APPENDIX F

City of Toronto
Cabling Standards

STANDARDS AND PROCEDURES

Cabling Standard

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IT
Network Services
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Revision History

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1.0	June 19, 2002	Old Format	N/A
2.0	May 13, 2002	Update doc and format	Format changed to standard
3.0	Sep 26, 2003	Update specification for corporate cabling standards and cabinets	
3.1	April 1, 2004	Added Voice exceptions at the introduction, update cabinet and electrical specifications.	
3.2	Nov 4, 2004	Added some room details and updated some cabinet details	
4.0	Oct 2. 2007	Add more details relating to process, cable installation and times lines and appendices.	
4.1	Jan 28, 2009	Changed some typos, added details regarding transition to new VOR.	
4.2	Jan 28, 2010	Added in section 3.0 Updated 1.2.1 to 1.2.6	
4.3	March 19 2014	Updating sections	
4.4	Jul 4, 2018	Added Section 1.2.18, 1.4.19. Updated 1.4.11 -1.4.17	

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Introduction

This document addresses the cabling design specifications of data cabling within the City of Toronto controlled buildings or leased spaces, where the network is controlled by IT-Network Services. This document should be considered a guideline, consideration for some of the content should be reviewed before placing this into a tender document, specifically extra costs and Bell standard pricing.

Though every attempt is made to cover unforeseen issues, every building and project has its own issues, therefore IT - Network services and Telecommunication services should be included right at beginning of the project and the communication specs must be reviewed and approved by these groups within the City of Toronto.

Cabling Agreement

Effective January 10, 2010 the City of Toronto has entered a multiyear Voice and Data cabling agreement with Bell Canada. Bell Canada is to be used for all Data and Voice cabling for all owned and leased City of Toronto buildings

A pricing table of services with this agreement with unit costing is available from IT with permission to authorized recipients.

When the agreement is replaced or renewed the, current cabling vendor of record (VOR) should be used. The cable VOR should be verified by IT network Services at time of proposed work or RFP.

When a new VOR is selected, some changes may occur to some of the site specific details, standard and non-standard work in this document.

Voice Cabling

As Part of the ITI agreement Unified Communications (UC) Devices are now deployed. Also known as VOIP. Where it is cost effective and proper planning and acceptance has been completed UC phones that plug into the data network will be utilized.

It is the responsibility of the voice applications group, (telecommunication) to direct if the location will be Centrex or UC. If the location is Centrex or undetermined, then cat3 cable should be installed to every phone location as well as 1 data.

The typical user workstation is for one Data jack Cat5e or Cat 6 that will support the phone plugged into the jack and the user's computer plugged into the phone. Any other special requirements must be identified by the client.

For Analog Devices such as Fax's, POS (Dialup), modems and other specialized monitoring lines, are considered to be using Centrex, but is prudent to also supply a data cat5e/6 cable for future use and conversion.

The voice cabling system for Centrex will be supplied and installed by Bell as part of an agreement between Bell and the City of Toronto. Bell will have ownership of the voice cabling system. The system will be based on Category 3 wiring and will be provided in accordance with

Bell's specifications. There is no cost to the contractor from Bell for this service. The cost will occur when the line is energized with service

All cables and related terminations, support and grounding hardware shall be furnished, installed, wired, tested, labeled, and documented by the Telecommunications contractor as detailed in this document.

Also review business requirements with both Voice Infrastructure Group and network groups to ensure the appropriate technology is used in the locations.

Please contact IT-Telecommunications Services, voice infrastructure group for more details.

Commercial Building Wiring Standard

In Canada this is the CSA T529-95 standard “Telecommunications Cabling Systems in Commercial Buildings”, which adopts the American ANSI/TIA/EIA-568-A standard “Commercial Building Telecommunications Cabling Standard”. This standard covers the following:

- Horizontal cabling
- Backbone cabling
- Telecommunications Closets
- Equipment rooms
- Entrance facilities
- Cable standards

Other cabling system standards and recognized telecommunications industry standards. Are incorporated for reference:

- ANSI/TIA/EIA-568-B.1 and its addendum
- ANSI/TIA/EIA-568-B.2 and its addendum
- ANSI/TIA/EIA-568-B.3 and its addendum
- ANSI/TIA/EIA-568-B.2-1 (category 6 addenda)
- ANSI/TIA/EIA-569-A and its addendum
- ANSI/TIA/EIA-606-A
- ANSI/TIA/EIA-J-STD-607
- ANSI/ICEA S-90-661
- ANSI/ICEA S-80-576
- ANSI/ICEA S-83-596
- ANSI/ICEA S-83-640
- ANSI/EIA/TIA-492AAAA
- ANSI/TIA/EIA-472CAAA
- ANSI/TIA/EIA-472DAAA
- ANSI/TIA/EIA-598
- ANSI/TIA/EIA-455
- ANSI/TIA/EIA-604
- ISO/IEC 11801 2nd edition
- CENELEC EN50173
- IEC 603-7

Commercial Building Standard for Telecommunications Pathways and Spaces

This is the American ANSI/EIA/TIA-569 standard that specifies the architectural requirements that support and enable the Commercial Building Wiring Standard.

