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END OF SECTION

Part 1 General

1.1 RELATED SECTIONS & SUMMARY

- .1 The General Conditions, Supplements and Amendments shall govern this Section (read in conjunction with Instructions to Tenderers / Bidders). This section covers items common to all Electrical sections and is intended only to supplement the requirements of Section 01 01 50.
- .2 Reference to "Electrical Divisions" shall mean all related Electrical Sections and components including Division 26 and 28 in the Master Format Specifications.
- .3 Reference to "Mechanical Divisions" shall mean all related Mechanical Sections and components including Divisions 23 and 25 in the Master Format Specifications.
- .4 The word "Provide" shall mean "Supply, Install and Connect" the products and services specified. "As Indicated" means that the item(s) specified are shown on the drawings.
- .5 Provide materials, equipment and plant, of specified design, performance and quality; and, current models with published certified ratings for which replacement parts are readily available. Provide project management and on-site supervision to undertake administration, meet schedules, ensure timely performance, and ensure coordination, establishing orderly completion and the delivery of a fully commissioned installation.
- .6 The most stringent requirements of this and other electrical sections shall govern.
- .7 All work shall be in accordance with the CONTRACT Drawings and Specifications and their intents, complete with all necessary components, including those not normally shown or specified, but required for a complete installation.
- .8 Provide seismic restraints for all required equipment, piping and ductwork.
- .9 Connect to equipment specified in other Sections and to equipment supplied and installed by other Contractors or by the Departmental Representative. Uncrate equipment, move in place and install complete; start-up and test. Include all field assembly of loosely/separately packaged accessories.

1.2 REFERENCES

- .1 Install in accordance with CSA C22.1-2018 except where specified otherwise.
- .2 Comply with CSA Certification Standards, local Authorities Having Jurisdiction and Electrical Bulletins in force at time of tender submission.
- .3 Comply with other applicable standards.
- .4 Perform work in accordance with CSA Z462 - Workplace Electrical Safety and Worksafe BC.

1.3 DEFINITIONS

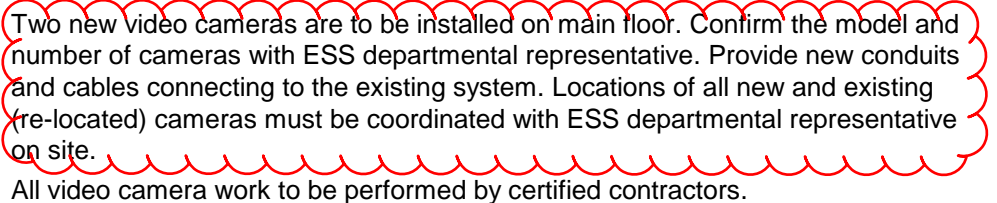

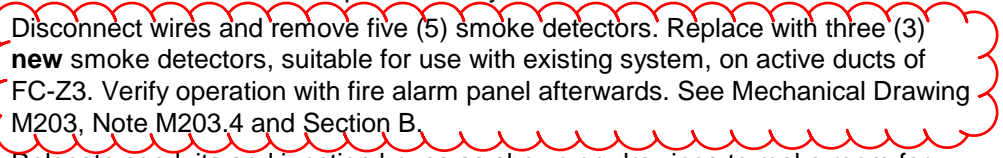

- .1 Electrical and electronic terms: unless otherwise specified or indicated, terms used in these specifications, and on drawings, are those defined by IEEE SP1122.

1.4 DESIGN REQUIREMENTS

- .1 Operating voltages to CAN3-C235-83.
- .2 Motors, electric heating, control and distribution devices and equipment to operate satisfactorily at 60 Hz within normal operating limits established by above standard. Equipment to operate in extreme operating conditions established in above standard without damage to equipment.

1.5 SCOPE OF WORK

- .1 Contractor shall supply, install, commission and provide warranty for a complete and fully documented electrical system as per contract drawings and specified herein. The Work includes all hardware, and services necessary to provide fully functional, coordinated electrical system. Refer to Section 01 01 50 for hours of work.
- .2 Coordinate with Mechanical Div. 25 for all the demolition and installation work. Ensure safety.
- .3 All demolition works refer to mechanical. Electrical contractor is responsible for demolition of the electrical connections to the mechanical equipment. To identify the equipment contractor to review electrical drawing package in conjunction with the mechanical package.
- .4 Scope of work
 - .1 Demolish Type A luminaires in corridors of first and second floors
 - .2 Supply and installation of Type L luminaires on first and second floors
 - .3 Supply and installation of Panel 'EH' and circuit breaker in CDP 'M2d' in mechanical room
 - .4 Supply and installation of service receptacles on roof
 - .5 Electrical installation of service chase heaters supplied by Mechanical. Supply and installation of disconnect switches for service chase heaters.
 - .6 Electrical installation of kitchen wall exhaust fan supplied by Mechanical. Supply and installation of magnetic starter and disconnect switch for kitchen wall exhaust fan.
 - .7 Electrical installation of HRV's on roof.
 - .8 Demolish existing circuits for fan coil, fan and pump in mechanical room
 - .9 Electrical installation of new fan coil and fan in mechanical room. Supply and installation of disconnect switches for fan coil FC-Z3 and fan S-11.
 - .10 Electrical installation of three pumps in mechanical room. Supply and installation of disconnect switches for pumps P-M2C-1, P-M2C-2 and P-15.
 - .11 Relocate emergency light outside cell 05 on second floor
 - .12 Relocate luminaires in shower on main floor
 - .13 Re and re two luminaires in kitchen

- .14 Relocate luminaires in cells 02, 03, 05A and 17 on second floor
- .15 Relocate 3 interior (2 on main floor, 1 on second floor) and 2 exterior video cameras as shown on drawings. Re-locate junction boxes, conduits and extend conduits as required.
- .16 Two new video cameras are to be installed on main floor. Confirm the model and number of cameras with ESS departmental representative. Provide new conduits and cables connecting to the existing system. Locations of all new and existing (re-located) cameras must be coordinated with ESS departmental representative on site.  
- .17 All video camera work to be performed by certified contractors.
- .18 Disconnect wires and remove five (5) smoke detectors. Replace with three (3) **new** smoke detectors, suitable for use with existing system, on active ducts of FC-Z3. Verify operation with fire alarm panel afterwards. See Mechanical Drawing M203, Note M203.4 and Section B.  
- .19 Relocate conduits and junction boxes as shown on drawings to make room for mechanical installation.

- .5 Provide new cabling with new conduit in the bid document.
- .6 Coordinate the exact location of the mechanical equipment with mechanical drawing package.
- .7 Make sure no disturbance/hazard to existing equipment.
- .8 Coordinate any outage in fire alarm systems with the Departmental Representative during construction. Provide a verification of the duct smoke detectors with the integrated system once it is commissioned with the new duct works.
- .9 All drawings to be read in conjunction with mechanical drawings provided with the package and other disciplines drawings.
- .10 Provide Quality Management (QM) services for the following:
 - .1 Project construction schedule
 - .2 Onsite testing and inspections of new and existing equipment
 - .3 Re-CSA certification of existing modified equipment
 - .4 Quality Management plan
- .11 Component subsystems of the electrical system will include, but are not limited to the following:
 - .1 Connect exterior mechanical equipment via a system of interior surface mounted conduit. Equipment shall be connected to new panel in existing electrical distribution system.
 - .2 Connect interior mechanical equipment via surface mounted conduit. Equipment shall be connected to new panel in existing electrical distribution system.
 - .3 Provide all required motor starters, associated control wiring and local disconnect switches.

