INFORMATION AND COMMUNICATIONS TECHNOLOGY

THE UNIVERSITY OF QUEENSLAND
AUSTRALIA

DESIGN STANDARDS

Document Register

Issue	Date	Description	Initials
Revision 1	18/10/2021	Project Use	P Saal (Aurecon)

Contents

Disclaimer

Refer to the Disclaimer within the UQ Design Standards.

Reference Documents

Refer to the UQ Design standards for the list of documents and associated standards to be referenced for design work.

The designer is to coordinate between disciplines and standards.

1 Introduction

1.1 Introduction

1.1.1 Context

The University of Queensland (UQ) positively influences society by engaging in the pursuit of excellence through the creation, preservation, transfer and application of knowledge. UQ helps shape the future by bringing together and developing leaders in their fields to inspire the next generation and to advance ideas that benefit the world. UQ strives for the personal and professional success of its students, staff and alumni.

UQ operates over 1,670 hectares of real estate across three major campuses at St Lucia, Gatton and Herston; and other sites including research stations, centres of excellence, clinical units and satellite sites such as UQ Brisbane City and Customs House.

UQ's Property and Facilities (P&F) Division manages projects and initiatives across UQ's real estate portfolio that enhance and enrich the experience of UQ sites for students, staff and visitors.

1.1.2 Purpose

This Design Standard forms part of the University of Queensland's suite of Engineering Design Standards.

The purpose of this Design Standard is to define the University of Queensland's specific requirements for the design of communications systems; and to assist designers, contractors and other professionals involved in the preparation of designs commissioned by UQ to understand the University context.

The purpose of this Design Standard is not to detract from designers' obligations to undertake stakeholder engagement to develop design briefs; follow good design practice; and produce designs that address project specific considerations.

The purpose of this Design Standard is not to detract from designers' obligations to seek endorsement of their design from UQ.

The purpose of this Design Standard is not to repeat the requirements of relevant legislation, regulations, codes and standards. Designers shall produce designs in accordance with the requirements of relevant references irrespective of the requirements of this Design Standard.

Where certain requirements are not addressed by this Design Standard, relevant industry-based design and construction standards should be adopted in consultation and agreement with UQ.

This document must be read and implemented in conjunction with project-specific documentation.

1.1.3 Applicability

This document is not applicable to tenant installations in UQ buildings, or where UQ is located as a tenant in other partner buildings, in which case the respective organisation's cabling standards are applicable.

This document is applicable in its entirety to new buildings and complete refurbishments of existing buildings.

In the case of partial refurbishment of buildings, if the current structured cabling system to be refurbished is Category 4, 5, 5e or 6, the entire structured cabling system in the area being refurbished shall be replaced. New cabling shall be Category 6_A. Telecommunications rooms, telecommunications racks, equipment cabinets, power provisions and cable pathways shall be upgraded in the area being refurbished, regardless of whether this formed an original part of the project scope.

In the case of additional outlets being provisioned in an existing area, it is acceptable for anything less than 24no. outlets to be installed to the standard that is homogenous to the installed structured cabling system, provided that standard is Category 6 or better. For anything more than 24no. outlets to be installed, compelling reasons shall be provided to justify not installing outlets to a Category 6_A standard. Examples of compelling reasons are:

a. Inadequate cable minders on racks

b. Inadequate cable pathways and spaces to cater for the larger bending radius and physically larger cables associated with higher category cables

Cost shall not be accepted as a reason for a departure.

1.1.4 Departures

Departures from these guidelines shall be requested by designers in writing to the Contract Administrator. Departures must be approved in writing prior to being incorporated into project designs.

Departures from this design standard must be endorsed by UQ ITS. Contact UQ ITS at:

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1.1.5 Contractors and consultants

Contractors shall read and comply with the requirements outlined in on the UQ Properties and Facilities Building Contractors and Consultants website, as follows:

https://coo.uq.edu.au/operational-areas/property-and-facilities/pf-staff-and-contractors/building-contractors-and-consultants

1.2 Objectives

Information and communications design plays an ever increasingly important role within the University. The data & Communications Engineering Design Standard sets out the Universities requirements for the design, installation and testing for all cabling and information services infrastructure across the University Campuses. The Design Standard shall assist designers, contractors and other professionals involved in the preparation of designs commissioned by UQ to understand the University context. The following principles are included:

a. Govern the cabling infrastructure for both voice and data communications on the University's campuses and properties

b. Provide a solid foundation to achieve performance, safety and serviceability criteria while achieving compliance with applicable Australian and international standards

c. Ensure consistent cabling practices across the Universities campuses and properties

2 Abbreviations & definitions

For the purpose of interpreting this Design Standard, the abbreviations listed in Table 2–1 apply.

Table 2–1 Abbreviations

Abbreviation	Definition
AWG	American Wire Gauge
AS	Australian Standard
AS/NZS	Australian Standard / New Zealand Standard
BCA	Building Code of Australia, incorporating National Construction Code Series Volume 1: Building Code of Australia Class 2 to 9 Buildings; and Volume 2: Building Code of Australia Class 1 and Class 10 Buildings
BICSI	Building Industry Consulting Services International
BD	Building Distribution
CD	Campus Distribution
CP	Consolidation Point
DB	Distribution Board
DLP	Defects Liability Period
DOA	Defects, Omissions, and Additions
FD	Floor Distribution
FOBOT	Fibre Optic Breakout Tray
F/UTP	Foil Shield over UTP
FRL	Fire Resistance Level
ITS	Information Technology Services (Division)
LSPM	Light Source / Power Meter
MMOF	Multimode Optical Fibre
NCC	National Construction Code
OD	Outside Diameter
OF	Optical Fibre
ORL	Optical Return Loss
OTDR	Optical Time Domain Reflectometer
P&F	Property and Facilities (Division)

Abbreviation	Definition
PC	Practical Completion
PDU	Power Distribution Unit
PE	Protective Earth
PLIE	Physical Layer Infrastructure Engineer
QGEA	Queensland Government Enterprise Architecture
RCD	Residual Current Device
RFI	Request for Information
RU	Rack Unit
SCP	Service Consolidation Point
SCS	Structured Cabling System
SD	Service Distribution
SPL	Sound Pressure Level
SWMS	Safe Work Method Statement
TO	Telecommunications Outlet
TR	Telecommunications Room
TLN	Technical Lead, Networks
SMOF	Singlemode Optical Fibre
STP	Shielded Twisted Pair
UFAD	Under Floor Air Distribution
U/FTP	Unshielded Foiled Twisted Pair
UN	University Networks
UPS	Uninterruptible Power Supply
UQ	The University of Queensland
UTP	Unshielded Twisted Pair
WAP	Wireless Access Point
WHS	Work Health and Safety
xTP	Twisted Pair Copper Cable (includes UTP, F/UTP, U/FTP, STP,)

For the purpose of interpreting this Design Standard, the definitions listed in Table 2–2 apply.

Table 2–2 Definitions

Term	Definition
Access for Maintenance	Access required for safe maintenance, inspection, measurement, operation, adjustment, repair, replacement and other maintenance related tasks.
Accredited Testing Laboratory	➢ An organisation accredited by the National Association of Testing Authorities (NATA) to test in the relevant field; or ➢ An organisation outside of Australia accredited to undertake relevant tests by an authority recognised by NATA through a mutual recognition agreement; or ➢ An organisation recognised as an Accredited Testing Laboratory under legislation at the time that the test was undertaken

Term	Definition
Contract Administrator	The University of Queensland's authorised representative for contractual matters, which may be a member of University staff, or a third-party representative appointed by the University.
Critical Electrical Supply	An electrical supply which is backed up by an alternative electrical supply from an Uninterruptible Power Supply. A Critical Electrical Supply may also be an Essential Electrical Supply.
Critical Service	A service requiring a Critical Electrical Supply. A Critical Service may also be an Essential Service. NB: This term has no bearing on the distinction between a General Service and a Safety Service.
Design Life	The period during which a building component is expected by its designers to operate within its specified parameters, with only anticipated maintenance being carried out, and without the need for major repair or replacement.
Designer	Any person commissioned directly or indirectly by the University of Queensland to undertake design activities. Designers are the intended audience for this document.
Economic Life	The period during which a building component is the lowest cost alternative for satisfying its function, with only anticipated maintenance being carried out, and without the need for major repair or replacement.
Essential Electrical Supply	An electrical supply which is backed up by an alternative electrical supply from an electricity generator or secondary low voltage distribution location (eg secondary main switchboard).
Essential Service	A service requiring an Essential Electrical Supply. NB: This term has no bearing on the distinction between a General Service and a Safety Service.
Fire Safety and Rescue Authority	An operational entity in government, established for the purposes of providing fire, rescue and emergency services.
Floor Area	Measurement as defined in Volume 1 of the National Construction Code.
Furnish	See 'Supply'.
General Service	A service which is not defined as a Safety Service.
High-level Interface	Transfer of complex information in a digital format using an open system protocol.
Hold Point	A point in time during the design period where design activities are paused, primarily allowing the Contract Administrator to conduct reviews with the client and other stakeholders; to provide feedback on the design; and to provide a direction for the design to proceed.
Ingress Protection	A rating describing the degree of protection provided by enclosures as defined in AS 60529.
Local (Government) Authority	An administrative entity in local government, established for the purposes of governing an area of the State or Territory.
Low-level Interface	Transfer of binary-type information via terminals and voltage-free contacts.
Main Contractor	See 'Principal Contractor'.
Managing Contractor	See 'Principal Contractor'.
Manufacturer's Recommendations	Recommendations, instructions, specifications and similar expressions provided in written or other form by an equipment manufacturer and/or supplier, relating to the suitability, use, installation, storage, maintenance and/or handling of a product.
Non-essential Electrical Supply	An electrical supply which is not backed up by an alternative electrical supply.

Term	Definition
Non-essential Service	A service requiring a Non-essential Electrical Supply.
Partner	See ‘Partner Organisation.
Partner Organisation	An organisation that is involved in the teaching or research activities of the University, and which may have staff members who are dual appointees. The partner organisation may share the UQ network (eg QAAFI) or setup an overlay network (eg CSIRO, Queensland Health) for use by their staff.
Principal Contractor	The primary construction contractor who maintains overall control of a construction site, and who is usually required to engage specialist trade contractors to complete the construction works. For the purposes of this Design Standard, the term ‘Principal Contractor’ has the same meaning as ‘Main Contractor’ or ‘Managing Contractor’.
Professional Engineer	A Registered Professional Engineer of Queensland (RPEQ).
Proprietary	Something that is used, produced, provided, installed, commissioned or marketed under exclusive legal right of the inventor, designer, owner, manufacturer or supplier.
Prototype	A full-sized or scaled mock-up of components or systems to demonstrate or test construction methods, junctions and finishes, used to define or prove a minimum level of quality.
Referenced Documents	Documents referenced by this Design Standard in Section 3.
Safety Report	A report satisfying the requirements of Section 295 of the Work Health and Safety Regulation (Queensland).
Safety Service	A service as defined in Section 7 of AS/NZS 3000.
Sample	A physical example of a component or system used to define or prove a minimum level of quality.
Statutory Authority	A public sector entity established under legislation, that is, a specific law of the Commonwealth, State, Territory or Local Government.
Supply	‘Supply’ shall mean to supply only.
Supply and Install	‘Supply and Install’ shall mean to supply, install, set to work, test, commission and warrant.
Tenant	See ‘Tenant Organisation.
Tenant Organisation	An organisation which provides support services to student and staff, which is not involved in teaching or research activities.
Trade Contractor	A secondary building contractor, usually engaged by the Principal Contractor to undertake a specialist portion of the construction works.

