INDEX TO

SECTION 16400
SCADA SYSTEM COMMUNICATION AND MISC. INSTRUMENTS

SECTION 16400

SCADA SYSTEM COMMUNICATION AND MISC. INSTRUMENTS

PART 1 – GENERAL

1.01 PURPOSE

Pump station SCADA, alarm dialers, and flow meters are used for control of the pump station, communication of the alarms, and recording of flow data such that the reliability of the pump station and overall sewage collection system is ensured.

1.02 RELATED DOCUMENTS

The below listed documents shall be used in conjunction with this section. In the event of conflict between the requirements of this document and the related documents; this specification document shall govern.

A. Specification Section 11110
B. Specification Section 16000
C. Specification Section 16482
D. Specification Section 16620

The most current revision at the time of project approval shall apply. Specification revisions become official once posted on the City of Savannah web site.

1.03 SUBMITTALS

A. SCADA System

1. Provide a complete submittal package for evaluation by the owner. The following list, as a minimum, shall be submitted for review.

    i. Descriptions of equipment and services to be provided
    ii. List of equipment.
    iii. Results of radio path study
    iv. Detail drawings of the panel layout: SCADA cabinet with RTU and associated equipment, include field wiring terminations
    v. Warranty
    vi. Antenna, cable and all fittings and connectors

B. Cellular Dialer

1. Provide a complete submittal package for evaluation by the owner. The following list, as a minimum, shall be submitted for review.

   i. Description of the equipment to be provided
   ii. Manufacturer cut sheets of the cellular dialer, enclosure, and remote antenna (as required).
   iii. Service contract
   iv. Warranty

C. Flow Measurement Equipment

1. Provide a complete submittal package for evaluation by the owner. The following list, as a minimum, shall be submitted for review.

   i. Description of the equipment to be provided
   ii. Manufacturer cut sheets of the flow meter
   iii. Installation instructions and programming
   iv. Warranty

PART 2 - PRODUCTS

2.01 SCADA REMOTE TERMINAL UNIT (RTU) DEVICES

A. SCADA RTU for ALL Stations (Duplex, Triplex, Variable Frequency Drive):

Controlwave MicroEnc with Modular input/output (I/O), 150 Mhz CPU, 1-Enet, 2- Rs232, 1-Rs485, (32) Digital Inputs points w/ remote termination, (16) Digital output points w/remote termination, (16) Analog Input points w/ Remote termination, (4) Analog output points w/ remote termination. The SCADA unit shall be supplied as a complete unit including a Microwave Data Systems (MDS) SD9 900MHz Radio with 9600bps modem Rs-232, with network wide diagnostics option.

B. Antenna:

Antenna - The antenna shall be 10DB Gain YAGI antenna and shall be furnished complete with all mounting hardware necessary for mounting to a 2" dia. mast (the 10DB Gain YAGI antenna is included in Bristol Babcock's standard duplex and triplex quote/price). Antenna shall be furnished such that the only field connection required by

the Contractor shall be the antenna cable by means of a Type-N male connector. Because the antenna height and Azimuth are site specific it shall be the responsibility of the contractor to obtain the services of a qualified radio system firm to determine proper height and direction of antenna placement. Antenna shall be mounted in accordance with City of Savannah Standard Detail S-18 as applicable. The results of the radio path study, which shall be performed to determine the required antenna height and orientation, shall be submitted to the Owner for approval prior to installation of any equipment. Detail necessary for installation.

C. Radio Path Survey:

Radio Path Study Form, provided below, shall be faxed to the City of Savannah Radio Shop (912-351-3443) and emailed to jeff_jones@savannahga.gov for a determination of height and repeater choice. Contractor shall hire Savannah Communications, contact Harold Miller or Randy Riggin, 912-964-1479 to perform radio path study.

D. SCADA REMOTE TERMINAL UNIT (RTU) STARTUP / TEST

1. The contractor shall provide for complete check out of the SCADA system by the SCADA RTU supplier. This shall include the field wiring, start-up, proper operator of the RTU, interface with field transmitters and control cabinet, the antenna installation, and verification of proper radio operation by the SCADA RTU supplier. The contractor shall provide a certificate of verification to the City of Savannah and signed by the supplier that the unit has been field verified as described above and that the unit will perform as intended under this specification.

2. Antenna: The City of Savannah at start-up will conduct an inspection of installation of Antenna to include the following:

    i. Mounting (Proper hardware)
    ii. Grounding (Proper Grounding Techniques, Cad-welding)
    iii. Cable Installation (Proper Cable Hanger Clips, Proper Spacing of Cable Hangers, SWR, Reflective Power)
    iv. Signal Strength (Min -88)
    v. Connecter End installation (Weather Proofing)

Any problems found by Radio Shop personnel will require immediate action to fix and station will not be allowed to pass inspection until problems are fixed and verified by Radio Shop personnel.

Radio Path Study

Site: _____

Site Coordinates: _____

Date: _____

Technician: _____

Contractor: _____

Survey Results

	Kerry Street N32 02’29.1” W081 04’24.2” 952.39375	South Side N31 56’33.3” W081 07’19.4” 952.08125	West Side N32 04’51.1” W081 15’12.2” 952.28125	Kerry MDS N32 02’29.1” W081 04’24.2” 941.29375
Magnetic				
Statute Miles				
10’				
20’				
30’				
40’				
50’				
60’				
Other				

FILL IN ALL BLOCKS

Comments: _____

2.02 CELLULAR ALARM RTU (Auto Dialer):

A. Equipment Identification:

1. The cellular auto-dialer shall be a Mission Communications Model 110/800 family series unit with Analog Input Option Board, PN 466 in the Mission Communications standard NEMA 1 enclosure with applicable transformer, battery pack, and antenna with mounting accessories.

