

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 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).
- .2 Canadian Standards Association, (CSA International)
 - .1 CSA-T529, Telecommunications Cabling Systems in Commercial Buildings (Adopted ANSI/EIA TIA 568A with modifications).
 - .2 CSA-C22.2 No. 214, Communications Cables (Bi-national Standard, with UL 444).
 - .3 CAN/CSA-C22.2 No. 182.4, Plugs, Receptacles, and Connectors for Communication Systems.
- .3 Telecommunications Industry Association (TIA)
 - .1 TIA/EIA/ANSI – 568B.1/2/3 latest revision Commercial Building Standards for Telecommunications Pathways and Spaces;
 - .2 TIA-568-C.0 Generic Telecommunications Cabling for Customer Premises;
 - .3 TIA-568-C Series Commercial Building Telecommunications Cabling Standard;

- .4 TIA/EIA-569 Commercial Building Standard for Telecommunications Pathway and Spaces;
 - .5 TIA/EIA-606 The Administration Standard for the Telecommunications Infrastructure of Commercial Building;
 - .6 TIA/EIA-607 Commercial Building Ground (Earthing) and Bonding Requirements for Telecommunications;
 - .7 Category 6 system and testing as released by TIA/EIA/ANSI – latest revision
 - .8 TIA/EIA T568-A UTP wiring/pinout
- .4 The structured communication wiring system shall comply with Treasury Boards Information Technology Standard for wiring as described in the TBITS 6.9 document. TBITS 6.9 – Profile for the Telecommunications Wiring System in Government Owned and Leased Buildings – Technical Specifications) shall be as per Information and Technology Standards:
<http://www.tbs-sct.gc.ca/it-ti/itp-pti/its-nit-eng.asp>

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

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 SYSTEM DESCRIPTION

- .1 There are two separate networks to be utilized in this building. The Information Management Services (IMS) network and the Essential Services Security (ESS) network. These networks have separate requirements, and as such have been separated in many of the specification sections in this section and all related sections. The IMS network is to be utilized for all data/voice connections, while the ESS network is to be used for all CCTV and security requirements.
- .2 The data and voice cable installation, shall include all cable, connectors, patch panels, patch cords, racks, bix blocks, etc., as specified and shown on the drawings
- .3 The cabling system shall meet or exceed the minimum characteristics as outlined TIA Standards Category 6. In addition, the testing method and parameters shall be as per the TIA recommendations.
- .4 The cabling installer shall be a Belden Certified System Vender installing Belden components. Once completed, the installation must be a Belden Certified System. The data system and components shall be guaranteed for a period of twenty (20) years from the date of installation against defects in materials and workmanship.

1.7 SUBMITTALS

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures and 26 05 01 – Common Work Results, Electrical.

- .2 Submit shop drawings for review prior to ordering equipment. Shop drawings shall include but not be limited to, photocopies of accredited installers, cabling, hardware and components, patch cords, tester information, and labeling.
- .3 Submit manufacturer's certification documentation that guarantees installation techniques, cable and cabling components and carry a minimum 20 year certification from the manufacturer for the capability to support gigabit applications such as 1000 Base-T, 622MB/s and 2.4 Gb/s ATM and work case channel performance based on the values indicated. The term channel performance incorporates manufacturer certified patch cords.
- .4 Upon request and at no cost, the contractor shall provide a manufacturer's technical representative to conduct an onsite visit to ensure complete technical compliance.
- .5 The manufacturer's certification must guarantee that design or installation negligence on the part of the certified contractor will not negate or void any portion of the certified system. The manufacturer must guarantee that all material, components and labour are covered for the full certification period. It must also guarantee that in the event a contractor is no longer in business, the full certification remains valid.

1.8 CONTRACTOR QUALIFICATIONS

- .1 The Installer (Firm and Employees) conducting the installation shall have full working knowledge of cabling low voltage applications such as, but not limited to data/voice communications cabling systems. The Installer shall have at least five years of continuous recent experience on similar projects. The Installer shall hold recent, up-to-date licenses, certifications and training certificates in the area the project is located and for the equipment to be installed. The Installer shall:
 - .1 Provide references of the type of installation provided for this specification;
 - .2 Be a Belden Certified System Vendor.
 - .3 Have a knowledge of all applicable Telecommunication standards such as but not limited to CSA, TIA/EIA, IEEE and ANSI;
 - .4 Have a experience in the installation of pathways and support for horizontal and backbone cabling;
 - .5 Be experienced in the installation and testing of telecommunication network cabling system, including the use of light meter and OTDR.
 - .6 Provide proof of being a manufacturer certified installer for all cable network components being installed such as but not limited to cables, connectors and end termination equipment. The use of non-manufacture certified installer is not permitted.

1.9 PROJECT CLOSEOUT

- .1 Submit product data in accordance with Section 01 33 00 - Submittal Procedures and 26 05 01 – Common Work Results, Electrical.
- .2 Operating and Maintenance Manuals at project closeout shall include
 - .1 List of cables, hardware and components;
 - .2 Copies of approved shop drawings;

- .3 Record drawings.
- .4 Warranty certification from the Manufacturer
- .5 Receipts that include the listing of spare parts, materials and supplies, including patch cables and equipment cords.
- .6 Test and verification reports (may be submitted on CD Disk inserted in an appropriate envelope page in the manual).

Part 2 Products

2.1 COMMUNICATION CABLES, PATHWAYS AND TERMINATION BLOCKS

- .1 Refer to Section 27 05 14 - Communication Cables Inside Buildings
- .2 Refer to Section 27 05 28 – Pathways for Communications Systems
- .3 Refer to Section 27 11 19 – Communications Termination Blocks

Part 3 Execution

3.1 FIELD QUALITY CONTROL

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results - Electrical.
- .2 The communications cabling system and testing shall comply with the following standards. All standards shall be as per the latest revision at the time of tendering this project.
 - .1 TIA/EIA/ANSI – 568B.1/2/3 latest revision
 - .2 Category 6 system and testing as released by TIA/EIA/ANSI – latest revision
 - .3 TIA/EIA T568-A UTP wiring/pinout
 - .4 BICSI, TDMM Telecommunications Distribution Methods Manual (latest edition)
 - .5 CAN/CSA-T529-M91
 - .6 CAN/CSA-T530-M90
 - .7 CAN/CSA-T527-94, EIA/TIA-607
 - .8 CAN/CSA-T528-93, EIA/TIA-606
 - .9 EIA/TIA-TSB 40-A
 - .10 EIA/TIA-TSB 67
 - .11 EIA/TIA-569
 - .12 EIA/TIA-606
- .3 The total installation shall be completed by the cable Installer who is certified by the manufacturer for Category 6 and fibre optic cable installations. The Installer shall submit photocopies of accreditation certificates with the shop drawings. Submit testing method and tester with shop drawings.
- .4 The contractor shall submit the verified test result on each cable, connector, and connection for the total installation, including back-bone and horizontal cabling. The model number and

manufacturer of the Category 6 cable and fibre cable shall be documented. The type of tester used for testing the Category 6 cabling and fibre cabling must also be documented.

- .5 Test results shall be evaluated by the test equipment using the most up-to-date criteria from the TIA/EIA Standard. This information shall be supplied in electronic format.
 - .1 Room number of installation
 - .2 Wall plate ID
 - .3 Test Results with an identification of type of test used and whether the result was PASS or FAIL
- .6 Category 6 cable tests shall provide results for the following tests:
 - .1 Near End Crosstalk (NEXT)
 - .2 Attenuation
 - .3 Ambient Noise
 - .4 Attenuation to Crosstalk Ration (ACR)
 - .5 Far End Crosstalk (FEXT)
- .7 Fibre Optic Testing:
 - .1 Single mode/multimode fibre cable shall be tested at both 850nm and 1300nm, and 1310nm and 1500nm in both directions.
 - .2 Testing of single mode fibre cabling shall meet the requirements of ANSI/TIA/EIA-526-7.
 - .3 Test set-up and performance shall be conducted in accordance with ANSI/TIA/EIA-526-14-A for multimode fibre. The light source shall meet the launch requirements of ANSI-TIA/EIA-455-50B, Method A. This launch condition may be achieved either within the test equipment or by use of an external mandrel wrap (as described in clause 11 of ANSI/TIA-EIA-568-C) with a Category 1 light source.
 - .4 Attenuation testing shall be performed with a stable launch condition using two-meter jumpers to attach the test equipment to the cable plat. The light source shall be left in place after calibration and the power meter moved to the far end to take measurements. Maximum attenuation for installed cables shall be evaluated basted on the following formula:
- .8 Provide with maintenance manuals, a marked set of prints illustrating the network drop name for each drop location. No other as-built information shall be provided on these prints unless it relates to the data or voice network.
- .9 The consultant will spot test this testing following test completion. Contractor shall provide the testing technician for (2) hours, and the completed test charts, for spot check verifications.

3.2 GROUNDING AND BONDING FOR COMMUNICATION SYSTEM

- .1 Bonding Backbone shall consist of green jacketed stranded copper conductors and insulated ground bars.
- .2 Install a #6 AWG insulated ground connection directly to each equipment rack in LAN Rooms. Each ground connection shall be terminated at the existing building ground system.

- .3 Bus bars shall be an insulated pre-drilled, electro tin plated copper busbar, minimum 6mm thigh x 100mm wide x 305mm long (or length that is determined by the number of required connections including space for additional bond connections). Mount up 300mm above finished floor near the equipment rack location.
- .4 Aluminum wires, clamps or terminal connectors will not be accepted for grounding and bonding.
- .5 Terminations to the telecommunication ground bus bars shall be installed without splices where possible. If splices are necessary, they shall be as few as possible. Use irreversible compression-type connectors, exothermic welding, or equivalent. The connection to the ground bus bar shall be done using 2-hole compression connectors.

3.3 WARRANTY

- .1 Testing and certification of the building network distribution cable installation shall be by the Installer and shall include the provision of a full Manufacturer's and Vendor's Warranty covering performance, products and installation. The Warranties shall cover the full repair and/or replacement of any component failing or failure to meet the design requirements within one (1) year. Warranties shall be delivered to the Project Manager with the Testing and Certification documentation.
- .2 Within ten (10) days after testing, the Installer shall submit the cable test results, and a marked up record drawing(s) of the as-built cable network. The record drawing(s) shall include the cable/jack identification at the outlet locations.
- .3 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.
- .4 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

3.4 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.