3 Reference documents

3.1 UQ reference documents

This Design Standard shall be read in conjunction with relevant UQ reference documents, including but not limited to those listed in Table 3–1. The designer shall the source of the version of the reference document applicable to their design.

Table 3–1 UQ reference documents

Title / description
UQ Design Guidelines
Campuses on Country Design Framework
Sustainability Strategy
Space Planning Documents
Architecture Design Standard
FF&E Standard Documents
Landscape Design Standard
Structural Design Standard
Civil Design Standard
Hydraulic and Wet Fire Design Standard
Mechanical Design Standard
Electrical Design Standard
Dry Fire Design Standard
Fire Engineering Design Standard
Veridical Transportation Design Standard
Acoustic Design Standard
Security Standards Document
Information and Communications Technology Design Standards Documents
Wayfinding and Signage Design Standard
Teaching Standards Documents
Laboratory Design Standards Documents
Environmental Design Standard
Climate Risk Assessment Design Standard

Title / description
Collaborative Learning Space Documents
AV Design Standard
Electrical Metering Standards Documents
Working at Heights Standards Documents
Waste Infrastructure Standards Documents

3.2 Legislation, regulations, codes and standards

This design standard shall be read in conjunction with relevant legislation, regulations, codes and standards, including but not limited those listed in Table 3–2. The designer shall source the version of the reference document applicable to their design.

Table 3–2 Legislation, regulations, codes and standards

Reference	Title / description
Building Act (Queensland) and associated regulations	*An Act to regulate building development approvals, building work, building classification, building certifiers and pool safety inspectors, and to provide for particular matters about swimming pool safety and sustainable buildings, and for other purposes*
Work Health and Safety Act (Queensland) and associated regulations and explanatory notes	*An Act to provide comprehensively for work health and safety, to provide for a new definition of asbestos in particular legislation and for a work health and safety levy, to amend other legislation as a consequence, and to amend the Workers' Compensation and Rehabilitation Act 2003 for particular purposes*
Professional Engineers Act (Queensland) and associated regulations and explanatory notes	*An Act to provide for the registration of professional engineers, and for other purposes*
National Construction Code	*Incorporating National Construction Code Series Volume 1: Building Code of Australia Class 2 to 9 Buildings; Volume 2: Building Code of Australia Class 1 and Class 10 Buildings; and Volume 3: Plumbing Code of Australia*
Fire Safety and Rescue Authority Requirements	*Incorporating technical standards, guidelines and requirements published by the Fire Safety and Rescue Authority, as applicable to the project*
Local Authority Requirements	*Incorporating technical standards, guidelines and requirements published by the Local Authority, as applicable to the project*
Supply Authority Requirements	*Incorporating technical standards, guidelines and requirements published by the Supply Authority as applicable to the project*
-	Queensland Government Enterprise Architecture (QGEA) ICT cabling infrastructure technical standard
AS/NZS 2967	Optical fibre communication cabling systems safety
AS/NZS 3000	Electrical installations (known as the Australian/New Zealand Wiring Rules)
AS/NZS 3084	Telecommunications installations – Telecommunications pathways and spaces for commercial buildings
AS/NZS 3085.1	Telecommunications installations – Administration of communications cabling systems Part 1: Basic requirements
AS/NZS 11801 (set)	Information technology – Generic cabling for customer premises
AS/NZS ISO/IEC 14763.2	Information technology – Implementation of customer premises cabling Part 2: Planning and installation

Reference	Title / description
AS/NZS ISO / IEC 14763.3	Information technology – Implementation of customer premises cabling Part 3: Testing of optical fibre cabling
SA TS 29125	Information technology – Telecommunications cabling requirements for remote powering of terminal equipment
AS 30129	Information technology – Telecommunications bonding networks for buildings and other structures
IEC 619351-1	Specification for the testing of balance and coaxial information technology cabling Part 1: Installed balanced cabling as specified in ISO/IEC 11801-1 and related standards
AS/CA S008	Requirements for customer cabling products
AS/CA S009	Installation requirements for customer cabling (Wiring Rules)

4 Design life

Building components and systems shall meet the requirements for design life as listed in Table 4–1.

Table 4–1 Design life

Element	Minimum design life
Cable containment – above ground (trays, conduits, etc)	25 years
Cable containment – below ground (conduits, pits, etc)	50 years
Copper structured cabling	25 years
Optical fibre cabling	25 years

5 Design criteria

5.1 Health and safety

5.1.1 General

5.1.1.1 Legislated obligations

Designers shall meet their obligations under the Work Health and Safety Act (Queensland) and Work Health and Safety Regulation (Queensland).

Particular attention is drawn to Section 22 of the Work Health and Safety Act (Queensland) – *Duty of persons conducting businesses or undertakings that design plant, substances or structures*.

Particular attention is drawn to Section 295 of the Work Health and Safety Regulation (Queensland) – *Designer must give safety report to person who commissions design*.

Designers requiring additional information regarding their legislated obligations should contact the relevant Local Authority.

5.1.1.2 Safety in design

Irrespective of their legislated obligations, designers shall:

a. Consult with UQ and its nominated stakeholders throughout the design process about how to ensure that risks to health and safety arising from the design during the construction work are eliminated, so far as is reasonably practicable; or if it is not reasonably practicable to eliminate the risks, minimised so far as is reasonably practicable. This consultation shall occur not less than once during each separate design phase

b. Provide a Safety Report to UQ not less than once during each separate design phase

c. Provide a Safety Report to the Principal Contractor, when appointed

5.1.2 Access

All plant and equipment shall be positioned to allow safe and ready access.

Any access provisions for operation and maintenance of communications equipment requiring a ladder, platform or similar shall be approved by the Contract Administrator.

Communications equipment shall not be located behind the open position of any door or access cover.

5.1.3 Safe working clearance

Safe working clearance shall be provided for all communications equipment as required by the reference documents listed in Table 3–2.

Required safe working clearances shall be documented on plan layout drawings.

5.2 Quality

Documentation issued formally by designers for design milestones shall be reviewed and verified by an engineer independent of the design team.

Documentation issued informally for information by designers need not be formally verified, however shall be quality checked by the designer to ensure the documentation is free from errors and omissions.

5.3 Flexibility and robustness

The design of electrical services shall incorporate the following spare capacity for flexibility for future installations and/or modifications:

Table 5–1 Spare capacity

Element	Spare capacity type	Requirement	Design Standard reference
Cable trays and ladders	Physical capacity	50% of maximum fill rate	Section 6.4.1
Skirting ducts	Physical capacity	50% of maximum fill rate	Section 6.4.1
Internal conduits	Physical capacity	50% of total required cross-sectional area	Section 6.4.1

5.4 Sustainability

5.4.1 Materials

5.4.1.1 Equipment and components

All communications equipment and components shall achieve RoHS compliance to minimise the presence of hazardous materials, including:

a. Lead (Pb): < 1,000 ppm

b. Mercury (Hg): < 1,000 ppm

c. Cadmium (Cd): < 100 ppm

d. Hexavalent Chromium (Cr VI): < 1,000 ppm

5.5 Acoustics

Refer to the Acoustic Design Standard for acoustic requirements and treatments required in connection with communications services. This includes:

a. Noise levels and other acoustic criteria relating to the operation of communications services and equipment

b. Mounting details for wall outlets to preserve acoustic ratings

c. Methods of sealing

d. Selection of sealants

6 Technical requirements

6.1 General requirements

6.1.1 Engagement with UQ ITS

As the primary stakeholder for all communications services, UQ ITS shall form a core part of the project team. As such, designers shall engage with UQ ITS as they would for any other designer or consultant.

UQ ITS shall be engaged during the early stages of projects, as would occur for any other designer or consultant, to ensure communications services requirements are captured in briefing and scoping discussions.

6.1.2 General roles and responsibilities

Roles and responsibilities for UQ projects shall be as outlined in Table 6–1.

All items noted in Table 6–1 Definitions shall be specified and documented by a consultant or other designer, except as noted. This shall be done on the basis of the brief provided by the parties noted in Table 6–1.

Where supply and/or installation is noted to be the responsibility of the Principal Contractor, these responsibilities may be delegated to respective trade contractors.

Table 6–1 Definitions

Description	Briefed by	Supplied by	Installed by
Structured cabling systems			
Data outlets for workstations and phones	User group	Principal Contractor	Principal Contractor
Data outlets for Wireless Access Points (WAPs)	UQ ITS	Principal Contractor	Principal Contractor
Data outlets for audio visual services [1]	UQ ITS – AV	Principal Contractor	Principal Contractor
Point-to-point data outlets and structured cabling for audio visual services [2]	Refer AV Design Standard	Refer AV Design Standard	Refer AV Design Standard
Data outlets for CCTV cameras	Security Tech Office	Principal Contractor	Principal Contractor
Data outlets for Building Management Systems (BMS')	UQ P&F	Principal Contractor	Principal Contractor
Telecommunications racks and equipment cabinets	UQ ITS	Principal Contractor	Principal Contractor
Horizontal copper cabling	UQ ITS	Principal Contractor	Principal Contractor

Description	Briefed by	Supplied by	Installed by
Patch panels	UQ ITS	Principal Contractor	Principal Contractor
Lead-in fibre cabling	UQ ITS	Principal Contractor	Principal Contractor
Lead-in voice (copper) cabling	UQ ITS	Principal Contractor	Principal Contractor
Backbone fibre cabling	UQ ITS	Principal Contractor	Principal Contractor
Backbone voice (copper) cabling	UQ ITS	Principal Contractor	Principal Contractor
Horizontal copper cabling	UQ ITS	Principal Contractor	Principal Contractor
Copper patch leads (for network rack, one for every new outlet installed)	UQ ITS	Principal Contractor	UQ ITS
Copper or fibre cabling to WAPs	UQ ITS	Principal Contractor	Principal Contractor
Corresponding power requirements			
Power supplies for communications services, including telecommunications rooms, racks and equipment cabinets	UQ ITS	Principal Contractor	Principal Contractor
Power supplies for audio visual services	Refer AV Design Standard	Refer AV Design Standard	Refer AV Design Standard
Power Distribution Units (PDUs)	UQ ITS	Principal Contractor	Principal Contractor
Power supplies to WAPs (as required)	UQ ITS	Principal Contractor	Principal Contractor
Cable pathways			
Cable trays in building risers	UQ ITS	Principal Contractor	Principal Contractor
Cable trays in ceiling spaces	UQ ITS	Principal Contractor	Principal Contractor
Conduits and pathways in walls and partitions	UQ P&F	Principal Contractor	Principal Contractor
Conduits and pathways in floors and slabs	UQ P&F	Principal Contractor	Principal Contractor
Floor boxes	UQ P&F	Principal Contractor	Principal Contractor
Passive fire seals and waterproofing for penetrations	UQ P&F	Principal Contractor	Principal Contractor
Underground conduits	UQ P&F	Principal Contractor	Principal Contractor
Underground pits	UQ P&F	Principal Contractor	Principal Contractor
Network equipment [5]			
Network aggregation switches	UQ ITS	UQ ITS	UQ ITS
Network access switches	UQ ITS	UQ ITS	UQ ITS

