
Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of Contract, Division 01 General Requirements and all Addenda thereto form an integral part of and must be read in conjunction with the requirements of this Section.
- .2 Cooperate and coordinate with the requirements of other units of work specified in other Sections.

1.2 REFERENCES

- .1 The Electrical Contractor shall be bound by industry standards, as interpreted by the Consultant, whether or not specifically referenced in this document. Comply with Electrical Protection Act and rules and regulations made pursuant thereto, including the Canadian Electrical Code. Also, comply with applicable standards of the following:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 Correctional Service Canada (CSC) – Technical Services Branch – ES/STD-0803
 - .4 Correctional Service Canada (CSC) – Technical Services Branch
 - .5 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .6 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .7 National Electrical Manufacturers Association (NEMA).
 - .8 National Building Code 2010 (NBC 2010)
 - .9 National Fire Protection Association (NFPA)
 - .10 Institute of Electrical and Electronic Engineers (IEEE).
 - .11 Audio Engineering Society (AES).
 - .12 Other Applicable CSA and UL approvals.

1.3 EXCEPTIONS OF REFERENCED STANDARDS

- .1 The Electrical Contractor shall be bound by the standards referenced herein. The following exceptions shall be noted and used for this project in reference to the following standards:
 - .1 ES/SOW-0101 Revision 3, April 15, 2004:

- .1 1.4 – Quantity of Equipment: Quantity and location of the equipment shall adhere to the requirements as noted in the Tender Drawings and associated specifications.
 - .2 3.1(c) – maintenance for the system is being handled by the Owner through a separate contracted entity. The Contractor is required to provide warranty services as specified for the specific system.
 - .3 3.1(h) – Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
 - .4 14.0 – Lightning Protection: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
- .2 ES/SOW-0102 Revision 6, May 1, 2008:
- .1 Wiring / Cabling Methods 3.1.1: The use of rigid steel conduit is not required.
 - .2 Splicing of existing power cabling due to breaker panel replacement is acceptable.
 - .3 Enclosures 3.3.2: Enclosures within the facility are not required to be IP64 rated.
 - .4 Lightning Protection 4.8: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with:
 - .1 Section 01 33 00 - Submittal Procedures
 - .2 26 05 01 – Common Work Results
 - .3 ES/SOW-0101 Revision 3, April 15, 2004
 - .4 ES/SOW-0102 Revision 6, May 1, 2008
- .2 Shop drawings shall include but not be limited to complete system block diagrams showing all system components, graphic screen layouts in conjunction with Owner’s approval, manufacturer’s specification sheets for all components used.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Meet requirements of Section 01 74 19 - Waste Management and Disposal.
- .2 Collect and separate waste for reuse, recycling, and other waste diversion strategies in accordance with Waste Management Plan.

1.6 SYSTEM DESCRIPTION

- .1 The Control Post Controls System is an industrial PLC base control system coupled with graphic operation human-machine-interface to control:
 - .1 Cell door and barrier control
 - .2 Lighting Controls
 - .3 Intercom & Public Address
 - .4 Fire Alarm Annunciation (simulation only)
- .2 Touch screen in control posts to control each of their respective units. Screens in observation rooms have the ability to override and control all other doors in the facility.

1.7 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for public address system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .2 Include:
 - .1 Operation instructions.
 - .2 Description of system operation.
 - .3 Description of each subsystem operation.
 - .4 List specifying each piece of equipment in system or subsystem by its original manufacturer name and model number.
 - .5 Part list specifying parts used in equipment by identification numbers that are standard to electronic industry.

1.8 SYSTEM STARTUP

- .1 Manufacturer's representative to instruct:
 - .1 Maintenance personnel in maintenance of system.
 - .2 Operating personnel in use of system.

1.9 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Provide two (2) spare fuses for each type provided.
- .3 Provide two (2) spare relays for each type provided.

Part 2 Products

2.1 MATERIALS

- .1 Conduits: to Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings.

- .2 Communication conductors: as indicated, to Section 27 05 14 - Communication Cables Inside Buildings.

2.2 COMPONENTS

- .1 Provide new programmable logic controllers in cabinets as shown on drawings.
- .2 Supply and install one (1) workstation PC and one (1), minimum 22" monitor, HMI terminals at each control post as shown on drawings.
- .3 Provide Cat6 communications cabling from the door control system, lighting control system, paging system, and PLC cabinets to the Security network.
- .4 Provide software and latest patches for all related systems.
- .5 The Electrical Contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required.
- .6 Upon completion of the installation, the contractor shall perform technical performance tests, in the presence of the consultant and to the consultant's satisfaction, that the system meets the performance criteria, as stated in this specification document and associated illustrations. The results of these tests shall be documented, in written form, noting all conditions at the time of tests and evaluation.

2.3 PERFORMANCE PARAMETERS

- .1 PLC configuration shall accept changes to accept new doors under this contract to communicate with the HMI terminal.
- .2 Graphical interface shall suit screen orientation to have north adjusted to suit each operator position.
- .3 Systems shall have the ability to operate independently on a stand-alone basis in the event of HMI failure.
- .4 System operation is to be controlled by the HMI terminal at the various control post locations. Observation rooms are to have complete control of all systems. Restrictions of access to certain sections of the control program shall be programmable and customizable for each control station.
- .5 The fire alarm graphical screen shall be simulation only, no connections to fire alarm panels are required. Screen shall be configured such that fire alarm components can be added/removed/edited easily. The Observation Area stations shall have the ability to simulate triggering one of these virtual fire alarm devices.
- .6 All other HMI graphical screen requirements are described in their associated specification sections.
- .7 PLC shall be equipped with real time clock.

- .8 It shall be the responsibility of the contractor to ensure that all necessary interconnecting wiring, etc., are provided to result in a fully operational system. The contractor shall be responsible for coordinating testing, schedule, rough-in, etc. with the Owner's Supplier, and general contractor.

2.4 PRODUCT APPROVALS

- .1 Manufacturers' and model numbers named in these specifications indicate an acceptable technical standard of performance and are not intended to be exclusive. Products submitted as alternates must result in a control system that meets or exceeds all technical performance criteria as described.
- .2 Products proposed as alternatives to those specified, shall only be considered if submitted for approval no later than 15 working days before tender close. Submit alternates, for approval, as one complete listing. Provide complete product specification sheets with request for approval.
- .3 The Bidder must provide a complete list of primary system products offered with their bid.

2.5 VIDEO MONITORS

- .1 22" flat screen LCD monitors
- .2 1280 x 1024 resolution @ 75Hz
- .3 Removable base and wall mountable
- .4 Black finish
- .5 Omnivision, Stealth, or approved equal.

2.6 SOFTWARE

- .1 PLC operational software as required to meet system operational and communication requirements described herein.
- .2 Graphic control software package for touch-screen terminals for graphics development and human machine interface.

