

## **Part 1 General**

### 1.1 Objective

- 1.1.1 This document identifies the design and specification requirements for a complete and functional Electronic Safety and Security (ESS) system to be performed for Toronto Metropolitan University (TMU). The Electronic Safety and Security as specified herein will support the access control, intrusion detection, video surveillance and electronic personal protection systems structured wiring connectivity.
- 1.1.2 It shall be mandatory that these standards and specifications, for communications infrastructure related work on the University campus, are adhered to stringently by all Toronto Metropolitan University staff and external contractors.
- 1.1.3 All work associated with these specifications shall comply with the Canadian Electrical Code (part 1), Ontario Electrical Safety Code (OESC) and the Ontario Building Code.
- 1.1.4 Wiring standards are dynamic and constantly changing due to continually evolving networking standards. Computing and Communication Services (CCS) holds the responsibility for approving changes to these specifications and all parties shall be responsible for acquiring the latest approved copy of these standards for use on any project.
- 1.1.5 These standards cover the basic requirements for all projects in new and existing buildings.
- 1.1.6 The department, Communications Services of CCS, Computing and Communications Services is responsible for the communications infrastructure at the University. CCS in consultation with building occupants are to be involved in the design process.
- 1.1.7 Toronto Metropolitan University appointed designates shall be consulted during the design and construction phases, and must approve all the designs prior to the construction phase. CCS is to be consulted as questions arise during the construction phase.

### 1.2 General Intent

- 1.2.1 The general intent of this document is to provide the architect, interior designer, engineers, Registered Communications Distribution Designer (RCDD) and Communications Contractor the tools necessary to ensure that all Toronto Metropolitan University standard telecommunications requirements are met were it relates to Electronic safety and Security.
- 1.2.2 Toronto Metropolitan University reserves the right to modify these requirements based on the needs of a particular project, however, the requirements outlined in this document shall represent the initial design requirements for any new project unless advised otherwise by Toronto Metropolitan University.
- 1.2.3 Where the architect, interior designer, corporate real estate or engineer wish to deviate from the Toronto Metropolitan University Communications Design Standards prior written approval shall be obtained from Toronto Metropolitan University.

### 1.3 Design Architecture

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- 1.3.1 Electronic Safety and Security (ESS) involves proprietary wiring (except for IP devices). All ESS device cabling (except for IP devices) shall be routed from the device to the nearest Data Gathering Panel (DGP). All IP devices shall be routed from the device to the nearest telecommunications Room (TR).

1.4 Related Documents

- 1.4.1 The latest versions of the following codes, standards, and guidelines shall be followed. Bring to CCS' immediate attention where construction documents or conditions differ from requirements in codes, standards, guidelines and specifications.

- 1.4.2 The following division 28 specifications:

1. 28 05 00 Common Work Results for Electronic Safety and Security
2. 28 05 26 Grounding and Bonding for Electronic Safety and Security
3. 28 05 28 Pathways for Electronic Safety and Security
4. 28 05 53 Identification for Electronic Safety and Security
5. 28 06 00 Testing for Electronic Safety and Security
6. 28 13 00 Access Control
7. 28 16 00 Intrusion Detection
8. 28 23 00 Video Surveillance
9. 28 26 00 Electronic Personal Protection System

- 1.4.3 The following standards:

1. ANSI/TIA-568.0-E, Generic Telecommunications Cabling for Customer Premises
2. ANSI/TIA 568.1-E, Commercial Building Telecommunications Cabling Standard
3. ANSI/TIA-568.2-E, Balanced Twisted-Pair Telecommunications Cabling and Components Standards
4. ANSI/TIA -568.3-E, Optical Fiber Cabling Components Standard.
5. ANSI/TIA-568.4-E, Broadband Coaxial Cabling and Components Standard
6. TIA-569-E, Commercial Building Standard for Telecommunications Pathways and Spaces
7. BICSI-003 Information Technology Systems Design and Implementation Best Practices for Educational Institutions and Facilities
8. ANSI/BICSI 007-2020, Information Communication Technology Design and Implementation Practices for Intelligent Buildings and Premises

- 1.4.4 The following guidelines:

1. BICSI, Telecommunications Distribution Methods Manual (TDMM)
2. BICSI, Information Transport Systems Installation Methods Manual (ITSIMM)
3. BICSI, Electronic Safety and Security Design Reference Manual, 4th Edition

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- 1.4.5 The following project specifications:
1. 27 05 26 Grounding and Bonding for Communications
  2. 27 05 53 Identification for Communications Systems
  3. 27 08 10 Optical Fiber Testing and Measurement
  4. 27 08 20 Copper Testing
  5. 27 11 19 Communications Terminations Blocks and Patch Panels
  6. 27 13 23 Communications Optical Fiber Backbone Cabling
  7. 27 15 13 Communications Horizontal Copper Cable
  8. 27 15 43 Communications Faceplates and Modular Jacks
  9. 27 16 19 Communications Patch Cords, Station Cords, and Cross Connect Wire

