



IT Services Network Infrastructure Specification

**Requirements Document for Project Managers and
Contractors**

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Contents

1. General requirements.....	5
1.1 Diverse connectivity.....	5
1.2 Data outlet type and distribution.....	5
1.3 Wireless infrastructure.....	5
1.4 Cabling etc. requirements.....	5
1.5 Connection of equipment	6
2. External services.....	6
2.1 Duct routes and construction	6
2.2 Duct access.....	6
2.3 External cabling and micro ducts.....	7
3. Wiring centres	8
3.1 Connectivity.....	8
3.2 Access.....	8
3.3 General design and layout.....	8
3.4 Power and environment	9
3.5 Signage.....	9
4. Data outlet distribution.....	10
4.1 Design and planning.....	10
4.2 Installation	11
4.3 Office areas	11
4.4 Meeting and seminar rooms.....	11
4.5 Open and communal areas.....	12
4.6 Residential areas.....	12
4.7 Plant and store rooms	12
4.8 Outdoor spaces.....	12
4.9 Wireless.....	13
5. Data cabinets	14
5.1 Preferred type.....	14
5.2 Layout	14
5.3 Installation	18
6. Labelling.....	20
6.1 External fibre optic cabling.....	20
6.2 Internal fibre optic cabling.....	20
6.3 Fibre optic patch panels.....	21
6.4 Data outlets.....	21
6.5 Patch panels.....	21
7. Acceptance testing and documentation.....	22
7.1 Structured cabling	22
7.2 Fibre optic installations.....	22
8. Connected equipment	23

8.1	Registration.....	23
8.2	Prohibitions.....	23
9.	Approved manufacturers and cabling systems.....	24
9.1	Augmented Category 6 (Cat.6A) infrastructure	24
9.2	Blown fibre components.....	24
10.	Compliance.....	25
10.1	Legislative compliance.....	25
10.2	Directorate of Estates and Campus Services requirements.....	25
10.3	Technical compliance	25
10.4	Approved installers.....	25
11.	Document updates, website references and IT Service Desk details.....	26
11.1	General requirements.....	26
11.2	Useful websites.....	26
11.3	IT Service Desk details	26
12.	University of York staff.....	27

1. General requirements

1.1 Diverse connectivity

All buildings shall be provided with two or more separate and dedicated ICT duct routes for resilience. Interconnections between buildings shall be made using blown fibre in micro ducts. See *Section 2*.

Interconnections between wiring centres within the same building shall be made using standard fibre optic cable supplemented by 24 No. Augmented Category 6 (hereafter referred to as Category 6A or Cat 6A) copper cables as directed by University of York IT Services.

Interconnections between wiring centres and buildings shall be designed as schematics by University of York IT Services.

1.2 Data outlet type and distribution

All building spaces shall be provided with data outlets in quantity and positions in accordance with *Section 4*. All data outlets shall be fitted in pairs, *i.e.* as “dual” outlets. See also *Section 1.4*.

Data outlet layouts designed by a project architect or project manager shall be approved by University of York IT Services before preliminary acceptance. Preliminary and final acceptances are conditional on receipt of documentation described in *Section 7*.

1.3 Wireless infrastructure

All building spaces shall be provisioned with data outlets for wireless access points (WiFi, wireless APs) in accordance with *Section 4.9*. Owing to the rapidly-changing technology, design shall be done only by University of York IT Services.

1.4 Cabling etc. requirements

Any work involving installation, re-installation, modification, or movement of data outlets requires that the outlets be re-tested and re-certified (see *Section 7*).

All data outlets shall be dual RJ45 outlets to Category 6A standard unless previously agreed with University of York IT Services, and chosen from the products listed in *Section 9*.

All horizontal cabling (*i.e.* cabling connecting RJ45 data outlets) shall be made with approved products and terminated in data cabinets in accordance with *Section 5* and *Section 9*.

No cable run shall be longer than 90m. Where necessary, a building shall be provided with more than one wiring centre.

All cabinet layouts shall be designed by University of York IT Services.

Acceptance of data cabling and associated infrastructure by University of York IT Services is conditional on receipt of documentation as described in *Section 7*.

1.5 Connection of equipment

All network infrastructure equipment such as switches, routers, wireless APs, etc. shall be supplied, installed and patched only by University of York IT Services or personnel under direct contract to University of York IT Services.

No switches, routers, wireless controllers, wireless APs etc. shall be used or installed by contractors for the purpose of connecting to or communicating with other equipment unless under instruction from the University of York IT Services.

2. External services

2.1 Duct routes and construction

All buildings other than “satellite” buildings (see below) shall be provided with two or more diverse ICT duct routes, each having a minimum of two 100mm ducts, for resilience. These shall be in addition to and separate from, ducts required for all other services including electrical supply, dedicated alarm systems and commercial telecommunications providers including BT.

Designation of a building or wiring centre as “subsidiary” or “satellite” is at the sole discretion of University of York IT Services. In general a “satellite” wiring centre is one which is sited in a satellite building such as an electrical substation and which services 24 or fewer outlets, with no current or future requirement for onward feeds to other wiring centres.

Where a building has only one wiring centre, the duct systems may both terminate in that wiring centre. Otherwise, they shall terminate in different wiring centres.

Where diverse duct systems enter a building at the same location, their point of divergence shall be at no greater distance than 5m from the point of entry to the building, and there shall be an access chamber at the point of divergence.

External ducts for fibre optic and other connections between buildings shall be twin walled rigid duct, minimum 100mm diameter, externally ribbed with a smooth interior.

All ducts shall be provided with polypropylene draw ropes to facilitate pulling additional cables, and when used for this purpose, draw ropes shall be replaced.

2.2 Duct access

Manhole covers over splicing or access chambers shall be robust and meet any requirements laid down by the Directorate of Estates and Campus Services.

Access chambers for data ducts shall be independent of access chambers for other services, such as power, heating, BMS systems, water, control cabling, etc.

