

SCOPE OF INSTRUMENTATION AND CONTROL WORK

1. GENERAL

- .1 Supply and installation all material, equipment, wiring and labour necessary for the installation of the systems detailed on the Drawings in accordance with the Specifications and the latest edition of the Canadian Electrical Code.

2. WORK INCLUDED

2.1 Related Work

- .1 Supply and installation of instrumentation and control equipment required to operate the WTP including the plant control system PLC equipment and all vendor packages and City supplied equipment as indicated on the P&IDs and in these specifications.

2.2 General Requirements

- .1 Shop Drawings
- .2 Record Drawings
- .3 O&M Data

2.3 Specific Requirements

- .1 Supply, install, test, and verify the performance of all instrumentation, components, materials and ancillary equipment covered under Division 17 of this Contract.
- .2 Clearwell Inlet Building
 - .1 Provide all analytical, process instrumentation, sample pumps etc including local control panels. as shown on P&ID number WT-P001.
 - .2 Provide all electrical, control and process connections to analytical and process instrumentation including sample lines and stilling tubes to clearwell.
 - .3 Provide part of the WTP wide fibre optic communication network for the PLC based plant control systems as shown on drawings WH-A0103 and WH-A0100.
 - .4 Provide interface wiring and connections between the HVAC BAS controller and LCP-T11.
- .3 Clearwell Outlet Valve Chambers
 - .1 Provide all electrical and control wiring to the new electrical valve actuators shown on P&ID WO-P0002. Cables to be installed to Deacon Booster Pumping Station and terminated into a junction box provided by the contractor.

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- .4 Generator Building
 - .1 Provide Fuel Transfer Control Panel LCP-H908A, this panel will incorporate starters for Fuel Transfer Pumps, interface to PLC in CP-H12 and interface to Leak Detection Panel. The Leak Detection Panel will be City Supplied but installed and wired under this contract.
 - .2 Provide leak detection sensors as shown in Section 17700a – Instrument Index.
 - .3 Provide all instrumentation and control wiring for all the fuel transfer systems as shown on P&ID WG-P0002.
 - .4 Provide part of the WTP wide fibre optic communication network for the PLC based plant control systems as shown on drawings WH-A0104 and WH-A0100.
 - .5 Provide conductivity type level switch and wiring in the building sump as shown on P&ID WG-P0001.
 - .6 Provide interface wiring to transformers and generators as shown on P&ID WG-P0001
 - .7 Provide interface wiring and connections between the HVAC BAS controllers and CP-H12 as shown on drawings WG-H0501, WG-H0502, WG-H0503 and WG-H0504
 - .8 Provide 2 emergency stop push buttons and the associated wiring to shutdown the fuel transfer system when operated.
 - .9 Provide interlock wiring between fire alarm system and fuel transfer system
- .5 Cell 1 Raw Water Valve Chamber
 - .1 Provide a conductivity type level switch installed in the valve chamber to monitor the air gap between two butterfly valves. The switch will be mounted with the probes into a plastic container (provided by the contractor) measuring any water which enters the container from the air gap. The switch will operate if 25mm of water enters the container.
 - .2 The contractor will provide all pipework and valves required to connect the container to the existing valve drain connection.
 - .6 Provide all control system communications equipment as show on the Drawings listed in above and as described in Specification Section 17275 – Miscellaneous Panel Devices.
 - .7 Terminate all spare fibre optic cores to patch panels at each drop point and label accordingly.
 - .8 Provide local control panels to house all PLC components and ancillary equipment, and to act as a marshalling panel for signals from instrumentation and equipment covered under Division 17.

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- .9 Supply redundant 24 VDC Power supplies installed within the local control panels whenever 24 VDC power is required.
- .10 Provide power-conditioning equipment within each local control panel.
- .11 Connect the healthy/fault status dry relay contacts from all power conditioning and UPS equipment to local PLC inputs.
- .12 Provide Ethernet connections from the following equipment to the WTP control system: VFDs, transformer power meters, neutral grounding resistors, switchgear protection relays, and large motor protection relays.
- .13 Hardwire I/O signals from the WTP control system PLCs to process instrumentation, HVAC/BMS system, Power Conditioning and UPS equipment and fire alarm panels.
- .14 All WTP control system PLC programming and WTP monitoring system HMI software development shall be performed by others.
- .15 Coordinate with the Supply Contractors of City Supplied Equipment under other contracts but installed under this Contract to install, test and verify performance of the systems shown on the P&ID'S.

2.4 Additional Requirements

- .1 Provide all necessary testing, detailed wiring continuity checks, installation integrity checks, equipment functional operation checks, and written system verification reports to provide a complete system that is ready for commissioning.
- .2 Provide Performance Verification and Commissioning of all systems included in the Scope of Work.

2.5 Materials

- .1 Cables and bus support systems, which are intended to enclose or support all forms of electrical conductors used for any purpose covered by this scope. This includes cable trays, raceways and all forms of rigid, flexible, metallic and non-metallic conduit, and including conduit for communication systems.
- .2 Control panels associated with any electrical equipment covered under this Section of Work.
- .3 Circuit breakers of all types and for all applications associated with electrical equipment, which receives its power supply from the main, auxiliary or emergency (including UPS) system.
- .4 Grounding systems, as required by the Canadian Electrical Code, or as otherwise specified.
- .5 Fibre optic patch panels and industrial Ethernet switches as shown on the Drawings and specified herein.

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- .6 Electronic data processing and transmission systems, including auxiliary equipment, interfaces and components.

END OF SECTION