2.7 HMI HARDWARE AND SOFTWARE

- .1 Provide new rack mounted computers c/w Longview transmitter/receivers for communication to the control post locations. Owner to approve before purchase. Computers shall be provided such that they are capable of running the HMI program and control all included components without stutter or lag (<0.5s for all commands, status changes, screen refreshes, etc.). The computer must also be capable of running multiple programs simultaneously with the HMI screen.
- .2 Additional technical requirements:
- .1 Two PCI 10/100/1000 base T Ethernet cards

- .2 16x DVD+/- RW drive
- .3 One (1) serial port
- .4 Four (4) USB 2.0 ports, two (2) USB 3.0 ports
- .3 Shall be BSI 2U rackmount PC or approved equal.
- .4 HMI software
 - .1 Provide Windows based software packages for the HMI workstations: one package for development and runtime; a second package for runtime only. Both versions capable of unlimited tags.
 - .2 Software shall be compatible with Windows XP, Vista, 7, and 8.
 - .3 Provide HMI software that will enable monitoring and control of all points, and systems through graphic display screens.
 - .4 Provide HMI with a set of tools for graphically representing door control status, lighting control status, intercom/public address, and fire alarm status. Provide a graphic editor for creation of graphic screens to represent current process information. Graphic objects on these screens to be linked by name to actual device data through the distributed point database. Objects on the graphics screens to be configured with animation features, causing them to change colour and/or position. Text information to be printed to the screen alerting personnel to current point status.

2.8 HMI SCREEN SCHEDULE

- .1 Minimum HMI graphic screens as listed and additional to be determined.
 - .1 Door control: 3
 - .2 Fire alarm annunciation: 3
 - .3 Paging/public address: 3
 - .4 Lighting control: 3

2.9 PLC COMPONENTS

- .1 Provide new programmable logic controllers as required manufactured by Schneider Electric, Allen Bradley, or approved equal.
- .2 24VDC Power Supply: 120VAC input, 24VDC – 20A output power supply. The power supply shall automatically shut-down whenever its output power is detected as exceeding 125% of its rated power. Weidmuller #CP-SNT-24W-24V or Quint PS-100-120VAC/24DC/20A or approved equal.
- .3 Fused Terminal Block: Terminal blocks c/w appropriate size fuse and end plates. Weidmuller SAKS-6/32 series, Wieland #WK6U series or approved equal.
- .4 Feed-through Terminal Block: Terminal blocks c/w end plates. Weidmuller SAKS-6/32 series, Wieland #WK6U series or approved equal.

- .5 All control/PLC cabinets as shown on drawings shall be equipped with lighting kits and power filtered vent kits.
- .6 Provide 1500VA dedicated UPS.
- .7 Provide emergency shut-down button in each control post. Button shall disable all PLC controls at local control post until reset at the panel. Momentary push button shall be complete with one N.O. contact and one N.C. contact. Telemecanique or approved equal.
- .8 Controls Relays: Omron #MK Series, Potter & Brumfield #KRP series, or approved equal.
- .9 Interposing Relays: Potter & Brumfield #CS series or approved equal.

2.10 CABLE AND CONNECTOR PANELS

- .1 Provide all cable, wire and connectors for a complete PLC system.
- .2 Minimum conductor sizes – field control conductors #16 AWG, instrumentation #18 AWG, control panel wiring #16 AWG TEW. All control and instrumentation conductors to be twisted pair stranded and tinned copper with shield. Ensure that shield is properly connected and carried throughout.
- .3 All wiring in control panels shall be run in Panduit.
- .4 All wire points shall be labelled where they enter and exit each pullbox, cabinet, junction and terminals.
- .5 All power and field terminations to be wired to terminal blocks and clearly labelled. This is to be reflected in detail on the required control panel Shop Drawings.

Part 3 Execution

3.1 INSTALLATION

- .1 This Contractor shall be responsible for ensuring that all wiring from the instrumentation to control PLC cabinet is wired according to intended functions. The Contractor shall be responsible for all wiring to and from the PLC cabinet. The Contractor shall ensure that the final operation of the facility is to the satisfaction of this consultant and the Owner. The electrical Contractor shall be responsible for any programming of control panels and field devices.
- .2 This Contractor is responsible for ensuring that the facility, including the final commissioning, owner training, and operator manual preparation is completed prior to substantial completion being granted.
- .3 This Contractor shall place all electrical works into operation including any necessary adjustments to ensure proper operation. The Contractor shall provide qualified personnel to install and assist with implementation and start-up of control and instrumentation systems as required to the satisfaction of the Owner and this consultant.

- .4 This Contractor shall have proper personnel present for commissioning & Owner training with the Owner, this consultant, and others.
- .5 All input/output (I/O) and other control features shall be demonstrated as part of Owner training.
- .6 This Contractor shall carry all costs associated with all monitoring equipment and the assembly of the control panels by an authorized panel builder. Panel builder shall pre assemble control panels.

3.2 ASSEMBLED SYSTEM

- .1 The assembled control panels shall include fuse blocks as sized by the Manufacturer's recommendation.
- .2 Prior to the start of the manufacturing of the control panels, the Contractor shall submit Drawings of the complete assembled system for approval by this consultant.
- .3 The first page of all Drawings and schematics shall be a cover sheet consisting of a bill of material, purchase order number, Manufacturer's job number, user's name, location, application, and shipping address.
- .4 The Drawings shall include a mechanical layout detailing the overall external dimensions of the enclosure. The Drawings shall include such pertinent information as location of door handles, and enclosure mounted items.
- .5 The Contractor shall provide documentation detailing the mounting of the control devices, fuse blocks, wireways, etc. All materials shall be labelled to provide easy cross-reference to the Bill of Material listing.
- .6 Electrical prints detailing all hardwiring, done by the panel builder, to devices such as relays, disconnect switches, fuse blocks, etc. shall be provided with individual wire numbers and relay contact cross-reference designations.
- .7 A section shall be provided designating field terminations required with terminal locations clearly defined.
- .8 The last sheet in the set shall be for terminal block designations each containing their individual terminal numbers.
- .9 At the time the equipment is shipped, one (1) reproducible copy of each drawing mentioned above shall be provided with the equipment.

3.3 WARRANTY

- .1 The contractor must make available to the Owner a local service department of a duly authorized distributor of the equipment manufacturer, which shall stock the manufacturer's standard parts. The service department shall have at least one factory trained repair technician available to the Owner on 24 hours notice.
- .2 Provide warranty of installation of equipment installed by this contractor to be free of defects

for a period of (1) one year from date of Substantial Completion.

- .3 Provide during the warranty period, all service, maintenance, parts, etc., required for normal operation of the systems, such that Owner needs not purchase additional maintenance agreement or contracts. Upon request, the manufacturer and his agent shall provide direct to the Owner the following proposals:
 - .1 Continuation, after the warranty period, of full maintenance, including all service, labour, parts, etc. required to maintain the systems in a fully operational condition.
- .4 During the warranty period, provide three (3) separate site visits of four (4) hours each on site for owner revisions and additional training.

3.4 WIRING

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results – Electrical.
- .2 A conductor colour coding system shall be used throughout. Submit colour coding scheme as part of the shop drawings for review and approval.
- .3 Wiring of field devices shall be run in accordance with the manufacturer's requirements for this system.

3.5 VERIFICATION

- .1 Perform tests in accordance with:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 Section 26 05 01 - Common Works Results - Electrical
- .2 The entire installation shall be performed under the supervision of the manufacturer. Upon completion of the installation, the manufacturer shall check and test the entire system. Certification of all tests shall be submitted in writing to the Consultant and shall certify the following:
 - .1 That the system is complete in accordance with this specification
 - .2 That the system is installed in accordance with the manufacturer's best recommendations.
- .3 During the certification tests, the contractor shall provide one (1) electrician and (1) helper to assist the manufacturer's representative. The contractor shall also provide any required equipment such as ladders, scaffolding, etc.