3.5 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.
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 - .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

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 - .6 National Building Code 2010 (NBC 2010)
 - .7 National Fire Protection Association (NFPA)
 - .8 Institute of Electrical and Electronic Engineers (IEEE).
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 - .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:
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 - .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.

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- .3 3.1(h) – Any required lightning protection on the cables entering / leaving the facility shall be as per the tender drawings.
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 - .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.
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1.4 SHOP DRAWINGS AND PRODUCT DATA

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 - .3 ES/SOW-0101 Revision 3, April 15, 2004
 - .4 ES/SOW-0102 Revision 6, May 1, 2008

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 The data and voice cable installation, shall include all cable, connectors, patch panels, patch cords, racks, bix blocks, etc., as specified and shown on drawings.
- .2 The cabling system shall meet or exceed the minimum characteristics as outlined TIA Standards Category 6. In addition, the testing method and parameters shall be as per the TIA recommendations and meet requirements for testing Category 6 installations.
- .3 The cabling system shall use matched components from a single manufacturer certified to deliver system performance over the lifetime of the applications which the cabling system was originally designed to support. The data system and components to be certified by the manufacturer and shall be guaranteed for a period of twenty (20) years from the date of installation against defects in materials and workmanship. The manufacturer shall be Belden.
- .4 Each cable shall be equipped with connectors on each end and connected to wall jacks or cable connectors. All field communications cabling to be terminated on patch panels located on the drawings.
- .5 The data cabling channel shall not exceed four (4) connections and shall not exceed 90m.

Part 2 Products

2.1 COPPER VERTICAL RISER / BACKBONE CABLING

- .1 All vertical riser cables for telephones shall be 100 ohm UTP, solid copper, 24 AWG Category 3 and shall be minimum 25 pair unless noted otherwise on drawings. All vertical riser cabling for telephones shall be grey.
- .2 Voice riser cabling shall be CMP/FT6 rated for use indoors.
- .3 All voice risers shall terminate on BIX1A/110 or equivalent blocks at the Electrical Room BIX termination blocks; at 48-port Category 6 patch panel at the LAN Room equipment racks. Provide a 3 meter service loop prior to termination on each end.
- .4 All vertical riser data cables shall meet minimum Category 6 requirements as detailed in the latest TIA/EIA-568C revisions. Provide 3 meter service loop prior to termination on each end.

2.2 ESS NETWORK OPTICAL FIBRE CABLE (OFC)

- .1 Multimode Optical Fibre (MMF): Backbone/riser fibre cables and Horizontal fibre cable to the desk top shall be factory pre-terminated cable and have a fibre count of 2-fibre, laser optimized 50um core diameter/125um cladding diameter OM3 multimode-coated fibres housed in colour coded tight buffer tubes and have a aqua sheath. All fibre cable shall have a cable jacket FT6 plenum CMP rating. Compliance to TIA/EIA-568-C.3.
- .2 Provide 3 meter additional length of cable at each end for service loop.

- .3 All fibre shall be of the “Zero Water Peak” type.

2.3 IMS NETWORK OPTICAL FIBRE CABLE (OFC)

- .1 Singlemode Optical Fibre (MMF): Backbone/riser fibre cables and Horizontal fibre cable to the desk top shall be factory pre-terminated cable and have a fibre count of 6-fibre, laser optimized 50um core diameter/125um cladding diameter OM3 multimode-coated fibres housed in colour coded tight buffer tubes and have a aqua sheath. All fibre cable shall have a cable jacket FT6 plenum CMP rating. Compliance to TIA/EIA-568-C.3.
- .2 Provide 3 meter additional length of cable at each end for service loop.
- .3 All fibre shall be of the “Zero Water Peak” type.

2.4 HORIZONTAL COMMUNICATIONS BUILDING CABLE (CBC)

- .1 All communication cable (data and voice) shall be unshielded twisted pair, Category 6. four (4) pair #23 AWG, CMP (FT6) rated and meet TIA/EIA/ANSI – 568-C.2, latest revision unless noted otherwise. IMS data cable shall be white, IMS voice cable shall be blue, and ESS cabling shall be green, unless noted otherwise.
- .2 Each cable shall be equipped with connectors on each end at the wall jacks and patch panels at the data equipment racks.
- .3 The data cabling channel shall not exceed four (4) connections and overall length shall not exceed 90m. The maximum distance shall include an allowance of 3 meters from the outlet to the workstation and 6 meters for patch cords.
- .4 Data and voice may be installed in a common box.
- .5 A minimum of two Category 6 UTP cables shall be installed at each workstation unless otherwise noted on the drawings.

2.5 ESS NETWORK PATCH CORDS

- .1 Pre-terminated, factory tested patch cords shall be of the same manufacturer as the installed system and shall be part of the certified system. Patch cables shall be labeled at both ends.
- .2 Patch cords for data and voice cables shall have stranded conductors and meets the requirements of TIA/EIA 568B (latest revision). Patch cords shall meet Category 6A criteria when tested with the components of the system. Patch cords at workstations shall be Category 6A cable terminated with 8 pin modular male jacks, TIA T568A pinout.
- .3 Provide patch cords for each cable drop located on the plans.
- .4 Provide cords in the following lengths: 50% (data total) shall be 1.2m length; 30% (data total) shall be 1.8m length; 20% (data total) shall be 2.1m length.
- .5 Fiber patch cords: All fibre cable shall be multimode tight buffered, multi-fibre building cable unless noted otherwise.

2.6 IMS NETWORK PATCH CORDS

- .1 Pre-terminated, factory tested patch cords shall be of the same manufacturer as the installed system and shall be part of the certified system. Patch cables shall be labeled at both ends.
- .2 Patch cords for data and voice cables shall have stranded conductors and meets the requirements of TIA/EIA 568B (latest revision). Patch cords shall meet Category 6 criteria when tested with the components of the system. Patch cords at workstations shall be Category 6 cable terminated with 8 pin modular male jacks, TIA T568B pinout.
- .3 Provide patch cords for each cable drop located on the plans.
- .4 Provide patch cords for rack in the following lengths:
 - .1 180 305mm White (data)
 - .2 15 305mm Blue (Phone)
 - .3 25 610mm Blue (Phone)
 - .4 25 915mm Blue (Phone)
 - .5 10 1220mm Blue (Phone)
- .5 Provide patch cords for PC connections:
 - .1 30 1220mm White
 - .2 20 2134mm White
 - .3 50 3048mm White
 - .4 50 4572mm White
 - .5 50 6096mm White
- .6 Fiber patch cords: All fibre cable shall be singlemode LC-Duplex to LC-duplex, tight buffered, multi-fibre building cable unless noted otherwise. Provide the following fibre patch cables:
 - .1 6 2000m
 - .2 2 15,000m
 - .3 2 25,000m

Part 3 Execution

3.1 INSTALLATION OF COMMUNICATION CABLES

- .1 All cable shall be pulled using proper wire grips. Pulling force and bend radius shall not exceed manufacturer's specifications.
- .2 Velcro straps shall be used in all locations, cable ties are unacceptable.

3.2 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.

3.3 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.
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- .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.

3.4 TRAINING

- .1 Perform training in accordance with:
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- .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.

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 - .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 Submit shop drawings for review prior to ordering equipment. Shop drawings shall include but not be limited to, photocopies of accredited installers, outlets, coverplates, “water fall kits”, cable management.

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 Telecommunications raceways system consists of outlet boxes, cover plates, cabinets, conduits, cable troughs, pull boxes, sleeves and caps, fish wires, service poles, service fittings, concrete encased ducts.

Part 2 Products

2.1 MATERIAL

- .1 Conduits: in accordance with Section 26 05 34 - Conduits, Conduit Fastenings and Conduit Fittings
- .2 Cable troughs: type, in accordance with Section 26 05 36 - Cable Trays for Electrical Systems
- .3 Junction boxes, in accordance with Section 26 05 31 - Splitters, Junction, Pull Boxes and Cabinets

2.2 OUTLET BOXES

- .1 Outlet boxes shall be 100mm square boxes. Multiple boxes shall not be ganged unless noted otherwise.
- .2 Wall plates for communication cable systems shall have integral self labeling. The wall plates must support up to four (4) network drops and be run in a minimum of **27mm** conduit to the nearest equipment rack or stub at the basket tray in the accessible ceiling. Provide blank filler plates for unused drops.
- .3 Wall plates shall be modular and in 'Keystone' format opening to allow the possibility of changing connector types in the future without replacing the wall plate. Faceplates shall be equipped with small form factor terminating connectors to fit the individual outlet's requirements (RJ45 and or Dual LC and or CATV bulkheads).
- .4 Wall plates shall be equipped with a minimum of four (4) angled keystone openings. The installer shall equip the wall plate with the required amount of blank inserts as required. The minimum standard of acceptance for wallplates are Corning WLL-PL-AP or Panduit NK4VSFWH.
- .5 When the wall plates are equipped with fibre optic port, it must be placed in the bottom keystone port position. Install 'Keystone' fibre 'SC' adapter for frame-station connector.

2.3 CABLE MANAGEMENT

- .1 Velcro ties shall be used. Each cable type shall be bundled separately; that is data bundle, voice bundle, and fibre bundle. Cable ties wraps are unacceptable.

Part 3 Execution

3.1 SECURITY

- .1 All cabling shall be installed in conduit in areas deemed unsecured. Unsecured areas, unless otherwise noted include the following:
 - .1 Any area accessible by more than one tenant or the public.
 - .2 Any area where cabling crosses from one tenant space to another tenant space.
- .2 No communication (data, voice or fibre) cabling shall share same raceway or junction boxes with any other pathway system.

3.2 INSTALLATION

- .1 All horizontal cables shall be run in conduit. All raceways shall be grounded. All conduit shall have suitable bushings.
- .2 Backbone/riser cables (fibre, copper) and horizontal cables shall be run in EMT conduit, minimum 27mm diameter unless otherwise noted on drawings. Maximum allowable percentage conduit fill shall not exceed 40%.
- .3 EMT conduit shall be reamed and bushed at both ends and bonded to the distribution system. Rigid PVC or flexible metallic or PVC conduits are not acceptable.
- .4 Inside radius bend in EMT conduit shall not be less than 6 times the internal diameter for conduit sizes up to 41mm inside diameter; 10 times the internal diameter for conduit sizes 53mm diameter and larger.
- .5 Pull boxes shall be installed in conduit runs where the total number bends exceed 180 degrees; where the overall length of the conduit run is more than 30m, or if there is a reverse bend in the run.
- .6 Pull boxes shall be installed in the straight sections of the conduit run and shall not be used lieu of a bend. Corresponding ends of conduit shall be aligned with each other. Conduit fittings shall not be used in place of pull boxes or bends.
- .7 Use of LL, LR and LL conduit fittings is not permitted.
- .8 The use of J-Hooks, brackets, cable ties and other attachments to support cabling **is not** permitted.
- .9 In all wall outlet boxes, the contractor shall leave 400mm length of cable in each box.
- .10 In all wall workstation drops, leave 300mm of cable slack before entering wall or workstation in suspended ceiling.