Intelligent Building Distribution Network

Originally developed by Nortel, but now owned by Belden, the IBDN standard is a commercial implementation of the ANSI/CSA cabling specifications.

1.0 Building Area Network

1.1 Cabling Standards

These standards address specifications that comply with the conventions established by CCITT, IEEE, ISO, BICSI or other organizations with responsibilities for setting international standards. The City of Toronto has, where possible, selected international standards for the implementation of CITYNET. Building cabling must conform to the Intelligent Building Distribution Network (IBDN) standard which is, in turn, compliant with the Electronics Industry Association / Telecommunications Industry Association (EIA/TIA) Commercial Building Wiring Standard. The IBDN standard specifies the configuration of the cable distribution and termination within the building from the outlet in each office to the exit point from the building to the external carrier system.

1.1.1 Where fiber is being used within buildings to support 10basefFL 100BaseFX or Gigabit Ethernet and/or any other LAN technology,

a. Always determine with IT Network Services Fiber and type as part of the design. But the guidelines below can followed.
b. In existing buildings new fiber should be OM3 unless otherwise specified. All terminated in Patch panel with LC terminations. Patch cables are determined by what network equipment will terminate on the fiber.
c. In new buildings where installing new fiber, OM3 multimode fiber cable will be used with LC terminations on the fiber patch panels. OM4 Considered in computer room type applications or core locations.
d. Where there is a mixture of old and new terminations, the cable connectors and patch panels should be replaced with current standard at the time of major reconstruction.
e. Relocation of the fiber termination point, must include updating connectors and fiber patch panels.
f. Where a pathway is open or harsh environment armored cable should be used or conduit installed.

1.1.2 Unshielded Twisted Pair used between the workstations and the Hub Room or for vertical Hub Room to Hub Room service must be 4 pair unshielded twisted pair enclosed in Plenum rated jacket with a minimum of EIA/TIA Category 5E performance with RJ45 terminations. If there is category 6 existing in the renovated space, then the location must use the same rating or higher rating and must be the same series of cable i.e. Belden/CDT 2400 series or 4800 Series.

a. The UTP-based cabling system shall have minimum a 160 MHz Channel Bandwidth over a maximum distance of 100m (328 ft.) and a positive channel Power Sum Attenuation-to-Crosstalk Ratio (PSACR) at 160 MHz.
b. The UTP-based cabling system shall use matched components from a single manufacturer, and the cabling system shall be certified to deliver system

performance over the lifetime of the applications for which the cabling system was originally designed to support.

c. All components used in the UTP-based cabling system shall be warranted for a period of 25 years from date of installation against defects in materials and/or workmanship.

d. The UTP-based cabling system shall comply with the following standards:
Minimum Enhanced Category 5 – ANSI/TIA/EIA-568-B.1
Class D ISO/IEC 11801 2nd edition
Class D - CENELEC EN50173

e. The UTP-based cabling system shall be capable of supporting the following applications:
Gigabit Ethernet (1000BASE-T)
Power over Ethernet (POE) 802.3af standard minimum
Fast Ethernet (100BASE-TX, 100BASE-T4)
Voice

IBDN System 1200 Parameters (cat 5e)

Parameters	Frequency	Standards*	IBDN Performance
PSNEXT	100 MHz	27.1 dB	32.7 dB
	155 MHz		29.6 dB
	160 MHz		29.4 dB
Attenuation	100 MHz	24.0 dB	22.3 dB
	155 MHz		28.6 dB
	160 MHz		29.1 dB
PSACR	100 MHz	3.1 dB	10.4 dB
	155 MHz		1.0 dB
	160 MHz		0.3 dB**
PSELFEXT	100 MHz	14.4 dB	20.0 dB
	155 MHz		16.2 dB
	160 MHz		15.9 dB
Return Loss	100 MHz	10.0 dB	12.0 dB
	155 MHz		10.1 dB
	160 MHz		10.0 dB
Propagation Delay		555 ns	490 ns
Delay Skew		50 ns	25 ns
Available Bandwidth		100 MHz	160 MHz

Worst case scenario for four-connector topology

*Based on ANSI/TIA/EIA-568-B.1 (May 2002)
ISO/IEC 11801 2nd edition (September 2002)

** Positive PSACR @ 160 MHz

1.1.3 In large campus environments such as civic centers and Metro Hall, connections from hub room to hub room or vertical riser's connection should use fiber, unless otherwise stated by IT – Network Services.