- .12 Provide grounding/bonding equipment as per CEC or as indicated in the contract drawings and specifications.
- .13 Provide fire stopping as required.
- .14 Perform commissioning in accordance with Section 01 01 50.
- .15 As-built drawings and maintenance manuals.
- .16 Seismic restraint for all electrical equipment and installations. See Section 26 05 25.

1.6 SUBMITTALS

- .1 Submittals to be in accordance with Section 01 01 50.
- .2 Submit shop drawings, product data and samples in accordance with Section 01 01 50. The submission shall be reviewed, signed and processed as described in Section 01 01 50.
- .3 Indicate details of construction, dimensions, capacities, weights and electrical performance characteristics of equipment or material.
- .4 Where applicable, include wiring, line and schematic diagrams. Include wiring drawings or diagrams showing interconnection with work of other Sections.
- .5 Content
 - .1 Shop drawings submitted in accordance with Section 01 01 50.
 - .2 Data shall be specific and technical.
 - .3 Identify each piece of equipment.
 - .4 Identify the electrical rating for each equipment.
 - .5 Information shall include all scheduled data.
 - .6 Indicate the exact proposed model number for certain equipment.
 - .7 Advertising literature will be rejected.
 - .8 The project and equipment designations shall be identified on each document.
 - .9 Information shall be given in S.I. units
 - .10 The shop drawings/product data shall include:
 - .1 Dimensioned construction drawings with plans and sections showing size, arrangement and necessary clearances, with all equipment weight and mounting point loads.
 - .2 Mounting arrangements.
 - .3 Detailed drawings of bases, supports and anchor bolts.
 - .4 Control explanation and internal wiring diagrams for packaged equipment.
 - .5 A written description of control sequences relating to the schematic diagrams.
- .6 Format
 - .1 Electronic copy (PDF format).

- .2 Bill of Quantities for related components, identified by model number, listed on the front cover with item identification numbers.
- .7 Coordination
 - .1 Where electrical equipment requires support or backing by other trades or mechanical connections, the shop drawings shall also be circulated through the other "services" contractor(s) prior to submission to the Departmental Representative.
- .8 Keep one copy of shop drawings and product data, on site, available for reference.
- .9 Quality Control: in accordance with Section 01 01 50
 - .1 Provide CSA certified equipment and material. Where CSA certified equipment and/or material is not available, submit such equipment and/or material to the authority having jurisdiction for special approval before delivery to site.
 - .2 Submit test results of installed electrical systems and instrumentation.
 - .3 Submit, upon completion of Work, the electrical "load balance" report.
- .10 Permits and Fees:
 - .1 Submit to Electrical Inspection Department, Local Fire Authorities and Supply Authority the necessary number of drawings and specifications for examination and approval prior to commencement of work. Obtain all required permits and pay all fees.
 - .2 Arrange for inspection of all Work by the authorities having jurisdiction. On completion of the Work, furnish final unconditional certificates of approval by the inspecting authorities.

1.7 QUALITY ASSURANCE

- .1 Quality Assurance in accordance with Section 01 01 50.
- .2 Qualifications: Electrical Work to be carried out by qualified, licensed electricians in accordance with authorities having jurisdiction.
 - .1 Employees registered in apprentices program: permitted, under direct supervision of qualified licensed electrician, to perform specific tasks.
 - .2 Permitted activities: Determined based on training level attained and demonstration of ability to perform specific duties.
- .3 Site Meetings in accordance with Section 01 01 50.
- .4 Health and Safety Requirements in accordance with Section 01 01 50.

1.8 DELIVERY, STORAGE AND HANDLING

- .1 Material Delivery Schedule: provide Departmental Representative with schedule within 4 weeks after award of Contract.
- .2 Construction/Demolition Waste Management and Disposal: separate waste materials for reuse and/or recycling in accordance with Section 01 01 50.

1.9 SYSTEM START-UP

- .1 Refer to Section 01 01 50.
- .2 Instruct the Departmental Representative and operating personnel in the operation, care and maintenance of equipment.
- .3 Arrange and pay for services of manufacturer's factory service Engineer to supervise start-up of installation, check, adjust, balance and calibrate components.
- .4 Provide these services for such period, and for as many visits as necessary to put equipment in operation, and ensure that operating personnel are conversant with aspects of its care and operation.

1.10 OPERATING INSTRUCTIONS

- .1 Provide for each system and principal item of equipment as specified in technical sections for use by operation and maintenance personnel.
- .2 Operating instructions to include following:
 - .1 Wiring diagrams, control diagrams, and control sequence for each principal system and item of equipment.
 - .2 Start up, proper adjustment, operating, lubrication, and shutdown procedures.
 - .3 Safety precautions.
 - .4 Procedures to be followed in event of equipment failure.
 - .5 Other items of instruction as recommended by manufacturer of each system or item of equipment.
- .3 Print or engrave operating instructions and frame under glass or in approved laminated plastic.
- .4 Post instructions where directed.
- .5 For operating instructions exposed to weather, provide weather-resistant materials or weatherproof enclosures.
- .6 Ensure operating instructions will not fade when exposed to sunlight and are secured to prevent easy removal or peeling.

1.11 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50.
- .2 Avoid using landfill waste disposal procedures when recycling facilities are available.
- .3 Place materials defined as hazardous or toxic waste in designated containers.

1.12 DRAWINGS AND MEASUREMENTS

- .1 Drawings are generally diagrammatic and are intended to indicate the scope and general arrangement of work and are not detailed installation drawings. Do not scale the drawings. Obtain accurate dimensions from the Architectural and Structural drawings.

- .2 Consult the architectural drawings and details for exact locations of fixtures and equipment. Obtain this information from the Departmental Representative where definite locations are not indicated.
- .3 Take field measurements, where equipment and material dimensions are dependent upon building dimensions.

1.13 PROJECT COORDINATION

- .1 Check drawings of all trades to verify space and headroom limitations for work to be installed. Coordinate work with all trades and make changes to facilitate a satisfactory installation. Make no deviations to the design intent involving extra cost without the Departmental Representative's written approval.
- .2 The drawings indicate the general location and route to be followed by the electrical services. Where details are not shown on the drawings or only shown diagrammatically, the services shall be installed in such a way as to conserve head room and interfere as little as possible with the free use of space through which they pass. Service lines shall run parallel to building lines. All services in the ceiling shall be kept as tight as possible to beams or other limiting members at high level. All electrical services shall be coordinated in elevation to ensure that they are concealed in the ceiling or structural space provided unless detailed otherwise on drawings.
- .3 Work out jointly all interference problems on the site and coordinate all work before fabricating, or installing any material or equipment. Where necessary, produce interference/coordination drawings showing exact locations of electrical systems or equipment within service areas, shafts and the ceiling space. Distribute copies of the final interference/coordination drawings to the Departmental Representative and all affected parties.
- .4 Contractor to read the drawings in conjunction with existing reference drawings and specifications to understand the intent of the work. Notify Departmental Representative if there is any discrepancies. No extra cost will be considered for any misunderstanding of work to be done.
- .5 Ensure that all materials and equipment fit into the allotted spaces and that all equipment can be properly serviced and replaced, if and when required. Advise the Departmental Representative of space problems before installing any material or equipment. Demonstrate to the Departmental Representative on completion of the work that all equipment installed can be properly, safely serviced and replaced, if and when required.

