



St-02 Communications Cabling Infrastructure

(Combined document from ACT Public Health standards ST-01, ST-02 & ST-03)

Version 2021.1.0 Approved



Please Read

IMPORTANT COMPLIANCE REQUIREMENTS

Note: The following instruction applies to all documents in this library.

1. This is a controlled document and is reviewed every two years. The last review was carried out in March 2021. If you are viewing this document after March 2023, you will need to contact the sender to confirm you are working from the latest revision.
2. It is the responsibility of the contractor/vendor to read and adhere to the procedures, processes and guidelines set out in the following document when quoting for or carrying out work for the ACT Public Health System Sites.
3. If you have questions or require clarification of any of the procedures, processes or guidelines in the following document please contact the sender of the document in writing with your questions so that a formal response can be provided. If any specific requirement is unclear, it is expected that clarification will be sought from the ACT Public Health System's Digital Solutions Division (DSD) Critical Systems Infrastructure (CSI) Hub- Information Communications and Technology (ICT) architect(s), rather than a decision made and a design implemented and based on unclarified assumptions.
4. These standards are applicable to ALL ACT Public Health System Sites or any work funded by ACT Health Directorate (ACTHD) (e.g. Calvary, ACTHD provided NGO sites) unless specifically exempt.
5. All Greenfield ACT Public Health System Sites are expected to be fully compliant with all appropriate standards.
6. Brownfield ACT Public Health System Sites undergoing refurbishment should be fully compliant unless an exemption is provided by DSD's CSI Hub.
7. In the event of any design non-compliance issues, a Departures document must be completed and submitted to DSD's CSI Hub. These issues should be resolved, in consultation with DSD's CSI Hub, as soon as possible within the project process and explicitly prior to site handover.
8. While some test cases have been cited within these documents as examples, the list is not exhaustive, and all appropriate test procedures shall be formulated, approved prior to testing and testing shall be performed by the client system administrators before full acceptance can be signed off by the Senior Director CSI Hub.

IMPORTANT:

Any departure from the standard, whether intentional or in error shall require a completed Departures Document to be submitted to DSD CSI Hub for approval.

Any non-compliant designs without a pre-approved Departures Document by completion of the project or a nominated milestone or gateway, will require remediation by the Head Contractor at the Head Contractors cost.

Document Review

(to review detailed document updates click here)

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Document Next Review

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Document Owner

Name	Location
Senior Director, CSI Hub, Technology Operations, ACTHD	DSD, CSI Hub, Technology Operations. ACTHD

Document References

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Old St-01,02 & 03	01,02 & 03	

Contents

Introduction.....	6
1. Design Constraints.....	7
1.1. Overarching Design Requirements	7
1.2. Mandatory Australian Standards	7
1.3. Detail Design Variation to Standards	8
1.4. Additional Requirements	8
1.5. Quality Standards.....	8
2. Quality of Workmanship.....	9
2.1. Compliance with Standards	9
2.2. Reservation Inspections	9
3. Application Support.....	10
3.1. Telecommunications.....	10
3.2. IP Delivered Applications	10
3.3. Data Networks	10
4. Occupational Health & Safety.....	11
4.1. Inductions	11
5. Earthing Requirements.....	12
5.1. Comms rooms	12
5.2. Miscellaneous Earthing.....	12
6. Pathways.....	13
6.1. Brown-fields sites.....	13
6.2. Fibre Duct.....	13
6.3. Cable Basket.....	14
6.4. Catenary Wire	15
6.5. Conduits	15
6.6. Ramset™ Cablemaster™ or equivalent fixings	16
6.7. Sealing for Fire, Smoke and General Penetration Requirements	16
6.8. Cable Path Access Hatches.....	16
6.9. Painting and Corrosion Protection.....	16
7. Horizontal Cabling	17
7.1. New Buildings	17
7.2. Existing Buildings (Zone refurbishment)	17
7.3. Exceptions.....	17
8. Telecommunications Outlets.....	18
8.1. Telecommunications Outlet (TO) Wiring	18
8.2. Specification.....	18
8.3. Wall Mounted Outlets	18
8.4. Ceiling and Specialised Mountings.....	18
8.5. Wireless Access Point Telecommunications Outlet Requirements.....	18
8.6. Distributed Antenna System (DAS) Telecommunications Outlet Requirements	18
8.7. Fourth Utility Telecommunications Outlet Requirements	19
9. CD/BD/FD Termination Hardware (RJ45 panels).....	20

9.2.	Green Field Buildings / Green Star Rated Installations	20
10.	Consolidation Points (CP)	21
11.	External Structured Cabling Support	23
11.1.	Additional Requirements for the installation of Outside Plant.....	23
11.2.	Pit and Conduit Installation.....	23
11.3.	Cable Termination.....	23
11.4.	Outdoor Rated Category 6/6A patch cords.....	23
11.5.	Copper Cable Routes Exceeding 90 metres	24
11.6.	External Cable Entry Pathways	24
12.	Category 6A Copper Patch Cord and Fly Leads	25
12.1.	All patch and fly leads shall comply with the following criteria:.....	25
12.2.	Standard colours ACT Public Health System Sites.....	25
12.3.	Patch Cords	25
12.4.	Fly leads – Connecting Telecommunications Outlet to end Device.....	26
13.	Backbone Cabling	27
13.1.	General Fibre Backbone Cabling Requirements.....	27
13.2.	Campus External Optical Fibre Ring Backbone	27
13.3.	Non-Campus External Fibre	28
13.4.	Internal Building Optical Fibre Backbone.....	28
13.5.	Enclosures for Optical Fibre Equipment.....	29
13.6.	Required Optical Fibre Accessories.....	30
13.7.	Required Fibre Documentation.....	30
14.	Fibre Patch Cord and requirements.....	31
15.	Installation Testing	32
15.1.	General Requirements	32
15.2.	Copper & Fibre Cabling Testing.....	32
15.3.	Additional Copper Testing for Power Over Ethernet (POE).....	33
16.	Labelling Conventions.....	34
16.1.	Schematic.....	34
16.2.	Labelling Cabinets single row.....	34
16.3.	Labelling Cabinets multiple rows	34
16.4.	Patch Panel Labelling methodology	34
16.5.	Field Telecommunication Outlets	36
17.	Documentation.....	37
17.1.	Hand-over Documentation Requirements.....	37
Appendix A -	Document Details.....	38
	Abbreviated Terms, Acronyms and Definitions	38
Appendix B -	CHS Induction Process	42
Appendix C -	Outdoor Fibre Plant	43
Appendix D -	TCH Campus Topology	44
Appendix E -	Approved Cable Basket Installation Examples	46
Appendix F -	Details of Changes.....	49

Introduction

The ACT Public Health System Building's Cabling Infrastructure document must be used to ensure Communications Cabling will comply with ACT Public Health System's requirements for a specific site, building, campus infrastructure or individual floor requirements.

It will be used in conjunction with the other ACT Public Health System's ICT Standards to ensure the communications infrastructure is fit for purpose on completion, and able to cater for any reasonably expected future expansion.

Installation contractors shall be assigned in line with the requirements of the ACT Government Structured Cabling Panel.

The contractor shall be certified by the manufacturer for the communications infrastructure being installed. For example, if installing CommScope SYSTIMAX they must be SYSTIMAX certified. In addition, on building projects the contractor shall have the required trained & certified designer required by the manufacturer and installers working on ACT Public Health System projects.

Compliance with this standard is mandatory.

Within all ACT Public Health System ICT standards documents, the term 'Shall' denotes a mandatory requirement.

Any proposed/unplanned deviations from this standard shall be provided to ACT Public Health System's DSD CSI Hub's Solution Architecture team at the planning stage in the first instance, in the form of a Departures document.

DSD's CSI Hub will respond to the proposed Departures document following an impact assessment on critical clinical and other critical non-clinical systems by DSD and their respective Solution Architecture teams.

The Head Contractor is expected to develop a thorough understanding of the cabling infrastructure requirements outlined within this document.

The Head Contractor or the nominated sub-contractor shall comply with the latest version of all ICT International and Australian standards that are relevant to the following:

1. Fibre, copper, and coaxial cabling.
2. Building code.

In addition to the above referenced documents and requirements, the installation contractor shall reference and comply with the Digital, Data and Technology Solution's Structured Cabling Standard (latest version).

A companion document to this standard is the associated CL-02 checklist document which provides an itemised summary of all standards required in an easy to follow, check off list.

1. Design Constraints

1.1. Overarching Design Requirements

ACT Public Health System's cabling infrastructure is based on an interconnect design and is required to support a wide range of applications.

The system is based around three distinct product sets:

- Copper Infrastructure, Category 6A, from SYSTIMAX by CommScope;
- Fibre backbone, OM4 and OS2 plus 'FRE' style MTP termination hardware, from AFL; and
- Cabinets from Server Rack Australia (SRA) and outdoor specialist cabinets from ICS.

1.1.1. All new installations shall comply with the above product sets.

1.1.2. It is mandatory that all cabling works are performed by cabling technicians who are certified by the respective infrastructure manufacturers. For large projects contractors shall be selected from the ACT Government Digital Marketplace (DTA) panel

Note: A list of current companies registered on the DTA panel can be provided on request by the DSD ICT Architecture team.

1.2. Mandatory Australian Standards

The following paragraphs state mandatory requirements for standards

1.2.1. All materials and the quality of workmanship shall comply with the latest version of standards listed below in table 1.

Where no Australia Standard exists, use the International Standard as published by the International Standards Organisation including subsequent amendments. Should conflict arise between the requirements of a nominated standard and this Specification, the later shall prevail.

A	AS/NZS 11801-1	General requirements
B	AS 11801-2	Office premises
C	AS 11801-3	Industrial premises
D	AS 11801-5	Data centres
E	AS 11801-6	Distributed building services
F	AS/NZS 3000	SAA Wiring Rules (latest Edition)
G	AS/NZS 3084	Telecommunications Installations – Telecommunications Pathways and Spaces for Commercial Buildings
H	AS/NZS 3085.1	Telecommunications Installations – Administration of Communications Cabling Systems
I	AS/NZS ISO/IEC 61935.1	Testing of Balanced Communications Cabling in accordance with ISO/IEC 11801 – Installed Cabling

J	AS/ NZS ISO/IEC 61935.2	Testing of Balanced Communications Cabling in accordance with ISO/IEC 11801 – Patch Cords and Work Area Cords
L	AS/ NZS ISO/IEC 14763.3	Telecommunications Installations – Acceptance Testing for Optical Fibre Cabling
M	AS/NZS 3260	Safety of Information Technology Equipment Including Electrical Business Equipment. (latest Edition)
N	AS/NZS 3548	Electrical Interference – Limits and Methods of Measurements of Information Technology Equipment. (latest Edition)
	AS/NZS 4251.1	Electromagnetic compatibility – Generic emission standard – Residential, Commercial and Light Industry. (latest Edition)
O	AS/NZS 2053	Conduits and fittings for electrical installations. (latest Edition)
P	AS/NZS 3594	Information Processing Systems – Interface connector and contact assignments for ISDN basic interface located at ref. points S and T
Q	AS/NZSISO 9002	Quality Systems – Model for quality assurance in production, installation and servicing.
R	AS/CA S008	Requirements for authorised cabling products
S	AS/CA S009	Installation requirements for Customer Cabling (Wiring Rules)

Table 1

1.3. Detail Design Variation to Standards

These Standards shall apply for installation activity.

Due to specific circumstances for a site, the approved Scope of Works may be at variance to these Standards. In this instance, this document still applies, unless otherwise approved through departures document.

Smaller projects that do not have detailed scope of works shall comply with this document unless the Contractor is issued with written variation from ACT Public Health System’s Digital Solutions Division (DSD).

1.4. Additional Requirements

The applicable standards shall be used in conjunction with the site-specific requirements for any given site.

The scope of works may include specific schematics for:

- Cable pathways.
- Cabinet/Rack Layouts; and
- Distributor Layouts.

