PART 1 - GENERAL

1.1   **RELATED SECTIONS**

.1   Section 01 33 00 - Submittal Procedures.

.2   Section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.3   Section 25 90 01 - EMCS: Site Requirements Applications and Systems Sequences of Operation.

1.2   **REFERENCES**

.1   American National Standards Institute (ANSI)/The Instrumentation, Systems and Automation Society (ISA).

    .1   ANSI/ISA 5.5-1985, Graphic Symbols for Process Displays.

.2   American National Standards Institute (ANSI)/Institute of Electrical and Electronics Engineers (IEEE).

    .1   ANSI/IEEE 260.1-1993, American National Standard Letter Symbols Units of Measurement (SI Units, Customary Inch-Pound Units, and Certain Other Units).

.3   Canadian Standards Association (CSA International).

    .1   CAN/CSA-Z234.1-FM89(C1995), Canadian Metric Practice Guide.

.4   Consumer Electronics Association (CEA).

    .1   CEA-709.1-B-2002, Control Network Protocol Specification.

.5   Departmental of Canada's Justice (Jus).

    .1   Canadian Environmental Assessment Act (CEAA), 1997, c. 37.

    .2   Canadian Environmental Protection Act (CEPA), 1999, c. 33.

.6   Electrical and Electronic Manufacturers Association (EEMAC).

    .1   EEMAC 2Y-1-1958, Light Gray Colour for Indoor Switch Gear.

.7   Health Canada - Workplace Hazardous Materials Infomations System (WHMIS).

    .1   Data Sheet (DS).

.8   Transport Canada (TC).

.1   Transportation of Dangerous Good Act, 1992, c. 34

1.3   ACRONYMS AND ABBREVIATIONS

.1   Acronyms used in EMCS:

.1   AEL - Average Effectiveness Level.

.2   AI - Analog Input.

.3   AIT - Agreement on International Trade.

.4   AO - Analog Output.

.5   BACnet - Building Automation and Control Network.

.6   BC(s) - Building Controller(s).

.7   BECC - Building Environmental Control Center.

.8   CAD - Computer Aided Design.

.9   CDL - Control Description Logic.

.10   CDS - Control Design Schematic.

.11   COSV - Change of State or Value.

.12   CPU - Central Processing Unit.

.13   DI - Digital Input.

.14   DO - Digital Output.

.15   DP - Differential Pressure.

.16   ECU - Equipment Control Unit.

.17   EMCS - Energy Monitoring and Control System.

.18   HVAC - Heating, Ventilation, Air Conditioning.

.19   IDE - Interface Device Equipment.

.20   I/O - Input/Output.

.21   ISA - Industry Standard Architecture.

.22   LAN - Local Area Network.

.23   LCU - Local Control Unit.

.24   MCU - Master Control Unit.

.25   NAFTA - North American Free Trade Agreement.

.26   NC - Normally Closed.

.27   NO - Normally Open.

.28   OS - Operating System.

.29   O&M - Operation and Maintenance.

.30   OWS - Operator Work Station.

.31   PC - Personal Computer.

.32   PCI - Peripheral Control Interface.

.33   PCMCIA - Personal Computer Micro-Card Interface Adapter.

.34   PID - Proportional, Integral and Derivative.

.35   RAM - Random Access Memory.

.36   SP - Static Pressure.

.37   ROM - Read Only Memory.

.38   TCU - Terminal Control Unit.

.39   USB - Universal Serial Bus.
.40   UPS - Uninterruptible Power Supply.

.41   VAV - Variable Air Volume.

1.4   DEFINITIONS

.1   Point: May be logical or physical.

.1   Logical points: Values calculated by system such as setpoints, totals, counts, derived corrections and may include, but not limited to result of and statements in CDL's.

.2   Physical points: Inputs or outputs which have hardware connected to controllers which are measuring physical properties, or providing status conditions of contacts or relays which provide interaction with related equipment (stop, start) and valve or damper actuators.

.2   Point Name: Composed of two parts, point identifier and point expansion.

.1   Point identifier: Comprised of three descriptors, "area" descriptor, "system" descriptor and "point" descriptor, for which database to provide 25-character field for each point identifier. "System" is system that point is located on.

.1   Area descriptor: Building or part of building where point is located.