1.14 SPRINKLER PROOF REQUIREMENTS

- .1 In sprinklered rooms where electrical equipment is installed surface mounted, electrical equipment contained in these rooms to be protected by non-combustible driphoods, shields, and gasketed doors as applicable to inhibit water ingress into electrical equipment. Exposed conduits connected to equipment to utilize watertight connectors.

1.15 EQUIPMENT RESTRAINT

- .1 Related Section: 26 05 25 Seismic Restraint.

- .2 It is the entire responsibility of equipment manufacturers to design their equipment so that the strength and anchorage of internal components of the equipment exceeds the force level used to restrain and anchor the unit itself to the supporting structure.

1.16 WARRANTY

- .1 Use of installed equipment during construction shall not shorten or alter the warranty period as specified in the Section 01 01 50.
- .2 Take note of any extended warranties specified.
- .3 Furnish a written warranty stating that all work executed under this Division will be free from defects of material and workmanship for a period of one year from the date of substantial performance.
- .4 Promptly investigate any electrical or control malfunction, and repair or replace all such defective work and all other damages thereby which becomes defective during the time of the warranty.

1.17 EXAMINATION

- .1 A site visit before the close of tender to be communicated with the Departmental Representative. No extra cost will be considered for any misunderstanding of work to be done.
- .2 Examine the documents for details of work included. Obtain a written clarification in the event of conflict within the specification, between the specifications and the drawings, or in the drawings. Obtain written clarification from the Departmental Representative if work affecting the installation is not clear. Where this is not done in advance, allow in the tender sum for providing the more costly alternative.

1.18 RESPONSIBILITIES

- .1 Ensure that equipment does not transmit noise and/or vibration to other parts of the building, as a result of poor installation practice.
- .2 The Drawings and Specifications complement each other and what is called for by one is binding as if called for by both. If there is any doubt as to the meaning or true intent due to a discrepancy between the Drawings and Specifications, obtain a ruling from the Departmental Representative **prior** to Tender closing. Failing this, the most expensive alternative is to be allowed for.
- .3 The Contractor shall advise the Departmental Representative during the Tender period of any specified material or equipment which is either no longer available from manufacturers or whose delivery is likely to exceed the requirements of the anticipated Construction Schedule. Failure of the Contractor to perform the above shall cause the Contractor to supply, at his own expense, alternate material or equipment as selected by the Departmental Representative at a later date. Alternatively, the Contractor shall procure the specified material or equipment at his own additional expense by means of air freight or other special means of transportation.
- .4 Advise the Departmental Representative of any specified equipment, material, or installation of same which appears inadequate or unsuitable or which is in violation of

laws, ordinances, rules, or regulations of authorities having jurisdiction. Provide all labour and materials which are obviously necessary or reasonably implied to be necessary to complete the work as if the work was shown on the Drawings and/or described in the Specifications.

- .5 Check Drawings of all trades and coordinate the installation of all material and equipment to ensure adequate space and free access and to maintain headroom limitations for all new and indicated future work. Work out jointly, with all Subcontractors on the site, solutions to interference problems. Coordinate all work before fabricating or installing any material or equipment. It is incumbent on all Subcontractors on the site to ensure that all materials and equipment fit into the allocated spaces and that all equipment can be properly inspected, serviced and replaced if and when required. Advise the Departmental Representative of space problems before fabricating or installing any material or equipment. Demonstrate to the Departmental Representative on completion of his work that all equipment and material installed by him can be properly and safely serviced and replaced. Make no deviations from the intent of the design, or any involving additional cost, without the Departmental Representative's written direction.
- .6 Where electrical work and materials are noted as being provided by the Departmental Representative or under other Divisions of these Specifications, the responsibility for integrating, to the extent required, such work and materials into the complete installation, shall remain within Division 26.
- .7 Protect equipment and material from the weather, moisture, dust and physical damage.
- .8 Cover equipment openings and open ends of conduit, piping and pullboxes as work progresses. Failure to do so will result in the Trade being required to adequately clean or replace materials and equipment at no extra cost to the Departmental Representative.
- .9 Protect all existing services encountered. Obtain instructions from the Departmental Representative when existing services require relocation or modification.
- .10 Refinish damaged or marred factory finish to factory finish.
- .11 The specifications and drawings form an integral part of the Contract Documents. Neither the drawings nor the specifications shall be used alone. Work omitted from the drawings but mentioned or reasonably implied in the specifications, vice versa, shall be considered as properly and sufficiently specified and shall be provided. Misinterpretation of any requirement of either plans or specifications shall not relieve this Contractor of the responsibility of properly completing his trade to the approval of the Departmental Representative.

1.19 EQUIPMENT LIST

- .1 Submit a completed Equipment List, showing the make of equipment and material included in the Tender, including the names of the subtrades, 10 days after the award of the Contract.
- .2 The equipment list shall be a full list of materials or systems intended for installation.

1.20 PROGRESS CLAIM AND CHANGE ORDER BREAKDOWNS

- .1 Ten days after the award of contract, submit detailed progress claim breakdown for each division. Items to be included but shall not be necessarily limited to the following:
 - .1 Site services
 - .2 Distribution
 - .3 Feeders
 - .4 Cable tray
 - .5 Branch circuit wiring, conduit and boxes
 - .6 Wiring devices
 - .7 Lighting
 - .8 Mechanical equipment and wiring
 - .9 Low tension
 - .10 Testing and commissioning
 - .11 As-built drawings and maintenance manuals
 - .12 Mobilization; not to exceed 2% of the contract value
- .2 Change order breakdowns shall include but not be necessarily limited to the following:
 - .1 Labour hours per unit of material or equipment to be added, deleted or altered
 - .2 Units of material or equipment to be added or deleted.
 - .3 Per unit cost of material, equipment and labour broken down by category of labour and type of material or equipment
 - .4 Extensions of the above to arrive at total costs
 - .5 Miscellaneous and identifiable charges such as re-stocking, overhead, profit, etc

1.21 PROJECT CLOSE-OUT REQUIREMENTS

- .1 Refer to Section 01 01 50.
- .2 Refer to detailed specifications in each section for detailed requirements. Provide the following list of required substantial completion submissions.
 - .1 Fire alarm system verification report.
 - .2 Seismic engineer report and schedules.
 - .3 Final electrical inspector certificate.
 - .4 Drafted as-built drawings.
 - .5 Operating and maintenance manual.
 - .6 Contractors letter of guarantee.
 - .7 Complete Demonstration of systems to Departmental Representative.
- .3 Record drawings to be submitted to the Departmental Representative and all life safety systems must be operational, verified and tested and demonstrated to Departmental Representative prior to issuance of Schedule C.

1.22 SUBSTANTIAL PERFORMANCE REQUIREMENTS

- .1 Before the Departmental Representative is requested to make an inspection for substantial performance of the work:

- .1 Commission all systems and prove out all components, interlocks and safety devices.
 - .2 Submit a letter certifying that all work is complete for the intended use, operational, clean and all required submissions have been completed.
 - .3 A complete list of incomplete or deficient items shall be provided by the Contractor. If, in the opinion of the Departmental Representative, this list indicates the project is excessively incomplete, a substantial completion inspection will not be performed.
- .2 The work will not be considered to be ready for use or substantially complete until the following requirements have been met:
- .1 All reported deficiencies have been corrected.
 - .2 Operating and Maintenance Manuals completed.
 - .3 "As Built" Record Drawing ready for review.
 - .4 Systems Commissioning has been completed and has been verified by Departmental Representative.
 - .5 All demonstrations to the Departmental Representative have been completed.
 - .6 All documents required have been submitted.
- .3 Letters of Assurance will not be issued until the following requirements have been met:
- .1 All items listed in 1.22 above have been completed or addressed.
 - .2 Certificate of penetrations through separations have been sealed and labelled with certified fire stopping material.
 - .3 Provincial Electrical Inspection - Certificate of inspection.
 - .4 Seismic Engineers letter of Assurance and final inspection report.
 - .5 Certificate of Substantial Performance.
 - .6 Fire alarm system verification report.

