



# Utility Engineering Consultants, LLC

Phone : 205.951.3838  
FAX : 205.951.3839  
WEB : www.uecllc.com

130 Southcrest Drive, Suite 100  
Homewood, AL 35209  
P.O. Box 19218  
Birmingham, Alabama 35219

June 28, 2024

Heflin Water Works and Sewer Board  
1219 Almon Street, Suite F  
Heflin, Alabama 36264

**RE:   ADDENDUM NO. 1  
      HEFLIN WATER WORKS AND SEWER BOARD  
      WASTEWATER LAGOON UPGRADES  
      CWSRF PROJECT NO. CS010452-05 CONTRACT NO. HEF23 076**

All Contractors shall acknowledge receipt of Addendum No.1 for above referenced job by signing and returning this statement by email: [ktwymon@uecllc.com](mailto:ktwymon@uecllc.com) or fax to (205) 951-3839.

Contractor: \_\_\_\_\_

Received by: \_\_\_\_\_

Date: \_\_\_\_\_



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The changes, modifications and/or additions covered by the set forth in this Addendum No. 1 shall become part of and be incorporated in the Specifications, Contract Documents and Bid Documents for the above referenced Project.

## **CONTRACT DOCUMENTS AND SPECIFICATIONS**

- **SECTION 13400 SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM**

This Addendum No. 1 should be added to the Contract and Specifications Documents. Acknowledgment of receipt of Addendum No. 1 shall be noted in the Bid for Unit Price Contracts Section of this contract.

UTILITY ENGINEERING CONSULTANTS, LLC

Dave Bechtel

DB/kt

**ATTACHMENT:   SECTION 13400 SUPERVISORY CONTROL AND DATA ACQUISITION  
SYSTEM**



## SECTION 13400

### SUPERVISORY CONTROL AND DATA ACQUISITION SYSTEM (TELEMETRY)

#### PART 1 - GENERAL

#### 1.1 SCOPE

- A. Coordinating Sections Under This Division
  - 13400 - Supervisory Control and Data Acquisition System. General specifications for performance, Master Instrumentation Index, Functional System Specification, I&CS contract administration, testing, and training.
  - 13402 - Hardware and software required for the various data acquisition.
  - 13403 - Field Instruments. Devices and methods for measuring and controlling process.
  - 13404 - Materials and methods for panel construction.
  - 13405 - Telemetry and Data Communication Equipment. Special equipment solely dedicated to data transmission.
- B. Work covered under this section shall include provision of all labor and material required to furnish, install, test, calibrate, and place into operation a complete Supervisory Control and Data Acquisition (SCADA) System as set forth in the drawings and in accordance with this section of the Specifications and other sections as outlined below.
- C. The work shall include the complete testing, recommended by respective equipment manufacturers, of all equipment and shall also include any changes or adjustments necessary for the proper functioning of the system and equipment.
- D. It shall be the responsibility of the Contractor to coordinate the work and equipment, as set forth in this section, with work and equipment specified under other sections of the Specifications in order to provide a complete and satisfactory installation. No changes in the work shall be made without written approval of the Engineer.

#### 1.2 DIVISION OF WORK

- A. SCADA Telemetry Supplier - CPI to match existing SCADA
  - 1. The Contractor shall employ a SCADA Supplier to implement and integrate the SCADA System. The SCADA Supplier shall:
    - a. Provide all required submittals for the SCADA System
    - b. Provide the SCADA System components as specified in this and subsequent sections.
    - c. Integrate the SCADA System and ensure proper functionality as specified in this section.

- d. Coordinate with the Contractor to ensure proper installation of the SCADA system components.
- e. Provide on-site startup of the SCADA system components.
- f. Provide all required testing and calibration.
- g. Provide Owner training.
- h. Provide Operation and Maintenance manuals.

### 1.3 **CONTRACTOR**

- A. The Contractor shall have overall system responsibility and shall provide all additional materials and work as necessary to meet the requirements of this specification. In particular, the Contractor shall:
  - 1. Provide any mechanical mountings, and mount panels and instrumentation.
  - 2. Coordinate system startup with other trades and equipment suppliers.

