9813 Data Cabling Infrastructure Design Specification

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Revision Control

All documentation will be updated at the discretion of Mackay Regional Council. Any changes to the documentation will require a new issue to be produced and re-circulated to all parties.

Changes deemed by Mackay Regional Council as minor will be issued as addendum's to this document and will be reflected accordingly in the revision control section. Changes deemed by Mackay Regional Council as major will be revised as a new issue of the document and will be reflected accordingly in the revision control section.

Issue	Date	Reason	Implemented by
V1.5	3/11/17	Update to reflect CommScope changes	S.Whiston
V1.6	7/11/17	Updates	C.Bath
V1.7	7/12/17	Tidy Up	C.Bath
V1.8	3/12/18	Commscope product changes	S.Whiston
V1.9	25/01/19	Yearly updates	C. Bath
V2.0	02/10/19	Updates	C. Bath
V2.1	16/03/20	Minor Update	C. Bath
V2.2	17/07/20	Supplementary Specification Number Allocated	R.Mogg

Issue Control

On updating the issue of the standards document or generating an addendum to the standards document all documentation must be issued to the following:

Issued To	Documentation Issue							
	19/11/15	3/11/17	7/11/17	3/12/18	25/1/19	02/10/19	16/03/20	17/07/20
CommScope	1.4	1.5	1.6	1.8	1.9	2.0	2.1	2.2
Mackay Regional Council	1.4	1.5	1.6	1.8	1.9	2.0	2.1	2.2

Contents

1.0 Introduction

1.1 Overview

The aim of this document is to provide a cabling infrastructure which has high reliability, is easy to maintain and can support the applications and services of today and the future.

The specification has been written to ensure that a cost-effective solution is provided without compromising any standards or safety issues, and that all single points of failure are designed out by means of route diversity and possible service duplication where appropriate.

This document describes the specification for the design of the network infrastructure including fibre and copper networks for voice, data and associated services within Mackay Regional Council network.

All cabling work supplied and installed shall be in-line with local Standards, along with any requirements as stipulated by Mackay Regional Council.

It is important to note that all network rooms are for the sole occupancy of Mackay Regional Council and their associated voice and data distribution equipment. It is not permissible for other parties to store or install equipment within these rooms without written consent from Mackay Regional Council.

The product set has been standardised on CommScope. This product set has been selected for its high degree of reliability, quality and performance. By standardising on this product set a standard warranty for voice and data has been set for all buildings within the Mackay Regional Council network. To this effect CommScope voice and data products must be selected.

All installation work must be covered by a 25 year system warranty. To ensure that this happens, only approved manufacturer Integrators shall be used.

1.2 Specification of Criteria

Two levels of criteria are specified, mandatory and highly desirable. The mandatory requirements are described by the word “must” and “shall”; whilst highly desirable are described by the words “should”, “may” or “desirable”. Mandatory requirements must be adhered to under all circumstances and may not be changed. Highly desirable requirements are the desired ways of design, implementation and documentation that may be changed depending on individual circumstances.

All parties shall adhere to this specification document. Any deviation from this document must be on written approval by Mackay Regional Council.

1.3 Scope of Works

This document provides minimum details on the scope and installation requirements across the communications network at all sites owned and/or run by Mackay Regional Council.

Any Appendix details or adjustments from Mackay Regional Council relating to particular project requirements shall be adhered to.

2.0 Install Requirements

2.1 Overview

All the work covered in this specification shall be implemented in strict compliance with the standards and codes issued or endorsed by the Australian Communications & Media Authority and the Standards Association of Australia.

2.2 Installer Requirements

All cabling works are to be performed under the Australian Communication & Media Authority (ACMA, formerly known as ACA) with the objective being to carry out general premises cabling as specified by the Structured Cabling System manufacturer.

2.3 Installer Licence

The communication cabling installation is to be carried out by a specialist Cabling Contractor licensed by the ACMA or registered with an authorised Cabling Registrar. The Cabling Contractor and nominated personnel must all hold current relevant and necessary licences / Open Registration with appropriate endorsements and must present these prior to commencement of work. A copy of the Contractor's license and Open Registration is to be made available to Mackay Regional Council upon request.

2.4 Preferred Cabling Contractor

The cabling contractor must be chosen by competitive quotation. Tenderers are advised to submit all relevant details to Mackay Regional Council when requesting quotations. Should a tender be in place then normal contact should be via Tender contact process, if this is not the case the below contact can be used:

Mackay Regional Council Contact Details

Attn: Senior ICT Network Engineer
Information Services
PO Box 41
Mackay Qld 4740
Telephone: (07) 49619456
Fax: (07) 49442488

2.5 Supplier Selection

The manufacturer's components used on any Mackay Regional Council site shall be as follows:

Structured Cabling Components (Copper and Fibre Optic):

- CommScope – NETCONNECT Solution

2.6 Supplier Certification

The Contractors ACMA license / Open Registration must be endorsed to allow performance of the cabling products being installed (i.e. CommScope NETCONNECT ACT 1, 2 & 3).

The Cabling Contractor (including 50% of employed staff) must be trained to the manufacturer's requirements for installation of the cabling system.

The Cabling Contractor must provide documentation that their organisation is a current minimum 25 years Integrator upon request by Mackay Regional Council.

2.7 Carrier Services

2.7.1 General

The contractor is to arrange for the installation of appropriate white UPVC conduit (with draw wire) - sized in accordance with AS/CA S009, to house the required Carrier lead-in cabling and install it in a

shared trench with the electrical lead-in. If the provision of a shared trench is not practicable a separate trench shall be provided. The conduit type and sizing shall also meet the requirements of NBN Co. requirements for future services.

The contractor is to formally advise the nominated telephone sub-contractor (if applicable) on the completion of the lead in trench and conduit fit -out.

The contractor shall also ensure that cable/conduit is installed to the minimum depths and required separation from electrical and other services, specified in AS/CA S009.

2.8 Customer Acceptance

At the conclusion of the installation a preliminary walkthrough with the Mackay Regional Council representative and installation contractor will be performed to check for installation quality, accurate performance of the work, and to verify engineering diagrams. Builder / Tenderer to notify Mackay Regional Council when the walk through is ready and verify with the relevant Project Manager in writing.

Any modifications to the documentation or the installation that may be required shall be accomplished within a 2week period. "Customer Acceptance" shall consist of a final walkthrough with the installation contractor. The walk through shall be scheduled within 3 weeks of the completion of the installation in order to turn the project and documentation over to the end user. Please note that "Customer Acceptance" does not release the installation contractor from repairing any cabling errors or improperly labelled circuits, caused by the installation contractors that may be discovered at a later date.

The cabling contractor shall warrant all cabling installation works for a period of no less than 12 months.

2.9 Cabling Practice

All cables shall be run and installed in a workmanlike manner and in accordance with AS/NZS 3080 and AS/CA S009 Wiring Rules. The recommendations in AS/NZS 3084 Pathways and Spaces should also be followed.

The Contractor shall plan the cabling system and routing to ensure adequate segregation from hazardous services, ensure system integrity and performance, ensure that it does not present problems of maintenance or access, and ensure there is no conflict with the operation and maintenance of other systems.