3.6 TRAINING

- .1 Perform training in accordance with:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 Section 26 05 01 - Common Works Results - Electrical
- .2 Written documentation bearing name and signature of Owner's personnel who received the above instructions shall be included in the operating instructions and service manuals.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of Contract, Division 01 General Requirements and all Addenda thereto form an integral part of and must be read in conjunction with the requirements of this Section.
- .2 Cooperate and coordinate with the requirements of other units of work specified in other Sections.

1.2 REFERENCES

- .1 The Electrical Contractor shall be bound by industry standards, as interpreted by the Consultant, whether or not specifically referenced in this document. Comply with Electrical Protection Act and rules and regulations made pursuant thereto, including the 2012 Canadian Electrical Code. Also, comply with applicable standards of the following:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 ES/STD-0205 - Outdoor Enclosure Close Circuit Television
 - .4 ES/STD-0223 - Outdoor Network Colour Dome (With Pan/Tilt/Zoom) Close Circuit Television Camera
 - .5 ES/STD-0227 - LCD Colour Computer Monitor Close Circuit Television
 - .6 ES/STD-0229 - Network Video Recorder Close Circuit Television
 - .7 ES/STD-0233 - Indoor Network Colour and Black/White No-Grip Corner Mount Close Circuit Television
 - .8 ES/STD-0235 - Indoor Network Dome Colour Panoramic Close Circuit Television
 - .9 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .10 CSA C22.1-06, Canadian Electrical Code, Part 1 (20th edition) Safety Standard for Electrical Installations
 - .11 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .12 National Electrical Manufacturers Association (NEMA).
 - .13 National Building Code 2010 (NBC 2010)
 - .14 National Fire Protection Association (NFPA)
 - .15 Institute of Electrical and Electronic Engineers (IEEE).
 - .16 Audio Engineering Society (AES).

- .2 Underwriters' Laboratories (UL)
 - .1 UL 294, Standard for Safety for Access Control System Units.
 - .2 UL 1076-1995, Standard for Safety for Proprietary Burglar Alarm Units and Systems.
- .3 Underwriters Laboratories of Canada (ULC)
 - .1 CAN/ULC-S301, Central and Monitoring Station Burglar Alarm Systems
 - .2 CAN/ULC-S317-1996, Installation and Classification of Closed Circuit Video Equipment (CCVC) Systems for Institutional and Commercial Security Systems.
 - .3 Other Applicable CSA and UL approvals.

1.3 EXCEPTIONS OF REFERENCED STANDARDS

- .1 The Electrical Contractor shall be bound by the standards referenced herein. The following exceptions shall be noted and used for this project in reference to the following standards:
 - .1 ES/SOW-0101 Revision 3, April 15, 2004:
 - .1 1.4 – Quantity of Equipment: Quantity and location of the equipment shall adhere to the requirements as noted in the Tender Drawings and associated specifications.
 - .2 3.1(c) – maintenance for the system is being handled by the Owner through a separate contracted entity. The Contractor is required to provide warranty services as specified for the specific system.
 - .3 3.1(h) – Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
 - .4 14.0 – Lightning Protection: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
 - .2 ES/SOW-0102 Revision 6, May 1, 2008:
 - .1 Wiring / Cabling Methods 3.1.1: The use of rigid steel conduit is not required.
 - .2 Splicing of existing power cabling due to breaker panel replacement is acceptable.
 - .3 Enclosures 3.3.2: Enclosures within the facility are not required to be IP64 rated.
 - .4 Lightning Protection 4.8: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with:

- .1 Section 01 33 00 - Submittal Procedures
- .2 Section 26 05 01 – Common Work Results
- .3 ES/SOW-0101 Revision 3, April 15, 2004
- .4 ES/SOW-0102 Revision 6, May 1, 2008

- .2 Shop drawings shall include but not be limited to speakers, riser diagram, cable types, and special mounting details.

- .3 Include as well:
 - .1 Functional description of equipment.
 - .2 Technical data sheets of all devices.
 - .3 Device location plans and cable lists.
 - .4 Video camera lens selection with surveillance chart.
 - .5 Complete system circuit diagram which clearly illustrate how all components are interconnected. All cables and terminations to be clearly marked.

1.5 WASTE MANAGEMENT AND DISPOSAL

- .1 Meet requirements of Section 01 74 19 - Waste Management and Disposal.
- .2 Collect and separate waste for reuse, recycling, and other waste diversion strategies in accordance with Waste Management Plan.

1.6 DEFINITIONS AND ABBREVIATIONS

- .1 CCTV: Closed Circuit Television.
- .2 FOV: Field of View.
- .3 PoE: Power over Ethernet
- .4 PTZ: Pan - Tilt – Zoom

1.7 DESIGN PERFORMANCE REQUIREMENTS

- .1 Provide a complete fully operation closed circuit video surveillance system as shown on the drawings and herein specified.
- .2 The video surveillance system shall be a network and IP video system that permits live and recordable video viewing, allowing real-time access to secure networks of video on a software system that currently used by the Owner.
- .3 The Contractor shall include a license for each camera and device operated through the software system.
- .4 The recording of all video and audio shall be stored on the rack mounted network video recorder. Contractor to verify that the proposed CCTV system does not exceed the data array's bandwidth limits, include spare capacity for future.

- .5 Environment: All exterior equipment shall be capable of operating in the adverse weather conditions where this system is installed. Design video components and systems to operate with all specified requirements under following ambient temperatures:
 - .1 Indoor installations:
 - .1 Temperature: 0°C to 30°C.
 - .2 Humidity: 10 to 90%.
 - .2 Outdoor installations:
 - .3 Temperature: -40°C to 60°C.
 - .4 Humidity: 10 to 100%.
- .6 Monitoring and control equipment will be located as noted on the drawings. Where indicated, the equipment shall be rack mounted.
- .7 All equipment furnished by this Division shall be the standard products of a supplier/manufacturer. Catalogue and model numbers indicate design, quality and type of materials, as well as required operating characteristics. Substitution of products will only be considered when submitted in advance for approval with detailed supporting literature accompanying the request for approval.

Part 2 Products

2.1 GENERAL

- .1 Contractor shall provide all system components not specified herein that are required for the system to operate. This includes but is not limited to, power over Ethernet switches, circuit breakers, patch cables, etc.
- .2 The contractor shall provide Preliminary and Final Design documentation in accordance to Section 4.0 of ES/SOW-0101.
- .3 The entire system shall contain all required components, programming, etc to accommodate spare capacity of twenty (20) additional cameras.
- .4 All video surveillance system equipment (excluding cameras, see point 2.1.4) shall be ULC listed products as manufactured by Genetec, Lenel, Schneider Electric Security, or equal, as part of the base contract. All suppliers wanting to be considered for an alternate system shall submit for approval minimum three weeks prior to submitting on this tender. The submission shall consist of product descriptions, functionality, service capabilities, future upgrade considerations, and may include samples as required to determine suitability.
- .5 The supplier and installer for all video surveillance equipment shall be certified by the manufacturer as a distributor and installer for that particular product.
- .6 All video cameras shall be ULC listed products as manufactured by one of the following manufactures:
 - .1 AXIS Communications

- .2 Lenel Systems International
- .3 PELCO
- .4 Panasonic
- .5 Bosh

2.2 SYSTEM MANAGER

- .1 The System Manager shall provide a user interface and database management of the IP Video Security System. The System Manager shall allow for users to be restricted via software to logical configurable groups of cameras, monitors and system operations.
- .2 The IP Video Security System network shall be arranged so each area will operate independently and shall communicate via a 1000 baseT (Giga-bit) network at a minimum to the System Manager.
- .3 The System Manager shall be capable of performing as an NTP Server for the entire system. The IP Video Security System shall be synchronized to an NTP server so that all system components are on the same time clock basis. The NTP server shall reside within the system, and be capable of being driven by external time sources if needed. All time- zone corrections shall automatically be provided in the system.
- .4 The System Manager shall be capable of performing as a DHCP and UPnP server for the entire system and components. The System Manager shall provide all connection and management communications between system devices
- .5 The System Manager shall be capable of incorporating RSA 256 bit public/private key authentication in addition to custom bit public/private key's. The system shall be capable of authenticating any video produced by the encoder that originally produced the stream, NVR recording the stream, operator who exported the stream, all with time/date stamped video.
- .6 The System Manager shall manage rights and permissions for all devices, persons, and any system video or other data.