1.23 POWER INTERRUPTIONS

- .1 Contractor shall work closely with Institutional personnel to arrange all interruptions of any portion of the existing electrical distribution systems.
- .2 All interruptions to existing electrical distribution systems and shutdown of existing Panel boards in the contract shall be carried out in coordination with the Institution. Normal working hours of the Institution are considered to be 0730 to 1600 hours, Monday through Friday, except holidays.
- .3 Contractor shall submit request for any power shutdown 3 working days prior to such power shutdown. Request shall indicate start time of interruption and duration of interruption. Indicate in request exactly what buildings and/or systems will be affected by the requested power shutdown.
- .4 No interruptions to power shall be carried out without the approval of the Departmental Representative.

Part 2 PRODUCTS

2.1 SUSTAINABLE REQUIREMENTS

- .1 Materials and products in accordance with Section 01 01 50.
- .2 Do verification requirements in accordance with Section 01 01 50.

2.2 MATERIALS AND EQUIPMENT

- .1 Provide materials and equipment in accordance with Section 01 01 50 and as follows.
- .2 Material and equipment to be CSA certified. Where CSA certified material or equipment is not available, obtain special approval from authority having jurisdiction before delivery to site and submit such approval.
- .3 Where equipment or materials are specified by technical description only, they are to be of the best commercial quality available for the intended purpose.
- .4 Factory assemble control panels and component assemblies.

2.3 ELECTRIC MOTORS, EQUIPMENT AND CONTROLS

- .1 Provide all power and electrical system related control wiring, conduit, wire, fittings, disconnect switches, motor starters, for all mechanical equipment unless otherwise specified.
- .2 Ground all motors to conduit system with separate grounding conductor in flexible conduit or bonding conductor in the flexible conduit.
- .3 Connections shall be made with watertight flexible conduit with watertight connectors.
- .4 Control wiring and conduit standards are specified in the Electrical Divisions. Refer to Mechanical Divisions for scope of work and particular details.

2.4 WARNING SIGNS

- .1 Provide warning signs, as specified or to meet requirements of Inspection Department and Departmental Representative.
- .2 Use decal signs, minimum 175 x 250 mm size.

2.5 WIRING TERMINATIONS

- .1 Lugs, terminals, screws used for termination of wiring to be suitable for copper conductors.

2.6 EQUIPMENT IDENTIFICATION

- .1 Identify all electrical equipment including but not limited to starters, disconnects, remote ballasts and controls with nameplates and labels as follows:
- .2 Nameplates:

.1 Electrical Equipment:

COMPONENT	LABEL TYPE	INFORMATION
Main distribution centre	A	Year installed and name of facility Name of Electrical Engineer and Electrical Contractor
Main Breaker	A	Voltage, phase, amps
Sub-distribution panel	A	Name of panels it is feeding (i.e. Panel A, Panel B)
Panelboards	B	Panel designation (i.e. Panel A, Panel B)
Terminal Cabinet	B	System and Voltage
Disconnect switches	B	Indicate equipment controlled and voltage
Starters/contactors	B	Indicate equipment controlled and voltage
Motor control centre	B	Indicate equipment controlled and voltage
Transformer	B	Transformer designation Circuit and Panel designation
Junction boxes, pull boxes	D	Circuit and panel designation
On/Off switches	C	If it is not obvious, then indicate area being served
Fire Alarm Devices (i.e. pull stations, bell, smoke detector, end-of –line)	C	Zone number and device number in that zone (i.e. Zone 1-#3, Zone 10-#7)
Receptacles	C	Circuit/panel designation
Special receptacles	C	Circuit/panel designation and voltage, phase, amps

.2 Label Type:

	LETTER HEIGHT	TYPE	COLOUR
Label Type A	9.5 mm	Lamacoid	White lettering/black background
Label Type B	6.0 mm	Lamacoid	White lettering/black background
Label Type C	3.0 mm	Lamacoid	White lettering/black background
Label Type D	3.0 mm	Adhesive label	As specified

.3 Adhesive Labels:

- .1 Good quality vinyl, self-laminating label as T & B E-Z Code WSL, Dymo Letratag or Brother P-Touch equivalent printable markers. Embossed Dymo or any labels with edges and corners that are prone to lift will be rejected.
- .4 Provide plastic covered typewritten panel directory with circuits and areas served and mounted on inside of door. Directory shall conform to Record Drawings.

2.7 WIRING IDENTIFICATION

- .1 Identify wiring with permanent indelible identifying markings, either numbered or coloured plastic tapes, on both ends of phase conductors of feeders and branch circuit wiring.
- .2 Maintain phase sequence and colour coding throughout.
- .3 Colour code to CSA C22.1-2018.
- .4 Use colour coded wires in communication cables, matched throughout system.

2.8 CONDUIT, CABLE AND PULLBOX IDENTIFICATION

- .1 All junction boxes, pull boxes and their covers shall be painted according to the colour coding schedule.
- .2 Code with 25 mm plastic tape or paint at points where conduit or cable enters wall, ceiling, or floor and at 15 m intervals.
- .3 Colour coding to be as follows unless otherwise specified:

COMPONENT	RACEWAY AND JUNCTION BOXES	RECEPTACLES AND OTHER
Normal 120/208, 240 volt	Gray	White
Normal 347/600 volt	Sand	White
Emergency 120/208, 240 volt	Green with red bands	Red
Emergency 347/600 volt	Sand with red bands	n/a
Fire Alarm	Red	Strobe (red)
Low voltage		
-switching/controls	Black	
-emergency/exit lighting	Black with red bands	
-security	Black with blue bands	Strobe (blue)
-mechanical alarms	Black with yellow bands	Strobe (amber)

2.9 FINISHES

- .1 Shop finish metal enclosure surfaces by removal of rust and scale, cleaning, application of rust resistant primer inside and outside and at least two coats of finish enamel.
- .2 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original finish.
- .3 Clean and prime paint exposed hangers, racks, fastenings to prevent rusting. Finish painting shall be provided by Division 09.