1.1.4 100BaseTX and 1000baset switches are used in each hub room or communications room. Cat5E / Cat6 patch cables are used to connect the switches to the building cabling system between the hub room and the servers / end user workstations. At the server/workstation, the appropriate Network Interface Cards (NICs) are incorporated in the workstations.

1.1.5 Servers in the main computer room will be connected to Cat6 patch panels within the cabinet. Cat6 cables will be run from these patch panels to patch panels specified by IT – Network Services Group or Gigabix Frame.

a. Any new server cabling put should be located on a directly installed patch panel within the cabinet of the server.
b. New Cabling infrastructure for computer room environment or where GigE is required Cat 6 utilizing 4800LX series Belden cable should be considered mandatory, decision should be decided with direction from IT-network services.

1.1.6 Workstations in office areas will be connected to Cat5E/Cat6 wall jacks or to Cat5E/Cat6 jacks incorporated into modular furniture.
a. If the location is new, or a fully renovated floor or location Cat6 cable should be used

1.1.7 Data Jacks are to be identified with a separate colour, by default black for voice, white or blue for data, unless a different scheme is used at the location, or aesthetic reasons the jack is in furniture and is limited available colours. Any differences should be approved by IT - Network Services,

1.1.8 Every effort should be used to support the Belden IBDN product line, this will keep the parts standardized and are readily available to the current cabling supplier used by the City of Toronto. Any changes should be a provided by IT -Network Services. Also a proper end to end solution for Cat5e / Cat6 will be certified by one vendor using all the same components from one vendor.

1.2 Cabling Standards (COT – Information Technology (IT))

Corporate standards address the design aspects of CITYNET that comply with industry practices but may be unique to the corporation. These specifications deal with the current environment and the variety of methods used to accommodate the varied computing platforms of the corporation.

There are a variety of methods used to cable LAN's and terminal equipment. The City has adopted the following corporate standards that address the methods for the implementation of cabling to serve a variety of equipment:

1.2.1 A central hub room for each Civic location for the city of Toronto shall be established. This must be located within the City of Toronto space and should be monitored by Corporate security. Access arrangements through Corporate Security for IT must be available 7x24. If any location through this central hub room is monitored by security or any department use is required beyond normal business hours.

1.2.2 A main secure hub room will be established on each floor, this must be located in the City of Toronto Space, all voice and data cabling should terminate here. **This is important for UC environment and -911 Enhanced service.** For Small locations, the equipment will generate some heat and noise. The main hub room should not be in an office where people are occupying.

1.2.3 Where the floor area is extensive, multiple hub rooms will be created

1.2.4 All hub rooms to house voice connections, network patch panels, Network equipment, terminal servers and all other network termination equipment. All units will be rack mounted. Rack mounted shelves can be used for equipment that does not provide rack mounts. (For Rack details please see section 1.3.0 Cabinet / Rack Standards) See Appendix A for examples of configurations.

1.2.5 All hub rooms should connect back to the central hub room via a **direct** back bone fibre and/or Copper multi pair riser cable. If security requirements are required, then all backbone cabling shall be placed in conduit. No Daisy chaining fiber cables from floor to floor.

1.2.6 The room should be located in an area that is not obtrusive to staff and sufficient room to house the shelf or rack.

1.2.7 Hub rooms are for Voice/network and communications and related computer equipment only and should **not** be used for storage space. Especially chemicals for cleaning etc.

1.2.8 Floors should not be carpeted; a sealed concrete or vinyl floor is acceptable, anti-static flooring is preferred.

1.2.9 There must be sufficient room in the hub room to allow access around all the racks installed in the room. 10 Feet by 10feet minimum in room containing only one rack

1.2.10 Sufficient cooling / ventilation should be provided into the hub room for the expected equipment to be installed and also have room for adequate growth.

1.2.11 Water Valves or water dripping hazards etc. should not be above equipment.

1.2.12 Enough electrical should be installed to service the rack(s) power strip(s) as well as additional equipment required by the client (local servers – not sanctioned by Network services, expected to follow IT server standards)

1.2.13 Plywood for any other communications should be fire rated or painted with fire retardant paint.

1.2.14 If systems, terminals, printers, etc. require special cable an exception from standard must be requested before installation.