Description	Briefed by	Supplied by	Installed by
Optical interfaces for switches	UQ ITS	UQ ITS	UQ ITS
Fibre patch leads (as required)	UQ ITS	UQ ITS	UQ ITS
Wireless Access Points (WAPs)	UQ ITS	UQ ITS	Principal Contractor
Standard mounting accessories for WAPs [3]	UQ ITS	UQ ITS	Principal Contractor
Customised mounting accessories for WAPs [4]	UQ ITS	Principal Contractor	Principal Contractor
Antennae for WAPs	UQ ITS	UQ ITS	Principal Contractor
Project injectors for WAPs (as required)	UQ ITS	UQ ITS	UQ ITS
WiFi licences	UQ ITS	UQ ITS	UQ ITS
Lighting and blinds integration			
Refer Electrical and Audio Visual Design Standards			
Telephony [5]			
Desk phones	UQ ITS	UQ ITS	UQ ITS
Operator terminal and other specialised requirements	User group	UQ ITS	UQ ITS

Notes:

[1] Field outlets that may be required for connection of audio visual services to the Local Area Network, and that are therefore terminated on patch panels within the local telecommunications rack. Excludes point-to-point outlets and structured cabling.

[2] For example, point-to-point outlets and structured cabling for transmission of audio visual signals over HDBaseT protocol.

[3] Standard mounting accessories are appropriate for standard set and tiled ceilings.

[4] Customised mounting accessories are required for feature ceilings.

[5] Items specified and documented by UQ ITS as required.

6.2 Design Interface requirements

6.2.1 General

Design submissions shall be made as described in Table 7.2.

6.2.2 Tenant organisations

6.2.2.1 Tenant organisation responsibilities

Tenants within UQ buildings shall observe the following requirements:

a. All tenant data, telephony and any other service cabling (including CCTV, etc) shall be confined within the tenancy area and shall be terminated on a dedicated telecommunications equipment cabinet or frame located within the tenancy area

b. All tenant active network equipment shall be located within a dedicated telecommunications equipment cabinet or frame located within tenancy area

c. Tenants shall coordinate with UQ to facilitate the provisioning of tenant carrier services to tenancies via UQ cabling infrastructure

UQ strongly recommends, but does not insist, that tenant communications services follow this design standard within tenancies.

Tenant communications services shall not be connected to UQ's data network by any means.

6.2.2.2 UQ responsibilities

UQ will generally provide the following for use by tenants:

a. Minimum 10 pair Category 3, 0.64mm lead in cable, supplied from the local telecommunications room to the location of the tenant's telecommunications equipment cabinet

b. Optionally, a 6-core OS2 lead-in cable, supplied from the local telecommunications room to the location of the tenant's communications equipment

c. Reasonable access to UQ cabling infrastructure for the provisioning of tenant carrier services to tenancies

6.2.3 Partner organisations

6.2.3.1 Partner organisation responsibilities

Partner organisations shall observe the following requirements:

a. All partner data, telephone and other service cabling (including CCTV, et) shall be terminated at the local telecommunications room

b. Partner organisations shall share campus and building lead-in cabling infrastructure to provide external connectivity and/or carrier services

UQ requires that partner communications services follow this design standard within tenancies, unless agreed otherwise with UQ.

6.2.4 Project scopes of work

6.2.4.1 In scope

The following typical communications scope items shall form part of the Principal Contractor's scope of works, on an as-required basis. These elements shall be delivered the requirements of this design standard, as detailed further throughout the document.

a. Audit the existing telecommunications outlets and wireless access points in the proposed project area and provide a report to UQ ITS prior to demolition. Telecommunications outlets marked for demolition shall be de-patched by UQ ITS prior to demolition commencing. Horizontal cabling shall not be cut mid-span while connected to switch ports, as it can cause arcing and permanent damage to switch ports

b. Disconnect and remove all WAPs and return to UQ ITS prior to demolition commencing

c. Disconnect and remove redundant cables in their entirety back to the source of supply (copper cables – from patch panel; fibre cables – from FOBOT). Do not cut and leave cables at the refurbishment boundary. Such cables will be disposed of at the Principal Contractor's expense. All patch cords plugged into outlets (at either end) previously connected to redundant cable are to be removed. All inter-building MMOF made redundant by the installation of SMOF will be removed in its entirety from each building and the pit and pipe system.

d. Disconnect and remove redundant cable containment dedicated to communications services in their entirety back to the source of supply

e. Deliver all equipment and materials to the project site

f. Unpack all equipment and materials, and remove packing materials from site

g. Supply, assemble and install communications services as specified, including telecommunications racks, equipment cabinets, patch panels, cable management units, cable containment, structured cabling, telecommunications outlets, etc

h. Supply (only) patch leads as specified for every telecommunications outlet installed

i. Supply, assemble and install additional telecommunications rack components as required

j. Supply, assemble and install cable containment systems dedicated to communications services (including cable tray, cable mesh, ladder tray, catenary, etc)

k. Mount WAPs, supplied by UQ ITS, according to the instructions provided

l. Supply, assemble and install custom mounting brackets for WAPs in feature ceiling areas, according to the instructions provided and to meet the aesthetic requirements of the project area

m. Supply, assemble and install non-metallic covers and/or enclosures for WAPs to meet the aesthetic requirements and/or weather-proofing requirements of the project area

n. Equipotential bond all telecommunications racks, equipment cabinets and cable containment

o. Label telecommunications racks, equipment cabinets, patch panels and outlets

p. Test, commission and certify new communications system elements, including structured cabling system and voice-grade elements

q. Arrange for independent third-party verification of test results

r. Provide operation and maintenance manuals, including as built drawings, warranty documentation, test results

s. Provide all miscellaneous items and services required to complete the communications services

6.2.4.2 Out of scope

The following typical communications scope items shall not form part of the Principal Contractor's scope of works.

a. Supply and installation of active equipment

b. Connecting of patch leads to network switches or terminal devices, unless specified otherwise

6.2.4.3 Quality Plan

A quality plan addressing the requirement of the installation specification shall be produced by, or on behalf of, the builder/cabling contractor in accordance with the requirements of this technical specification. The quality plan shall be agreed with UQ ITS prior to the commencement of the installation. In the absence of an agreed quality plan from the installer, the quality plan in Appendix E – QGEA Compliance will become applicable.

6.2.5 Structured cabling systems

6.2.5.1 General

Structured cabling systems offered on projects shall incorporate all features and facilities listed in this design standard.

Structured cabling systems shall comply with the requirements of the reference documents listed in Table 3–2.

6.2.5.2 Supported applications

Structured cabling systems shall be suitable to support analogue and digital voice, data, Local Area Network (LAN), video and low voltage applications and devices, including for building controls and management on a common cabling platform.

6.3 Building Communications Infrastructure

6.3.1 Lead-in Cables

Unless otherwise specified, all new buildings with teaching, research or administrative

functions, shall have two lead-in optical fibre cables via physically diverse path. The upstream buildings will be nominated by ITS. Each lead-in cables to enter the building via separate building entry points (BEP). If the building has more than one Telecommunication Room (TR), the lead-in cables to be terminated in two of the TRs closer to ground level.

All new buildings shall have copper voice tie cable from a nominated existing building or campus MDF to be used by network independent services.

6.3.2 Building Backbone

Unless otherwise specified, all new buildings with multiple-TRs shall have redundant building backbone implemented via two physically separate risers.

In existing buildings with no redundancy in lead-in and/or building backbone, due consideration shall be given to implement redundancy to bring the building in par with UQ standard.

Fibre and copper cable capacity will be specified by ITS based on the building size and function.

6.4 Cable containment

6.4.1 General

6.4.1.1 Installation standards

Horizontal cable containment shall be installed parallel to building lines.

6.4.1.2 Changes in direction

Cable containment shall be installed in horizontal and vertical planes to support changes in direction or height. Such supports shall be installed using proprietary accessories from the same manufacturer as the cable containment system. The finished installation shall be neat and orderly in appearance.

Where cables exit cable containment systems and travel vertically, an appropriate accessory shall be utilised to maintain the required cable bending radius.

6.4.1.3 Equipotential bonding

All metallic cable containment shall be equipotential bonded. Equipotential bonding shall be provided by way of 6 mm^2 green / yellow cable staps between sections of conductive but non-continuous elements. The final installation shall be electrically continuous from any point to any other point, and bonded to the building's protective earth system.

6.4.1.4 Shared cable containment

No other services are permitted to be laid on cable containment that is dedicated to communications services.

6.4.1.5 Hold point

A hold point shall be established following installation of cable containment, but prior to laying of cables, to permit inspection by UQ ITS.

6.4.1.6 Segregation

The contractor shall ensure that all communications cables are sufficiently separated from power cabling or other cabling to ensure satisfactory performance of the communications cabling system. Separation distances shall comply with the requirements of the reference documents listed in Table 3–2 and the manufacturer's installation specification to achieve manufacturer's warranty. UQ ITS request a minimum 300mm separation with no solid barrier in between for parallel runs.

It is the contractor's responsibility to ensure that any breaches of minimum separation requirements caused by other service installers after the SCS is installed are brought to the attention of the other service installer (in the first instance) and UQ if compliance cannot be achieved. This is to be adhered to in all places including ceiling spaces, risers, wall cavities, service umbilicals to 'island' workstations and reticulation under the desks for row of workstations.

6.4.1.7 Vertical riser cabling

Where cables are installed on vertical cable ladder/tray, the individual 4-pair xTP cables shall be loosely loomed together and fixed to

the cable ladder/tray with velcro style cable ties at 500mm centres. Cable bundles shall not be combed. There shall be no more than 24 individual cables in each bundle, and bundles shall not be stacked more than one layer high. OF cables shall be fixed to the cable ladder/tray with velcro style cable ties at 500mm centres to provide adequate support for the cables. OF cables shall be installed on the rightmost edge of the cable tray unless otherwise specified.

6.4.1.8 Core holes

The cabling contractor will be responsible for the drilling of any core holes. Where core holes are required there shall be a minimum of two 100mm diameter holes. Locations for core holes shall be X-Rayed and an independent engineering certificate supplied to P&F Engineering before commencing work.

For core holes through fire rated barriers, the fire seals to be applied shall be in accordance with 6.10 Fire Rated Barriers.

Drilling of core holes will be carried out in accordance with relevant legislation and codes of practice.

6.4.2 Spare capacity

Pathways shall be initially installed to provide spare capacity and flexibility as listed in Table 5–1.