Main arterial routes (aka “the superhighway”) on the Heslington West campus consist of 6No. 100mm diameter ducts shared with the Directorate of Estates and Campus Services. On the Campus Utilities Corridor (CUC) and on the Heslington East campus an independent ICT duct network has been installed. This infrastructure uses fewer physical ducts as the Heslington East campus employs blown fibre or blown cable technology with a minimum of 7 sub ducts or micro ducts throughout.

2.3 External cabling and micro ducts

Data connections between buildings shall be made using fibre optic cables. Copper cables are not permitted between buildings.

The default standard for fibre optic cables is 48 core single mode to OS2 (9/125) specification or better. Where University of York IT Services specify multimode fibre optic cable, this shall be to OM3 (50/125) specification or better.

Fibre optic interconnections between wiring centres and buildings shall be designed as schematics by University of York IT Services.

Wherever possible, interconnections between buildings shall be made using blown fibre in approved micro ducts; between buildings the micro-ducts shall be installed within the normal ducts.

Where blown fibre is not used an armoured cable must be used *e.g.* corrugated steel taped (CST) or steel taped armoured (STA).

External fibre optic cables shall be labelled at each end and in each access chamber according to the convention in **Section 6.1**. Micro ducts shall be labelled at each end, in each access chamber and where they are diverted or “tee’d” from the rest of the bundle, in the same style. The colour of micro ducts must not change along their length.

Fibre optic cables for external connections shall be terminated in metal patch panel boxes fitted with duplex LC connectors. The patch panel boxes shall be 1U high and accommodate 24 duplex connectors (48 fibre cores). The rear cable entries shall be slotted to permit removal of the cable without the need to cut and re-terminate it. Single mode and multimode fibre terminations shall not be mixed on the same 1U panel.

Each pair in a fibre optic installation shall be fitted as a crossover. Because fibre optic connections require overall Tx-to-Rx crossover connections, this is essential in order to preserve an odd number of Tx-to-Rx crossovers when patching.

Fibre optic termination panels shall be labelled in accordance with **Section 6.3** and tested in accordance with **Section 7.2**.

3. Wiring centres

3.1 Connectivity

Wiring centres, other than those explicitly designated by University of York IT Services as “satellite” wiring centres (see *Section 2.1*), shall be provided with no less than two separate fibre optic connections to other wiring centres, for resilience. Note that this requires each building has a minimum of two duct routes to other buildings.

3.2 Access

Wiring centre rooms shall be secure (lockable), with standard plant-room key (Yale 22028 E305 D17 on Heslington West, and GG02282 01127 on Heslington East). Key issue shall be restricted to University of York IT Services and Directorate of Estates and Campus Services.

Access must be available to authorised University of York IT Services staff, including out-of-hours. Note that this may require consideration of access route, alarms, etc. Wiring centres shall be located so that access is from outdoor or indoor public areas (rather than departmental areas which may be closed off). Access to staff other than University of York IT Services and Directorate of Estates and Campus Services and their contractors is prohibited.

Access for contractors will be by arrangement with University of York IT Services. All keys shall be signed out from University of York IT Services, and shall be returned to University of York IT Services directly, or out of normal hours to the University Library Help Desk or Security Services. No keys may be retained overnight.

3.3 General design and layout

Wiring centres shall consist of a dedicated room provisioned with appropriate services (see *Section 3.4*). The room shall not be used for storage or any other purpose not directly related to the delivery of University of York IT services. Wiring centres shall not be used to site power distribution equipment other than that dedicated to the operation of the wiring centre.

Certain other building services shall be excluded from wiring centres. These include but are not limited to water supplies, drains (including drain pipes), and heating pipes. There must be no water or liquid pathway, sources or outlets in the ceiling above the cabinet(s). This includes waste water pipes, chilled water pipes, hot water pipes, sewer pipes, and rainwater downpipes.

New wiring centres shall be capable of accommodating an appropriate number of data cabinets to meet total outlet count based on a typical maximum of 384 outlets per cabinet with allowance for 30% future growth. For example, wiring centres serving more than 1200 data outlets will require four cabinets. Each cabinet must be 800mm wide by 1000mm deep and minimum 42U high. Clearance is required to provide access space of a minimum of 1000mm to front and rear, and 1000mm to at least one side.

Where such equipment is required one data cabinet will be reserved for Facilities Management in each major wiring centre (see *Section 5.2*).

Wiring centres shall be fitted out with an appropriate floor covering, such as antistatic vinyl or tiles, or in certain cases by prior agreement with University of York IT Services, painted concrete. Carpet and carpet tiles are not acceptable.

After construction and decoration, and before any active equipment can be fitted, the wiring centre shall be thoroughly cleaned to eliminate all dust and debris, including the interiors and tops of data cabinets.

3.4 Power and environment

Adequate ventilation and/or cooling shall be provided to maintain the room temperature below 26°C based on a nominal thermal load of 1kW per data cabinet and data cabinet location.

Each wiring centre shall be provided with a means of fire detection, connected to the University fire alarm system and optionally to any relevant building management system.

Each data cabinet shall be provided with a minimum 1No. IEC 60309-2 16A (2P+E) outlet fed from a dedicated mains supply. This circuit should feed the data cabinet in such a manner as to prevent trip hazards from trailing cables and shall be provided with a method of isolation within easy reach and outside of the cabinet *e.g.* a rotary isolator in the circuit located on a wall adjacent to the cabinet between 1m to 1.7m from finished floor level. Where multiple data cabinets are installed power cables shall not pass through one data cabinet to reach another.

Each wiring centre requires a minimum of one 13A TSSO for general small power.

Lighting within the wiring centre should take into account the number and location of data cabinets with levels meeting the minimum requirements set by other University of York specification documents.

Where possible power and data should be delivered to cabinets at high level on suitable basketwork or cable trays.

3.5 Signage

The door to each wiring centre shall be labelled with the University of York space code in accordance with the requirements of the Directorate of Estates and Campus Services, and shall in addition have a small sign stating "Restricted Access. IT Services only."

Within each wiring centre, all data cabinets shall have a sign affixed to the front door stating "This wiring centre is managed by IT Services. No additions or alterations to equipment or cabling may be made except by IT Services."