.2   System descriptor: System that point is located on.

.3   Point descriptor: Physical or logical point description. For point identifier "area", "system" and "point" will be shortforms or acronyms. Database must provide 25 character field for each point identifier.

.2   Point expansion: Comprised of three fields, one for each descriptor. Expanded form of shortform or acronym used in "area", "system" and "point" descriptors is placed into appropriate point expansion field. Database must provide 32-character fields for each point expansion.

.3   Bilingual systems to include additional point identifier expansion fields of equal capacity for each point name for second language.

.1   System to support use of numbers and readable characters including blanks, periods or underscores to enhance user readability for each of the above strings.

.3   Point Object Type: Points fall into following object types:

.1   AI (analog input).

.2   AO (analog output).

.3   DI (digital input).

.4   DO (digital output).

.5   Pulse inputs.

.4   Symbols and engineering unit abbreviations utilized in displays: To ANSI/ISA S5.5.

.1   Printouts: To ANSI/IEEE 260.1.

1.5   SYSTEM DESCRIPTION

.1   Supply and install a new DDC system for local use in the pumphouse. The system shall be complete and autonomous, with a controller and color LCD touchscreen to view status of equipment and other information directly in the pumphouse.

.2   Refer to control schematics for system architecture.

.3   The above-mentioned sections aim at the supply and installation of a new system. Include what follows:

.1   Autonomous Controller.

.2   Control devices as listed in I/O point summary tables.

.3   Color LCD viewing screen with touch sensitive interface.

.4   Field control devices.

.5   Software/Hardware complete with full documentation.

.6   Complete operating and maintenance manuals.

.7   Training of personnel.

.8   Acceptance tests, technical support during commissioning, full documentation.

.9   Wiring interface co-ordination of water meter.

.10   Miscellaneous work as specified in these sections and as indicated.

.4   Design Requirements:

.1   Design and provide conduit and wiring linking elements of system.

.2   Supply sufficient programmable controllers of types to meet project requirements. Quantity and points contents as reviewed by Departmental Representative prior to installation.

.3   Location of controllers as reviewed by Departmental Representative prior to installation.

.4   Provide utility power to EMCS and emergency power to EMCS as indicated.

.5   Metric references: In accordance with CAN/CSA Z234.1.

.5   Language Operating Requirements:

.1   Provide passwords to use the system in English.

.2   Use non-linguistic symbols for displays on graphic terminals. Display other information in English.

.3   Operating system executive: Provide primary hardware-to-software interface.

.4   System manager software: System definition point database, additions, deletions or modifications, control loop statements, use of high level programming languages, report generator utility and other OS utilities used for maintaining optimal operating efficiency.

.5   Software has to include:

.1   Input and output commands and messages from operator-initiated functions and field related changes and alarms as defined in CDL's or assigned limits (i.e. commands relating to day-to-day operating functions and not related to system modifications, additions, or logic re-definements).

.2   Graphic "display" functions, point commands to turn systems on or off, manually override automatic control of specified hardware points. These functions have to be in French in all the prescribed work station.

.3   Reporting function such as trend log, trend graphics, alarm report logs, energy report logs, maintenance generated logs.

1.6   SUBMITTALS

.1   Make submittals in accordance with Section 01 33 00 - Submittal Procedures.

.2   Submit for Review:

.1   Equipment list and systems manufacturers within 48 hours after award of Contract.

.3   Quality Control:

.1   Provide equipment and material from manufacturer's regular production, CSA certified, manufactured to standard quoted plus additional specified requirements.

.2   Where CSA certified equipment is not available submit such equipment to inspection authorities for special inspection and approval before delivery to site.

.3   Submit proof of compliance to specified Standards with shop drawings and product data label or listing of specified organization is acceptable evidence.

.4 In lieu of such evidence, submit certificate from testing organization, approved by Departmental Representative, certifying that item was tested in accordance with their test methods and that item conforms to their standard/code.

.5 For materials whose compliance with organizational standards/ codes/specifications is not regulated by organization using its own listing or label as proof of compliance, furnish certificate stating that material complies with applicable referenced standard or specification.

.6 Permits and fees: In accordance with general conditions of Contract.

.7 Submit an acceptance certificate provided by the competent authority to the Departmental Representative.