The Contractor shall in his Tender submission, give full details of the type of cables to be used including the type of termination, colour scheme, identification method, method of installation and shielding (if required), limitations (if any) and any other relevant telecommunications information.

Unless otherwise stated, the Contractor shall submit for approval one month prior to commencement of installations, drawings, showing the proposed wiring cable tray/catenary or conduit layout for the entire systems with all necessary dimensions and support details clearly indicated.

All cable trays, catenaries and ductwork required to complete the installation will be the responsibility of the Tenderer to supply and install. The installer is to liaise with end user, and/or main contractor when strip out of existing floors/ buildings commences to evaluate if any existing cable tray or ducts can be re-used.

All necessary pathway penetrations and access between floors is the responsibility of the Tenderer to provide, and to ensure all penetrations and access holes at the completion of the installation are fully sealed to local authority requirements and fire regulations by qualified personnel.

All work shall be installed and comply with the cabling manufacturer’s Installation Practices. These Practices are available upon request.

3.0 Definition of Terms

3.1 Overview

To provide detailed information regarding the definitions of terms that is pertinent to this standard.

3.2 Definition of Terms

3.2.1 Building
A roofed structure enclosed by walls on all sides, used for the express purpose of housing telecommunications related equipment for the transmission and reception of data, voice, video etc, signals and any related processing of the signal content.

3.2.2 Backbone cable
A cable that connects any combination of carrier and network devices for the transmission of multiplexed signals.

3.2.3 Channel
ISO/IEC 11801 defines a channel as "*The end to end transmission path connecting any two pieces of application specific equipment. Equipment and work area cords are included in the channel, but not the connecting hardware into the application specific equipment.*"

3.2.4 Communications Room (CR)
A room within the building that houses all the core data & telecommunications transmission and processing equipment.

3.2.5 Communications Cabinet (CC)
A cabinet within the building that houses all cabling terminations network equipment and PABX equipment. The Communications Cabinet may contain communications equipment such as CATV, Public Address, and Security CCTV systems but this is at the approval of Mackay Regional Council Information Services. A CC may also be referred to as the 'Local Cabinet' or 'Data Rack (DR)'.

3.2.6 Consolidation point
ISO/IEC 11801 defines a consolidation point as "*A connection point in the horizontal cabling subsystem between a floor distributor and a telecommunication outlet*."

3.2.7 CP cable
ISO/IEC 11801 defines a CP cable *as "A cable connecting the consolidation point to the telecommunications outlet(s).*"

3.2.8 CP link
ISO/IEC 11801 defines a CP link as "*The part of the permanent link between the floor distributor and the consolidation point, including the connecting hardware at each end*."

3.2.9 Cross connect
ISO/IEC 11801 defines a cross connect *as "An apparatus enabling the termination of cable elements and their cross-connection, primarily by means of patch cords or jumpers. Incoming and outgoing cables are terminated at fixed points.*"

3.2.10 Data room
Generic term used to describe entrance, equipment and main communication rooms.

3.2.11 Entrance room
A room within the building that caters for the entry of cables into the building.

3.2.12 HighBand
A KRONE horizontal cable distribution frame.

3.2.12 NETCONNECT
CommScope structured cabling solution consisting of the AMP NETCONNECT, KRONE, ADC KRONE, TE Connectivity and Tyco Electronics cabling solutions.

3.2.13 Private Automatic Branch Exchange (PABX)
A private telephone exchange system to provide connections via the telephone handsets to the public switched telephone network via trunk lines.

3.2.14 Pit
A box, joint box, manhole or cable chamber.

3.2.15 Pit cover
A covering lid used to seal a pit.

3.2.16 Solution
An end to end network of active and interconnecting passive devices that are required to transmit and process a stream(s) of client or application specific data.

3.2.17 Telecommunications
A branch of technology concerned with the transmission, emission and reception of signals, that is, information of any nature by cable, radio, optical or other electromagnetic systems. Telecommunications covers all forms of information whether voice, video, data etc.

3.3 Abbreviations

a.c.	Alternating current
BD	Building Distributor
CD	Campus Distributor
CC	Communications Cabinet
CR	Communication Room
CP	Consolidation point
d.c.	Direct current
ER	Equipment room
ISO	International Standards Organisation
LAN	Local area network
PABX	Private branch exchange
TE	Terminal equipment
TO	Telecommunications outlet
MRC	Mackay Regional Council

4.0 Cabling Systems

4.1 Overview

The topology of the cabling systems shall be set out and clearly defined in terms of design and product set. The Structured Cabling system is required to provide a flexible distribution architecture for both voice and data connectivity.

4.2 Cabling System Structure

The cabling system can be considered as a series of clearly defined subsystems, each one interconnecting a specific piece of active equipment that may in some cases change the media type.

It can be seen that there are two main components to the cabling systems for any one end to end solution. The basic elements are as follows:

- Backbone Cabling (Copper and Fibre Optic)
- Horizontal Cabling (Copper Cabling)

4.2.1 Backbone Cabling

The backbone cabling provides connection from the Campus Distributor to the Building Distributor, and the Building Distributor to the Floor Distributor/ Telecommunication Room (if applicable). The CD/BD shall house both lead in carrier cabling termination frames, as well as active equipment. Voice tie cabling shall be via a minimum of Category 3, 25 pair copper voice cabling. This cabling shall be run in a star topology and be terminated within the Distribution Room onto Patch Panels where possible. Cabling requiring surge protection shall transition via a TE KRONE disconnection module with suitable 250V Surge Suppression devices.

Data backbone services shall be supported via Multimode OM4 fibre optic cabling or Single mode fibre optic only when distances exceed OM4. This cabling is to be terminated using LC connectors with minimum 12 cores and suitable LC adapters.

Lead in Carrier copper cabling shall terminate onto TE KRONE Pro-fil type frames – sized to accommodate both lead in and any required Patch Panel ties – allowing for additional 30% expansion.

4.2.2 Horizontal Cabling

The horizontal cabling is the cabling system that provides telecommunication services from CC to the user outlets (TOs). All user outlets shall be fed from the nearest CC to ensure cabling lengths comply with AS/NZS 3080. Cable lengths of the permanent link must be less than 90 metres.

Cables reticulating to the CC shall be terminated onto 24 port Category 6A Flush Patch Panels. A general CC layout is available from Mackay Regional Council upon request.

4.3 Earthing

Tenderer shall supply and install a complete earthing system for the voice/data system to ACMA, AS/CA S009 and AS/NZS 3080 requirements.

All distribution frames, cable trays and catenary wires shall be connected to the building protective earth from the electrical distribution board on the floor where such is installed, as specified for each case in AS/CA S009 or local equivalent (whichever is superior / most stringent).

Sizing of earthing conductors shall conform to the standard specified in AS/CA S009 or local equivalent (whichever is superior / most stringent).

Cables with metallic sheaths will be earthed at one end only. This will then be tied to the building protective earth via green / yellow conductor as per AS/CA S009 or local equivalent (whichever is superior / most stringent).