## **1.4 RELATED SECTIONS**

- A. 01300 - Submittals. Submittals shall be in accordance with the requirements set forth in Section 01300 General Requirements.
- B. 01400 - Quality Control. Equipment acceptance, testing, FAT and SAT shall be in strict accordance with Section 01400 and any general requirements set forth in this section.
- C. 01730 - Operation and Maintenance Data. Operation and Maintenance data shall be submitted in accordance with Section 01730.
- D. 16000 - Electrical Work. Electrical raceways and wiring external to panels covered under this section are part of the ELECTRICAL work specified in Section 16000. Except for special communication cables, all instrumentation wiring and cables and the proper termination of same, shall be provided and installed under Section 16000.

## **1.5 SUBMITTALS**

- A. All submittals shall be neat and meet any general requirements for submittals as called for elsewhere in this specification.
- B. The following submittals shall be provided in quantity required by Section 01300, according to the Submittal Schedule, for the following:
  - 1. Panel component manufacturer's data sheets indicating pertinent data and identifying each component by item number and nomenclature as indicated on the drawings and Master Instrumentation Index.
  - 2. Field Instrument manufacturer's data sheets showing dimensions, mounting, and external connecting details. Data sheets shall be marked indicating pertinent data and identifying each component by item number and nomenclature as indicated on the drawings and Master Instrumentation Index.
  - 3. System interconnection wiring schematics showing details of panel internal wiring and field wiring terminations.
  - 4. Mechanical layouts for all panels showing complete layout and panel front configuration.
  - 5. A thermal study for each control panel, demonstrating that panel interior conditions satisfy requirements for all devices contained therein across worst case environmental circumstances.
  - 6. Acceptance Test procedures detailing personnel, setup requirements, simulator/field instrument connections, required test equipment, and fault condition testing.

## **1.6 PROJECT RECORD DOCUMENTS**

- A. Following Site Acceptance, the System Supplier shall furnish Operation & Maintenance Manuals in quantity required by relevant paragraphs in Sections 01300 and 01700, containing the following:
  - 1. "As Built" blue line or photocopy drawings of same scale as original drawings, showing all equipment as actually installed. This set of drawings shall include all installed change orders, field condition changes, and other departures from the original plans and Specifications.
  - 2. Shop drawings and other data required by the Specifications reflecting the manufacturer's shop fabrication of the materials and equipment as installed. Data sheets shall be provided for all instruments, controllers, and computers detailing as-installed hardware configuration and setup.
  - 3. Program listings for each programmable control device. Listings shall include a descriptive heading containing at least the controller identifier, program version number, and release date.
  - 4. Instruction manuals detailing operation procedures, computer user interface, and special maintenance. Manuals shall give thorough attention to system management from an operator's viewpoint, including normal operation and adjustments, access to "Help" functions, emergency procedures, and failure recovery.

## 1.7 QUALITY ASSURANCE

### A. Single Source Responsibility

1. Attention should be directed to the fact that the SCADA System is an integrated system and, as such, shall be furnished by a single System Supplier. This System Supplier shall provide all equipment, field mounted accessories, and services regardless of manufacturer, and shall be responsible for satisfactory commissioning of the entire system.
2. The System Supplier shall be responsible for the detailed design and the proper functioning of the control and data acquisition system and instrumentation to be furnished under these Specifications; the preparation of required submittals and record documents; and providing technical supervision for installation and connection of equipment.
3. The System Supplier shall have in regular employ competent personnel experienced in the design, programming, and manufacture of equipment and systems required to be furnished under these Specifications. The Supplier shall assign an experienced, competent person to act as Project Manager. This person shall have responsible project experience on systems similar in scope and complexity to that specified herein.
4. The System Supplier shall have an in-house quality assurance organization capable of ensuring compliance with the standards set forth in these Specifications. The quality assurance organization shall be capable of performing complete in-house system check-out and simulation prior to shipment, as required by these Specifications.
5. It shall be required of the Systems Supplier to execute and submit a guarantee to assume full responsibility as defined herein above. It is the duty of the Contractor that this guarantee shall be included with the executed contract documents. The written guarantee shall be on the System Supplier's letterhead and shall be signed by a responsible representative who will be primarily involved in the fulfillment of this guarantee. The written guarantee shall be stated as follows:

United Controls Corporation guarantees that the proposal offered provides for complete compliance with all requirements of the section of the project Specifications without exceptions to these Specifications.

