

SECTION 40 95 13.22 – WASTEWATER TREATMENT CONTROL SYSTEMS (WWTCSs)

1.01 SUMMARY:

- A. ^{A17}**Scope:** Scope of work shall be in accordance with Paragraph 1.01 D. of Section 01 81 26 (Communications, Control, Safety, and Security Systems), as required, for expanding the Employer's "Division de Agua" (EAA) supervisory control and data acquisition (SCADA) system to wastewater/sewage treatment plants as part of the Works.^{A17} This Section of the Employer's Requirements shall be read in conjunction with the Sections listed in Table 40 95 13.22-1.

B. **Related Sections:**

Table 40 95 13.22-1: Related Sections	
1.	Section 01 81 26 - Communications, Controls, Safety and Security Systems.
2.	Section 01 86 13 - Plant - Mechanical Systems and Equipment.
3.	Section 01 89 19 - Sanitary Sewer / Wastewater.
4.	Section 25 11 00 - Data Processing Equipment (DPE).
5.	Section 27 11 16 - Cabinets, Racks, Frames, and Enclosures.
6.	Section 40 00 00 - Process Systems Integration.
7.	Section 40 70 00 - Electrical Supervisory Control and Data Acquisition System.
8.	Section 40 91 00 - Primary Process Measurement Devices.
9.	Section 40 95 13 - Process Control Hardware.
10.	Section 40 96 45 - Process Control Software.

1.02 REFERENCE:

- A. **Applicable Publications:** Refer to Section 01 81 26 (*Communications, Controls, Safety and Security Systems*), Paragraph 1.02.

1.03 REQUIREMENTS:

A. **General:**

1. The Contractor shall meet all applicable requirements of Section 01 81 26 (*Communications, Controls, Safety and Security Systems*), Paragraph 1.03.
2. SCADA equipment shall be independent of process control systems (PCSs) specified in other Sections of Division 40 (*Process Integration*).

B. **Communications:**

1. Remote SCADA equipment shall communicate with EAA SCADA master station using DNP user group (DUG) distributed network protocol (DNP) version 3 or latest.

2. Communications interface shall be 100/1,000 Mbps Ethernet in accordance with IEEE 802.3. Communications lines shall also be configurable for transmission control protocol / Internet protocol (TCP/IP) communications.

C. **Inputs/Outputs:**

1. Analog inputs (AIs) and outputs (AOs) shall be 4-20 mA for unipolar variables.
2. Input points shall include alarm/status digital input (DI) and analog input (AI) points.
3. Output points shall include analog outputs (AO), digital output (DO) or control points operating supplier-furnished interposing relays, and setpoints.

D. **Interoperability and Coordination:**

1. Remote SCADA equipment shall be compatible with EAA SCADA master station in use at the time of installation. Its hardware and software are likely to be upgraded before such time.
2. As of the Base Date, EAA SCADA uses Dell model Power Edge 600SC servers, Microsoft Windows Server 2003 operating system, and Survalent Technology (www.survalent.com, Mississauga, ON, Canada) ^{A8}WorldView software version 1.07.0918^{A8}.

E. **Relays:**

1. Relays for control output points shall be of the plug-in type, with a transparent dust cover, and have one or more sets of dry form "C" (normally open, normally closed, and common terminals) or form "X" relay contacts.
2. Contact rating shall be 3 Amperes at 24 VDC, 2 Amperes at 120 VAC, and 10 Amperes at 125 VDC, or better.

F. **Equipment and Materials:**

1. **General:** Equipment and hardware shall be in accordance with Section 40 95 13 (*Process Control Hardware*).
2. **Cabinet Racks:** Cabinets shall be in accordance with Section 27 11 16 (*Cabinets, Racks, Frames, and Enclosures*) and have front and rear access swing doors with key locked provisions and internal lighting.
3. **Data Concentrators:** Shall be furnished instead of most of remote terminal unit (RTUs) components whenever possible. Units shall allow communications to and control from EAA SCADA system.
4. **Programmable Logic Controllers or Input / Output (I/O) Concentrators:** The Employer prefers using PLCs (or I/O concentrators) over RTUs and Data

- Concentrators. If used, PLCs shall be in accordance with Section 40 94 43 (*Programmable Logic Controllers*).
5. **Remote Terminal Units (RTUs):** If used, RTUs shall meet the requirements of Section 40 70 00 (*Electrical Supervisory Control and Data Acquisition System*).
6. **Transducers and Intelligent Electronic Devices (IEDs):** Shall be in accordance with Section 40 91 00 (*Primary Process Measurement Devices*). The Employer strongly prefers using IEDs instead of RTUs whenever feasible.
- G. **Software:** Shall be furnished as required in accordance with Section 40 96 45 (*Process Control Software*), including licenses.
- H. **Installation:**
1. **General:**
- a. ^{A17}Items shall be installed in all wastewater/sewage treatment plants servicing the Works.^{A17}
- b. ^{A9}The Contractor shall make SCADA data base changes and additional custom display pages in the existing master station at Miraflores Filtration Plant, as required for the new wastewater control equipment to be provided at the Atlantic and Pacific locks complexes.^{A9}
2. **Remote Terminal Units (RTUs):** If any are used, RTUs shall be connected to the same local area network (LAN) where IEDs are connected.

1.04 DESIGN CRITERIA/SYSTEM PERFORMANCE:

- A. **General:**
1. **Problem to be Solved:**
- a. To meet the process control requirements of Section 01 89 19 (*Sanitary Sewer / Wastewater*) and other related requirements of Section 01 86 13 (*Plant - Mechanical Systems and Equipment*).
- b. ^{A17}To seamlessly integrate all new wastewater/sewage treatment plants provided as part of the Works with the existing Employer's EAA SCADA installation, using a DUG DNP3 or latest version of this communications protocol.^{A17}
- c. Should treatment plants have digestors, the **WWTCSs** shall maintain a nearly constant flow of wastewater into such digestors.
2. **Restrictions to be Considered:**
- a. **WWTCS** equipment shall be compatible with EAA SCADA master station in use at the time of installation.

B. Design Criteria:

1. I/O points shall include, but not be limited to, the following: dissolved oxygen, Ph, and all other process variables specified in Section 01 89 19 (*Sanitary Sewer / Wastewater*) that can be read in real time in EAA SCADA system.

C. System Performance: EAA SCADA system performance with new WWTCS equipment shall not be any slower or have fewer functions than with existing RTUs elsewhere in the Employer's EAA SCADA system at the time of installation.

1.05 SUBMITTALS: Shall be in accordance with Section 40 00 00 (*Process Systems Integration*), Paragraph 1.05.

1.06 QUALITY ASSURANCE: Shall be in accordance with Section 40 00 00 (*Process Systems Integration*), Paragraph 1.06.

END OF SECTION