1.2.15 The unshielded twisted pair will be terminated on RJ45 Cat5e/Cat6 patch panels. The four pair cables will be terminated (ISDN format) on the patch panels, all excess will be trimmed and cables will be tied back appropriately. Cables will then be labeled on the cable at the connection point on the back of the patch panel and on the front of the patch panel above each port.

1.2.16 Patch cables running from the patch panel to the network equipment will adhere to the same UTP standard as above and will be labeled before installation.

1.2.17 Patch panel ports will be labeled following the corporate standard see section 1.4.0 Cabling Procedures (COT-IT)

1.2.18 All Hub room doors within Civic Centers or City owned Buildings should include an access card reader which will be controlled by City of Toronto Corp Security Division.

1.3 Cabinet / Rack Standards (COT-IT)

This standard specifies installation of racks and cabinets in the various buildings throughout the city. Each location has its uniqueness therefore local knowledge should be part of the design process for the layout of the cabinet and/or rack. Also larger locations or locations with a proper raised floor computer room environment have different standards than most other buildings. Most wiring locations, racks are adequate, but some locations, such raised floors areas and proper

computer rooms should contain cabinets.

1.3.1 All racks and cabinet Z-rails, must have threaded holes for 10/32 screws, no punch rails with separate bolt inserts.

1.3.2 All racks should have a 2 vertical cable managers at least 5” Wide and the height of the rack and should be attached to each side of the rack, the manger should be metal and have a hinged cover. If only one side can be attached or where two racks a placed in a row a 9” wide cable manger should be used.

1.3.3 All racks should be mounted securely to the floor.

1.3.4 Each rack should have a power strip (12 pos) attached to the side of the rack, with a minimum of a 15 foot cord attached to the strip, terminated with standard 125V 15A blade connector or Twist lock, this should be verified with IT – Network Services. If the cabinet is going on a raised floor. The power bar should have a twist lock on the end of the cable with the appropriate rated connector.

1.3.5 For some small wiring closets where there is no room for a rack or growth is not expected to be more than 24 ports, a wall mount 19” frame (11 RU) can be used in place of a rack. The frame should have a 2 RU metal hinged horizontal cable manager installed under the patch panel and room for at minimum 2RU switch and one shelf to hold non-rack mountable equipment and a 19” rack mountable 6 pos power bar. This rack should be installed at 48 – 60 inches above the floor so that it is accessible without a use of a ladder. IT staff are not certified via health and safety to be on ladders.

1.3.6 A duplex 125V 15A electrical outlet on an independent circuit should be installed within 10 feet of the rack, so that the power cord from the power strip will not cross any open areas. For the wall mounted racks the duplex outlet should be installed in the cabinet. For computer rooms in a raised floor environment a twist lock connector should be provided under the raised floor for the cabinet. Ensure the rating matches the power bar/strip. Within the city, currently there 15A 125V twist locks and 20A 125V twist Locks on cabinets. All power for cabinets and equipment should be verified in computer room environments with IT - Network Services.

1.3.7 If emergency power is available at the location then power for network equipment should be on the emergency power.

1.3.8 UPS requirements are based on the client's requirements. Not IT Network Services. Unless specified.

1.3.9 When a cabinet is used, the cabinet type and style should be specified by IT - Network Services, each location is different.

1.3.10 In general for cabinets the should be 30” wide cabinets with 19” Z rails front and back to allow for 19” rack mounted equipment. But should be confirmed depending on the location.

1.3.11 For cabinets, vertical cable managers should be used at the front corners, for every 48 patch ports a 2 RU horizontal cable manager should be used. All cable managers should be metal with hinged doors.

1.3.12 In the cabinets a 19” front mounted shelf should be installed in every cabinet.

1.3.13 For cabinets the patch panel layouts and locations must be approved by IT - Network Services.

1.3.14 For cabinets electrical requirements are specific to the location and equipment within the cabinets and should be specified by IT - Network Services.

1.4 Cabling Procedures (COT-IT)

These procedures will provide a common implementation method for all LAN installations and the appropriate relativity to the Cable/Configuration management system.

