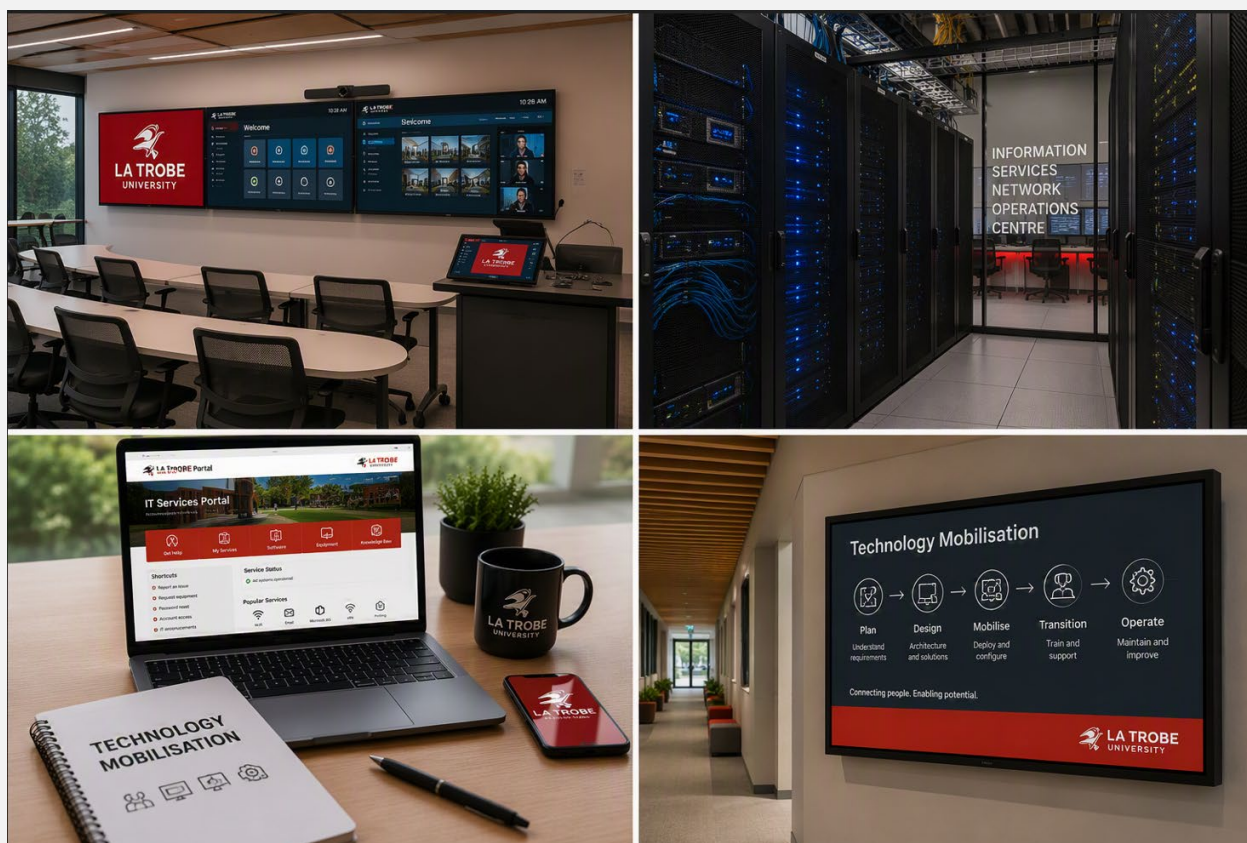


La Trobe University

Design Standards

Information Services – Technology Mobilisation

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Prepared for:

IS | Information Services
TM | Technology Mobilisation

ENQUIRIES

IS Service Desk T: 03 9479 1500

La Trobe University W: <https://www.latrobe.edu.au/information-services-design-standards>

Victoria 3086

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1 Overview

1.1 Executive Summary

La Trobe University (LTU) is committed to cultivating environments that inspire connection, learning, and creativity in line with our strategic plan. La Trobe's Strategic Plan is organised around four themes:

- Our foundations
- Accelerating our growth
- Maximising our impact
- Shaping our future

Our people, our values, and our partners are the very foundations upon which our impact and successes are built. We will accelerate our growth so that more people can benefit from a university education, and to increase our capacity to invest in world-class teaching and research infrastructure. This, in turn, will enable us to maximise our impact for our students, our communities, and our country, working closely with business, industry, public service, and non-for-profit partners. We will shape our future by leveraging artificial intelligence to innovate in everything we do, by growing our short course portfolio to support lifelong learning, and by continuing a major transformation of our Bundoora campus into a University City. La Trobe University is proud of our past and the impact we have achieved. We are invested in our staff, our partners, and most of all our students. And we are determined to shape a future that is better for Australia, our region, and the world. Strategic Plan 2025 to 2030.

This document outlines the standards governing the design, installation, and operation of Information Services infrastructure including Network communication, Computer and Peripherals and Audio-Visual (AV) systems across all LTU campuses, with a focus on simplification through design and consistent standardisation. This forms the backbone of LTU's technological ecosystem, supporting connectivity and digital operations across all sites supporting our campuses.

This document defines the University's minimum requirements and must be read in conjunction with all relevant statutory regulations.

1.2 Role of Technology Mobilisation

Technology Mobilisation is a division within Information Services, responsible for the design and implementation of information technology systems across the University—including computing, networking, and Audio-Visual (AV) infrastructure. The team implements the University's Information Services designs and installation requirements, acts as the approving authority for commissioned systems at practical completion and ensures that installed systems meet the standards contained in this document.

1.3 About This Document

This document serves to:

- Ensure a consistent user experience for end users and operational teams throughout all information services deployments.
- Maintain alignment with Infrastructure & Operations (I&O) standards and requirements.
- Facilitate the timely and cost-effective deployment and maintenance of systems.
- Specify minimum functional and installation standards.
- Provide clear, comprehensive guidance to consultants, integrators, architects, and other stakeholders regarding design, product selection, and installation procedures.
- Establish criteria for equipment consolidation and vendor streamlining.
- Detail the University's approved manufacturers and parts list (see Appendices).
- Define evaluation criteria for adding new equipment to the approved list.
- Describe procedures for managing design variations and resolving non-compliance issues.
- Reference appropriate support documentation.

1.4 Authority and Review

These Information Services Standards are issued under the authority of the Senior Manager, Technology Mobilisation. They must be reviewed regularly to ensure they remain current, practical and aligned with university requirements, with formal review and approval by the Network Infrastructure Manager (on behalf of the Network Infrastructure team), Manager, Workplace Technology (on behalf of the Audio-Visual and desktop maintenance team).

1.5 Copyright and Intellectual Property

All content contained in this document is owned by La Trobe University and must not be reproduced or replicated without written approval of the Senior Manager Technology Mobilisation. Approval is given to reproduce content only where the content is to be used for the delivery of La Trobe University related projects.

2 How to Use These Standards

2.1 Relationship to Other Project Documents

These Design Standards must be read together with the project brief, consultant agreements, contract documents, University policies, relevant legislation, codes, standards and any approved reference documents. Compliance with one document does not remove the obligation to comply with the others.

2.2 Document Hierarchy

As well as complying with this document, implementation of information services systems shall also comply with the following:

- La Trobe University Design Standards - <https://www.latrobe.edu.au/io/working-with-us/design-standards>
- Where any conflicts exist between any of the above document and this document, a Request for Information (RFI) shall be raised to request clarification. The RFI will be brought to the attention of the Information Services Technology Mobilisation and the Principal for a clarification.

In addition, several standards will be relevant to any network communications project. They will apply according to the following order of precedence (higher on the list will take precedence).

- Any Victorian or Commonwealth Legislation that may apply (including reference regulations) including the National Construction Code (NCC).
- Other Relevant Australian Standards
- LTU Standards (including this document).

2.3 Codes, Standards and Reference documents

The following list of documents may be relevant to projects. Where this document does not specifically address an issue, the below should be consulted for relevant design information and referred to Technology Mobilisation team for an instruction.

Standard	Name / description
AS 1428.1:2021	Design for access and mobility, Part 1: General requirements for access New building work.
AS 1428.2:1992	Design for Access and Mobility – Enhanced and Additional Requirements Buildings and Facilities
AS 3084:2017	Telecommunications Installation, Pathways and Spaces for Commercial Buildings.
AS 3760:2022	In-service safety inspection and testing of electrical equipment and RCDs
AS/NZS 61000	Electromagnetic Compatibility (EMC) Limits
NCC (BCA)	Building Code of Australia 2021 (BCA)
C-tick:	Complying with Australia and New Zealand EMC Framework requirements.
DDA	Commonwealth Disability Discrimination Act 1992 (DDA)
Disability Standards 2005	Disability Standards for Education 2005
La Trobe University Design Standards	https://www.latrobe.edu.au/io/working-with-us/design-standards
AVIXA 10:2013	Audio-Visual Systems Performance Verification
AVIXA A102.01:2017	Audio Coverage Uniformity in Enclosed Listener Areas
AVIXA 2M-2010	Standard Guide for Audio-Visual System Design & Coordination Process
AVIXA V201.01:2021	Projected System Image Contrast Ratio
AVIXA F501.01:2015	Cable Labelling for Audio-Visual Systems
AS 1428.1:2021	Design for access and mobility, Part 1: General requirements for access — New building work
AS 1428.2:1992	Design for Access and Mobility - Enhanced and Additional Requirements – Buildings and Facilities
AS 1428.5:2021	Design for Access and Mobility - Communication for People who are Deaf or Hearing Impaired
AS/NZS 11801.1:2019	Information Technology - Generic Cabling for Customer Premises
AS/NZS 11801.2:2019	Information Technology - Generic Cabling for Office Premises
AS/NZS 11801.3:201	Information Technology - Generic Cabling for Industrial Premises