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 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.

3.5 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.

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- .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 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 Institute of Electrical and Electronic Engineers (IEEE).
- .2 Canadian Standards Association (CSA) International
 - .1 CAN/CSA-C22.2 No.182.4, Plugs, Receptacles and Connectors for Communication Systems.
 - .2 CSA T529, Telecommunications Cabling Systems in Commercial Buildings (Adopted ANSI/EIA TIA 568a with modifications).
- .3 Electronic Industries Alliance (EIA) / Telecommunications Industries Association (TIA)
 - .1 TIA/EIA/ANSI – 568B.1/2/3 latest revision
 - .2 Category 6 system and testing as released by TIA/EIA/ANSI – latest revision
 - .3 TIA/EIA T568-A UTP wiring/pinout
- .4 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 Submit shop drawings for review prior to ordering equipment. Shop drawings shall include but not be limited to, photocopies of accredited installers, copper patch panels, copper termination jacks, coax jacks, fibre patch panels, fibre terminations, communication racks, cable management, and sample labeling.

- .3 The contractor shall provide Preliminary and Final Design documentation in accordance to Section 4.0 of ES/SOW-0101.

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 Termination, patch cords, and cross-connection equipment installed inside building for voice and data for telecommunications systems employing unshielded-twisted-pair (UTP), coaxial (CXC), and optical fibre (OFC) cables. Refer to drawings for special details.

Part 2 Products

2.1 PATCH PANELS, CONNECTORS AND ADAPTORS

- .1 Data and voice patch panels shall be 24 or 48-port panels mounted in the communication equipment racks, as indicated in rack diagrams. A minimum of 12 ports shall be spare for future. Patch panels shall be compatible with Category 6 installations, and shall accept snap-in non keyed modular 8-pin jacks with T568A pinout.
- .2 Connectors shall be modular 8 PIN jacks, rated Category 6 –TIA/EIA T568-A UTP wiring/pinout. All data jacks shall be white and all voice jacks shall be blue. All ESS network jacks shall be green.
- .3 Fibre patch panels mounted in communication equipment racks shall accommodate 12 strands of fibre minimum of 2 ports shall be spare for future. Provide additional fibre patch panels within the equipment rack as required. Provide cable management bracket/cable management bar for each fibre patch panel. Provide fan-out “spider” kits at all termination trays exceeding six (6) terminations.
- .4 All IMS fibre connectors shall be LC singlemode duplex connectors.

- .5 All ESS fibre connectors shall be 50 micron, SC multimode fibre.

2.2 IMS NETWORK COMMUNICATION RACKS

- .1 Contractor to supply racks as needed for the ESS network. Confirm additional rack(s) location with consultant prior to installation.
- .2 Communication equipment racks shall be 4 post style free standing with floor mounting kit, 2134mm (84 inch) high x 565 (22.25-inch) mounting width providing 42U rack units, 905mm (36 inch) deep. The equipment rack shall be in black finish. Racks shall be HP 842 1200mm Shock Intelligent Network Series.
- .3 Racks shall be equipped with 19" mounting rails and full length vertical management trough (150mm x 150mm) hinged doors and access cutouts on both sides. The management troughs are for patch cords only.
- .4 Provide a 1U cable management between each patch panel.
- .5 Racks shall have a minimum clearance as follows: front – 914mm, rear – 1067mm, one side – 762mm. Refer to drawings
- .6 Provide one 6-outlet power bar per rack with 12-foot shielded cord set, integral on/off switch, 15-amp breaker reset, EMI/RFI filtering. Mounting within the equipment rack at the base, facing the rear.
- .7 All racks shall be grounded with a minimum #6 AWG insulated ground wire connected to the building ground bus within the data/com room.
- .8 Provide electrical circuits installed into each rack, location shown on E5.3, as follows:
- .1 1 x 120V 15A
 - .2 1 x 208V 30A Nema L6-30P
- .9 Provide cable tray and "waterfall" kit above each equipment rack.

2.3 ESS NETWORK COMMUNICATION RACKS

- .1 Contractor to supply racks as needed for the ESS network. Confirm additional rack(s) location with consultant prior to installation.
- .2 Communication equipment racks shall be 4 post style free standing with floor mounting kit, 2134mm (84 inch) high x 565 (22.25-inch) mounting width providing 42U rack units, 905mm (36 inch) deep. The equipment rack shall be in black finish.
- .3 Racks shall be equipped with 19" mounting rails and full length vertical management trough (150mm x 150mm) hinged doors and access cutouts on both sides. The management troughs are for patch cords only.
- .4 Provide a two-ring horizontal wiring management between each patch panel. The horizontal wire management shall occupy a maximum 2U rack space.

- .5 Racks shall have a minimum clearance as follows: front – 914mm, rear – 1067mm. Refer to drawings
- .6 Provide one 6-outlet power bar per rack with 12-foot shielded cord set, integral on/off switch, 15-amp breaker reset, EMI/RFI filtering. Mounting within the equipment rack at the base, facing the rear.
- .7 All racks shall be grounded with a minimum #6 AWG insulated ground wire connected to the building ground bus within the data/com room.
- .8 Provide a minimum of one separate circuit and one data drop adjacent to each rack. Refer to drawings for locations.
- .9 Provide cable tray and “waterfall” kit above each equipment rack.

2.4 ESS NETWORK SWITCH

- .1 Switches shall have both access layer 2 and access layer 3 switching features.
- .2 Switches shall be available in either 24 port or 48 port stackable configurations, complete with minimum 4 Gigabit Ethernet (SFP) ports. Contractor to utilize 48 port version for majority of rack space.
- .3 Each switch shall contain four (4) spare Ethernet ports for future expansion.
- .4 Electrical contractor to confirm that all switches are mountable in 19” mounting rail racks, and that switches do not exceed the depth of communication racks.
- .5 Contractor to supply switches to meet the needs of all ESS network requirements. Switches shown on drawings are not intended as a bill of materials. Contractor to utilize 48 port switches exclusively unless otherwise needed.
- .6 All network switch ports shall be capable of requiring device authentication via software, Contractor to include system wide device and user authentication software.
- .7 A management GUI interface for maintaining equipment shall also be included.
- .8 Technical requirements:
 - .1 Redundant, 350W, 120V power supplies.
 - .2 Redundant, modular, forced air cooling.
 - .3 Support to up to 50 access points (48 port version).
 - .4 Software support for IPv4 and IPv6 routing.
- .9 Standard of acceptance shall be Cisco 3850 series switches.

2.5 ESS POWER OVER ETHERNET (POE) RACK SWITCH

- .1 PoE switches shall have both access layer 2 and access layer 3 switching features.
- .2 PoE switches shall be available in either 24 port or 48 port stackable configurations, complete with minimum 4 Gigabit Ethernet (SFP) ports. Contractor to utilize 48 port version for majority of rack, 24 port version configuration to be used to limit sparing.
- .3 Electrical contractor to confirm that all PoE switches are mountable in 19" mounting rail racks, and that PoE switches do not exceed the depth of communication racks.
- .4 Contractor to supply PoE switches to meet the needs of all ESS network requirements. PoE switches shown on drawings are not intended as a bill of materials.
- .5 Each switch shall contain four (4) spare Ethernet ports for future expansion.
- .6 All PoE network switch ports shall be capable of requiring device authentication via software, Contractor to include system wide device and user authentication software.
- .7 A management GUI interface for maintaining equipment shall also be included. On top of basic equipment management features, this interface shall be capable of providing Power over Ethernet monitoring.
- .8 Technical requirements:
 - .1 Supply minimum 30W/port.
 - .2 Complete with 8+ class 4 POE ports.
 - .3 Redundant, modular, forced air cooling.
 - .4 Support up to 50 access points (48 port version).
 - .5 Software support for IPv4 and IPv6 routing.
 - .6 Redundant internal power supplies.
- .9 Standard of acceptance shall be Cisco 3850 series PoE switches.

2.6 ESS 8 PORT POWER OVER ETHERNET (POE) COMPACT SWITCH

- .1 PoE switches shall have both access layer 2 and access layer 3 switching features.
- .2 PoE switches shall be available in either 8 port configuration, complete with minimum 2 Gigabit Ethernet (SFP) ports.
- .3 Contractor to supply PoE switches to meet the needs of all ESS network requirements. PoE switches shown on drawings are not intended as a bill of materials.
- .4 PoE switches shall be capable of requiring device authentication, and include a management GUI interface for maintaining equipment.

- .5 Technical requirements:
 - .1 Supply minimum 30W/port.
 - .2 Software support for IPv4 and IPv6 routing.
- .6 Standard of acceptance shall be Cisco 3560-C series PoE switches.

2.7 IP KVM EXTENDER

- .1 KVM Extenders shall be used to allow communication between rack mounted PC's and peripherals located in control posts / observation rooms.
- .2 KVM transmitters/receivers shall communicate with its paired receiver through LAN, all connections from the KVM transmitters/receivers to the network shall be CAT6.
- .3 All KVM receivers shall be mounted in data racks. Electrical contractor to provide all 19" mounting trays to accommodate KVM receiver installation. Refer to drawings for KVM transmitter mounting location and information.
- .4 Technical requirements:
 - .1 Minimum 1 x DVI-D video connection
 - .2 Minimum 1 x VGA video connection
 - .3 Support USB keyboard, mouse, and mass storage devices
 - .4 1 x 3.5mm audio jack for speakers
 - .5 Utilize AES 128 bit encryption
- .5 Standard of acceptance shall be Avocent Longview IP KVM Extenders.

