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BARR

December 26, 2018

Mr. Jon Haukaas
City of Blaine
10801 Town Square Drive Northeast
Blaine, MN 55449

Re: City of Blaine SCADA System Engineering Services

Dear Mr. Haukaas:

This letter is intended to serve as a proposal and definition of scope of engineering services that Barr Engineering Co. (Barr) is providing to the City of Blaine (City) for the construction of the recently designed and bid municipal water and wastewater Supervisory Control and Data Acquisition (SCADA) System Improvements project. The services we are proposing include construction phase services and arc-flash analysis for this project.

Please note: With regard to arc-flash analysis, this proposal supersedes our previous proposal for arc-flash analysis dated October 5, 2018. Please discard that proposal with the understanding that we are gaining some efficiency in field time by combining arc-flash into this proposal. In addition to the SCADA System Improvements Project sites, this proposal includes arc-flash analysis for the Wellhouse Rehabilitation Project sites and Water Treatment Plant No. 4.

This proposal letter includes the following sections:

- Project understanding and assumptions
- Description of project phases
    - Construction phase services
    - Arc flash analysis services
- Assistance provided by the City
- Project team
- Fee estimate
- Project schedule

Project Understanding and Assumptions

This letter outlines construction phase services and arc-flash analysis services connected with the recently bid Blaine SCADA System Improvements project (City Project No. 18-11).

The following assumptions were made when developing this proposal:

- Barr will be providing construction phase administration and arc-flash analysis services as further outlined in subsequent sections, relevant to the system design for the SCADA System Improvements project and additional sites as further outlined.
- The City has multiple ongoing projects that require interfacing with the proposed SCADA work. Barr has not included time for construction phase services for these projects in this proposal other than what is specifically mentioned below.
- Software programming for the SCADA system will be performed under a separate professional services agreement between the City and Automatic Systems Company.

Project Phases

The project construction-related services are proposed to be performed in the following phases:

Phase 1: Construction Phase

To start the construction project, Barr will meet with City staff and the Contractor for a kick-off meeting to verify that we all agree on project objectives and goals and to outline the anticipated steps to the construction process. In addition to the kick-off meeting, our construction phase services include the following tasks:

- Attend construction progress meetings (anticipated to be weekly during some portions of the project; a quantity of 80 total meetings is assumed, which will be attended by either Mark Ziemer, Zach Nesler, or Neil Oftelie, with two people attending up to 10 of these meetings if warranted).
- Provide shop drawing submittal review.
- Provide onsite observation of construction progress, and system startup (anticipated to be an average of 4 hours per week over the entire construction schedule, ¼ of the total time by either Mark Ziemer or Zach Nesler, and ½ of the total time by Neil Oftelie).
- Provide review of Contractor Pay Applications.
- Respond to contractor Requests for Information (RFI's) and provide change documentation as necessary.
- Issue Proposal Requests, and review returned proposals as necessary, and facilitate resulting Change Orders, if any.
- Provide record drawings based on Contractor's field-marked plan redlines.
- Review Operation and Maintenance (O&M) Manual submittals.

Phase 2: Arc Flash Analysis Services

Barr understands that the City is planning to provide arc flash analysis for all City water and wastewater facilities. The analysis will adhere to the IEEE Std. 1854 guide for performing arc flash hazard calculations and the requirements of NFPA 70E Standards for Electrical Safety in the Workplace.

We intend to complete the analysis at each site as the modifications and installations are occurring during the construction projects, including the separate Wellhouse Rehabilitation Project. This schedule allows for

the arc flash analysis to include all new equipment being provided at each site, such that additional analyses will not be necessary until future panel or equipment modifications occur.