Standard	Name / description
AS 3084:2017	Telecommunications Installation, Pathways and Spaces for Commercial Buildings.
AS 3760:2022	In-service Safety Inspection and Testing of Electrical Equipment
AS 60118.4-2007	Hearing Aids Magnetic Field Strength in Audio Frequency Induction Loops for Hearing Aid Purposes
AS/ACIF S008:2020	Requirements for Customer Cabling Products
AS/ACIF S009:2020	Installation Requirements for Customer Cabling (wiring rules)
AS/NZS 2107:2016	Acoustics – Recommended Design Sound Levels and Reverberations Times for Building Interiors
AS/NZS 3000:2018	Electrical Installations (Wiring Rules)
AS/NZS 3760-2022	In-Service Safety Inspection and Testing of Electrical Equipment
AS/NZS 62368.1:2018	Audio/video, information and communication technology equipment - Part 1: Safety requirements
AS/NZS 61000	Electromagnetic Compatibility (EMC) Limits
NCC (BCA)	Building Code of Australia 2021 (BCA)
C-tick:	Complying with Australia and New Zealand EMC Framework requirements.

2.4 Definitions

The following definitions are used throughout this document.

Name	Description
LTU	La Trobe University
Approval	Formal acceptance of submitted works. Does not remove responsibility from the contractor.
Authorities	Statutory bodies responsible for enforcing regulations.
Contract	A legally binding agreement between LTU and the contractor.
Contractor	Entity contracted to complete works detailed in a contract or scope.
Defects Liability Period	Period post-practical completion during which the contractor guarantees all supplied goods and services.
Delivery Director – Technology Mobilisation	LTU representative identifying technological opportunities and facilitating funding applications.
Instruction	A formal directive issued by the principal or delegate.
Practical Completion	Practical completion refers to the stage when the works are substantially finished, is fit for its intended use and can be occupied and used for its intended operation.
UPR	University Project Representative is the LTU representative with full technical and design authority.
Architect	The person (group) who plans, designs and oversees the construction of buildings
Builder	Typically engaged by I&O to coordinate construction and contractor activity.
Project Manager	LTU representative responsible for project coordination and delivery.
Superintendent	LTU representative with full authority over project matters.
Active Network Hardware	Electronic hardware that transmits data between devices, i.e. network switches and routers.
Passive Network Hardware	Structured cable (fibre/copper), equipment racks, connectors, patch panels.
Information Services	La Trobe Information Services is a central operational unit responsible for the university's digital ecosystem. It supports staff, students, and researchers by delivering and maintaining the technology platforms, systems, and services that underpin academic and administrative functions.

2.5 Acronyms

The following acronyms are used throughout this document.

Acronym	Definition
4K	4069 x 2160 pixels
AFFL	Above Finished Floor Level
AT	LTU Asset Transformation
AV	Audio-Visual
AVoIP	AV over IP
BYOD	Bring Your Own Device
BYOM	Bring Your Own Meeting
dB	Decibel
DDA	Disability Discrimination Act
DER	Distribution Equipment Room
DGPO	Double General Power Outlet
DLP	Defects Liability Period
DSP	Digital Signal Processor
EDID	Extended Display Identification Data
FB	Floor Box
FOH	Front of House

Acronym	Definition
FPD	Flat Panel Display
GPO	General Power Outlet
GUI	Graphic User Interface
HA	Hearing Augmentation
HDCP	High-bandwidth Digital Content Protection
HDMI	High-Definition Multimedia Interface
HVAC	Heating, Ventilation, and Air Conditioning
ICT	Information and Communications Technology
I&O	LTU Infrastructure and Operations
IEEE	Institute of Electrical and Electronics Engineers
IoT	Internet of Things
IP	Internet Protocol
IPTV	Internet Protocol television
IS	LTU Information Services
IT	Information Technology
IWB	Interactive Whiteboard
K/M	Keyboard and Mouse
LAN	Local Area Network
LMS	Learning Management System
LTU	La Trobe University
MATV	Master Antenna Television
MER	Main Equipment Room
NCC	National Construction Code
O&M	Operations and Maintenance Manual
OSD	On Screen Display
OS2 SM OF	Optical Single mode Fibre
PA	Public Address
PBC	Push Button Controller
PC	Personal Computer
PDU	Power Distribution Unit
PIP	Picture in Picture
PIR	Passive Infrared
PoE	Power over Ethernet
PTZ	Pan Tilt Zoom
RBP	Room Booking Panel
RF	Radio Frequency
RT	Reverberation Time
SER	Satellite Distribution Room
SPL	Sound Pressure Level
STI	Speech Transmission Index
TSC	Touch Screen Controller
TV	Television
UC	Unified Communication platform (Zoom/MS Teams)
UCI	User-Computer Interface
UHD	3840 x 2160
UPS	Uninterruptable Power Supply
USB	Universal Serial Bus
VC	Video Conference
WHS	Workplace Health & Safety

3 Governance and Compliance

3.1 Mandatory Compliance

Compliance with these Information Services Standards is mandatory unless a departure has been approved in writing by the University in accordance with the relevant consultant agreement, contract or project governance process. Consultants and contractors must not assume that a departure will be accepted.

3.2 Responsibilities

All parties involved in a project are responsible for implementing these Information Services Standards within their scope of work. Where a consultant is engaged, the consultant is responsible for ensuring that the intent and requirements of the Information Services Standards are reflected in the design, documentation and instructions issued to contractors. Where no consultant is engaged, this responsibility rests with the University Project Representative or other nominated responsible officer.

Party	Relevant Information
Architect / Principle	Equipment Room Requirements Equipment Room Types Cabling standards Audio-Visual Standards Appendices
Services Engineer / Contractor / Builder	Whole Document La Trobe Data Cabling and Infrastructure Standards

3.3 Roles

The table below provides a overview of stakeholder responsibilities throughout the AV project lifecycle. Whenever you see a circle symbol, it highlights moments when each stakeholder plays an active role. This visual guide makes it easy to track involvement and ensures everyone understands their part in bringing the project to life.

Task Stakeholder	University Project Representative	LTU I&O Services	Architect	Services Engineer	AV Consultant	LTU Technology Mobilisation	LTU Digital Workplace Services	Electrical & Communications Contractor	AV Integrator
Initiation									
Develop Concept Design			○						
IS Existing Conditions Assessment (Comms, Compute, AV)						○			
Schematic Design			○						
User Group Workshops			○						
Develop Information Services Brief						○			
Planning									
Co-Ordination Detailed Design (Network & Wireless Access Points, Telephony, Compute, Audio-Visual)						○			
Detailed Design (Network & Wireless Access Points)							○		
Detailed Design (Telephony, Compute)							○		
Detailed Design (Audio-Visual)					○				
Detailed Design (HVAC, Hydraulic, Mechanical, Luminance, Electrical and Data)				○					
Detailed Design (Building, Layouts, FF&E)			○						
Develop network and wireless design						○			
Audio-Visual Design						○			
IS fixed equipment schedule						○			
Software application planning									
Design services (HVAC, Hydraulic, Mechanical, Luminance, Electrical and Data)				○					
Review and Approve Detailed Designs (Network & Wireless Access Points, Telephony, Compute, Audio-Visual)	○	○				○			
Create Bill of Materials (telephony, compute)						○			
Create Bill of Materials (AV)					○				
Schedule (Ricoh Printing)	○								

Task Stakeholder	University Project Representative	LTU I&O Services	Architect	Services Engineer	AV Consultant	LTU Technology Mobilisation	LTU Digital Workplace Services	Electrical & Communications Contractor	AV Integrator
IS Compliance and Security Review (CISO)						○			
Execution									
Decommission (Telephony, Compute, AV)							○		
Hardware Procurement (Network Switches)						○			
Hardware Procurement (Wireless Access Points)						○			
Hardware Procurement (Telephony, Compute)							○		
Pre-commission QA assessment (Rough in Inspection) (Network, AV)						○			
Build Equipment Rooms (data & power passive cabling, PDUs, rack & rack peripherals)								○	
AV Space (data & power passive cabling)								○	
Procurement PODION Lecterns						○			
Procurement Software						○			
Procurement PANDUIT patch and field cables (copper & fibre)						○			
Installation (Network Switches)						○			
Installation (Wireless Access Points)								○	
Installation (Telephony)								○	
Installation (Compute)							○		
Installation (Audio-Visual)									○
Installation (PODION)									○
Installation (Power & Data Services fit off)								○	
Installation (Printing)	○								
Software and System Integration							○		
Defect Inspection (Network, Wi-Fi, Telephony, Compute)						○			
Defect Inspection (Audio-Visual)					○				
Defect Remediation Co-ordination (Network, Wi-Fi, Telephony, Compute)						○			
Defect Remediation (Audio-Visual)									○
Functional Testing						○			
User Acceptance Testing							○		
AV Training (IS Support Team)									○
AV Training (End Users)									○
Closure									
Transition to Operational Support	○								
Stakeholder Communication	○								
Defect Liabilities Period									
Co-Ordinate repairs and remediation	○								

3.4 Departures from the Design Standards

Non-compliance with this document, or with any referenced La Trobe University standards, is not permitted without formal approval. Where a design, installation, product selection, or construction activity cannot meet the requirements of this document, the contractor, consultant, or responsible party must submit a formal Non-Conformance and Variation Request (NCVR) to the Principal and the Manager, Technology Mobilisation before any works proceed. The NCVR must include:

- The specific clause(s) of this document being varied
- A clear justification outlining why compliance cannot be achieved
- The functional, operational, safety, accessibility, and lifecycle impacts of the variation
- Any proposed mitigation strategies or alternative solutions
- Supporting evidence, drawings, calculations, or manufacturer documentation where relevant

No deviation is permitted until written approval is issued by the Manager, Technology Mobilisation (or delegate). Approval is not guaranteed and may require additional consultation with I&O, Digital Workplace Services, or other University stakeholders. Proceeding with works without written approval may result in:

- Rejection of the affected works
- Withholding of Practical Completion
- Mandatory removal and rectification at the contractor's cost
- Delays to project milestones and handover
- Escalation to LTU Procurement, Legal, or I&O for contractual or compliance action
- Non-acceptance of the system by Information Services

3.5 Version Control and Revision History

Printed and or electronically issued versions of this document are to be considered as uncontrolled. This document will be subject to continual review and updates, and the latest version can be downloaded from: Information Services Design Standards, La Trobe University.