4. Data outlet distribution

4.1 Design and planning

Data outlet quantities and locations shall be designed by or in consultation with University of York IT Services Network staff before construction. Subject to the foregoing and the rest of this section, data outlet layout may be designed by a project architect or project manager, but shall be approved by University of York IT Services before preliminary acceptance. Such approval shall be conditional on receiving lists of quantities and drawings indicating proposed layout.

High-level data outlet quantities and locations for wireless AP's shall be designed by University of York IT Services (see *Section 4.9*).

Designs shall be produced in accordance with or to exceed the minimum data outlet requirements detailed in *Sections 4.3* to *4.9* and in accordance with any additional requirements of the University Department which will occupy or be responsible for the space.

All data outlets shall be fitted in pairs, as "twin" or "dual" RJ45 outlets. All components of the installation shall be to Category 6A standard unless previously agreed with IT Services, shall be chosen from a single range of the products listed in *Section 9*, and shall only be installed by an installer approved by the manufacturer for that product range (see *Section 10*).

No data cable run shall be longer than 90m. Where necessary to comply with this requirement, a building shall be provided with more than one wiring centre, suitably located, and connected by fibre optic cable to two other wiring centres. Any cable run exceeding 90m in length will fail the standards tests and will not be accepted.

Wiring runs shall be in wire trays within equipment rooms, risers, ceiling voids, and loft spaces. In under-floor spaces, where outlets are to be in floor boxes, galvanised sheet trays may be used instead of wire trays to facilitate fitting flexible conduit. Where wiring runs are not in such spaces they shall be enclosed in plastic trunking on the surface of a wall. In some locations, mini-trunking may require painting to be discrete and/or to avoid reflections.

Designers should note that Category 6A cable is significantly thicker than older types and should use one of the readily-available cable containment calculators to ensure adequate containment provision.

Dado trunking, back boxes, floor boxes and containment must be specified to have sufficient depth to accommodate the bending radius of Category 6A cable from any of the approved cabling systems listed in *Section 9*.

Where floor boxes and containment are set permanently into the floor an allowance for at least 100% expansion should be made.

4.2 Installation

All data outlets shall be labelled in accordance with the University of York IT Services scheme detailed in *Section 6.4*.

All horizontal cabling (i.e. cabling connecting RJ45 data outlets) shall be made with approved products, terminated in data cabinets in accordance with *Section 5* and certified to comply with the relevant standards.

Cable bundles shall be secured with Velcro cable ties or an equivalent cable tie designed to prevent any possibility of crushing or deforming of the cable.

When installing cable in new containment or conduit the contractor shall allow for 50% future expansion. However, this requirement may be relaxed in the case of flexible conduit attached to individual floor boxes, if by prior agreement with University of York IT Services.

All data cabling must be one continuous unjointed length from patch panel to outlet and shall not have splices or in-line connectors other than those integral to the patch panel and the room outlet. No “consolidation points” shall be used.

For reasons of warranty, cables shall not be installed by one contractor and terminated/tested by another unless by prior approval from University of York IT Services.

Final acceptance of an installation is conditional on receipt of documentation by University of York IT Services as described in *Section 7*.

University of York IT Services staff will not patch or “make live” any outlet until it has been finally accepted as above.

4.3 Office areas

Each workstation location in office space shall have at least 2No RJ45 dual data outlets (i.e. four outlets). Compliance with EN50173 or IEC 11801 requires that a *minimum* of 2No data outlets be provided at each work area. In multiple-occupancy offices, compliance will require an allowance for alternative workstation positions, for example by fitting sockets on opposite walls, not just along one wall. Note that no patch cable is permitted to be longer than 5m, nor to be routed where it could constitute an obstruction, a trip hazard or other health and safety hazard.

4.4 Meeting and seminar rooms

Each seminar or meeting room shall be provisioned with sufficient dual data outlets to service a telephone, audio-visual equipment, at least one wireless access point, and at least one accessible dual data outlet at the rear of the room.

The University of York Audio Visual Services must be consulted for specific audio-visual equipment network requirements. This is likely to include a lectern requiring a minimum of four dual data outlets to support, for example, a managed PC, a laptop connection, a controller connection, and a telephone. Additional network requirements may include a Smart board and/or a ceiling-mounted data projector.

4.5 Open and communal areas

Open areas shall have a minimum of one RJ45 dual data outlet per 10 square metres of floor space, to allow for printers, copiers, and telephony equipment, with a minimum of two dual RJ45 outlets in each area. These shall be distributed evenly around the area.

Open areas shall be provided with at least one dual data outlet to support a digital signage system, at one or more locations and at heights to be agreed with University of York IT Services and Audio Visual Services.

Open areas shall be provided with adequate high-level dual data outlets for wireless access points as designed by University of York IT Services (see *Section 4.9*).

Communal areas such as kitchens in residential accommodation shall each be provided with at least one dual data outlet to support a telephone, one high-level dual data outlet to support a wireless access point, and one further dual data outlet to support IPTV or other digital media *e.g.* games console, all appropriately located.

4.6 Residential areas

Study bedrooms shall have a minimum of one RJ45 dual data outlets *per occupant*. These data outlets shall be presented at sufficiently high level to avoid damage from beds or other furniture being pushed against them. They shall be positioned close to mains power sockets likely to be used for IT equipment and in such a way as to reduce the possibility of long patch leads trailing across the room.

Tutor rooms, accessible rooms, Dean's flats, staff flats, and any room larger than 12.5m² shall be provided with at least *two sets* of RJ45 dual data outlets, on opposing walls.

Corridors in residential accommodation shall be provided with adequate high-level dual data outlets for wireless access points as designed by University of York IT Services (See *Section 4.9*).

4.7 Plant and store rooms

Plant rooms require at least one data outlet for each piece of networked equipment, plus at least one spare and always fitted in pairs. BMS equipment must not be connected via local Ethernet switches. Plant rooms in buildings which are not otherwise provided with network connectivity shall in addition require a fibre-optic feed from a nearby wiring centre, and a suitable mounting for a network switch.

Storage rooms larger than 4m² require one dual data outlet.

