Building Standards   Version 4   Section 27 15 00

 Note to the Designer/Architect/Engineer/Installer: These Specifications are basic *minimum criteria to be met in preparing the final project specifications for this section, which is the responsibility of the Designer*

York University Building Standards

Prepared by:	Reviewed by:	Authorized by:
Tracy Wechsler	Mike Daigle	Ramon Kagan,
Project Administrator	Manager, Network Operations.	Director Operational
UIT- Infrastructure Planning	UIT- Network Operations	Excellence,
Administration		UIT Project Management Office.

1.0. GENERAL

.1   All UIT Standards are based on BICSI Industry Standards.

1.1 Overview

.1   Communication/Cabling Contractors are responsible for labeling all terminations in accordance with UIT-Infrastructure Standards. Any deviations will be corrected at the Contractors' expense.

.2   The General or Communication/Cabling Contractor will be responsible for informing UIT-Project Coordinator of any company being sub-contracted as part of the project and the names of the technicians on site. It is preferable to leverage UIT's vendor of record as the Cabling Contractor.

.3   The General or Communication/Cabling Contractor will be responsible for the coordination of furring, patching, fire stopping and labelling as required for the completion of work.

.4   The General or Communication/Cabling Contractor will secure all Communication Rooms and areas they are working in when vacating the space for any length of time, or at the end of the workday.

.5   The General and Communication/Cabling Contractor is responsible for maintaining a clean work environment and ensuring any materials being used do not obstruct any traffic paths.

.6   The General or Communication/Cabling Contractor is responsible for clearing all dust and debris from the Communication Rooms and workspaces.

.7   The General or Communication/Cabling Contractor is responsible for the protection of any installed or operating equipment during construction. This includes measures to control dust, heat/cooling of the environment to acceptable operating temperatures, and physical security of equipment on the work site. This also includes maintaining stable electrical power service to operating equipment.

.8   The General Contractor and Communication/Cabling Contractor are responsible for ensuring all sub-contractors are adhering to all Health and Safety Codes, UIT Standards and York University Standards.

.9   Any overtime that results in additional costs to York University must be approved by UIT-Project Coordinator prior to work commencing.

1.2 Horizontal Cables

.1   All horizontal cables feed directly from a Communication Room to a faceplate or termination box for termination. No intermediate splices or junctions are permitted.

.2   All horizontal cables must be less than 90 meters in length (from network switch port to termination jack).

1.3 Cable Terminations

.1   Faceplate or termination boxes must be used to house horizontal jack terminations in work areas. No jack termination should be without a housing.

.2   Horizontal terminations must be labelled with a wraparound label on the cable and a faceplate/box label on the jack. Wrap around labels must be printed in minimum 10pt Ariel font, the cable identification should be completely on one line and repeated on multiple lines to optimize visibility on the round cable. Handwritten labels are not acceptable.

.3   Termination jacks must be of the same category rating as the cable being terminated.

.4   RJ45 male cable end terminations rated at CAT5E or better are acceptable for terminations for applications such as AP's or cameras. These do not require a housing. Belden REV connect terminations are one example. The cable must have a wraparound label within 15 cm of the cable end.

1.4 Communications Room Terminations – Patch panels

.1   Cable numbers are assigned by UIT starting at 01-01 and correspond to the termination location on the patch panel. Always use UIT provided numbers for reference to horizontal cable numbers.

.2   Horizontal cables entering the communications room must be bundled into the cable manager from the top of the equipment rack. Each switch rack can accommodate up to 384 cables. Cables are broken out into up to 8 bundles of 48 for each patch panel and terminated to the patch panel in sequential order.

.3   Cable bundles of 48 must have a service loop of at least 2 m separated from the main trunk of cable and must be gathered to one side of the

patch panel to allow the patch panel to fold out for servicing. All horizontal cables for even numbered patch panels should gather to the left of the patch panel, and all horizontal cables for odd numbered patch panels should gather to the right of the patch panel. Left and right are visualized from the front of rack.

.4   Each horizontal cable must be labelled with a wraparound label before termination. Patch panel ports must be labelled from the front side.

.5   All horizontal cables in the work area are to be terminated in patch panels regardless of the intended service type. Horizontal cable numbers correspond to the patch panel number and jack number on which they terminate in the format "PP-NN" (where PP is the patch panel number, NN is the jack number)

.6   Spacing of patch panels in a rack is laid out in the rack template spreadsheet *Patch Panel Rack Template.xls*. Use the most current version available. Patch panels must be clearly labelled with incrementing 2 digit numbers from the top to bottom starting at 01. Patch panel ports must be clearly labelled. Starting at 01 and in a sequence corresponding with the switch port layout typically with odd numbers on top, even on the bottom. Customized layouts may be provided for some projects.

