APPENDIX A – SCOPE OF SERVICES

General

Generally, the scope of services includes final design, construction phase services, and application engineering for improvements to the City of Lawton's Supervisory Control and Data Acquisition (SCADA) systems at the following facilities:

1. Southeast Water Treatment Plant (SEWTP)
2. Medicine Park Water Treatment Plant (MPWTP)
3. Water Distribution System

A conceptual design for water system SCADA improvements was recently completed under a previous phase of the project. The final design services provided under this Amendment will develop the recommended improvements presented in the Lawton Water Treatment and Water Distribution SCADA Improvements Conceptual Design Report, dated July 2021, into a design package for bidding, construction, and implementation. ENGINEER's scope of services also includes construction administration and application engineering (PLC and SCADA HMI programming) of the control system during construction of the project. Major components of design for the new systems include:

1. A new radio telemetry system and SCADA graphics for the water distribution system, with redundancy features.
2. New RTU panels at remote sites of the water distribution system.
3. New chlorine analyzer instrumentation at remote water distribution sites such as each pump station and ground storage and commissioning of the existing chloramine booster station.
4. Intrusion detection improvements (door switches, motion detection) at remote sites of the water distribution system.
5. Incorporation of existing digital I/O into the new RTU panels at remote sites of the water distribution system for status and alarm feedback of specific equipment that are not currently connected to the existing RTU panels. Evaluate each site to determine available signals – examples include valve positions, power failure, pump out of service, etc.
6. Upgraded SCADA HMI hardware and software with redundancy features at both water treatment plants.
7. New PLC hardware at both water treatment plants.
8. Coordination with City IT department for network design and configuration.

1. Project Management

ENGINEER will provide overall project management services for the project including the following:

1. Conduct a kick-off meeting at the Owner's site to review project objectives, schedule, and deliverables.
2. Develop an initial project schedule. ENGINEER will advise the Owner of critical path items affecting the project progress versus the planned schedule.
3. Development of a project specific Project Management Plan for use as an ENGINEER delivery plan used internally to document:
    a. Scope
    b. Schedule
    c. Budget
    d. Project Organization
    e. Project Quality Management
    f. Establish Technical Review Committee.

4. Conduct progress meetings as needed, with the Owner's staff via teleconference.
5. Provide an agenda in advance of all scheduled meetings and provide subsequent meeting minutes following the meeting.
6. Maintain and monitor project engineering budgets and submit monthly invoices based on progress of work to date. ENGINEER will also maintain total project budgets that may include other parties involved in the project.
7. Provide Owner with deliverables in accordance with ENGINEER quality assurance and quality control procedures. ENGINEER to provide quality control plan to the Owner for review.

2. Radio Path Study

A desktop radio path analysis was provided as part of the conceptual design report in the previous conceptual design phase of the project. It is expected that a field radio path study may be required during the final design phase to confirm radio paths between remote sites and determine required antenna heights for the frequencies under consideration. If the Owner and ENGINEER agree that a field radio path study is required, ENGINEER will coordinate this work with a company that specializes in radio telemetry path studies, who will perform the field path evaluations and provide results of the field studies and recommendations for operating frequency, antenna types, and antenna heights. The Owner will be responsible for providing a representative to accompany the radio path technician for site access, and any lift equipment necessary to reach antenna locations. Field path study is anticipated to require one week of on-site testing time.

3. Preliminary Design

The preliminary (50%) design phase submittal will build on the conceptual designs accepted by the Owner and include preliminary layouts of the improvements as well as an opinion of probable construction cost (OPCC). The anticipated OPCC accuracy for this level of design is in the range -20 percent to +30 percent. Design drawings will be developed and represent approximately 50 percent of final construction contract plans. Technical specifications will not form part of this submittal.

ENGINEER will develop sample HMI graphic screens for the new water distribution SCADA, with features based on discussions during the conceptual design phase of the project. ENGINEER will review these with the Owner during the preliminary design review workshop. Sample screens will include one pump station and one elevated storage tank to convey common features and elements across all sites. Additionally, ENGINEER will provide a preliminary list of I/O specific to each remote location, for discussion and review with the Owner during the workshop to verify that the unique features of each location have been identified.

ENGINEER will submit the preliminary (50%) plans with OPCC to the Owner for review. The submittal will exclude front end and technical specifications and construction details.

Upon submission of the preliminary (50%) design documents, ENGINEER will participate in one (1) preliminary design review workshop with the Owner, including Owner's IT Department for comment and input. ENGINEER will generate minutes from the meeting that will include review comments from the Owner. ENGINEER will begin final design upon receiving written approval by Owner of the preliminary design.