.8 Existing devices intended for re-use: Submit test report.

1.7 QUALITY ASSURANCE

.1 Have local office within 50 km of project, staffed by trained personnel capable of providing instruction, routine maintenance and emergency service on systems.

.2 Provide record of successful previous installations submitting tender showing experience with similar installations utilizing computer-based systems.

.3 Have access to local supplies of essential parts and provide 7-year guarantee of availability of spare parts after obsolescence.

.4 Ensure qualified supervisory personnel continuously direct and monitor Work and attend site meetings.

1.8 DELIVERY, STORAGE, AND HANDLING

.1 Material Delivery Schedule: Provide Departmental Representative with schedule within 2 weeks after award of Contract.

.2 Waste Disposal and Management:

.1 Sort out wastes for re-use or recycling in accordance with section 01 74 21 - Construction/Demolition Waste Management and Disposal.

.2 Evacuate all wrapping material off the job site to the appropriate recycling facilities.

.3 Place wrapping material made of paper, plastic, polyester and corrugated cardboard in appropriate bins located on site for recycling, in accordance with the wastes management plan.

.4 Sort out the steel and plastic waste for re-use and drop them in designated bins, in accordance with the wastes management plan.

.5 Drop in designated bins the elements corresponding to the definition of hazardous and toxic wastes.

.6 Manipulate and dispose of the hazardous wastes in accordance with the municipality regulations.

.7 Identify the storing location for the salvaged material and protect it with a fence and a security system.

.8 Make sure that empty containers are sealed and safely stored.

.9 Bring the unused metallic elements to a recycling facility approved by the Departmental Representative.

.10 Fold metal and plastics straps, flatten and place them in the designated area for recycling.

1.9 EXISTING CONTROL/REGULATION ELEMENTS

.1 As indicated, use existing controls conduits.

.2 Reusable controls elements can be reused if they comply to the codes, the standards and the prescriptions that apply.

 .1 It is forbidden to modify the initial design of an existing element without having a written approval from the Departmental Representative.

 .2 If there is doubt about an element's reusability, provide new elements with the appropriate design criteria to this project.

.3 The existing elements to be reused must be inspected within 30 days of Contract award, but before the installation of new devices.

 .1 Provide, within 40 days of Contract award, the test reports listing each reused device, while indicating if it meets requirements or needs to be repaired. In the latter case, the Departmental Representative will take action on it.

 .2 If the Contractor fails to provide test reports, it is assumed that the Contractor accepts the existing devices.

.4   Defective Elements:

.1   Provide, with the test reports, specifications or functional requirements that back the results.

.2   The Departmental Representative will request the repair or the replacement of the defective existing elements.

.5   Before starting Work, submit in writing an authorization request to power down the control elements and put the material out of service.

.6   The Contractor's responsibility concerning the control elements that must be integrated to the EMCS, starts after receiving the authorization from the Departmental Representative.

.1   The Contractor is responsible for the repaired elements requested by the Departmental Representative.

.2   The Contractor is responsible for extra repair costs due to negligence or abusive material usage.

.3   The Contractor's responsibility concerning existing control elements ends at the moment where the complete EMCS including all modified systems have been received with entire satisfaction from the Departmental Representative.

.4   Collect the existing control elements that will not be reused. Store them in an approved storage area, in order to dispose of them following the Owner's instructions.

PART 2 - PRODUCTS

2.1   EQUIPMENT

.1   Control Network Protocol and Data Communication Protocol: To CEA 709.1 and ASHRAE STD 135.

.2   Complete list of equipment and materials to be used on project and forming part of tender documents by adding manufacturer's name, model number and details of materials, and submit for approval.

2.2   ADAPTORS

.1   Provide adaptors between metric and imperial components.

PART 3 - EXECUTION

3.1   MANUFACTURER'S RECOMMENDATIONS

.1   Installation: To manufacturer's recommendations.

3.2   PAINTING

.1   Perform painting in accordance with the following requirements:

.1   Clean and retouch the surfaces that were scratched so that they have the same original finish.

.2   Where retouches are not sufficient, a complete reconditioning (primer coat and finishing coat) of the damaged surfaces is required.

.3   Clean and use a primer coating on visible elements like supports, equipment frames and any other fixing devices.

END OF SECTION