1.5 Quality Assurance

- 1.5.1 The Communications Contractor shall install all equipment and material in accordance with the standards aforementioned in this section.
- 1.5.2 Quality and workmanship shall be at the highest of professional tradesman levels to be accepted for completion. The Communications Consultant shall have the sole right to reject any work not in accordance with industry standards.
- 1.5.3 All work shall also be performed in accordance with the latest BICSI installation standards and best practices.
- 1.5.4 Communications Contractors shall provide installers trained in all applicable codes, standards, regulations and installation standards as well as have structured cabling industry certification, such as BICSI or NCS.
- 1.5.5 All installers shall have successfully completed the approved manufacturer's installation training program .The Client reserves the right to receive written proof of such training at any time during the project. If such proof is not provided the Communications Contractor will remove the installer from the site immediately and replace the installer within 24 hours.
- 1.5.6 The maximum horizontal run length shall not exceed 90-meters for IP devices. If the 90 meter constraint cannot be met, the Communications Contractor shall notify the CCS immediately (prior to installation).

1.6 Work Results

1.6.1 Administrative Services

Contractor is required to provide test results and as-built documentation/record drawings prior to job acceptance.

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1.6.2 Grounding and Bonding for Electronic Safety and Security

1. Bonding conductors from the TMGB or TGB will be installed to all security equipment cabinets, equipment racks, raceway, cable ladder rack, cable tray, sleeves and conduits. Bond all TGBs to the TMGB.

2. Bond TMGB to building ground.

3. Final design and specifications for the Grounding and Bonding system shall be coordinated with the Electrical Engineer of Record.

1.6.3 Pathways for Electronic Safety and Security

1. VoIP Powered Devices

a. The primary horizontal cable support system shall be conduit to cable tray and or J hooks, installed parallel to column lines. Wall penetrations shall transition to properly firestopped sleeves, then back to cable tray and or J hooks.

b. Outlets having one single cable require a single gang box that routes to the cable tray via min.1" conduit with pull string. Unless noted otherwise on drawings.

c. Conduit runs may not be longer than 100ft or contain more than two 90 degree bends between pulling points, pull boxes or reverse bends without the use of a properly sized junction box.

d. Riser sleeves in ER/TR must be properly installed with bushings and firestop. Provide Shop Drawings of all core drilling locations for coordination with Architect and Owner prior to drilling.

e. All security conduits shall be provided with a measured pull tape.

2. Access Control Devices

a. The primary horizontal cable support system for Access Control devices shall be conduit. Wall penetrations shall be properly firestopped sleeves.

1.6.4 Identification for Electronic Safety and Security

1. All cable labeling will be compliant with TIA/EIA606 - Administration Standard for Commercial Telecommunications Infrastructure.

2. All labeling will comply with Owner administrative labeling scheme of cabling and its numerical positions on the termination hardware. Ensure compliance with Owner's preferred administrative labeling standards.

1.6.5 Electronic Safety and Security Equipment Room Fittings

1. Contractor shall provide each ER/TR with proper equipment installed per specifications and drawings.

1.6.6 Electronic Safety and Security Horizontal Cabling

1. Installed by Communications Contractor:

a. Security camera cables will consist of plenum rated, Category 6, 4 pair UTP copper cables terminated on 48 port, RJ45, Category 6, 568A patch panels in the ER/TRs. The maximum horizontal distance shall be 295 feet.

b. Access control cables will consist of plenum rated, 4C 22AWG 2pr. (Installed by Communications contractor, unless noted on drawings)

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c. Unless noted, provide proper plenum rated cabling for all Electronic Safety and Security equipment and devices- locations as detailed on the Security drawings.

2. Installed by Electrical Contractor:

a. Security camera power cables will consist of plenum rated stranded, 18AWG-2C, Low voltage cabling (depending on the distance) installed by Contractor). Unless noted on drawings, 16AWG-2C. High voltage cabling installed by Electrical Contractor.

1.6.7 Termination Hardware

1. All Electronic Safety and Security cabling shall terminate in proper enclosures, back boxes, electronic devices per drawing, specifications, and manufacturer standards.

1.6.8 Patch Cords, Station Cords, and X-Connect Wire

1. Contractor shall provide two (2) Category 6 patch cords per Security camera cable installed: 50% 5' length, 50% 3' length. (Provided by communications contractor)

## **Part 2 Product**

### 2.1 General

2.1.1 All equipment and products supplied shall be new and free of all manufacturer defects and delivery or installation damage.