Document Title	INFORMATION SERVICES STANDARDS
Document Author	Adriano Salutari
Approved By	• Director, Digital Workplace Services • Senior Manager, Technology Mobilisation • Associate Director – Network Management • Manager, Workplace Technology

Version	Date	Comment	Author
1.5.2	August 2024	Nursing & Midwifery additions	Adriano Salutari
1.6	March 2025	Updates to cables, colours	Adriano Salutari
1.7.1	November 2025	Major Update and Merge	Adriano Salutari
1.7.2	April 2026	Corrections, Network & AV	Adriano Salutari
2.0	July 2026	Combined IS Standards	Adriano Salutari

4 Methodology

4.1 Project Process

The La Trobe Project Process follows a structured sequence that ensures every initiative aligns with the University's teaching, learning, research and operational goals while maximising value, safety and long-term performance. It begins with defining the project's strategic purpose, then assessing concepts and feasibility to identify the most sustainable and cost-effective approach. Detailed design development coordinates all disciplines—IT, AV, infrastructure and building services—to avoid redesigns and ensure maintainability. Procurement and planning secure the right partners and establish clear delivery pathways, followed by implementation that integrates technology and construction activities efficiently. Rigorous testing and commissioning confirm performance before handover to operational teams, and a final post-implementation review captures lessons learned to drive continuous improvement across future projects.

Initiation (What we want to build)

Project initiation involves defining project stages, assessing current conditions, and starting schematic designs. It includes identifying stakeholders, gathering requirements, defining the project scope, and preparing the Information Services brief. The phase also covers forecasting resources, financial planning, risk assessment with mitigation strategies, and engaging necessary consultants.

- Project initiation and stage management
- Evaluation of current conditions
- Initiation of schematic design
- Identification of stakeholders and assignment of roles
- Collection of requirements (such as user workshops)
- Definition of scope and preliminary design
- Preparation of the Information Services Brief (what elements of the project require IS involvement)
- Resource allocation by role
- Financial planning and budgeting
- Risk assessment and development of mitigation strategies
- Engagement of consultants

Planning (How we will build it)

Project planning phase includes resource allocation, preparation for enabling works and decommissioning, detailed design of network, wireless, and AV systems, as well as system schedules for various technologies. It also covers planning for software, coordinating architectural and service requirements, defining procurement strategies, preparing a bill of materials, and ensuring compliance and security.

- Begin stage control and design
- Allocate resources
- Plan to enable works and decommissioning
- Design network and wireless systems
- Create AV schematics and schedules
- Develop system schedules for telephony, AV, compute, and printing
- Plan software and applications
- Coordinate architecture and services
- Define procurement strategy
- Prepare bill of materials
- Review compliance and security

Execution (Getting it built)

These project phase include coordinating stage management and addressing requests for information, managing technical changes through the Change Advisory Board, implementing enabling works and decommissioning of old hardware, the procuring new equipment with pre-commissioning with QA. Construction tasks cover equipment rooms, wireless networks, AV systems, computing platforms, as well as telephony and printing solutions. The phase also encompasses user and functional testing, defect inspection and remediation, delivery of support training, preparation of documentation, updating system attributes in Archibus, facilitating operational handover, creating knowledge base resources, and conducting post-implementation reviews.

- Stage management and radio frequency interference (RFI) coordination
- Management of technical change requests via Change Advisory Board (CAB)
- Implementation of enabling works and decommissioning of legacy hardware
- Procurement of hardware and execution of pre-commissioning quality assurance

- Construction of:
- Equipment rooms
- Wireless network infrastructure
- Audio-visual systems
- Computing platforms
- Telephony and printing solutions
- Conducting functional and user acceptance testing
- Inspection and remediation of defects
- Delivery of support training and preparation of documentation
- Updating Archibus system attributes
- Facilitating operational handover and developing knowledge base resources
- Performing post-implementation review

Closure (Concluding all works and handover)

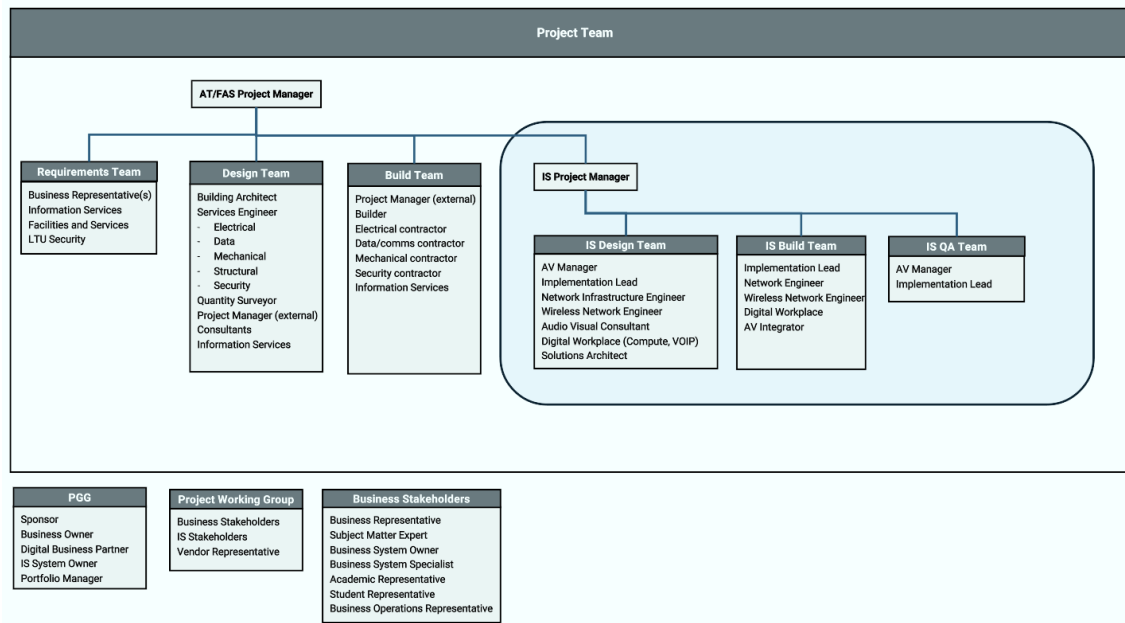
Project closure outlines the concluding of activities in the project lifecycle, including transitioning operational support, updating stakeholders and issuing a final report, completing financial processes, handing over to the support team, and formally closing the project. These steps ensure that responsibilities are transferred smoothly, all stakeholders are informed, financial matters are settled, and the project is officially completed.

- Operational support transition
- Stakeholder updates and final report
- Financial closeout
- Support team handover
- Formal project completion



4.2 Project Organisation

Projects are set up to establish clear channels of communication and support an organised exchange of information among roles, teams, and stakeholders. This approach helps maintain alignment, fosters accountability, and supports prompt decision-making. The focus goes beyond simply identifying who communicates with whom—it also considers the methods, timing, and reasons behind each interaction. For clarity and consistency Information Services team members from various departments will communicate with the IS Project Manager who in turn will relay any decisions to the AT/IO Project Manager for execution. The diagram below illustrates a standard project Organisational structure, showing both the hierarchy and the channels of communication.



5 Project General Requirements

5.1 Workmanship

All IS infrastructure and audio-visual works must be completed in a professional, compliant, and coordinated manner by qualified personnel under appropriate supervision. All works must:

- Comply with all applicable Standards with the listed order of precedence:
- Australian and International Standards.
 - All applicable I&O, IS and Technology Mobilisation Technology Standards.
 - All applicable Facilities and Services Standards.
 - Where there are no applicable Standards, follow industry best practice.
- Be undertaken by licenced and qualified staff.
- Follow the intent and requirements as detailed in the scope of works.

