SCOPE OF SERVICES

Solicitation Number: CLMP208
Project Name: Walnut Creek WWTP Control System Upgrade

PROJECT FOR:

CITY OF AUSTIN, AUSTIN WATER, THROUGH ITS CAPITAL CONTRACTING OFFICE

PROJECT TITLE:

WALNUT CREEK WASTEWATER TREATMENT PLANT CONTROL SYSTEM UPGRADE

OBJECTIVES OF THE PROJECT:

The purpose of this project is to provide engineering services for the evaluation and subsequent improvements to the Supervisory Control and Data Acquisition (SCADA) system at the Walnut Creek Wastewater Treatment Plant (WWTP).

The intent of this project is to replace the existing obsolete control system network and hardware with modern equipment which follows Austin Water (AW) SCADA standards. This will be achieved by replacing existing obsolete Programmable Logic Controllers (PLCs), upgrading computers which run SCADA software, and utilizing fiber optic cabling and Ethernet networking equipment to extend the SCADA Ethernet network to portions of the plant currently served by SY/MAX PLCs and SY/NET.

***The selected consultant shall be required to comply with Austin Water Utility Facility Security Procedure SP-1070 (see Attachment A-2).**

BACKGROUND:

Walnut Creek WWTP is permitted to treat and discharge an average daily flow of 75 million gallons per day (MGD) and a 2-hour peak flow of 165 MGD. The plant currently averages a daily flow of approximately 60 MGD.

The plant effluent is used for non-potable water (NPW) on the plant site and supplies much of the City's growing Water Reclamation Initiative (WRI) program. The remainder is discharged into the Colorado River. The Texas Commission on Environmental Quality (TCEQ) regulates the quality of discharge to the Colorado River. The discharge and reuse permit limits are below:

Discharge Permit	Reuse Type 1 Permit
5 mg/l CBOD	5 mg/l CBOD
5 mg/l TSS	3 NTUs Turbidity
2 mg/l ammonia	126/100 ml *E. coli*
126/100 ml *E. coli*	126/100 ml *E. coli* (Single Grab)
6 mg/l DO	

Walnut Creek WWTP uses SCADA extensively for process control and monitoring. The system is made up of PLCs located in proximity to process areas of the plant, and a PLC network.

The majority of the existing SCADA system is made up of SY/MAX PLCs and a dual channel copper SY/NET network. This system was installed around 1990 as part of a plant-wide network renovation. Recent projects have installed fiber optic cabling and Ethernet communications to some portions of the plant, but the plant fiber network has not been addressed as a whole.

The following process areas were evaluated in the *SCADA Network Improvements Preliminary Engineering Technical Memorandum* (TM), dated June 2015, by Harutunian Engineering, Inc. The TM contains information sufficient to move into the design phase without further preliminary engineering; however, a TM shall be produced as part of this project to confirm the basis of the design, as required in the Anticipated Deliverables section of this document. The TM by Harutunian Engineering, Inc., is included in the solicitation packet as Attachment A-1.