Full responsibility will be placed upon United Controls Corporation for all engineering necessary to select, furnish, supervise installation and connections, calibrate, and to place into operation a Supervisory Control And Data Acquisition System and all other equipment and accessories need to provide a complete operation system to comply with requirements of this section of the Specifications. United Controls Corporation guarantees to provide all submittal data and drawings, technical manuals, and qualified personnel for specified field services and training, all as defined within this section of the project Specifications. The guarantee on system function and equipment shall be one (1) year from date of acceptance by the Owner.

## 1.8 SITE ACCEPTANCE TEST

- A. The System Supplier shall conduct a Site Acceptance Test (SAT) at the customer's facility following system installation and startup, and prior to final commissioning. The SAT shall include complete in-service testing of all system components, panels, communications, and computers to assure conformance with this specification.
- B. The SAT procedure shall cover as a minimum: point-by-point testing of all RTU/PLC inputs and outputs based on actual equipment operation; demonstration of nominal and off-nominal function (in so far as practically possible) for all control loops; exercise of all counters, totalizers, etc.; and demonstration of data reporting and control through all panel fronts, display/keypad units, and computer interfaces.

- C. The SAT shall be performed by the customer's personnel in cooperation with the System Supplier's representatives. Procedures shall be structured as a series of STIMULUS-RESPONSE tests with explicit check-offs for each item.
- D. Deficiencies (defined as non-compliance with these Specifications) identified during the SAT shall be corrected and affected systems completely re-tested. There shall be no outstanding deficiencies at the completion of the SAT.
- E. The SAT procedure shall be submitted to the customer for approval at least fifteen (15) working days prior to the scheduled SAT. The customer shall return the SAT procedure to the System Supplier at least five (5) working days prior to the scheduled SAT.

## **1.9 CERTIFICATION**

All control panels shall be constructed in strict accordance with Underwriter's Laboratories Subject 508A, and shall bear the serialized U.L. mark of a certified integrator.

## **1.10 QUALIFICATIONS**

- A. The System Supplier shall have been regularly engaged in the type of work called for under these Specifications for at least ten years to date, and shall have recent and pertinent experience with systems of comparable scope and complexity.
- B. The System Supplier shall demonstrate systems capabilities by having the resources to successfully complete the work as called for in the Specifications.
- C. The System Supplier shall be fully certified according to Underwriters Laboratories Subject 508A at the time of contract award.

## **1.11 PATENTS AND CLAIMS**

- A. The Contractor shall be responsible for all patents, licenses, fees, or claims because of the design, equipment or assemblies used, and because of any special provision or requirements which are inherent for the proper operation of the equipment specified or required under these Specifications.
- B. The Contractor shall assume all costs of any patent fees, or licenses, and shall safeguard and indemnify the Owner from all damages or judgments, claims, and expenses arising from the infringement of any patent letters or patent rights, or because of any royalty, fee, or license item, or for any features or arrangements occasioned by reason of the installation and use of a mechanism, including electrical circuits and/or devices furnished under this Contract, and all costs shall be included in the incidental cost for constructing the facilities for patent fees, licenses, and royalties as mentioned herein.

## **PART 2 - PRODUCTS**

### **2.1 MASTER CONTROL SOFTWARE SYSTEM (MCSS)**

- A. The Master Control Software System shall be the latest version of scadaVision and shall provide features as listed below:
  - 1. Operating System
    - a. The MCSS shall run under standard Windows NT version 4.0 or greater, to provide:
      - 1) true multi-tasking with realtime preemptive scheduling of processes based on priority
      - 2) separate scheduling classes for idle-time, normal, and real-time requirements
      - 3) execution in protected mode with access to 512 megabytes of real and 4 gigabytes of virtual memory space
      - 4) unlimited full speed execution of Windows applications