4.8 Outdoor spaces

As the requirements for outdoor spaces can vary significantly, the network infrastructure will be designed by University of York IT Services on a case by case basis but will typically include:

- A duct to a nearby building hosting a network or routing centre
- A fibre connection
- Somewhere to host network switch(es) *e.g.* a 19" vertical frame or 19" data cab
- Minimum 2No. std 3-pin 13A TSSO supplying the network equipment
- Cat 6A cabling internal to the structure to service AV, WiFi and CCTV units
- Somewhere to mount WiFi units

AV and other service providers such as the University of York Security Team should also be consulted as they will have further power and data requirements.

4.9 Wireless

The requirement for design and layout by University of York IT Services for data outlets supporting wireless access points shall be included in any Employer's Requirements for new or refurbished building work.

Inclusion of dual data outlets for wireless access points shall be included in designs for corridors, open spaces, office space, communal areas, residential kitchens, study bedrooms and other areas that may be advised by University of York IT Services.

Prior to commencement of cabling work, DWG files shall be provided to the University of York IT Services so that modelling software can be used to determine precise quantities and locations of dual data outlets for wireless access points.

Wireless access points shall be provisioned and installed with due regard to wireless and client density, interference, propagation differences at different wavelengths including 2.4GHz and 5GHz and using different modulation techniques including but not limited to 802.11a/b/g/n/ac, interaction with neighbour wireless access points, and any building features or construction which may impede the signals. Note that modern wireless systems use increasingly higher cell densities and smaller cells and therefore require increasingly closely and regularly spaced data outlets.

University of York IT Services are responsible for all radio operations in the 2.4GHz and 5GHz bands on the University campus and no equipment other than that provided by University of York IT Services or operating under their written permission shall be installed or operated in or adjacent to University of York premises.

Dual data outlets for wireless access points shall be either wall-mounted at high level, or such as to allow for ceiling-mounted access points, to be decided by University of York IT Services according to the type and model of wireless access point planned.

High-level outlets and mounting bracket positions for wall-mounted access points shall be fitted at a height of approximately 2.3m from the floor, but in all situations shall be fitted with a clearance of at least 270mm between the ceiling and the centrelines of both the data outlet and the mounting bracket.

Data outlets intended to serve horizontal ceiling-mounted access points shall be located in such a position as to be readily accessible to authorised University of York IT Services staff without the use of specialist tools or equipment for the purpose of patching to the access point when fitted or serviced.

Where external Wireless Access Points are required weather proofed infrastructure shall be used. Additional earth bonding shall be installed under guidance from the University of York IT Services.

The contractor shall install brackets and wireless access points supplied by the University of York IT Services (internal and external) as required and under guidance from the University of York IT Services.

5. Data cabinets

5.1 Preferred type

The preferred cabinet type for wiring centres is the Dataracks 303 Eco Network Cabinet range. Alternative products shall only be installed with the prior agreement of University of York IT Services.

Cabinets shall be standard 19" type, minimum 42U high (where ceiling height allows), 800mm wide x 1000mm deep.

Wall-mounted data cabinets shall not be used, unless agreed in advance by University of York IT Services, as this precludes the installation of the routers/network switches required to feed Wireless Access Points, IP telephony, CCTV and certain other equipment.

Each cabinet shall be fitted with standard locks (preferably key no. EK333, but 250 or 92250 are acceptable), and mesh (ventilated) doors.

Each cabinet shall be floor-standing and fitted with a plinth at the base. In exceptional cases, cabinets may be fitted with suitably-rated levelling feet (but not casters) by prior agreement with University of York IT Services.

Each cabinet shall be internally fitted with two cable trays running vertically, and positioned on each side, slightly to the rear of the centre line. The front rails must be mounted back 10cm from the door to allow clearance for patch cables.

Cabinets shall be supplied with side rail mounted cable management, *e.g.* 20No. "Elite jumper ring radius knuckles" for a 42U cabinet.

5.2 Layout

Cabinet layouts shall be designed by University of York IT Services. Contractors shall not install patch panels until they are in receipt of University of York IT Services cabinet layouts.

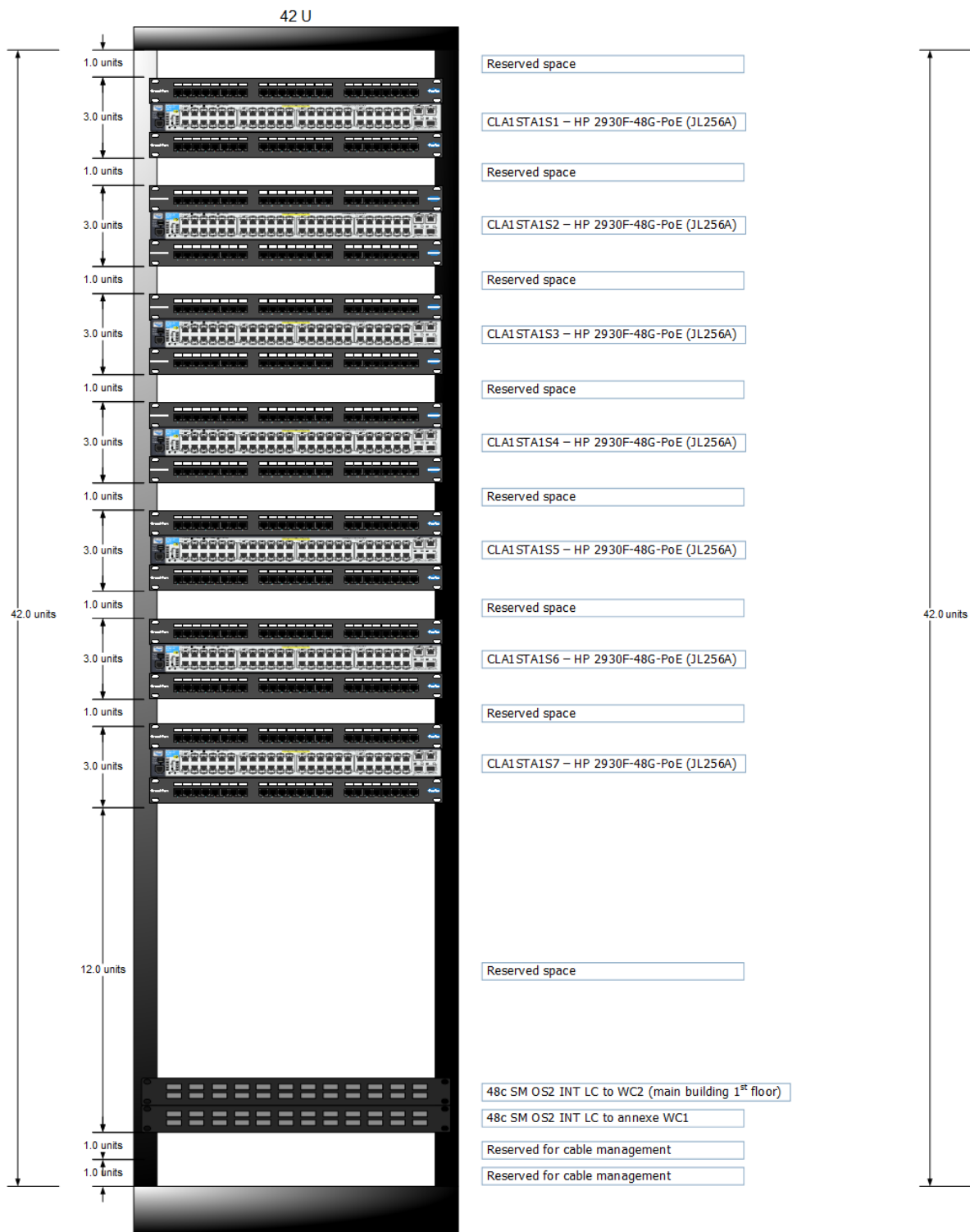
Layout within general purpose cabinets shall be arranged to accommodate eight groups of patch panels and switches, each group being 4U high. These shall be spaced to allow for the addition of one additional 1U (44mm) Ethernet switch in each group, allowing for a maximum of sixteen 24-way patch panels and a maximum of 384 RJ45 positions.