In an effort to have common cabling practices across CITYNET the following procedures have been developed to detail exact cable placement and installation procedures:

1.4.1 Cables will be labeled using the corporate standard. For horizontal data cables use Dxxxyyy. Where xxx is the building floor number and yyy is the cable number on that floor. For example cable 17 on floor 12 would be D012017. Where there is more than one Hub Room on a floor a direction indicator will be used (i.e. N, E, W, and S). For example, the first cable on the 3rd floor terminated in the north Hub Room will be labeled D03N001. If an existing cabling scheme exists, that is different, continue to follow the existing cabling scheme or contact IT -Network Services for clarification. Computer room wiring labeling should always be confirmed with IT - Network Services. Be aware of older exiting cabling and wire scheme so that numbering is not overlapped. If this occurs and is difficult to continue, then wiring can continue from next hundred higher , for example if the wires end at D021162 then continue d021200

1.4.2 The patch panel's ports will be labeled with the above standard numbering system.

1.4.3 For non- standard office devices on utilizing IP and cat5/6 cabling, patch panels should be grouped for services separately and identified jacks such as IP security cameras or intercom systems etc. Enough room should be allocated for expansion and layout of all patch panels included regular office jacks should be documented in a design and approved by IT - network services.

1.4.4 All cables should be terminated on the patch Panel then Patch cables will be utilized to connect into the switch, unless a Gigabix IDC type solution is used, Then Pigtails from the switch to the IDC Block is acceptable.

1.4.5 Cables from the office terminated on the patch panel should be attached to the outside rear of the cable manager, not run inside the cable manager.

1.4.6 Any vertical backbone copper cables will be labeled aaa-bbb where aaa is the destination floor and bbb is a consecutive number within the group running to a given floor. For example, if you are looking at the patch panel on the 12th floor, the first vertical cable running to the 11th floor will be labeled 11-1 the second 11-2, the first cable running to the 13th floor will be labeled 13-1 and so on.

1.4.7 When there are more than 24 cables on the floor, additional patch panels will be added and manufacture’s port numbering will begin again at 1 and continue consecutively. City standard labeling of these ports will continue consecutively from the panel above. For example port 4 on the second patch panel will have a cable number of D12028 and on the third patch panel port 3 will be cable number D12051. Always use the Dxxxyyy designation when referring to a port, or contact COR I&T – Network Services for clarification

1.4.8 Patch cables will be labeled numbering from 1 to 999 within a single hub room. Straight through cables will have grey jacket colour.

1.4.9 Patch cables must be plugged to the patch panel port within the relative numbering system above. For example cable 9 in port 9 of the first patch panel, cable 34 in port 10 of the second patch panel, cable 55 in port 7 of the third patch panel etc.

1.4.10 Patch cables will be run through vertical and horizontal cable trays where available. Otherwise patch cables will be gathered in groups of 12 at the patch panel and tie wrapped, pulling the cables horizontally across the panel to clear the view of port numbers. Cables 1 through 12 will be gathered, tied and pulled to the left, then tie wrapped again to the rack. Cables 25 through 36 will be gathered, tied and pulled to the right then tie wrapped again to the rack.

1.4.11 Patch cables that are run vertically between patch panels and Network equipment, without cable management trays, will be grouped as above and tie wrapped periodically along the outside of the rack, neatly with sufficient tension to form a straight line of cable down the side of the rack.

1.4.12 Clusters of switches will be connected to a master switch. The master switch will be connected to the backbone network.

1.4.13 When daisy chaining is required, use the first port(s) of the master switch to connect to the other switches. Be sure to set the MDI/MDIX switch to MDI or use a cross over cable. Cross over cables will have orange or red jacket colour or proprietary stack cable can be used.

1.4.14 Complete all connectivity cabling of routers, connections between groups of Network equipment/switches, etc. before beginning the user equipment cabling.

1.4.15 All cables will be connected to the switches in order. For example patch cable 1 in the first available user port of first switch followed by cable 2 and so on.

1.4.16 Where cable mgt. trays are not used, cables will run down both sides of the cabinet or relay rack and Network equipment will be mounted directly below the patch panels. All cables must be connected to the Network equipment in order working from the left plugging the cables running down the left side of the rack ending at the middle of the Network equipment. Cables running down the right side of the rack will begin in the center port and plug across to the right of the concentrator. This process will be repeated on consecutive concentrators until all connections are completed.

1.4.17 All cables at the switches must be pulled and tied to provide a clear view of the port numbers on the switches.

1.4.18 Patch cable lengths,

1.4.19 For wall mount racks used in small site 2ft patch cord should be used.

1.4.20 For standard 2 post racks default should be 7ft. but should be verified with IT-network services staff assigned to project.

1.4.21 Other configuration should be designed as part of the project.

1.4.22 Cable tray should be utilized within all hub rooms when possible or required, Basket type cable tray should be used along with waterfalls.

2.1 Installation Procedures and Prerequisites.

Data cabling requests and services should be issued from an authorized person within the client department (preferred Telecom Coordinator or IT staff) or the project leader from Facilities and real estate, with the cost centre and site contact or alternative contact and/or numbers.