2.10 FASTENING TO BUILDING STRUCTURE

- .1 General:
 - .1 Do not use inserts in base material with a compressive strength less than 13.79 MPa (2000 psi).
 - .2 All inserts supporting conduit racks shall have a factor of safety of 5. All other inserts shall have a factor of safety of 4.
- .2 Types:
 - .1 Cast-in-place type:
 - .1 Channel type - Burndy, Canadian Strut, Unistrut, Cantruss or Hilti Channel.
 - .2 Wedge type galvanized steel concrete insert, Grinnell Fig. 281 for up to 200 mm (8") pipe size.
 - .3 Universal type malleable iron body insert, Grinnell Fig. 282 for up to 200 mm (8") pipe size.
 - .2 Drilled, mechanical expansion type:
 - .1 Hilti HSL or UCAN LHL heavy duty anchor for use in concrete with compressive strength not less than 19.6 MPa (2840 psi).
 - .2 Hilti Kwik-Bolt or UCAN WED stud anchor for concrete. (Do not use in seismic restraint applications).
 - .3 Hilti HDI or UCAN IPA drop-in anchor for concrete.
 - .4 Hilti or UCAN Sleeve Anchor (medium and light duty) for concrete and masonry.
 - .5 Hilti ZBP or UCAN Zamac pin bolt (light duty) for concrete and masonry.
 - .3 Drilled, adhesive type:
 - .1 Hilti HVA or UCAN Adhesive Anchor consisting of anchor rod assembly with a capsule containing a two-component adhesive, resin and hardener.
 - .2 Hilti HY150 consisting of anchor rod with a 2 part adhesive system.
 - .3 For use in concrete housekeeping bases (in vertical downward position) where the distance to the edge of the concrete base could cause weakness if a mechanical expansion type anchor were used.
 - .4 Rod assemblies shall extend a minimum of 50 mm (2") into the concrete slab below the housekeeping bases.
- .3 Note:
 - .1 All drilling for inserts shall be performed using the appropriate tool specifically designed for the particular insert. The diameter and depth of each drilled hole shall be to the exact dimensions as specified by the insert manufacturer.
 - .2 Refer to manufacturer's recommendations for tightening torques to be applied to inserts.
 - .3 Where specifically called for, drills shall include a dust vacuum system, Hilti SAV Dust Vacuum System.

2.11 EQUIPMENT SUPPORTS

- .1 Provide stands and supports for equipment and materials supplied.
- .2 Lay out concrete bases and curbs required under Electrical Divisions. Coordinate with Concrete Divisions.
- .3 Concrete bases shall be a minimum of 100 mm thick, or as noted and shall project at least 150 mm outside the equipment base, unless otherwise directed. Bases and curbs shall be keyed to the floor and incorporate reinforcing bars and/or steel mesh. Chamfer edges of bases at 45 degrees.
- .4 Equipment with bedplates shall have metal wedges placed under the edges of the bedplates to raise them 25mm above the base after levelling. The wedges shall be left permanently in place. Fill the space between the bedplate and the base with non-shrink grout - Embeco or In-Pakt.
- .5 Construct equipment supports of structural steel. Securely brace. Employ only welded construction. Bolt mounting plates to the structure.
- .6 Support ceiling hung equipment with rod hangers and/or structural steel.

2.12 MISCELLANEOUS METAL

- .1 Be responsible for all miscellaneous steel work relative to Electrical Divisions of the Specifications, including but not limited to:
 - .1 Support of equipment.
 - .2 Hanging, support, anchoring, guiding and relative work as it applies to wiring raceways and electrical equipment.
 - .3 Earthquake restraint devices - refer also to "Seismic Restraint" sections
 - .4 Bridle rings - secure to structure or steel supports.
- .2 All steel work shall be primed and undercoat painted ready for finish under the related Division.

2.13 OPERATION AND MAINTENANCE DATA

- .1 Provide operation and maintenance data for incorporation into maintenance manual specified in Section 01 01 50 and as follows.
- .2 Include in operations and maintenance data:
 - .1 Details of design elements, construction features, component function and maintenance requirements, to permit effective operation, maintenance, repair, modification, extension and expansion of any portion or feature of installation.
 - .2 Technical data, product data, supplemented by bulletins, component illustrations, exploded views, technical descriptions of items, and parts lists. Advertising or sales literature not acceptable.
 - .3 Wiring and schematic diagrams.
 - .4 Names and addresses of local suppliers for items included in maintenance manuals.

- .3 Include in the manual the following major sections:
 - .1 Title page (in plastic cover).
 - .2 Comprehensive description of the operation of the systems, including the function of each item of equipment within the system.
 - .3 Detailed instructions for the normal maintenance of all systems and equipment installed including procedures and frequency of operational checks and service and trouble shooting instructions.
 - .4 Local source of supply for each item of equipment.
 - .5 Wiring and control diagrams.
 - .6 Spare parts list.
 - .7 Copies of guarantees and certificates.
 - .8 Manufacturer's maintenance brochures and shop drawings.
 - .9 Test and inspection reports.
- .4 Submit a draft copy to the Departmental Representative for approval thirty days prior to start up of the systems and equipment.

2.14 PROJECT RECORD DRAWINGS

- .1 Refer to Section 01 01 50.
- .2 During the construction period, maintain on Site a clean set of drawings and specifications marked up clearly and indelibly in red, indicating "As-Built" conditions where such conditions deviate from the original directions of the Contract Documents and indicating final installation of feeders and branch circuits.
- .3 "As-Built" drawing markings shall include but shall not be limited to the following:
 - .1 All changes in circuiting.
 - .2 Size and routing of all conduits for all branch circuits including power, lighting and systems. Note that branch circuit wiring is generally not shown on Drawings. Accurately record "As-Built" drawings the size and routing of all installed raceways and cables.
 - .3 Number and size of conductors (#10 AWG and larger) in raceways and cables.
 - .4 Location of all junction boxes and pullboxes.
 - .5 Location of all conduits or duct stubs, installed equipment, devices and fixtures.
 - .6 All changes to electrical installation resulting from Addenda, Change Orders and Field Instructions.
 - .7 Exact location of all services left for future work.
 - .8 Location by accurate horizontal and vertical dimensions of the routes and terminations of all raceways and cables installed underground beyond the building.

Part 3 EXECUTION

3.1 INSTALLATION

- .1 Do complete installation in accordance with CSA C22.1 2018 except where specified otherwise.
- .2 Do overhead and underground systems in accordance with CSA C22.3 No.1 except where specified otherwise.
- .3 Comply with CSA Electrical Bulletins and Local Authorities having jurisdiction.

3.2 NAMEPLATES AND LABELS

- .1 Ensure manufacturers nameplates and CSA labels are visible and legible after equipment is installed.

3.3 CONDUIT AND CABLE INSTALLATION

- .1 Install conduit and sleeves prior to pouring of concrete. Sleeves through concrete: schedule 40 steel pipe, sized for free passage of conduit and protruding 50 mm.
- .2 Install cables, conduits and fittings to be embedded or plastered over, neatly and close to building structure so furring can be kept to minimum.
- .3 Install weatherproof service entrance caps where conduit and cables penetrate roofs. Apply sealant after installation.
- .4 All cables and conduits shall be concealed in finished areas.

3.4 LOCATION OF OUTLETS

- .1 Coordinate outlet locations with Architectural Drawings.
- .2 Do not install outlets back-to-back or in the same stud space in wall; allow minimum 400mm horizontal clearance between boxes.
- .3 Change location of outlets at no extra cost or credit, providing distance does not exceed 3000 mm and information is given before installation.
- .4 Locate light switches on latch side of doors unless otherwise indicated.
- .5 Locate disconnect devices in mechanical and elevator machine rooms on latch side of doors.

3.5 MOUNTING HEIGHTS

- .1 Mounting height of equipment is from finished floor to centreline of equipment unless specified or indicated otherwise.

- .2 If mounting height of equipment is not indicated verify before proceeding with installation. Confirm the height of devices in handicapped facilities before installation.
- .3 Refer to detail on architectural drawings.
- .4 In the absence of a drawing detail or drawing note, use the following:

<u>Device</u>	<u>Height</u>		<u>Comment</u>
Local switches	1200	48"	
Wall receptacles/data	400	12"	General
Wall receptacles/data	175	7"	Above top of counters or counter splash backs – coordinate with Architectural detail
Wall receptacles/data	1400	56"	In mechanical rooms
Panelboards			Panelboards: as required by Code or as indicated.
Wall mounted telephone	1500	60"	
Fire alarm stations	1200	48"	As required by ULC S524.
Fire alarm bells/audio/visual	2300	90"	ULC S524 requires not less than 1800mm. In any event not closer than 50mm to the ceiling
End of line resistors	1800	72"	
Television outlets			As receptacles –coordinate with equipment location
Wall mounted speakers & clocks	2100	84"	Coordinate with equipment location
Door bell pushbuttons	1200	48"	Coordinate with location
Emergency Lighting (wall mounted)			150mm below ceiling or 2300mm max.