- The Administration Building houses several control panels, operator interface units, and other network equipment located in the main control room, which serves as the focal point of the plant's control network. The main control room contains two communication control panels which bring in all the remote signal telemetry throughout the plant. The SY/MAX PLC located in the main control room is used as a gateway to the entire plant wide SY/NET network. There are five computers in the main control room which are the primary points of plant monitoring and control. There is also SCADA equipment located in several other rooms within the administration building. As part of this project, it is anticipated that the top-end control system hardware (servers and workstations) will be replaced. The SY/MAX PLC will be removed once the SY/NET network is decommissioned.
- The Dechlorination Building serves as the storage location and feed source for the plant's dechlorination system. It includes a sulfur dioxide feed manifold and storage area, evaporators, sulfonators and ancillary piping and equipment. The dechlorination building SCADA network consists of a SY/MAX PLC and a SY/NET signal routed from the SY/MAX PLC in the dechlorination building to the SY/MAX Gateway PLC in the main control room. As part of this project, it is anticipated that the SY/MAX PLC will be replaced and the SCADA Ethernet network will be extended to this building.
- The Water Reuse System (WRS), also referred to as WRI, distributes non-potable water to the plant for use in operation and maintenance activities, as well as to an offsite storage tank where it is stored and distributed to customers. The WRI SCADA equipment is located in the WRI Electrical Building and consists of several control panels containing PLCs and networking equipment. Each panel is responsible for monitoring and control of different components of the WRS. The SCADA equipment consists of seven Modicon Quantum PLCs that are interconnected with a Modbus Plus network; one of these PLCs serves as a data concentrator and communicates to the plant SCADA Ethernet network. There is an additional Modbus Plus network used to gather electrical data using power quality monitors. There is one OIU located in the WRI Electrical Building. As part of this project, it is anticipated that the OIU will be replaced. The Quantum PLCs will be replaced and will be connected to the building's existing SCADA Ethernet network.
- Substation No. 1 receives 15KV power from Austin Energy and distributes it throughout the plant. The PLC located within Substation No. 1 gathers electrical and switchgear data from within the substation. The network equipment includes two Ethernet modules connected to media converters which convert copper Ethernet to single-mode fiber optic media. Single- mode fiber optic patch cables connect to fiber optic patch panels. The fiber optic patch panels are connected to patch panels in the WRI Electrical Building then through to the main control room. There is one OIU located in the substation that can control the switchgear circuit breakers. As part of this project, it is anticipated that the OIU will be replaced. The Quantum PLC will be replaced and will be connected to the building's existing SCADA Ethernet network.

- Substation No. 2 receives power from Substation No. 1 and distributes it throughout the plant. The PLC located within Substation No. 2 gathers electrical and switchgear data from within the substation. Its network equipment is similar to that of Substation No. 1. There is one OIU located in the substation. As part of this project, it is anticipated that the OIU will be replaced.

At each of the aforementioned locations, there may be required modifications to the existing Ethernet network equipment or the addition of new network equipment. In order to facilitate the routing and expansion of the fiber optic network, related network equipment may be installed in some buildings in addition to those listed above. Heating, Ventilation, and Air Conditioning (HVAC) may also need to be evaluated, depending on the location of the new network equipment.

It should be noted that there are several concurrent projects which will be making changes to the SCADA network and will be replacing existing SY/MAX and Quantum PLCs throughout the plant. Some of these projects will be occurring prior to, during, and after the anticipated construction of the Control System Upgrade Project. Close coordination with those projects will be required throughout design and construction.

In order to decommission the SY/NET network and keep the existing SY/MAX PLCs operational, additional tasks are required. As mentioned above, these process areas each have an improvement project associated with them, indicated in parenthesis below, in which control system improvements will be made. Depending on timing of these projects, additional effort under this project may include:

- Headworks 1: Extend fiber from HW2 building to HW1. Install SY/NET to Modbus Transmission Control Protocol (TCP) converter to get PLC-1 on plant SCADA network. (Headworks Improvement Project 3023.019)
- Operations Building: Extend Ethernet cabling from blower area to LPU2/4. Install SY/NET to Modbus TCP converter to get LPU2 and LPU4 on plant SCADA network. (Pumping System Improvements Project 3023.022)
- Primary Treatment Complex 2 (PTC2): Extend fiber cabling in duct bank to PTC2 from Substation No. 2. Install SY/NET to Modbus TCP converter to get PLC-3 on plant SCADA network. (Pumping System Improvements Project 3023.022)
- Sludge Thickener: Extend fiber cabling in duct bank to Sludge Thickener Building from WRI. Provide significant spare length of cable to allow relocation to final control system area as determined by separate Sludge Thickener Rehabilitation project. Install SY/NET to Modbus TCP converter to get PLC-10 on plant SCADA network. (Sludge Thickener Rehabilitation Project 3023.035)
- Sludge Pressurization Pump Station: Extend fiber cabling in ductbank to Sludge Pressurization Building from WRI. Provide significant spare length of cable to allow relocation to final control system area as determined by aforementioned Sludge Thickener Rehabilitation project. Install SY/NET to Modbus TCP converter to get PLC-11 on plant SCADA network. (Sludge Thickener Rehabilitation Project 3023.035)