5.2 Qualifications and Competency

All personnel must hold appropriate qualifications relevant to their scope of work:

- Trade Qualifications
- A-Grade Electrician Licence
- White Card (Construction Induction)

Audio-Visual Manufacturer Certifications

- Crestron, CTI-P101, CTI-P201, CTI-P301, CTI-CSD
- Crestron NVX Design Certification, Crestron Certified Programmer (CCP)
- QSC – Q-SYS Level 2, with Scripting experience
- Dante Level 3

Audio-Visual Industry Certifications

- CTS (Certified Technology Specialist)
- CTS-D / CTS-I (Design/Installation)

Communications Certifications

- ACMA Open Cabling Registration (OCR)
- Panduit Certified Installer (PCI) – required for all termination and testing (Gold, Silver Preferred)

The Panduit ONE Partner Program is a global initiative designed to support and reward solution providers who design, build, install, and service physical network infrastructure, key features of the Panduit ONE Partner Program.

Training & Certification

- Access to online, virtual, and in-person training
- Certifications in key competencies like infrastructure design and installation
- Use of the University of Panduit and Partner Hub for learning resources
- Warranty & Assurance
- Ability to offer Certification PlusSM System Warranties on qualified installation projects

Professional Engineering

- Engineering tasks must be performed by qualified professionals with current memberships to relevant bodies
- All certifications must be available upon request.

5.3 Equipment and Services

All personnel must hold appropriate qualifications relevant to their scope of work.

All supplied equipment must:

- Be listed on the approved equipment list (see Appendices)
- Not be substituted without prior approval from the relevant La Trobe University SME within information services
- Include all required licenses, options, and accessories as per the scope
- Be installed on-site during construction, protected from damage until handover
- Be installed per manufacturer guidelines
- Maintain manufacturer warranties throughout installation
- Be delivered in original packaging, unless pre-configured or rack-mounted
- Remain the contractor's responsibility until accepted by LTU or the builder
- Include relevant compliance certificates (e.g., PANDUIT, hearing augmentation, fire, structural)
- Be tested and tagged prior to handover.

5.4 Warranties and Minimum Requirements

- All products must be new, sourced via approved Australian supply chains (no grey imports)
- At a minimum must support commercial use (14hours/7days) unless otherwise specified
- Must have Australian-based support and spare availability
- AV equipment must carry a minimum 5-year warranty
- All AV installations must be installed with a defect liability period of 36 months

5.5 Structured cabling Compliance and Quality of Workmanship

- All Panduit cabling to be provided with a Panduit issued 25-year Certification Plus System Warranty Certificate (See: Appendices)
- All PANDUIT cable test results must include the full name of the certified installer and be in metric
- All works must meet relevant local and international standards <https://www.acma.gov.au/technical-standards>

- Regulatory approval documents must be provided
- Manufacturer installation guidelines must be followed; any variation must be documented and co-signed by LTU representatives.

5.6 Inspections

- Installation inspections may be requested by LTU at any time during the project
- Installation inspections will be requested to take place during the construction phase, before wall sheeting and enclosure are completed.
- Any anomalies must be recorded in site meeting minutes and addressed in a rectification plan
- Manufacturer engineers may be consulted if required.

5.7 Handover and Documentation

The following documentation must be provided in both hard copy and digital format:

- Marked up “as-built” drawings (including LTU construction drawings)
- A0 AutoCAD floor plans with telecommunication outlet locations and cable routes
- A0 AutoCAD plans with telecommunication cable pathways (trays, riser, waterfalls, catenary wire & conduits)
- Structured Cabling System patching records
- Cabinet and frame layout schematics
- Panduit System Certification and Application Assurance Warranty
- Test results and compliance documentation
- Maintenance schedules and operation manuals
- Fibre & Copper cable test reports (native format and PDF).

5.8 Non-Compliance

Non-compliance with this document, is not permitted without formal approval. Where a design, installation, product selection, or construction activity cannot meet the requirements of this document, the contractor, consultant, or responsible party must submit a formal a non-conformance and variation request (NCVR) to the Principal and the Manager, Technology Mobilisation before any works proceed.

- The NCVR must include:
- The specific clause(s) of this document being varied
- A clear justification outlining why compliance cannot be achieved
- The functional, operational, safety, accessibility, and lifecycle impacts of the variation
- Any proposed mitigation strategies or alternative solutions
- Supporting evidence, drawings, calculations, or manufacturer documentation where relevant

No deviation is permitted until written approval is issued by the Manager, Technology Mobilisation (or delegate). Approval is not guaranteed and may require additional consultation with I&O, Digital Workplace Services, or other University stakeholders.

Proceeding with works without written approval may result in:

- Rejection of the affected works
- Withholding of Practical Completion
- Mandatory removal and rectification at the contractor’s cost
- Delays to project milestones and handover

- Escalation to LTU Procurement, Legal, or I&O for contractual or compliance action
- Non-acceptance of the system by Information Services

La Trobe University information services reserves the right to require full rectification of any non-compliant works, regardless of cost or schedule impact, where the variation has not been formally approved in advance.

6 Equipment Rooms (MER/SER/DER)

6.1 General Requirements

Information Services Equipment Rooms fall under the following categories Campus Distributor (CD), Main Equipment Room (MER), Satellite Equipment Room (SER), or Distributed Equipment Rooms (DER). These designations establish the hierarchical infrastructure that ensures seamless information flow throughout La Trobe University campuses.

The Campus Distributor (CD) serves as the main network hub on a university campus, connecting major data streams (Internet) and enabling high-capacity access to external services. It houses core hardware and systems, forming the backbone of campus IT operations. Main Equipment Room (MER) are typically located on the ground floor of a building and serve to connect the building to a campus distributor as well as being a conduit for communications from satellite equipment rooms typically located on the floors above. Satellite Equipment Rooms (SER) are located on subsequent floors above a main equipment room of a multi-story building and extend network access to additional floors. Distributed Equipment Rooms (DER) offer localized network expansion across a floor of a building where distance to an SER exceeds the maximum allowable cable length. This typology ensuring reliable service and rapid response for maintenance or upgrades in areas with unique requirements. Collectively, this structured approach enables efficient management, scalability, and resilience for the university.

Each building must include at least one centrally located Main Equipment Room to support structured cabling and network connectivity to a campus distributor). On each floor of a multi-story building there must be a satellite equipment room vertically aligned across levels to minimize deviations in vertical cable paths.

- Equipment rooms shall be centrally positioned within the building floor plan to optimize cable runs.
- Equipment rooms must be in low-risk areas, avoiding overhead hazards (e.g., kitchens, toilets, cafés), glazed walls, and public zones.
- Each MER must support two diverse fibre pathways interconnecting with at least two separate CDs for redundancy and resiliency.
- Horizontal cable runs must not exceed 75 meters in length. If this limit is exceeded, additional equipment rooms SER or DER must be provided to maintain adherence to maximum cable lengths.
- Dedicated overhead cable trays or baskets shall be installed to support all fibreoptic and copper cabling.
- Equipment racks must be arranged side-by-side (if multiple) with minimum clearances of:
 - 1400mm at sides
 - 1200 mm at the front and rear
- All walls must be fireproof and extend floor to ceiling slab-to-slab.
- All surfaces (walls, ceilings, doors, entry points) must be dust sealed.
- Wall construction must include acoustic treatment to suppress noise transmission to adjacent workspaces.
- Slabs must support the weight of fully loaded equipment racks.
- No hydraulic services (inclusive of stormwater, water, sewer pipe runs) other than those serving the space are permitted to traverse through or over the equipment room.
- Access to the room must be via a public area, not through plant room, or teaching/office spaces.
- Access must be clear and direct from the level entrance, with no passthroughs to other rooms.
- Storage of furniture or fixtures are not permitted within the equipment room.
- Walls and ceilings shall be finished in Antique White USA, semi-gloss paint.

- MER and SER will have sufficient power services to operate fully populated racks and equipment; in addition multiple GPOs located along walls for service personnel to power service equipment without interfering with rack power or equipment.

6.2 Ceilings

- Minimum ceiling height of 2.7 meters is required and be open to the floor slab above.
- Suspended ceiling tiles are not permitted.
- Where no upper slab exists (e.g., top floor), a ceiling constructed of fireproof solid plaster, including an access hatch 600x600mm is required.

6.3 Floors

- Floors must be level with adjacent corridors or rooms; raised or lowered floors are not permitted.
- Acceptable finishes: sealed concrete or anti-static vinyl.

6.4 Doors

- Doors are to be a minimum of 2400mm (height) x 920mm (wide) and be of solid construction to maintain the rooms fire rating.
- Doors shall open inward and be positioned to avoid obstructing the working area in front of or behind equipment racks.
- Each door must be fitted with a hold-open door closer, with the hold-open position set to a minimum of 100 degrees.

6.5 Fire Rating

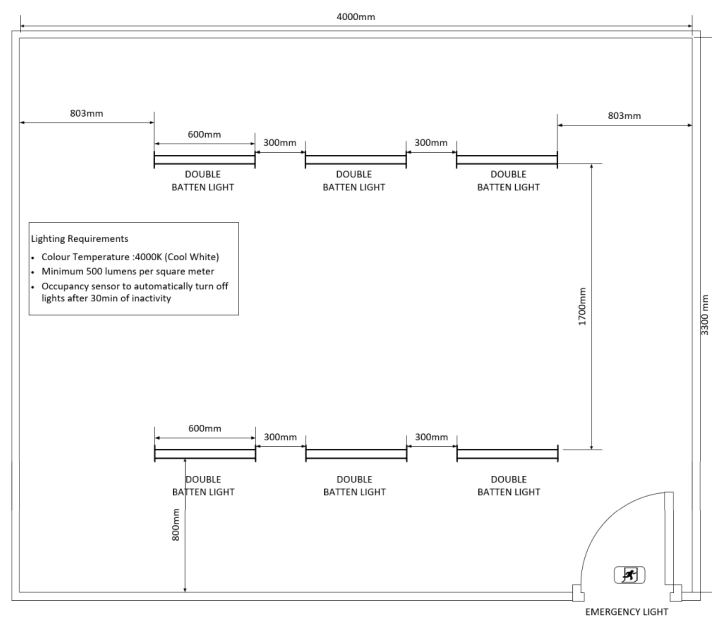
- Equipment Rooms shall be constructed to achieve a minimum 2-hour fire rating.
- Water sprinkler systems are not permitted.
- A CO₂ portable fire extinguisher, typically 4.5 kg and rated for Class E (electrical) fires, shall be installed near the exit door outside the room.
- A smoke detection system shall be installed and interfaced with the building's Fire Indicator Panel (FIP).
- All fire protection measures must comply with relevant building codes and fire safety standards.