6.4.3 Cable tray and cable mesh

6.4.3.1 Installation standards

Where cables are installed on horizontal cable containment, such as on cable tray and cable mesh, individual copper or fibre cables shall be neatly and loosely laid out. Cables shall not be loomed.

Cable tray/mesh shall galvanised steel, with a minimum thickness of 1.5mm and of a specified width and powder coated white. Securing bolts for joiners, bends, support mounts etc shall have the head of the bolt within the cable bearing area.

Installed cable tray and cable mesh shall have 150 mm vertical clearance from the uppermost edge.

Sides shall be rolled or folded and a minimum of 30mm high. All tray, bends, tees & joining pieces, covers and cable retainers shall be shop manufactured and shall be sourced from the same product range. Butt joining Tee intersections is not acceptable.

All cable trays and all fittings such as bends, tees, reducer's, fishplates shall be powder coated white. Any modifications made to tray (including cuts or bends), channel, rods or other fittings shall be coated with white, rust inhibiting paint

6.4.3.2 Supports

Where struts and trapeze brackets are to be used for support of cable trays or cable mesh beneath beams or slabs, the struts shall be minimum 10 mm diameter threated rods attached to heavy duty Y-brackets (or angled brackets for vertical supports), fixed to directly to the respective beam or slab. Fixing of brackets to the respective beam or slab shall utilised minimum 10 mm diameter expansion type bolds, inserted within correctly drilled holes.

Cable trays and mesh shall be secured to partitions and ceilings with brackets of an approved design, and shall be installed so as to support trays in a straight line. The distance between supports shall not exceed the manufacturer's recommendations, with due consideration given to the expected load, and in any case, shall not exceed 1,800 mm.

6.4.3.3 Raised access floors

Cable tray and mesh installed within raised access floors shall be supported by the slab below, and shall not be suspended from floor mounting hardware or pedestals.

6.4.3.4 Sizing

Cable tray runs longer than 15 metres shall be minimum 600 mm wide.

6.4.3.5 Product selections

Cable tray shall be provided as one of the approved proprietary products listed in Table 7–1 or an equivalent approved by the Contract Administrator.

Cable mesh shall be provided as one of the approved proprietary products listed in Table 7–1 or an equivalent approved by the Contract Administrator.

6.4.3.6 Horizontal distribution

The bulk of horizontal distribution shall be installed on cable tray or cable mesh. Cables shall be run loosely (not bundled). These measures are to:

a. Provide a clearly defined pathway for telecommunications cabling

b. Minimise exogenous (alien) crosstalk (ANEXT)

c. Aid in dissipating heat generated in Power over Ethernet (PoE) applications

Installation contractors shall supply and install all required communications cable tray or cable mesh for the support of horizontal and backbone cabling, whether or not indicated on design drawings.

Where cable runs incorporate twelve or fewer cables, these may be supported using a catenary system. Installation of parallel catenary systems to avoid use of cable tray is not permitted.

Cable tray and cable mesh shall be installed according to approved design documentation. Departures from approved design documentation must be requested in accordance with the requirements of Section 1.1.4.

6.4.4 Conduit

All external conduit either above (covered walkways etc.) or below ground shall be white rigid only UPVC 4.5mm wall thickness, self-supporting, 100 mm diameter conduit to AS 2053, and:

a. all UPVC joints to be glued with external – blue PVC cement

b. conduit ends are to be fitted with a white UPVC conduit flare (bell-mouth) installed flush with the wall surface

c. to be installed in complete lengths

d. ends to be cut square and all burrs removed so that conduits are completely clean inside

e. to be installed such that water does not accumulate

f. to be capped and sealed until used to ensure that the conduits remains free of all material and moisture

g. all exposed UPVC conduit between ground level and 2400mm will be provided with a “hat section” cover. This will eliminate accidental damage to the conduit and ICT cabling within. In high risk areas steel bollards should be considered.

A nylon draw rope is to be installed and left in each conduit and shall have sufficient strength to withstand a pulling tension of greater than 4000Nm and installed in one continuous length.

6.4.5 Catenary Wire Support Systems

The Contractor can only supply and install a catenary wire support system through a tiled ceiling space where cable tray/mesh cannot be accommodated. The Contractor to consult with PLIE before finalising the proposed installation.

Bundle sizes shall not exceed twelve (12) xTP cables in new building installations and full or partial building refurbishments. This will allow growth to a maximum of 24 cables when adding additional outlets.

For more than 12 cables an appropriate cable tray/basket is to be installed.

The communications cables shall be supported by 19mm Velcro style wraps at a maximum of 1000mm centres, and shall be supported at changes of direction to provide adequate cable support.

Ceiling tile hangers are NOT to be used for the mounting of any hardware.

6.4.6 Underground services

6.4.6.1 Pits

All telecommunications pits not installed flush into a footpath or roadway shall have a flush, 100mm minimum reinforced concrete border

installed as a “mowing strip” which will also prevent the pit wall from accidental damage.

All telecommunications pits installed in locations where vehicles (including self-propelled mowers) may impact the integrity of the completed pit with damage by crushing will have a bollard installed adjacent to the pit.

The minimum size pit shall be a Type P3 plastic pit with the following dimensions, 663mm(L), 243mm(W) and 570mm(D), with a concrete cover.

The Type P3 pit shall be used when there is a requirement for no more than two 100mm conduits to be installed at each end.

All 100mm conduits entering pits will be connected to the pit-wall with a Bell-mouth adapter.

Where there is a requirement for 3 or more of 100mm conduits to enter the pit, the minimum pit size shall be 600mm(L), 600mm(W) and 600mm(D), plastic pit with a concrete cover.

The pit and pipe infrastructure at UQ is managed by the P&F Engineering section. All questions regarding pits shall be directed to the P&F Engineering Section.

6.4.6.2 Pit lids

All pits shall have:

a. A concrete lid with the word “Communications” or “Communications Cables” on it.

b. A brass label installed on the outside to identify the pit number

c. A brass label shall be installed to indicate the direction of the conduits exiting and entering the pit.

6.4.6.3 Drainage

To allow drainage of the pit, drainage holes shall be provided, and the pit shall be bedded on:

a. 100mm of fine sand

b. a layer of permeable, durable, underlay

c. 150mm of gravel.

6.4.6.4 Trenches

Trench depths will be specified by P&F. Where this has not been specified then the minimum depths are:

a. 300mm from the ground surface to top of the conduit in non-trafficable areas

b. 500mm in trafficable areas.

Trenches will be backfilled with fine sand, such that the sand provides a minimum 100mm bed around the entire circumference of the installed conduit, and:

a. AS/CA S008 approved PVC marker tape is to be laid on top of the sand prior to filling in the trench (minimum 150mm above conduit)

b. all open trenches will be guarded by approved safety barriers

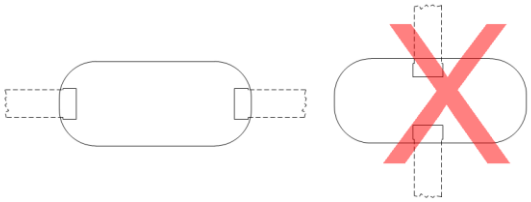
c. restored by filling and compacting

d. all surfaces restored to original condition.

Where appropriate, under-boring should be considered as an alternative to trenching.

6.4.6.5 Pit Entry Points

All conduit entering a pit will be done through the ends (sides with the shortest walls). Conduits shall not be installed in the long sides of P3 pits.



6.5 Spaces

6.5.1 Telecommunications rooms

Telecommunications rooms shall be designed and installed to meet the following criteria:

a. Telecommunications rooms shall be sized in accordance with the requirements of the reference documents listed in Table 3–2

b. A minimum clearance of 900 mm shall be available from the front and rear face of each telecommunications rack

c. A minimum clearance of 900 mm shall be available from at least one side of each telecommunications racks, except where racks are located side-by-side

d. Telecommunications rooms shall be provided with slab-to-slab partitions

e. Telecommunications rooms shall be provided with anti-static vinyl flooring in a neutral grey colour

f. Bare concrete walls and ceilings (slab over) in telecommunications rooms shall be painted white

g. An electronic lock shall be fitted to at least one door of each telecommunications room. A card reader shall be provided as close as practical to the door

h. Doors to each telecommunications room shall be fitted with GM2 key barrels

i. Telecommunications rooms shall be provided with permanent air conditioning that operates 24 hours a day, 7 days a week. Air conditioning systems shall be sized to accommodate a heat load of 4 kW per rack. The set point of air conditioning systems shall be set to 24 degrees Celsius

j. Sound seals shall be fitted to all doors of telecommunications rooms, such that the Sound Pressure Level (SPL) measured at a distance of 1 metre from the door is less than 15 dBA

6.6 Telecommunications Racks

6.6.1 General

All racks will be black and, rack height will be specified on a per project basis.

The contractor will supply and assemble all racks including fitting of all shelves, PDUs, cable management.

6.6.2 Cable Management

All cabinets and racks will have a minimum 300mm vertical cable management area on both sides. For racks in a row, the vertical minder shared by two racks will be of a minimum 400mm wide.

6.6.3 Racks

UQ's preference of racks are stated in Table 7.1 Nominated proprietary equipment specifications. Two options for the default 45RU, 4 post open racks have been provided.

Open frame lab racks will be fixed to the floor as strongly as possible (eg: dynabolts, chemsets, etc.). The top of the rack will be fixed to the ceiling or wall using 50mm unistrut extended at least 150mm down the channel of the frame from the top of the rack.

Typical Rack Elevation for 45RU rack is presented for references in Appendix C – Typical Rack Elevation

6.6.4 Power

There are two options for power for Telecommunications Racks. The type to be used will be specified on a case by case basis. If nothing is specified, then the 32A option will be installed. The outlets will be installed at the same height above the finished floor as the highest point of the cabinet/rack.

One of the pair of power outlets will be on general power and the other on UPS. Where UPS is not available one of the outlets will be on the essential circuit.

Each outlet will be on a dedicated circuit breaker in the power distribution board.

6.6.4.1 15A Option

For each rack, the cabling contractor shall install two 15A single phase, captive outlets and two power distribution units (PDU). The captive outlets and PDU shall be as listed in Table 7.1 Nominated proprietary equipment specifications.

6.6.4.2 32A Option

For each rack, the cabling contractor shall install two 32A single phase, captive outlets and two custom power distribution units (PDU). The captive outlets and PDU shall be as listed in Table 7.1 Nominated proprietary equipment specifications.

6.7 Structured cabling

6.7.1 xTP Copper Classification & Installation

6.7.1.1 General

Unless otherwise specified, all installed horizontal permanent links will be Class E_A (Category 6_A) F/UTP or U/FTP.

Class E (Category 6) may be installed under the provisions of section 1.1.3 Applicability.

All xTP shall be a minimum of 23 AWG.