2.3 VIDEO HARDWARE

- .1 **CAMERA TYPE "FIX"** – Indoor Fixed IP Camera
 - .1 Characteristics:
 - .1 Colour Camera CMOS imaging, progressive scan.
 - .2 Video Transmission: Over Ethernet.
 - .3 Sensitivity: Minimum Illumination for useable colour video image, 0.3 LUX.
 - .4 Resolution: Colour resolution 1280x960/1.3MP @ 30fps.
 - .5 White Balance: Auto
 - .6 Automatic Gain Control: Yes
 - .7 Focus: Auto
 - .8 Audio input: 1/8", mic level input
 - .9 Mounting: Ceiling Mounted.
 - .10 Motion controllable frame rate and bandwidth
 - .11 Addition features: Backlight compensation.
 - .12 Image compression: h.264

- .13 Operational voltage: PoE IEEE 802.3af Class 3
- .14 Current consumption: 12.1 watts or less.
- .15 Environment: Outdoor - unless otherwise noted.
- .16 Weight: 1.2 lbs or less.

.2 Lens:

- .1 Varifocal, remote focus and zoom, P-Iris control, IR corrected, megapixel resolution.

- .3 As detailed above, standard of acceptance shall be Panasonic WV-SP306. Any submitted alternate shall be of equal or greater performance.

.2 **CAMERA TYPE “PTZ” – Indoor PTZ IP Camera**

.1 Characteristics:

- .1 Colour Camera CMOS imaging, progressive scan.
- .2 Video Transmission: Over Ethernet.
- .3 Sensitivity: Minimum Illumination for useable colour video image, 0.5 LUX.
- .4 Resolution: Colour resolution 1280x960/1.3MP @ 30fps.
- .5 White Balance: Auto
- .6 Automatic Gain Control: Yes
- .7 Focus: Auto
- .8 Audio input: 1/8”, mic level input
- .9 Mounting: Ceiling Mounted.
- .10 Motion controllable frame rate and bandwidth
- .11 Addition features: Backlight compensation.
- .12 Image compression: h.264
- .13 Operational voltage: PoE IEEE 802.3af Class 3
- .14 Current consumption: 12.1 watts or less.
- .15 Environment: Outdoor - unless otherwise noted.
- .16 Weight: 1.2 lbs or less.
- .17 360° panning range (endless)
- .18 Full PTZ control from remote location

.2 Lens:

- .1 Varifocal, remote focus and zoom, P-Iris control, IR corrected.

- .3 As detailed above, standard of acceptance shall be Panasonic WV-SC386. Any submitted alternate shall be of equal or greater performance.

.3 **CAMERA TYPE “PTZ EXT” – Outdoor PTZ IP Camera**

.1 Characteristics:

- .1 Colour Camera CMOS imaging, progressive scan.
- .2 Video Transmission: Over Ethernet.
- .3 Sensitivity: Minimum Illumination for useable colour video image, 0.5 LUX.
- .4 Resolution: Colour resolution 1280x960/1.3MP @ 30fps.
- .5 White Balance: Auto
- .6 Automatic Gain Control: Yes
- .7 Focus: Auto
- .8 Audio input: N/A

- .9 Mounting: Ceiling Mounted.
 - .10 Motion controllable frame rate and bandwidth
 - .11 Addition features: Backlight compensation.
 - .12 Image compression: h.264
 - .13 Operational voltage: PoE IEEE 802.3af Class 3
 - .14 Current consumption: 12.1 watts or less.
 - .15 Environment: Outdoor - unless otherwise noted.
 - .16 Weight: 1.2 lbs or less.
 - .17 360^o panning range (endless)
 - .18 Full PTZ control from remote locations
- .2 Lens:
 - .1 Varifocal, remote focus and zoom, P-Iris control, IR corrected.
 - .3 As detailed above, standard of acceptance shall be Panasonic WV-SW396. Any submitted alternate shall be of equal or greater performance.

2.4 NETWORK VIDEO RECORDER

- .1 The network video recorder shall support up to 100 cameras at 30 frames per second, it shall supply up to 32 simultaneous playback streams, 10 simultaneous queries and video to USB transfer. The network video recorder shall be capable of continuous, schedule, alarm/event, and motion recording, shall have pre- and post-alarm recording available, and shall be fully programmable on a per-channel basis.
- .2 The network video recorder shall have expandable storage capacity using storage expansion boxes, and it shall maximize storage efficiency and offer a time- and priority- based system that identifies data to be removed when storage time expires. The network video recorder shall offer both unsecured and secured modes, using a proprietary key system in the secured mode to prevent unauthorized devices from communicating with any IP Video Security System device. System built-in-storage-time to record all cameras on the system for a minimum thirty (30) day period.
- .3 The network video recorder shall be capable of decimating recorded images by time, without losing all video past the decimated time point. The decimated rate shall be no less than 2 images/second, regardless of the original record rate
- .4 The network video recorder shall offer plug-and-play configuration and data authentication facilities. The network video recorder shall have outputs viewable on up to 32 individual workstations, shall record video, audio, and data streams for every channel, and shall have storage locking. The network video recorder shall be fully compatible with the IP Video Security System integrated system architecture and shall have full over-the-network remote control and administration, and it shall have system diagnostics and error logging.
- .5 The network video recorder shall provide hard drives as needed to meet storage needs. Hard drives shall be 7200RPM, 2TB, enterprise quality drives configured in a minimum RAID-5e setup. In addition, the NVR shall feature a hot drive swap that automatically configures the drives when installed.
- .6 The diagnostics shall be systemized with other IP Video Security System products so that problems are reported to the System Manager.

- .7 The NVR shall also handle all audio recording, as specified in the Audio Recording section.
- .8 As detailed above, standard of acceptance shall be Pivot 3 DataBank 2U-D. Any submitted alternate shall be of equal or greater performance.