1.5. Quality Standards

The Contractor shall have a quality system in place that conforms to the requirements of ISO 9000 series of quality related standards or shall provide details of progression toward accreditation to the relevant standard.

2. Quality of Workmanship

This section describes the minimum requirements for the testing, inspection, and commissioning of the installation.

2.1. Compliance with Standards

In addition to anything specified herein, all works, and materials shall comply with all relevant International and local standards.

- 2.1.1. The Contractor shall provide all regulatory approval documents.
- 2.1.2. Without exception, the contractor shall follow all manufactures installation guidelines. Where a variation is required to adhere to these guidelines, the contractor shall mediate with the site manager. ACT Health DSD will not accept cost variations to remediate works against these guidelines. It is the contractor's responsibility to be aware of what the manufacturer's guidelines contain.
- 2.1.3. Any such variation between the contractor and site manager shall be documented, the documentation shall be counter signed by both parties, the Head Contractor/Contractor and DSD CSI Hub and included in the hand over documentation.

2.2. Reservation Inspections

- 2.2.1. The contractor in the presence of the site manager shall conduct installation inspections. These inspections shall be conducted on a weekly basis or as required, prior to the programmed site meetings and shall include inspectors from DSD CSI Infrastructure.
- 2.2.2. Any irregularities/anomalies highlighted shall be incorporated into the formal site meeting minutes. The recorded irregularities/anomalies shall be discussed, and a rectification plan put in place. If deemed necessary, the matter may be referred to the manufactures engineer for appraisal. Where possible these irregularities/anomalies shall be rectified before the next site meeting.
- 2.2.3. Contractor shall coordinate project inspections with a manufacturer CommScope, SYSTIMAX® representative and ACT Health DSD, 14 days prior to the following installation phases;
 - 1. At commencement of any horizontal copper cabling installation (Cable pathways all installed).
 - 2. At the stage that 50% of the cabling terminations are completed.
 - 3. As outlined within ACT Health ICT standard "ICT Inspection Hold Points"

These inspections relate to all projects and major building renovations.

On smaller installations, these visits will be at the discretion of ACT Health DSD, and contractor will be notified of any visit occurring.

3. Application Support

The structured cabling system shall be capable of supporting the following services:

3.1. Telecommunications

- 10Gb/s Ethernet data
- Voice over Internet Protocol (VoIP)
- Telephone/Fax
- Asymmetric Digital Subscriber Line (ADSL)
- Very High-Speed Digital Subscriber Line (VDSL)
- National Broadband Network (NBN)
- Digital Data Storage (DDS)
- Integrated Services Digital Network (ISDN)

3.2. IP Delivered Applications

- Building Automation Systems (BAS)
- Building Management and Control Systems (BMCS)
- Energy Management System (EMS)
- Nurse Call
- Digital Lighting Control including Emergency lighting
- CCTV
- Security
- Access control
- AV services (including Audio, IPTV & Digital Signage)
- Distributed Antenna System (DAS)
- Various assorted digital devices (e.g., room booking screens, Data Networks)

3.3. Data Networks

- IEEE 802.3
- IEEE 802.11 (Wireless LAN) (802.11n, ac, ax)
- IEEE 802.af, at, bt (af POE-15/12.95W), (at POE-30/25.50W), (bt POE-90/70.00W))
- IEEE 802.15.4 (Zigbee)
- ISO 16484-5 (BACnet) & BACnet/IP
- Modbus over TCP/IP
- 100Base-TX, FX
- 1000Base-T, SX, LX
- 10GBase-T
- 10GBase-SR/SW

4. Occupational Health & Safety

4.1. Inductions

Working within the ACT Public Health System, requires different procedures, requirements and inductions depending on the “controller” of the individual building site. There are distinct “building management” groups within the ACT Public Health System, and some of these are:

- a. Canberra Health Services – e.g., Canberra Hospital and Walk in Centres, etc.
- b. Health Directorate – e.g., Ngunnawal Bush Healing Farm.
- c. Calvary Hospital and associated sites – e.g., Calvary, Clare Holland House etc; and
- d. ACT Property Group – e.g., Moore St,

The required induction process will be identified by the assigned Project Manager.

Contractors are to note that site induction may differ from site to site. for example, the site induction for Bowes St may differ from that of Centre of Health and Medical Research. Hence it is the responsibility of the contractor to ensure Contractor Safety Information and Induction information check list are obtained for the respective site prior and induction attend prior to commencing any work on site.

- 4.1.1. All Contractors that perform any work on an ACT Public Health System Sites are to undertake a site-specific safety induction.
- 4.1.2. No Contractor is permitted to commence any work on a site without having completed the site-specific safety induction process and received their personal ID card
- 4.1.3. The selected Contractors shall hold all relevant state & current industry work certificate cards.
- 4.1.4. Any works within CHS sites that may cause a disturbance, disruption, or possible outage, must lodge a Disturbance or Interference with Services, Safety or Traffic (DISST) application form. All DISST application forms are to be Lodged by COB Thursdays for approval meeting 2pm following Tuesdays. As part of the DISST process, contractors may be required to provide further documentation such as ACT *traffic management plans* or x-ray wall scans.

Note: All CHS Sites will require a lodgement of DISST document and have approval from the relevant authorities for approval 10 days prior to commencement of works

5. Earthing Requirements

Note: Sizing of Earthing conductors shall be as per AS3000 and AS/CA S009 (latest revision).

5.1. Comms rooms

- 5.1.1. All distribution frames and cabinets shall be connected to the building protective earth (PE) as, specified for each case in AS3000 and AS/CA S009 (latest revision).
- 5.1.2. In all communications rooms including BDs, earthing shall be connected back to a large copper earthing strip located on the wall above and at the end of the cabinet row (See Figure 1: Comms Room Copper Earthing Strip).
- 5.1.3. Cables with metallic sheaths will be earthed at one end only, on the matching Category patch rail, installed within the communications room. Each individual patch-rail shall then be earthed to the earthing bar within its relevant communications rack. Comms room earth will then be tied to the building protective earth via green/yellow conductor and sized accordingly as per AS3000 and AS/CA S009 (latest revision).
- 5.1.4. All cabinets shall be connected together using the manufacturers “t” brackets at front and rear of each cabinet, with each cabinets earth bar also earthed independently back to the room copper earthing strip (See Figure 1: Comms Room Copper Earthing Strip).



Figure 1: Comms Room Copper Earthing Strip

- 5.1.5. All equipment requiring earthing shall have an individual earth strap to the cabinet earthing bar.

5.2. Miscellaneous Earthing

- 5.2.1. All metallic pathways, cable baskets and catenary wires shall be connected to the building protective earth (PE) as, specified for each case in AS3000 and AS/CA S009 (latest revision).

6. Pathways

All copper and fibre cable shall be supported by a Standards compliant pathway, (AS/NZS 3084).

Pathways shall be comprised of a combination of the following products:

- Fibre Duct (yellow), or dedicated basket (DB) in BD's.
- Cable Basket dedicated to copper cabling.
- Catenary Wire; and
- Conduit.

6.1. Brown-fields sites

- 6.1.1. In all brown-fields sites, all existing structured cabling shall be taken into consideration when determining the structured cabling reticulation design.
- 6.1.2. New infrastructure shall not disregard existing cabling which requires cable support remediation. This requirement is regardless of whether it is possible to remediate the existing infrastructure or not.
- 6.1.3. If the existing state of a pathway indicates the requirement for an improved reticulation solution it shall be the responsibility of the cabler to quote and install the required solution to ensure a pathway does not continue to deteriorate.
- 6.1.4. The cabler shall confirm the sizing of new pathways with DSD CSI Solutions Architecture team.
- 6.1.5. The cabler shall secure existing structured cabling along new cable support structure where possible.

EXAMPLE: A hallway is to have four new structured cabling runs installed, the cabler identifies that there are approximately 50 loose-laid runs pre-existing and supported only by the ceiling tiles. The cabler is required to install a cable basket to support the existing and new infrastructure.

NOTE: All Pathway Routes and construction shall be verified by DSD's CSI Hub, Solution Architect(s) or their appointed Site Manager, before the commencement of any installation.

6.2. Fibre Duct

- 6.2.1. Entry of building entry fibres or FD to BD trunk cables into the cabinet A of a BD room shall use a separate approved Fibre Duct (yellow), or dedicated 150mm basket within the BD room.



Figure 2: Example of yellow fibre duct and basket entering a Building Distributer cabinet A

6.3. Cable Basket

- 6.3.1. For all sites and new installs a Cable basket system shall be used for structured cabling runs greater than four metres or containing more than 6 cables.
- 6.3.2. All new cable basket installations shall have a floor plan developed showing sizes of basket and catenary paths along with seismic restraint locations (If located in Ward areas) for approval prior to any installation starting.
- 6.3.3. The cable basket shall be constructed with open wire mesh, hot-dipped galvanised, with all cross connections (“T” joins), joining on the same level plane. Basket side section where join occurs shall be cut/bent to avoid any obstruction, be smooth and have no sharp edges left. The internal curves created by the walls of the basket shall be such that the bend radius of the curve, against the cables is not less than the manufacturers minimum bend radius (See examples in Appendix E - Approved Cable Basket Installation Examples). When there is a turn in the cable basket e.g., 90° bend, a slow sweeping bend shall be manufactured by removing every second section of basket wall (see below). Changes in height shall be done by bending the basket down or up, with a curve created such that curve created does not create a bend less than the manufacturers minimum bend radius. i.e., a right-angle bend along a basket cross member is not accepted.
- 6.3.4. The cable basket shall be designed such that after completion of the current project cable installation, the installed cables consume no greater than 2/3 (two thirds) basket capacity, i.e., 1/3 (one third) spare capacity for later non project cabling. This applies to all Green Field (new construction). For Brown Field sites, existing baskets may be used up to basket capacity (i.e., level with top of basket sides). Anything expansion beyond this, shall provide a new basket installation; and in this case the cabler shall confirm the sizing of new pathways with DSD CSI Solutions Architecture team.
- 6.3.5. All bends shall be manufactured as sweeping bends such that a consistent sectional radius is maintained (i.e., a basket grid section is the maximum stepped curve), be smooth and have no sharp edges left. radius (See examples in Appendix E - Approved Cable Basket Installation Examples).
- 6.3.6. Basket width available shall include 150, 200, 300, 400, 500 and 600mm, dependent on cable load calculation. In new buildings and complete floor/ward refurbishments however, all main corridors and central pathways shall always be installed with a minimum 600mm basket regardless if less than 50% fill expected.
- 6.3.7. Depth of basket shall be either 50mm or 100mm dependent on cable load.
- 6.3.8. All mounting hardware, bends, T-offs and cable waterfalls shall be by the same manufacturer. All basket joins shall use the manufactures steel clamps hardware; Velcro, cable ties or other methods are not permitted.



Figure 3: example of steel clamps

- 6.3.9. A Cable Basket Waterfall with dimensions to match cable basket, shall be provided above each communications rack, with an additional waterfall for each copper patching rack (one per topside left & right entry slots).
- 6.3.10. The space between the basket/waterfalls and the top of cabinets shall not exceed 300mm without deploying a vertical basket for vertical cable support.

- 6.3.11. Installation unless otherwise specified in the specific scope of works shall be to the manufacture's guidelines.
- 6.3.12. For under floor pathways, Cable basket shall be mounted on Uni-strut.
- 6.3.13. Cable loading shall follow the manufactures guidelines.
- 6.3.14. Seismic restraints shall be used in line with Australian standards.
- 6.3.15. Where an existing basket is present and has spare capacity, it can be used, however the DSD CSI Architects must be informed of this to decide whether additional capacity should be added at this time.
- 6.3.16. All baskets shall not have structured cabling attached to the outside of the basket frame.