6.6 Electrical Services

- Each equipment rack shall be provided with two 15A captive outlets, suspended overhead to eliminate tripping hazards.
 - Each outlet must be on an independent circuit and separately fused.
 - Each outlet must be 1800mm AFFL
- An independent and separately fused 32A outlet shall be provided for HVAC equipment.
- A dedicated distribution board (DB) shall be installed within the equipment room to locally supply power to all installed systems and equipment.
- Dual-feed power supply should be considered for critical systems to ensure redundancy and continuity of service. The requirement for dual feed must be confirmed during the design phase in consultation with LTU and the Electrical Services Engineer.
- Additional power services (e.g., for security panels) shall be included as required.
 - These services must be fitted with isolator switches to allow safe power disconnection during maintenance.
 - Power specifications for these systems shall be defined by the Service Engineer and must be separately fused.

6.7 Lighting

- LED lighting shall be installed to illuminate both the front and rear of all equipment racks.
- Lighting specifications:
 - Colour Temperature: at least 4000K (Cool White)
 - Brightness: Minimum 500 lumens per square meter
- Control:
 - Lighting shall be operated via a wall-mounted switch located at the entry door. Occupancy sensors shall automatically switch off lighting after 30 minutes of inactivity.
- Lighting systems must comply with La Trobe Design Standards S003.
- Emergency Lighting:
 - An emergency light shall be installed to activate during power outages or emergency events.
 - It must provide sufficient illumination to guide occupants safely to the exit door.



6.8 Environmental (HVAC)

Aligned to ASHRAE TC9.9 – Thermal Guidelines for Data Processing Environments, Class A1, applicable to MER and SER equipment rooms, and communications rooms hosting core or distribution infrastructure, and edge facilities supporting critical Information Services platforms.

- A split-system air conditioner shall be installed, with an indoor wall-mounted unit.
- The HVAC system must be independent of the building's general air conditioning and comply with Mechanical Services requirements.
- Minimum cooling capacity: 7 kW
- Power supply must be on an independent circuit.
- A drain shall be installed to expel condensation moisture away from the room.
- Run Time: 24/7 continuous operation and must auto-restart after power outages

Temperature & Humidity

(Measured at equipment air inlet – cold aisle where implemented)

Parameter	Target	Alert	Critical
Inlet Temperature	22–24°C	≥ 26°C	≥ 30°C
Lower Limit	≥ 20°C	≤ 18°C	≤ 15°C

Design Basis: ASHRAE Class A1 Recommended Range (18–27°C)

Relative Humidity (Non-Condensing)

Parameter	Target	Alert	Critical
Relative Humidity	45–55%	< 35% or > 65%	< 20% or > 80%

Preferred alternative metric where supported: Dew Point: 5.5°C – 15°C

Rate of Change (Ramp Controls)

Rapid environmental change presents operational risk even within allowable bands.

Parameter	Recommended Limit	Critical Threshold
Temperature Change	≤ 3°C per hour	≥ 5°C per hour
Humidity Change	≤ 10% RH per hour	≥ 20% RH per hour

Breaches of critical ramp thresholds require incident review.

- Airflow & Containment
 - Hot aisle recirculation to be minimised
 - Rack blanking panels mandatory
 - Cable penetrations sealed
 - Raised floor pressure balanced where applicable
- Monitoring & Alerting
 - Information Services shall ensure:
 - Continuous environmental monitoring
 - Sensor placement at bottom, middle, and top of representative racks
 - Minimum one sensor per containment zone
 - Integration with central monitoring and ITSM platforms
 - Polling interval: ≤ 5 minutes
 - Trend retention: ≥ 12 months
 - Alert thresholds aligned to ASHRAE Class A1 Recommended Range.

6.9 Security and Access

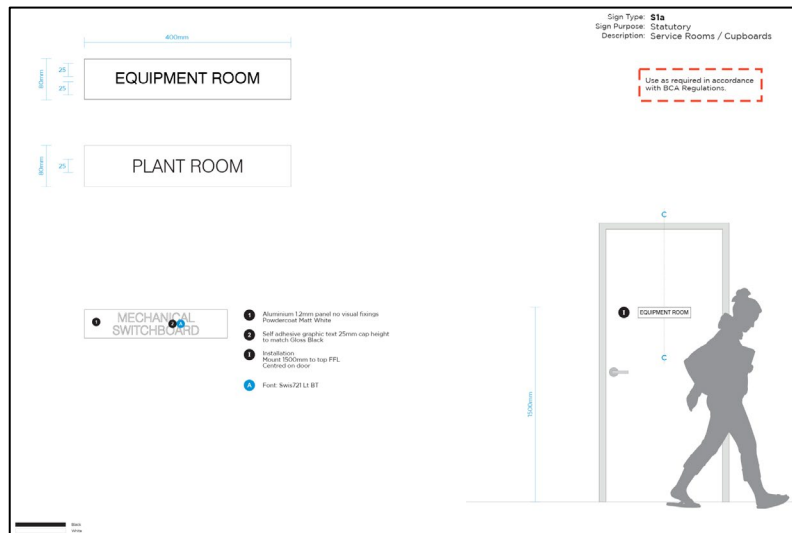
- Access shall be controlled through the designated security control system, in accordance with LTU security standards. In addition, key access will be provided as a contingency in the event of card reader failure. Keys will be matched to the nominated IS equipment room key, with details provided upon request.
- A 4K dome security camera with AI capability shall be installed at a maximum height of 2700 mm AFFL, positioned to monitor both the equipment racks and entry door.
- Camera specifications must comply with LTU Security Standards and integrate with the LTU Security System.
- Entry shall be restricted to authorised personnel from La Trobe University Information Services and Infrastructure & Operations (I&O) maintenance teams.
- Entry shall be guaranteed to personnel from La Trobe University Information Services and not require special permits, keys or pathways operated exclusively by Infrastructure & Operations (I&O) maintenance teams.

6.10 Room Numbering

Room numbering for communications rooms will comply with LTU Design Standards. Room numbering for existing communications rooms will not be modified unless the room is to be demolished and rebuild in entirety.

6.11 Signage and labelling

All equipment rooms will have signage at the entry showing room number and title of “Equipment Room”. The signage style will be as defined by the Signage Style Guide in the La Trobe Design Standards. Equipment Racks will be labelled with the rack identification number. The label will be placed on the front of the rack frame in the top, left hand corner. Patch Panels and Fibre panels will be labelled in accordance with AS/NZS 3085.1 and LTU Data Cabling Standards. All electrical switches and outlets are to be labelled and identify circuit origin.



(Diagram 5.2.11a Drawing typical signage)

6.12 Penetrations

Equipment room penetrations refer to the physical openings made in walls, floors, ceilings, or enclosures to allow cables, conduits, or trays to pass through. These must be carefully designed and sealed to maintain fire safety, security, and environmental integrity.

- Fire Safety & Compliance- all penetrations within MER & SER must use compliant sealing systems (e.g. intumescent putty, fire collars) to maintain the room’s fire rating and follow AS/NZS 3000 and AS/NZS 3084 standards for electrical and communications installations.
- Penetrations are to be sealed prevent Dust ingress, Humidity or temperature fluctuations, Rodent or pest entry
- Penetrations should not compromise physical security:
- Avoid oversized openings
- Use metal conduit sleeves or grommets where appropriate
- Group penetrations logically (e.g. power vs data)
- Label conduits and trays clearly at entry/exit points
- Use cable glands, brush strips, or blanking panels for modular racks
- Avoid penetrations through load-bearing walls unless engineered

6.13 Penetrations Capacity

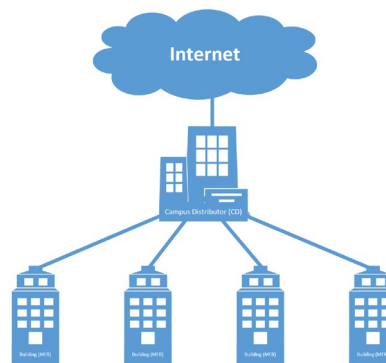
- Between buildings connecting the CD to MER a minimum of 2x 100mm conduit openings
- Between floors of a building connecting SER to MER a minimum of 1x 100mm conduit openings

6.14 Equipment Room Types Detailed

Campus Distributor (CD)

The CD is a key component in a structured cabling system, especially in large-scale environments like universities. It serves as the main cross-connect point for a campus network, linking multiple buildings or zones into a single unified network. The CD typically connects multiple MERs which handle internal distribution within buildings.