2.5 WORKSTATION

- .1 The IP Video Security System shall have the capability to display video onto a standard analog monitor, a video wall, or any number of monitors via a PC connected to the CCTV network. The system shall allow any of the system encoded devices to be decoded and displayed on a standard monitor or the workstation PC as well as control and program pan/tilt/zoom cameras.
- .2 The PC workstation shall allow users with authority to configure devices, set up users, adjust network settings, and create recording schedules. Permission to access these functions and all other system services can be configured to a fine level of detail. The PC workstation shall have advanced search capabilities, event logging, and alarm interface displays. The PC workstation shall export video and still images in multiple formats, including h.264, MPEG4, MJPEG, BMP and JPG. A front panel USB 3.0 port and DVD/CD-RW drive make it capable of exporting video clips and still images to external media.
- .3 The system shall be capable of providing user defined workspaces on any workstation, based on an individual user profile.
- .4 The Workstation Application shall support the functionality to view procedures; these procedures shall be triggered to appear during a certain event and can be used to provide detail written or verbal instructions to the operator as to the actions to be taken
- .5 The Workstation Application shall support digital zoom on any fixed camera's video streams.
- .6 The Workstation Application shall support digital zoom on a PTZ camera's live video streams
- .7 The Workstation Application shall provide the ability to control and program any camera equipped with pan, tilt controls and zoom lens:
 - .1 Manually control the pan, tilt and lens functions.
 - .2 Set the pan and tilt home positions for manual or alarm activation.
 - .3 Automatically control the cameras through an alarm trigger.
 - .4 Ability to set multiple preset positions.
 - .5 Ability to set multiple tours.
 - .6 Remotely set and clear the movement limits of the pan and tilt mechanism from control room via telemetry unit at camera site for outdoor cameras.
 - .7 The ability to control the camera menu and setup the camera through the IP Video Security
- .8 The IP Video Security System Video Workstation shall provide up to six (6) predefined and programmable by user views with either one up to sixteen different camera views on the DVI

monitors. Additionally, the system shall be capable of providing the user defined workspaces on any operational control point, based on an individual user profile.

- .9 The system shall be capable of providing a minimum quad screen playback with each quadrant playing video from different cameras all with the same time/date stamp.

2.6 VIDEO MONITORS

- .1 22" flat screen LCD monitors
- .2 1280 x 1024 resolution @ 75Hz
- .3 Removable base and wall mountable
- .4 Black finish
- .5 Standard of acceptance shall be Omnivision or Stealth monitors. Any submitted alternate shall be of equal or greater performance.

2.7 OVERHEAD AUDIO MICROPHONES

- .1 Audio recording shall be accomplished by utilizing the ceiling mounted microphones specified in Section 27 56 00. Refer to details drawings E5.1 and E5.4 for further information.
- .2 Audio is to play back with video records for that area. This includes archived videos and live viewing.
- .3 The contractor shall supply all necessary components to properly condition the audio signal before it reaches the audio-input of the camera, coordinate requirements with the camera supplier. This includes but is not limited to microphone phantom power supplies, unbalanced to balanced audio transformers, etc.

2.8 EXTRA MATERIALS

- .1 Include the following spare materials including commissioning, 10m of cabling and installation costs:
 - .1 5 x Type 'FIX' Cameras
 - .2 1 x Type 'PTZ' Camera

Part 3 Execution

3.1 MANUFACTURER'S INSTRUCTIONS

- .1 Compliance: Comply with manufacturer's written data, including product technical bulletins, product catalogue installation instructions, product carton installation instructions, and datasheet.

3.2 INSTALLATION

- .1 Prior to any rough-in and installation, the Contractor shall confirm with the Owner and Consultant on site the placement, site and FOV of all cameras.
- .2 All termination points and cables within the system shall be labelled in a logical numbering sequence using decal type marking devices similar to Brady wire markers. Corresponding numbers shall appear on the circuit diagrams in the instruction manuals and shop drawings. Multi-conductor cables shall be given an overall identification. Individual conductors shall have individual labels, matching the terminal label.
- .3 All wiring shall be neatly harnessed or laced, or secured. Cable ties are unacceptable. Excessive loose lengths shall be avoided.
- .4 The video surveillance system with all components, cables and services shall be supplied and installed by an established and qualified video system contractor. All necessary components and services shall be provided, whether or not each and every item is necessarily mentioned in the specification or on the drawings.
- .5 Install cable, boxes, mounting hardware, brackets, video cameras and system components in accordance with manufacturer's written installation instructions.
- .6 Connect cameras to cabling in accordance with installation instructions.

3.3 CABLE INSTALLATION

- .1 CAT6 cabling run in cable tray shall be provided to all camera locations shown on drawings.
- .2 All data cables and data jumper cables (minimum 23 gauge), jacks and connector boots installed as part of this project, whether CAT 6 or fibre optic, shall be BRIGHT GREEN in colour. All cables shall be FT4 rated.
- .3 All patch cables are to be stranded cable with RJ45 connectors. RJ45 connectors are not to be attached to solid conductor cable.
- .4 All installed runs of CAT6 cable are to be solid conductor cable and terminated into patch panels in equipment racks or faceplates in other locations.
- .5 An installed cable is any cable that is run through a conduit, run from one area in a building to another area, any cable that travels farther than the adjacent equipment cabinet in a series of cabinets. Note: Equipment cabinets must be abutting without side panels to open connection to be considered adjacent.
- .6 All cabling necessary to make the systems operable shall be provided and installed as instructed by the manufacturer of the Video Surveillance System. The overall system coordination shall be the responsibility of the Contractor, and they shall ensure that all of the necessary system components are installed to result in a complete workable system.
- .7 All components shall be installed in accordance with the manufacturer's written instructions as to location, heights and surfaces shown on the reviewed shop drawings.

- .8 All control equipment including access control modules shall be the standard product of the manufacturer. Local fabrication of parts, printed circuit boards, etc. will not be acceptable.
- .9 All cabling for this Video Surveillance System shall be run within cable tray except where walls are exposed and then the cabling shall be run concealed in conduit in these walls.
- .10 All wiring installed in conduit shall be with a maximum conduit fill of 40%.
- .11 Some cable tray dimensions have been indicated on the drawings that may be larger than those recommended by the manufacturers. These dimensions shall not be reduced.

3.4 CLEANING AND ADJUSTING

- .1 Remove protective coverings from cameras and components.
- .2 Adjust cameras for correct function.
- .3 Clean camera housing, system components and lens, free from marks, packing tape, and finger prints, in accordance with manufacturer's written cleaning recommendations.

3.5 WARRANTY

- .1 The contractor must make available to the Owner a local service department of a duly authorized distributor of the equipment manufacturer, which shall stock the manufacturer's standard parts. The service department shall have at least one factory trained repair technician available to the Owner on 24 hours' notice.
- .2 Provide warranty of installation of equipment installed by this contractor to be free of defects for a period of (1) one year from date of Substantial Completion.
- .3 Provide during the warranty period, all service, maintenance, parts, etc., required for normal operation of the systems, such that Owner needs not purchase additional maintenance agreement or contracts. Upon request, the manufacturer and his agent shall provide direct to the Owner the following proposals:
 - .1 Continuation, after the warranty period, of full maintenance, including all service, labour, parts, etc. required to maintain the systems in a fully operational condition.
- .4 During the warranty period, provide three (3) separate site visits of four (4) hours each on site for owner revisions and additional training.

3.6 VERIFICATION

- .1 Perform tests in accordance with:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.

- .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
- .3 Section 26 05 01 - Common Works Results - Electrical
- .2 The entire installation shall be performed under the supervision of the manufacturer. Upon completion of the installation, the manufacturer shall check and test the entire system. Certification of all tests shall be submitted in writing to the Consultant and shall certify the following:
 - .1 That the system is complete in accordance with this specification
 - .2 That the system is installed in accordance with the manufacturer's best recommendations
- .3 Provide Operational verification as follows: Purpose to ensure that devices and systems' performance meet or exceed established functional requirements. Operational verification includes:
 - .1 Operation of each device individually and within its environment.
 - .2 Operation of each device in relation with programmable schedule and or/specific functions.
 - .3 Operation control of camera lens, pan, tilt and zoom.
 - .4 Switching of camera to any monitor.
 - .5 Switching of system video recorder to selective monitor.
 - .6 Set dwell times.
 - .7 Demonstrate:
 - .1 Sequence viewing of cameras on each monitor.
 - .2 Bypass capability.
- .4 During the certification tests, the contractor shall provide one (1) electrician and (1) helper to assist the manufacturer's representative. The contractor shall also provide any required equipment such as ladders, scaffolding, etc.