Part 3 Execution

3.1 LABELLING

- .1 Cable labels shall be self laminating labels as manufactured by Burndy or Panduit.
- .2 Bix Blocks, patch panels, and wall plates shall have integral labeling; self-adhesive labels will not be acceptable. Wall plates shall have self-adhesive icons adjacent to each jack of either a telephone or workstation to illustrate type of jack.
- .3 Cable labels shall be self laminating labels as manufactured by Burndy or Panduit.
- .4 Labeling shall be neatly typewritten and be in accordance with TIA 660. Cabling shall be labeled with the drop ID number at both termination points. Cable labeling shall be a logical numbering system. Confirm if owner has special labeling system prior to installation. If owner has no set labeling system, confirm contractor suggested labeling with owner or

consultant prior to any installation. The owner or consultant must sign off on labeling prior to installation; this sign-off shall be included in the maintenance manuals.

- .5 Bix Blocks, Patch panels, and wall plates shall have integral labeling; self-adhesive labels will not be acceptable. Wall plates shall have self-adhesive icons adjacent to each jack of either a telephone or workstation to illustrate type of jack.

3.2 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.

3.3 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.

3.4 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

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 Correctional Service Canada (CSC) – Technical Services Branch – ES/SPEC-0101 Revision 2, January 14, 2002: Public Address System for Use in Federal Correctional Institutions.
 - .4 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .5 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .6 National Electrical Manufacturers Association (NEMA).
 - .7 National Building Code 2010 (NBC 2010)
 - .8 National Fire Protection Association (NFPA)
 - .9 Institute of Electrical and Electronic Engineers (IEEE).
- .2 American National Standards Institute (ANSI)
 - .1 ANSI C82.1, Electric Lamp Ballasts-Line Frequency Fluorescent Lamp Ballast.
 - .2 ANSI C82.4, Ballasts for High-Intensity-Discharge and Low-Pressure Sodium Lamps.
 - .3 American National Standards Institute/Institute of Electrical and Electronics Engineers (ANSI/IEEE)
 - .4 ANSI/IEEE C62.41, Surge Voltages in Low-Voltage AC Power Circuits.
 - .5 American Society for Testing and Materials (ASTM)

- .6 ASTM F1137, Specification for Phosphate/Oil and Phosphate/Organic Corrosion Protective Coatings for Fasteners.
- .7 United States of America, Federal Communications Commission (FCC)
- .8 FCC (CFR47) EM and RF Interference Suppression.

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 – Lighting 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 Lighting 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.

1.5 SYSTEM DESCRIPTION

- .1 Provide the speakers and infrastructure for a fully operational Public address system as herein specified.
- .2 The Electrical Contractor shall include within their tender, the costs for the provision of the infrastructure and speakers. This specification shall be read in conjunction with specification section 27 05 28 – Pathways for Communication Systems.
- .3 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.
- .4 The contractor shall exercise caution, as necessary, to guard against electrostatic hum, and to install the cabling so as to provide maximum safety to non-technical operators.

1.6 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.

1.7 SYSTEM STARTUP

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

1.8 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.

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 Distributed paging speakers shall be provided throughout the facility. Speakers shall be provided and distributed throughout as required to provide proper coverage. See drawing for speaker types and locations.
- .2 Provide recessed outlet complete with optical audio jack, with optical cabling within EMT conduit from observation rooms #1, #5, #6, and #7 to DSP-1 rack to allow for audio files to be played throughout the paging system.
- .3 The Electrical Contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and hand stations shall be coordinated with the manufacturer and wired as required.
- .4 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.
- .5 All system components shall be grounded.

2.3 SYSTEM FEATURES

- .1 The Paging system shall provide the following features as a minimum:
 - .1 Internal and external zone paging.
 - .2 Connection for background music installation
 - .3 Program can be turned on or off and the volume adjusted on each zone or individual speakers where required.
 - .4 Priority override capability for emergencies (i.e/ fire and evacuation)
 - .5 System Programming from console
 - .6 All zone control for paging system shall be controlled from integrated HMI system.

2.4 PERFORMANCE PARAMETERS

- .1 The system shall provide adequate dynamic range and system gain at an acoustic level sufficient to ensure minimum listening fatigue, but avoiding acoustic feedback.

- .2 The entire sound system and all components shall be free of parasitic oscillation and radio frequency pickup at all times, including full facilities operation, both in the absence of audio input signal and also when the system is driven to full output. Hum and noise from the system shall be in-audible with the controls set a normal operating positions.
- .3 The contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and call stations shall be coordinated with the manufacturer and wired to suit the needs of the owner.

2.5 COORDINATION

- .1 The contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and consoles and microphones shall be coordinated with the manufacturer.

2.6 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 an audio 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. Failure to do so will disqualify their bid. This shall include but not limited to, loudspeakers, amplifiers, audio processing, system control and program input products.
- .4 Loudspeakers proposed as alternatives must be demonstrated to perform equally as the accepted technical standard.

2.7 AUDIO POWER AMPLIFIERS

- .1 Provide high performance professional grade power amplifiers with power ratings and technical performance such that each loudspeaker shall achieve the overall audio system performance specification stated.
- .2 Technical specifications shall include:
 - .1 Shall be modular power, two-channel or single channel amplifiers as required.
 - .2 All amplifiers shall be rack mountable.
 - .3 Have non-linear switching power supplies.
 - .4 Cooled by forced air.
 - .5 Have electronically balanced XLR inputs with an input impedance of 10Kohms or greater.
 - .6 Provide full short circuit protection and power monitoring capabilities.
 - .7 Amplifiers shall be capable of driving low and high impedance speakers.

.8 Provide adequate power capacity for all loudspeakers with added headroom of 3db SPL or greater for the specified loudspeakers.

.3 Acceptable products shall be those manufactured by QSC, Crown, Crest or Peavey.

2.8 DSP / MATRIX ROUTING

.1 Provide one (1) DSP that shall provide the following.

.2 Performance features and functions shall include but not limited to:

.1 Fully programmable, fully configurable DSP based audio signal processing and control via a programmable drag and drop interface.

.2 20 balanced analogue inputs and 12 balanced analogue outputs.

.3 24 bit A/D converters and 24 bit D/A converters utilizing software selectable sample rates of 44.1 kHz or 48 kHz, 64 kHz, 88.2 kHz or 96 kHz.

.4 Floating point DSP engine.

.5 All audio processing shall be accomplished via DSP methods. These processes shall include but not limited to the following: audio level control, equalization (parametric and graphical), speaker zone delays, zone control, gating, ducking, auto-mute on audio recognition, output limiting, matrix routing, low pass filtering, high pass filtering, and band pass filtering.

.6 Metering for audio signals within DSP.

.7 The host processor unit shall have non-volatile flash memory to be used as primary storage media and operating system root.

.8 Reconfigurable via site computer loaded software.

.3 Technical specifications shall include:

.1 Frequency response @ 20 Hz to 20 kHz;

.2 Total harmonic distortion no more than .02% from 20 Hz to 20 kHz.

.3 Dynamic range of not less than 107 dB unweighted;

.4 Input common mode rejection ratio (CMRR) greater than 75 dB @ 1KHz.

.5 Maximum input level without clipping shall be +20 dBu while maintaining CMRR;

.6 Maximum output level shall be +19 dBu;

.4 The standard of acceptance shall be SoundWeb DSP, Yamaha DME series, or approved equal.

2.9 DESKTOP PAGING MICROPHONES

.1 Technical features shall include:

.1 Dynamic (moving coil) microphone

.2 Polar pattern shall be unidirectional (cardioid)

.3 Shall feature high shock resistance and on/off switch

- .4 Balanced, 600ohm impedance
 - .5 Sensitivity of -58dbV/Pa @ 1kHz
 - .6 3 pin XLR male connector complete with 25' XLR extension cable
 - .7 Frequency response of 100 to 10Khz
- .2 One desktop microphone call station shall be located at each control post and observation area as shown on drawings.
- .3 These shall be the Toa PM660U or approved equal.

2.10 PUBLIC ADDRESS HMI DETAILS

- .1 The call station in the observation areas shall have priority over the proximity control post stations.
- .2 The user must first choose the paging zone on the HMI, then press the push-to-talk on the microphone in order to open the communication line.
- .3 Paging selection on the HMI is to be made by selecting the page function and a group or zone from the selection list. Alternately, the zone number may be entered after the page function has been selected.
- .4 The trainee in the local control post shall only be able to select the local simulation area's paging zones.
- .5 Within each location as shown on the DSP detail (drawing E5.4/detail 2), there shall be the functionality to program 4 zones per location.

2.11 RECESSED CEILING LOUDSPEAKERS (Type S1)

- .1 Provide speakers in suspended ceiling locations as shown on the drawings. Exact locations of speakers shall be coordinated on site.
- .2 Specifications:
- .1 Ceiling mounted speakers shall be 5" co-axial bass reflex c/w back box/can and grill
 - .2 Beam width: 155° Conical @ (1-4 kHz average)
 - .3 Frequency response: 80 Hz to 20 kHz
 - .4 Sensitivity @ 1 W/M: 89 dB SPL (min)
 - .5 Power rating: 6 W (xfmr) / 18W (8 ohms)
 - .6 Nominal impedance: Integrated 25/70/100V transformer, and 8/16 direct
 - .7 Color: White grill
- .3 The technical standard of acceptance is TOA electronics #F-2352SC or approved equal
- .4 Provide appropriate tile bridge supports when installed in T-bar ceilings.

- .5 Provide three (3) additional speakers c/w 10m cabling, conduit, installation, and commissioning for placement during construction.

2.12 RECESSED SIMULATION AREA LOUDSPEAKERS (Type S2)

- .1 Provide full-range, coaxial ceiling recessed loudspeakers with integrated transformer. See drawings for speaker locations.
- .2 Specifications:
 - .1 Ceiling mounted 2-way coaxial full range speaker, complete with speaker back box and grill.
 - .2 Beam width: 120° Conical
 - .3 Frequency response: 60 Hz to 19 kHz (or better)
 - .4 Sensitivity @ 1 W/M: 90 dB SPL (min)
 - .5 Power rating: 140W program (or better)
 - .6 Nominal impedance: 8 ohm (when not using transformer)
 - .7 Color: White
- .3 The technical standard of acceptance is Community Cloud 6 or JBL Control 226C/T or approved equal.
- .4 Provide appropriate tile bridge supports when installed in T-bar ceilings.