.7   Patch cords should be customized lengths that connect sequential switch ports to sequential horizontal cables on a 1 to 1 basis. Non-network horizontal cables should not be patched to the switch port, the corresponding switch port should be left empty. Patch cords must be routed from the switch port, via the vertical cable management trough (VCM) to the corresponding patch panel location with a slack loop of approximately 30cm. Typically a 7' patch cord will fit for 1 to 1 patching. All patch cords from switch to patch panel go through the left VCM for even numbered patch panels, and through the right VCM for odd numbered patch panels. Left and right are visualized from the front of rack.

.8   Longer patch cords are used to route special services to aggregation switch ports or other services. A pigtail cable is used to route analog services from the copper punch down block to the patch panel horizontal cable jack.

.9   All patch cords must be labelled at both ends with the unique horizontal cable identifier in the PP-NN format. Wrap around labels should be place 15cm (6") from either end of the patch cord. Wrap around labels should be printed in multi line repeating format to avoid twisting the cable to find the text.

1.5   Communications Room Terminations – MDF (existing buildings only)

.1   Cable numbers are assigned by UIT on the architectural drawings starting at 0001. Always use 4-digit numbers for reference to horizontal cable numbers.

.2   Horizontal cables entering the communications room must be routed to the back of the MDF bump-out wall and must be terminated on the back of the horizontal MDF field in sequential order.

.3   Each horizontal cable must be labelled with a wraparound label before termination. The front of the MDF must be labelled with blue designation strips.

1.6   Pathways

.1   Pathways consist of bundles of one or more cables running from the communication room along cable trays, J-hooks or conduits through the building space to deliver communication services to all required work areas.

.2   All new pathway locations must be cleared with the building owner (or contractor) and UIT-Project Coordinator. All pathways must provide a path that is less than 90 meters to the work area (from network switch port to termination jack).

.3   Work area cables will preferably be dropped through an interior wall utilizing dedicated conduits or pathways and terminating at an information outlet/faceplate.

.4   Adhere to fire stopping regulations for pathways as required by fire codes and building codes.

.5   Pathways must be kept clear of any materials or other equipment.

.6   Pathways must be accessible after construction is completed to allow maintenance and addition of new cables.

.7   Pathways will be routed to avoid electrical interference.

.8   All major cable pathways must be documented on architectural floor plans.

1.7   Conduit

.1   All conduit installations should be designed and built with a post-construction maximum fill of 50%.

.2   No section of conduit should be longer than 30 meters or contain more than two 90-degree bends.

.3   A pull or splice box should be provided if there are more than two 90-degree bends, a reverse bend in the run or the length is over 30 meters.

.4   Conduits should terminate in a separate electrical box or equivalent and should not be incorporated with any electrical faceplates.

.5   A pull cord of suitable size and construction will be installed in the conduit run and made to run freely through the pathway.

.6   The pull cord will be secured to an accessible anchor point at both ends.

.7   Pull cords must be installed regardless of whether there is cable pulled in the conduit or not.

.8   To ensure 40% conduit fill maximums are adhered to, all cabling will follow calculations provided by Belden's "Conduit Capacity Calculator" available at: https://tools.belden.com/conduit-capacity-calculator/

1.8   Ceilings

.1   During the design phase, UIT-Project Coordinator should be consulted to discuss the type of ceiling and materials that will be installed in all spaces. The type of materials does affect the wiring infrastructure.

.2   Obstructing access to cables trays, J-hooks, AV equipment or Wireless Access Points must be avoided.

.3.1   Hard Ceilings

.1   Access hatches must be incorporated into solid-ceiling designs.

.2   Access hatches to spaces above the ceiling must be placed at least every five meters.

.3   Cable pathways through hard-ceiling areas may be constructed utilizing zoned-conduit runs accessible at common-distribution points.

.3.2   Ceiling Tiles

.1   If installing a removable ceiling (tiles), J-hooks should be placed every two meters for cable pathways.

.2   Pathways will be installed with a minimum of 7.6 cm of clear vertical space above the ceiling tiles to ensure accessibility and adequate clearance for pulling additional cables. Cases where this clearance is not available, should be treated as hard-ceiling spaces.

.3.3   Open Ceiling

.1   For open mechanical ceilings, cable trays are required.

.2   There should be a minimum of 30 cm of vertical space above the tray.

.3   All applicable codes will be followed for the installation of cable trays.

.4   Cable trays must be installed in accessible areas to facilitate maintenance and the addition of post construction cables. A minimum of 46 cm service clearance should exist on at least one side of the pathway.

.5   Cable trays should be placed in hallways and public areas as much as possible and avoid being routed through office space, classrooms or other occupied spaces while maintaining shortest possible path to the communications room.

.6   Communications cable tray must not be shared by any other service cable, especially power cables due to EMF interference.

.7   Cable trays should be routed to avoid proximity to power cables and lighting fixtures as much as possible to minimize EMF interference.