6.4. Catenary Wire

- 6.4.1. Catenary wire maybe used as a secondary feeder pathway to a cable basket from a termination outlet (TO).
- 6.4.2. Catenary wire shall be comprised of a minimum of seven strand galvanised steel wire.
- 6.4.3. The in-ceiling cable support structure shall comprise catenary wire suitably anchored and supported to the ceiling slab and tensioned by way of turnbuckles.
- 6.4.4. Catenary wire shall be secured to the base building utilising its own fixings and shall never be attached to other services or supports such as cable basket.
- 6.4.5. No more than 6 structured cables shall be run on any catenary wire. Duplicating catenary wires to increase capacity shall not be permitted as a substitute for running cable basket.
- 6.4.6. Catenary wire shall not exceed six metres, structured cable runs greater than six metres should be supported by cable basket.
- 6.4.7. Under no circumstance shall catenary wire be used for under floor reticulation.
- 6.4.8. Catenary wires shall not be used for external aerial installations.

6.5. Conduits

- 6.5.1. Conduits shall be used where cable is required to run within the floor slab, and in such locations where normal pathways are not practical or likely to be unserviceable once construction is completed.
- 6.5.2. Conduit shall also be used in locations and for services that are deemed to have a security risk, for example IP security cameras and door access.
- 6.5.3. Intermediate wiring joints shall not be permitted within conduit or wiring ducts.
- 6.5.4. Inspection tees, elbows, bends, etc. are permitted with the approval of DSD's CSI Hub or their appointed the Site Manager.
- 6.5.5. Where metal conduit is used, ends shall be reamed or filed free of burrs and conduit threads entering junction boxes or fittings shall be at least 10mm long.
- 6.5.6. Where non-metallic conduit is used, all joints shall be secured with the manufacturer's approved adhesive.
- 6.5.7. Any conduit cast in-slab should protrude the surface of the slab a minimum 100mm and located as close as practical to sidewalls and vertical cable baskets and exit the slab perpendicular to the surface.
- 6.5.8. A durable (blue and yellow) draw rope shall be provided in all conduits to assist in subsequent cable installation. The rope shall be fastened securely at each end.

- 6.5.9. As per Australian Standards requirements a minimum of 40% spare conduit capacity shall remain after the initial installation is complete, however expected long term requirements should be provisioned for, if greater than this initial allowance. Consideration should be given to the expected upgrade requirements of any given site before selecting the required size and numbers of conduit.
- 6.5.10. Pull boxes shall be installed along conduit and ducting routes where there is a change in direction and at distances not exceeding 12 metres between pull boxes.

6.6. Ramset™ Cablemaster™ or equivalent fixings

Ramset™ Cablemaster™ or equivalent fixings shall not be used for any structured cabling runs greater than two metres and/or containing more than four cables. These fixings shall only be used as a last resort and final carriage prior to entering a wall-space for termination.

6.7. Sealing for Fire, Smoke and General Penetration Requirements

Please consult ACT Public health standard “St-11 ICT Fire Standard” for all requirements relating to fire/smoke wall penetrations.

6.8. Cable Path Access Hatches

- 6.8.1. Where cable baskets are installed above set ceilings, a 600x600 access panel shall be installed at intervals not greater than 8 metres apart and/or where cable basket direction changes or intersects other cross paths.
- 6.8.2. Access hatch design and placement must be approved by DSD PM, prior to purchase and installation

6.9. Painting and Corrosion Protection

- 6.9.1. The Contractor shall be responsible for corrosion protection and the painting treatment of all brackets, supports, cable ladders, weather shields, etc. being supplied and/or installed by the Contractor.
- 6.9.2. The Contractor shall also be responsible for the restoration to the supplier’s finish (or approved matching equivalent) on any damaged paintwork to equipment and accessories.
- 6.9.3. Other painting and corrosion protection shall be in accordance with the main painting specification for the site.

The finishing coats, including colour and type of paint, shall be advised by the Site Manager.

- 6.9.4. Where no special painting procedure is specified, all metal surfaces shall be wire brushed to remove all traces of rust, scale, grease, and prime coated with one coat of an approved rust inhibiting paint.

7. Horizontal Cabling

7.1. New Buildings

- 7.1.1. For new sites, all copper cabling shall meet the channel requirements of ISO/IEC Class EA and the component requirement of EIA/TIA Category 6A.
- 7.1.2. Only the following structured cabling shall be used:
 - SYSTIMAX® GigaSPEED™ X10D® 3091B ETL Verified Category 6_A U/UTP Cable, **LSZH, white jacket, 4 pair, 760107318 - 3091B WH 4/23 W1000.**
- 7.1.3. All Contractors shall ensure that cables are sourced through the approved Australian wholesale distributor and ensure that the distributor is notified early in the project that the materials are for the ACT Public Health System, so that priority is established.

7.2. Existing Buildings (Zone refurbishment)

- 7.2.1. Check the site-specific requirements of works for verification, with DSD CSI Architect representative prior to procurement of materials.
- 7.2.2. All four-pair cabling shall be installed as per the manufacture's guidelines. Noting the required manufacture's bend radius should be upheld. No tight bends or crushing of cable will be accepted.
- 7.2.3. Where the use of a cable manufacturer different to CommScope, and/or the use of a different Category cable is approved for a site, all other requirements in this standard shall still be required.

7.3. Exceptions

- 7.3.1. The above cabling requirements are mandatory except for specific cases within brownfield (existing) buildings, non-Canberra Health owned sites or non-ACT Health owned sites and shall only be approved by the DSD CSI Architectural team.

8. Telecommunications Outlets

8.1. Telecommunications Outlet (TO) Wiring

8.1.1. All TO's shall be wired to the T568A wiring scheme without exception.

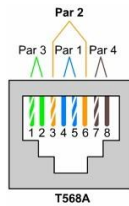


Figure 4: T568A RJ45 Wiring Standard

8.2. Specification

8.2.1. For all Greenfield (new) sites, the ACT Public Health System require the installation of ISO/IEC Class EA / EIA/TIA Category 6A- RJ45, 8 pin modular jack, matching the infrastructure being installed

8.2.2. For all existing brownfield (existing) sites, check the site-specific scope of works for verification with the ACT Health DSD ICT Architecture team prior to procurement of materials.

8.3. Wall Mounted Outlets

8.3.1. Outlets quantities shall be determined by the project and shall be as per 8.2.1 above, mounted in Clipsal 2000 series wall plate and clearly labelled as per **Error! Reference source not found.** REF_Ref64368730 \h * MERGEFORMAT **Error! Reference source not found.**

8.3.2. At minimum, dual outlet wall plates shall be used. Where only a single telecommunication outlet is required, a blanking panel shall be used to fill the vacant slots.

8.3.3. Where flush mounted faceplates cannot be used, a type and site approved surface mount box (SMB) may be substituted following approval from DSD CSI's Solutions Architecture team.

8.4. Ceiling and Specialised Mountings

8.4.1. For mounting in ceiling spaces or internally for pole mounted devices such as CCTV and WAPs a **CommScope SL series** Surface Mount Modular jack, unloaded Box (SMB) **P/N 1-1116697-3** or other infrastructure matching the installed infrastructure can be utilised.

8.5. Wireless Access Point Telecommunications Outlet Requirements

Check the detailed scope of works for each site to ascertain the specific requirements.

8.5.1. All wireless access points shall be serviced with a minimum of two Telecommunications Outlets.

Note: Please consult the *ST-04 Wireless Network standard for the complete requirements for Wireless Access Point installation.*

8.6. Distributed Antenna System (DAS) Telecommunications Outlet Requirements

Check the detailed scope of works for each site to ascertain the specific requirements.

8.6.1. Digital DAS points shall be serviced with 2 or 4 Telecommunications Outlets.

Note: Please consult the ST-04 Wireless Network standard for complete requirements for DAS, TRN and wireless point installation.

8.7. Fourth Utility Telecommunications Outlet Requirements

Applications and Outlet requirement will vary from site to site, Check the detailed scope of works for each site to ascertain the specific requirements.

The fourth utility may consist of any of the following IP based systems.

- Building Management & Control Systems (BMCS)
- Energy Management Systems (EMS)
- CCTV (Avigilon)
- Security Intercom (Jacques)
- Access control
- Nurse call (Master call point)
- Audio and/or Video services
- Digital Addressable Lighting Interface (DALI)
- Fire panel serial/IP converter (MOXA)
- Bed Boards
- Room booking screens (EVOKO)

Some of the above require specific mounting etc to allow for the devices to be recessed (e.g. EVOKO panels) or internally terminated (e.g. in fire panel).

- 8.7.1. The structured cabling will still be terminated on an applicable format RJ45 outlet and connected via Mino patch leads.
- 8.7.2. Where Devices are wall mounted and have limited cavity depth behind to have a termination outlet and patch lead installed, the TO can be ceiling mounted above wall stud and a conduit installed within the wall cavity, terminating in a standard wall box located behind the desired wall mounted device.
- 8.7.3. Mechs shall always be fitted to a purpose manufactured RJ45 faceplate or box type housing if located in ceiling space.
- 8.7.4. Spare cable loops shall not be left lying on ceilings, but should be Velcro-ed to a compliant structure e.g. cable basket

9. CD/BD/FD Termination Hardware (RJ45 panels)

- 9.1.1. The patch panels shall be, 19" angled, 24 port, pre-loaded RJ45 panels, and the number required is dictated by the number of telecommunications to be terminated in each location and the manufacturer shall be as specified for the project by the DSD SCI Architects.



Figure 5: Example of a Systemax Patch panel -P/N **760151324: 1100A-EE-GS6-1U-24**

9.2. Green Field Buildings / Green Star Rated Installations

- 9.2.1. Angled panels are used, the panel shall be a SYSTIMAX 360™ GigaSPEED X10D® 1100GS6 Evolve Angled Category 6A U/UTP Patch Panel, 24 port: 760151324: 1100A-EE-GS6-1U-24.
- 9.2.2. The manufacturer's guidelines for termination shall be followed without exception.
- 9.2.3. The panels shall be configured as an interconnect as shown in the cabinet layout schematics included in the scope of works for each specific site.
- 9.2.4. Shielded patch panels, if deployed for specialist applications shall be individually earthed to the rack earthing bar.
- 9.2.5. Patch panels shall be in groupings of no more than 12. These shall only be placed in 45RU racks between RUs 2-14 and 32-44.
- 9.2.6. Up to a maximum of 21 patch panels (500 outlets) shall only be installed in a single cabinet however the following requirements must also be met, thereby possibly reducing the number of patch panels per cabinet:
- Maximum switch capacity per cabinet = 8x48 (384) active ports
 - Maximum patched outlets = 384
- shall be installed into any ICT cabinet, whichever is less.

10. Consolidation Points (CP)

- 10.1.1. Consolidation points shall be installed when directly requested by DSD Solution Architects or under these circumstances:
- a. In areas that will exhibit a high growth potential or high degrees of rearrangement (e.g. admin areas as growth capacity).
 - b. Where a point of interconnect is required to transfer between indoor horizontal structured cabling and a different type such as for a lift travel cable, outdoor rated - gel filled cable.
 - c. In areas where cables will be difficult or impossible to run additional cabling at a later date or would cause major disruption once operational e.g., surgical areas.
- 10.1.2. The number and density of Consolidation points (CPs) will be decided on a site-by-site basis and be tabled in the scope of works for each specific site.
- 10.1.3. 760049445 VP360-4U-32P, or one of the alternatives shown below if they prove to be more appropriate either financially or spatially.
- 10.1.4. CPs shall be tested to AS/NZS - ISO/IEC 11801 Class E_A, +POE for Permanent Link 2 (PL2) at the time of installation.
- 10.1.5. CP terminations shall be labelled to identify what communications room, rack and port they correspond with.
- 10.1.6. CP enclosure shall be labelled with the cable distance to their associated communications room.
- 10.1.7. After a port on a CP is used, i.e., extended to a workstation or IP connected device the completed circuit shall be re-tested to AS/NZS - ISO/IEC 11801 Class E_A, +POE for Permanent Link 3 (PL3).
- 10.1.8. The below items are confirmed and approved alternatives for CPs depending on the specific requirement however, the choice shall be clarified with DSD CSI solutions architects.