There shall be no more than sixteen patch panels and 384 RJ45 connections in any cabinet, unless by prior agreement with University of York IT Services.

Major wiring centres may require one cabinet laid out in suitable form to accommodate one or more chassis switches for network routing, as illustrated below.

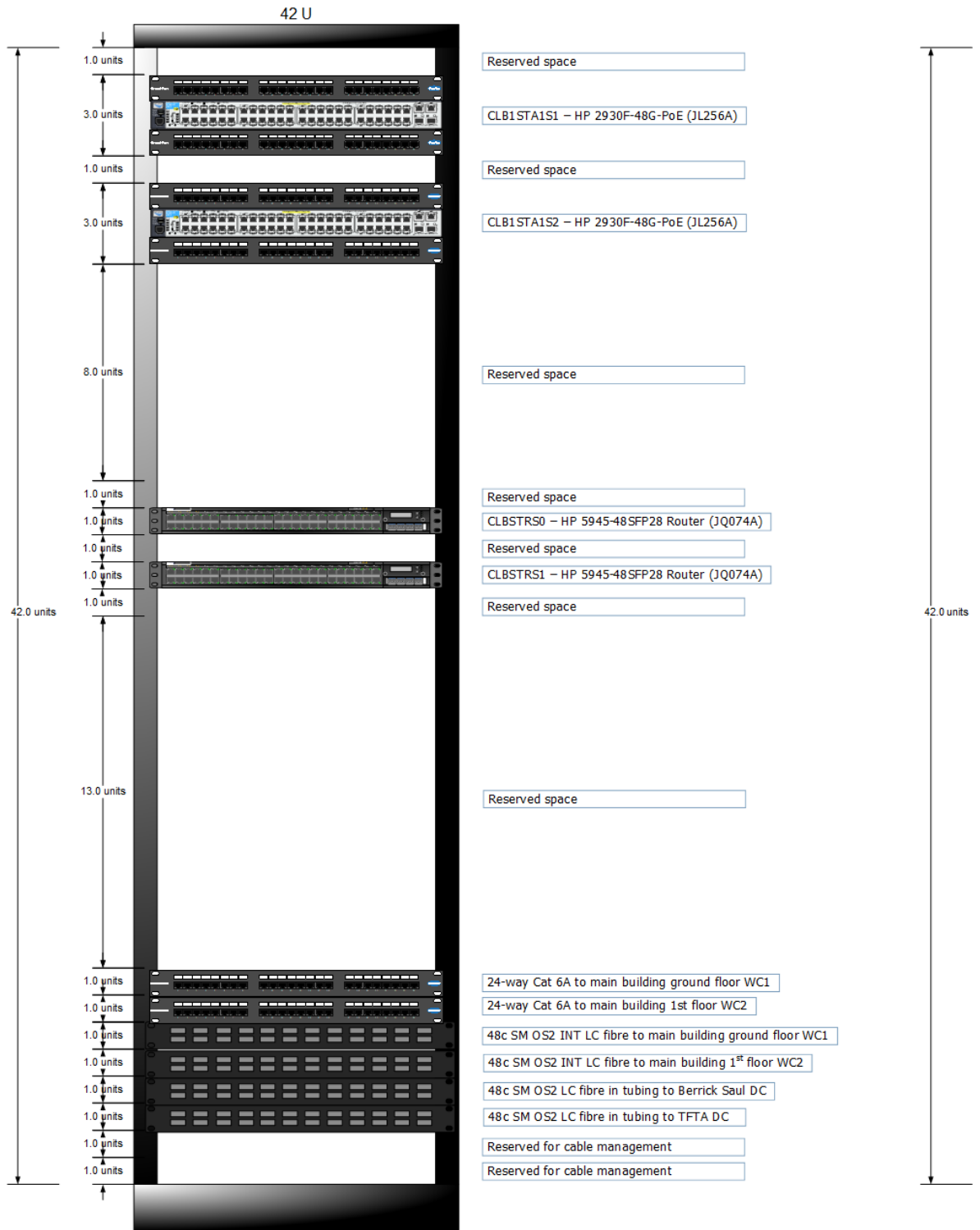
Major wiring centres may require one cabinet reserved for Facilities Management equipment including but not limited to AV equipment, CCTV equipment, Access control equipment, etc. Allowance will be made for third-party equipment such as CCTV equipment and cabinet space will be allocated by University of York IT Services following receipt of space requirements from third parties.