For Bell services for network connectivity to new locations, the call should be initiated from an authorized person from the client department to the IT Service desk.

This section for planning, please ensure that information is review before placing in a tender document.

2.2 Internal cabling.

2.2.1 The cable vendor (Currently Bell Canada under communications Tender ITI Agreement) should be a good standing member in BICSI. The product managers should be accredited RCDD, the technicians installing the cable should have training credits pertaining the product they are installing.

2.2.2 Current base costs of the cabling are for different types of buildings. Bell must follow the standard city pricing where applicable. This is based that all pathways are in place. For example Zone Conduit from the hub room and box and conduit on the wall from the ceiling space. Ceiling height is nominal 10ft.

2.2.3 Extra costs per tech/hr could be incurred for work not covered under the contract. All time and material work details have to be reviewed by network services, approval request from the account holder (i.e. department supervisor or telecom coordinator.

2.2.4 Extra high ceilings must be taken into special considerations for workplace safety reason, extra equipment such as sky lifts must be brought for the cable to be installed properly and provide a safe work area for the contractors. All this will cost will be funded from the department requesting the work.

2.2.5 Pathways **must be provided for the cable contractor** unless request for cable contractor to install /create the pathways. Extra charges will apply for this work. All conduits must have proper bend radius for type of cable used in the conduit, special consideration for fiber. Pull boxes should be placed after two 90 degree bends. No LB joints to be used. Pathways should be designed for installation of network cable standards.

2.2.6 For open areas, where there are no conduits, Cable tray should be utilized to allow installation of the cable and pathway back to the hub room.

2.2.7 Any Conduits from wall boxes, must extend up to the ceiling and flow into a cable tray.

2.2.8 Extensive pathways floor ducts should have pull strings and old cabling should be removed. Access points and pull boxes should accessible to ease in the installation, should not covered up with carpet and/or furniture. This will incur extra costs.

2.2.9 For general work on buildings the following practices must be used, or verified with the building supervisor.

All wiring to be installed in conduit 90 degrees to building grid fastened to the upper slab.

No free run wiring greater than 10' (should the free run be in a space deemed a plenum, the wiring shall be appropriately fire rated FT6).

All wiring made obsolete/ non-functional shall be removed as part of the installation process.

Cable tray systems can be used if appropriately sized & fire rated cabling is used, these are not preferred since they can eventually overflow and become unmanageable.

J-hooks can be used under the direction of the building supervisor and installation of the system recommended of the manufacturer and approved by IT-network services. Cable Tray is preferred.

2.2.10 Attachment to existing sprinklers, or duct work is not permitted.

2.2.11 Loop extra slack should be built in for relocation or re-termination of the cable.

2.2.12 Major renovations cabling should be brought up to current standard, it is easier to remove all the old cable and pull in new cable. Rerouting large quantities of existing cables and installing around existing cable can cause damage to the existing cable. Some locations are still at category/level 3 or level 4 communications cable.

2.2.13 Old cables that do not meet current standard and are removed should be removed back to the patch panel.

2.2.14 New cables should be terminated on patch panels, that are current cat 5e/Cat6 standard and match the current IBDN system in place (currently Belden IBDN)

2.2.15 System furniture where the data jack is integrated, if the jack cannot be placed in securely and reliably than a surface mount jack should be used secured on the surface in the furniture. The contractor is expected to replace this, if this identified as deficiency. Also is should also be confirmed the requirements with designer what is preferred.

2.2.16 Installation for Wall Jacks

a. If system furniture is being placed, then jacks are to be wired into the system furniture, walls jacks must not be covered up.
b. Any special requirements for the systems furniture jacks should be identified by the manufacturer/Furniture re back to the cable contractor.
c. For wall mount jacks the height of Voice/Data Jacks should be placed for accessible standards, such that a person in a wheel chair can access the phones. Must be verified by the client and/or Public Health or accessibility standards
d. All wall plates should have a covered plate with the Jack installed, if a UC phone is to be placed on this jack then a secure wall mount bracket with Key lock must be placed around this jack. Likewise for any other specialized device such as intercoms and wall clocks etc. Should also be identified any special mounting during the design and marked on the drawings.

2.2.17 Installation of Jacks for specialized devices

a. Wireless Access points Jacks should be install so that they can be moved in both directions to adjust the wireless access point

b. Wireless access point should be mounted on the T-Bar ceiling with approved hardware If not T-Bar then approved method must be agreed with IT Network Services.
c. Other Devices, such as time clocks security cameras must be identified on any drawings and mounting must be agreed and to the manufacturers standards and department standards (i.e. Corporate Security or Toronto Water etc.)