See examples of Consolidation Points on next page:

Other available Category 6A solutions:

Highband® Consolidation Point,
100-pair (25 ports)



Figure 6: [64501105-21](#) | [6450 1 105-21](#)

Consolidation Point Enclosure,
12-Port,
with cover, unloaded, black



Figure 7: [2-1671163-1](#)

Universal Connectivity Platform Quick-Fit
Consolidation Point Box, 6 port capacity.



Figure 8: [1-1671414-1](#)

Consolidation Point Enclosure,
4-port, twist/SL jack.



Figure 9: [1-1671163-1](#)

11. External Structured Cabling Support

11.1. Additional Requirements for the installation of Outside Plant

11.1.1. All cable run in the Outside Plant (OSP) environment shall be fit for purpose, i.e. shall be underground rated for preventing water ingress; UV rated if exposed at any point and Cable Construction shall be Category 6_A - F/UTP for electrical protection;

11.1.2. Required solution shall be CommScope SYSTIMAX Category 6_A-4pair-Solid-F/UTP:

- P/N: 460 158 784 – (903574)
- Jacket Material: LLDPE (UV Resistance) – Black in colour
- Conductor Material: Bare copper 23AWG
- Water proofing: Nonconductive water blocking gel
- Drain Wire Material: 1/26 AWG solid tinned copper
- Insulation Material: Polyethylene
- Separator Material: Polyolefin
- Shield (Tape) Material: Aluminium/Poly

11.2. Pit and Conduit Installation

11.2.1. All OSP cable shall be installed in suitable conduit rated for underground use.

11.2.2. A single cable may be installed in a 25mm conduit, for multiple cables the conduits need to be sized for the requirements of each installation.

11.2.3. All exposed conduits shall be of an armoured anaconda type and UV rated.

11.2.4. All cabling to be contained in conduit extending the complete distance to termination point.

11.2.5. Only manufactured slow bends shall be used and no more than two bends shall be installed between pits or haul points.

11.2.6. Manufacturers minimum bend radius shall be maintained at all times.

11.2.7. Maximum distance between pits shall be 100 metres along the cable path.

11.2.8. All pits shall be SCEC approved concrete ACO PitLok® pits sized appropriately for their respective uses and ensuring provision for future expansion capacity.

11.2.9. All pits shall have steel lids rated to withstand the standard vehicle road weight allowance.

11.2.10. All Pit lids shall be lockable, and SCEC approved

11.2.11. All Pit lids shall be locked with the appropriate DDTs's Southern Network pit padlocks.

11.3. Cable Termination

11.3.1. All OSP cable runs shall be terminated with a HGS620 shielded modular jack (760152801).

11.3.2. At the distributor end the HGS620 jacks shall be housed in SYSTIMAX 360™ GigaSPEED X10D® Evolve High Density Shielded Angled Modular Panel, 24 port, 360-IPR-MFTPA-E-HD6B-1U-24 (760151290). Located in the outdoor ICT cabinet or CCTV/Security equipment cabinet as defined by DSD CSI Solutions Architecture.

11.3.3. At the remote device end the cable shall be terminated on a HGS620 jack.

11.4. Outdoor Rated Category 6/6A patch cords

Outdoor rated patch cords designed for rugged deployments such as Power over Ethernet delivery to security cameras, wireless access points, and security access will be required.

Patch cords designed for outdoor applications above ground, that are UV proof and water resistant but not waterproof. U-UTP and F-UTP options, rated CM/LS will be used depending on application.

11.4.1. Shielded F/UTP patch cords shall be used for all field connected devices.

11.4.2. Unshielded U/UTP patch cords shall be used within the ICT cabinets.

The following part numbers shall be utilised as application appropriate:

Part #	Catalogue #	Description
CO18882-01F	PCOSP-6AU-BK	CAT6A, U/UTP, Outdoor Rated Patch Cord
CO11192-01F	PCOSP-6AS-BK	CAT6A, F/UTP, Outdoor Rated Patch Cord

Table 2

11.5. Copper Cable Routes Exceeding 90 metres

11.5.1. Copper structured cabling shall not exceed 90 metres. Any ICT structured cabling route longer than 90 metres shall be engineered around.

11.5.2. In exceptional circumstances where lengths greater than 90 metres cannot be avoided, PFCPFC--S02012 Powered Fibre Cable, OS2, 2 Fibres, Outdoor, 12AWG Copper Conductor (S02012) Hybrid cable shall be used.

This cable is part of an engineered solution, at the distributor end a rack mounted power supply is required, this needs to be engineered for each location and is dependent on the number of devices to be powered and their power requirements.

11.5.3. At the remote/terminal equipment end a POE Extender is required, this device shall:

- a. Supply a UPoE+ compliant interface to endpoint device.
- b. Shall Automatically correct voltage drop over distance to be compliant with the device requirements (POE, POE+, POE++ or UPoE+).
- c. Supply integrated 3 stage electrical protection for endpoint.

11.6. External Cable Entry Pathways

11.6.1. Where direct underground conduit entry is not available directly into the floor of a BD or FD comms room; or where a conduit must vertically traverse a structure (e.g. side of building wall or retaining wall) the following shall apply:

- a. All above ground level, entries of cables into buildings shall be covered by a purpose manufactured, Colourbond or powder coated metal cover coloured to suit wall (even where the cables are located in conduit up the wall)
- b. If entering from an enclosure (e.g. WAP) into a building, the entry point must be fully sealed and waterproof.

12. Category 6A Copper Patch Cord and Fly Leads

- 12.1. All patch and fly leads shall comply with the following criteria:
- 12.1.1. Each patch cord shall have an 8-pin modular plug (RJ45) terminated at both ends.
 - 12.1.2. Patch cords shall have a maximum Nominal Outside Diameter of less than 5mm.
 - 12.1.3. All patch cords shall be factory manufactured and tested to conform with UL STD 1863 and certified to CSA STD C22.2 No. 233 & 182.4.
 - 12.1.4. All patch cords shall conform to the approved manufacturer's system installed.
 - 12.1.5. All patch cords to Cross Connect / FD / BD shall be Category 6A U/UTP, Reduced Diameter LS-CM Dual Rated Cords of a manufacturer which matches the brand and series of installed structured cabling and compliant and certified to carry 90w of power.
 - 12.1.6. For CommScope SYSTEMAX installs, leads shall always be supplied as MiNo6A Series.
 - 12.1.7. MiNo6A leads shall be supplied in a mix of colours, with numbers based on the proposed connection type. The proposed breakdown of colours shall be provided by the contractor to the DSD PM, who will then advise the required length distribution of each and confirm numbers of each colour and length required back to the contractor for purchase.
 - 12.1.8. Manufacturer certified cabling contractors shall supply patch cords and fly leads for individual projects in the quantities, colours and lengths nominated by the DSD's CSI Hub Project Manager.

12.2. Standard colours ACT Public Health System Sites

Please refer to "ACT Health Comms Room Patch Lead Colours Chart" for network purpose of patch cord colours.

12.3. Patch Cords

The following Table 16.2 indicates the percentage allowance per patch cord colour length of each lead for use as part of the Contractors Tender submission.

Colour	Patch Cord	Code	Description	3ft	5ft	7ft
Lt. Blue	C0199K2-02	MiNo6A-BL	Mino 6A Series Category 6A	55%	40%	5%
White	C0199K2-08	MiNo6A-WH	Mino 6A Series Category 6A	55%	40%	5%
Red	C0199K2-07	MiNo6A-RD	Mino 6A Series Category 6A	55%	40%	5%
Yellow	C0199K2-09	MiNo6A-YL	Mino 6A Series Category 6A	55%	40%	5%
Green	C0199K2-04	MiNo6A-5G	Mino 6A Series Category 6A	55%	40%	5%
Black	C0199K2-01	MiNo6A-BK	Mino 6A Series Category 6A	55%	40%	5%
Purple	C0199K2-0L	MiNo6A-VL	Mino 6A Series Category 6A	55%	40%	5%
Dk. Grey	C0199K2-03	MiNo6A-DG	Mino 6A Series Category 6A	55%	40%	5%
Orange	C0199K2-06	MiNo6A-OR	Mino 6A Series Category 6A	55%	40%	5%
Pink	C0199K2-0K	MiNo6A-OR	Mino 6A Series Category 6A	55%	40%	5%

Table 3

- 12.3.1. One (1) patch cord per port is to be allowed for by the Contractor. As an example, if 100 x ports are to be installed then Contractor is to allow in their Tender submission the following; 55 x 3Ft, 40 x 5Ft and 5 x 7Ft or metric length equivalent.
- 12.3.2. Contractor to confirm with DSD's CSI Hub final colour quantities, prior to the contractor procuring any patch cords.
- 12.3.3. Contractor to confirm with DSD's CSI Hub final quantities, length and colour prior to the contractor procuring any patch cords.

12.4. Fly leads – Connecting Telecommunications Outlet to end Device

- 12.4.1. One (1) Fly leads per outlet is to be allowed for by the Contractor. As an example, if 100 x outlets are to be installed which require blue cords, then Contractor is to allow in their Tender submission the following: 100 x 5Ft (or metric equivalent). Contractor shall confirm with DSD's CSI Hub final quantities, length, manufacture, model and colour prior to the contractor procuring any Fly leads.

13. Backbone Cabling

All Internal and External backbone cabling shall be fibre optic, Copper backbone cabling is not permitted. Backbone cabling links floor distribution switches back to building switches and building switches back to core switches.

13.1. General Fibre Backbone Cabling Requirements

See general campus network topology in drawing packs for Western, Eastern and Far Eastern Rings

- 13.1.1. The minimum number of cores is 12 cores (6 Pairs).
- 13.1.2. Where it is anticipated that more than 12 cores are to be used at the time of initial installation, additional cores shall be provisioned in multiples of 12.
- 13.1.3. Quantity of fibre to be installed shall be confirmed with DSD CSI Solutions Architecture team.
- 13.1.4. The optical fibre backbone has two distinctive components:
 - i. Internal Riser Rated Cable used within a building; and
 - ii. External Outside Plant Rated Cable used between buildings on a campus or for MAN links.

This combination of fibre will vary from site to site due to application support and distance requirements. Check the scope of works for a given site to determine the actual requirements.

- 13.1.5. All Optical Fibre Backbone Cable shall be OS2 9/125µm Single- mode.

13.2. Campus External Optical Fibre Ring Backbone

- 13.2.1. **Main HCC trunk fibre** – (312 cores or >) water blocked loose tube, GRP central strength member, loose tube, polyethylene sheathed and integrally bonded nylon jacket. AS/ACIF S008; IEC 60793; IEC 60794 & ITU-T Recommendations
- 13.2.2. **LCC sub trunks:** As above for main trunk but with various core configurations (144, 96, and 48)
- 13.2.3. **Building entry cables:** As above for main trunk but with 24 fibres entering each BD as minimum. Each Campus 24 core building lead-in cable will be terminated at the BD end via a 24-comb splice tray onto dual 12-core SM MTP Elite Plus AFL crossover tails, which in turn plug into a Standard density SM MTP/LC AFL cassette providing 12 cores north & 12 cores south on the Campus Ring.
- 13.2.4. In conditions of physical cable vulnerability cable shall be enclosed in steel anaconda from last pit before entry to building up to the first FoBoT.
- 13.2.5. Fibre Cable used outdoors shall be Outside Plant rated (OSP) they shall be laid in conduit within a trench.
- 13.2.6. OSP fibre backbone shall be loose tube gel filled or central tube OS2-9/125µm Single-mode.
- 13.2.7. Where duct space is limited a composite loose tube, cable containing separate tubes of OS2 may be used.
- 13.2.8. Both ends of the OSP cable shall be identified with a permanent label, this label shall identify the source and destination of the cable.
- 13.2.9. Each core of the OSP cable shall be terminated at both ends within a 24-way splice tray within sliding FoBoT onto an MTP connector tail matching the fibre type and then presented as LC. To achieve this the fibre shall be fusion spliced to the MTP tail within the splice tray. This in turn will be connected to a standard AFL MTP elite+/LC SM Cassette.