2.1.2 All equipment and products supplied shall meet all manufacturer listed characteristics as identified in the latest manufacturer catalogue.

2.1.3 All products shall meet all applicable codes and standards and bare the UL/ULC label, be CSA approved and meet FCC/CRTC Regulations.

2.1.4 All products shall be provided in accordance with local, provincial and national fire ratings for the installation on this project.

2.1.5 The only acceptable Manufacturers for installed end to end structured cabling systems will be the following, unless otherwise specified in this document.

1. Panduit
2. Hubbell
3. Corning (fiber systems)

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4. Belden (for proprietary cabling only)

ESS Device	Cable Type	Quantity
Card Reader	82504/82444	1/1
Electric Strike	82740	1
Motion Detector (REX)	82444	2
Sonalert	82444	1
Door Contact	82444	1
Panic Button	82444	1
DGP Data Line	82723/82444	1/1
Elevator Card Reader	6506FE	1
RS-485	82841	1
Elevator Control Cable	82760	2

5. Provo (for proprietary cabling only)

ESS Device	Cable Type	Quantity
Card Reader	996808/999224	1/1
Electric Strike	999182	1
Motion Detector (REX)	999224	2
Sonalert	999224	1
Door Contact	999224	1
Panic Button	999224	1
DGP Data Line	992252/999224	1/1
Elevator Card Reader	996708	1
RS-485	995401	1
Elevator Control Cable	992234	2

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6. Tevelec (for proprietary cabling only) **Pending Campus Security Systems (CSS) approval**

ESS Device	Cable Type	Quantity
Card Reader	T12804/T15404	1/1
Electric Strike	T15452	1
Motion Detector (REX)	T15404	2
Sonalert	T15404	1
Door Contact	T15404	1
Panic Button	T15404	1
DGP Data Line	T13401/T15404	1/1
Elevator Card Reader	T17604	1
RS-485	to be determined	1
Elevator Control Cable	to be determined	2

- 2.1.6 STRUCTURED CABLING INFRASTRUCTURE: The ESS System installers shall adhere to all Division 27 specifications for all requirements of structured cabling components to be used as part of the ESS system. The structured cabling components include but are not limited to:
1. All unshielded twisted pair Category cables and fiber optic cables
  2. Termination devices like termination jacks, patch panels and faceplates.
  3. All UTP and fiber optics patch cords.
  4. Proprietary Cabling
  5. All testing procedures for Category and fiber optic cables.
- 2.1.7 All networking equipment required for the ESS System shall be provided by the owner unless otherwise noted in the design documents.

### Part 3 Execution

#### 3.1 General

- 3.1.1 The Communications Contractor shall supply all materials, labour, tools and equipment to provide a complete warranted installation as outlined in the contract documents and

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suitable to the approval of the Client, Communications Consultant and inspection bodies having jurisdiction.

- 3.1.2 The Communications Contractor shall be responsible for installing and providing pulling strings, ropes and fishing walls wherever conduit is not installed or conduit is installed without these provisions.
  - 3.1.3 Provide continuity of all existing services while completing the specified installation. Losses due to interruption of services will be the responsibility of the Communications Contractor.
  - 3.1.4 Arrange for all shutdowns (1) week prior in writing with the Project Manager and those in control of services shall be disrupted. All overtime costs, fees, security and other requirements shall be the full responsibility of the Communications Contractor.
  - 3.1.5 Should services be interrupted accidentally the Communications Contractor shall provide material and labour to re-establish services immediately and shall continue without stoppage until all services have been re-established. All material and labour costs including overtime shall be borne solely by the Communications Contractor. Any material and/or labour costs including overtime associated with other trades and/or the General Contractor to assist in any way the Communications Contractor in re-establishing services shall be borne solely by the Communications Contractor.
- 3.2 Labour
- 3.2.1 The Communications Contractor shall provide only skilled, trained tradesmen experienced in the installation of a certified installation. Sub-contractors, if used, must be approved by the Client before the commencement of the project.
- 3.3 Installation
- 3.3.1 Adequate space and provisions shall be left for removal of components and servicing of equipment, with minimum inconvenience to the operation of systems.
  - 3.3.2 Communications Cabling shall not touch or be supported from piping, ductwork, conduits, ceiling supports or any other service / equipment. Communications Cabling shall be supported by approved j-hooks, cable slings, ladder / basket tray and/or conduit as outlined in this document.
- 3.4 Quality Control
- 3.4.1 All CAT5E/CAT6/6A cabling links in the ESS installation shall be tested for the following, in accordance with the field test specifications defined in ANSI/TIA-568-C.2 "Commercial Balanced Twisted-Pair Telecommunications Cabling and Components Standard".
  - 3.4.2 All fiber optic cabling cabling links in the ESS installation shall be tested for the following, in accordance with the field test specifications defined in ANSI/TIA-568-C.0 "Generic Telecommunications Cabling for Customer Premises"
- 3.5 Coordination
- 3.5.1 Work causing noise, dust and/or odour shall be performed during evenings and/or weekends to prevent disturbance to the operation of the Client's or surrounding businesses. Work shall be performed at agreed times and in coordination with each party. All damages caused for work performed not in compliance with this item shall be the responsibility of the Communications Contractor.