2.3 External Cabling for Bell Services

2.3.1 For current data services via ITI/Bell Canada allow Minimum 45 to 85 business days for installation. Determine by presales check. Any escalation will result in extra fees

2.3.2 The move in date should be planned for 1 week after the Bell due date to ensure any issues with installation are accounted for.

2.3.3 All pathways from the street line must be provided by the City of Toronto (Department requesting the work) or General Contractor associated with the project with adequate space for the cabling required for the services and growth. Follows the same requirements as internal cable. If this is not provided extra fees could be charged.

2.3.4 For services required far from the main DMARC of the building extra charges may apply. This cannot be determined until after the order is places and Bell performs site visits from the BND (Building Network Design) and access networks groups.

2.3.5 In order for data service to be on time and reduce billing charges due to an early installation. The custom must provide a date they want the activation of the service to happen. Otherwise the order will be placed and bell will provide due date. Please allow minimum times.

2.3.6 Under certain circumstances where a delay will be longer than anticipated, the install can be placed on hold, but will require at least 2 to 3 weeks to continue and reschedule the installation.

2.3.7 Any moves of an existing service within the building may be subject to a moving charge.

2.3.8 Any relocation of services from outside the build, charges may apply.

2.3.9 For extended runs of cable inside a building any outdoor cable that is not fire rated must be placed in conduit of fire rated inner duct.

2.3.10 Bell owns the cable to the DMARC point and must be Bell Canada owned fibre pulled in by their contractor (separate from local Voice and Data Contractor) Usually done by Expertech, Aecon and internal Cable Ready etc, but arranged by Bell Access networks. **Warning: These contractors attend unannounced before the due date. They may require clean dust free environment to complete fiber splicing reliably. Therefore trades may have to work somewhere else. The impact of not allowing them when the show up is that the installation of the service will more than likely be delay.**

2.4 External Cabling - Private Cable and Property

2.4.1 Cabling between buildings on City of Toronto property where there are no issues with right of way crossing of streets etc. This is private cable that the City of Toronto owns and will and the department that requests will be responsible for all installations and future repair costs not associated with warranty on materials or workmanship. There are no guaranteed service levels for repair of this cable and is best effort.

2.4.2 All pathways must be defined, either Conduit underground, trenching or above ground on along a series of poles.

2.4.3 Similar rules for pathways for section 2.2 and 2.1 apply, Pathways can be supplied by outside source which is preferred, otherwise cable installers will have additional costs and subject to review by IT network services against the cabling agreement.

2.4.4 Safety devices utilized for environmental protections such as lightening should be used.

2.4.5 Tracing wire must be placed for cables installed in the ground.

2.4.6 For aerial cable ensure the height is adequate for any vehicles traveling below the cable.

3.0 Working with GC/Landlords and Clarification of Projects and Timelines.

3.1 Summary.

3.1.1 City current standard is cat 5e based on Belden 1200 series cable and former CDT/NORDX IBDN standards

3.1.2 Current the cabling Vendor of record is to be used for Voice and Data cabling and associated racks, contact to be provided by IT Voice or Data group.

3.1.3 All pathways are to be provided for communication services and voice and data cabling.

a. These are considered construction expect to be completed, by Facilities or the landlord, or the department. The cabling vendor of record can do these as requested, but this should follow standard purchasing polices, since conduit work and electrical work is not included in the ITI agreement.

3.1.4 For orders as part of tenders/landlord agreements, a scope of work/requirements (SOW) must to be stated clearly to the cabling vendor, this should include in the front any cabling specification, and/or indicated clearly in the drawings the expectations from the cabling vendor. A sign-off of the SOW between the GC/Landlord and cabling vendor of record must be included in the response package.

3.1.5 For service installations, voice or data, the department is responsible for this cost, the order must be placed though COT- Information technology (IT) processes and procedures.

Clarification and permissions can be exempted, but must be approved at supervisor level in IT. Cabling infrastructure for these services required to be installed in parallel with the construction, since the cabling is a service, the installation is the responsibility of the vendor, but all pathways as per the service provider specification must be provided by COT, GC/Landlord contracted to do this.

3.1.6 Service orders, especially for data services can be a lengthy process, since outside infrastructure may require building. For typical office buildings where there are tenants, a minimum of 8 weeks sis required and should be sufficient, where the locations are new city property or city leased property in obscure areas, longer timelines may be required for the fibre build. This is can only be determined at the time of order.

3.1.7 GC/Landlords must allow access for service providers and COT- IT Staff during the construction phase to implement the service for time of completion as requested by the department. A local contact/Supervisor cell phone and email must be provided. City IT staff and the service provider are expected to follow health and safety requirements and direction from the GC/Landlord during the construction.