- 5) unlimited execution of Windows applications without hampering SCADA performance
  - 6) full DOS/Windows file and command compatibility
2. MCSS programs which do not employ priority based preemptive scheduling, or which replace the operating system kernel or load a specialized command interpreter will not be accepted.
- B. Security
1. User access to MCSS control and configuration functions shall be limited by Username and Password. Each user shall have a unique password which that user can change at any time. All password and name information shall be stored on disk in a secure, encrypted format to prevent unauthorized access. A user shall gain access to the system by the log-in process wherein the user supplies a name and password. No portion of a user's password shall be visible on the screen at any time during log-in.
  2. System access privilege shall be divided into at least the following categories:
    - a. Privilege to select arbitrary display pages and to acknowledge alarms
    - b. Privilege to issue discrete and analog controls and setpoint changes
    - c. Privilege to perform On-Line RTU download and to access Workline
    - d. Privilege to perform On-line database edits
    - e. Privilege to add and delete users, to reset user passwords, and to assign user privileges
- C. Database
1. The MCSS shall allow up to 65,000 points of analog or digital data to be stored in the real-time database. Analog data shall be stored in Double Precision floating point format. The MCSS shall allow database values to originate as telemetered data, computed data, manually entered data, or data generated by other processes running on the MCSS computer.
  2. The MCSS shall provide for manual override of any point in the database. When a point is in manual mode, results of telemetry or computation shall be superseded by the operator's specified value. Normally telemetered or computed data shall still be available for operator viewing even when a database point is manually overridden.
  3. The MCSS shall support on-line addition, deletion, and modification of any point in the database. On-line editing shall not interfere with normal data acquisition and processing. All on-line database access shall be via selection from a scrollable list or explicit entry of a point id.
  4. The MCSS shall support off-line addition, deletion, and modification of any point in the database. Off-line editing shall only operate on a static definition of the database and shall not interfere with normal on-line functions.
  5. The MCSS shall provide a library of computed point functions including arithmetic, Boolean, and statistical operators. Users shall have the ability to compose and add new computed point function definitions through OS/2 DLL support. The MCSS shall allow any point in the database to act as an input to any number of computed point functions.
- D. Graphical User Interface
1. The MCSS shall provide color, full graphic display pages using at least SVGA format (1280 x 1024 pixels). The display pages shall be user composable, requiring no programming. There shall be no limit on the number of pages available other than the physical size of the storage medium. The MCSS shall have the capability to edit and load page definitions without interrupting normal data acquisition and other run-time functions.
  2. The run-time interface to the display system shall employ a mouse, trackball, or other pointing device to: select pages to view, execute functions, and pick elements to control. Keyboard operation shall not be required for any function other than alphanumeric data entry.
  3. No area of user composable screens shall be dedicated to any function. Full screen displays shall cover the entire active monitor area and shall not require bars, borders, or gadgets. All selection information shall be presented via pop-up menus or dialog boxes in order to maximize usable screen space. Menu bars, function keys, or keyboard entry shall not be required to access menus.
  4. Setpoints and controls shall be accessed by pointing device selection of on-screen objects and subsequent entry into a pop-up dialog box. Menu bars or function keys shall not be required to

issue controls. Keyboard sequences shall not be required except to enter alphanumeric setpoint data.

5. The MCSS user interface shall provide a shortcut mechanism for directly accessing tag names and information about dynamic on-screen objects. This shortcut mechanism shall be strictly based on pointing device selection of the on-screen object and shall not require a priori knowledge of tag names.

#### E. Display Page Editor

1. The MCSS shall include a CAD-like display editor for user creation and modification of pages. The editor shall employ the same type of menuing system as the MCSS run-time. The editor shall provide tools to:
  - a. define, place, edit, and activate lines of varying widths and varying colors
  - b. define, place, edit, and activate symbols of varying colors from a library of user-composable bit images
  - c. accept PCX or TIFF bit images from illustration programs such as Corel Draw or PC Paintbrush
  - d. define, place, edit, and activate text lines of varying lengths, colors, and backgrounds
  - e. move all or any portion of a page from one location on a page to another, including all linkages to real-time database elements
  - f. delete all or any portion of a page, including all linkages to real-time database elements
  - g. place lines, texts, and symbols using a snap-to grid to allow easy connection of objects
2. The display page editor shall provide tools for associating both dynamic control and display functions with any object on any user composable display page. Control (Pick) functions and display (Format) functions shall be presented on context controlled scrollable lists. Configuration of dynamic points shall not require programming.