2. The enclosure for the sub-system shall be rated a minimum of NEMA 3R and shall be a Stahlin Part # J1816HPL enclosure with a Stahlin Part # BP-1816CS backplane.

3. A Thomas & Betts (Steel City) utility box P/N 58371 ¾ with NEMA 5-20 R configured receptacle and Part # 58 C 7 cover for 120 VAC power.

4. All signal/sensing wiring to/from the cellular unit shall be Belden P/N 9316A shielded pair wire.

5. Substitute or “as equal” equipment/material shall not be acceptable.

B. Equipment Installation:

1. The mission unit less the antenna components shall be mounted inside the NEMA 3R enclosure using #8-32 machine screws. The enclosure shall also have the 5-20 R configured receptacle mounted inside of it. The antenna and mount shall be located externally to and higher than the NEMA 3R enclosure such that the cellular signal is not obstructed.

2. The entire assembly shall be securely mounted to its supporting structure as described in Specification Section 11100 and Detail # S19A as applicable.

3. All signal/sensing wiring inside the enclosure shall be terminated by City of Savannah technical personnel. Shield “drain” wires shall not be terminated to ground outside of the enclosure.

4. The cellular alarm RTU assembly shall monitor, report, and/or alarm on the following points as applicable to the individual station:

   a) Wet Well High Level alarm
   b) Phase failure/loss of utility alarm

c) Motor Fail Alarm – Pump #1
d) Motor Fail Alarm – Pump #2
e) Motor Fail Alarm – Pump #3
f) Motor Fail Alarm – Pump #4
g) Generator is “On-Line” alarm
h) Wet Well Level (4-20ma)
i) Pump #1 running AMPS (4-20ma)
j) Pump #2 running AMPS (4-20ma)
k) Pump #3 running AMPS (4-20ma)
l) Pump #4 running AMPS (4-20ma)
m) Flow Meter (pulse)
n) Rain Gauge (pulse)

5. Programming and activation of the cellular dialer shall be accomplished by City of Savannah Wastewater Conveyance Department technical personnel during the final phases of acceptance inspections related to it.

2.03 FLOW MEASUREMENT EQUIPMENT

A. Meter

1. The flow meter shall be of the magnetic type and provide for transmitting of flow in full pipes. The flow meter shall be obstruction free and installed between two pipe flanges having the same nominal diameter as the flow meter end connections. The flow meter shall operate by means of pulsed DC coil excitation and shall not require zero reset. The flow tube shall be constructed of type 304 stainless steel, the liner shall be Neoprene and the sensor electrodes and the grounding electrodes shall be stainless steel type 316. Flow tube end connection shall be 150# ANSI steel flanges. The flow tube shall be able to withstand up to 30 feet submersion for 20 years.

2. The external surface of the sensor shall be protected by corrosion resistant two component paint. The sensor shall be pressure tested to 2.5 times the nominal pressure. The sensor shall be manufactured by an ISO 9001 approved company and shall be Siemens/Danfoss Model MAG 3100/6000 or equal. Sensor shall be supplied with appropriate length of signal cable.

3. If a grounding ring is required, it shall be 316 Stainless Steel and installed at the inlet flange to assure potential equalization.

B. Signal Converter/Indicator and Totalizer

1. The converter shall be suitable for remotely mounting up to 1,000 feet from the sensor. The converter shall be supplied with its own dedicated 120VAC, 60 Hz power source at the station. The power consumption shall not exceed 10 VA.

2. The converter shall provide a 4-20ma isolated output proportional to flow. In addition a frequency/pulse output and a relay output shall be provided by the converter. The frequency output shall be proportional to flow rate and shall be capable of being scaled from 0-10 KHz. The pulse output shall be capable of being scaled for remote totalization.

3. The converter shall have an LCD display showing actual flow in GPM and totalized flow in Gallons. The LCD display shall have at least 2 x 16 alphanumeric digits and be back-lit. The units shall be field programmable and configurable. The units are to be field full scale configurable (exchange from 150 full scale to 300 full scale). The keyboard and display shall be rotatable so that the flow rate and totalized flow can be seen independent of sensor orientation. The converter shall be suitable for bi-directional flow, reading flow rate in both forward and reverse directions and containing two internal counters for totalized flow in both directions.

4. The converter shall be provided with an automatic zero point setting, an auto-range function and an empty pipe cut-off.

5. The converter shall be capable of detecting the following fault conditions:

    a) Loss of current to the coil circuit

    b) Loss of load on the current output

    c) Empty pipe

6. The converter shall be provided with an error log where all fault conditions occurring within 180-day period are stored.

7. The converter shall be a plug-in module, immediately replaceable without the need of disconnecting cables or recalibration.

8. The signal converter shall be manufactured by an ISO 9001 approved company.

9. The flow accuracy on the electronics of the magnetic meter shall be within 0.25% of reading flow accuracy of 0.10% of rate. The magnetic flow-meter shall be Siemens/Danfoss Model MAG 3100/6000 or equal.

C. Execution

1. All components shall be located, (minimum runs of straight pipe upstream and downstream, full pipe flow conditions, etc.), installed and tested in accordance with the manufacturer's written instructions.

2. All component parts/sub-systems shall be located outdoors and, where applicable, contained in a readily accessible enclosure which is rated a minimum of NEMA 3R. Appropriate conduit(s) and wiring shall be installed for power and monitoring signals to be installed into/out-of the system for correct operation.

D. Warranty: All components shall be warranted one year from the final acceptance of the system.

END OF SECTION 16400