The following requirements for copper (xTP) installation shall be adhered to:

a. The length of each permanent link shall be a minimum of 15m and a maximum of 90m.

b. Each cable run shall be continuous without any joints or splices (excluding CPs).

c. If CPs are used there shall be a minimum of 15m cable distance from the FD to the CP/SCP and 5m minimum cable from the CP/SCP either end of the cable run (i.e.: minimum 20m permanent link).

d. Fixed xTP Cable shall have an OD less than 8.5mm, and a minimum bend radius less than 32mm.

e. Unless otherwise specified all installed horizontal channels will be terminated as T568A

f. The list of cable and equipment shall be verified for completeness by the cabling vendor. The list of cable and cabling equipment shall be made available to the PLIE for review prior to commencement.

g. All communications cable and cabling equipment shall be installed in accordance with the manufacturers' guidelines, relevant Australian Standards and this specification.

h. The installation method shall be designed to avoid damage to cables, during and post installation.

i. RJ45 plugs will be of the 'Catch free latch' type.

j. Excess cable shall be concertinaed (maintaining minimum bend radius) and not coiled.

k. Velcro style cable ties shall be used.

l. Nylon cables ties shall not be used where they come directly into contact with the cable sheath.

6.7.1.2 Cable Installation

The following requirements for horizontal cabling installation shall be adhered to:

a. The first set of 48 cable terminations shall be inspected by the PLIE. Once approved the standard of termination is to be maintained or exceeded for all other terminations.

b. Looming of cables shall allow for equipment installation and flexibility in the positioning of patch panels in the rack.

c. Each cable shall be labelled at both ends in accordance with UQ's standard.

d. Cables shall be installed to a high standard of quality using cable tray/mesh, catenary, duct and conduit. Cabling shall not be secured to ceiling hangers, building services or allowed to lie on ceilings, floors (including under or above false floors) or grids.

e. The contractor shall ensure that the maximum pulling tensions of the specified distribution cables are not exceeded and cable bends maintain the proper radius.

f. Failure to follow the appropriate guidelines will require the contractor to provide in a timely fashion the additional material and labour necessary to properly rectify the situation. This shall also apply to any and all damages sustained to the cables by the contractor during the implementation of the SCS.

g. Where cables are installed on a horizontal cable tray:

- Cables shall be run with a view to minimising alien crosstalk (i.e.: cables should be laid as loosely as possible)
- Cables shall not be bundled

h. Cables shall be installed observing the minimum bend radius requirements and without kinks or loops,

i. An allowance of “excess” cable (service loop) shall be left at each end of the cable run. At the rack end a minimum length of 1 metre and a maximum of 2 metres is required and shall be formed in an “S” bend or gooseneck (not coiled). At the outlet end 30 to 50cm of excess to be left to facilitate future re-termination in the event of failure.

j. On completion of cable rough-in and before termination, all cabling shall be securely supported (taking care not to deform the cable sheath at any point) to reduce the likelihood of mechanical damage

6.7.1.3 Outlet Density

All staff and student workstations will have dual outlets. The table in Appendix F describes the minimum number of outlets required for each type of application.

6.7.1.4 Telecommunications Outlets

Workstation outlets shall be easily accessible for staff to self-service and outlet identification labels clearly visible for making service requests and/or report faults.

The outlets will be permanently attached to a fixed surface or structure and will not be moveable. The horizontal cable to the outlets to be contained in a casing or conduit.

Outlets installed above solid and feature ceilings shall have an access panel for accessing the outlets.

6.7.1.5 Patch Panel Installation

The following requirements for patch panel installation shall be adhered to:

a. All new cabling shall be terminated on new patch panels.

b. Unless otherwise specified, all 24 port patch panels will be angled.

c. Wherever wide vertical minders are installed, the default patch panel density will be 48 port in 1RU

d. All patch panels to be mounted securely into racks as per the supplied rack elevations.

e. A self-supporting cable loom is to be installed at the rear of each patch panel.

f. For 24 port patch panels:

- Bundles of 24 cables feeding the rear of the patch panel will be fed from one side.
- Descending patch panels feeds will alternate between left and right vertical minders. Example:

g. For 48 port patch panels:

- Cables for outlet numbers 1 to 24 will be fed from the right hand side
- Cables for outlet numbers 25 to 48 will be fed from the left hand side (no more than 24 cables per finger management guide).
- There is to be NO gooseneck in the vertical minder. All slack, including the service loop, is to be pulled back up onto the overhead tray.

6.7.1.6 Consolidation Points

Consolidation Points (CP) are not preferred by UQ and shall only be used where specified in writing by the TLN/PLIE

6.7.1.7 Multi User Telecommunications Outlet Assembly

Multi User Telecommunication Outlet Assemblies (MUTOA) are not preferred by UQ

and shall only be used where specified in writing by the TLN/PLIE.

6.7.2 Optical Fibre Classification & Installation

6.7.2.1 General

All new installed optical fibre (OF) will be single mode (SMOF) unless specified otherwise.

All SMOF will be OS2. All multi-mode (MMOF) will be OM4. All OF (MM and SM) connectors will be LC Duplex.

The following requirements for optical fibre installation shall be adhered to:

a. All cores will be terminated.

b. 48 Core, underground loose tube, gel filled sacrificial sheath SMOF cable will be used for all external applications unless otherwise specified.

c. All underground fibre will be transitioned to indoor tight buffered (through the use of a wall mounted splice enclosure) within 15m of entering the building.

d. All OF connectors (MM and SM) shall be LC Duplex.

e. All Links/ permanent links shall have a transposition between adjacent cores, i.e.: within a pair.

f. Where OF makes an unsupported transition (eg: between tray and a cabinet, horizontal tray and vertical tray, etc.) it shall be installed in corrugated conduit for a minimum 300mm either side of the transition.

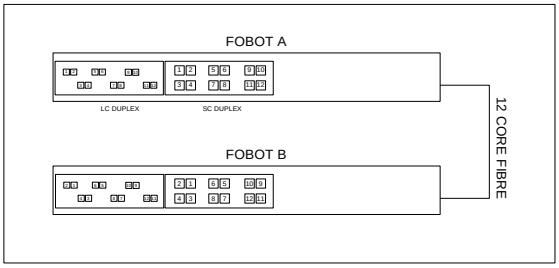
g. A minimum of 4 metres of cable shall be coiled at each end of a Link/permanent link. The coil shall be as close as practicable to the FOBOT. The coil will allow for the FOBOT to be removed from the rack and placed on a table for additional OF installation and testing.

h. SM and MM connections shall be on separate FOBOTs unless otherwise specified.

i. FOBOTs will be the sliding drawer type.

j. OF entering the drawer from the rear shall be fixed in such a manner that there is sufficient length to slide the drawer 150mm forward.

k. OF core numbering and placement will be as per below (LC and SC shown for clarity only):



6.7.2.2 Single Mode

The following requirements for single mode optical fibre shall be adhered to:

a. All Single Mode fibre will be OS2.

b. All OS2 supplied patch leads shall be yellow in colour.

c. All OS2 through connectors shall be blue in colour

6.7.2.3 Multimode

The following requirements for multimode optical fibre shall be adhered to:

a. All Multimode fibre shall be OM4.

b. All OM4 supplied patch leads shall be aqua in colour.

c. All OM4 through connectors shall be aqua in colour.

6.7.2.4 FOBOTS

New FOBOTS shall be medium / high density FOBOT design.

- Medium density is 48 cores in 1RU.
- High density is 96 or 144 cores in 1RU (only used in data centres).

1RU FOBOTS will be used (unless otherwise specified in writing by the PLIE)

Where a vendor offers Medium Density or Low Density faceplates, only Medium Density will be used. Therefore, if a 1RU FOBOT is being used to terminate a 24 core fibre, it is preferred

to install a face plate that will have 24 cores on the left (with a blanking plate on the right) instead of 12 cores in the left half and 12 cores in the right half.

Specific requirements exist for any fibre terminating in the Prentice Building (Data Centre 1) and GPN3 (Room 110) Fibre Node cabinets. These will require the use of the Quareo product. Refer 7.1- Nominated proprietary equipment specifications for specific model numbers and quantities.

All FOBOTs will allow access to the front panel without the use of tools. Specifically, the Krone LKH series of FOBOTs are not to be used.

6.8 Wireless access point (WAP) Installation

The following requirements for WAP installations shall be adhered to:

a. WAPs are to have white $CAT6_A$ or higher spec patch lead on white ceiling or black on black ceiling. The length is to be 0.5m as to not require it being wrapped around the WAP. Cabling is to be plugged into the port marked POE or ETHERNET and any WAPs not alive once active equipment installed is at the contractor's expense to rectify

b. WAPs should be installed within 0.5m from the designated positions marked on the respective FOR CONSTUCTION drawing.

c. Indoor access points if designed can be mounted outdoors only if an IP67 pool box is used. Sufficient drip loop required on incoming Ethernet cable to prevent the pool box being a pool of water.

d. Strong spring toggle anchors or hollow wall anchors on gyprock are to be used or the supplied T bar bracket on hanging ceiling. No use of glue, double-sided tape or wall mates/plaster mates.

e. WAPs are to be mounted below ceiling and away from any obstructions or protrusions (such as other service infrastructure), ensuring clear line of sight to users.

f. Indoor WAPs are to be installed in a horizontal position to maximize antenna radiation. No installing indoor access points in a vertical position.

g. Any changes to mounting positions or any clarifications regarding mounting to be communicated to the PLIE or via a formal RFI to UQ ITS.

h. Any additional mounting brackets, poles or vanity covers required to meet the site requirements to be supplied and installed by builder/cabling contractor.

i. The as-built drawing supplied to UQ ITS shall have the WAP positions and face label identity number marked up on them along with the outlet ID.

j. Data outlet labelling is required next to the WAP and not on the face of the WAP on 12mm dynamo tape black text on white for white ceiling and vice versa for black celling.

k. If the data outlet is above ceiling it must be located at an access panel with the WAP no more than 2m from this position for future serviceability.

l. Any specified outdoor access points are to be installed as per manufactures guide. The use of anaconda and gland to weatherproof waterproof the connector and the accessible data outlet on the inside of the building or a suitable weatherproof box near if data outlet is installed exterior.

6.9 Earthing

The following requirements for earthing shall be adhered to:

a. All metal structures shall be earthed in accordance with the requirements of the reference documents listed in Table 3–2.

b. Yellow/green building wire (minimum size 6 mm2) shall be used for earthing metal structures (cable tray, distributors, equipment cabinets etc.)

c. The earth conductor shall be terminated at the earth bar of the electrical distribution board or main switchboard.

d. Connections to cable tray or other metal structures shall be via a suitably sized closed hole terminal lug, and serrated washer or manufacturer's accessory, ensuring that any paint is scraped back to bare metal.

6.10 Fire Rated Barriers

The following requirements for fire rated barriers shall be adhered to:

a. Fire protection for the TR shall be provided in accordance with the NCC, where required.

b. Cableways shall not pass-through fire rated barriers unless approved by the PLIE.

c. Approved installations of cables through fire rated barriers shall be co-ordinated with the PLIE and an inspection of completed works requested prior to restoration of the fire barrier.

d. Any fire rated system, such as collars and the like, around comms cable penetrations through fire rated building elements is to be certified at Practical Completion as providing the required FRL and smoke sealing capability specified in the NCC.

e. The fire rating system is to be a permanent system able to accommodate future changes such as reducing or increasing the quantity of individual cables passing through the fire rating element. An example of a fire rating system that complies with this requirement is Fyrebox manufactured by Trafalgar.

f. The cabling contractor will provide a certificate from an approved inspector attesting the efficacy of the fire stopping barrier. This certificate will be provided electronically and as a hard copy to the PLIE.