Fibre panels shall be installed starting at the bottom of cabinets, leaving 2U (88mm) at the bottom of the cabinet for cable management.



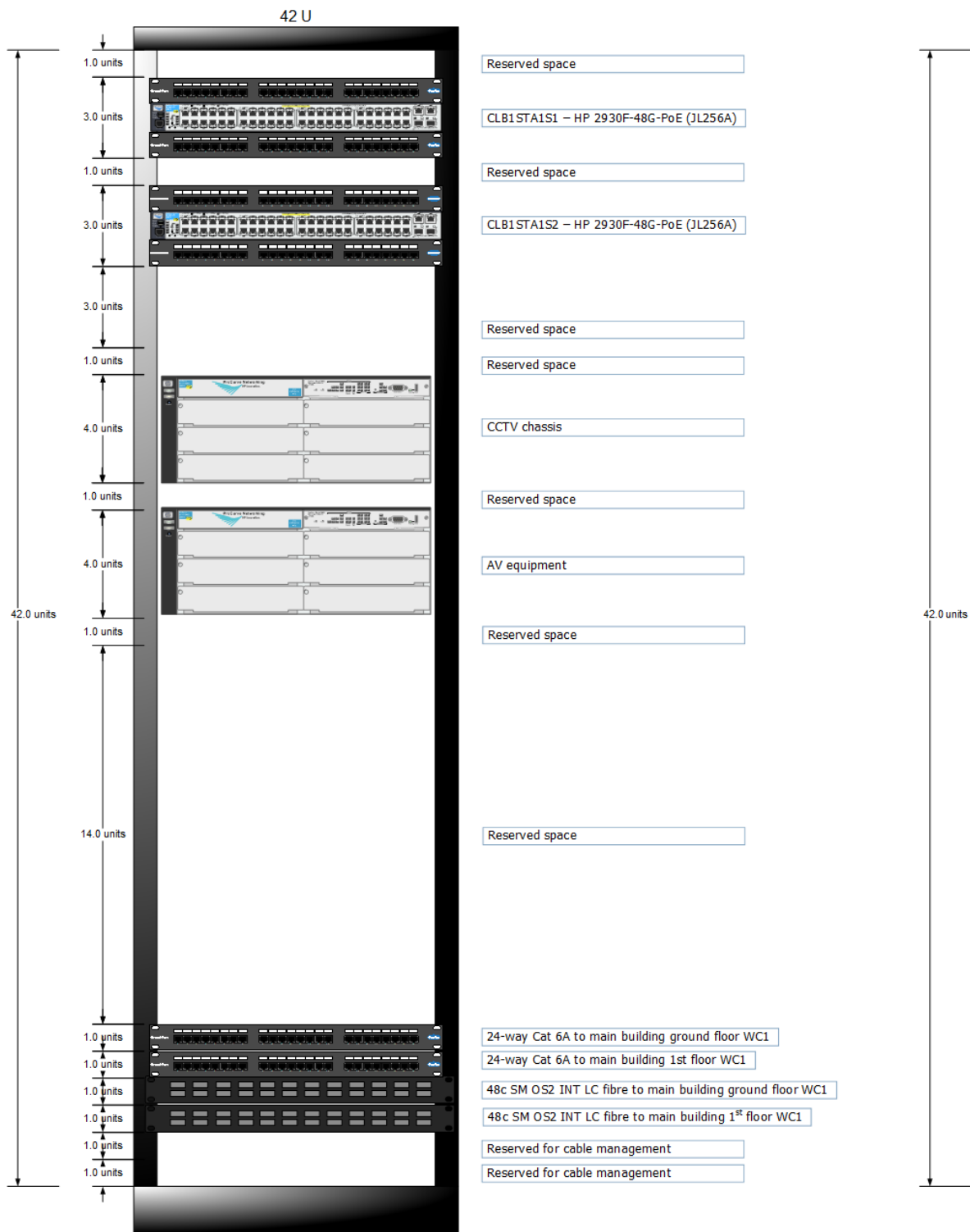
TYMS WC1 (ground floor main building) CL/A/<room ref>		Switch ports available: 336			
		SIZE A4	FSCM NO	DWG NO CLA-WC1-1	REV A
Data cabinet 1		SCALE NTS	SHEET 1 OF 1		
Approved by:					

Figure 1. Example of standard cabinet layout diagram, accommodating 14 patch panels and up to 336 data outlets; space has been left for more sets.



TYMS Annexe WC1 CL/B/<room ref>		Switch ports available: 96			
		Data cabinet 1	SIZE A4	FSCM NO	DWG NO CLB-WC1-1
Approved by:	SCALE NTS	SHEET 1 OF 1			

Figure 2. Example of layout diagram for the first cabinet in a major wiring centre, accommodating two chassis switches for network routing, and several fibre optic panels.



TYMS Annexe WC1 CL/B/<room ref>		Switch ports available: 96			
		FM cabinet 1	SIZE A4	FSCM NO	DWG NO CLB-WC1-1
Approved by:		SCALE	NTS	SHEET	1 OF 1

Figure 3. Example of layout diagram for a “Facilities Management” cabinet in a major wiring centre, accommodating third-party equipment and associated fibre optic panels.

5.3 Installation

Wiring centres, including the exterior and interior of data cabinets, shall be cleaned and free of dust and debris before installation of any active equipment.

Patch panels and other equipment shall be fitted using M6 pan-head Pozidrive screws only, secured to M6 cage nuts.

All equipment shall be aligned vertically on 1U boundaries.

By prior agreement with University of York IT Services only, equipment which is not inherently rack-mounting may be installed on a fixed shelf which shall be aligned on a 1U boundary.

Within cabinets, cable bundles shall be enclosed in cable socks up to the point at which the bundles are split out into individual cables, and shall be affixed to cable trays with Velcro or equivalent non-crushing cable ties.

Sufficient slack shall be left in cable bundles to allow minor repositioning of panels, to at least 1U up or down.