- Key Characteristics
 - Sits at the top of the cabling hierarchy, followed by MER, SER and DER.
 - Aggregates traffic from multiple buildings.
 - Provides routing and switching between buildings.
 - Ensures scalability and performance across the campus.
 - Acts as a connection point for multiple external services

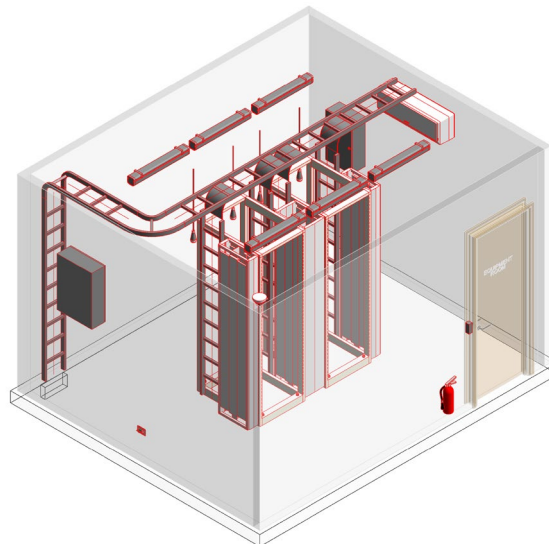


(Diagram 5.1.1a Illustration of MER connection to CD)

Main Equipment Room (MER)

The MER is the central point for network infrastructure within a building. It serves as the primary distribution point for data, voice, video, and control system for a building. The MER handles incoming and outgoing building-to-CD fibre optic cable connections, serving as the gateway for inter-building network traffic across a campus.

- Key Characteristics:
 - Hosts core networking hardware: routers, switches.
 - Includes centralized control systems, patch panels, and power management units.
 - Located in secure, climate-controlled environments to ensure optimal performance.
 - Feeds structured cabling to Satellite Equipment Rooms (SERs) and endpoint devices throughout the building
- For a detailed drawing See: Appendices

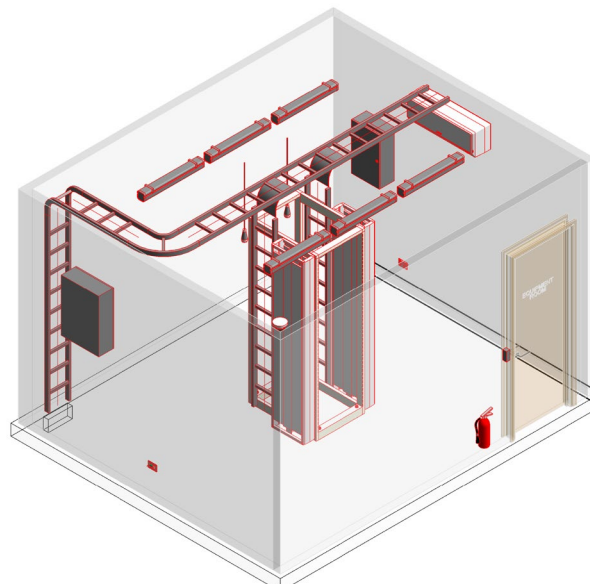


(Diagram 6.1.4a MER Drawing typical arrangement See: Appendices)

Satellite Equipment Room (SER)

The SER is a secondary distribution space that extends the reach of the MER to specific areas or floors within a building. It supports localised connectivity for adjacent rooms or areas extending the reach of an MER beyond the typical seventy meters.

- Key Characteristics:
 - Contains intermediate switches, AV equipment and control modules.
 - Contains fibre optic cable and copper patch panels for intermediate switches servicing a floor
 - Houses fibre optic cable linked back to the MER.
 - Reduces cable lengths and improves signal integrity across large/multi-level buildings.

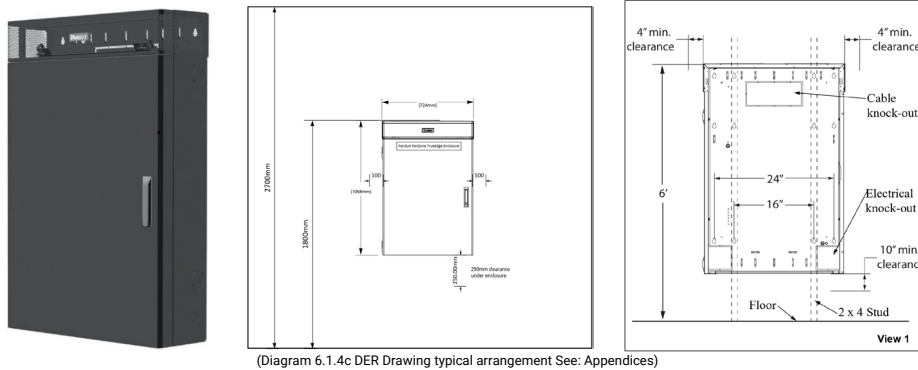


(Diagram 6.1.4b SER Drawing typical arrangement See: Appendices)

Distribution Equipment Room (DER)

A DER is a tertiary distribution space that extends the reach of the MER/SER to specific areas of a floor within a building. DER Provides localised connectivity for adjacent rooms or areas increasing the capacity and reach of a network beyond the typical seventy meters.

- Key Characteristics:
 - Wall mount unit
 - Contains switches, and equipment.
 - House fibre optic cable patch panels that link back to MER/SER.
 - Reduces overall cable lengths and enhances signal performance in building with large/complex floor plans.



These equipment room types help streamline infrastructure planning, ensure scalable deployments, and support efficient maintenance and troubleshooting.

7 Racks, Cable Trays & Data Cabling

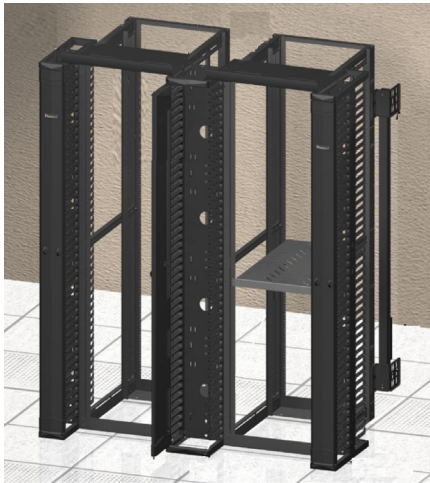
Network Infrastructure and Data Cabling refer to the physical and logical foundation that enables communication, connectivity, and data exchange across an Organisation's IT and AV systems. Here's a breakdown of what it encompasses:

- Equipment racks
- Fibre optic and copper structured cabling
- Pits, ducts and conduits

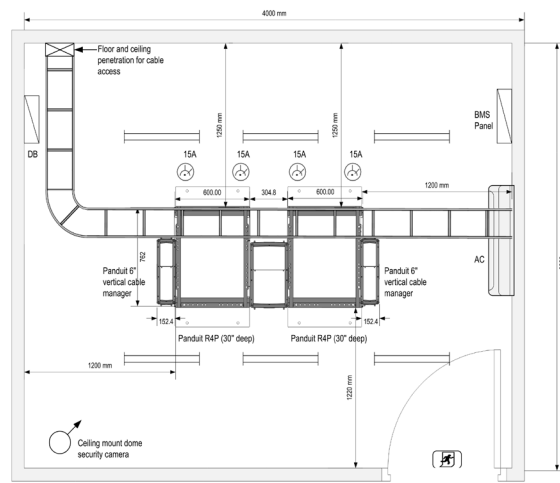
7.1 Equipment Racks

- La Trobe University specifies the use of Panduit R4P-Post Rack, 45RU, 30 in. Deep, #12-24 Threaded E-Rails, Black equipment racks as the standard for all equipment rooms.
- Alternative rack types are not permitted.
- All rack-mounted components and accessories must be selected from the approved parts list provided in (Appendices)
- Any components installed that are not on the approved list or lack an approved variation will be deemed non-compliant and a defect.
- Racks shall be fitted with:
 - Vertical cable managers on both sides
 - Horizontal cable management accessories
- Where multiple racks are installed, they must be arranged side-by-side to maintain consistent cable pathways and airflow
 - Any rack-mounted equipment for Audio-Visual (AV) or third-party systems must be housed in separate, dedicated racks.
- For planning and spatial coordination, allow a minimum footprint of 1000 mm (W) × 1000 mm (D) per Panduit R4P rack, inclusive of accessories
- All equipment racks must be securely fixed to the floor using Panduit supplied floor plate
- All metallic components—including racks, cabinets, cable trays, baskets, and catenary wires—must be bonded to the building's protective earth in accordance with the latest versions of:
- AS/NZS 3000

- AS/CA S009
- AS 30129
- Earthing conductor sizing must comply with the above standards



(Diagram 7.1a Drawing PODION R4P Rack)



(Diagram 7.1b Drawing MER typical layout arrangement)

7.2 Structured Cabling System

Structured cabling is a standardized, modular approach to network infrastructure that supports diverse hardware platforms and communication systems. It provides a consistent and scalable foundation for data, voice, video, and building automation technologies.

- Outdoor cable installations, pits, ducts and conduits
- Inter-Building fibre optic and copper cables
- Building cable pathways, trays, mesh, catenary wire
- Equipment room racks and rack layouts
- Patch panels
- Cable managers
- Jacks
- Face plates
- Labelling requirements

Infrastructure Design Considerations

- Scalability and futureproofing
- Compliance with standards (e.g., ANSI/TIA, ISO/IEC, Latrobe)
- Environmental factors (EMI, temperature, airflow, power consumption, security)
- Labelling and documentation for maintenance

7.3 Optical Fibre

A fibre optic cable is a high-performance network cable made of thin strands of glass or plastic that transmit data using light pulses rather than electrical signals. This allows extremely fast, long-distance, and interference-free communication. This combination of fibreoptic type will vary from site to site, check the scope of works for a given site to determine the actual requirements. Fibreoptic cabling shall be Panduit OS2 9/125µm single mode.