6.11 Raised Floor Penetrations

Where penetrations are required in Raised Access Floors, the floor tiles shall be fitted on one edge with a Chatsworth KoldLok Split Integral Raised Floor Grommet (or equivalent) to minimise air spillage from the UFAD plenum. Two KoldLoks will be supplied per cabinet – one for power and one for data cabling.

Penetrations will preferably be made on the tile edge and shall allow for the tile to be lifted and removed without disturbing the SCS. Where the penetration cannot be made on the tile edge the tile shall be cut into two pieces and the penetration made on a cut edge.

In situations where a tile has been cut and the rack or part of the rack are supported by the tile then an assessment shall be made on whether additional sub floor posts are required to restore the load bearing capacity of the tile to support the fully loaded rack. Alternatively consider cutting tiles that do not support load.

6.12 Materials

All materials supplied shall comply with the relevant standards and those specified in this document. To ensure the consistency of the installation, all cabling, connectors, network support or any other equipment/hardware supplied by the contractor shall be sourced from the one vendor.

All materials supplied by the contractor shall be delivered to site new and in sealed packaging.

6.13 Tools

At all times the correct tools shall be used to carry out all works. This applies to all power and hand tools and includes any specialised tools or instruments that are specified by manufacturers in the installation of their equipment of accepted industry standards.

6.14 Maintaining a Clean Work Environment

The site is to be kept clean at all times.

Maintaining a clean work environment includes:

a. Cleaning the work area (before commencement of works, during works at regular intervals or as required, and on completion of works).

b. Taking necessary precautions to minimise dust.

6.15 Working near active equipment

Wherever possible cutting and drilling work shall not be done near active equipment. For example, cable trays shall be removed from the building and cut outdoors.

Where it is not practical for this to occur then the work shall be undertaken with a view to minimising airborne particulate matter by using, for example, a vacuum extraction system.

All active equipment shall be shrouded with clean cotton covers placed in such a manner as to provide the maximum protection whilst minimising disruption to cooling air flow. Covers shall be removed in a manner which contains any debris. Covers shall be removed from the building and cleaned outdoors before re-use.

6.16 Ceiling Tiles

Where ceiling tiles need to be removed to allow for installation works the contractor will:

a. Cover and protect all adjacent UQ property prior to handling any ceiling tiles,

b. Completely remove the tiles from the ceiling grid

c. Stack the tiles flat on a clean area of the floor. Tiles will be stacked like surface to like surface.

d. After replacing tiles ensure the surrounding areas are clean and free from debris

e. Persons handling ceiling tiles shall wear clean, white, cotton or other non-marking gloves.

6.17 Labelling

6.17.1 General

Unless otherwise specified the cabling contractor will supply all of the labelling detailed below.

All fixed cables shall be labelled at each end (behind the patch panel or TO) with self-laminating wrap around labels. Labels shall be affixed approximately 20mm from the stripped end of the cable sheath and shall comprise C-LOO (as per information below).

All cabinets and racks shall be labelled.

All patch panels shall be labelled.

Handwritten labels will not be accepted.

6.17.2 Telecommunications Outlets

All TO's shall be labelled.

All TO labels shall be 7mm Arial black text on a white background (9-12mm tape) –

For TOs located above ceiling, label shall be placed on the TO and on the ceiling directly below the location of outlet. This is applicable for outlets to connect WAPs, security cameras and BMS elements.

TO labels shall be in the following format:

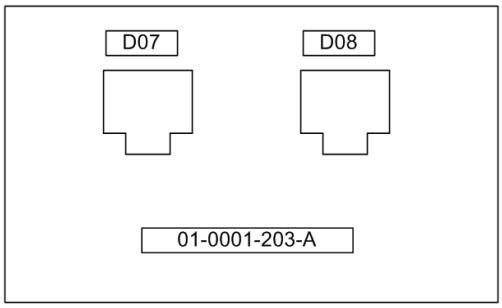
SS-BBBB-NNnnnn-C-LOO where:

	Description
SS	Site Number
BBBB	Building Number
NNnnnn	Telecommunications Room Number
C	Cabinet / Rack ID (alphabet)
L	Patch panel ID (alphabet)
OO	Outlet number

The NNnnnn component can be variable length and same as the room number assigned by Property & Facility.

The SS-BBBB-NNnnnn-C portion of the address needs to be done only once per faceplate or MUTOA.

Example:

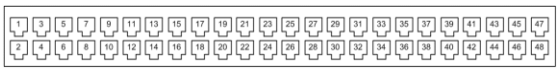


Outlets 7 and 8 on the patch panel labelled D of Cabinet A in TR number 203. The outlet is in Building 1 (Forgan Smith) at St Lucia.

6.17.3 48 Port Patch Panels

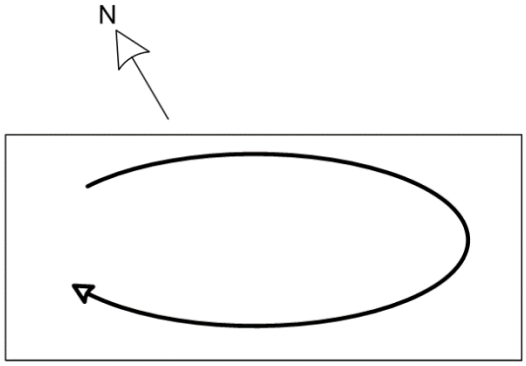
CAUTION
VISIBLE AND INVISIBLE LASER BEAM
AVOID EXPOSURE TO THE BEAM

All 48 port in 1RU patch panels will follow the numbering scheme shown below:

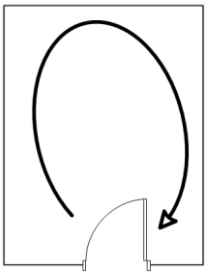


6.17.4 Order of Labelling

Outlet numbering will start from the corner of the building closest to North West and shall be done in a clockwise direction.



Within each room of a building the first outlet will be to the left of the lowest numbered door and shall be done in a clockwise direction. The outlets numbering shall be sequential either left to right or top to bottom.



6.17.5 Patch Panels

Patch panels will be labelled with a LETTER. Labels will comprise 10mm Arial white text on a black background on 12mm tape. Two labels will be affixed to each patch panel, one on the left-hand edge and one on the right hand edge.

6.17.6 FOBOT Labelling

All FOBTs will have laser safety label and identification label. The laser safety label to be of the format similar to the one shown below.

FOBOTs identification label will be of the following format describing the fibre number, type and remote end.

FFF – nnC-TTT-SS-BB-NNnnnn-C where.

	Description
FFF	Fibre number – assigned by PLIE
Nn	Number of cores
C	Denotes Number of Cores (always ‘C’)
TTT	Type of fibre – OS2 or OM4
SS	Site Number
BBBB	Building Number
NNnnnn	Telecommunications Room Number
C	Cabinet/Rack ID (alphabet)

6.17.7 Racks

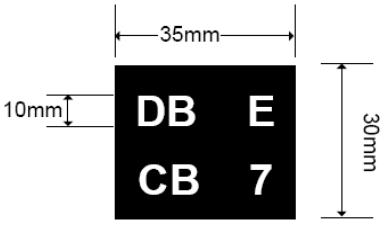
All racks will be labelled front and rear with a flexible magnetic strip label. This will be 50mm high and 400mm long comprising white text on a matte black background. The text shall be 35mm high and 5mm thick and all in uppercase. The label will be placed on the highest point of the cabinet/rack from which it can be easily read.

The label will show the word “RACK” followed by a letter.

6.17.8 Power Distribution Units

Every PDU will be labelled front and rear with a flexible magnetic rubber strip label. This will be 30mm high and 35mm wide comprising white text on a black background. The label shall have a matt finish. The text shall be 10mm high and 1.5mm thick and all in uppercase. The label will be placed on the highest point of the PDU from which it can be easily read. If the label will not magnetically adhere to the PDU it shall be glued using four small dots of cyanoacrylate adhesive (superglue) applied in such a manner that the label will not fall off inadvertently but may be removed using a small amount of force.

The label will show the descriptor “DB” followed by the Distribution Board designator. The second line will show the descriptor “CB” followed by the Circuit Breaker number.



6.17.9 Optical Fibre Backgone Cables

All fibre optic cables shall be labelled in every telecommunications riser, pit entry, exit of any conduit and shall be labelled within 1m of entry to the FOBOT. All labelling exposed to the environment shall be punched stainless steel.

Any exposed or above ground conduits that have copper or Fibre optic telecommunications cable inside must have a firmly affixed label on the outside of the conduit at a maximum of 5 metre intervals. Fibre cables traversing building risers will be labelled at least once in each riser at 1200mm AFF. The label on the conduit must match the cable that is inside the conduit reflecting the standard labelling method outlined in this document.

All fibre cable installed in pits will have a minimum of two labels affixed showing the fibre cable’s unique identifying number. Labels WILL NOT show the A and B end building names or numbers.

6.18 Documentation

The following documentation shall be provided and updated to reflect changes:

a. Marked up (as-built) documentation.

b. Performance Test Results.

c. SCS warranty and certification.

d. Third party verification of test results where applicable.

e. Electronic documentation shall be in Ms Visio, Ms Excel or PDF formats.

6.19 As-Built Diagrams

Upon completion of the installation the cabling contractor shall submit a hand-marked version of as-built drawing to ITS to facilitate the activation of outlets.

For outlet installation managed by ITS, the contractor is responsible to obtain the as-built drawing from P&F and update the newly installed outlets.

As-part of the as-built drawings submitted by the Principal Contractor the outlet locations and labels shall be marked in the AutoCAD format drawings in a separate layer.

6.20 Testing

6.20.1 General

Testing shall be done on 100% of the cables in accordance with the requirements of the reference documents listed in Table 3–2 .

Tests that report NA, PASS* (marginal/star), FAIL* (marginal/star) or FAIL shall not be accepted.

6.20.2 Test Equipment

Only test equipment approved by the SCS vendor and correctly calibrated shall be used.

Test equipment shall only be used with the manufacturer's approved accessory cables provided for testing of links/permanent link models.

6.20.3 Test Environment

Tests should be done in an environment as close to operational conditions as possible.

Cabling infrastructure shall not be moved after testing has taken place unless it is subsequently retested.

Testing shall be undertaken after workstation or adjacent power has been commissioned and whilst the office lighting is functioning.

6.20.4 Test Results

Test result sheets will include:

a. Test equipment used (make/model).

b. Operator's name

c. Operators certification from test equipment vendor

d. Software / firmware revisions used during the testing

e. Date of calibration

f. A copy of a current manufacturer's or National Australian Testing Association (NATA) calibration certificate for all test equipment to be used, prior to the commencement of testing.

Test results will be provided in LinkWare format for xTP and LSPM, and Bellcore Telcordia (*.sor) format for OTDR

LSPM results for optical fibre cable will be provided as one Fluke LinkWare (*.flw) file per fibre cable. The file name will be in the format "SS-XXX.flw" where SS is the Site Designator and XXX is the fibre number.