3.7 TRAINING

- .1 Perform training in accordance with:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 Section 26 05 01 - Common Works Results – Electrical

- .2 Written documentation bearing name and signature of Owner's personnel who received the above instructions shall be included in the operating instructions and service manuals.

END OF SECTION

Part 1 General

1.1 GENERAL REQUIREMENTS

- .1 The General Conditions of Contract, Division 01 General Requirements and all Addenda thereto form an integral part of and must be read in conjunction with the requirements of this Section.
- .2 Cooperate and coordinate with the requirements of other units of work specified in other Sections.

1.2 REFERENCES

- .1 All equipment shall be listed by Underwriters' Laboratory of Canada. The entire installation shall be in full compliance with the 2010 National Building Code, 2012 Canadian Electrical Code, National Standard of Canada/Underwriters' Laboratory of Canada Standards, and the Saskatchewan Human Rights Commission, Accessibility Standard.
- .2 The system design, installation and verification, shall comply with the following National Standard of Canada/Underwriters' Laboratories of Canada Standards:
 - .1 CAN/ULC-S524-M06 "Standard for the Installation of Fire Alarm Systems".
 - .2 CAN/ULC-S536-M04 "Standard for the Inspection and Testing of Fire Alarm Systems".
 - .3 CAN/ULC-S537-M04 "Standard for the Verification of Fire Alarm System Installations".
- .3 The Electrical Contractor shall be bound by industry standards, as interpreted by the Consultant, whether or not specifically referenced in this document. Comply with Electrical Protection Act and rules and regulations made pursuant thereto, including the 2012 Canadian Electrical Code. Also, comply with applicable standards of the following:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .4 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .5 National Electrical Manufacturers Association (NEMA).
 - .6 National Building Code 2010 (NBC 2010)
 - .7 National Fire Protection Association (NFPA)
 - .8 Institute of Electrical and Electronic Engineers (IEEE).
 - .9 Audio Engineering Society (AES).
 - .10 Other Applicable CSA and UL approvals.

1.3 EXCEPTIONS OF REFERENCED STANDARDS

- .1 The Electrical Contractor shall be bound by the standards referenced herein. The following exceptions shall be noted and used for this project in reference to the following standards:
 - .1 ES/SOW-0101 Revision 3, April 15, 2004:
 - .1 1.4 – Quantity of Equipment: Quantity and location of the equipment shall adhere to the requirements as noted in the Tender Drawings and associated specifications.
 - .2 3.1(c) – maintenance for the system is being handled by the Owner through a separate contracted entity. The Contractor is required to provide warranty services as specified for the specific system.
 - .3 3.1(h) – Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
 - .4 14.0 – Lightning Protection: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
 - .2 ES/SOW-0102 Revision 6, May 1, 2008:
 - .1 Wiring / Cabling Methods 3.1.1: The use of rigid steel conduit is not required.
 - .2 Splicing of existing power cabling due to breaker panel replacement is acceptable.
 - .3 Enclosures 3.3.2: Enclosures within the facility are not required to be IP64 rated.
 - .4 Lightning Protection 4.8: Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.

1.4 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings in accordance with:
 - .1 Section 01 33 00 - Submittal Procedures
 - .2 Section 26 05 01 – Common Work Results
 - .3 ES/SOW-0101 Revision 3, April 15, 2004
 - .4 ES/SOW-0102 Revision 6, May 1, 2008
- .2 Shop drawings shall include but not be limited to complete floor plans, riser, equipment, control schematics and wiring diagrams. Each component shall be identified as to manufacture, type, description and catalogue number.

1.5 PRODUCT APPROVALS

- .1 Manufacturers' and model numbers named in these specifications indicate an acceptable technical standard of performance and are not intended to be exclusive. Products submitted as alternates must result in a control system that meets or exceeds all technical performance criteria as described.
- .2 Products proposed as alternatives to those specified, shall only be considered if submitted for approval no later than 15 working days before tender close. Submit alternates, for approval, as one complete listing. Provide complete product specification sheets with request for approval.
- .3 The Bidder must provide a complete list of primary system products offered with their bid.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Meet requirements of Section 01 74 19 - Waste Management and Disposal.
- .2 Collect and separate waste for reuse, recycling, and other waste diversion strategies in accordance with Waste Management Plan.

1.7 SYSTEM DESCRIPTION

- .1 Modify and expand an existing supervised, non-coded, closed circuit, annunciated, addressable fire and smoke alarm system, as shown on the drawings and as herein specified.

1.8 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance information for the Fire Alarm System for incorporation into manual specified in:
 - .1 Section 01 78 00 - Closeout Submittals
 - .2 ES/SOW-0101 Revision 3, April 15, 2004
 - .3 ES/SOW-0102 Revision 6, May 1, 2008
- .2 Include:
 - .1 Operation instructions
 - .2 Description of system operation
 - .3 Description of each subsystem operation
 - .4 List specifying each piece of equipment in system or subsystem by its original manufacturer name and model number.
 - .5 Parts list specifying parts used in equipment by identification numbers that are standard to electronic industry.

1.9 SYSTEM STARTUP

- .1 Manufacturer's representative to instruct:

- .1 Maintenance personnel in maintenance of system
 - .2 Operating personnel in use of system
 - .3 Other requirements as per ES/SOW-0101 Revision 3, April 15, 2004
 - .4 Other requirements as per ES/SOW-0102 Revision 6, May 1, 2008
- .2 Provide operation and maintenance data for Fire Alarm System for incorporation into manual specified in Section 01 78 00 - Closeout Submittals.
- .3 Include:
- .1 Operation and maintenance instructions for complete fire alarm system to permit effective operation and maintenance.
 - .2 Technical data - illustrated parts lists with parts catalogue numbers.
 - .3 Copy of approved shop drawings.
 - .4 List of recommended spare parts for system.
 - .5 Certification of tests, upon completion, shall be issued in writing to the Consultant by the manufacturer's representative.

1.10 SPARE DEVICES

- .1 Provide the following spare devices with 10 meters of conduit and wire per device, back boxes, installation, testing, verification, etc., shall be provided:
- .1 Fire alarm pull stations 5
 - .2 Multi-sensor detectors 5
 - .3 Monitor Modules 10
 - .4 Control Modules 10
 - .5 Relay Modules 5
 - .6 Fault Isolator Modules 10
 - .7 Speaker/Strobes 10

Part 2 Products

2.1 MATERIALS

- .1 Equipment and devices: ULC listed and labelled and supplied by **Notifier** to match existing installed system.