Cables in cabinets shall be suitably dressed such that there is clear space for unimpeded installation of active equipment to the full depth of the cabinet between any two adjacent patch panels.

In multi-storey buildings, outlet terminations for each floor or equivalent aggregated area shall be made on its own group or groups of panels, and wherever practical in its own data cabinet.



Figure 4. Cabinet layout after patching with 0.25m patch leads, showing groups of two 1U 24-port Cat.6A patch panels, located above and below a 48 port PoE switch. Note gaps left to facilitate maintenance and airflow. Note also the dressing of the infrastructure cables to facilitate the switch installation.

When additional outlets are installed from any wiring centre, unused sections of patch panels shall be utilised before adding additional patch panels.

Data patch panels must be high-density *i.e.* 24 sockets per 1U height.

Each patch panel must be earthed to the manufacturer's specifications.

Data outlets, RJ45 patch panels and fibre optic patch panels shall be labelled in accordance with **Section 6**.

Each cabinet must be fitted with a power distribution unit with the following features:

- Zero U
- 16A single phase input from a commando socket as detailed in **Section 3.4**
- Minimum 10-standard 3-pin 13A sockets
- Bottom fed with a cord length of approx. 2.5m

The PDU should be mounted at the rear of each data cab in a location which doesn't impede installation of the active equipment. Where a UPS is present in the wiring centre, an additional un-switched PDU with IEC 320 C13 socket connectors must be fitted to each cabinet.

Each cabinet must be provided with earth bonding, which must be installed to comply with the requirements of any shielded cable which may be installed, and of IET Wiring Regulations, including bonds to the doors and side panels.

Where more than one cabinet is present, they must be bolted together ("bayed").

6. Labelling

6.1 External fibre optic cabling

External fibre optic cables shall be labelled at each end and in each access chamber using a suitably durable marker *e.g.* Critchley, Traffolyte or laser-etched perspex.

Cable markers should use the following convention:

- Department code (University of York four digit code),
- Space character,
- Fibre core count and type,
- Space character,
- Start point consisting of building code and wiring centre number,
- Space character,
- The word 'to',
- Space character,
- End point consisting of building code and wiring centre number,
- Space character,
- Sequence number (one digit)

Example 1:

The second of two 48c SM IT Services cables running between Alcuin College D block wiring centre 1 and Alcuin Teaching Block wiring centre 1 will be labelled:

0087 48C SM A/D WC1 to -ATB WC1 2

Example 2:

A single 48c SM IT Services cable, running between Goodricke College Baker Court block A2 and Goodricke College Sheldon Court Substation:

0087 48C SM GBA/A2 WC1 to GSH/SUB WC1 1

Commonly used departmental codes are:

- 0087 IT Services
- 0244 Telephony
- 0238 Estates and Campus Services
- 0246 Security Services
- 0006 Computer Science

Micro ducts shall be labelled at each end, in each access chamber and where they are diverted or "tee'd" from the rest of the bundle, in the same style as fibre optic cables.

6.2 Internal fibre optic cabling

Internal fibre optic cables shall be labelled in every inspection location *e.g.* electrical risers and to the same standard as that detailed for external fibre optic cables (see *Section 6.1*).

6.3 Fibre optic patch panels

Fibre optic panels shall be labelled with the number of cores, the type of cable (single mode or multimode), the source and destination locations and the sequence number. For example:

48C SM A/D WC1 to IT Services WC1 1

6.4 Data outlets

Rooms and other spaces must be allocated their final space codes before labelling data outlets or patch panels. Outlets and patch panels shall not be labelled with interim numbers which may be indicated on, for example, architect's plans prior to completion of building works.

By convention the University of York numbers rooms with three digits, of which the first is the floor number. For example, room A/D/131 is located on the first floor of Alcuin College D block. All building codes and space codes will be supplied by the University.

Room outlets shall be labelled according to the following convention, with the elements separated by slashes '/' except the outlet number, which must be separated by a dash:

- building code (*e.g.* 'A/D' for Alcuin College D block)
- wiring centre number (*e.g.* '1' for Wiring Centre 1 in the building)
- room number
- outlet number within the room

For example, the first two sockets (*i.e.* the first dual data outlet) in room A/D064; that is room 64 on the ground floor of Alcuin College D block, which is fed from Wiring Centre 2 in that building will be:

A/D/2/064-1 A/D/2/064-2

Room outlets shall be clearly labelled with black lettering in a plain typeface on a white background, and the lettering shall be no less than 3mm high (*e.g.* 12 point Helvetica).

Self-adhesive labels are preferred.

6.5 Patch panels

Individual terminations on patch panels shall be labelled with room number and outlet number (only) within the room. For example, a connection to the third and fourth outlets in room 123 (in any building) would be labelled merely:

123-03 123-04

Patch panel ports shall be clearly labelled with black lettering in a plain typeface on a white background, and the lettering shall be no less than 3mm high (*e.g.* 12 point Helvetica).

Self-adhesive labels are preferred.

7. Acceptance testing and documentation

7.1 Structured cabling

University of York IT Services will not patch or “make live” data outlets until they are in receipt of the necessary documentation described here.

All data cable related work, including cable installation, re-installation, rework, modification, or movement of data outlets, trunking or containment replacement, and any other work that involves adding, repairing or moving outlets or their cabling shall be tested and (re)certified according to the approved regime and standards.

Acceptance of data cabling and associated infrastructure by University of York IT Services is conditional on receipt of as-fitted drawings showing positions of the dual data outlets with correct outlet labelling, schedules of panel connections, and valid test results.

All wiring installations shall be tested to ensure conformity with Category 6A, BS EN 50173 or IEC 11801, or better. Note that European standards are revised from time to time and adoption of the latest standards will normally be expected.

Test results shall be delivered in electronic form as Fluke Linkware files or Ideal Networks DataCenter showing the complete test results to Cat.6A standards as appropriate, for each outlet.

As-fitted drawings shall be delivered in electronic format as PDF and DWG documents and shall be of sufficient resolution to read data outlet designations when printed at A3 size. They shall consist of one or more A3 pages per floor, if necessary with floors split over multiple pages with an overlap to allow for recombination.