<u>Deliverables</u>

- Electronic (PDF) copy of the preliminary (50%) design documents with opinion of probable construction cost

4. Final Design

Upon receiving written authorization to proceed with design after the 50% submittal, ENGINEER will conduct final (100%) design tasks to prepare construction plans and specifications, for one (1) construction contract, including final construction details and quantities, technical specifications, "front-end" contract documents, and OPCC (anticipated accuracy in the range -10 percent to +15 percent).

Additionally, ENGINEER will present finalized sample HMI graphic screens and final site specific I/O lists for the new water distribution SCADA, based on feedback and discussion during the preliminary review workshop. ENGINEER will review these with the Owner during the final review workshop.

ENGINEER will submit the draft final plans, technical specifications, "front-end" contract documents, and OPCC to the Owner for review.

Upon submission of the draft final (100%) documents, ENGINEER will participate in one (1) final design review workshop with the Owner. ENGINEER will generate minutes from the meeting that will include review comments from the Owner. Final comments agreed to by both Owner and ENGINEER will be incorporated into the documents and final (100%) construction documents will be prepared as required to advertise for bids.

Deliverables

1. Electronic (PDF) copy of the draft final (100%) design documents with opinion of probable construction cost
2. Electronic (PDF) copy and three (3) hard copies of the final bid documents

5. Contractor Pre-Qualification

ENGINEER will assist the Owner with pre-qualification of contractors to perform the construction work associated with the project. To assist with the pre-qualification of contractors, ENGINEER will:

1. Prepare pre-qualification information packet that will serve as the Request for Qualifications for interested contractors.
2. Prepare and submit advertisement for pre-qualification to newspaper(s) for publication as directed by the Owner. Owner will pay advertising costs outside of this contract.
3. Support the pre-qualification packet by preparing addenda as appropriate.
4. Participate in a pre-qualification meeting.
5. Prepare a pre-qualification meeting memorandum and distribute to attendees.
6. Participate in a construction site tour by interested pre-qualification meeting attendees. The Owner will host the site tour.
7. Attend the opening of Submittals of Qualifications.
8. Prepare a review of each submittal and rank based upon agreed to criteria. Also, perform the following:
    a. Verify contractor certifications and licenses to serve as the Primary Contractor for the project.
    b. Survey (via telephone) the submitted project references.
    c. Survey (via telephone) the submitted references for key staff.
    d. Evaluate the Contractor's ability to meet a guaranteed emergency response time.
    e. Evaluate the submittals and recommend pre-qualified contractors to Owner.
9. Prepare pre-qualification notices to qualified contractors and advise of preliminary schedule for bidding.

6. Bidding Services

Following Owner written notification to advertise for bids, ENGINEER will provide bidding phase services. ENGINEER will accomplish the following:

1. Prepare and submit Advertisement for Bids to newspaper(s) for publication as directed by the Owner. Owner will pay advertising costs outside of this contract.
2. Dispense construction contract documents to prospective bidders using ENGINEER's online plan room (at the approximate cost of reproduction and handling).
3. Support the contract documents by preparing addenda as appropriate.
4. Participate in one (1) pre-bid meeting.
5. Attend the bid opening.
6. Prepare bid tabulation.
7. Evaluate bids and recommend award.
8. Prepare construction contracts. ENGINEER will submit two (2) copies of conformed documents to the Owner and three (3) copies to the Contractor, including plans and specifications with bidding addenda incorporated.

7. Construction Phase Services

Following Owner award of a contract to a bidder, ENGINEER will provide construction phase services. ENGINEER will accomplish the following:

1. Attend one (1) preconstruction meeting.
2. Attend up to nine (9) monthly progress/coordination meetings with the Owner/Contractor.
3. Assist OWNER to evaluate and respond to construction material submittals and shop drawings. Contractor shall submit construction material submittals and shop drawings to both OWNER and ENGINEER. ENGINEER shall incorporate OWNER corrections and comments into responses. Corrections or comments made by ENGINEER on the shop drawings during this review will not relieve Contractor from compliance with requirements of the drawings and specifications. The check will only be for review of general conformance with the design concept of the project and general compliance with the information given in the contract documents. The Contractor will be responsible for confirming and correlating all quantities and dimensions, selecting fabrication processes and techniques of construction, coordinating his work with that of all other trades, and performing his work in a safe and satisfactory manner. ENGINEER's review shall not constitute approval of safety precautions or constitute approval of construction means, methods, techniques, sequences, procedures, or assembly of various components. When certification of performance characteristics of materials, systems or equipment is required by the Contract Documents, either directly or implied for a complete and workable system, ENGINEER shall be entitled to rely upon such submittal or implied certification to establish that the materials, systems, or equipment will meet the performance criteria required by the Contract Documents. ENGINEER will provide the Owner electronic PDF copies of approved submittals and shop drawings received from the Contractor.
4. Issue instructions to the Contractor on behalf of the Owner and issue necessary clarifications (respond to RFIs) regarding the construction contract documents.
5. Review up to nine (9) Contractor's progress payment requests based on the actual quantities of contract items completed and accepted and will make a recommendation to the Owner

regarding payment. ENGINEER's recommendation for payment shall not be a representation that ENGINEER has made exhaustive or continuous inspections to (1) check the quality or exact quantities of the Work; (2) to review billings from Subcontractors and material suppliers to substantiate the Contractor's right to payment; or (3) to ascertain how the Contractor has used money previously paid to the Contractor.