#### F. Historical Recording

1. The MCSS shall allow any point in the real-time database to be historically recorded, at any frequency multiple of one minute. The MCSS shall allow any number of instances of a data element to be retained in the historical database (arbitrary recording interval). There shall be no restrictions on the number of points or amount of data recorded in the historical database except the limits of the physical storage medium.
2. The MCSS shall permit on-line addition, deletion, review, and editing of historical points without disruption of normal system function or historical data collection.
3. The MCSS shall provide an archiving mechanism for copying portions of the historical database to a static file. The MCSS shall be capable of performing on-line data archiving, including periodic automatic archiving, directly from the historical database without disruption of normal historical recording. The MCSS also provide a rebuild capability for reconstructing a historical database from archive files.

#### G. Limits and Alarm Processing

1. The MCSS shall provide the following user configurable alarm processing on each analog point:
  - a. Limits
    - 1) High Reasonability
    - 2) High-high limit
    - 3) High limit
    - 4) Low limit
    - 5) Low-low limit
    - 6) Low Reasonability
    - 7) Rate-of-Change
  - b. Deadband

The MCSS shall provide a user selectable deadband on analog alarms, to filter small oscillations about an alarm limit.

2. The MCSS shall permit definition of an alarm state for any or all states of each digital point. Alternately, any discrete state may be configured as a Log-Only condition. Log-Only states produce audit trail entries but no alarms.
3. The MCSS shall be capable of inhibiting alarm checking on any alarm in the system upon request by an operator with sufficient privilege. The operator shall be able to set and clear inhibits on-line without disrupting normal system function.
4. The MCSS shall present all active alarms in reverse chronological order (most current first) on a series of alarm summary display pages. Each alarm occurrence shall remain visible on its alarm summary page until the operator has acknowledged the alarm and the alarm condition has returned to normal. Alarms shall be annunciated via an audible tone and shall be silenced by selection of an on-screen object or by a shortcut function key.
5. The MCSS shall perform Reasonability limit checking on Analog Output points and shall not allow assignment or transmission of setpoint values outside configured upper or lower limits.
6. The MCSS shall have provisions for the data to be printed in tabular form over any time period from thirty (30) minutes to five (5) years. The user shall be able to choose how the data is printed (i.e. hourly flow, daily flow, minimum, maximum, average, etc.).
7. The MCSS shall export data to Microsoft Excel spreadsheet program.
8. The MCSS shall insert the appropriate data into spreadsheet in the format as required by the Owners.

#### H. Help

1. The MCSS shall provide Help functions accessible to the operator by pointing device selection of screen objects on display pages, the Alarm Summary, or Trend Pages.
2. Help messages shall be user composable, in plain ASCII text. Editing Help text shall not disrupt normal on-line functions of the MCSS run-time.
3. Help messages for the Alarm Summary shall be available for each individual alarm state of all real-time points, RTU communication failures, printer device failures, etc. Alarm Help messages shall be context sensitive such that only the appropriate message is presented when a displayed alarm is selected with the pointing device.

#### I. Printers and Management Record Keeping

1. The MCSS shall provide for configuration of multiple printers or other output devices. The MCSS shall support at least an audit trail (logging) printer and a report printer, with the ability to internally route both functions to one device. Electronic storage of all output shall be supported for systems with no printers.
2. For systems with two printers available, the MCSS shall be capable of automatically failing-over from one printer to another if one of the two has malfunctioned or is turned off.
3. All events, controls, alarms, log-ins and log-outs (including username), and database edits, shall be recorded on the logging printer and shall be time stamped with the date and time of occurrence.
4. The MCSS shall maintain daily log files on disk, in ASCII plain text format. Each log file shall be time stamped with the year, month, and day as the file name. Log files shall contain a copy of all traffic to the audit trail (logging) printer such as alarms, events, operator log-in/log-out, controls, database edits, and other messages which the MCSS may include.
5. For systems where reports and logging are occurring on the same printer, report printing shall not be interrupted by audit trail (logging) entries.