All wiring installations must be supported by a manufacturer’s Performance Warranty or equivalent, valid for a minimum of 20 years. Documentary evidence in the form of the manufacturer’s certificate for the specific installation must be provided in support of this.

7.2 Fibre optic installations

Fibre optics shall be terminated in pairs on LC duplex connectors fitted to patch panels in accordance with *Section 2.3*. The fibre optic cables shall be labelled in accordance with *Section 6.1*, *Section 6.2* and the panels shall be labelled in accordance with *Section 6.3*.

Each pair in a fibre optic installation shall be fitted as a crossover. Because fibre optic connections require overall Tx-to-Rx crossover connections, this is essential in order to preserve an odd number of Tx-to-Rx crossovers when patching.

All fibre installations shall be tested to produce measurements of both ILM (Insertion Loss Measurement) and OTDR (Optical Time Domain Reflectometry). ILM tests shall be conducted from both ends. The test results shall be provided to IT Services in electronic form, either as Ideal Networks, Fluke Linkware or SOR files.

Acceptance of fibre optic cabling and associated infrastructure by University of York IT Services is conditional on correct outlet labelling and receipt of valid test results.

8. Connected equipment

8.1 Registration

Unless otherwise directed by University of York IT Services Network Operations staff, equipment shall not be connected to any part of the University network until it has been properly registered in the LAN database, an IP address and a hostname has been allocated, and the relevant part of the “Facilities Network” has been made accessible.

Requests for allocation of IP addresses for “Facilities Management” type devices such as BMS, CCTV, EPoS, Access Control, emergency lighting, alarm systems, and other equipment can be made via the “Moves & Changes” web-based system or by raising a call with the IT Service Desk see *Section 11*.

Only the contractor actually installing the equipment may request device registration.

Note that it may take several days to satisfy IP address requests, especially where the secured parts of the “Facilities Network” have to be created specially.

Equipment shall be labelled with the hostname allocated by University of York IT Services, and this name must be included in any communication with University of York IT Services.

If any equipment is relocated or replaced, University of York IT Services must be informed of the change of location or MAC address and the new or relocated equipment shall not be (re)connected until authorised. In some cases this may require allocation of a different hostname.

8.2 Prohibitions

In most circumstances, all standard active network equipment (routers, switches and WiFi access points) shall be funded by the construction/refurbishment project but specified and/or provided by the University of York IT Services. Exceptions to this are to be negotiated with the University of York IT Services in advance of the project. Other, specialist equipment that include an element of networking may be provided by contractors but can only be connected to the network through consultation with University of York IT Services.

No local or private network switches or wireless devices are permitted on the University network. All devices must be connected directly to University network outlets.

No other equipment operating in the 2.4GHz or 5GHz bands is permitted on the University campus, except for certain very-low-power devices operating at 2.4GHz with the written permission of University of York IT Services.

All other network-connected equipment shall be installed by the relevant contractor, in compliance with safety and positioning requirements advised by University of York IT Services, and shall be connected directly to a data outlet.

9. Approved manufacturers and cabling systems

9.1 Augmented Category 6 (Cat.6A) infrastructure

Solutions are welcomed from the following manufacturers:

Leviton shielded Cat 6A

Hellerman Tyton shielded Cat 6A

Siemon shielded Cat 6A

9.2 Blown fibre components

Blown fibre solutions are welcomed from the following manufacturers:

Leviton

Emtelle

TFK

Siemon

10. Compliance

10.1 Legislative compliance

All solutions must comply with current legislation in particular, but not limited to, Part M Building Regulations 2013 (or subsequent version) specifically, 'Access to and use of buildings'.

10.2 Directorate of Estates and Campus Services requirements

All contractors must comply with University of York contractor competency requirements. Please see 'Contractor Competency Check List' on the following web page:

<https://www.york.ac.uk/admin/estates/operations/business/helpdesk/Contractorinfo.html>

(N.B. – University control may not be necessary if operating in a CDM or “closed” site).

10.3 Technical compliance

All structured cabling systems and their installation must comply with the following standard as applicable. As these standards are updated from time to time a contractor is expected to work to the latest version:

- BS EN 50173
- BS EN 50174
- BS EN 50310
- BS EN 50346
- IEC/ISO 11801
- BS6701: Amendment 1-2017
- BS7671: 18th Edition

10.4 Approved installers

For reasons of warranty, all installations must be undertaken by a contractor that is a manufacturer approved installer for the system being installed (see *Section 9*) with the installation backed by a minimum 20 year manufacturer's warranty.

11. Document updates, website references and IT Service Desk details

11.1 General requirements

This document will be updated periodically. Anybody using this document especially contractors and Project Managers should ensure they are working to the latest version by visiting:

<http://www.york.ac.uk/it-services/info/contractors/>

11.2 Useful websites

To request device registration and obtain IP addressing details please visit:

<https://www.york.ac.uk/it-services/services/moves/>

or

contact the IT Service Desk (*see Section 11.3*)

11.3 IT Service Desk details

To contact the IT Service Desk to request a device registration or raise a general enquiry please ring 01904 323838 or e-mail: ITSupport@York.ac.uk or visit:

<http://www.york.ac.uk/it-services/>

12. University of York staff

Job title	Post holder	Responsible for	Contact details
Head of Networking		Strategic planning; University committee representation; IT Services budgets; data centres	Email: Tel: 01904 32nnnn
Network Operations Manager	Mrs E Coultish	Network operations; installation and commissioning; procurement; contractor and Estates Services liaison	Email: eleanor.coultish@york.ac.uk Tel: 01904 328467
IT Infrastructure Projects Manager	Mr G Borwell	Project management; contractor management and Estates Services liaison	Email: gary.borwell@york.ac.uk Tel: 01904 323888
Network Technician	Mr D Munday	Installation and commissioning; contractor management and Estates Services liaison	Email: darren.munday@york.ac.uk Tel: 01904 328469
Unified Communications Manager	Mr S Wielgosz	Unified Communications strategic planning, contract management	Email: stefan.wielgosz@york.ac.uk Tel: 01904 323826