- .5 Confirm mounting height with Departmental Representative prior to rough-in.

3.6 DELIVERY AND STORAGE

- .1 Store all electrical equipment and devices other than conduits, fittings, boxes, and ducts in a heated and ventilated space, and protect from construction damage. Include in the tender price all costs related to such storage.
- .2 Conduits, fittings, boxes, and ducts may be stored outside if properly protected against the weather.
- .3 Ship and store floor mounted equipment in upright position.
- .4 Ship equipment in adequate containers to assure it arrives undamaged at the site.
- .5 Keep equipment doors locked. Protect equipment from damage and dust.
- .6 Block moving parts when necessary to prevent damage during movement and shipment of equipment.
- .7 Remove from the site, and replace with new, all materials showing evidence of damage or rust.

3.7 CO-ORDINATION OF PROTECTIVE DEVICES

- .1 Coordinate and pay for all tests specified herein including further tests as required by authorities having jurisdiction.
- .2 All testing shall be performed after each system installation has been completed. Prior to commissioning, all motors, MCCs, transformers and switchgear shall be meggered for insulation integrity and the results recorded prior to the systems being put into operation.
- .3 Perform the testing, adjusting, and balancing only when conditions are commensurate with actual operating conditions for the given system.
- .4 Advise the Departmental Representative 48 hours in advance of each test. Carry out tests in the presence of Departmental Representative.
- .5 Submit detailed printed, dated and signed test reports in duplicate to the Departmental Representative within 7 days after the completion of each test. Include all test reports in the Maintenance Manuals. Each test shall clearly indicated, in a line-by-line format, that the components (not as a group) have been tested, test results, and whether test results are within acceptable limits. Each test report shall be accompanied by a front cover sheet briefly outlining what the test report is for and clearly summarizing all items that have failed the tests. The cover sheet shall indicate names of individuals who conducted the tests and their signatures.

3.8 FIELD QUALITY CONTROL

- .1 Load and Balance:
 - .1 Measure voltage and phase & neutral currents to panelboards with normal loads (lighting) operating at time of acceptance; adjust branch circuit connections as required to obtain best balance of current between phases and record changes.
- .2 Conduct and pay for the following tests:
 - .1 Motors, heaters and associated control equipment including sequenced operation of systems where applicable.
 - .2 Systems: fire alarm system, communications systems.
 - .3 Main ground resistance (at all grounding locations).
- .3 Provide instruments, meters, equipment and personnel required to conduct tests during and at conclusion of project.
- .4 Reports:
 - .1 Provide written reports in a timely manner upon completion of the testing and load balance. Indicate test hour and date.

3.9 DEMONSTRATION

- .1 Demonstrate to and instruct the Departmental Representative on operating and maintenance procedures for all electrical systems using the assistance of specialist sub-trades and manufacturer's representatives for instruction and include all costs in the tender. Systems to be demonstrated shall include, but not be limited to, the following:
 - .1 Routing and installation of major feeders, duct banks and manholes, grounding and cable trays.
 - .2 Arrange an acceptable time with the Departmental Representative and submit a program of instruction and demonstration for the Departmental Representative's approval. Assume that the Departmental Representative is not familiar with any of the special equipment and/or systems installed.
 - .3 Submit to the Departmental Representative, at the time of Substantial Performance inspection, a complete list of systems stating for each system:
 - .1 Date of instruction.
 - .2 Duration of instruction.
 - .3 Name of persons instructed.
 - .4 Other parties present (manufacturer's representative, etc.).
 - .5 Signature of the Departmental Representative stating that they properly understood the system installation, operation, and maintenance requirements and identifying any systems or equipment which were not demonstrated to their satisfaction and which must be re-demonstrated.

3.10 CLEANING

- .1 Do final cleaning in accordance with Section 01 01 50.
- .2 At time of final cleaning, clean lighting reflectors, lenses and other lighting surfaces that have been exposed to construction dust and dirt.
- .3 Clean and touch up surfaces of shop-painted equipment scratched or marred during shipment or installation, to match original paint.
- .4 Clean and prime paint exposed non-galvanised hangers, racks, fastenings to prevent rusting. Coordinate finish painting with Section 01 01 50.

3.11 WORKMANSHIP

- .1 Workmanship shall be in accordance with well established practice and standards accepted and recognized by the Departmental Representative and the Trade.
- .2 The Departmental Representative shall have the right to reject any item of work that does not conform to the Contract Documents and accepted standards of performance, quietness of operation, finish and appearance.
- .3 Employ only tradesmen holding valid Provincial Trade Qualification Certificates. Tradesmen shall perform only work that their certificate permits. Certificates shall be available for inspection by the Departmental Representative.

3.12 PROTECTION OF WORK

- .1 Protect equipment and materials, stored or in place, from the weather, moisture, dust and physical damage.
- .2 Mask machined surfaces. Secure covers over equipment openings and open ends of equipment and conduit, as the installation work progresses.
- .3 Equipment having operating parts, bearings or machined surfaces, showing signs of rusting, pitting or physical damage will be rejected.
- .4 Refinish damaged or marred factory finish.

3.13 PROTECTION ELECTRICAL EQUIPMENT

- .1 Protect exposed live equipment during construction for personnel safety.
- .2 Shield and mark live parts, e.g. "LIVE 120 VOLTS".
- .3 Arrange for installation of temporary doors for rooms containing electrical distribution equipment. Keep these doors locked except when under direct supervision of electrician.

3.14 CONCEALMENT

- .1 Conceal wiring and conduit in partitions, walls, crawlspaces and ceiling spaces, unless otherwise noted.
- .2 Do not install wiring and conduit on outside walls or on roofs unless specifically directed.

3.15 SERVICE PENETRATIONS IN RATED FIRE SEPARATIONS

- .1 Refer to 07 84 00.
- .2 All cabling, wiring, conduits, cable trays, etc. passing through rated fire separations shall be smoke and fire stopped to a ULC or cUL tested assembly system, in accordance with CAN4-S115-95, that meets the requirements of the Building code in effect.
- .3 The scope includes new services which pass through existing rated separations and also all existing services which pass through a new rated separation or existing separations whose rating has been upgraded.
- .4 Fire resistance rating of installed firestopping assembly shall not be less than fire resistance rating of surrounding assembly indicated on Architectural drawings. Where this is not indicated assume a minimum of one hour for walls and two hours for floors.
- .5 Install firestopping and smoke seal material and components in accordance with ULC certification and manufacturer's instructions. The Applicator shall be approved, licensed and supervised by the manufacturer in the installation of firestopping and are to follow the requirements of a rated system as detailed above.
- .6 Contractors are expected to submit system information detailing firestopping product, backing, penetration, penetrated assembly, fire and temperature rating, and ULC or cUL system number.

- .7 Provide fire stopping material and system information in the maintenance manuals and via labels at major penetrations that are likely to be re-penetrated.
- .8 Allow openings for 100% capacity of raceway.
- .9 Provide split systems where existing cables are involved.