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- 3.5.2 Communications Contractor shall coordinate with Toronto Metropolitan University to ensure the protection of the active LAN Hardware from dust and debris.
- 3.6 Site Conditions
  - 3.6.1 The Communications Contractor is responsible for maintaining a clean work environment and is responsible for the removal of all debris on a daily basis. Debris and removed materials shall be disposed of in conformance with all local by laws and regulations. Failing to comply and after reasonable time and written notice the General Contractor reserves the right to hire cleaners to complete the cleaning and back charge the Communications Contractor.
  - 3.6.2 The Communications Contractor shall be responsible for the removal and reinstallation of all floor or ceiling tiles, hatch ways or access panels. All items shall be removed and replaced on a daily basis and left in the original condition. Special caution shall be taken to not break, chip or discolour with dirt or finger prints any such items. The Communications Contractor will be fully responsible for repair or replacement of all damaged pieces at the discretion of the Project Manager or Client.
  - 3.6.3 All materials and installation throughout the project will remain the responsibility of the Communications Contractor until final completion for the project is accepted by the Client. Damages to any item installed shall be replaced or repaired by the Communications Contractor to provide a complete final installation at no additional cost to the Client.
- 3.7 Safety
  - 3.7.1 The Communications Contractor shall adhere to all safety laws, rules and regulations issued by the authorities having jurisdiction, General Contractor, Project Manager and the Client.
  - 3.7.2 At all times maintain clear fire exits, emergency routes and access to emergency equipment including fire hose cabinets, fire extinguishers and stand pipe connections.
  - 3.7.3 Smoking and combustion of any materials is strictly prohibited on all sites.
  - 3.7.4 Provide protection as required by the authorities having jurisdiction to all employees for work performed in typically inaccessible or concealed spaces.
- 3.8 Site Adjustments
  - 3.8.1 Locations or all equipment, outlets or devices prior to installation may be revised to within (3) meters without any additional cost or change request.
  - 3.8.2 Portions of the project may be at any time identified in writing to be "On Hold". Work in these areas shall not be started, continued or completed until further direction is received. No additional cost shall be accepted by the Client for areas put on hold.
- 3.9 Substitutions
  - 3.9.1 Substitution of any product shall be prior approved in writing by only TMU CCS and the Communications Consultant.
  - 3.9.2 The procedure for substitution approval will include the written submission by the Communications Contractor including the following:
    - .1 Original specified product

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- .2 Proposed product being substituted
  - .3 Reason for substitution
  - .4 Shop drawings indicating all technical specifications
  - .5 Financial advantage
  - .6 Schedule delivery date
  - .7 Written approval from certifying system manufacturer
- 3.9.3 Based on the review of the information requested above, the Client and/or Communications Consultant reserve the right to reject any proposed substitution without delay or cost to the project or the Client.
- 3.10 Material Handling
- 3.10.1 The Communications Contractor is responsible for the delivery of all materials to site and transportation to the work place in accordance with all safety regulations and procedures.
  - 3.10.2 Make arrangements and schedule all hoisting with Building Management and the General Contractor.
  - 3.10.3 Provide and be responsible for lockable storage for all tools and material required to complete the installation through the duration of the project. Once the project is complete remove all tools and excess materials within 2 business days.
  - 3.10.4 The Client and its representatives shall in no way be held liable for any missing material, equipment or tools required to complete the installation.
- 3.11 Cutting, Patching and Repairing
- 3.11.1 It is the responsibility of the Communications Contractor to perform all cutting, patching and repair related to the Communications Cabling work including any penetrations through walls or floors.
- 3.12 Firestopping
- 3.12.1 The Communications Contractor is required to properly fire-stop any penetrations through fire barriers utilized for the placement of telecom cabling. Provide fire resistant intumescent materials to restore fire ratings to wall, floor, or ceiling penetrations according to local, provincial and national codes.
  - 3.12.2 Fire stop systems shall meet the requirements of ULC Standard CAN/ULC-S115.
- 3.13 Hoisting Facilities
- 3.13.1 This Division shall provide its own hoisting facilities regardless of height required to perform work.
  - 3.13.2 Hoisting facilities may be provided by the General Contractor, although the General Contractor may at its own discretion not allow the Communications Contractor to make use of such.

End of Section 28 05 00