6.20.5 Independent Third Party Test Result Verification

UQ deems the Structured Cabling System (SCS) supporting the network to be critical for its effective operation.

In the interests of ensuring compliance to the performance requirements of the installed cabling system against Australian Standards and UQ requirements, the Contractor shall carry out all tests required to establish conformance. This applies to all installations irrespective of the communication contractor or structured cabling system vendor.

For installations of optical fibre and installations of more than 50 outlets it is a UQ requirement that all test data associated with structured cabling be independently verified by a NATA Type A Inspection Body. This requirement applies to both twisted pair and optical fibre test data.

The contractor shall submit all SCS test results to UQ Approved NATA Inspection Body once the project is near completion.

The cost of test verification shall be borne by the installation company and should be included in any quoted price or tender response. Costs may include fees for resubmission of data to address non-conformance issues.

The Contractor shall pay for all expenditures incurred by UQ for re-inspection due to the Contractor's failure to complete the SCS installation after the date of practical completion.

No site will achieve practical completion until a "NATA Statement of Compliance" and associated NATA report has been received by UQ for all work forming part of the project.

It is a UQ requirement that a copy of all NATA reports will be sent directly from the Approved NATA Inspection Body to UQ on generation.

6.20.6 Approved NATA Inspection Bodies

The Approved NATA Inspection Body shall be:

a. NATA accredited for inspections and that the scope of accreditation includes AS/NZS3080, similar standards and requirements set out within this specification.

b. A NATA Type A Inspection Body and shall be independent from any equipment or Service provider.

c. Approval is based, in part, on the following

d. NATA Scope of Accreditation including review of in-field testing results of LAN and telecommunications cabling covering optical fibre and copper cabling systems (balance pair systems)

e. Ability to carry out High Level Analysis

f. Active participation in performance based communication cabling standards (Australian Standards)

g. Active participation in testing standards of communication cabling (Australian Standards)

h. Active industry involvement

i. Quality of reporting.

UQ Approved Inspection Bodies:

VTI Services (Inspection Body NATA Accreditation Number 15120)

19 Adams Circuit
Elderslie. NSW. 2570
Australia

t: +61-2-4658 0914

e: **office@vti.net.au**

6.20.7 Minimum Test Standards

As a minimum the following parameters shall be tested and recorded.

6.20.7.1 Class E, E_A, F and F_A Links

All test results shall be reported using the Permanent Link model.

Compliance testing for Class EA requires a level 4 tester as defined by IEC 61935-1. Class E requires a level 3 tester. If uncertain, the contractor is to consult Fluke Australia for approved testers before starting the installation.

Electrical acceptance tests shall be carried out on all xTP cables in accordance with IEC 61935-1 in accordance with values set out in AS/NZS 11801.1. Test equipment must be calibrated, and calibration certificates must be supplied. Accredited installers must also be trained and certified for the test equipment used for acceptance testing. Certificates must be provided.

6.20.7.2 Voice Grade Links

The following test results shall be submitted for voice grade links:

a. Pair of Continuity/Rotation

b. Date of Test

6.20.7.3 Fibre Optic Links

Compliance testing for MMOF and SMOF shall be in accordance with the requirements of the reference documents listed in Table 3–2

Accredited installers must be trained and certified for the test equipment used for acceptance testing. Certificates of competence must be provided.

Test equipment must be calibrated, and calibration certificates must be provided.

The following information will be provided:

a. UQ Fibre Cable Number

b. Date of test

c. Length in metres

d. Insertion loss measured at 1310nm and 1550nm in both directions with a

e. Light Source/Power Meter.

f. OTDR traces (as per below).

LSPM Test results will be provided electronically in the testers' native format along

with VTI Services fibre reporting sheet completed (www.vti.net.au)

All fibre cores shall be tested with a light source and power meter in both direction and at two appropriate wavelengths

Light source and power metre testing (LSPM) shall ultise the One Test Reference Cord (TRC) method will be used for testing all fibre links

All fibre cores over 100 metres shall be tested with an OTDR utilising a launch and a tail cable in both directions and at both wavelengths

All OTDR testing shall be presented in a Bellcore format

No mated connectors are to have an optical attenuation loss exceeding 0.75dB-Analysis by two point LSA method on the OTDR trace

No event other than a mated connector shall have a loss greater than 0.2dB. - Analysis by two point LSA method on an OTDR trace

The pass fail criteria will be that specified within AS/NZS ISO/IEC 14763.3.

Launch and tail cable associated with OTDR testing shall be of sufficient length to determine the optical return loss of the interface connectors of the link under test.

A loss budget shall be provided for each fibre run. An electronic copy of all test results shall be submitted and included in the As Built documentation.

6.21 Acceptance and Commissioning

6.21.1 Acceptance Check-list

For installation of more than 24 outlets, the acceptance check list in Appendix B will be used for final inspection and acceptance. It will be the builder / contractor's responsibility to organise handover meeting on site for inspection and handover. The builder / contractor shall rectify any non-compliant criteria in the check list before acceptance and commissioning by UQ ITS.

6.21.2 Documentation Inaccuracies

The site supervisor will personally confirm that all labelling is correct. If during the DLP any labelling is found to be incorrect then UQ will engage an independent third party (at UQs discretion) to conduct a full audit. The cost of this audit will be invoiced to the cabling contractor. The contractor will then remedy any defects.

6.21.3 Defect Rectification

On P&F projects, the contractor will provide a contact phone number and email address for logging defects with the SCS. Requests for rectification work will be attended to within 2 business days during the DLP.

6.21.4 Warranty

Installation contractors shall hold authorisation from the respective cable manufacturer to install the specified structured cabling.

All new installations shall carry a minimum 20 year vendor's warranty on the product and the installation. The contractor will provide a contact phone number and email address for logging warranty claims.

7 Schedules

7.1 Nominated proprietary equipment specifications

Where trade names, brands, proprietary products and equipment are stated in Table 7–1, the use of such names is intended to define the concepts, features, attributes and expected levels of performance that are required by the University in the product or equipment tendered. In each case, where a trade name, brand, proprietary product is stated, this shall be understood to mean “or alternative which is technically equivalent and approved by UQ”.

The exception is the terminating hardware and cable of the specified structured cabling system vendor, or where a substitute product may violate the structured cabling system warranty, in which case substitutes are not accepted. Refer also Appendix E – QGEA Compliance.

Table 7–1 Nominated proprietary equipment specifications

Equipment type		Nominated specification	Design Standard reference
Cable containment – cable tray		➢ Burndy ➢ EzyStrut	Section 6.4.3.5
Cable containment – cable mesh		➢ Cable Cage Systems	Section 6.4.3.5
Fibre Requirements – Prentice Building (Data Centre 1) and GPN3 (Room 110): ***Note**: UQ is aware that the above BoM is capable of terminating 96 cores. Unless otherwise specified, all items, in the quantities shown, will be supplied for each 48 core*	1RU Un-managed QUAREO empty PA	➢ QUCH-1RU (x 1)	Section 6.7.2
	Single more ultra polish LC-MPO elite blade	➢ QUFB-48FDLCMSMHR (x 2)	Section 6.7.2
	24 Position heat shrink f usion splice wheel with splice chip	➢ FST-DRS24-NT (x 4)	Section 6.7.2
	Single mode MPO12 (female) to MP012 (female), Fiber Patch Cord, 12-Fiber, Method A, LSZH, 10m	➢ ARGMPMPGD-JAM010 (x 4)	Section 6.7.2
	Rack Technologies IQ Open Frame 45RU	➢ IQOF4501 (x 2)	Section 6.6.3
	Rack Technologies IQ 1RU Horiz CM 150mm Finger System	➢ IQOF9509-150 (x 1)	Section 6.6.3

Equipment type		Nominated specification	Design Standard reference
Rack Technology: 1 x 45RU 4 Post Open Frame Rack	Rack Technologies IQ 2RU Horiz CM 150mm Finger System	➢ IQOF9502-150 (x 1)	Section 6.6.3
	Rack Technologies IQO-F Cable Manager 300W Long Fingers	➢ IQOF4540-150 (x 4)	Section 6.6.3
	Rack Technologies Shelf	➢ S-SHELF-MOD-300-BL (x 1)	Section 6.6.3
	Rack Technologies IQ Open Frame Joining Kit Adjustable (400-600mm)	➢ IQOF9514 (x 1)	Section 6.6.3
	Rack Technologies pack 100 Cage Nuts and Screws.	➢ 9075 (x 4)	Section 6.6.3
	B&R Cable Hanger	➢ BRQ-Q10600A/3 (x 1)	Section 6.6.3
	Nylex Safe-T-Step (or equivalent)	➢ E739A (x 1)	Section 6.6.3
SRA Solution: 1 x 45RU 4 Post Open Frame Rack	45RU 2-Post Open Frame Rack	➢ 133584 (x 2)	Section 6.6.3
	Adjustable Joining Kit for 4 Post Open Frame Rack	➢ 133593 (x 1)	Section 6.6.3
	45RU x 300mm Open Frame Vertical Cable Manager with Dual Hinge Door, Long Fingers	➢ 133587 (x 4)	Section 6.6.3
	1RU Horizontal Cable Manager Long Fingers	➢ 132110 (x 1)	Section 6.6.3
	2RU Horizontal Cable Manager Long Fingers	➢ 132168 (x 1)	Section 6.6.3
	2RU 350D Shelf	➢ 070D33- (x 1)	Section 6.6.3
	Cage Nut Kit (50 pack)	➢ 80041-0 (x 2)	Section 6.6.3
Telecommunications Rack Power - 15A Option	Clipsal 15A 250V 1 gang 3 pin combination surface switched socket outlet	➢ 56C315-GY (x 2)	Section 6.6.3
	Rack Technology 15A, 10 Way Horizontal PDU	➢ 9003-RB-CAP15F (x 2)	Section 6.6.3

Equipment type		Nominated specification	Design Standard reference
Telecommunications Rack Power - 32A Option	Clipsal Combination Switched Socket Enclosure	➢ 56E2 GY (x 2)	Section 6.6.3
	Clipsal 32A 250V 1 gang surface rotary switch	➢ 56SW132LE GY (x 2)	Section 6.6.3
	Clipsal 32A 250V 1 gang 3 pin surface socket outlets	➢ 56SO332-GY (x 2)	Section 6.6.3
	Rack Technology UQ Custom 32A PDU	➢ RTPDU- PH113-013008320833-2T0-02 (x 2)	Section 6.6.3
	Clipsal 32A 250V 1 gang surface rotary switch OR SRA Solutions UQ Custom 32A PDU	➢ 56SW132LE GY (x 2) OR SRAPDU-PH113-013008320833-2T1PI (x 2)	Section 6.6.3

7.2 Design submissions

The submissions listed in Table 7–2 may be undertaken by a consultant or contractor depending on the procurement methodology of the project.

The submission timing noted shall be adjusted as necessary to suit individual project programs.