- 13.2.10. The OSP cable sheath shall have a permanent print string identifying the manufacturer the date of manufacture, Cable type and construction, sheath composition, fibre count, fibre type.
- 13.2.11. All cables used within the outdoor environment shall be Gel filled to prevent water ingress.
- 13.2.12. Where cables have metallic armouring or metallic barrier foiled sheath all metallic components shall be connected to the building protective earth to ensure equipotential bonding as per AS/NZS 3000 and AS/CA S009.

Note: Refer to ACT Public Health System's Fibre Configuration Diagram for actual requirements for each site.

13.3. Non-Campus External Fibre

Note: Offsite building fibre connections may be supplied and managed through DDTS Fibre manager and shall have Dual fibre entries giving 10 Gb/s redundancy to and from two separate regional nodes.

- 13.3.1. **Building entry cables:** shall be fibre water blocked loose tube, GRP central strength member, loose tube, polyethylene sheathed and integrally bonded nylon jacket. AS/ACIF S008; IEC 60793; IEC 60794 & ITU-T Recommendations.
- 13.3.2. Fibres shall enter via disparate paths and from separate regional nodes.
- 13.3.3. Each BD shall have its own fibre lead-ins to each regional node as minimum to be confirmed with DSD CSI Solutions Architecture team.
- 13.3.4. Lead-ins from last ACT Gov pit to Rack FoBoT shall be enclosed in steel anaconda.
- 13.3.5. A 1 x 12 core fibre lead in cable shall be installed from each separate Fibre Access Pit (FAP) to each Building Distributor (BD) or Floor Distributor (FD).
- 13.3.6. The lead-in cables will be spliced within each FAP to a dedicated 12 core tube providing two paths in opposite directions back to each of two regional nodes.

13.4. Internal Building Optical Fibre Backbone

Refer to ACT Health Fibre Configuration Diagram **Figure 11:** BD to FD SM Pre-terminated MTP trunks, sliding HD trays and MTP/LC HD cassette configuration. for actual requirements for each site.

- 13.4.1. Internal fibre backbone shall be tight buffered OS2-9/125µm Single-mode in a ruggedised sheath.
- 13.4.2. Internal building fibre backbone interconnects between each BD and FD shall be of ruggedised construction, pre-terminated, 12 core MTP terminated cables.
- 13.4.3. The OS2 cable sheath shall also carry a print string identifying the manufacturer the date of manufacture, fibre count, fibre type and sheath composition.
- 13.4.4. Both ends of the OS2 cable shall be identified with a permanent label on the FoBoT faceplate. This label shall identify the far end destination of the cable.
- 13.4.5. If this is not the final destination of the link the patch leads at the source, interim patch points and final destination shall be labelled with all this link information (e.g. Source via Interim Patch Point (& IPP) to Final Destination).
- 13.4.6. Each 12 core OS2 backbone cable shall be a pre-terminated OS2 MTP link connected to AFL MTP elite+/LC HD Cassette and mounted in a (4 position) HD Sliding Tray.

13.4.7. OS2 fibre shall be terminated using MTP spliced links connected to AFL MTP elite+/LC HD Cassettes mounted in a (4 position) 24-port sliding splice tray.

13.5. Enclosures for Optical Fibre Equipment

- 13.5.1. Cabinet mounted sliding tray termination enclosures (FoBoT) specifically designed to house optical fibre cable terminations shall be provided at each fibre termination point.
- 13.5.2. All outdoor/ incoming OS2 Single mode fibres (TCH Campus & MAN links) shall be installed at RU 44 in a splice tray and FOBOT in the first Cabinet designated "A",
- 13.5.3. TCH Campus Ring links shall be terminated in a sliding 1RU tray (D) as per below Figure 10, containing a 24 way splice tray (A), crossover MTP tails (C) and SM MTP/LC cassette (B).

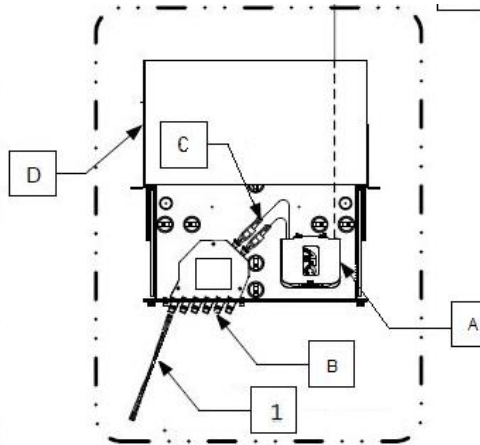


Figure 10: TCH Campus Ring connection to BD Sliding FoBoT.

13.5.4. TCH Campus & MAN links shall be tested and operational by room handover. For more detail refer to appendix 'A' of this document.

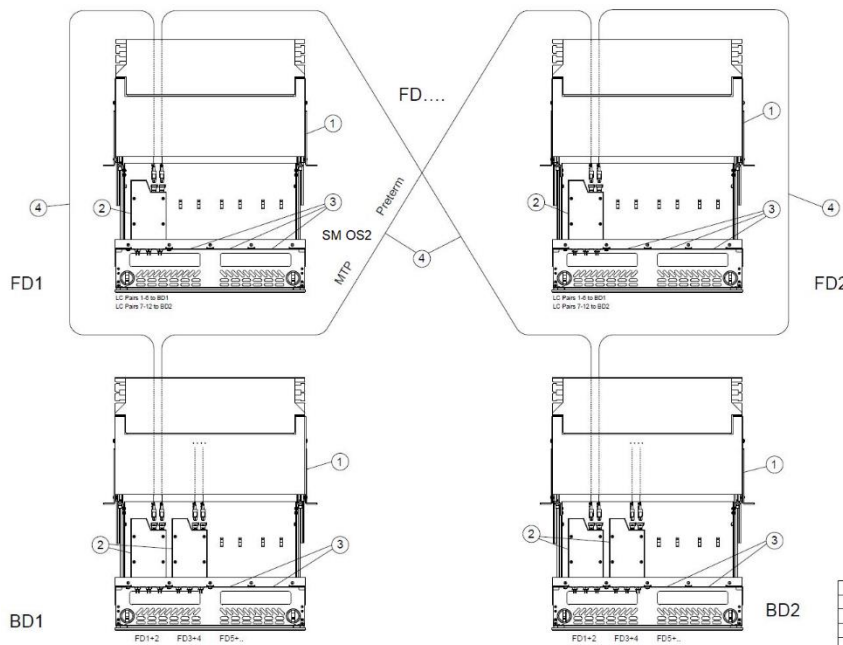


Figure 11: BD to FD SM Pre-terminated MTP trunks, sliding HD trays and MTP/LC HD cassette configuration.

- 13.5.5. BD FD trunks shall be pre-terminated MTP crossover cables (4) terminating in a sliding 1RU HD tray (1) as per Figure 11, containing 1 or more SM MTP/LC HD cassette (2).
- 13.5.6. Each unused fibre panel location not fitted with an LC connector plate shall have a blanking panel installed.

- 13.5.7. All newly spliced tails shall have the LC connector ends cleaned with a One-Click cleaner after insertion into the LC through connector plate before capping.
- 13.5.8. Each LC connector that is unused shall be fitted with a plastic dust cap or cover at the completion of the fibre termination and testing.

13.6. Required Optical Fibre Accessories

The following Optical Fibre Accessories shall be provided as specified below:

- 13.6.1. An LC One-Click cleaner shall be supplied for each communications room containing a FoBoT (if not already located in the room) and shall be attached with a flexible cord so that it cannot be removed from the location easily.
- 13.6.2. Each BD room shall be supplied with an MTP One-Click cleaner (if not already located in the room) and shall be attached with a flexible cord so that it cannot be removed from the location easily.

13.7. Required Fibre Documentation

The following shall be provided:

- 13.7.1. A schematic diagram showing each fibre terminated and the service to which it is connected shall be prepared and secured in a transparent protective cover to an appropriate location adjacent to the respective termination enclosure to facilitate easy location of circuits.
- 13.7.2. A warning notice detailing the hazards associated with optical devices shall be affixed to each termination enclosure in a prominent position.

14. Fibre Patch Cord and requirements

- 14.1.1. All fibre optic patch cords shall be duplex, LC to LC configuration. Fibre optic patch cords shall be ACMA approved, have high quality machine polished connectors and shall conform to the approved manufacturer's system installed.
- 14.1.2. The end face geometry of all fibre optic patch cords shall be flat, and Interferometer tested by the manufacturer with a conformance certificate supplied.
- 14.1.3. Cords shall conform to IEC 61300-3-4, IEC 61300-3-6 and Materials compliance to ROHS3 REACH & SvHC compliant.
- 14.1.4. If a patch lead is reused it must be cleaned with a One-Click cleaner before reuse even if caps were present
- 14.1.5. Manufacturers certified cabling contractors shall supply fibre optic patch cords for individual projects in the quantities, colours and lengths nominated by the DSD CSI solutions architect.
- 14.1.6. The patch leads shall be from the same manufacturer as the in-building fibre used to enable end to end warranty.

15. Installation Testing

15.1. General Requirements

- 15.1.1. The installation shall be thoroughly tested to ensure the as-built performance meets the requirements specified within the ACT Public Health System Detail Design document and such other specifications referenced either explicitly or implicitly.
- 15.1.2. The Contractor shall supply all testing equipment.
- 15.1.3. On building projects or refurbishments at least one week's notice of any compliance tests shall be given to the Site Manager, who shall witness such tests. These reports shall be submitted to the DSD CSI solutions architect within two weeks of test completion.
- 15.1.4. The installation shall not be deemed complete until all wiring and equipment has been checked and tested and permanent labelling installed to the satisfaction of the DSD CSI solutions architect.

15.2. Copper & Fibre Cabling Testing

The following shall be the minimum testing requirements for copper cabling:

- 15.2.1. Copper testing shall be in accordance with ISO/IEC 11801 Class Ea (+poe) and AS/NZS - ISO/IEC 61935.1 for Permanent Link PL2 or PL3 as mandated by design.
- 15.2.2. Optical fibre testing shall be in accordance with ISO/IEC 11801 and AS/NZS - ISO/IEC 14763.3. This shall include the Encircled Flux requirements specified within the standard.

NOTE: Refer to the above-mentioned standards for all testing requirements.

- 15.2.3. Test parameters and set up testing shall be in accordance with SYSTIMAX® Design and Installation Guidelines.
- 15.2.4. Testing of both copper and optical fibre shall be carried out with either a Fluke® DSX-5000 or DSX-8000 Cable Analyser or an approved equivalent.
- 15.2.5. Only certified approved test leads shall be used.
- 15.2.6. The software version installed on the test equipment shall be the latest recommended for that test instrument.
- 15.2.7. Any optical fibre cabling lengths exceeding 300 metres shall include an OTDR trace in a single direction only.
- 15.2.8. All test results shall be included with the as-built documentation and no optical fibre test result shall exhibit more loss than the calculated loss budget.
- 15.2.9. Microscope inspection probe photos of all terminations shall be provided. All terminations shall be clean and free of dirt, oil and scratches.

15.3. Additional Copper Testing for Power Over Ethernet (POE)

15.3.1. Where copper cabling is required to support power over Ethernet (POE) the following additional testing shall be carried out and results presented.

- a. Loop Resistance per pair.
- b. DC Resistance Unbalance, within each pair.
- c. DC Resistance Unbalance between all pairs.