3.16 SERVICE PENETRATIONS IN NON-RATED SEPARATIONS

- .1 Provide metal sleeves for all cabling, wiring, conduits, cable trays, etc. passing through non-rated fire separations and non-rated walls and floors shall be tightly fitted and sealed on both sides of the separation with caulking or silicon sealant to prevent the passage of smoke and/or transmission of sound.

3.17 CONDUIT SLEEVES

- .1 Provide conduit sleeves for all conduit and wiring passing through rated and non-rated walls and floors. Sleeves shall be concentric with conduit or wiring.
- .2 Except as otherwise noted conduit sleeves are not required for holes formed or cored in interior concrete walls or floors.
- .3 Conduit sleeves shall extend 50 mm above floors in unfinished areas and wet areas and 6 mm above floors in finished areas.
- .4 Conduit sleeves shall extend 25 mm on each side of walls in unfinished areas and 6 mm in finished areas.
- .5 Conduit sleeves shall extend 25mm beyond exterior face of building. Caulk with flexible caulking compound.
- .6 Sleeve Size: 12 mm clearance all around, between sleeve and conduit or wiring.
- .7 Paint exterior surfaces of ferrous sleeves with heavy application of rust inhibiting primer.
- .8 Packing of Sleeves:
 - .1 Where sleeves pass through foundation walls and perimeter walls the space between sleeve and conduit shall be caulked with waterproof fire retardant non-hardening mastic.
 - .2 Pack future-use sleeves with mineral wool insulation and then seal with ULC approved fire stop sealant for rated fire separations.

3.18 EQUIPMENT INSTALLATION

- .1 Provide means of access for servicing equipment.
- .2 CSA identification and equipment labels to be clearly visible after installation.

3.19 CUTTING, PATCHING, DIGGING, CANNING, CORING & CONCRETE

- .1 Lay out all cutting, patching, digging, canning and coring required to accommodate the electrical services. Coordinate with other Divisions. The performance of actual cutting, patching, digging, canning and coring is specified under other Divisions.
- .2 Be responsible for correct location and sizing of all openings required under Electrical Divisions, including piped sleeves.
- .3 Openings through structural members of the building shall not be made without the approval of the Departmental Representative.
- .4 Openings in Concrete:
 - .1 Be responsible for the layout of all openings in concrete, where openings are not left ready under previous contract.
 - .2 All openings shall be core drilled or diamond saw cut.
 - .3 Refer to structural drawings for permissible locations of openings and permissible opening sizes in concrete floors and walls.
 - .4 Refer to structural drawings for locations of steel reinforcing.
 - .5 Be responsible for repairing any damage to steel reinforcing.
- .5 Openings in building surfaces other than concrete:
 - .1 Lay out all openings required.
- .6 Poured concrete for duct encasements, pole bases, transformer pads and housekeeping pads shall be provided by other Divisions, coordinated and supervised by the Electrical Divisions.
- .7 Precast concrete items such as transformer pad bases and light pole bases to be provided and installed by the Electrical Divisions unless otherwise specified.
- .8 Excavation and backfilling will be provided by other Divisions. This division to supervise the work and provide all layouts and parameters.

3.20 PAINTING

- .1 Clean exposed bare metal surfaces supplied under the Electrical Divisions removing all dirt, dust, grease and mill scale. Apply at least one coat of corrosion resistant primer paint to all supports and equipment fabricated from ferrous metal.
- .2 Paint all hangers and exposed sleeves, in exposed areas, with a rust inhibiting primer, as they are installed.
- .3 Repaint all marred factory finished equipment supplied under the Electrical Divisions, to match the original factory finish.
- .4 Coordinate with Division 09.
- .5 Finish painting of all equipment and materials, supplied under the Electrical Divisions, installed in Electrical Rooms of the building or exposed outside the building, is included under Division 09 of the Specification.

END OF SECTION



1 General

1.1 EXISTING IP CCTV SYSTEM

- .1 The existing IP CCTV System consists of the following:
 - .1 "Genetec" Version 4.8 operating System.
 - .2 Virtual server/storage; "Pivot3 vSTAC" storage appliances located in CER.
 - .3 Various Network User Stations (NVUS) located throughout Institution.
 - .4 "Planet Layer 3" Network Switches.
 - .5 "Planet" POE Injectors.

1.2 SCOPE OF WORK

- .1 Work under this contract includes but is not limited to:
 - .1 Provide new IP CCTV cameras and relocate existing cameras as indicated on the drawings and specifications.
 - .2 Provide Category 6, UTP Cables from existing patch panel(s) in the building(s) to new IP CCTV Cameras as indicated.
 - .3 Provide all on-site programming of the existing "Genetec" operating system to incorporate the new IP CCTV cameras onto the existing NVR's and NVUS's as directed by Departmental Representative.
 - .4 Provide all testing, aiming and adjustments to the new IP CCTV Cameras.
 - .5 Provide before and after screen shots of any moved or new cameras for approval
 - .6 Provide new "Genetec" camera licence (Om-E-1C) and failover licence (Om-E-FO) for new CCTV Cameras and install licenses on existing server
 - .7 Submit all camera test reports, Maintenance Handover Report.
 - .8 Provide test reports for all new Category 6, UTP Cabling.
 - .9 Provide new Category 6, UTP Patch Cables at Camera location, POE Injector, and Network Switch as indicated.

1.3 CONTRACTOR QUALIFICATIONS

- .1 The contractor and all personnel performing any work related to this Section shall be a Genetec certified vendor and have successfully completed Omnicast 4.8 certification process. Certificate to be provided with bid package.
- .2 The contractor and all personnel performing any work related to this Section shall have successfully completed all training and received certification for "Pivot3, Vstac" Network Video Recorder equipment. Certificate to be provided with bid package.
- .3 Failure to meet or provide such documentation will be the basis for rejection of sub-contractor proposed for work under this section.

1.4 STANDARDS AND CODES

- .1 TIA/EIA, 568-D series standards – Commercial Building Telecommunications Standards.
- .2 NECA/BICSI 568-2006 – Standards for Installing Commercial Building Telecommunications Cabling.
- .3 IEC EN 60950-1; EN 61000-4-3; EN 60529 IP66; EN 62262 IK10
- .4 Canadian Electrical Code including all BC amendments and bulletins.

1.5 SHOP DRAWINGS

- .1 Submit shop drawings in accordance with Section 01 01 50 – General Instructions.

1.6 WASTE MANAGEMENT AND DISPOSAL

- .1 Separate and recycle waste materials in accordance with Section 01 01 50 – General Instructions.

2 Products

2.1 IP CAMERA Dome

- .1 Compatible with existing “Genetec”, Version 4.8 operating System.
- .2 Dome camera shall meet the following requirements;
 - .1 IK-10 and IP66 rated Impact resistant casing with polycarbonate hard coated dome, aluminum base and dehumidifying membrane.
 - .2 Lens shall be Varifocal, 3–10mm, F1.4 with a Horizontal field of view: 90°–34° and a Vertical field of view: 50°–20°.
 - .3 Capable of continuous operation; start and operate from -40 Deg. To 55 Deg. C
 - .4 Mean Time Between Failures (MTBF) of at least 25,000 hours
 - .5 Meet safety standard IEC 60950-1 or CSA C22.2
 - .10 Adjustable gimble rotation: Pan: +- 180 Tilt: -20 to 80 Rotation: +- 90.
 - .11 True automatic day/night camera with automatically removable IR cut filter

- .12 Digital wide dynamic range
- .13 Acceptable model: AXIS 3375-VE with conduit base or equivalent
- .14 Low light capability Color: 0.15lux, B/W: 0.03lux
- .15 Power-over-Ethernet (IEEE 802.3af)
- .16 Streaming: H.264 Baseline, with multiple configurable streams in H.264 and Motion JPEG
- .17 Must interface over IPV4 TCP/IP; be able to operate on 100Base-TX (IEEE 802.3u); connect using an RJ45 connector and be ONVIF compliant
- .18 Camera model must be identified as "Certified" or "Supported by Design" in the Genetec Omnicast Supported Hardware camera list
- .19 Must retain its configuration over a power cycle
- .20 Automatic or remote back focus
- .21 Automatic Gain Control (AGC)
- .22 Camera case and dome must have threaded openings for conduits; a threaded plug to seal all unused openings; set screws to secure all conduit and plugs from inside the dome; tamper resistant heads on all externally accessible screws; permanently affixed label on the interior and exterior of the unit which identifies the manufacturer, the model or assembly number, the serial number and the power requirement.

