results of the Arc Flash Hazard Analysis are used to define the Arc Flash protection boundary and the incident energy levels in the work areas of the power distribution system as defined by the Scope of Work. Upon completion of the Arc Flash Study, power distribution equipment cabinet labels will be installed that specify the hazard levels, the work distances and the PPE clothing needed to perform work on the energized equipment.

PPE will be recommended based upon the guidelines in NFPA 70E with safe working distances identified for energized equipment and the calculated Arc Flash boundary.

The Arc Flash Hazard Analysis Study includes BC developing site specific data collection sheets and populating with pertinent field data obtained by BC. The data will be used to generate a software model in PowerTools “SKM” engineering analysis software. The SKM model will be used to conduct device trip coordination studies, fault current calculations and Arc Flash Hazard calculations. Upon completion of the Arc Flash Study, component labels specifying the hazard levels, distance and PPE needed to perform work on the electrical equipment will be installed by BC personnel. Generic labels will be provided for all equipment that falls outside of the IEEE 1584 study parameters, but may be required by Article 110.16 of the NEC.

BC will include recommendations to reduce incident energy levels at any equipment found to require Level 3 PPE or greater. The recommendations will be discussed during the Draft Review meeting and upon direction from COT; BC will amend the SKM with approved changes prior to printing labels.

The Arc Flash Hazard Analysis Study will be conducted in accordance with the procedures stated in NFPA 70E and IEEE Standard 1584. The analysis is performed in conjunction with the short circuit and protective device coordination studies. Fault current momentary duty and protective device clearing times are required to perform the Arc Flash Hazard Analysis Study and will be derived from the Short Circuit and Protective Device Coordination studies.



Results of the Arc Flash Hazard Analysis Study are used to define the flash protection boundary and the incident energy levels in the work areas of the EDS as defined by the Scope of Work. PPE will be suggested based upon the guidelines in NFPA 70E. If the calculated incident energy at some locations reveals hazard risk levels that may be unacceptable for this facility and cannot be reduced by selectivity adjustments, then further investigation outside the scope of this study is recommended to determine the most effective means of reducing the incident energy while maintaining the highest desired degree of reliability.

BC will provide an Arc Flash report to COT that will meet the Arc Flash labeling requirements per NFPA 70E and NEC.

Deliverables

- Individual Draft AFHARs for each Facility combined with the EDSE Reports – 1 hard copy.
- Individual Final AFHARs for each Facility combined with the EDSIE Reports – 1 hard copy, 1 electronic copy (BC shall maintain the hard copy until completion of all phases)

Task 400 – Optional Training

BC will provide up to 20 hours of training to COT personnel. Training may include:

1. NFPA 70E Low Voltage Qualified Person training (8 hours)
2. Understanding Arc Flash Labeling and PPE training (2 hours)
3. 2009 NFPA 70E review of changes presentation training (2 hours)

BC will coordinate with COT desired training based on current and future COT training programs.

Level of Effort

The costs for this Scope of Work, including allowances, shall be a Not to Exceed amount of \$98,214 (Exhibit B).

Schedule

The schedule shall be 270 days from receipt of Notice to Proceed.



EXHIBIT B FEE SCHEDULE

Tempe, City of (AZ) -- Elec Dist. Sys. Eval. Prog. Ph 2														
LINE	DESCRIPTION	Professional Fees	Special Services	Sub- contractors	Local Contract	Material Costs	Travel Expenses	Other Expenses	Other Travel	Total ODCS	Total Expense Cost	Total Expense Effort	Total Effort	
100	Project Management	\$144.00	\$80.00	\$80.00	\$80.00	\$80.00	\$123.00							
		35	18	0	0	0	0	53	6,480	1,000	1,000	1,000	1,000	7,480
200	EDSE	16	0	80	0	28	322	446	50,550	1,000	1,000	1,000	1,000	51,550
300	AFHAR	36	0	0	354	35	0	425	36,304	0	0	0	0	36,304
400	Training	20	0	0	0	0	0	20	2,880	0	0	0	0	2,880
GRAND TOTAL		107	18	80	354	63	322	944	96,214	2,000	2,000	2,000	2,000	98,214

Hours and Dollars are rounded to nearest whole number. To display decimals, change the format of the cells.