#### J. Trending

1. The MCSS shall provide color graphic trending of real-time, historical, and archive data. The MCSS shall provide at least two full-screen trend displays. Trends shall be on-line user-configurable and shall have the following characteristics:
  - a. There shall be at least five trend lines in each window, differentiated by color.
  - b. Data trended shall be in any combination from the real-time database, the historical database, or from archived data such that current data may be compared against historical data.
  - c. The time scale shall be arbitrary and user definable from 1 second to any number of days, months, or years.

- d. Decimal precision and vertical scaling for each trend curve shall be set by the user. Vertical scales shall be arbitrary floating-point values.
  - e. Horizontal and vertical axis labels shall be presented, showing current settings for all scales.
  - f. Time offset shall be available such that individual curves can present historical data while the rest present real-time data. Each offset interval shall be an arbitrary unit of time and shall be configurable by the user.
  - g. Each trend page shall provide a movable cursor to measure exact data values on the trend lines at particular dates and times.
2. The MCSS shall allow any number of trend page configurations specifying points, scales, and time. These configurations shall be easily saved and loaded while on-line. A priori knowledge of trend page configuration names shall not be required.

#### K. Communication

1. The MCSS shall concurrently support multiple communication protocols over multiple ports.
2. The MCSS shall provide communication statistics on both an RTU and port level. The MCSS shall provide communication alarm generation after a user selectable number of message failures and in peer-to-peer hierarchies shall generate scans to second and lower level RTUs to detect communication failures.
3. For RTUs and PLCs which keep internal clocks, the MCSS shall be capable of automatically synchronizing machine time with the MCSS system clock.
4. For appropriate RTUs and PLCs, the MCSS shall provide a Work line capability which allows direct access to machine parameters. The work line shall generally support such features as single point scanning of arbitrary analog and discrete data, and manual control and over-write.

#### L. Reports

1. The MCSS shall be able to generate reports as hard copy, electronic copy, or both.
2. Reports shall be user composable while the system is running. Reports shall present any combination of fixed text, real-time data, statistical analysis or computations, or historical data. Printer controls shall be provided for type face and width selection, and relative positioning of data.
3. Reports shall be generated on operator demand, periodically, or both. Demand reports shall have the facility to accept run-time parameters entered by the operator when the report is invoked.
4. In a single printer system, the MCSS shall provide appropriate printer form feeds to completely separate reports from logging entries. Generated reports may be stored electronically in the same form as that used for printing, such that they may be archived.
5. The MCSS reporting system shall provide format features whereby data may be exported in blocks to external applications such as spreadsheets and databases.

#### M. Network

1. The MCSS shall support a local area network configuration that permits multiple operator workstations to access a shared real-time database.
2. Each operator's workstation shall have visibility of any data that is collected, calculated or entered into the MCSS database.
3. An operator with the appropriate privilege shall be able to modify the database from any workstation. Appropriate interlocks shall exist which prevent multiple operator workstations from modifying the same database element simultaneously.

#### N. Applications

1. The MCSS shall support optional add-on modules and applications including the following:
  - a. Historical database update. The MCSS shall support an application which populates the historical database with data from infrequently polled RTUs. This application shall receive time-stamped bulk data from RTUs with the capability to record such and place this data in the history file to appear as though it had been collected in real-time.
  - b. Alarm Limit profiling. The MCSS shall support an application which updates alarm limits for selected points based on date and time, according to a predetermined profile. The profile and

update intervals shall be user configurable while the system is running.

- c. Voice interface. The MCSS shall support a software module that allows users to interact with the system over the telephone, voice radio, or personal paging devices. MCSS generated vocal messages shall be arbitrary, user composable text strings of any length. Capabilities shall include announcement of alarms, statuses, parameters values, and execution of controls. Access to, and control of, the Voice Interface shall be by DTMF tones, and shall be password protected.