2.2 SYSTEM OPERATION

- .1 If an alarm is caused by activation of any of the following devices:
- .1 pulling a manual station;
 - .2 operation of a sprinkler flow valve;
 - .3 operation of a smoke detector (ceiling or duct mounted);
 - .4 operation of a pre-action system alarm;
- .2 The following shall occur:

- .1 A pre-signal alarm shall sound on all signal devices throughout the building.
- .2 The fire alarm control panel shall indicate the alarm location (address), alarm type (pull station, photoelectric detector, sprinkler, thermal, etc.), and location description along with time.
- .3 The pre-signal alarm shall continue until the alarm is acknowledged and the system is silenced. The device causing the alarm shall cause the system to remain in alarm until the device is cleared or reset, and the system alarm is acknowledged. The pre-signal alarm must sound for a minimum duration of one minute.
- .4 The first stage signal shall continue until a general alarm key switch in any manual station or a variable 0-5 minute time delay activates the general evacuation signal. When a key switch is operated, all fire alarm signal devices in the building shall sound an evacuation alarm. When the variable 0-5 minute time delay expires and activates the evacuation alarm, it shall sound throughout the entire building.
- .3 The fire alarm system shall provide a signal to the access door control systems in the building to disengage electric door locks and magnetic door locks allowing fail-safe and free egress for doors controlled by the access control systems.
- .4 There shall be a capability provided, through an operator bypass control panel, to bypass the shutdown of any desired mechanical ventilation unit during a fire alarm evacuation condition. The operator bypass control panel shall be installed adjacent to the main fire alarm control panel. The contractor shall confirm final units to be controlled on site. The ventilation bypass controls shall be cabled to the motor controller for each unit. All fire alarm cabling shall be run within EMT.
- .5 A subsequent alarm from any initiation device shall cause the signal devices to sound again. Subsequent alarms shall be displayed by the system in order of priority and then in the order in which they occur. Subsequent alarms may occur prior to acknowledgement of initial alarm.
- .6 The entire system shall be electrically supervised against opens, shorts and grounds of any wire on the alarm initiating circuits or any wire on the signal circuits. Trouble conditions shall display as a lower priority than an alarm.
- .7 Coordinate with Mechanical Contractor to ensure that all necessary wiring and controls have been provided to accommodate fire alarm interconnections with the sprinkler and mechanical control systems. Provide required RJ45/Cat 5 cable connections within EMT conduit from fire alarm control panel to the BMS control panel to allow the BMS to know when the fire alarm system is activated.
- .8 Sprinkler valves being provided within this project by the Mechanical Contractor, shall have a tamper switch which shall be connected to a separate fire alarm system address. Tamper switches shall cause a trouble indication when the shut-off valve is closed. Coordinate final location and quantity with the sprinkler system supplier.
- .9 Coordinate with Mechanical Contractor to ensure all necessary wiring and controls have been provided to accommodate fire alarm system interconnections with the sprinkler systems.
- .10 Provide circuits as required by the fire alarm manufacturer for the signal circuit booster panels using 2 #12 RW90 (& #12 insulated ground) in 20mm EMT conduits.

- .11 Provide an addressable control module and wiring connection to the nearest BMS control panel to indicate a "Fire Alarm Drill" condition. This contact shall be used in the BMS to allow a fire alarm test without ventilation shutdown. This is to be used for fire drill purposes only.

2.3 SPRINKLER PROTECTION SYSTEMS

- .1 Sprinkler valves shall have a tamper switch which shall be connected to a separate fire alarm system address. Tamper switches shall cause a trouble indication when the shut-off valve is closed. Coordinate final location and quantity on site.
- .2 All existing tamper switches, control valves and shut-off valves shall remain connected to the fire alarm system.
- .3 The electrical contractor shall provide wiring connections to the solenoids of the sprinkler system

2.4 SMOKE CONTROL REQUIREMENTS

- .1 In the event of a fire alarm, the signal to the mechanical ventilation systems shall be maintained to control and prevent the spread of smoke to other parts of the building and to minimize the smoke build-up within the fire zone as required in the mechanical control scheme, the Provincial Fire Commissioner and the City of Regina.
- .2 Each smoke damper is equipped with an electric actuator which shall be controlled by the fire alarm system. A powered contact to control each damper shall be provided. Confirm on site the location and identification of all dampers. Control relay modules controlling the actuator shall be provided.
- .3 For all smoke dampers, provide a control relay module for each damper or group of smoke dampers to control and operate the 120-volt actuator at the damper.
- .4 In addition, each damper is equipped with end switch to indicate damper position. Provide a monitor module for each smoke damper to monitor the open/close status of the end switch provided with external contacts.
- .5 Provide connections and control to magnetic type door holders and door closures, window vent controllers, and fire shutters. Provide the programming for the release of all doors within the smoke control fire zones, and all doors to adjacent fire zones.
- .6 All fire shutters shall automatically close upon detection of smoke within the fire zone in which the fire shutter is located, and on detection of smoke on any adjacent fire zone including the fire zone on the floor above and below the fire shutter. The fire shutters shall be permitted to be manually or automatically opened upon the clearing of the fire alarm system from the fire alarm control panel.
- .7 In the event of a pre-signal alarm, all doors within the smoke control zone, and all doors to the adjacent smoke control zone shall be released.

2.5 DEVICES

- .1 **Manual Pull Stations:** Manual fire alarm pull stations where indicated shall be addressable two-stage, pull lever, single action type, finished in red, semi-flush mounting.
- .2 **Detectors:** Provide multi-sensor low-profile intelligent detectors designed to increase immunity to false alarms. The detectors shall be microprocessor-based, combination photoelectric and thermal technology, addressable analog type detector. The detector shall adjust its sensitivity automatically without needing operator intervention or control panel programming. The thermal sensing rating shall be fixed-temperature set point 135°F (57°C). Includes LED red indicator when in alarm; flashes green in standby for normal conditions.
- .3 **Thermal Detectors:** Provide low-profile intelligent thermal detectors using thermistor sensing circuit to produce 135°F (57°C) fixed temperature. Includes LED red indicator when in alarm; flashes green in standby for normal conditions.
- .4 **Duct Detectors:** Photoelectric type smoke detectors shall operate on the light scattering principle and be activated by smoke particles. Smoke duct detectors shall be plug-in base type equipped with sampling tubes and framework to support the sampling tubes. LED's shall be provided on the detector to indicator an alarm condition.
- .5 **Monitor, Control and Relay Modules:** Provide addressable monitor, control and relay modules to interface to convenience non-addressable devices.
 - .1 Monitor modules shall be installed to supervise a circuit of dry-contact input devices, such as conventional heat detectors and pull stations, or monitor and power a circuit of two-wire smoke detectors. Powered directly by the SLC loop, high-noise (EMF/RFI) immunity, LED flashes green for normal operation and latches on steady red to indicate alarm.
 - .2 Control modules provide the control panels a circuit for operating horns, strobes, speakers, etc., or to monitor a telephone circuit. Addressability allows the control module to be activated, either manually or through panel programming on a select zone or area of coverage. LED blinks green each time a communication is received from the control panel and turns on in steady red when activated.
 - .3 Relay modules provide the system with a dry-contact output for activating a variety of auxiliary devices, such as fans, dampers, control equipment, etc. Addressability allows the dry contact to be activated, either manually or through panel programming. LED blinks green each time a communication is received from the control panel and turns on in steady red when activated.
- .6 **Fault Isolators:** Provide fault isolator modules to detect and isolate short-circuited segments on the SLC loops. The module shall automatically determine a return-to-normal condition of the loop and restore the isolated segment. Integral LED blinks to indicate normal condition, illuminates steady when short circuit condition is detected. Provide fault isolator modules on each loop after every (20) twenty devices and after every floor penetration or penetrations of fire barriers.
- .7 The plug-in module shall be supervised against removal, improper module position and incorrect module type. The control panel shall provide absolute electronic protection of all circuitry such that any module may be inserted or removed, while the control panel is fully powered without causing an alarm condition or any damage to the equipment.