Table 7–2 Design phase submissions

Submission	Description	Reviewer	Timing (to be aligned with PREM process)	Design Standard Reference
Coordination package	Work-in-progress copy of design documentation for the following disciplines: a. Architecture / interior design b. Electrical c. Audio Visual d. Mechanical e. Dry fire f. Wet fire	UQ ITS	End of each design phase	Section 6.2.1

Appendix A – Project specific design standard deviations

This appendix will be supplied in a completed form to describe deviations from these standards that are permitted for specific projects.

Project name and number

Completed by: *name*

Dated: *date*

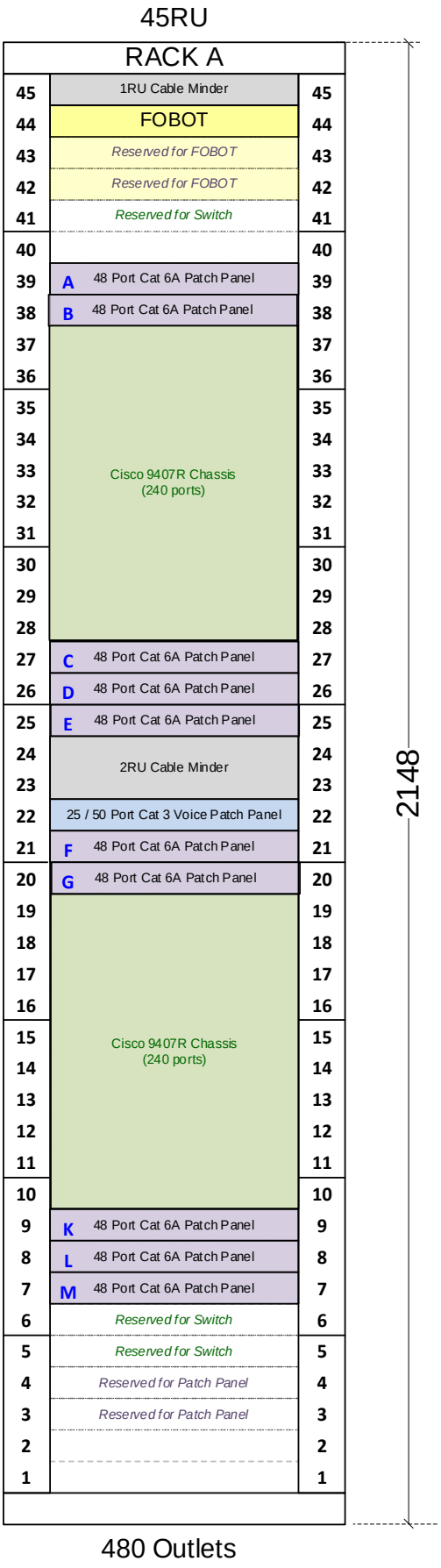
Design Standard Reference	Approved deviation

Appendix B – TR Acceptance Checklist

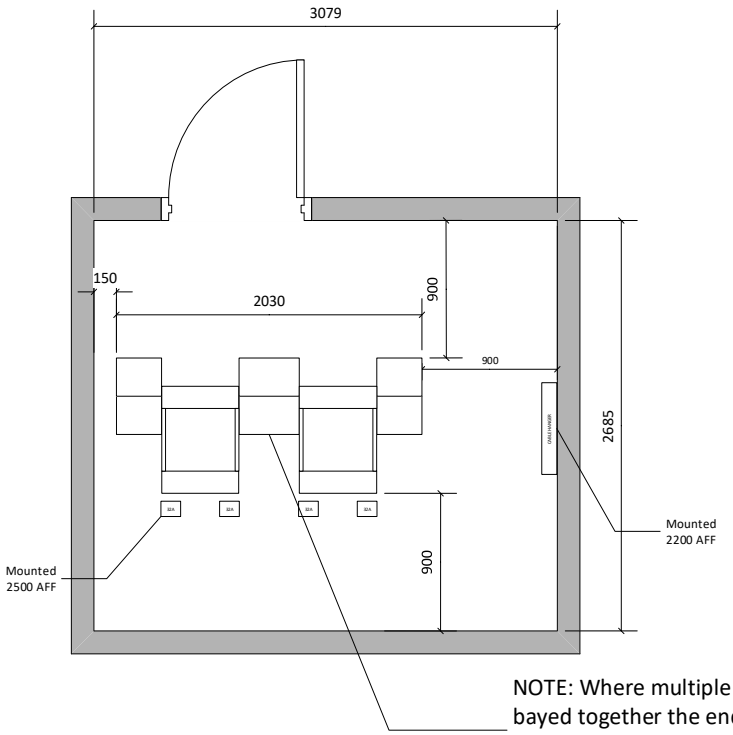
		Yes, No or N/A			
	TR Number:				
1	Cables are neatly reticulated on cable trays and secured				
2	Cable entry points are sealed / protected as per UQ Fire Protection Specification (check with P&F)				
3	Racks				
	All racks are labelled				
	All racks are bolted to the floor				
	All racks are earthed				
4	Horizontal cabling (for each floor)				
	Patch Panels are labelled				
	Wraparound labels – remote room number & outlet ID				
	All Cat 6_A PATCH PANELS ARE EARTHED				
	48 port patch panel outlet sequencing is correct				
	Test Results received and reviewed				
5	As-built Drawing				
	Drawings received (hand-marked drawings acceptable)				
	Outlet numbers marked				
	WAP locations with Device IDs marked				
6	Lead-in Cables				
	All cables terminated and labelled				
	Test results submitted and reviewed				

		Yes, No or N/A			
	Voice cable record books supplied / updated				
7	Power feeds				
	Socket types are correct				
	Sockets are labelled				
8	Air-conditioning				
	Installed and functioning				
	Cooling adequate				
9	TR Access				
	UQ Common TR key works				
	Proximity card reader available and working				
10	All service installation in the TR have been completed				
11	Room is cleaned				

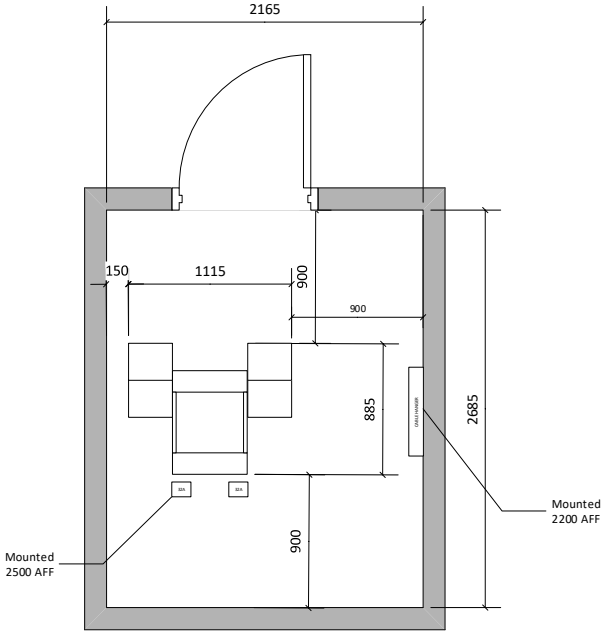
Appendix C – Typical Rack Elevation


45RU
RACK A
1RU Cable Minder
FOBOT
Reserved for FOBOT
Reserved for FOBOT
Reserved for Switch
A 48 Port Cat 6A Patch Panel
B 48 Port Cat 6A Patch Panel
Cisco 9407R Chassis
(240 ports)
C 48 Port Cat 6A Patch Panel
D 48 Port Cat 6A Patch Panel
E 48 Port Cat 6A Patch Panel
2RU Cable Minder
25 / 50 Port Cat 3 Voice Patch Panel
F 48 Port Cat 6A Patch Panel
G 48 Port Cat 6A Patch Panel
Cisco 9407R Chassis
(240 ports)
K 48 Port Cat 6A Patch Panel
L 48 Port Cat 6A Patch Panel
M 48 Port Cat 6A Patch Panel
Reserved for Switch
Reserved for Switch
Reserved for Patch Panel
Reserved for Patch Panel
2148
480 Outlets

Appendix D – Telecommunications Room Examples



TWO RACKS
Minimum Area 8.5m^2



SINGLE RACK
Minimum Area 6m^2

Appendix E – QGEA Compliance

E.1 General

UQ is bound by Queensland Government State Purchasing Policy and is obligated to comply with the Queensland Government Enterprise Architecture (QGEA), ICT Cabling Technical Standard.

Of particular note in this standard:

Paragraph 3.3 – the procurement of ICT cabling infrastructure shall be undertaken separately from other building works, including the Electrical works.

Paragraph 4.2 – The minimum warranty provided by the manufacturer of the infrastructure connecting hardware shall be 20 years full parts and labour warranty and for the cable and connecting hardware, and 20 years applications assurance (or protocol assurance) warranty.

Paragraph 4.3 – Single System Sites

Paragraph 4.4 – Multiple System Sites

A copy of the standard is available from:
https://www.qgcio.qld.gov.au/documents/ict-cabling-infrastructure-technical-standard

E.2 Single System Sites

E.2.1 St Lucia, Gatton, Indooroopilly Mine, Pinjarra Hills and PACE Woollongabba

A Commoscope solution will be used (Tyco Electronics, ADC Krone and AMP Netconnect). All refurbishment projects in existing buildings are to use the same system for new cabling. However UQ is willing to consider SCS solutions of alternate systems from Molex or Siemon for new building constructions at St Lucia site.

E.2.2 Royal Brisbane and Women's Hospital, Herston

Currently a Molex solution is used. However UQ is willing to consider SCS solutions of alternate systems from Commscope or Siemon for new building constructions at Herston & RBWH site.

E.2.3 Multiple System Sites

Princess Alexandra Hospital

- Queensland Health (QH) cabling specifications will be applicable for in all hospital buildings.
- TRI Building – A Siemon solution will be used

Other Queensland Health Sites
Where the buildings are owned and managed by QH, the QH Cabling specification will apply.

Other UQ Sites
UQ will assess these on a case by case basis.

Appendix F – Outlet Density

Application	Number of Outlets
Staff/Student Workstations	Dual outlet per workstation
Wireless Access Point (WAPs)	Dual outlet
Computer labs	Single outlet per computer stations + 2 spares for each group of stations
Other labs	As specified in the project documentation
Digital signage LCDs	Dual outlet
Meeting room LCDs	2 x Dual outlet
Teach space LCDs	Dual outlet
Multimedia projector	Dual outlet
Motorised screens	Single outlet
Room booking panels	Single outlet
LED Clocks (PoE)	Single outlet
AV Lectern	5 x Dual outelts
CCTV cameras	Dual outlet
Door phones	Single outlet
Emergency phones	Single outlet
Lift motor room / controls	6 Dual outlets in a secure cabinet outside the lift shaft
Electrical switch boards	Quad outlet
Mechanical plant rooms	Quad outlet
Fire Indicator Panel	Quad outlet
Access control panel	Quad outlet
People Counting Cameras	Dual outlet

Appendix G – Quality Plan

The reference quality plan is available to be downloaded as a separate file here: **https://coo.uq.edu.au/operational-areas/property-and-facilities/pf-staff-and-contractors/building-contractors-and-consultants**