ANTICIPATED SERVICES

1. Preliminary Engineering Report (PER)
    a. A Technical Memorandum (TM) to clearly define the basis of design for this project and identify improvements that will be made under this project for process areas that do not require further preliminary engineering.

b. TM to evaluate and present recommended improvements for process areas requiring further preliminary engineering. The TM should be complete with supporting data such as calculations, condition assessments per Austin Water Standards, and evaluation of alternatives, including evaluations based on estimated engineering, life cycle, construction and other applicable costs.

c. TM to outline how this project will coordinate with other Capital Improvement Projects (CIP) listed in the Background section above.

These TMs shall be submitted for City review and comment. Once finalized, the TMs shall be compiled into a single PER and submitted to the City.

2. Design Phase Services

   a. Complete and detailed engineering documents and associated services are required for bidding and construction of the proposed improvements. Engineering documents shall be delivered for City review and comment at 30%, 60%, and 90% stages of completion.

   b. At each of these stages, the design development package shall provide documents appropriate to the design stage including, but not limited to, deliverables listed in the Facility Project Milestone Checklist.

   c. Design schedule, including the above noted progress milestones, shall be updated monthly and submitted with each monthly payment application.

3. Bid Phase Services
4. Construction Phase Services
5. Configuration and Programming Services
6. Warranty Phase Services

Quality Assurance / Quality Control (QA/QC)

The selected consultant shall develop and implement a QA/QC plan in conformance with requirements of the City.

PROPOSED PROCUREMENT SCHEDULE

RFQ Issue Date: September 6, 2016
Pre-Response Meeting: September 14, 2016
RFQ Due Date: October 12, 2016
Interviews (if necessary): Week of November 7, 2016
Tentative Council Date: December 15, 2016

PROPOSED PROJECT SCHEDULE:

Preliminary Engineering	12 Months
Design	12 Months
Construction	18 Months

COST ESTIMATE:

Preliminary Engineering and Design (fees under this RFQ)	$750,000
Construction	$3,000,000

MAJOR AND OTHER SCOPES OF WORK:

Below is a list of the major scopes of work that the City has identified for this project***. *There must be representation for all major scopes of work listed in the prime's statement of qualifications. The experience of the firms listed to perform the Major Scopes of Work, whether a subconsultant or prime firm, will be evaluated under Consideration Item 6 – Major Scopes of Work – Comparable Project Experience.***

In addition, the City has identified Other Scopes of work that MAY materialize during the course of the project. The City does not guarantee that the scopes listed under Other Scopes of work will materialize on this contract. If the prime consultant intends to enter into a subconsulting agreement on a scope of work not listed below, the prime consultant is required to contact SMBR and request an updated availability list of certified firms in each of the scopes of work for which the prime consultant intends to utilize a subconsultant.

Major Scopes of Work*
Instrumentation Engineering
Control Systems Engineering
Electrical Engineering

Other (Minor) Scopes of Work
Civil Engineering
Mechanical Engineering

Notes:

- Construction Inspection and Public Information and Communications are **NOT** subconsultant opportunities. These services will be performed in-house or under a separate contract, if needed, and will be determined when project assignment is made.
- Participation at the prime or subconsultant level may create a conflict of interest and thus necessitate exclusion from any contracts resulting from the work performed in the design phase.
- If the City determines that a conflict of interest exists at the prime or subconsultant level, the City reserves the right to replace/remove the prime or instruct the prime consultant to remove the subconsultant with the conflict of interest and to instruct the prime consultant to seek a post-award change to the prime consultant's compliance plan as described in City Code § 2-9B-23. Such substitutions will be dealt with on a case-by-case basis and will be considered for approval by Small and Minority Business Resources (SMBR) in the usual course of business. The City's decision to remove a prime or subconsultant because of a conflict of interest shall be final.
- A consultant performance evaluation will be performed on all professional services contracts. This evaluation will be conducted at the end of each Preliminary, Design and Construction phase.