.8   All metallic cable tray must be grounded but can be used as a grounding conductor itself. Grounding and bonding must follow all applicable electrical codes.

.9   All cable trays designs must be reviewed and approved by UIT ICTI prior to construction.

1.9   Drawings

.1   Drawings indicate the location of the cable terminations using the appropriate communications symbols. If there is a conflict on site, then the

Contractor will contact the UIT-Project Coordinator for verification prior to proceeding with cable installations.

.2   The horizontal termination points that are fed from each Communication Room will be defined per-floor on each drawing by UIT.

.3   Cable numbering assignments will be defined on each drawing by UIT and will be provided to the Contractor to follow during installation, termination and labeling.

.4   Contractors will install all cabling infrastructure per the drawings provided and will not omit or add any cables unless first reviewed and approved by the UIT-Project Coordinator.

2.0.   PRODUCTS

2.1.   Cable Trays

.1   All cable trays will be a minimum of 45.72 cm (18 inch) wide in areas near data closets where cable capacity is at maximum. Smaller trays may be used for distant pathways where cable counts are demonstrated to be lower than 48 CAT5E cables. Raceway sizing and installation shall be made based on manufacturer recommendations and post construction cable count capacity. Cable tray capacity must be less than 40% full as determined by the static load capacity of the tray and length of the support span at the completion of construction.

.2   Most manufacturers recommend support every 5 feet.(1.52 m) Follow all manufacturers recommended installation details. Curved sections and transition pans should be used to avoid sharp bends in any cable tray transitions. Manufacturer's supplied joiners, hangers, brackets, and clips should be used for all installations.

.3   Recommended standard for cable trays for horizontal pathways outside of the Communication Room are;

    a. Homaco TRC-512 and associated hardware.

    b. Canadian Electrical Raceways product CR1.5-18-09-BLK and associated hardware.

    c. an equivalent cable tray approved by UIT ICTI.

    Sizes and colours may be changed to suit the architecture.

2.2.   Voice and Data Cables

.1   Indoor voice and data cabling will be CAT6A for all new build as specified below. Determination of the appropriate standard will be confirmed with UIT for all existing builds. Specifications of cables are as follows:

a. Belden 10GXW13 Category 6A UTP, CMR-rated or CMP-rated as required by code, colour white. Associated jacks, connectors, patch panels and faceplates shall be Category 6A, manufactured by Belden - 10GX series.
    i.   10GXS13 White - 10GXW (0.250") Category 6A Cable, 4 Pair, U/UTP, CMP Nonbonded Pair
    ii. RVAPPF2U48WH 10GX REVCONN PTCH PANEL-LOADED48 PORT 2UWHITE
    iii. CA21109007 - 10GX Modular Cords White 7 Foot Patch Cord
    iv. CA21109010 - 10GX Modular Cords White 10 Foot Patch Cord

b. Belden/NORDX CAT 6, 4 pair, 2400 service plenum rated cables. Based on minimum EIA/TIA-568 Category 6 Performance level. Colour Blue. Used for existing builds prior to 2018 standards update.

.2   Other locations may require gel-filled outdoor cables and/or armored cables. These exceptions will be specified in detail within the planning documents.

2.3.   Patch Cables

.1   All work-area patch cables will be 3 meters long (10'), Belden CAT6A 10GX series, colour white or Belden/NORDX CAT6, 4 pair, 2400 service, Colour Blue to match the installed horizontal cables.

.2   Typical communications room patch panel cables will be 2.1 meter long (7') Belden CAT6A 10GX series, colour white. Custom lengths may be required for some patches.

3.0.   EXECUTION

.1   All materials purchased by the Contractor will be stored by the Contractor at their site or trailer.

.2   The Contractor will be responsible for the purchase of all materials for the project and for the delivery and inventory of all materials for the project unless otherwise agreed.

.3   All horizontal cables must be installed by a BELDEN certified installer and tested to meet Belden certification.

.4   In accordance with Belden Industry specification standards, at no time will network cables be painted. If this is done, the cables will be replaced at the Contractors' expense.

.5   If, during the cable's installation or testing stage, it is determined that they have been damaged, the Contractor will replace the cable, patch cord, pigtail or other wiring infrastructure-related material at the expense of the Contractor.

.6   Adhere to manufacturer-published specifications for pulling tension, minimum-bend radii and sidewall pressure when installing cables.

.7   Maximum length of cables shall not exceed 90 m (from network switch port to termination jack).

.8   The resultant cable installation shall be Belden certified and warranted.

.9   Cables shall be bundled and terminated on 48-port patch panels in communication rooms unless otherwise specifically noted. Installation in buildings built before 2018 may terminate on Gigabix MDF frames (requires review and approval of UIT Project Coordinator.)

.10   If cables are specifically noted not to be terminated, a minimum of 5 m slack should be left in the communications room; leave appropriate slack at or nearby outlet as directed.

End of Section 27 15 00