16. Labelling Conventions

16.1. Schematic

- 16.1.1. Patch panels, distribution frames, CP's, outlets and comms room active equipment shall be prominently and permanently labelled.
- 16.1.2. Permanent labels shall be "Trafolyte" style labels.
- 16.1.3. The unique identifier shall be printed on labels suited to the hardware they are installed on indicating the ID, nature and identity of the terminated cable.
- 16.1.4. All horizontal cabling that is 'patch frame' to 'workstation outlets' or 'wall mounted outlets' shall be permanently labelled at both ends as per ACT Health Standards requirements.
- 16.1.5. Where labelling is white, the print shall be in black and be clearly visible.
- 16.1.6. Where labelling is black, the print shall be in white and be clearly visible.
- 16.1.7. Where labelling is yellow, the print shall be in black and be clearly visible.
- 16.1.8. Handwritten or portable printed labelling is unacceptable in all situations and shall not be accepted.
- 16.1.9. The labelling convention across all sites shall be uniform as follows:

16.2. Labelling Cabinets single row

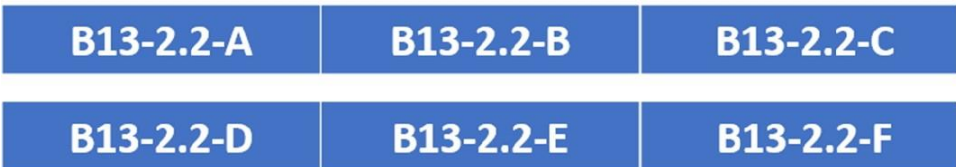
- 16.2.1. Cabinets are provided pre-labelled with Communications room name-number and cabinet ID as per their position in the room. The label names will be finalised by DSD's CSI Solutions Architecture.
- 16.2.2. Each cabinet will be allocated a letter with "A" being the left most and sequentially incremented as they progress to the right.

For example, in building designated B13 a communications room "FD2.2" provisioned with three cabinets, from left to right they would be labelled:



16.3. Labelling Cabinets multiple rows

- 16.3.1. Should the room have multiple rows of cabinets, then the naming convention will continue (from the left). Any spare rack space provisions should be reserved for in the cabinet labelling.
- For example, in the room previously noted provisioned with two rows of three cabinets, with first row from left to right, the front row would be labelled:



16.4. Patch Panel Labelling methodology

- 16.4.1. The methodology for all labelling shall comply with AS/NZS 3085.1.
- 16.4.2. Labelling shall be provided on all patch panels as follows:

- i. Each patch panel (PP) shall be centrally labelled, commencing from the top down with a ~17mm bold capital black alpha character on a 20mm square white permanent label.
- ii. Where the telecommunications outlet is not located in a room/corridor or an area designated with a building ID (above door lintel), the outlet label should commence with a direction from the nearest room number (i.e., as an alpha = N, NE, E, SW or “X” if located externally). e.g.:
 - a) if it was located West of the above room example and the TO is above the ceiling the label would be W3.02.18-A.
 - b) if it was located externally to the above room example and on a pole the label would be X3.02.18-C

Patch panel Label Prefix	
Compass Direction	Designation
North	N
South	S
East	E
West	W
In between directions	e.g., NE, NW, SE, SW
External	X

Table 4

- iii. Where the telecommunications outlet designation shall be added to the end of the label that depicts non-standard location of the device for e.g.:

Patch panel Label Postfix	
Device	Designation
Above Ceiling	A
Below/On Ceiling	B
Concealed in Cabinet	C
Floor (box)	F
Pillar/Pole	P
Standard skirting wall mounted	None

Table 5

Example: For outlets located in the ceiling, to the east side of room 18, the label would be E 03.02.18-A

16.5. Field Telecommunication Outlets

16.5.1. Building data outlets shall be labelled with Communications room name, cabinet and port ID number.

16.5.2. Labelling will denote "Building Number", dash, "Room type", space, "room number", dash, "Cabinet ID", dash, "Patch Panels Alpha", dot, "port number" (01-24).

For example, a data port connecting back to the Floor Distributor in Building 3, level 2, third communications room, second cabinet(B), fifth patch panel from top(E), eighth data outlet will have the label: **B3-FD 2.3-B.E-08**

16.5.3. In buildings that are standalone and there is no doubt as to the location of the building, the building reference can be dropped. All labelling shall be confirmed with DSD CSI Solutions Architecture prior to installation.

For example an ACT Public Health System Site such as Community Health Walk in Centre - Floor Distributor on level 1, first communications room, second cabinet(B), fifth patch panel from top(E), eighth data outlet will have the label represented as: **FD 1.1-B.E-08**

17. Documentation

This section describes the minimum requirements for the documentation to be submitted as part of the completed installation.

17.1. Hand-over Documentation Requirements

- 17.1.1. The Contractor shall maintain on site, a set of drawings including the construction drawings and all others that the Contractor produces for installation, progressively marked up to cover the actual “as-built” installation.
- 17.1.2. The Contractor shall provide structured cabling manufacturer certification on completion of installation. All test results and certificate to be included in handover documentation.
- 17.1.3. The following as-built documentation shall be provided as applicable in hard copy and soft copy format: (specific project requirements to be confirm with DSD PM)
 - a. Cable routes shall be marked on site drawings defining the exact route.
 - b. Floor plans in DWG format.
 - c. Structured Cabling System patching records.
 - d. Cabinet layout schematics.
 - e. Structured Cabling System frame layouts Schematics.
 - f. Manufacturer’s System Certification certificate.
 - g. Manufacturer’s Application Assurance Warrantee certificate.
 - h. Test certificates.
 - i. Maintenance schedules and details.
 - j. Operation manuals.
 - k. Certificate of Compliance to local regulations.
 - l. Test reports for copper cable.
 - m. Test reports for fibre optic cable.
 - n. Minimum of A2 size, laminated floor plan with data outlet names and locations identified.
 - o. A bound copy of all documentation shall be provided.

Appendix A - Document Details

Abbreviated Terms, Acronyms and Definitions

Acronym	Term	Definition
2N	2 x N (equipment)	Replicated hardware or operationally independent modules to provide two times the optimum sized requirement
AEP	Approved Equivalent Product	A requested and then approved equivalent alternative to a specified piece of equipment
ATS	Automatic Transfer Switch	A switch that transfers load between two electrical sources.
BD	Building Distributor (Room)	Building communications room housing building distribution switches and other Health Directorate system servers/ appliances and connecting to all FD rooms/switches in that building. (two per building for clinical buildings)
	Building Distributor (Switch)	Building distribution switches that provide layer 3 aggregation for all FD switches in that building
BEP	Building Entry pit	A small pit providing easier fibre access into a single building
BMCS	Building Management & Control System	A centralised system that both allows control and records the outputs of various building systems
Brownfield	Brownfield Buildings	Health Directorate existing buildings that are being fully or partially refurbished
BTU	British Thermal Unit	Standard measure of heat energy
CA	Campus Aggregation (Switch)	Provides layer 3 aggregation for all campus based FD switches that do not have a local Building distribution switch
DALI	Digital Addressable Lighting Interface	International lighting standard for digital lighting
DB	Distribution Board	Electrical Distribution Board which holds fuses for electrical connections.
DDTS	Digital, Data and Technology Solutions	Information Technology Solutions providers to the ACT Government
DLP	Defect Liability Period	The period where the builder/other is responsible to repair defects
DO	Data Outlet	It should be RJ45 Cat6A
DP	Distribution Pit	A small pit (J5) containing several 24 core fibres which then head in different directions to different buildings
EO	Electric Orange	Essential UPS circuits will be coloured Electric Orange
EPO	Emergency Power Off	Emergency power off button

Acronym	Term	Definition
EWIS	Emergency Warning Information System	Emergency Warning Information System
FAP	Fibre Access Pit	An offsite equivalent of a LCCSP
FD	Floor Distributor (Room)	Floor communications room hosting floor distribution/access switches and houses all structure cabling patch panels
	Floor Distributor (Switch)	Floor distribution switches that provide layer 2 access for all edge devices within 90m in that building
FDF	Final Distribution Frame (FDF)	Furthest and final termination point
FIST	Fibre Insertion Splice Termination	A waterproof enclosure to house fibre splice trays for use in a pit
FoBoT	Fibre-optic Break-out Tray	A sliding tray within a BD cabinet providing a splice tray
GPO	General Power Outlet	Power sockets
GY	Grey	Non-Essential UPS circuits will be coloured Grey
Greenfield	Greenfield Building	ACT Public Health System's new building
HA	High Availability	High Availability
HCC	High Core Count	A fibre cable (312-> cores)
HCCSP	HCC Splice Pit	A splice pit where a HCC fibre cable is spliced in a FIST
HCM	Horizontal Cable Manager(s)	Used for cable management in a data cabinet
ICT	Information Communication Technology	Information Communication Technology
IDF	Intermediate Distribution Frame	A termination frame after MDF but prior to final distribution frame (FDF)
KVA	Kilovolt-ampere	Unit of electrical power
LCC	Low Core Count	A fibre cable (72-144 cores)
LCCSP	LCC Splice Pit	A splice pit where a LCC fibre cable is spliced within a FIST
MDF	Main Distribution Frame	First point of carrier line termination within a building
OSP	Outside Plant	Referring to external rated materials
PA	PA system	Public Address system – distributed speakers for building, ward or room-based announcements or piped music
PDU	Power Distribution Unit	Electrical power board in the data cabinets
PM	Project Manager	Project Manager
PP	Patch Panel	Comms room termination of data outlets
PSP	Preliminary Sketch Plan	Preliminary Building Plan
RU	Rack Unit	A unit of measure in the data cabinets which is 44.45mm.

Acronym	Term	Definition
SNMP	Simple Network Management Protocol	Protocol for collecting and organising information about a managed device on IP network.
SRA	Server Racks Australia	Data Cabinet vendor
TCH	The Canberra Hospital	The Canberra Hospital
UPS	Uninterruptible Power Supply	Uninterruptible Power Supply units and batteries
UTP	Unshielded Twisted Pair	A type of a cable
VOIP	Voice over Internet Protocol	Technology that allows phone call to be made over the network
VRS	Vertical Riser Stack	Vertically aligned Communications rooms providing a connecting cable basket path
WAN	Wide Area Network	Provides connectivity from a building to the external network
WAP	Wireless Access Point	A device that allows connectivity to the wireless network
WH&S	Work Health and Safety	Rules and guidelines for safer work practices

Table 6 – Glossary

Amendment History

Version	Summary of Changes	Author	Date
2019.0.1	Transfer the contents to the new template. Update several sections.	Nitin Saxena	19/09/2019
2019.0.2	Sent to the Technology Strategy Committee for approval to release	Mark Moerman	30/09/2019
2019.1.0	CIO to endorse after review and approve for release as 1.0	Sandra Cook a/g CIO	09/10/2019
2019.1.1	Minor Changes	Raj Mohan	25/10/2019
2019.1.2	Minor Changes	Raj Mohan	28/11/2019
2019.1.3	Minor Changes	Raj Mohan	03/12/2019
2020.1.4	Minor formatting updates	Mark Cahill	14/01/2020
2020.1.5	Restored Data Cabinet Layout (Figure3)	Michael Hickey	6/10/2020
2020.1.6	<i>PO's comments – MM updates</i>	Mark Moerman	24/11/2020
2021.0.1	Annual document review	Mitchell Jamieson-Curran & David Richards	08/01/2021 03/03/2021
2021.0.2	Label mythology updated	Raj Mohan	23/03/2021

2021.0.2	Document Review (Combined St -01, 02 and 03)	Mitchell Jamieson- Curran	25/03/2021
2021.0.2	Document Review	Mitchell Jamieson- Curran	30/03/2021
2021.0.2	Major changes to cable support requirements	Mitchell Jamieson- Curran	30/03/2021

Appendix B - CHS Induction Process

Contractor inductions are no longer conducted on site and are now available online.