6. ENGINEER is not providing residential construction observation services during the 9-month construction contract performance time but will coordinate with the Owner's chosen onsite representative for construction. If the Owner wishes ENGINEER to provide observation, the Owner will pay ENGINEER an additional fee agreed to by the Owner and ENGINEER.
7. When authorized by the Owner, ENGINEER will prepare up to two (2) change orders for changes in the work that originally provided for in the construction contract documents. If redesign or substantial engineering or surveying is required in the preparation of these change order documents, the Owner will pay ENGINEER an additional fee to be agreed upon by the Owner and ENGINEER.
8. Prepare and furnish record drawings based upon a set of redline marked up construction drawings maintained by the Contractor and verified by the Owner during construction observation. ENGINEER will provide the Owner one (1) hard copy set of 11" x 17" record drawings.
9. Participate in final project inspection, prepare punch list, review final project closing documents, and submit final pay request.

The basis for the proposed fee for Construction Phase Services is a 9-month construction contract performance time. If the construction time extends beyond the time established in this agreement, and the Owner wants ENGINEER to continue the applicable Construction Phase services, the Owner will pay ENGINEER an additional fee agreed to by the Owner and ENGINEER.

8. Application Engineering Services

The application engineering scope of services includes PLC and HMI programming for the new water treatment and distribution SCADA systems as described below.

Southeast Water Treatment Plant

1. Perform SCADA software configuration on new SCADA hardware for the most recent version of FactoryTalk View Site Edition SCADA software. Software and hardware will be provided by the Contractor. Process control functionality and content of existing graphic screens might require some modification.
2. Configure and test redundant server configuration for SCADA software.
3. Configure ThinManager software for new thin client workstations.
4. Coordinate with City IT department for network, firewall, and security configurations for remote access.
5. Assist with configuration and setup of applications on mobile and tablet devices for remote access to SCADA graphics.
6. Configure and test new PLC processor modules at distributed PLC cabinets. New PLC hardware and installation will be provided by the Contractor.
7. Coordinate replacement of vendor supplied package system control panel hardware and configure SCADA graphic screens to communicate with new hardware. Replacement of hardware to be provided by the Contractor/package system manufacturer.

Medicine Park Water Treatment Plant

1. Perform SCADA software configuration on new SCADA hardware for the most recent version of FactoryTalk View Site Edition SCADA software. Software and hardware will be provided by the Contractor. Process control, functionality, and content of existing graphic screens might require some modification.
2. Configure and test redundant server configuration for SCADA software.
3. Configure ThinManager software for new thin client workstations.
4. Coordinate with City IT department for network, firewall, and security configurations for remote access.
5. Assist with configuration and setup of applications on mobile and tablet devices for remote access to SCADA graphics.
6. Configure and test functionality of new redundancy hardware for the main PLC. New PLC hardware and installation will be provided by the Contractor.
7. Coordinate replacement of vendor supplied package system control panel hardware and configure SCADA graphic screens to communicate with new hardware. Replacement of hardware to be provided by the Contractor/package system manufacturer.

Water Distribution System

1. Develop new SCADA graphic screens in FactoryTalk View Site Edition for all water distribution sites. Screens will include functionality similar to existing Terra SCADA HMI screens, with additional status and alarms for additional I/O identified during design. The screens will be included as part of the FactoryTalk installation at the SEWTP.
2. Develop programming for new PLCs at water distribution sites. Process control functionality to match existing.

Factory Acceptance Testing

1. Southeast Water Treatment Plant and Water Distribution
    - Attend up to five (5) days of factory acceptance testing for the new water distribution and SEWTP SCADA system. The factory acceptance testing is expected to initially include ENGINEER and the Contractor to perform basic setup and operational testing. The Owner is expected to attend for demonstration testing after ENGINEER and the Contractor have successfully performed operational testing. The factory acceptance testing will include all new water distribution RTU panels and new SEWTP SCADA hardware, connected together at a single location provided by the Contractor. ENGINEER will provide the PLC programming and SCADA graphics for the testing. The purpose of the factory acceptance test will be to ensure the functionality of all screens and process control of the water distribution system, and SCADA HMI redundancy and communications configuration for the SEWTP HMI system.
2. Medicine Park Water Treatment Plant
    - Attend up to five (5) days of factory acceptance testing for the new Medicine Park SCADA HMI and central redundant PLC system. The factory acceptance testing is expected to initially include ENGINEER and the Contractor to perform basic setup and operational testing. The Owner is expected to attend for demonstration testing after ENGINEER and the Contractor have successfully performed operational testing. The factory acceptance testing will include the new MPWTP SCADA HMI and central PLC hardware, connected together at a single location provided by the Contractor. The purpose of the factory acceptance test will be to ensure the functionality of the SCADA HMI and central PLC redundancy and communications configuration for the MPWTP system.