No steel cabling enclosure medium will be installed without having continuity to a protective earth.

4.4 Labelling

All Patch Panels and TO's shall utilize adhesive labels to clearly identify services i.e. Active Equipment, horizontal cabling etc. Proper labelling and numbering shall also be provided on the outlets.

If requested all cable labels are to be of clear wrap around self-adhesive type and each cable is to be labelled at each end 100 - 150mm from the termination point.

Outlets shall be clearly labelled on the exterior of the wall plate utilising a lettering method to the approval by Mackay Regional Council. A white (black lettering) Self-adhesive non-fading label applied to the outlet frame/cover in a prominent position, firmly affixed.

The number format for wall outlets shall be:

Cabinet/Panel-Outlet
e.g. CAB1/B-01

All cabinets and approved connection frames are to be labelled as agreed with Mackay Regional Council, and complete records are to be provided showing all connections.

These numbers must be entered in the Communications Cabinet (CC) record book in the same way outlets are numbered. Both data and voice shall be labelled in the same manner.

The number format for Voice Tie panels shall be:

Cabinet-Panel-Outlet
e.g. CAB1/VT1-01

Backbone or intra-cabinet cabling shall have both 'to' and 'from' listed on the labelling to provide maximum amount of detail.

Voice frames – shall be labelled by vertical and pair number. All detail should be entered in the Telecommunication Room record book.

Voice Frame Label Example: A = Vertical A
001 = Cable appearance on Frame

All labels shall be supplied, printed and fitted by the Cabling Contractor.

4.5 Penetrations

Cables that penetrate fire barriers shall have the penetrations suitably sealed and fire-stopped by qualified operators as required by local building code regulations/laws.

All cable passing through floor or wall penetrations shall have the penetrations suitably sealed and fire-stopped by qualified operators as required by local building code regulations/laws.

4.6 Conduit/ Subduct Systems

4.6.1 General

The Tenderer shall obtain all clearances in accordance with Mackay Regional Council Facilities and Maintenance department before any work can proceed. The Contractor shall follow the "Dial before you Dig" requirements at all times where applicable. All trenches and conduits shall comply with AS/CA S009 and AS/NZS 3084 for depth, location and usage.

All conduits will have a draw wire of 7/0.67 PVC SI Building wire installed. There must be no joins in this draw wire. Galvanised draw wire will not be permitted.

Before cable is installed and after installation, ensure that the conduit is thoroughly clean of any extraneous material such as cable scraps, dust, dirt, construction debris and moisture. Any cable that has been subjected to immersion in fluid that has not completely dried out within 24 hours of immersion starting shall have the pathway dried and cleaned and the cable shall be completely replaced with new clean dry cable.

Co-ordinate all conduit and subduct work with other services on site as necessary. Conduits and ducting protruding through a floor shall extend between 50 - 75 mm above estimated finished floor level to act as a bund against fluid spillages.

At least 40% conduit capacity must remain after the initial installation is complete and a draw wire shall be provided in all conduit runs.

4.6.2 Indoor Conduit/ Subduct

Restrict conduit lengths to no more than 30m of continuous pull inside a building between hauling points. Restrict any cable pull to no more than two (2) x 90-degree bends, in conduits or ducts.

All fibre optic cabling inside conduit systems shall be clearly labelled with warning tape, yellow and black in colour. The pathway system shall otherwise be installed in accordance with the manufacturer's instructions.

4.6.3 Underground Conduit/ Subduct

All conduits located in trenches shall be at a minimum of 100mm diameter or substituted (on approval) by 2 x 50mm diameter PVC, Class 12, white in colour. A metallic galvanised trace wire shall be installed along each conduit path between pits and run into the pits above the conduit entry and a 50cm excess tail shall be left neatly coiled up and secured to the pit wall. A tape identifying that communications services are below shall be placed 150mm above the top of the conduits.

Conduit entry holes to the cable pit shall be sealed effectively with a flexible sealer to stop ingress and have a bell mouth/pit bush end put in place. Straight conduit runs shall be no longer than 120m in total length before a pit must be installed to provide a hauling point (Exclusions apply to Underboring and road reserve installations)

Any change of direction greater than 45% shall be done via cable pit (including entry to buildings, note that only sweep bends are allowed in this case to allow change in direction for building access). Any pits that are open at the time of the works shall have approved safety barriers surrounding them at all times. Any newly installed pits shall comply with AS/CA S009.

Any new pit installed in an existing and/or proposed garden bed shall have a communications locating marker installed.

Pits supplied shall be ACO (http://www.acoaus.com.au/cablemate/index.htm)
pits and lids sized to accommodate the required cabling plus 30% expansion but must not be any smaller than a “Type 5 plastic or Type 95 Polycrete” cable pit (i.e. for non-fibre joint pits) and minimum “Type 8 plastic or Ploycrete” cable pit (i.e. for fibre joint pits). A 100mm wide minimum concrete surround shall be installed around each Class B pit upon installation for longevity. Class C (or greater) will require the appropriate concrete structure built around the pit to maintain the relevant class rating as per manufacturer recommendations.

A minimum of 1m cable slack shall be left in each pit during cabling install and pull ropes are to be installed or maintained (if existing) during each new cable install and have a 90kg minimum break force.

Pits installed in Mackay Regional Council owned sites:

In non-trafficable areas - (Footways & areas that can be accessed by people, cyclists, mowing vehicles)
Any pits/lids supplied shall meet Load Class B requirements and have a non-locking galvanised steel lid and attached labelling plate or engraved lettering “COMMUNICATIONS”

In trafficable areas - (Roadways, Driveways & parking areas where vehicles may drive)
Any pits/lids supplied shall meet Load Class C requirements (or greater) and have a non-locking steel lid and attached labelling plate or engraved lettering “COMMUNICATIONS”

Pits installed outside Mackay Regional Council sites (including General Public Areas):

In non-trafficable areas - (Footways, road reserves & areas that can be accessed by people, cyclists, mowing vehicles)
Any pits/lids supplied shall meet Load Class B requirements and have a **PowerLok** galvanised steel lid and attached labelling plate or engraved lettering “MRC COMMUNICATIONS”

In trafficable areas - (Roadways, Driveways & parking areas where vehicles may drive)
Any pits/lids supplied shall meet Load Class C requirements (or greater) and have a locking steel lid and attached labelling plate or engraved lettering “MRC COMMUNICATIONS”

4.6.3.1 Underground Boring Conduit/ Subduct (inclusions/exclusions)

All the above items in 4.6.3 apply unless otherwise added, changed or removed by the items within this section

Any conduit installed shall be of 100mm diameter Polyethylene, Class 9, white in colour. A metallic galvanised trace wire shall be installed along each conduit path between pits and run into the pits above the conduit entry and a 50cm excess tail shall be left neatly coiled up and secured to the pit wall. No identification tape is required

Any new pit installed in an existing and/or proposed communications or rail corridor or rural road reserve or location where grass can easily obscure the pit, shall also have a set of communications locating markers installed either side of the pit detailing location, owner & contact details of 1100 dial before you dig.