Contractors need to register their business with Rapid Global:

<https://my.rapidglobal.com/Web/Account/ContractorRegistration/1907>

Once you have completed the registration, including the provision of all required documentation, the CHS Safety and Risk team will review your application within 2 business days and approve the business to undertake work for Canberra Health Services.

Once the business is registered and current, they will be able to issue induction codes to their employees to undertake online induction at any time.

Once the employee has successfully completed the induction, they need to print out the certificate and take it to the Security office in the main foyer at Canberra Hospital. Office hours are 8:00am – 4:00pm Monday to Friday. The employee will be issued with an ID Card and an access card. The access card only grants access to the main entry doors to Canberra Hospital and to the Key Cabinet.

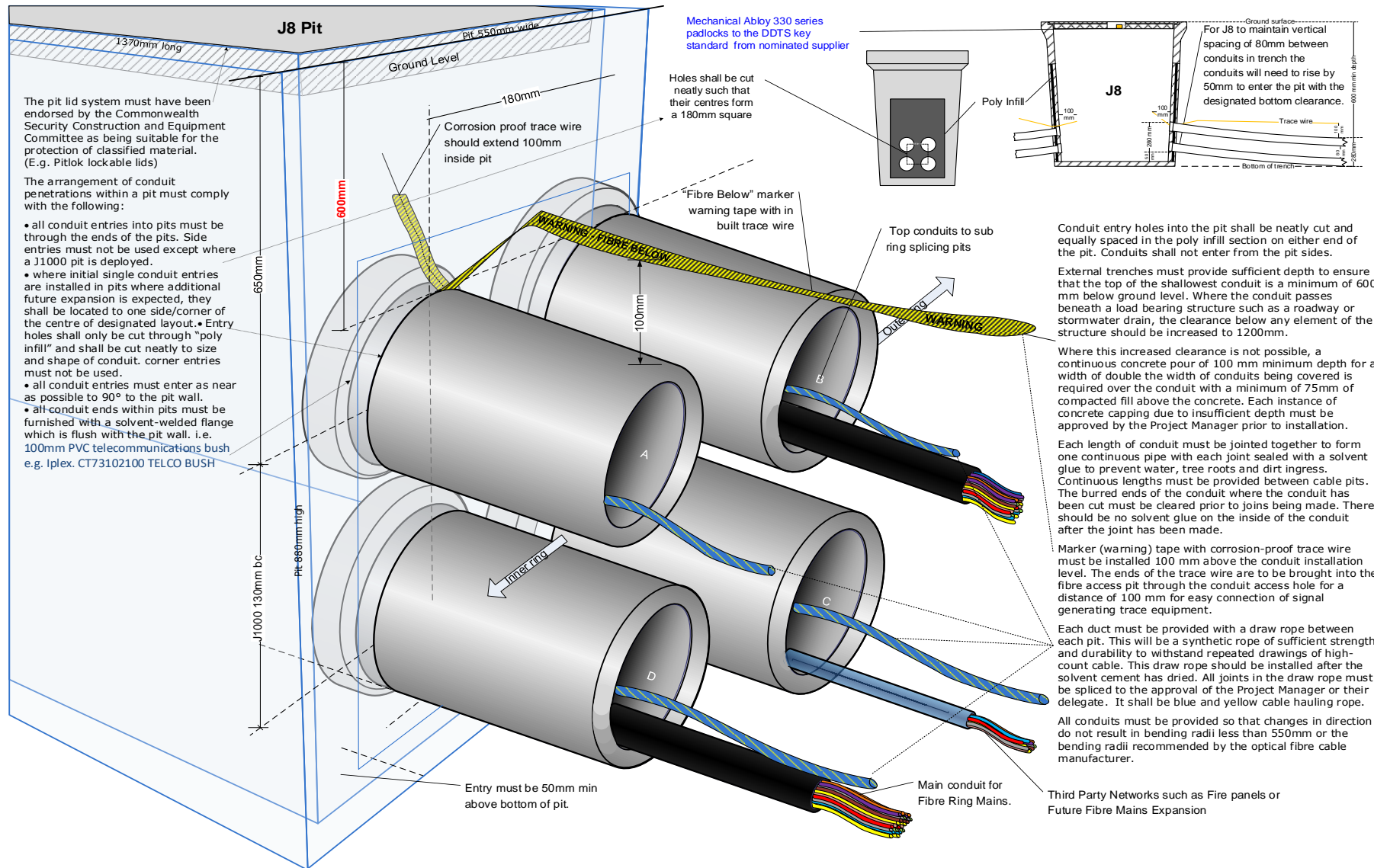
When a contracted worker attends the Canberra Hospital site, they must sign in on the Kiosk located in Building 1 Level 1 in the Facilities Management corridor. The Rapid system will check the business and individuals details to make sure that they are current. If they are, they will be able to access the key cabinet to take the keys to the area where they are working. The keys must be returned as soon as the work is complete, must not be taken off site and must be returned within 10 hours.

On completion of the work, the contracted worker must sign out on the kiosk prior to leaving site.

Should the business or individual not have current information, i.e. insurances not current or induction not completed every 12 months. Access will be denied, and works will not be able to be undertaken. Reminder emails will be sent prior to the expiry date to allow businesses and individuals to keep information current.

Should you have any issues regarding the registration process, please contact Rapid Global on 1800 307 595. Should you wish to discuss working for Canberra Health Services, please contact the **Safety and Risk Section** on **(02) 512 42215**.

Appendix C - Outdoor Fibre Plant



Drawing 1 - Conduit Design

Appendix D - TCH Campus Topology

General Description

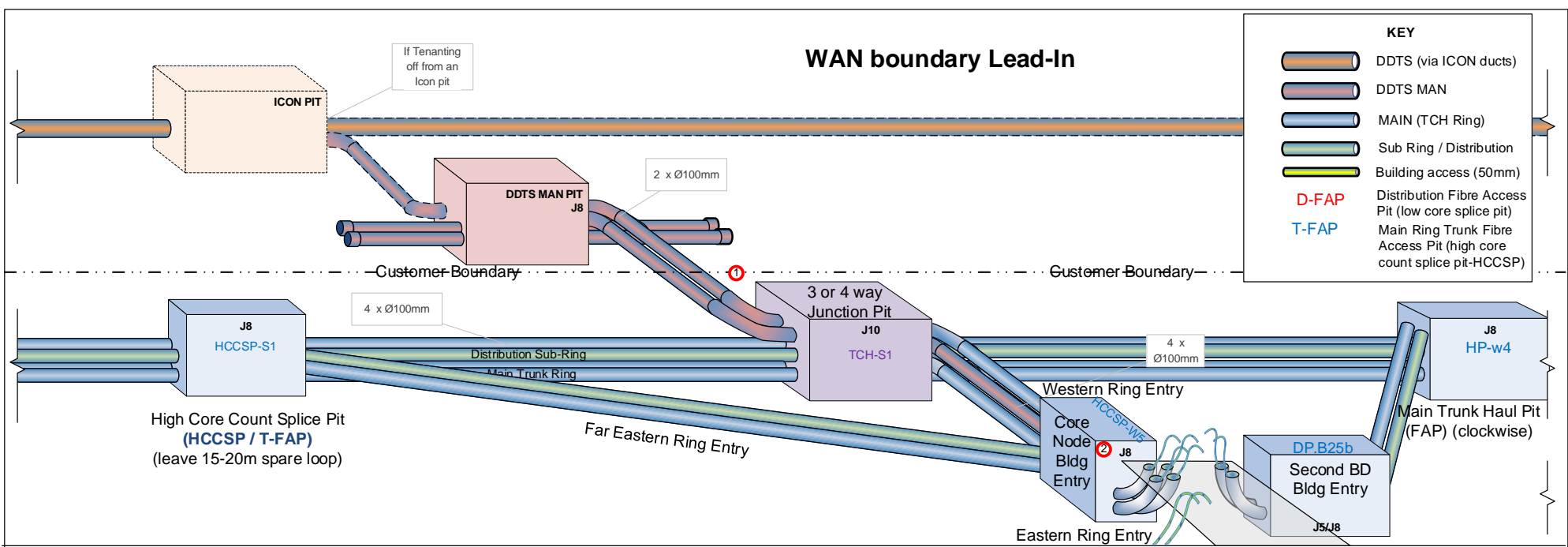
The fibre ring at TCH campus consists of a network of specific function pits, that reticulate the network to buildings in a high availability (HA) construct. The Campus uses two Core nodes for redundancy to link all campus buildings to the MAN links situated in B11 and B25. The Ring consists of three separate diverse conduit paths from B11 in the North to B25 in the south, providing to most buildings a primary, secondary, and tertiary path, of which only two are actively used at any point in time, achieving a north link to the core in B11 and a south link to the core in B25.

High Core Count Splice Pits (HCCSP's) sits along the main north-south conduit pathways. They contain High core fibre trunk cables (312/408/&312 respectively) running from B11 to B25. These are constructed with groups of 12 fibre cores contained in separate tubes.

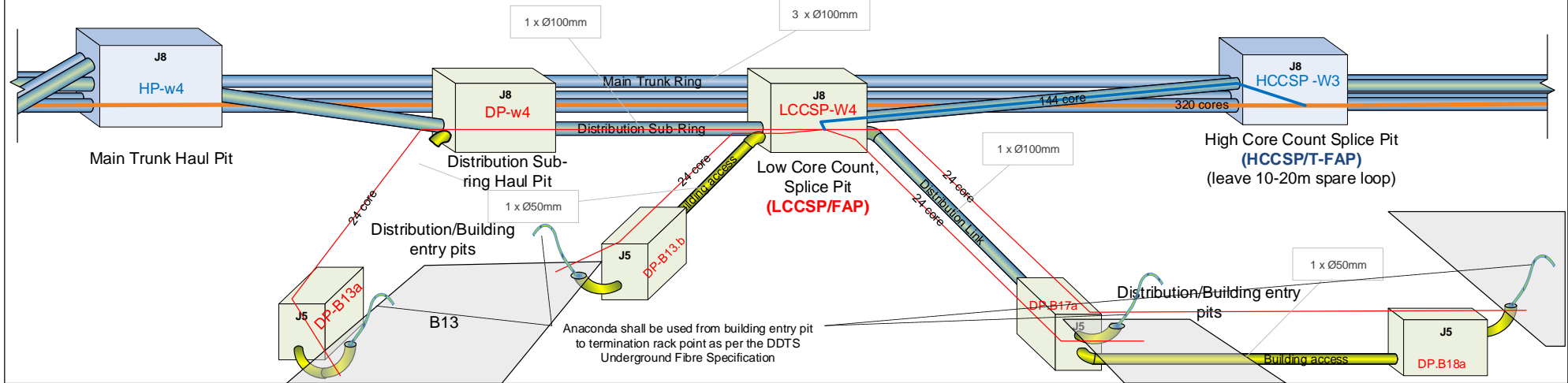
Each HCCSP feeds a low Core Count Splice Pit (LCCSP) via a low core count (LCC) arterial cable (LCC fibre=72-144 cores). At each HCCSP FIST a number of tubes of 12 cores on the main trunks are cut, with each side of the 12 cores cut and then spliced successively (1-12 North then 1-12 South.) to the LCC fibre (1-24) providing a 12 core north and 12 core south path to the ring from the LCCSP. These 24 cores are then spliced in the LCCSP FIST to a 24-core fibre that feeds a Building Distributer room (BD). These links may pass through additional pits...Haul Pits if distance requires and/or Distribution Pit, if two runs need to split in different directions and/or a Building Entry Pit to enable easier entry into building (as illustrated in Drawing 2 bellow)

Each clinical building will have two BD rooms providing alternate physical network paths for redundancy and high availability (HA). Nonclinical buildings may have a single BD room but will still have two alternate physical network paths.