- .8 **End of Lines:** End-of-line devices for signalling zones and sprinkler flows and tampers shall be mounted in separate single gang box with red cover plate. Mount end of line in wall above device but not above 1800 mm above finished floor.
- .9 **Audible/Visual Fire Alarm Signaling Devices:** Audible and visual signaling appliances shall be provided to meet code requirements, ADA/NFPA/ANSI compliant, and shall be ULC listed for the purpose of fire alarm signaling and emergency voice communication including emergency paging. The signal devices shall be combined speaker/strobe type or separate speaker only. The speakers shall produce a code-3 temporal pattern. The speakers shall have a minimum dBA output of approximately 92dBA. Signal devices shall be surface wall mounted on flush outlet boxes. Wall mounted horn/strobe devices shall be by Notifier.
- .10 Provide one additional XP6-CA card for the main fire alarm cabinet for additional devices.
- .11 Provide one additional fire alarm cabinet and two new audio amplifiers to match existing.
- .12 The strobe shall produce white light with a minimum of 75 candelas across all viewing angles, but shall be field selectable for other ratings.
- .13 All circuits shall be supervised and shall have signal isolation for speaker circuits only.
- .14 Provide connections to each magnetic type door holder. Door holders shall be supplied and installed by Architectural Division. Co-ordinate with appropriate Architectural Division for voltage and special connection requirements. Site verify and co-ordinate voltage, capacity and special connection requirements. In the event of a pre-signal alarm, all doors within the smoke control zone, and all doors to adjacent smoke control zones, shall be released.
- .15 Where fire alarm devices are installed within unheated spaces or spaces where temperatures may drop below 0°C, appropriate fire alarm devices intended for those conditions shall be provided.
- .16 The fire alarm system shall include all necessary software and interconnecting wiring to control and operate the mechanical ventilation scheme. The final logic and system operation shall be determined during construction in co-ordination with the Consultant, the Provincial Fire Commissioner and the City of Regina.

Part 3 Execution

3.1 INSTALLATION

- .1 The contractor must make available to the Owners a local service department of the equipment manufacturer, which shall stock the manufacturer's standard parts. The service department shall have at least one factory trained repairman available to the Owner on a 24 hours' notice. The systems shall be guaranteed for a period of one year. Provide, during the guarantee period, all service, maintenance, parts, etc., required for the normal operation of the systems, such that the Owner need not purchase additional maintenance agreement or contracts. The manufacturer shall visit the jobsite a minimum of once every four (4) months during the guarantee period to perform above noted maintenance.

- .2 The overall system co-ordination shall be the responsibility of the contractor, and he shall ensure that all of the necessary system components are installed to result in a complete, workable system.
- .3 All field devices including manual pull stations, detectors, monitor, control and relay modules shall be externally labelled showing the address and device controlled and monitored. The self-adhesive identification labels shall be 12mm WHITE laminated marker tape with black typed lettering. Identification shall be placed on the inside of doors where doors are either controlled by magnetic door holders, electric locks, or magnetic locks.
- .4 Detectors shall be mounted in suitable mounting plates with finish ring. Where shown in proximity to unit heaters, detectors shall be located at least 3000mm from such unit heaters, and out of line of direct heat. Detectors shall be located 1500mm from any air handling diffusers or grilles.

3.2 WIRING

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical and CAN/ULC-S537.
- .2 All wiring shall be color coded. Wire and conduit necessary to make the system operable shall be provided and installed as instructed by the manufacturer of the fire alarm system. All wiring shall be installed in conduit with a maximum conduit fill of 40%. All conduit shall be installed in accordance with the project specifications.
- .3 Wiring shall be as follows:
 - .1 Wiring for signal strobe device circuits shall be a minimum #14 gauge RW90, 300 volt, solid copper. Run in separate conduit from initiating circuits. Run speaker circuits on separate circuit from strobes.
 - .2 Wiring for Speaker device circuits shall be #16 gauge, twisted shielded jacketed pair. Shielding must be continuous throughout and isolated from ground except at the control panel.
 - .3 Addressable devices shall be #18 gauge, twisted shielded jacketed pair. Shielding must be continuous throughout and isolated from ground except at the control panel.
 - .4 Ancillary circuits shall be #14 gauge RW90, 300 volt, solid copper. Run in separate conduit.
 - .5 Annunciator wiring shall be as per manufacturer's recommendations.
- .4 All wiring and its installation must comply with all appropriate codes including CAN/ULC-S524-M01. Refer to Appendix 'A' of CAN/ULC-S524-M01 for further requirements.
- .5 All cabling entering and exiting fire alarm control panels, signal booster panels, annunciator panels, BMS control panels that is installed by electrical contractor, and pull boxes shall be labelled as to identify circuit/signal cable.
- .6 All boxes and panels noted above shall also receive lamecoids for identification.
- .7 All devices shall be installed in outlet boxes
- .8 All wiring shall be run in EMT conduit raceway.

3.3 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical and CAN/ULC-S537.
- .2 Manufacturer shall allow for a required amount of on-the-job site assistance for the contractor during the construction period.
- .3 The entire installation shall be performed under the supervision of the manufacturer. Upon completion of the installation, the manufacturer shall check the entire system to the approval of the Consultant. The manufacturer shall verify the entire system and demonstrate its complete operation to those having jurisdiction.
- .4 The manufacturer shall perform a complete verification and inspection of all installed equipment, including each and every component, such as manual stations, automatic ionization detectors, sprinkler switches, audible signalling appliances, station indicating lamps, control equipment, remote peripherals, etc., to ensure the following:
 - .1 That the type of equipment installed is that designated by the Consultant's specifications and plans;
 - .2 That the wiring connections to all equipment are correct and in accordance with CSA and ULC requirements;
 - .3 That the equipment is installed in accordance with the manufacturer's recommendations;
 - .4 That the regulations concerning the supervision of components have been adhered to (e.g. stations, detectors, signal devices, etc.), and are properly wired and supervised;
 - .5 That any subsequent changes necessary to conform to the above will be done by the contractor, with technical advice supplied by the manufacturer.
- .5 During the period of inspection, the Contractor shall supply to the manufacturer, one (1) electrician and one (1) helper.
- .6 The contractor shall also supply any required equipment such as ladders, scaffolding, etc.
- .7 To assist the installer in preparing his bid, the manufacturer shall indicate the number of hours necessary to complete this inspection.
- .8 Upon completion of the inspection, and when all of the above conditions have been compiled with, the manufacturer shall issue to the Consultant the following:
 - .1 A copy of the inspecting technician's report, showing the location of each device, and certifying the test results of each device.
 - .2 A certificate of verification confirming that the inspection has been completed, and showing the condition upon which such inspection and certification have been rendered.
 - .3 Proof of liability insurance for the inspection.
- .9 All verification certificates shall include the testing of the audibility of the signal devices to confirm compliance with the 2010 National Building Code.

3.4 TRAINING

- .1 Perform training in accordance with:
 - .1 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0101 Revision 3, April 15, 2004: Statement of Work for Electronic Systems for Correctional Service Canada Institutions.
 - .2 Correctional Service Canada (CSC) – Technical Services Branch – ES/SOW-0102 Revision 6, May 1, 2008: Statement of Work for Quality Control for installation of Electronic Systems in Federal Correctional Institutions.
 - .3 Section 26 05 01 - Common Works Results - Electrical
- .2 Written documentation bearing name and signature of Owner's personnel who received the above instructions shall be included in the operating instructions and service manuals.

END OF SECTION