Straight conduit runs shall be no longer than 250m in total length before a pit must be installed to provide a hauling point. This applies only to outside MRC sites grounds for underground boring, conduit or duct installations within communications or rail corridors or road reserves.

When a conduit run is crossing a road, street or a crossing a pit must be installed either side of the road way or crossing somewhere in the nature strip/ road reserve area

Any Single Mode fibre cable installed outside of MRC sites shall have custom printed labelling on the outer sheath which states “Mackay Regional Council” along with cable properties such as cable type, core count, date of manufacture etc. and can be of type CommScope Mini Loose Tube for core counts up to 144 and Commscope Flextube style for core counts above 144 core.

4.7 Security/Access Control

4.7.1 General

Cabling to the security/access control system(s) shall be via 2 x telecommunications outlets to each primary system and are to comply with Clause 6.3 and 6.4. Consultation with the security/access control supplier should be sought to confirm any other additional cabling/ installation requirements and shall be advised to Mackay Regional Council Project Manager.

Labelling of the outlets must be done for future reference when housed within the security/access control system

Details on the security/access control system shall be available from the Mackay Regional Council Project Manager.

4.7.2 IP CCTV Cabling

All Cabling for the CCTV system shall be run to an allocated Communications Cabinet(s) by the Mackay Regional Council Project Manager with consultation of the security/access control supplier and MRC Information Services Department. This cabling will be used solely for the purpose of IP CCTV.

4.7.3 IP CCTV Networking

The IP CCTV networking hardware shall be provided by the Security/Access control supplier for the IP CCTV system (connecting Cameras & Server/Storage together)

The Security/Access Control supplier will be provided access to the Mackay Regional Council corporate network to remotely access the onsite CCTV system via a second network port on the CCTV system.

Further details can be obtained from the Mackay Regional Council Information Services Department

4.8 Communications Cabinets

The Tenderer shall utilise 19" cabinets from APC Schneider Electric or AUSRACK B&R Cabinets as listed below for cable termination panels and for equipment mounting as appropriate. All cabinets supplied shall have key locks on any removeable panels or access doors/frames

Core 45RU Communications Cabinet:
1 x AR3305 – NetShelter SX 45RU 600mm Wide x 1200mm Deep x 2124mm High Enclosure
2 x AP8858 – Rack PDU, Metered Zero U, 16A, 230V, (18)C13 & (2) C19
4 x AR7711 - NetShelter SX racks PDU bracket
2 x AP8754 – Locking PDU input cable 3.0m Aus AS3112 to IEC-C19

Local 45RU Communications Cabinet (Floor Cabling Terminations):
1 x AR3355 – NetShelter SX 45RU 750mm Wide x 1200mm Deep x 2124mm High Enclosure
2 x AP8858 – Rack PDU, Metered Zero U, 16A, 230V, (18)C13 & (2) C19
4 x AR7711 - NetShelterTM SX racks PDU bracket
2 x AP8754 – Locking PDU input cable 3.0m Aus AS3112 to IEC-C19

Any model numbers changes of the required cabinet(s), monitored Power Distribution Units and accessories will be provided by the Mackay Regional Council Project Manager.

All frames, racks and cabinets shall be levelled to the floor or fixed to the wall to prevent movement to themselves and the cables.

Cable access paths into cabinets shall be via approved cabinet cable entry points such as via the top cable entry or under the cabinet via the spacing or plinth. For wall mount cabinets cabling shall either enter via wall cavity at the back of the cabinet or via the wall mount swing frame. They shall be run as to not impede the locking of all removal panels and access doors.

Vertical cable and patch cord management on the 19" rack shall be by suitable rubber access entry/ exit containers complete with bend radius protection to comply with ISO/IEC 11801:2002 Table 25 to ensure mechanical protection and performance is maintained.

Horizontal cable and patch cord management between patch panels or equipment on the 19" racks shall be 1 RU CommScope cable managers spaced as per the MRC Typical 45, 42, 18 & 12RU cabinet layouts attachment.

Where the structured cabling system at the site/location in question has less than 96 outlets, a smaller sized cabinet may be utilised. The smaller sized cabinet shall be no smaller than 18 RU high and shall be an AUSRACK Wall series Model: ARW18U600 with back mount/swing frame. When the site/location has less than 48 outlets a cabinet shall be no smaller than 12 RU high and shall be an AUSRACK Wall series Model: ARW12U600 with back mount/swing frame. Smaller sized cabinets may be wall or floor mounted, dependant on the mounting structural integrity. Exact mounting to be provided by Mackay Regional Council Project Manager.

See below for a typical cabinet layout. Exact layout to be provided by Mackay Regional Council Project Manager.

12 & 18 & 42&
45RU MRC Data Rac

4.9 Cable Tray/ Pathways

Either overhead ceiling mounted tray/ basket or under-floor mounted basket solutions may be used to carry cables within the communication rooms depending on the overall building construction.

Cable tray/ basket must be installed as to provide routes from the communications room to the building distributor. Cable runs holding more than 24 cables shall use tray/ basket only. Smaller cable runs (less than 24 cables) shall use catenary wires.

There shall be separate trays for power and telecommunication services. Where the trays cross they must be bridged and cross at 90^0. Horizontal, building backbone cables must be dressed to enter either the top or the bottom of the designated structured wiring cabinets.

Cable tray sizing shall conform to AS/NZS 3084, and any manufacturer Installation Specifications. No whale bone type tray will be accepted. Any pathway shall not exceed 50% capacity for the life of the installation.

Cable entry/ exit shall be via a system to ensure the bend radius of the cable is maintained (e.g. waterfall or similar). Cables passing through cavity wall spaces shall be protected via flexible conduit at all times.

4.10 Skirting Duct/ Service Columns

Where appropriate, skirting duct shall be used for the reticulation of power and communications services to the final outlet location. Cable pathways must be designed to ensure cabling should not run any further than 5 metres within enclosed skirting duct work.

Skirting duct shall be a minimum of 50mm in depth, comprising of 3 channel construction to provide adequate separation from power and communications services. All outlets mounted to skirting duct shall use the manufacturer's approved outlet mounting kit(s).

Change of direction within the skirting duct shall require the use of suitable bend radius protection of the communications cabling. No sharp edges shall be evident. All outlets mounted directly to the skirting duct. Channel shall use angled faceplates to provide adequate bend radius protection of the communications cable.

Service columns to supply skirting duct and/ or workstation(s) shall provide adequate separation of the power and communications services. Cabling through service columns shall not exceed the maximum allowable fill rate. Bend radius protection of the cabling entering and leaving the service column must be provided for.

Exact skirting/ service column type/ model to be approved by Mackay Regional Council Project Manager, before any on site works begins.

5.0 Communications Room (CR)

5.1 Overview

A CR is a generic term used to describe the passive cabling termination frame and surrounding room. The location and size of all CR's shall be provided by others. Mackay Regional Council Project Manager shall approve any proposed location and size of these facilities.

The following is a guide as to the expectations of the CR provision:

5.2 Position

5.2.1 General

The communications room must be positioned with consideration to other communications rooms and the backbone cabling. The most important rule is to plan the position of the room to cater for the maximum distances for telecommunication services.