Fibre-Optic Topology

The location and connectivity to campus distributors will be provided by LTU Information Services upon request

Connections between CD and MER or between MER and MER of connected buildings.

- OS2 | 48 Core | Stranded LT | INDOOR / OUTDOOR FIBRE
- FLRL948 - Standard Loose Tube Dry core (Paste) – No Gel, Dry Core, when run outdoors we recommend for conduits only, not direct burial

Connections between MER and SERs between floors of a building.

- OS2 | 24 Core | Stranded LT | INDOOR / OUTDOOR FIBRE
- FLRL924 – Standard Loose Tube Dry core (Paste) – No Gel, Dry Core, when run outdoors we recommend for conduits only, not direct burial

Connections between MER/SER and DER across a single floor of a building.

- OS2 | 12 Core | LT | INDOOR/OUTDOOR FIBRE
- FLCR912Y - Central Loose Tube Gel (OFNR) – this has a Gel, when run outdoors we recommend for conduits only, not direct burial

Installations that are a special requirement.

- OS2 | 6 Core | LT | INDOOR/OUTDOOR FIBRE
- FLCR906Y – Central Loose Tube Gel (OFNR) – this has a Gel, when run outdoors we recommend for conduits only, not direct burial

Enclosures for Optical Fibre Equipment

- Cabinet mounted termination enclosures specifically designed to house optical fibre cable terminations shall be provided at each fibre termination point.
- Such termination enclosures shall unless otherwise specified, be mounted adjacent to the distribution frame, at the top of the active equipment cabinet.
- Each termination enclosure shall be arranged to accommodate at least forty-eight (48) “LC” connections.
- A schematic diagram showing each fibre terminated and the service to which it is connected shall be prepared and secured in a transparent protective cover to an appropriate location adjacent to the respective termination enclosure to facilitate easy location of circuits.
- A warning notice detailing the hazards associated with optical devices shall be affixed to each termination enclosure in a prominent position.
- Each unused fibre panel location not fitted with an LC connector shall have a blanking panel installed.
- Each LC connector that is unused shall be fitted with a plastic dust cap at the completion of the optical fibre termination.

Fibre Optic termination and labelling

- Sheath markings must include:
 - Manufacturer name
 - Date of manufacture
 - Fibre count
 - Fibre type
 - Sheath composition
- Both ends of the cable must be fitted with permanent labels identifying the source and destination
- Each fibre core must be terminated with LC single mode connectors
- Termination method:
 - Use fusion-spliced, tight-buffered, factory-manufactured pigtails
 - Pigtail fibre must match the backbone fibre type
- Installation requirements:

- Cables must be OSP-rated and installed in conduit within trenches
- Cables exposed to sunlight must have a UV-resistant sheath
- Cables with metallic armouring or barrier foil must be bonded to the building protective earth in accordance with AS/NZS 3000 and AS/CA S009

7.4 Copper Cable

Structured copper network cabling is a unified, standards-driven approach to designing and installing copper-based communications infrastructure within a building or across a campus. Instead of running cables directly from one device to another, it uses a planned, modular architecture that ensures every cable, connector, and pathway is installed consistently and performs predictably.

At its core, structured cabling creates a permanent, high-quality network foundation that can support a wide range of technologies—data networking, telephony, audiovisual systems, security devices, building automation, and PoE-powered equipment—without needing to redesign the cabling each time a new device is added.

This approach replaces the limitations of ad-hoc wiring with a hierarchical topology consisting of equipment rooms, telecommunications rooms, patch panels, horizontal cabling, and work-area outlets. By following international standards such as ANSI/TIA-568 and ISO/IEC 11801, the system ensures interoperability, predictable performance, and long-term scalability. Because the cabling is installed in a structured, repeatable manner, organisations gain a network infrastructure that is easier to maintain, simpler to troubleshoot, and far more adaptable to future technologies. It becomes a long-term asset that supports upgrades—from 1GbE to 10GbE and beyond—without requiring major physical changes to the building.

Legacy Cable Cat5e

Because there are existing legacy Cat5e cable installations, where identified projects must completely remove these cables. This means within equipment rooms removing any Cat5e jacks and cables from patch panels, racks, cables along waterfall sections, chimneys, catenary wires, mesh and trays. Through penetrations and along any trays to the ceiling locations or wall cavities that leading to the jack located at a face plate.

In practice, this process involves a systematic approach beginning with thorough documentation of all Cat5e runs within the facility. Technicians should trace each cable and label connections to ensure that only obsolete wiring is targeted for removal, reducing the risk of accidental disconnection of active infrastructure. Safety protocols must be observed at every stage, particularly when accessing confined spaces or working overhead in areas such as chimneys and along catenary wires. After physical removal, the vacated pathways should be inspected and cleaned to prepare them for new cabling or to avoid future hazards. The effort to remove outdated Cat5e cables not only ensures compliance with current networking standards but also improves airflow, reduces fire loads, and creates a more organized and manageable cabling environment for ongoing operations.

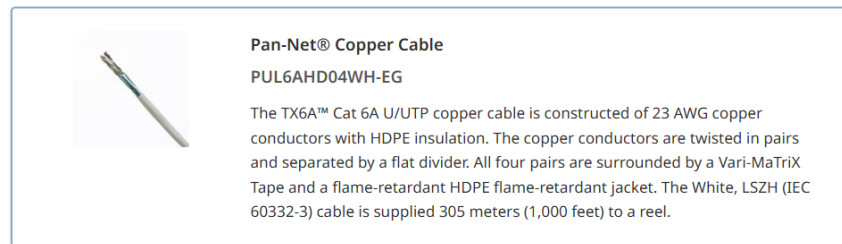
General Requirements

The installation shall be thoroughly tested to ensure the as-built performance meets the requirements specified within the Detail Design document and such other specifications referenced either explicitly or implicitly. The installation shall not be deemed complete until all wiring and equipment has been checked and tested to the satisfaction of an authorised network officer of La Trobe University Information Services and the Site/Project Manager.

- The Contractor shall supply all testing equipment.
- At least one week's notice of any compliance tests shall be given to the Site/Project Manager, who may witness such tests.
- Test reports must be submitted an authorised network officer of La Trobe University Information Services and the Site/Project Manager within two weeks of test completion and shall contain data outlet ID numbers.
- La Trobe University Information Services shall not commission network equipment until all test results have been submitted and approved by Senior Manager, Networks and Facilities.
- Panduit will from time to time perform site audits to ensure installation has been carried out in accordance with their guidelines.

Horizontal Cable (Cat6A)

La Trobe University mandates the installation of the following ISO/IEC Class EA / Category 6A 4-pair UTP copper cabling. All cabling must be installed in accordance with manufacturer guidelines, with particular attention to bend radius specifications.



(Diagram 7.4a Image approved PANDUIT horizontal cable)

7.5 Copper & Fibre Cabling Testing Requirements

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

- Cable testing must be completed only after the cable, jack, wall plate, or equipment termination point has been securely fixed in place. Once test results are submitted to LTU for review, no component of the structured cabling system may be modified, moved, or disturbed.
- Copper testing shall be in accordance with ISO/IEC11801 PL2 Class Ea (+ All) and AS/NZS - ISO/IEC 61935.1 for Permanent Link PL2 or PL3 as mandated by design.
- Ensure Resistance Unbalance and Resistance Balance between Pairs is tested for PoE purposes, e.g. Typical tester setting: TIA Cat.6A PL (+PoE), Cat.6A U/UTP, T568A (an allowance up to 21ohms in loop resistance for a PL and 25 ohms for Channel will be deemed acceptable)
- Optical fibre testing shall be in accordance with ISO/IEC 11801 and AS/NZS - ISO/IEC 14763.3. This shall include the Encircled Flux requirements specified within the standard.
- Test parameters and set up testing shall be in accordance with the Panduit Design and Installation Guidelines.
- Testing of both copper and optical fibre shall be carried out with either a Fluke® DSX-5000 or DSX-8000 Cable Analyser or an approved equivalent.
- Only approved test leads shall be used.
- The software version installed on the test equipment shall be the latest recommended for that test instrument.
- Test results need to identify the operator performing the test and that the testing device is in calibration.
- All multimode optical fibre links shall be tested at both 850nm and 1300nm and in both directions as mandated by ISO/IEC 14763.3.
- Any optical fibre cabling lengths exceeding 300m shall include an OTDR trace in a single direction only.
- All test results shall be included with the as-built documentation, and no optical Fibre test result shall exhibit more loss than the calculated loss budget.

Jacks (General)

The following jacks are approved installation, PANDUIT Mini-Com TX6A 10Gig UTP Jack Modules are a component of the TX6A 10Gig UTP Copper Cabling System with MaTriX Technology. This end-to-end system provides a cost-effective medium for ensuring that network bandwidth needs are easily met today and in the future. This solution helps ensure Organisations efficiently and reliably meet their data transmission needs. With certified performance to the ISO 11801 Class EA, IEEE 802.3an-2006 and ANSI/TIA-568.2-D Category 6A Standards, this system will support high bandwidth applications like 10GBASE-T and HDBaseT and is ideal for running next generation Power over Ethernet (POE++).