2.13 PENDANT LOUDSPEAKERS (Type S3)

- .1 Provide speakers in exposed ceiling locations as shown on the drawings. Exact locations of speakers shall be coordinated on site.
- .2 Specifications:
 - .1 Ceiling pendant style speakers shall be 5" 2-way cone-type c/w back can and grill
 - .2 Beam width: 90° conical, minimum
 - .3 Frequency response: 100 Hz to 18 kHz
 - .4 Sensitivity @ 1 W/M: 90 dB SPL
 - .5 Power rating: 30 W (100 V, 70 V)
 - .6 Nominal impedance: Integrated 70/100V transformer, and 8 direct
 - .7 Color: White with white grill
- .3 The technical standard of acceptance is TOA electronics model PE-304 or approved equal
- .4 Cable length to be determined and adjustment on site. Paint cabinet and ceiling mount to match décor.
- .5 Mount 4300mm AFF.
- .6 Provide two (2) additional speakers c/w cabling, installation, and commissioning for placement during construction

2.14 OUTDOOR WALL LOUDSPEAKERS (Type EXT)

- .1 Provide speakers for external locations as shown on the drawings. Exact locations of speakers shall be coordinated on site.
- .2 Specifications:
 - .1 Surface wall mounted horn style speakers, weather proof for external use
 - .2 Beam width: 110° conical
 - .3 Frequency response: 400 Hz to 14 kHz
 - .4 Sensitivity @ 1 W/M: 107 dB SPL
 - .5 Power rating: 15 W (25/70 V)
 - .6 Nominal impedance: Integrated 25/70V
 - .7 Color: White Enamel
- .3 The technical standard of acceptance is Enforcer #EMH-15 or approved equal
- .4 Mount 2300mm AFF.

2.15 CABLE AND CONNECTOR PANELS

- .1 Provide all cable, wire and connectors for a complete and operational sound system.
- .2 All cable for sound system to be PVC insulated, stranded pairs (or multi-conductor), as required. Provide shielded program (line level) cable, as required.
- .3 Cable type and gauge shall be at the discretion of the speaker supplier. However, all systems, when completed, must meet technical performance requirements, as specified.
- .4 Provide all wiring terminal panels, terminal strips and cable wiring blocks. All connections, in sound panels and racks, shall be made with screw clamp terminal blocks.
- .5 Loudspeaker cable to simulation area "S2" speakers shall be 2C#14 AWG (min) stranded paired (Belden #5100UE).

Part 3 Execution

3.1 INSTALLATION

- .1 Coordinate all paging system work with the supplier.
- .2 Review detailed shop drawings and wiring layouts provided by supplier.
- .3 Cable and conduit necessary to make the system operable shall be provided and installed as instructed by the supplier of the Paging 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. Where conduit sizes have been shown on the drawings larger than those recommended by the supplier, they shall not be reduced. All wiring shall be in conduit and shall be provided by Division 26. All accessories,

backboxes, backing, and requirements for an operable system shall be coordinated and provided by the Division 26 contractor.

- .4 All wiring shall be in separate EMT conduit utilized solely for paging.
- .5 Minimum wiring shall be #18 gauge, PVC jacketed FT4 for other. Coordinate cable requirements with manufacturer and provide other cable if required. Any substituted cable type utilized shall not be lesser in quality or capability with the specified cable types. See section 27 05 14 - Communication Cables Inside Buildings.
- .6 All interconnecting wiring terminations shall be made on numbered screw type terminal strips. Soldered, crimped or twisted connections will not be accepted.
- .7 Rack terminations shall be made on internal termination panels.
- .8 The Electrical Contractor shall perform and be responsible for all associated cable terminations.
- .9 All wiring installed in conduit shall be with a maximum conduit fill of 40%. Increase indicated conduit sizes, if necessary, to accommodate manufacturer's cable requirements
- .10 Coordinate installation of equipment in and on millwork with millwork supplier and installer.
- .11 No audio cable shall be installed adjacent to power cable or power conduit.
- .12 All audio equipment shall be fixed mounted. This shall include loudspeakers, input and output jacks, switches and interconnecting cable.
- .13 All loudspeaker fastenings and supports shall be of appropriate type to support loads with a safety factor of eight times their weight.
- .14 Sufficient slack cable shall be left on termination at outlets to allow easy removal of panels for maintenance and re-wiring as necessary. Slack cabling shall be neatly coiled. All high signal level wiring shall be terminated on outlet connectors and terminal blocks.
- .15 All wiring shall be neatly harnessed, with signal category segregation maintained throughout.
- .16 Absolute phasing of all loudspeaker lines shall be maintained. The contractor must take such precautions as are necessary in a public building, and in this particular environment, to guard against electromagnetic and electrostatic hum and radio frequency interference. Proper mounting shall assure adequate amplifier equipment ventilation. Equipment shall be installed to provide maximum safety to non-technical operators.
- .17 Exact locations of paging distributed speakers, and associated controls, shall be coordinated on site with the consultant.
- .18 Care shall be taken in wiring to avoid damage to cables, which might at a future date prove troublesome. All wiring shall be executed in strict adherence to professional industry standards, with due consideration to appropriate grounding and shielding practices

- .19 All switches, connectors, input and outlet jacks, controls, etc., shall be clearly, logically, and permanently marked during installation. All markings on operating panels of equipment shall be 'Lamecoid' plates. Refer to Section 260 05 01 – Common Works Electrical.
- .20 The system shall be checked for:
 - .1 Verification of color codes with respect to interconnections as recommended by the manufacturer
 - .2 Verification of color codes with respect to drawings and maintenance manuals
 - .3 Inspection of wiring and methods of termination in open junction boxes, backboxes for the devices and termination at control equipment
 - .4 Inspection of wiring and methods of termination in open junction boxes, backboxes for the devices and termination at control equipment;
 - .5 Designation of junction box covers and references with respect to these boxes on electrical drawings
- .21 The system shall be tested for:
 - .1 Grounding
 - .1 System to building electrical ground;
 - .2 Cable shielding;
 - .3 Balance transmission lines above ground;
 - .2 Operation of system shall be checked step by step as described in user's manual
 - .3 Isolation of extraneous noises induced or otherwise, if present.
- .22 Provide cable management and “waterfall” kits for cabling entering racks. Provide Velcro ties for bundled cabling, cable ties are unacceptable.
- .23 All wiring shall be point to point and terminated directly onto the equipment or terminal strips that form part of the equipment.
- .24 Provide a minimum of 200 mm of cable slack prior to termination to allow for future upgrades.

3.2 COMMISSIONING AND TESTING

- .1 Commissioning shall be completed with the electrical consultant, electrical contractor, the Paging System Supplier, owner representatives, and a manufacturer representative.
- .2 The entire system shall be tested for ground loops.

END OF SECTION

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/SPEC-0500 Revision 5, March 12, 2012: Inmate Cell Call system for Use in Federal Correctional Institutions.
 - .4 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .5 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .6 National Electrical Manufacturers Association (NEMA).
 - .7 National Building Code 2010 (NBC 2010)
 - .8 National Fire Protection Association (NFPA)
 - .9 Institute of Electrical and Electronic Engineers (IEEE).
 - .10 Audio Engineering Society (AES).
 - .11 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.
- .3 ES/SPEC-0500, Revision 5, March 12, 2012:
 - .1 General 3.1: System capable for future interfaces to a Data Logger and to the Main Communications Control Post (MCCP) and Facility Alarm Annunciation System (FAAS). All functional controls shall be via respective range Primary Annunciation Control Panels.
 - .2 System Capacity 3.1.1: In accordance to number of cells as identified in the contract specification documentation.
 - .3 Sabotage, Tampering and Survivability 3.3.3: ICCS components will not operate in areas exposed to inmates. Components are to be supplied with intent for general use, and thus provide defense against normal wear and tear.
 - .4 Interface to FAAS 3.4.11: No FAAS connections required.

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 device specifics, accessories, options, programming modes, riser diagram, cable types, and special mounting details.

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 DEFINITIONS AND ABBREVIATIONS

- .1 Design Authority: Director, Engineering Services, Correctional Service Canada (CSC)
- .2 Contractor: The Company selected as the successful bidder.
- .3 API: Application Programming Interface
- .4 CCD: Call Cancellation Device
- .5 CD: Commissioner's Directive
- .6 CER: Common Equipment Room
- .7 COD: Call Origination Device
- .8 CSC: Correctional Service Canada
- .9 GFE: Government Furnished Equipment
- .10 ICCS: Inmate Cell Call System
- .11 NTP: Network Time Protocol
- .12 TCP/IP: Transport Control Protocol/Internet Protocol
- .13 UPS: Uninterruptible Power Supply

1.7 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition Waste Management and Disposal.
- .2 Collect and separate waste for reuse, recycling, and other waste diversion strategies in accordance with Waste Management Plan.

1.8 SYSTEM DESCRIPTION

- .1 The ICCS shall consist of one (1) Call Origination Device (COD) and one (1) Call Cancellation Device (CCD) per cell in the Maximum and Medium Security Cell Areas. One (1) Status Display screen illustrating the acknowledged and

unacknowledged cell calls per Control Post shall be provided.

- .2 The ICCS system provider shall design, supply, install, and test the entire system and shall provide documentation and training for the ICCS in accordance with the Specifications, Standards and Statements of Work specified in this specification.
- .3 The ICCS system shall have one dedicated display in each of the Class A Control Post, Open Control Post, and SLE Control Post.
- .4 The ICCS system shall support at least fifty (50) cells (COD + CCD) per Status Display in each Control Post and at least five (5) Status Displays.
- .5 When power is returned after a power failure, the system shall resume normal operation without operator action and shall automatically start from an all calls cleared condition.
- .6 The ICCS shall use commercial off-the-shelf equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. The goal is to allow integration of co-located systems on to shared displays and provide a consistent, common look and feel. The equipment design shall provide open Ethernet TCP/IP APIs to the consoles and the edge devices to allow integration with future systems. The goal is for the APIs to be usable in an extensible, open architecture, security electronics framework.

1.9 SHOP DRAWINGS AND PRODUCT DATA

- .1 Submit shop drawings and product data in accordance with Section 01 33 00 - Submittal Procedures and 26 05 01 – Common Work Results, Electrical.
- .2 Include schematic, wiring and interconnection diagrams, which shall include component identification on each circuit board.
- .3 Each component shall be identified as to manufacturer, type, description, and catalogue number.
- .4 Drawing details show all stations, control modules, cabling and field terminations.
- .5 Submit a recently dated support letter from the manufacturer stating that the supplying contractor is an Authorized Distributor for the specified product being supplied.
- .6 Include a statement of warranty hardware from the manufacturer.