The following assumptions were made when developing this proposal:

- The following sites are included in this scope of work:
    - Water Treatment Plants 1, 2, and 3
    - Wells 1, 2, 5, 7, 8, 9, 10, 11, 14, 16 (concurrent construction to this project anticipated)
    - Sanitary Lift Stations 1 through 17 and 19 through 30
    - Water Treatment Plant No. 4 (concurrent construction to this project anticipated)
- Barr will have full access to all sites. If required, the City will provide competent staff to provide access to equipment.
- Barr's data collection will be limited to visual inspections and will not include voltage or amperage measurements.
- When data cannot be verified, Barr will use IEEE or other industry standards for data collection assumptions.
- Barr will contact the serving electric utilities to obtain available fault current levels. Typically, the utility will not release the actual fault current available at a specific site and only release the maximum available fault current based on the transformer serving that site. If the utility only provides the maximum available fault current, Barr will perform all analyses under two scenarios; (1) maximum available fault current and (2) 50% of maximum available fault current. These scenarios are outlined in IEEE Paper No. PCIC-2009-16 "Impact of Available Fault Current Variations on Arc-Flash Calculations".

Data Collection
Barr will begin the project by developing preliminary system models for each site using data, photos and project drawings Barr has accumulated through past and existing project work for the City.

System Modeling and Analysis
Utilizing verified site data, Barr will model the electrical system for each site using Power Tools for Windows, a power system modeling software published by SKM Systems Analysis. The models will include relevant distribution equipment and protective devices starting at the utility feed at each site. Protective devices will be modeled appropriately using verified field data.

Short circuit analysis will be performed and device withstand ability will be evaluated at each site to determine if any equipment is exposed to current above its ratings and could cause unsafe conditions in the event of a fault.

Device coordination will be evaluated at each site using protective device time-current curves (TCCs) and will help Barr determine recommended settings for each protective device in the system.

Arc flash analysis will be performed at each site to determine the incident energy and flash protection boundary at all locations where energized work could be performed at each site.

Barr will provide recommendations for arc-flash mitigation at locations where exposure to high incident energy levels exist. The recommendations may range from changing protective device settings to proposing the installation of new protective devices to lower incident energy levels. Design services for proposed mitigations are not included in this proposal.

Arc-Flash Analysis Results
Barr will finalize the findings of the system analysis and arc flash results to create reference documentation for the City's use, including the following deliverables:

- Arc flash label sticker(s) and application for each site
- One-line diagram (in PDF format) for each site with verified input data used to complete arc flash analysis and incident energy levels to allow City staff to determine appropriate levels of personal protective equipment (PPE)
- Arc flash table, summarizing arc flash and incident energy results at each site.

Prior to delivering the final results of the analysis, Barr will organize a review meeting with the City to present and explain the findings from the arc-flash analysis and allow the City to provide feedback. Subsequently, Barr will provide the final report.

Assistance Provided by the City

This proposal is based on the assumption that the City will provide the following:

- Preferences on installation standards, equipment, and instrumentation as questions arise
- Access to sites, as needed
- Input during prioritization of the SCADA installations
- Assistance with utility locates and coordination with affected utilities
- Coordination with other projects and planned improvements to SCADA sites
- Coordination with WTP4 design and construction
- Coordination necessary to integrate the SCADA system backhaul on the City's existing fiber-optic network.

Project Team

Barr proposes to use staff members with whom you are familiar and who are acquainted with the design of SCADA systems. Primary team members dedicated to this project include:

- **Sheldon Sorensen, PE**: principal in charge
- **Mark Ziemer, PE:** project manager, electrical engineer
- **Zach Nesler:** electrical engineer

- **Neil Oftelie:** electrical engineer
- **Chad Lakose:** engineering technician

Proposed Fees

Barr proposes to provide the described services on an hourly basis at standard rates, plus outside expenses such as automobile mileage. Total fees not to exceed the total amount of $330,000, without prior authorization. Services will be billed monthly.

Project Schedule

The project schedule is understood to be as published in the bidding documents (City Project No. 18-11) and assumes a notice to proceed to the successful bidder by January 1, 2019.

If you have any question or comments, please contact Sheldon Sorensen at 952-832-2970, Mark Ziemer at 952-832-2973, or Zach Nesler at 952-832-2839. If the terms of this proposal are acceptable, please sign the document in the appropriate places located below and return a copy to us for our records. The work will be performed according to the terms of our master services agreement. Thank you for working with Barr.

Sincerely,

Sheldon Sorensen, PE
Vice President

Mark Ziemer, PE
Project Manager, Engineer of Record

Zach Nesler
Electrical Engineer

Accepted this ___ day of _____, 2018

CITY OF BLAINE

By_____

Its_____