5.2.2 CR Room Position in Respect to Backbone Cabling

CR rooms provide copper connectivity to all TO's, and shall also provide voice and data backbone cabling to reticulate to the Core Communications Cabinet. Cabling shall use the star topology for voice and data wiring. Each CC shall have a minimum of 25 pairs of Category 3 cable run to the Core Communications Cabinet used for voice services. The Core Communications Cabinet shall have a minimum of 50 pairs of Category 3 cable run to the CD/BD used for voice services.

Backbone fibre optic cabling shall be via Multimode cable. Each cable shall be run via a diverse path and terminated into the CR Core Communications Cabinet.

5.3 Size of CR Room

5.3.1 Floor space

The CR shall be designed to accommodate all the known and planned requirements for the equipment it shall house. The room shall be designed to accommodate all floor areas that are to be used as office areas, or could accommodate office areas. Room sizing shall be in accordance with AS/NZS 3084. Room dimensions shall comply with the below:

Serving Area (m^2)	Recommended room dimensions (mm)	Minimum internal area (m^2)
1000-1500	3000 x 3400	10
800-999	3000 x 2800	8
500-799	3000 x 2200	6

5.4 Room Layout

Each telecommunications space shall conform to the minimum requirements as specified in AS/CA S009. Passive Cabinets shall provide minimum of 900mm clearance front and rear, with an additional 300mm added to front clearance if active components are present within the cabinet.

A generic cabinet layout is available from Mackay Regional Council upon request.

5.5 Lighting

Lighting intensity on the front and back of installed terminations, Patch Panels and equipment should be 500 lux at 1m above floor to meet AS/NZS 3084 requirements. The lights should be situated to minimise shadows on the patching and termination areas. Spot lighting must not be used to illuminate the aisles.

5.6 Ventilation

The CR room shall be fed by a dedicated HVAC system that is design to provide the correct operational environment for all active equipment to be installed. To allow a safety margin of cooling it should be designed to accommodate the requirements of flood wiring with all ports active. As a minimum, there must be a single AC unit rated to a minimum of 750W output of cooling per cabinet.

Each HVAC unit shall be fed from a separate mains cable(s) to the circuit board. Each HVAC unit within the same data room must not share the same circuit breaker with any other HVAC unit. Consideration must be taken for future power requirements of new equipment.

The HVAC shall be provided on a 24hr 365 days a year basis.

The temperature and humidity shall be controlled to provide continuous operating ranges of 18^{o} C (64^{o} F) to 23^{o} C (73^{o} F) with 45% to 55% relative humidity. Humidification and dehumidification equipment may be required depending upon local environmental conditions.

5.7 Power

Power shall be provided into cabinets that house active equipment.

Communications Room Power Requirements:

The power requirements for each cabinet must be calculated from the maximum amount of equipment that can be fitted. A minimum of two 15A captive sockets shall provide feeds to each active cabinet and their rating shall be based on the calculated power rating for each cabinet.

The captive sockets shall be mounted above the rear of the cabinet via suspended outlets from the ceiling.

The power should be fed from a local distribution board which in turn is fed from the main distribution board. Each outlet shall be labelled with Distribution Board and Circuit number using a treffolyte label using black lettering on white background.

Smaller Data Cabinet Power Requirements:

The power requirements for each cabinet must be calculated from the maximum amount of equipment that can be fitted. A minimum of one double 15A GPO outlet shall provide feed to each active cabinet and the rating shall be based on the calculated power rating for each cabinet.

The Double GPO shall be mounted inside the Data Cabinet towards the bottom of the cabinet.

The power should be fed from a local distribution board which in turn is fed from the main distribution board. Each outlet shall be labelled with Distribution Board and Circuit number using a treffolyte label using black lettering on white background.

5.7.1 UPS Power

If required Mackay Regional Council may request a hardwired UPS system with its own local distribution board to replace the one listed above in 5.7 for Communication Rooms. Details of this will be provided by the Mackay Regional Council Project Manager.

5.8 Internal Cable Tray

Either overhead ceiling mounted tray/ basket or under-floor mounted basket solutions may be used to carry cables within the CR's depending on the overall building construction.

There shall be separate trays for power and telecommunication services. Where the trays cross they must be bridged and cross at 90^{0}. Horizontal, building backbone cables must be dressed to enter either the top or the bottom of the designated structured wiring cabinets.

Cable entry/ exit shall be via a system to ensure the bend radius of the cable is maintained (e.g. waterfall or similar).

5.9 Ceiling Void

Planning of overhead cable trays must be co-ordinated with all parties involved in the planning, design and implementation of the building works.

Lighting and sprinkler systems must not be impeded by tray work.

5.10 Fire Stopping

Any doors into CR's that require venting must have vented grills with inbuilt intumescent fire stopping materials.

Any cabling or associated pathway associated with telecommunications services penetrating fire rated elements of the building shall be fire stopped to comply with the BCA and Australian Standards.

6.0 Horizontal Distribution

6.1 Overview

The horizontal distribution listed is for the purposes of data and voice connectivity. Cabling shall extend from the CC and shall be terminated onto Category 6_A outlets. Cables reticulating to the CC shall be terminated onto Category 6_A Patch Panels.

It is critical that the horizontal distribution is designed correctly and consideration given to:

- Communications media choice
- Layouts
- Routing
- Ceiling void
- Cable management

6.2 Channel Design Rules

The distances quoted in the table below are from the source equipment (i.e. switch) to the terminal equipment (i.e. PC). Allowances must therefore be made for vertical drops/rises as well as the horizontal runs.

Technology	Distance for application (m)			
	1G Base T	10G Base T	1000 Base SX	10G Base LR
Cat 6	90	N/A	N/A	N/A
Cat 6_A	90	90	N/A	N/A
OS2 Fibre	N/A	N/A	1000	10 000
OM3 Fibre	N/A	N/A	550	300
OM4 Fibre	N/A	N/A	550	400

Table 6.2 - Maximum distances

The distances for the fibre are the absolute maximum and do not take into consideration the number of splices and connectors used. A budget calculation must be done on any fibre channel before the exact distance is known.

The maximum channel distances and connectors permissible for Category 6_A are detailed in figure 6.2 below.

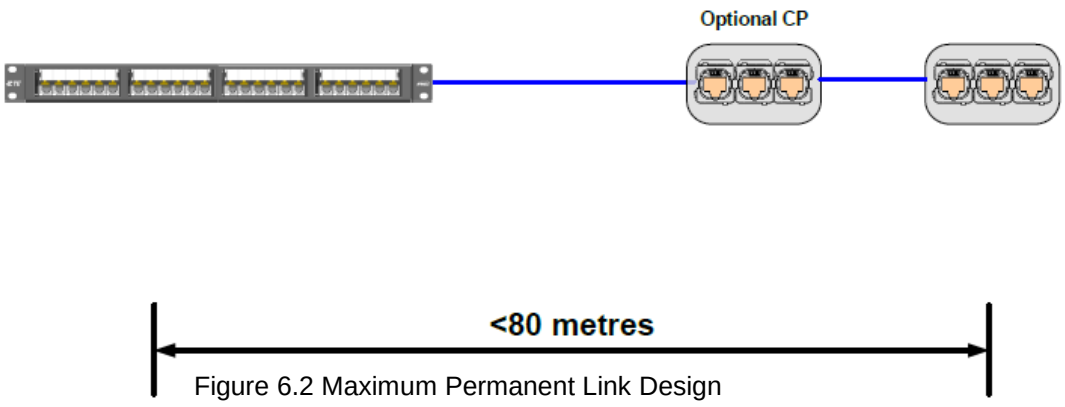

Figure 6.2 Maximum Permanent Link Design

The total length of the horizontal cable (solid conductor) must not exceed 90m and the total length of the patch cordage (stranded cable) must not exceed 10m. The total combined end-to-end length must not exceed 100m.