WAN boundary Lead-In



Sub ring splice & building pit arrangement



Drawing 2 - TCH Fibre Ring Generic Layout (Note: this applies to Campus based ring topology only)

Note: All WAN connections for sites other than TCH are managed directly by DDTS

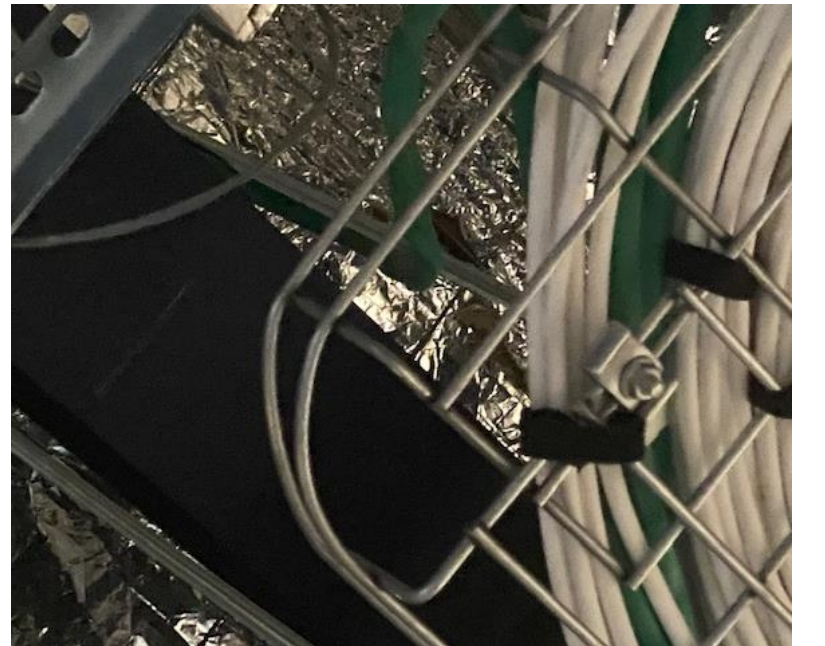
Appendix E - Approved Cable Basket Installation Examples



Preferred basket bend method.

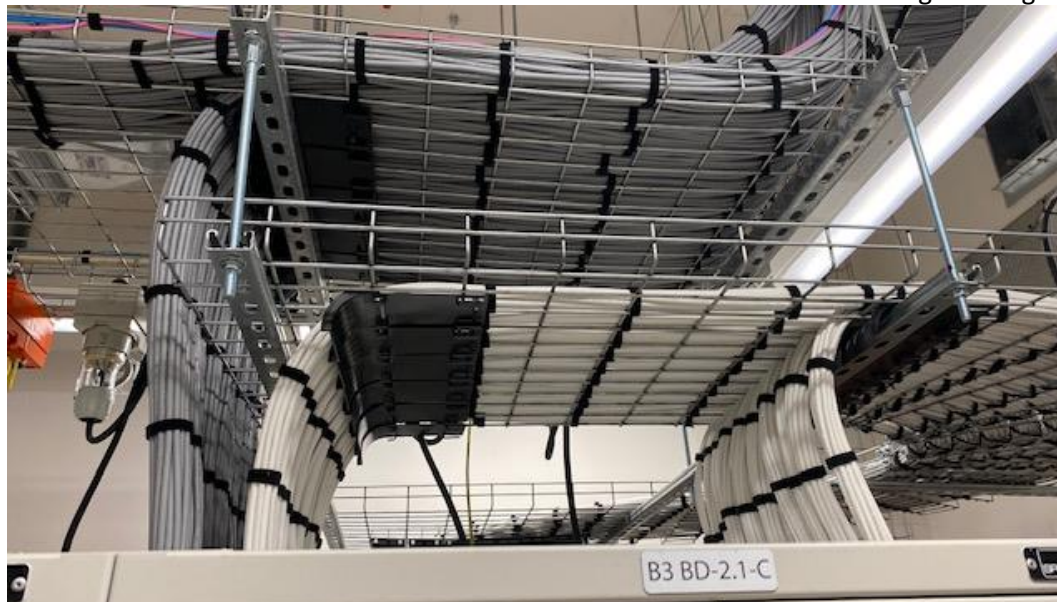


Alternative method

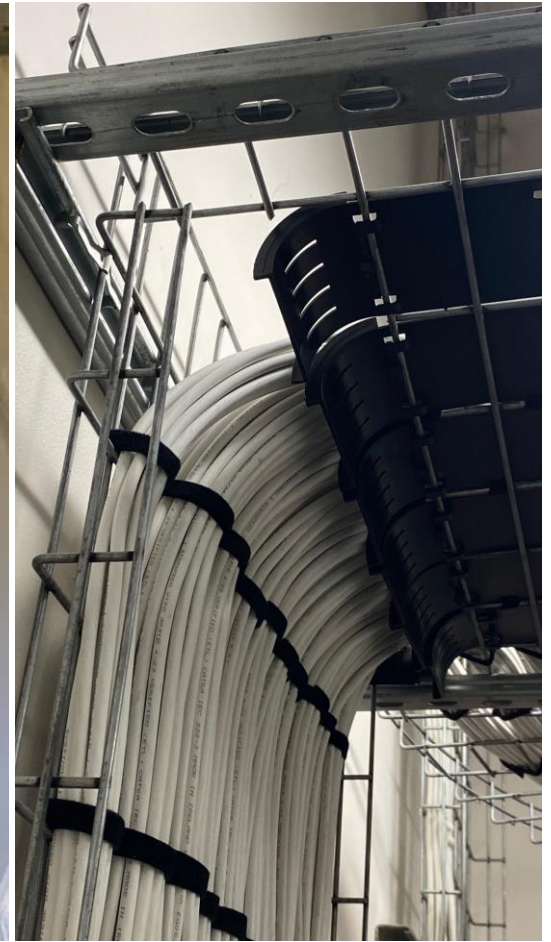
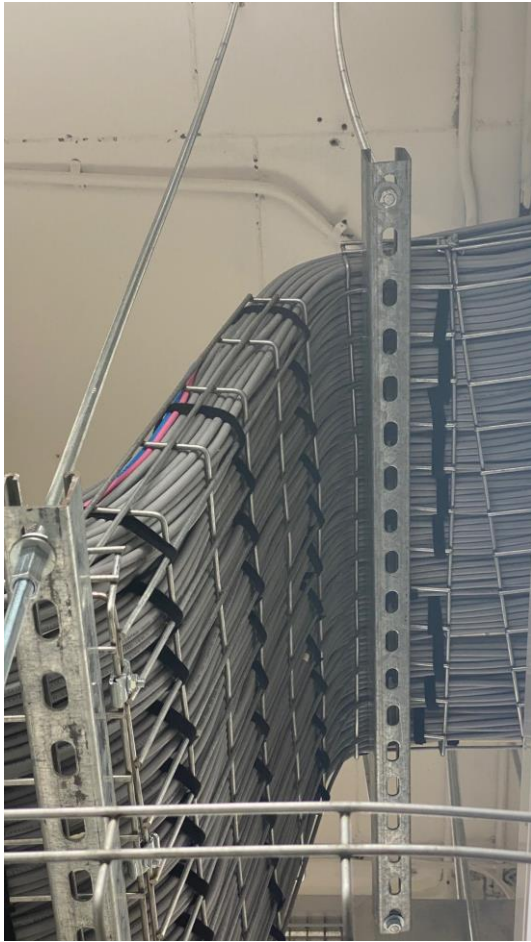




Height change and second feeder basket.



multiple basket cascades into cabinets.



Appendix F - Details of Changes

Version	Last Modified date	Author Name	Summary of changes	Section No.	Section Details	Page. No.	Revision/Changes Made
2020.1.5	06/10/2020	Alkesh Hemrajani	PO's Comments		Main Page with picture	1	Removed page footer words
2020.1.5	06/10/2020	Michael Hickey	Restored Data Cabinet Layout (Figure3)	15	15. Cabinets	28	Replaced figure 3
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments		Blank page removed	2	Blank page removed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments		Please Read	3	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments		Introduction	8	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	1.1	Design Constraints	9	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	1.3	Detail Design Variation to Standards	10	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	2.1	Compliance with Standards	11	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	3.1	Telecommunications	12	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	5	Occupational Health & Safety	15	Non-Technical Words & formatting Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	6	Earthing requirements	16	Non-Technical Words & formatting Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	7	Pathways	17	Non-Technical Words Changed

2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	7.5	Sealing for Fire, Smoke and General	18	PO's comments
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	8.1	Existing Building (Zone refurbishment	20	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	9	Telecommunications Outlets	21	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	9.1	Wall mounted outlets	21	PO's comments
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	12	Forth Utility Telecommunications Outlet requirement	24	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	13	CD/BD/FD Termination Hardware	25	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	13.1	Greenfield Building/Green star Rated Installations	25	PO's comments
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	15	Cabinets	28	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	16.5	Copper cable Routes	31	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	17	Category 6A Copper Patch Cord and Fly Leads Requirement	33	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	17.1	Standard Colours	33	PO's comments
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	17.2	Cross Connect Path Cords	34	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	17.3	Fly Leads	34	Non-Technical Words & PO's comments
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	18.3	Fibre Backbone	36	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	19	Fibre Patch Cord and requirements	39	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	20.1	General Requirements	40	Non-Technical Words Changed

2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	20.3	Additional Copper Testing	40	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	21.1	Schematic	42	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	21.2	Labelling cabinets Single Row	42	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	21.4	Patch Panel Labelling methodology	43	Non-Technical Words & formatting Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	21.5	Telecommunications Outlets	44	Non-Technical Words Changed
2020.1.6	24/11/2020	Alkesh Hemrajani	PO's Comments	Appendix	Appendix B	49	PO's comments
2021.0.1	20/02/2021	David Richards	Technical Update	All	All	All	Combine Standards 1,2 & 3 into single 'ST-02' document
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	3.1	Telecommunication	10	Word "Data" has been removed
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	3.2	IP Delivered Applications	10	DAD services & Various assorted digital devices added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	3.3	Data Networks	10	Wireless IEEE 802.11 Protocol, Some Network speed protocol has been changed/removed
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	5.1	Earthing requirements	15	Technical data has been modified and new picture added.
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.1	Brown-filed sites	13	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.2	Cable Basket	13	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.3	Catenary Wire	14	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.4,7,8	Conduits	15	Technical data has been modified

2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.5	Ramset Cablemaster or Equivalent Fixings	15	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.6	Sealing for Fire, Smoke and General	15	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	6.7	Cable Path Access Hatches	15	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	7.1.2	New Building	16	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	7.2.3	Existing Building (Zone refurbishment	16	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	7.3	Exception	16	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.2	Specification	17	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.3	Wall Mounted Outlets	17	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.4	Ceiling and Specification Mountings	17	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.5	Wireless Access Point Telecommunication Outlet Requirement	17	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.6	Distributed Antenna System (DAS) Telecommunication Outlet Requirement	18	New heading has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.7	Fourth Utility Telecommunication	18	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	8.7.1,2,3,4	Fourth Utility Telecommunication	18	Technical data has been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	9.2 & 9.3	Workstation Outlets & Telecommunications Wiring	19	Heading has been removed
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	9.2.1,2,3,4,5,6	Greenfield Building/Green star Rated Installations	19	Technical data has been modified

2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	10.1.1,2,3,4,5,6,7,8	Consolidation Points (CP)	20	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	11	External Structured Cabling Support	22	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	12	Category 6A Copper Patch Cord and Fly Leads	24	Technical data has been modified & new table been added
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	13	Backbone Cabling	26	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	14	Fibre Patch Cord and requirements	30	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	15	Installation Testing	31	Technical data has been modified
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	16	Labelling Conventions	33	Instruction has been modified & new table/picture been inserted
2021.0.2	30/03/2021	Mitchell Jamieson-Curran	Technical Update	Appendix -A	Document Details	37	Amendment History and Abbreviated Terms, Acronyms and Definition Table has been added
2021.0.2	31/04/2021	David Richards	Technical Update	Appendix - E	Acceptable cable basket installation examples	47	New appendix