1.10 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for the Inmate Cell Call system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals and 26 05 01 – Common Work Results, Electrical.
- .2 Include
 - .1 Operation instructions

- .2 Description of system operation
- .3 Description of each sub-system operation
- .4 List specifying each piece of equipment in the system or sub-system 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

1.11 SYSTEM START-UP

- .1 Refer to:
 - .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

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.
- .3 Cell call components: CSC ES/SPEC – 0500, Revision 5

2.2 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 an Inmate Cell Call 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. Failure to do so may disqualify their bid.

2.3 CALL ORIGINATING DEVICE PUSHBUTTONS

- .1 Call originating device (COD) shall be 30mm diameter, white, flush head, complete with red LED visual alarm indication, pushbutton.
- .2 Contractor shall provide DC power supply and minimum #20AWG wire for interconnection to pushbutton if required.

2.4 PROXIMITY CALL CANCELLATION DEVICE

- .1 Proximity CCD's shall be wall mounted in locations shown on the drawings, in order to allow User to cancel a cell call signal.
- .2 Proximity CCD's shall provide the ability for mounting to standard electrical boxes through the use of universal international mounting holes.
- .3 Proximity Call Cancellation Device shall be a contactless smart card reader and shall have the ability to communicate with Proximity Reader Interface to fulfill access control requirements.
- .4 Twenty (20) compatible magnetic encoded cards shall be included with proximity reader system.
- .5 Technical features shall include:
 - .1 12VDC power input
 - .2 Audio beeper to signify successful/unsuccessful card read
 - .3 Tri-colour light bar to provide clear visual status
- .6 Proximity CCD's shall provide a lifetime warranty against defects in materials and workmanship.
- .7 Proximity Reader shall be HID Global iCLASS model RK40 or equal.

2.5 PROXIMITY READER INTERFACE

- .1 The Proximity Reader Interface (PRI) shall provide access control processing for a single call cancellation device.
- .2 The PRI shall accept Wiegand output card/keypad readers and card formats up to 128 bits in length.
- .3 The PRI shall provide a complete, fully featured access control hardware and firmware infrastructure for host-based access control software applications.
- .4 It shall communicate with the ICCS using TCP/IP protocol over Ethernet.
- .5 PRI features and functionality:
 - .1 Power over Ethernet power supply
 - .2 32bit 200MHz ARM9 processor running Linux operating system

- .3 64MB on-board non-volatile flash memory
 - .4 8MB of RAM
 - .5 Ability to be expandable to a total of 16 inputs and 6 outputs utilizing plug-in I/O devices operation on a CAN bus backbone
 - .6 Electric strike output control
 - .7 Reader status LED, network status LED, and door entry status Bicolour LED
- .6 The PRI shall be an HID EDGE EVO Standard reader/controller & Module p/n 82125CKI0001A EDGE EVO EHRP40K or equal.
- .7 This unit shall be warranted against defects in materials and workmanship for 18 months.

2.6 KEYED CALL CANCELLATION DEVICE

- .1 The Keyed Call Cancellation Device shall be a single gang, flush mount, stainless steel, momentary SPDT keyed switch.
- .2 Contractor shall provide DC power supply and minimum #20AWG wire for interconnection to keyed switch.

2.7 PoE SWITCH

- .1 Shall be 8 port PoE compact switch, complete with Gigabit SFP ports. Refer to specifications section 27 11 19 - Patch Panels, Switches, Network Equip. for further information.

2.8 NETWORK CONTROLLER

- .1 Electrical contractor to provide wall mounted network controller to convert relay outputs of pushbutton CCD's / keyed CCD's to TCP/IP Ethernet for connection to the ICCS.
- .2 Support minimum of 8 12VDC relay inputs, CAT6 cabling output.
- .3 One controller shall be provided for each cell range, see drawing E3.2 for locations.

2.9 ICCS HARDWARE AND SOFTWARE

- .1 Provide new touchscreen panel PC at each location where an ICCS station is shown. Owner to approve PC's before purchase. Computers shall be provided such that they are capable of running the ICCS program and control all included components without stutter or lag (<0.5s for all commands, status changes, screen refreshes, etc.).
- .2 Additional technical requirements:
 - .1 1 x 2.5" SATA drive
 - .2 17" Flat-Bezel Touchscreen
 - .3 Minimum 1280 x 1024 resolution
 - .4 One (1) serial port
 - .5 Two (2) USB 2.0 ports, two (2) USB 3.0 ports

- .3 Shall be BSI touchscreen panel or approved equal.
- .4 Electrical contractor shall supply all necessary components for connection between the panel PC, incoming Cell Call and Guard Tour connections, and the ESS network.
- .5 ICCS software
 - .1 Provide Windows based software packages for the ICCS workstations. Provide all licenses required, including full package license and workstation licenses as required.
 - .2 Software shall be compatible with Windows XP, Vista, 7, and 8.
 - .3 Provide ICCS software that will enable monitoring and control of all cell call and guard tour points, and systems through graphic display screens.
 - .4 Software shall allow access of historical archived guard tour and ICCS data on the panel PC from any computer on the ESS network that has authorization to do so. Authorization shall be adjustable.
 - .5 Software shall provide a set of tools for graphically representing cell call and guard tour status. Provide a graphic editor for creation of graphic screens to represent current 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. Refer to drawing E5.2 for details on operation of the graphics screens.

Execution

3.1 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.

3.2 INSTALLATION

- .1 All cabling necessary to make the systems operable shall be provided and installed as instructed by the manufacturer of the Inmate Cell Call 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.
- .2 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.
- .3 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.
- .4 All cabling for this Inmate Cell Call 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.
- .5 All wiring installed in conduit shall be with a maximum conduit fill of 40%.
- .6 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.

3.3 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.

3.4 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.

3.5 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

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 – Statement of Technical Requirements (STR), Revision 1, April 2013: Installations of CSC Security Electronics Systems at RCMP & CSC Shared Learning Facility.
 - .4 Correctional Service Canada (CSC) – Technical Services Branch – ES/SPEC-0900 Revision 2, July 10, 2003: Door/Barrier/Gate Control System for use in Federal Correctional Institutions.
 - .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
 - .5 STR: Revision 1, April 2013.
- .2 Shop drawings shall include but not be limited to speakers, riser diagram, cable types, and special mounting details.
- .3 Include schematic, wiring and interconnection diagrams, which shall include component identification on each circuit board.
- .4 Each component shall be identified as to manufacturer, type, description, and catalogue number.
- .5 Drawing details show all stations, control modules, cabling and field terminations.
- .6 Submit a recently dated support letter from the manufacturer stating that the supplying contractor is an Authorized Distributor for the specified product being supplied.

- .7 Include a statement of warranty hardware from the manufacturer.

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 Separate and recycle waste materials in accordance with Section 01 74 19 - Construction/Demolition 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 The primary purpose of the Door Control system (DCS) shall be to provide control and status monitoring of all secure cell and barrier doors in the facility.
- .2 The DCS shall be monitored and controlled through the shared programmable logic controller (PLC) and human-machine interface (HMI) system as described in section 28 13 20. Contractor shall supply all necessary equipment in order to properly allow the PLC system to monitor and control all components of the DCS.
- .3 This system is applicable for both the Medium Range and Maximum Range areas, along with barriers to these areas as shown on drawings.

1.8 PERFORMANCE PARAMETERS

- .1 The Contractor and their system provider shall provide all necessary components to allow proper communication protocol conversion between the PLC and DCS systems.
- .2 The DCS shall keep all doors open when the simulation ranges are not in use. This can be accomplished through the PLC system's real time clock, and a scheduling program.
- .3 When power is returned after a power failure, the system shall resume normal operation without operator action. All doors shall fail open in the event of power loss.
- .4 The DCS shall use commercial off-the-shelf equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. The goal is to allow integration of co-located systems on to shared

displays and provide a consistent, common look and feel. The equipment design shall provide open Ethernet TCP/IP APIs to the consoles and the edge devices to allow integration with future systems. The goal is for the APIs to be usable in an extensible, open architecture, security electronics framework.

- .5 Every lockable cell door controlled by the DCS shall have an emergency override push button located inside the cell. Pushing this button shall immediately release the door, without the need to communicate with the DCS. See drawing E3.2 for button locations, and drawing E0.1 for button specifications.
- .6 Operator access to the Door Control System terminal screens shall be by user definable passwords. The administrator shall be able to define individual operator passwords to view only, change data, and/or control of any functions, sub functions and screens. Allowable operator action assignment shall be via a matrix form, with all persons on one axis and all functions on the other axis. Any person may be provided/denied access to any or all functions. The passwords shall control access to all system functions including but not limited to: operating system, programming all system parameters, access to training screens, maintenance functions and access to source code.
- .7 On a failure of the primary PLC the operator must be notified by an alarm that indicates the failure and what action is required. The system shall switch over to the secondary PLC and continue to operate. The system shall remain operational on the backup unit even if the primary comes back online. Switching back to the primary shall only occur if the secondary fails or by manual command from the maintenance terminal.
- .8 Systems shall have audible tones to alert the operator as follows:
 - .1 Audible signals shall be clearly heard at any positions within a Control Post.
 - .2 Shall be user selectable.
 - .3 Tones shall be different and distinct for each system event.
 - .4 Volume shall be adjustable.
 - .5 Provide a disable function so that audible alarms can be eliminated on maintenance terminals and adjustable at each console positions individually.
 - .6 Tone shall sound for all changes from inactive to active state, i.e. communication failure door forced open, server failure, etc.
- .9 The DCS shall be connected to the other components of the BSCS system to provide fully integrated operation as described in the specification.
- .10 The system shall provide for redundant file servers.
- .11 The communications network between the PLC and the Field I/O shall be via the Ethernet network.
- .12 The DCS shall provide data entry screens for addition, deletion, or modification of all input and output points and their operating characteristics. Data entry shall be customized and allow system administrators to modify points without having to understand or use traditional PLC programming techniques such as ladder logic.