6.3 Media Selection

The category and type of copper cable to be installed shall be:

- CommScope NETCONNECT Category 6A F/UTP with Blue Sheath (Part #: 884028508/10)

The type of horizontal cables used shall be 4-pair 100Ω Cat 6A high performance shielded twisted pair (F/UTP) cable for Cat 6A applications.

The diameters of the insulated wires shall be different between the pairs to achieve the necessary NEXT and delay skew performance. The 4-pair F/UTP cable shall be run using a star topology format from the cross connect at the floor distributor (TR) on each floor to every individual telecommunications outlet.

The 4-pair UTP cable must be able to meet AS/NZS 3080 Category 6A requirements. It must be proven to ensure connectivity for any application up to and including 10 Gbps from the CC/floor distributor wiring closet to the telecommunications outlet at the work area.

Any changes to the above grade cable shall be on approval from Mackay Regional Council.

Final outlet locations and quantities shall be confirmed by the Mackay Regional Council Project Manager.

6.4 Telecommunication Outlet (TO)

All telecommunications outlets supplied by the tenderer shall be Cat 6A RJ45 outlet type, accepting standard phone and data modular plugs.

The category and type of copper connector to be installed shall be:

- CommScope NETCONNECT Category 6A (Part #: 2153449-2)

- CommScope NETCONNECT Category 6A Right Angled Outlets (Part #: 1711343-2) can be used where bend radius of the cable needs to be maintained.

The outlet shall be supplied with a CommScope Shuttered Bezel (Part #: 6467 1 116-07SH). The TO shall be multi-application supportive and shall be able to be reconfigured to different applications when required. Each outlet shall have an automatic wire cutting feature for termination, and provide 360 degree shield protection.

The TO shall meet or exceed AS/NZS 3080 Category 6A component requirements. The modular jack offered shall conform to AS/NZS 3080 T568A wiring scheme.

6.5 Outlet Presentation

6.5.1 Faceplates

Shall be able to accommodate 2 x Category 6A FTP RJ45 outlets via a bezel system. 2, 3 or 4 gang faceplates are to be used. Each faceplate shall have the option for the faceplate to be mounted vertically or horizontally.

By default faceplates shall be electric white in colour and match the power GPO to ensure aesthetics of the site are maintained. Unless requested otherwise by Mackay Regional Council

For outlets that are on block walls where cabling is not able to use a cavity to maintain bend radius then angled face plates shall be used. The plate type shall be a Clipsal 2032VHA attached to a standard mounting block

6.6 User Type Outlet Quantities

Each user type will demand different requirements from a structured wiring infrastructure. The main user types and associated technologies have been defined below as the minimum requirements for outlet concentrations. See table 6.3 below.

User Type	Number of channels per outlet
	Data and Voice

General office outlet, workstation user or generic work space	2 per user
General office outlet - Front counter or reception desk	4 per user
Printer	2 per location
Emergency Lighting	2 per main panel
Fire Alarm	2 per panel
IP CCTV	2 per unit
Wireless AP	2 per unit
Security/Access Controller	2 per primary panel

Table 6.3 Outlet densities per user

6.7 Patch Panels

Patch Panels should be used at the CC and CR locations as approved by Mackay Regional Council. The category and type of copper connector panel to be installed shall be:

- CommScope NETCONNECT Category 6_A Flush patch panel kit (Part #760242563)

The Tenderer shall supply 24 port Category 6_A Patch Panels with identical performance to that listed in Clause 6.4 (TO's).

6.8 Patch Cords

Mackay Regional Council shall supply Category 6_A S/FTP patch cords for cross-connection and inter-connection of termination Patch Panels and desk device connections.

Patch cords shall be 4 pairs with default lengths of 0.3 metres at the CC and 3 metres at the TO. Equipment cords should be 4 pair with construction suited to the installation. All patch cords shall be colour coded to the service provided as per Table 6.4

Colour coding of Services shall be as per the below legend:

Data	Blue
Voice - IP	Green
Voice – Analogue/Digital	Yellow
CCTV – Camera Network	Grey
CCTV - Management	Orange
Building Management Systems	Orange
SCADA	Orange
Uplinks	White
Wi-Fi AP	Pink
Public Library network	Purple
Internet services	Black
Management services	Red

Table 6.4 Cable Patch Leads

The patch cord shall have built in exclusion features to prevent accidental polarity reversals and split pairs. It shall have a latching mechanism to prevent accidental dislodging of the plug from the termination module or modular Patch Panel.

The copper patch cord shall comply with Cat 6_A applications requirement.

6.9 Cable Management

Cable management is split between continuous (tray) and non-continuous pathways. This is primarily to cater for the differing requirements for capacity and future expansion requirements.

6.9.1 Cable Tray

Either overhead ceiling mounted basket or under-floor mounted basket solutions may be used to carry cables depending on the overall building construction.

There shall be separate trays for power and telecommunication services. Where the trays cross they must be bridged and cross at 90^0. Horizontal, building backbone cables must be dressed to enter either the top or the bottom of the designated structured wiring cabinets.

Cable tray sizing shall conform with AS/NZS 3084, and CommScope Specifications. No whale bone type tray will be accepted. Any pathway shall not exceed 50% capacity. Clause 4.9 provides further detail.

6.10 Cable Capacity

Planning of cable capacity must be co-ordinated with all parties involved in the planning, design and implementation of the IT network. The capacity of cables must cater for requirements that will be implemented from day one and all known requirements that will follow in the future plus additional capacity for unknown future expansion.

6.11 Wireless LAN (WAP)

Wireless Access Points (WAP's) shall be located on the ceiling space where possible. Each WAP shall have 2 x telecommunications outlets terminated onto outlets with performance equal to that as per Clause 6.4. Locations of WAP outlets shall be determined by Mackay Regional Council Project Manager, once signal strength readings have been taken.

6.12 Surface Mount Outlets

Cabling mounted on surface shall use surface mount outlets designed to carry the outlet and maintain the bend radius of the cable. A 2 port surface outlet box (Part No 1-1116698-3) shall be the maximum number of outlets unless otherwise approved by MRC Project Manager. The copper connector surface mount to be installed shall be as advised in 6.5

7.0 Fibre Optic Backbone

7.1 Overview

In addition to the voice services backbone network is the data service backbone network to be provided by fibre optic cabling.