2.2 CATEGORY 6 UTP CABLE

- .1 Four (4) pair, unshielded twisted, solid copper core, 100 ohm, 24 AWG, Category 6, FT4 rated for two (2) new CCTV Cameras.
- .2 Green color outer jacket.

2.3 Transmission requirements shall conform to or exceed all applicable section of the TIA/EIA 5668-B current specifications and addendums for Category 6 cable and components. **CATEGORY 6 UTP CABLE CONNECTORS**

- .1 8P/8W, Female, RJ45, Category 6 punch down jack at Camera. Category 6 patch panel at head end.
- .2 Suitable for 24 AWG, solid copper wire.

- .3 Meet or exceed technical criteria outlined in TIA/EIA 568, "Transmission Performance Specifications for 4-Pair, 100 ohm, Category 6 Cabling.
- .4 Cables shall be wired straight through, no crossover is allowed. Pin 1 at one end is connected to Pin 1 at the other end of the cable.
- .5 All cable supports shall be velcro. No 'zap straps' are permitted anywhere on the run

2.4 CATEGORY 6 UTP PATCH CORDS

- .1 Four (4) pair, unshielded twisted, stranded copper core, 100 ohm, 24 AWG, Category 6.
- .2 Green color outer jacket. Length as required, factory molded ends, no site crimping is permitted.
- .3 Transmission requirements shall conform to or exceed all applicable section of the TIA/EIA 568-B current specifications and addendums for Category 6 cable and components.

2.5 CABLE LABELS

- .1 Bold face laser quality printed labels, black print on white background. No hand written labels will be accepted.
- .2 Self adhesive, one piece label and clear cover wrapped around cable.
- .3 Wording on labels to be approved by Departmental Representative prior to manufacture.

3 Execution

3.1 INSTALLATION OF CCTV CAMERA

- .1 Install cameras as indicated.
- .2 Adjust Field-of-View and focus camera as directed by Departmental Representative.
- .3 Caulk neatly around the conduits, junction boxes and entire camera enclosure between walls and ceiling with security caulking.
- .4 All Camera views of effected cameras to be captured prior to editing or moving. New camera views to be approved by Departmental Representative

3.2 INSTALLATION OF CATEGORY 6 UTP CABLING

- .1 Supply & install new Category 6, UTP cable to new camera in conduit as indicated.
- .2 Terminate all new Category 6, UTP cables on existing Patch Panels as indicated.
- .3 Label both ends of all Category 6, UTP Cables indicating Camera I.D. and location. Wording on labels to be approved by Departmental Representative prior to manufacture.
- .4 Provide 3 m of slack cable at Patch Panel end of cable. Neatly coil slack cable to side of existing CCTV Cabinet.

3.3 INSTALLATION OF CATEGORY 6 UTP PATCH CORDS

- .1 Supply & Install one new Category 6 UTP Patch Cord for new Camera as follows:
 - .1 From existing Patch Panel to existing POE Injector.
 - .2 From existing POE Injector to existing POE Switch.
 - .3 From camera to female jack at Camera.

3.4 CATEGORY 6 UTP CABLE TESTING

- .1 Test all cables with a CAT6 certification analyzer that comply with all TIA/ISO standards.
- .2 No marginal passes or conditional passes will be accepted on these cables.
- .3 Replace entire length of cable for any cables that do not pass tests outlined in the specification.
- .4 Provide electronic and paper copy of all test results for incorporation into Maintenance Manuals specified in Section 01 01 50 – General Instructions.

3.5 PROGRAMMING CAMERA INTO THE EXISTING CCTV SYSTEM

- .1 Contractor shall program camera into the existing “Genetec” operating system as required to incorporate new and existing cameras into the system as directed by Departmental Representative.
- .2 Camera shall be recorded on existing “Pivot3 vSTAC” Virtual server/storage array.
- .3 Contractor shall program the existing “Genetec” operating system for viewing on existing Network Video User Stations as directed by Departmental Representative.

- .4 All programming to the existing system shall be carried out by personnel who have successfully completed all training and received necessary certification from "Genetec".
- .5 Camera licenses to be included and updated on existing server by Contractor, both enterprise "connection" and "failover" licenses are required for each new camera.

3.6 MAINTENANCE HANDOVER REPORT

- .1 Submit a Maintenance Handover Report as per Appendix 'A' of these Specifications.
- .2 Maintenance Handover Report to be completed in its entirety. Complete project information, Warranty Details, Distribution Details and Training Details.
- .3 Include a list of all equipment itemizing the locations, quantity, model number, serial number and latest revision level of all installed equipment.
- .4 Attach "Genetec" licence for new cameras to Maintenance Handover Report.
- .5 Insert copy of Maintenance Handover Report in each copy of Maintenance Manuals.
- .6 Provide Electronic Copy of Maintenance Handover Report in Microsoft Word format.

END OF SECTION

CORRECTIONAL SERVICE OF CANADA
TECHNICAL SERVICES BRANCH
ELECTRONICS SYSTEMS
MAINTENANCE HANDOVER REPORT

INSTITUTION:**DATE:****SYSTEM/EQUIPMENT:****APPLICABLE CONTRACT NO:**

PWGSC PROJECT NO:

SPECIFICATIONS:

EQUIPMENT SUPPLIER (NAME AND ADDRESS):**SUPPLIER CONTACT (NAME AND TELEPHONE):****WARRANTY DETAILS:**

Expiry date on materials/parts:

Expiry date on installation:

Expiry date on factory labour:

Travel & living expenses during the warranty period:

chargeable to CSC not chargeable to CSC

Equipment transportation costs are paid by CSC for:

sending to the supplier returning from the supplier

Negotiated rates for emergency repairs at site due to misuse/abuse during warranty period are as follows:

Not applicable.

Negotiated rates for labour at site after warranty period are as follows:

Not applicable.

DEFICIENCIES:

None remain

List attached

DOCUMENTATION:

Maintenance manual:

Supplied

Due by ;

As-built drawings, cabling and wiring diagrams:

Supplied

Due by ;

Acceptance test results:

Supplied

Due by ;

DISTRIBUTION OF DOCUMENTATION:

1 copy to CESM sent on:

1 copy to RATIS/RTEO sent on:

2 copies to institution sent on:

SPARES:

All delivered

Delivery to be completed by ;

EQUIPMENT LIST:

See attached list.

MAINTENANCE TRAINING:

Completed

Scheduled for ;

SIGNATURE: Project Manager

DISTRIBUTION: CESM, NHQ
RATIS/RTEO, RHQ