- .13 The DCS shall provide data entry screens for creation and modification of logical points. This would include the defining of doors where a door is the logical association of multiple and different low level points. Programming functions shall be from Microsoft Windows style dialog boxes, Microsoft design principles shall be applied for the creation of all data entry screens. For each door the system shall allow the definition of:
 - .1 Input point for the door monitor switch.
 - .2 Input point for the lock status switch.
 - .3 Output point that activates the lock.
 - .4 Intercom stations on either side of the door.
 - .5 CCTV cameras on either side of the door.
 - .6 Amount of time the door lock is activated for.
 - .7 Amount of time the alarm switches are bypassed or shunted when the door is commanded to open.
 - .8 Membership in a door interlock group.
 - .9 The above items are intended to present a general intent and is not a complete listing of required functions. Submit with graphic screen presentation samples of all data entry screens for all system functions specified herein. These items are to be considered a shop drawing submittal.
- .14 The system shall have a master disable icon on primary workstations. Activation of this icon shall cause the system to suspend all functions at all operator consoles in the room. The workstations shall be reset at the respective control posts via a switch located by the console.
- .15 A device icon (door) selected at a workstation shall only be controllable (lock/unlock) from that same workstation while it is selected. Other workstations that display the same icon shall indicate that the device has been selected but shall not be controllable until the first location has been unselected or completed the operation.
- .16 Following a power failure the door control system shall resume normal operation without human intervention and shall display the real time status of all the doors. Operators shall be required to login on restoration of the system. Power failure is defined as any action or activity that causes a loss of electricity to the system motherboard.
- .17 The system shall provide for an orderly shutdown. This is defined as closing all files and protect data such that no data is lost during the shutdown process.
- .18 Any number of cell doors, up to the maximum installed complement shall be capable of group operation without a system overload.
- .19 The unlocking of doors shall execute at any time regardless of whether there is an intercom connection to the door or not. The audio switcher intercom channels will remain active when changing screens.

1.9 HMI PARAMETERS

- .1 Each group of cell doors and barriers shall have a unique page in the HMI software.

- .2 The operator shall have the following abilities available through the HMI:
 - .1 Open
 - .2 Close
 - .3 Pass
 - .4 Mask
- .3 When the operator is using the group functions, selected doors shall react the same as if only one door was being operated.
- .4 HMI shall display the status (open, close, moving) of all doors through colour coding.

1.10 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for the Access Control system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals and 26 05 01 – Common Work Results, Electrical.
- .2 Include
 - .1 Operation instructions
 - .2 Description of system operation
 - .3 Description of each sub-system operation
 - .4 List specifying each piece of equipment in the system or sub-system 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

1.11 EXTRA MATERIALS

- .1 Include spare materials for one complete cell door.

Products

2.1 GENERAL COMPONENTS

- .1 Division 8 shall supply the following:
 - .1 Electric locks including mortise latches, electric strikes, electric latches, magnetic locks, paracentric locks
 - .2 Electric hinges
 - .3 Latch monitor switches
 - .4 Power supplies for those doors with electric latches, electric strikes.
- .2 The electrical contractor shall be responsible for the supply and installation of all conduit and wire to the appropriate door locations. Power supplies provided by Division 8, shall be wired by the electrical contractor.

- .3 Division 8 shall drill doors and door frames as required to allow the mounting of door contacts and wiring within the door frames to door hardware components.

2.2 DOOR CONTACTS

- .1 Steel Door Contacts shall be flush mounted in new door frames. The door contact housing shall be of a rugged unibody construction with flexible ribbed sides for quick installation, secured without the need for gluing. The magnetic housing isolates the magnet from the surrounding steel for maximum gap distances, both make and break.
- .2 The contact shall contain a hermetically sealed magnetic reed switch. The reed shall be potted in the contact housing with a polyurethane based compound. Contact and magnetic housing shall snap-lock into a 3/4" or 1" diameter opening in the door frame. Housings shall be molded of flame retardant ABS plastic. Colour of housing shall be suit door frame finish.
- .3 Style or model type required for the door application shall be determined by the supplier of the door control system: Regular, wide gap, SPDT, DPDT, or high security models.
- .4 Steel door contacts shall be GE Magnetic Door Contacts 1078/1076 series or approved equal.

PART 3 Execution

3.1 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.

3.2 INSTALLATION

- .1 All cabling necessary to make the systems operable shall be provided and installed as instructed by the manufacturer of the door control system. The overall system coordination 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. Cabinets required for the mounting of Security Control Modules essential to the operation of the system shall be provided.

- .2 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.
- .3 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.
- .4 All cabling for this Door Control 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.
- .5 All wiring installed in conduit shall be with a maximum conduit fill of 40%. Increase indicated conduit sizes, if necessary, to accommodate manufacturer's cable requirements.
- .6 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.

3.3 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.

3.4 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 Correctional Service Canada (CSC) – Technical Services Branch – Statement of Technical Requirements (STR) – Installations of CSC Security Electronics Systems at RCMP & CSC Shared Learning Facility, Revision 1, April 2013.
 - .4 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.

END OF SECTION

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 Correctional Service Canada (CSC) – Technical Services Branch – ES/SPEC-0506 Revision 2, December 21, 2011 – Security Patrol System for use in Federal Correctional Institutions
 - .4 CSA C22.1-2012, Canadian Electrical Code, Part 1.
 - .5 Electrical and Electronic Manufacturers Association of Canada (EEMAC).
 - .6 National Electrical Manufacturers Association (NEMA).
 - .7 National Building Code 2010 (NBC 2010)
 - .8 National Fire Protection Association (NFPA)
 - .9 Institute of Electrical and Electronic Engineers (IEEE).
 - .10 Audio Engineering Society (AES).
 - .11 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 Include schematic, wiring and interconnection diagrams, which shall include component identification on each circuit board.
- .3 Each component shall be identified as to manufacturer, type, description, and catalogue number.
- .4 Drawing details show all stations, control modules, cabling and field terminations.
- .5 Submit a recently dated support letter from the manufacturer stating that the supplying contractor is an Authorized Distributor for the specified product being supplied.
- .6 Include a statement of warranty hardware from the manufacturer.

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 The Guard Tour System (GTS) shall have two different systems for each Maximum Security or Medium/SLE. Both shall report back to the CCTV network, where the information will be stored for later viewing.
- .2 Maximum Security Guard Tour shall consist of proximity readers, along with all necessary components for the CCTV network to monitor this reader.
- .3 Medium Security / SLE Guard Tour shall utilize the SilverGuard Tour System. This system consists of wall mounted RFID tags, handheld wands, and all necessary hardware to communicate with the CCTV network.

1.8 PERFORMANCE PARAMETERS

- .1 The GTS system provider shall design, supply, install, test and provide documentation and training for the GTS in accordance with the Specifications, Standards and Statements of Work specified in this specification.
- .2 There is no requirement to have this system interface to the Data Logger or to the Main Communications and Control Post (MCCP). These are not part of this facilities operations.
- .3 The GTS system shall support at least twenty (20) guard tour points.
- .4 When power is returned after a power failure, the system shall resume normal operation without operator action and shall automatically start from an all calls cleared condition.

- .5 The GTS shall use commercial off-the-shelf equipment and proven designs to the maximum extent possible. All new equipment shall meet the specified lifespan requirements. The goal is to allow integration of co-located systems on to shared displays and provide a consistent, common look and feel. The equipment design shall provide open Ethernet TCP/IP APIs to the consoles and the edge devices to allow integration with future systems. The goal is for the APIs to be usable in an extensible, open architecture, security electronics framework.

1.9 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance data for the Access Control system for incorporation into manual specified in Section 01 78 00 - Closeout Submittals and 26 05 01 – Common Work Results, Electrical.
- .2 Include
 - .1 Operation instructions
 - .2 Description of system operation
 - .3 Description of each sub-system operation
 - .4 List specifying each piece of equipment in the system or sub-system 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

1.10 SYSTEM START-UP

- .1 Manufacturer's factory service engineer to instruct:
 - .1 One training session totaling (2) hours to train maintenance personnel in the maintenance and operation of the system.

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 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 an audio 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. Failure to do so will disqualify their bid. This shall include but not limited to, loudspeakers, amplifiers, audio processing, system control and program input products.

2.3 PROXIMITY READER

- .1 Proximity Reader shall be a contactless smart card reader and shall have the ability to communicate with Reader Interface.
- .2 Proximity Reader shall provide the ability for mounting to standard electrical boxes through the use of universal international mounting holes.
- .3 Refer to electrical drawings for locations and number of proximity readers.
- .4 Fifty (50) compatible magnetic encoded cards shall be included with proximity reader system.
- .5 Technical features shall include:
 - .1 12VDC power input
 - .2 Audio beeper to signify successful/unsuccessful card read
 - .3 Tri-colour light bar to provide clear visual status
- .6 Proximity Reader shall provide a lifetime warranty against defects in materials and workmanship.
- .7 Proximity Reader shall be HID Global iCLASS model RK40 or equal.

2.4 READER INTERFACE

- .1 The Reader Interface shall supply power to a GTS proximity reader and provide an interface from the local GTS proximity reader to the GTS network controller.
- .2 Technical features shall include:
 - .1 Power requirements: 600mA @ 9-18VDC
 - .2 Wall mountable
 - .3 Inputs for two (2) GTS readers
 - .4 Quick-disconnect screw terminal connectors
- .3 Electrical contractor shall provide 12V DC power supply for Reader Interface.
- .4 Shall be HID VertX V100 Door/Reader Interface.

2.5 NETWORK CONTROLLER

- .1 The Network Controller shall provide an interface from the Reader Interface to the

CCTV network.

- .2 Technical features shall include:
 - .1 Power requirements: 140mA @ 12-18VDC
 - .2 Wall mountable
 - .3 Reporting to host CCTV network through TCP/IP protocol
 - .4 Support 32 Local Control Processors
- .3 Electrical contractor shall provide 12V DC power supply for Network Controller.
- .4 Shall be HID VertX V1000 Network Controller.

2.6 SILVER-GUARD WAND

- .1 SilverGuard Wand shall be a stainless steel, handheld RFID wand for use with its compatible RFID tags. When a wand scans an RFID tag, the location and timestamp are saved within the wand's memory to be downloaded at a later time.
- .2 Technical features shall include:
 - .1 Capacity: 30,000 reads before download
 - .2 Connectivity: Mini-USB
 - .3 3.6V rechargeable lithium battery
 - .4 Water and tamper proof with no button controls
 - .5 Capable of reading 125KHz RFID tags
- .3 SilverGuard Wand shall activate RFID Tag when the wand is within 306mm (1') of the tag.
- .4 Provide two (2) SilverGuard Wands for each the Open Control Post, and SLE Control Post.
- .5 Shall be BCS SilverGuard SG6 RFID or equal

2.7 SILVER-GUARD RFID TAG

- .1 SilverGuard RFID Tags shall be wall mountable stainless steel housed RFID tags.
- .2 These tags do not require a hard-wired power feed, they shall return the location stamp to the SilverGuard Wand when it is within proximity distance.
- .3 RFID Tags must be compatible with SilverGuard Wands and Data Transfer Station.
- .4 Refer to electrical drawings for location and number of RFID Tags.
- .5 Shall be BCS Guard Media Tag or equal

2.8 SILVER-GUARD DATA TRANSFER STATION

- .1 The Data Transfer Station shall provide a download station for the information stored in the SilverGuard Wand. The Data Transfer Station shall connect to a local PC located on

the CCTV network.