Each CC shall be linked via multimode OM4 fibre optic cabling.

7.2 Position

7.2.1 General

Backbone cabling shall be installed using a minimum of 12 core OM4 grade Multimode fibre optic cabling. Cabling shall reticulate from the Core CC to each Local Communications Cabinet in a star configuration. Core count shall provide a minimum 50% spare capacity. For longer runs, singlemode cable type may be acceptable. Approval of any singlemode cabling must be by the Mackay Regional Council Project Manager

These fibre optic backbone cables are to terminate within each Communications Cabinet. Cabinet size and location is to be at the discretion of the Mackay Regional Council. Fibre Termination Unit panels with LC type connectors shall be used at either end of the cabling.

All cabling/ internal or external shall be installed or labelled where possible with “Warning – Fibre Optic Cable” or suitable marking tape.

7.2.2 Internal Cabling

Where possible, all fibre optic cabling shall be run on communications tray, and segregated from regular network cabling by way of separated bundling.

The multi-core optical fibre cable shall consist of multimode fibre. Each fibre shall be tight buffered with colour-coded PVC (or LSZH) for identification for multi-core fibre optic cable.
Cable shall be CommScope:

760004267 (for 12 core Single-mode Yellow jacket)
760012161 (for 12 Core Multimode OM4 Aqua Jacket)

The fibre cables shall meet the following transmission specification: -

OM3/4 Specification	**50/125 μm Fibre**
a)	Max fibre attenuation: 3.0 dB/km at 850 nm 1.5 dB/km at 1300 nm
b)	Sheath Colour: Aqua
c)	Cabled cut off nm: <1170nm
OS2 Specification	**9/125 μm Fibre**
a)	Max fibre attenuation: 0.4 dB/km at 139 nm 0.4 dB/km at 1373 nm 0.3 dB/km at 1550 nm
b)	Sheath Colour: Yellow
c)	Cabled cut off nm: <1170nm

7.2.3 External Cabling

Cabling to be run externally, either underground or outdoor, shall utilise outdoor rated loose tube cable. Any cable to be run underground shall pass the “water penetration test” as set out in AS/CA S008. Each loose tube to contain a gel filled (thixotropic compound) surrounding a glass reinforced plastic (GRP) central strength member. Tubes are to be wrapped with water swellable tape, sheathed with UV stabilised polyethylene (Black) and Nylon outer jacket (Blue).
Cable shall be CommScope:

6462 3 447-24MLT (for 24 core Singlemode)
6462 4 474-24 (for 24 core Multimode OM4)

The fibre cables shall meet the following transmission specification: -

OM3/4 Specification	**50/125 μm Fibre**
a)	Max fibre attenuation: 3.0 dB/km at 850 nm 1.5 dB/km at 1300 nm
b)	Sheath Colour: Blue
c)	Cabled cut off nm: <1170nm
OS2 Specification	**9/125 μm Fibre**
a)	Max fibre attenuation: 0.4 dB/km at 139 nm 0.4 dB/km at 1373 nm 0.3 dB/km at 1550 nm
b)	Sheath Colour: Yellow (indoor)/ Black (Sac Sheath)
c)	Cabled cut off nm: <1170nm

7.2.4 Fibre Termination Unit – Hi-D Tray

The 19" rack mount fibre termination unit shall be CommScope NETCONNECT HD-1U, 2U, 4U or Agile type sliding trays and provide cross-connect, interconnect or splicing capabilities.
The FOBOT shall be CommScope NETCONNECT 760231506 or 760242476..

The 19" rack mount fibre termination unit shall consist of a frame mountable housing for terminating and/or splicing fibre optic cables and allow for organization of the fibre optic interconnects. The assembly shall have rear slots for cable entry, with grommet fibre retainers for holding buffered fibre in place and fibre storage guide for maintaining bend radius.

The 19" rack-mounting unit should be either 12 or 24 duplex ports for one rack unit (1RU), shall have a sliding tray to improve access.

The adaptor plates are suitable for LC duplex couplings, and the adaptor plates should be installed to shuttered through adaptors to the left or to the right of the panel to improve the patch cord management and provide safety from possible damage to the eyes from accidental exposure to active fibres.

7.2.5 Cabinets

Fibre optic cabling shall be terminated within the Local Communications Cabinet. Final location of this Cabinet to be provided by Mackay Regional Council Project Manager

7.2.6 Fibre Optic Patch Cords

Mackay Regional Council shall supply the Fibre Patch Cords and;

- Shall consist of two single, tight buffered, Multimode graded-index fibres with a 50 micron core and a 125 micron cladding or Singlemode fibres with 9 micron core and a 125 micron cladding.
- Shall be used for optical fibre cross connects and interconnects.
- Shall have the fibre cladding covered by aramid yarn and a protective outer jacket.
- Shall be factory terminated with LC ceramic connectors at each end.

Shall meet the following specifications:-

a) Minimum bend radius: 25 mm
b) Operating temperature:-40 to +75º C
c) Loss: ≤0.5 dB per mated connector
c) Return Loss Maximum: -45dB
e) Cable OD: 3mm
d) Tip material: Ceramic

Patch Cords used for connection to active equipment shall have LC connectors at the active connection end – LC at the opposing end.

Any multimode cabling shall have Patch Cords supplied by Mackay Regional Council to the applicable OM4 or OS2 specification.

8.0 Voice Backbone

8.1 Overview

All general telephones shall be VOIP type, administered by Mackay Regional Council and run via the 4 pair balanced cable of the structured cabling system. Voice grade backbone cabling shall be installed from the CD/BD to the Core CC then from the Core CC to each Local CC for additional services.

Any work pertaining to the connection or disconnection of voice services shall be co-ordinated and completed by Mackay Regional Council Information Services Section.

8.2 Media selection

Provided by backbone Category 3 voice grade cabling. Each Local CC shall be linked via a minimum of 25 pairs of Category 3 voice grade cabling reticulating to the Core CC.

Cabling to be run externally, either underground or outdoor, shall utilise outdoor rated cable. Any cable to be run underground shall pass the “water penetration test” as set out in AS/CA S008. Each underground cable to contain a gel filled (thixotropic compound) or other suitable water stopping barrier.

Aerial cables shall use cable designed for aerial loads by way of manufactured structural support, or be supported within flexible conduit to catenary type pathways. Aerial cabling shall not display excessive sag or load upon the manufacturer’s load limitations.

All aerial cabling shall comply with AS/CA S009 including attention to ground clearance, pole structure and support, earthing and separation from surrounding services.

8.3 Termination Frame

Cabling shall be terminated onto the CommScope KRONE Pro-fil frame at the CD/BD. Cables reticulating to the Core CC or Local CC shall be terminated onto 25 (Part #: 1711213-2) or 50 (Part #: 1711214-2) port CommScope NETCONNECT voice grade Patch Panels. Where surge suppression is required, voice backbone cabling shall pass through a CommScope NETCONNECT Pro-fil frame complete with CommScope NETCONNECT 10 pair disconnection modules using LSA technology complete with 250V surge suppression fitted.