9. Project Implementation

The construction documents will specify the contractor's responsibilities for coordination and completion of project start-up services. ENGINEER's application programming technicians will be on site at the Owner's facilities to provide programming support for system startup and implementation. It is expected that startups will occur in three separate stages: one for MPWTP, one for SEWTP, and one for the water distribution system. ENGINEER will provide on-site startup support for up to (2) weeks for each stage. ENGINEER's technicians will spend up to (2) additional days onsite with the Owner's staff to go through the new systems and answer questions.

The Owner will provide ENGINEER with remote access to each SCADA system network for remote startup support as required.

Engineer will provide an application manual at the completion of the project that will include documentation about the configuration and operation of the new SCADA system including the following:

- Project record drawings
- O&M manuals for equipment
- Written description of new radio telemetry system operation
- Written logic control narratives describing the functionality of the new PLC and HMI application development
- Documentation of SCADA HMI software configurations

Deliverables

1. Digital copies of final PLC and HMI application programs.
2. Digital copy of application manual

10. Programming Support

ENGINEER will provide application engineering support for the new systems for both planned maintenance and emergency tasks, as directed by the Owner, for a period up to (5) years after completion of the project.

Planned maintenance services are expected to include one (1) site trip per year to install software updates to the SCADA equipment at the water treatment plant sites. It is expected that the Owner will maintain a software support agreement with software developers that will enable access to free software updates and support. The ENGINEER will not provide software licenses or pay software fees associated with upgrades.

Emergency support will be provided, as directed by the Owner, for troubleshooting of the software systems as needs arise. Support is limited to PLC or HMI programming modifications only. The Owner will provide ENGINEER with remote access to each SCADA system network for remote emergency support where feasible. Site visits will be conducted, as directed by Owner, if emergency support services cannot be successfully provided with remote access.

Support services will be provided on an hourly basis as indicated in the agreement. Requested support beyond the contract amount will be as directed by the Owner in writing for an additional fee as agreed upon by the Owner and ENGINEER.

11. Additional Services considered Extra Work

The following items are anticipated to be required for this project, but the required level of effort is not known at this time and therefore not included in this agreement. These items are intended to be included at a later date by amendment or provided by others:

1. Construction observation.

The following items are not included under this agreement but will be considered as extra work:

1. Redesign for the Owner's convenience or due to changed conditions after previous alternate direction and/or approval.
2. Submittals or deliverables in addition to those listed herein.
3. Financial/Funding assistance
4. Warranty assistance services
5. Construction materials testing
6. Utility potholing or design of utility relocation
7. Electrical utility design
8. Radio telemetry system configuration. Configuration and testing of the new radio telemetry system will be specified in the bid documents to be provided by the contractor.
9. Design of new pump starters or pump control panels at water distribution pump stations.
10. Formal classroom training for SCADA systems
11. Computer hardware or software, software upgrades, or software license purchases. All required hardware and software will be specified in the bid documents to be provided by the contractor.
12. Modification of existing graphic screens for SEWTP or MPWTP related to water treatment process control.
13. Troubleshooting existing or new hardware faults or installation errors.
14. Enterprise network configuration.
15. Preparation of a Storm Water Pollution Prevention Plan (SWPPP).
16. Construction materials testing.
17. Construction observation.
18. Environmental Handling and Documentation, including wetlands identification or mitigation plans or other work related to environmentally or historically (culturally) significant items.
19. Coordination with FEMA and preparation/submittal of a CLOMR and/or LOMR.

Extra Work will be as directed by the Owner in writing for an additional fee as agreed upon by the Owner and ENGINEER.

12. Schedule

ENGINEER shall begin work under this Agreement within ten (10) days of a Notice to Proceed and shall complete the work in accordance with the schedule below:

Phase Description	Calendar Days
50% Design Deliverable	90 days from Notice to Proceed
50% Design Workshop	To be scheduled
100% Design Deliverable	90 days from approval of 50% design
100% Design Workshop	To be scheduled
Final Bid Documents	14 days after approval of 100% design
Bidding Services	60 days after approval of Final Bid Documents
Construction Phase Services	270 days from issue of NTP to Contractor
Application Engineering and Project Implementation	As required concurrent with construction
Programming Support	As required post-construction