3.2 Project related scheduling.

3.2.1 A GANTT chart or time line must be provided and update accordingly, This must be provided and reviewed by IT Voice and Data groups to ensure the site is prepared for the service provider implementation and IT change management processed to interface to the new location.

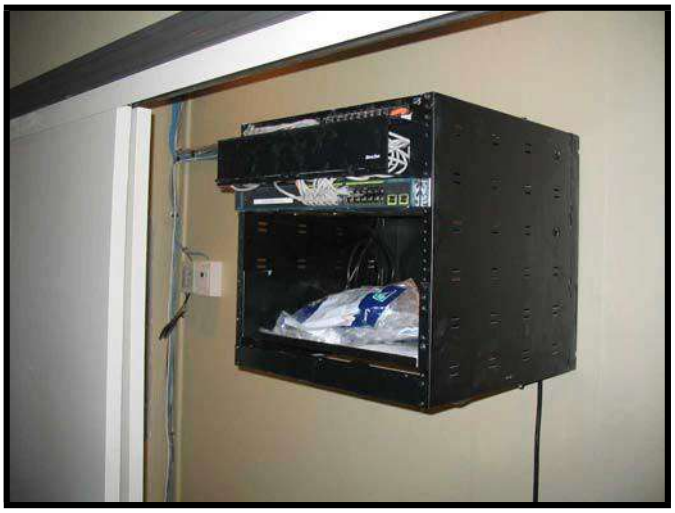
3.2.2 Certain milestones are require for the service provider to implement service on time as required by the client and/or COT (i.e. security). This includes the communications racks and associated power.

3.2.3 Site meetings, the IT Voice and Data rep should receive minutes of the site meetings and be allowed to attend when required pertaining any issues to IT communication requirements. All communication for changes and issues should be communicated through the COT project manager assign to this project through Facilities Management.

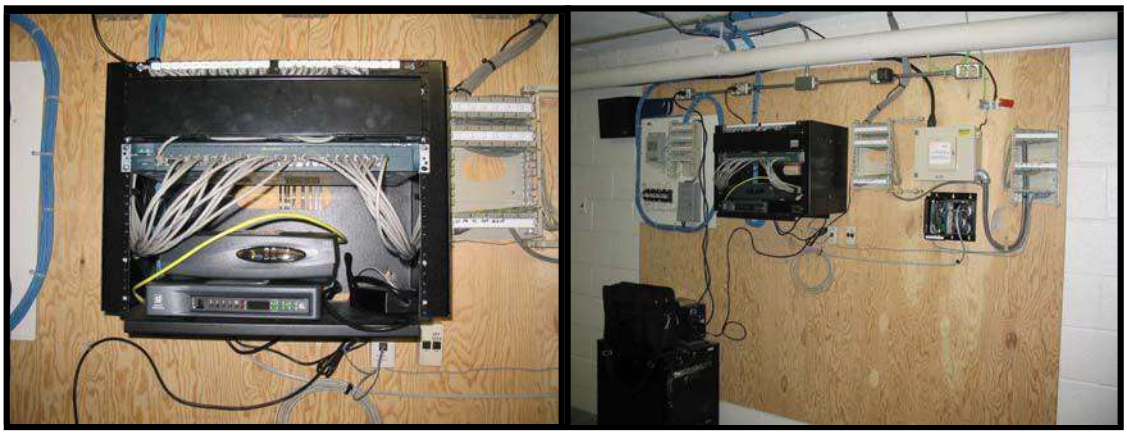
Appendix A

Examples of rack configurations

Small Locations with HDSL



Currently the HDSL was not moved over from other location. This is the High Park supervisor's house. Issue here, rack was larger than expected by the client, so it should have been placed in the basement out of the way. That is why the closet now has doors. Rack is 11U Rack. There is about 12 connections in Total.



The HDSL circuit installed in this rack at the Fire Hall, 280 Burnhamthorpe. This is a little smaller than above. Only issue Patch cords should have been smaller, 2ft to hide in the cable manager. Almost 22 Connections. This room has enough space for a 2-post rack if required.

Larger sites

Typically Fibre locations, where there is more than 1 switch or multiple buildings connecting into the main building.

Below is new location Public Health 44 Victoria, with a 2 post rack, to vertical cable managers and 12 port power strip. Total 3 switches, Issues with this is the room, it was nice size but the air conditioning unit took up more space than anticipated. Therefore only room for growth is the one rack. This floor is at maximum capacity. The rack can be passed to maintain the AC unit.