Carrier Lead-In Termination modules in the CD/BD shall be via Commscope NETCONNECT 10 pair disconnection modules utilising LSA IDC technology. The Carrier Lead-In frame shall be sized to accommodate the current and future voice tie cables. This frame shall be sized to allow for at least 30% future termination modules.

The Carrier Lead-In frame shall be sized to accommodate the current and future PABX voice tie cables. This frame shall be sized to allow for at least 30% future termination modules.

9.0 Testing

9.1 General

Testing of all installed services shall conform to the cabling manufacturer's Installation Specifications and all local regulations. Where there is conflict between any of these requirements, the more stringent shall be utilised.

9.2 Copper - Category 6_A F/UTP System Performance

Channel performance is the preferred acceptance criteria for all installations if possible. All permanent links are to be installed and all end user patch cords, equipment cords and work area cords are to be in place and left in the position where they were tested.

Where this is not practical, the Permanent Link performance will be the acceptance criteria for the installation. A certain percentage of the outlets may be chosen at random for the final acceptance testing by the end user or in his absence, by the manufacturer. The design data and the full results of all acceptance tests performed by the installer are to be fully documented and submitted to end-user to hold for the period of the warranty.

The results must include 100% of total installation and provide full electronic data files for each cable run indicating the name of the person doing the testing, date, building, cable identification, cable length, insertion loss, NEXT, PSNEXT, ACR, PSACR, propagation delay, delay skew, ELFEXT, PSELFEXT, and Return Loss.

All copper cabling shall be tested in accordance with AS/NZS IEC 61935.1.

Summary files in electronic format are **not** acceptable. All test results must be provided in native format.

9.2.1 Channel Performance

Channels shall meet the minimum requirements of;
AS/NZS 3080 for Class E_A (using $Cat6_A$ F/UTP components), or
ISO/IEC 11801 Ed 2 for Class E_A (using $Cat6_A$ F/UTP components).

9.2.2 Permanent Link Performance

Permanent Links shall meet the minimum requirements of;
AS/NZS 3080 for Class E_A (using $Cat6_A$ F/UTP components), or
ISO/IEC 11801 Ed 2 for Class E_A (using Cat 6_A F/UTP components).

9.3 Fibre Optic – System Performance

Channel performance shall not be accepted criteria for any fibre optic installations. All permanent links are to be installed and tested at the completion of the installation.

9.3.1 OS2 links (if installed)

100% of the singlemode optical fibre links must be tested for attenuation (power loss);
1. In both directions, and
2. At both frequencies, SMOF (1310 nm & 1550nm),

Conduct the tests in accordance with the manufacturers OF Testing Guidelines (e.g. use mode of stripping) and ISO/IEC 14763-3 using as a minimum LSPM and OTDR equipment if links are longer than 300 metres. If conflict exists, correct testing with LSPM shall be taken as correct.

9.3.2 OM3/4 links

100% of the multimode optical fibre links must be tested for attenuation (power loss);
3. In both directions, and
4. At both frequencies, MMOF (850 nm & 1300nm),

Conduct the tests in accordance with the manufacturers OF Testing Guidelines (e.g. use mode of stripping) and ISO/IEC 14763-3 using as a minimum LSPM and OTDR equipment if links are longer

than 300 metres. If conflict exists, correct testing with LSPM shall be taken as correct.

Ensure Reference Grade leads have been used and qualification of these has been saved as part of fibre optic test results.

Summary files in electronic format are **not** acceptable. All test results must be provided in native format.

10.0 Documentation

10.1 Overview

The contractor shall provide complete documentation covering the installation and maintenance of the Structured Cabling System. Including “as built” drawings showing all main cable runs, cable trays and catenaries, consolidation points, multi use terminal outlets and telecommunications outlets: complete with outlet numbering.

10.1.1 Quantity

The Tenderer shall provide three complete sets of documentation (2 hardcopies and 1 electronic copy). As built drawings shall be provided within 14 days of completion of the project to the project manager and/or the client showing all main cable runs, locations, identifications and destinations.

10.1.2 Printing and Binding of Documentation

The Tenderer shall provide all documentation in suitably labelled, A4 sized binders. All binding shall be of a high quality to provide for a long and durable service.

10.1.3 Document and Drawing Sizes

All documentation shall be typed on either single or double-sided A4 pages. Drawings shall where practicable, be on A4 size. However A3 may be used for larger drawings.

10.1.4 Contents

The Installation/Systems manual shall cover the following areas:

a) A detailed overview of the building cabling system
b) Full description of the specific installation
c) Full schematics showing the overall layout of the installation
d) Floor layout drawings showing the location and designation of each outlet, location of cable trays and ducts and location of all connection frames.

The Maintenance manual shall cover the following areas:

a) Test results for each Fibre Link
b) Test results for each Copper Link
c) Manufacturer’s Warranty Certificate
d) Manufacturer’s Warranty Documentation

10.1.5 Electronic Documentation

General electronic documentation shall be provided in a PDF format. All documents relating to schematics for overall layout and floor layout drawings showing the location and designation of each outlet, location of cable trays and ducts and location of all connection frames shall be provided in an editable PDF format to allow for future moves/adds/changes

10.2 Warranty

The contractor shall provide a minimum 25 Year passive product & Labour warranty from the date of successful commissioning and, backed up by the Manufacturer’s Category 6A Certification, will form part of the Warranty.

The Manufacturer’s Warranty Registration form and test results shall be submitted for approval. This shall be appraised and approved after the manufacturer has carried out their site audit(s).

The warranty documentation shall be contained within the Maintenance Manuals. Included in this documentation shall be the Manufacturer 25 year Warranty Certificate.

If required, Calibration certificates for the test equipment used to test the site shall be forwarded to Mackay Regional Council.

11.0 Standards

11.1 Standards

All stated standards must be adhered to, but not limited to, where applicable. In the case of conflict between standards the most onerous standard must be adhered to for the individual section under discussion.

11.1.1 Australian Standards

AS/CA S008 Requirements for Customer Cabling Products
AS/CA S009 Installation Requirements for Customer Cabling (Wiring Rules)
AS/NZS 3000 SAA Electrical Wiring Rules
AS/NZS 11801.1 General
AS 11801.2 Offices
AS 11801.3 Industrial
AS 11801.5 Data Centres
AS 11801.6 Distributed Services
AS/NZS 3084 Telecommunications Installations – Telecommunications Pathways and Spaces for Commercial Buildings
AS/NZS 3085.1 Telecommunications Installations – Administration of Communications Cabling Systems – Basic Requirements
AS/NZS 4117 Surge Protective Devices for Telecommunications Cabling
AS/NZS 14673 Information Technology – Implementation & Operation of Customer Premises Cabling:
Part 3. Testing of Fibre Cabling.
AS/NZS IEC 61935.1 Testing of Balanced Pair Cabling – Site Certification
AS/NZS 2967 Optical fibre communications system safety

11.1.2 ISO/IEC

ISO/IEC 11801:2002 Information Technology – Generic Cabling for Customer Premises. (Inc Amd. 2.2)

11.1.3 Miscellaneous