O. The peak flow SCADA shall be completely integrated into the existing plant SCADA.

## 2.2 MONITOR AND CONTROL SYSTEM

- A. The main control and monitoring Computer, PLC, and Communications System shall be provided by a Licensed Alabama General Electrical Contractor, located within 100-mile radius of the Heflin Wastewater Plant. The contractor must provide documentation to demonstrate, at minimum, 10 years in business of monitor and control system.
- B. The contractor will provide a complete and operational system to fully provided the functionality required by the specifications. System will be required to interface to the existing Radio Telemetry Monitor and Control System provided by Hydra Link. Relocation of CPI System components will also be included in this project.
- C. Monitor and control system requirements shall be as follows:
  1. The primary sections specified are:
    - a. The control room computer system.
    - b. Installation of monitor system in main office
    - c. Installation of plant PLD's and all associated firmware and software.
- D. Computer Room shall contain one 60" monitors,
- E. The corresponding Computers shall interface, as required, for a fully operational system. Each PC shall be installed with a UPS of at least 1000 VA. The WWTP and CPI System shall both be supplied with a new inkjet printer. The existing CPI System shall include a PC upgrade. Software for the Plant shall operate and/or monitor plant utilizing graphical and digital information, as required.

## 2.3 PLC OPERATIONS

- A. The software package shall provide alarms, setpoints, control points, and status of the following as required for operations:
  1. I/O Points:
    - DI 1 DO 1 Influent Pump #1
    - DI 2 DO 2 Influent Pump #2
    - DI 3 DO 3 Influent Pump #3
    - DI 4 DO 4 Bar Screen Run
    - DI 5 DO 5 Bar Screen Fault
    - DI 6 DO 6 Conveyor Run
    - DI 7 DO 7 Conveyor Fault
    - AI 1 Influent Flow
    - DI 8 DO 8 Aerator #1
    - DI 9 DO 9 Aerator #2
    - DI 10 DO 10 Aerator #3
    - DI 11 DO 11 Aerator #4
    - DI 12 DO 12 Aerator #5
    - DI 13 DO 13 Aerator #6
    - DI 14 DO 14 Aerator #7
    - DI 15 DO 15 Effluent Pump #1
    - DI 16 DO 16 Effluent Pump #2
    - DI 17 DO 17 Effluent Pump #3

AI 2 Effluent Flow  
AI 3 Septage Station Flow  
DI 17 18 18 Septage Station Run  
AI 4 UV System Data  
DI 19 DO 19 Front Gate Open  
AI 4 Generator Data

2. Monitor and Report Information

1 Effluent Pump Run Hours  
2 Effluent Pump Run Hours  
3 Aerator Run Hours  
4 Bar Screen Run Hours  
5 Conveyor Run Hours  
6 Influent Flow- Daily 24 hour & Monthly totals  
7 Effluent Flow- Daily 24 hour & Monthly totals  
8 Septage System reports for billing  
9 UV System - bulb hours, power consumption, run time  
10 Generator run time and fault alert  
11 Wet well level monitoring hourly  
12 All equipment faults

3. Control Logic Software:

- a) Wonderware Graphical Software or equivalent, including runtime key.
- b) Provide graphical and digital I/O point illustrations.
- c) Provide alarm page, history charts and I/O summary page.

4. License Requirements:

- d) SCADA Contractor shall have an Alabama Electrical General Contractors License and a City of Heflin business license.

5. Conduit Requirements:

- a) Per NEC in effect at time of installation

**PART 3 - EXECUTION**

**3.1 INSTALLATION**

- A. All wiring, controls, switches, alarms, components, and accessories shall be sized and installed per the manufacturer's recommendation.
- B. The contractor, SCADA System Supplier, and all sub-contractors shall familiarize themselves, coordinate, and cooperate with other trades in installation of the instruments and SCADA System.
- C. The Contractor shall notify the Engineer of conflicts with electrical, structural, architectural, or mechanical work arising from installation of instrumentation and SCADA components.

**3.2 CABLE INSTALLATION**

- A. All cable installed for communications with the SCADA system shall be done with a single pull.
- B. The length of connections to the SCADA system may require terminal strips in above ground junction boxes.
- C. All in the field terminations shall be made with above grade terminal strips in watertight junction boxes.
- D. Cable splice shall not be allowed in shielded cable.