- .2 Technical features shall include:
 - .1 120VAC adaptor
 - .2 Desk mounted
 - .3 USB or serial port PC connectivity
- .3 Contractor shall confirm that data transfer station is compatible with SilverGuard Wand.
- .4 Software package to handle data downloading shall be included.
- .5 Shall be BCS Computer Transfer Station or equal

Part 3 Execution

3.1 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.

3.2 INSTALLATION

- .1 Wire and conduit necessary to make the systems operable shall be provided and installed as instructed by the manufacturer of the Guard Tour 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.
- .2 All Reader Interface Modules, Network Controllers, and associated components shall be mounted in a wall mounted, force air cooled, cabinet in the Common Equipment Room.
- .3 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.
- .4 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.

- .5 All cabling for this GTS system shall be run within cable tray.
- .6 Any wiring installed in conduit shall be with a maximum conduit fill of 40%. Increase indicated conduit sizes, if necessary, to accommodate manufacturer's cable requirements.

3.3 WIRING

- .1 Perform tests in accordance with Section 26 05 01 - Common Work Results – Electrical.
- .2 Wiring of field devices shall be run in accordance with the manufacturer's requirements for this system.

3.4 VERIFICATION

- .1 Perform tests in accordance with Section 26 05 01 - Common Work 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.

3.5 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 SGeneral

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 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 speakers, riser diagram, cable types, and special mounting details.

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 Provide the speakers and infrastructure for a fully operational Intercom system as herein specified.
- .2 The Electrical Contractor shall include within their tender, the costs for the provision of the infrastructure and speakers. This specification shall be read in conjunction with specification section 27 05 28 – Pathways for Communication Systems.
- .3 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.
- .4 The contractor shall exercise caution, as necessary, to guard against electrostatic hum, and to install the cabling so as to provide maximum safety to non-technical operators.

1.8 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance information for the Intercom 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

1.10 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Other requirements as per ES/SOW-0101 Revision 3, April 15, 2004
- .3 Other requirements as per ES/SOW-0102 Revision 6, May 1, 2008

Part 2 Products

2.1 COMPONENTS

- .1 Wall mounted paging stations shall be provided throughout the building in locations for both training purposes and communication during simulations. See drawings for paging station types and locations.
- .2 There shall be two different types of stations: master stations and slave stations.
 - .1 Master stations shall be located at control posts as shown on drawing E3.2.
 - .2 Slave stations shall be located near secured doors for entry requests.
- .3 The Electrical Contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and hand stations shall be coordinated with the manufacturer and wired as required.
- .4 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. All testing and final commissioning documentation and processes shall follow the requirements of the ES/SOW-0101 and ES/SOW-0102 standards referenced herein.
- .5 All system components shall be grounded.

2.2 PRODUCT APPROVALS

- .1 Manufacturers' model numbers named in these specifications indicate an acceptable technical standard of performance and are not intended to be the exclusive product chosen. Products submitted as alternates must result in an audio system that meets or exceeds all technical performance criteria as described and illustrated.
- .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, performance criteria, etc as per the ES/SOW-0101 / ES/SOW-0102 criteria with all requests for approval.

- .3 The Bidder must provide a complete list of primary system products offered with their bid. Failure to do so will disqualify their bid. This shall include but not limited to, loudspeaker products, layouts and performance, amplifiers, audio processing, system control and program input products.
- .4 Loudspeakers proposed as alternatives must be demonstrated to perform equally as the accepted technical standard.

2.3 INTERCOM MASTER STATIONS

- .1 Shall be audio only, desktop push-to-talk intercom system.
- .2 Capable of supporting minimum 3 slave stations.
- .3 LED annunciation and momentary tone from calling slave station.
- .4 Adjustable voice and call tone volume controls.
- .5 Shall be connected to slave stations as shown on drawings.
- .6 Shall be AIPhone LEF-3 or approved equal.

2.4 INTERCOM SLAVE STATIONS

- .1 Shall be basic wall mounted stations.
- .2 Shall be audio only, stainless steel, and flush mounted into a single gang box.
- .3 Shall be connected to master station as shown on drawings. Slave station shall be capable of hands-free reply to master station.
- .4 Shall be AIPhone #L-SS-1G or approved equal.

2.5 CABLE AND CONNECTOR PANELS

- .1 Provide all cable, wire and connectors for a complete and operational sound system.
- .2 All cable for sound system to be PVC insulated, stranded pairs (or multi-conductor), as required. Provide shielded program (line level) cable, as required.
- .3 Cable type and gauge shall be at the discretion of the speaker supplier. However, all systems, when completed, must meet technical performance requirements, as specified.

Part 3 Execution

3.1 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.

3.2 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.

3.3 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 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 speakers, riser diagram, cable types, and special mounting details.

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 Provide the microphones, mixers, power supplies, and infrastructure for a fully operational audio recording system as herein specified.
- .2 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.
- .3 The audio recording system utilizes components from the Public Address System and Video Surveillance System, and is to be read in conjunction with these sections.

1.8 PERFORMANCE PARAMETERS

- .1 The system shall provide adequate dynamic range and system gain at an acoustic level sufficient to ensure that conversation level voices can be clearly heard on recorded audio playback.
- .2 The entire sound system and all components shall be free of parasitic oscillation and radio frequency pickup at all times, including full facilities operation, both in the absence of audio input signal and also when the system is driven to full output. Hum and noise from the system shall be in-audible with the controls set a normal operating positions.
- .3 The contractor shall coordinate final placement of ceiling mounted microphones with respect to public address speakers, mechanical components, and any other source of noise. These noise sources shall not conflict with the ability of the recording system to properly record conversations at desk level.
- .4 The contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and call stations shall be coordinated with the manufacturer and wired to suit the needs of the owner.

1.9 CLOSEOUT SUBMITTALS

- .1 Provide operation and maintenance information for the Intercom 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.

1.10 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

1.11 EXTRA MATERIALS

- .1 Provide maintenance materials in accordance with Section 01 78 00 - Closeout Submittals.
- .2 Other requirements as per ES/SOW-0101 Revision 3, April 15, 2004
- .3 Other requirements as per ES/SOW-0102 Revision 6, May 1, 2008

Part 2 Products

2.1 PRODUCTS

- .1 The Electrical Contractor shall coordinate all requirements of the respective systems with the manufacturer and provide as required. The wiring of the speakers and hand stations shall be coordinated with the manufacturer and wired as required.
- .2 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. All testing and final commissioning documentation and processes shall follow the requirements of the ES/SOW-0101 and ES/SOW-0102 standards referenced herein.
- .3 All system components shall be grounded.

2.2 CEILING MOUNTED OVERHEAD MICROPHONES

- .1 Technical features shall include:
 - .1 Boundary condenser microphone
 - .2 Polar pattern shall be omnidirectional
 - .3 Ceiling flush mount
 - .4 Low impedance of 120 ohm

- .5 Sensitivity of -36dbV/Pa @ 1kHz
 - .6 3 pin XLR male connector complete with 25' XLR extension cable
 - .7 Require 9-52VDC phantom power, 2.0mA
 - .8 Frequency response of 30Hz to 20Khz
 - .9 Colour: White
- .2 Shall be TOA EM-600 or approved equal.

2.3 MICROPHONE AUTO MIXER

- .1 Provide one (1) single unit, 8-channel (minimum), 1U rack mounted microphone auto mixer. This shall feature balanced low impedance inputs compatible with professional microphones supplied.
- .2 Other general features shall include: Phantom power for mic inputs, clipping indication, (line level) input with level control, Master level control. Individual channel control of gain, limiter, EQ, and mute.
- .3 The mixer shall provide automatic reduction of background noise by utilizing:
 - .1 Auto-muting individual microphones that are below an adaptive audio threshold.
 - .2 Customizable low and high pass filtering.
- .4 Auto mixer shall have two output mixes, with ability to separately mix each output. Each output mix shall have overall adjustable EQ as a minimum.
- .5 Mixer shall be complete with control software for control, monitoring, routing and configuration.
- .6 Technical features shall include:
 - .1 Frequency response (Ref 1kHz, channel controls centered)
25 Hz to 20kHz; ± 2 dB
 - .2 Signal to Noise Ratio @ greater than 90 dB with Volume min.
 - .3 48 Volt Phantom power
 - .4 2 x Balanced XLR 3-pin output with selectable mic or line level.
 - .5 Off-Attenuation @ 15 db (switchable to infinity)
 - .6 Common mode rejection @ >70 dB at 1kHz
 - .7 Low frequency EQ @ ± 12 dB @ 100 Hz
 - .8 High frequency EQ @ ± 12 dB @ at 10 kHz
- .7 Microphone auto mixer shall be manufactured by Shure, Behringer, Yamaha, Mackie, Rolls, Crown, or approved equal.

2.4 NETWORK I/O MODULE

- .1 This module is required to convert the audio output of the DSP to CAT6 in order to transmit to the network video recorder for storage.

- .2 Technical features shall include
 - .1 Module shall be Power over Ethernet
 - .2 8 configurable I/O ports
 - .3 Input: Microphone or Line in
 - .4 48 Volt Phantom power
- .3 Audio from module shall be paired to corresponding cameras for seamless audio/video playback through CCTV network.
- .4 Standard of acceptance shall be Axis P8221 Network I/O Module.

2.5 AUDIO STORAGE

- .1 All recorded audio shall be stored on the Network Video Recorder (NVR), specified in Video Surveillance 28 23 00.
- .2 The owner shall have the ability to select any audio from any device for playback, regardless of the camera or cameras that are being viewed.

2.6 CABLE AND CONNECTOR PANELS

- .1 Provide all cable, wire and connectors for a complete and operational sound system.
- .2 All cable for sound system to be PVC insulated, stranded pairs (or multi-conductor), as required. Provide shielded program (line level) cable, as required.
- .3 Cable type and gauge shall be at the discretion of the speaker supplier. However, all systems, when completed, must meet technical performance requirements, as specified.

Part 3 Execution

3.1 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.

3.2 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.

3.3 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