CJ6X88TGIW (Off-White)	Category 6A, RJ45, 10 GB/s, 8-position, 8-wire universal module. Includes patented MaTriX split foil tape.
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Off-White

(Diagram 6.3.2a Image approved PANDUIT jack)

Jacks (Audio-Visual use only)

NOTE: Only use this jack when specifically instructed to do so.

**CJ6X88TGBU
(Blue)**

Category 6A, RJ45, 10 GB/s, 8-position, 8-wire universal module. Includes patented MaTriX split foil tape.



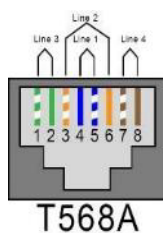
Blue

(Diagram 6.3.2a Image approved Audio-Visual PANDUIT jack)

Jack Termination

All Jacks will be terminated in T568A wiring standards defined by the TIA/EIA-568 telecommunications cabling standards for terminating 8-conductor twisted pair Ethernet cables (Cat6a) using Mini-Com TX6A 10Gig UTP Jack Modules. It specifies the pinout configuration the order of wire colours for structured cabling systems.

T568A Pinout Configuration



Pin	Wire Color	Pair	Signal
1	White/Green	3	TX+
2	Green	3	TX-
3	White/Orange	2	RX+
4	Blue	1	—
5	White/Blue	1	—
6	Orange	2	RX-
7	White/Brown	4	—
8	Brown	4	—

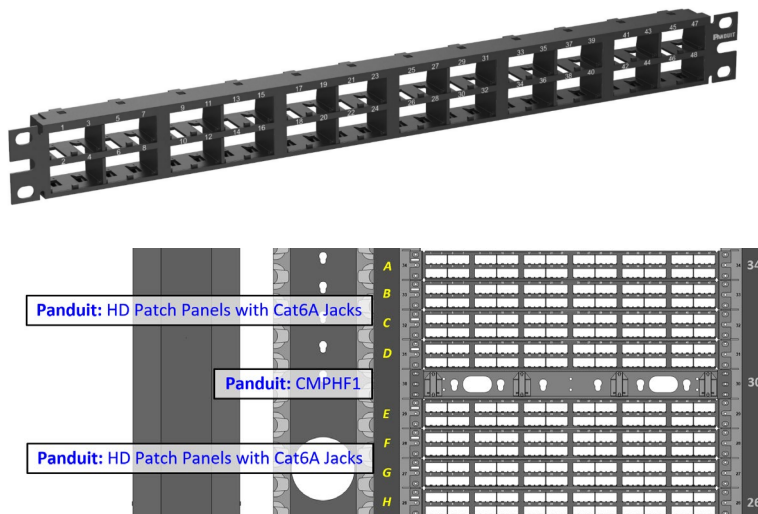
(Diagram 6.3.3a Image PANDUIT T568A pinout configuration)

Equipment Room Patch Strips

Due to the existence of multiple legacy installations, a detailed design for patch installation within equipment rooms including the location of the racks and patch strips that are required to be removed, modified or added is to be provided before projects are to be tendered.

Installation of copper jacks within an equipment room at the R4P rack locations will be as follows:

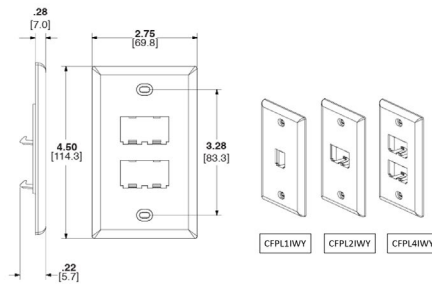
- Up to eight PANDUIT high density forty-eight port vertical numbering 1RU patch strips may be installed per rack
- Per installed Cisco switch there must be a PANDUIT high density forty-eight port vertical numbering 1RU patch strip
- Patch strips are to be installed commencing at the highest location RU 34 with additional patch strips populated beneath this location
- Every four patch strips are to be spaced with a horizontal cable manager
- Patch Strips are to be labelled in sequence with letters commencing with RU 34 having letter A



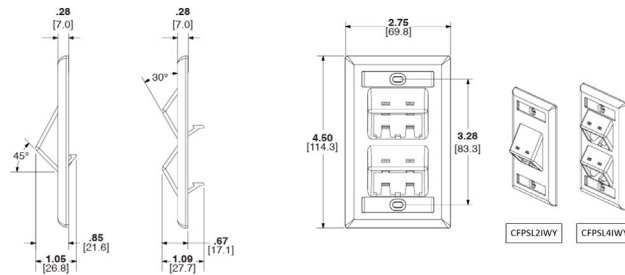
Wall Mounted Outlets Face Plates

La Trobe University requires the installation of Panduit Classic series faceplates single gang for vertical applications. Classic series faceplates accept all Mini-Com TX6A 10Gig UTP Jack Modules. Faceplates shall be available in 1,2 or 4 gang flush and 2 or 4 gang sloped design; Sloped provide additional room for bend radius control to help comply with standards.

vertical faceplates



vertical sloped faceplates



(Diagram 6.4.4a Image approved PANDUIT face plates)



(Diagram 6.4.4b Image approved PANDUIT face plates 4 Gang Flat and Sloped)

- Refer to Appendices for the part numbers of Panduit two or four Off White RJ45 TOs and the Panduit sloped dual wall plates in which they are mounted and labelled.
- Faceplate requirements and TO numbers may vary from site to site; check the specific scope of works for each site.
- Where there are unused TO mounting locations, a blanking insert shall be used to fill the vacant slot(s).
- Where flush mounted faceplates cannot be used, a type and site approved surface mount box (SMB) may be substituted.
- Generally, TOs shall be mounted at the following standard locations or heights with specific requirements outlined in the site-specific document:
 - In or on skirting duct, dependant on whether a flush mount plate or SMB has been used.
 - For standard wall mounting with no obstructions, 300 mm above floor level
 - To meet DDA requirements.

Face Plate / Wall Box Labelling - CCB BBBRRRR-FFF

Faceplates for a data network are the visible, user-facing interface of a structured cabling system. They provide the physical outlet where network devices connect to the building's horizontal cabling. They house RJ45 jacks or keystone modules and create a clean, protected, standards-compliant termination points for copper or fibre connections. The labels applied to these faceplates aid in the determination of cable pathways.

CONTENT	FUNCTION	DETAILS
C	Campus, 2 Characters (campus identifiers)	BU = Bundoora, see naming convention
B	Building, 2-4 Characters	TLC, LIMS1,..etc
R	Room, 2-4 Digits required	013, 4116
-	Delimiter	-

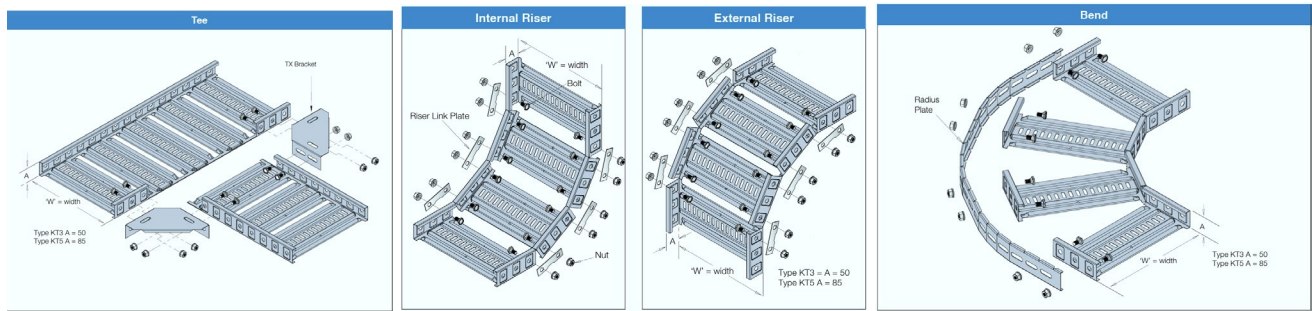
- A schematic diagram showing the arrangement of circuit groups for the distribution frames shall be provided.
- The schematic diagram shall be mounted in the Building or Floor Distributor hardware for future reference.
- Patch panels, distribution frames and outlets shall be prominently labelled in accordance with AS/NZS 3085.1.
- The unique identifier shall be printed on labels suited to the hardware they are installed on indicating the nature and identity of the terminated cable.
- All horizontal cabling that is 'patch frame' to 'workstation outlets' or wall mounted outlets are to be labelled identically at both ends.
- All labelling is to be printed in black on white background and be clearly visible.
- Handwritten labelling is unacceptable in all situations.
- The labelling convention across all sites shall be uniform as follows:
 - Tie Cables: Source and Destination at both ends
 - Cabinet/ Open Frame Rack Layout: Numerical (01-45 from bottom to top)
 - Telecommunications Outlet(FD): Patch Panel, Outlet Number, e.g. A01+ (Note: + indicates that it has passed the return resistance test)
 - Telecommunications Outlet (Work Area): FD Number, Outlet Number, e.g. A01+ (Note: + indicates that it has passed the return resistance test)
 - Telecommunications Outlet plate (Work Area), if fitted: Comms Room ID; otherwise on the device.

7.6 Fibre and Cable Pathways

Cable Pathway Systems are developed for use in commercial and industrial applications; it offers strength and durability to carry medium to heavier duty cabling whilst maintaining an economical support span to minimise support steelwork costs. All pathway routes and construction shall be verified by of an authorised network representative of La Trobe University Information Services before the commencement of any installation.

Cable Tray

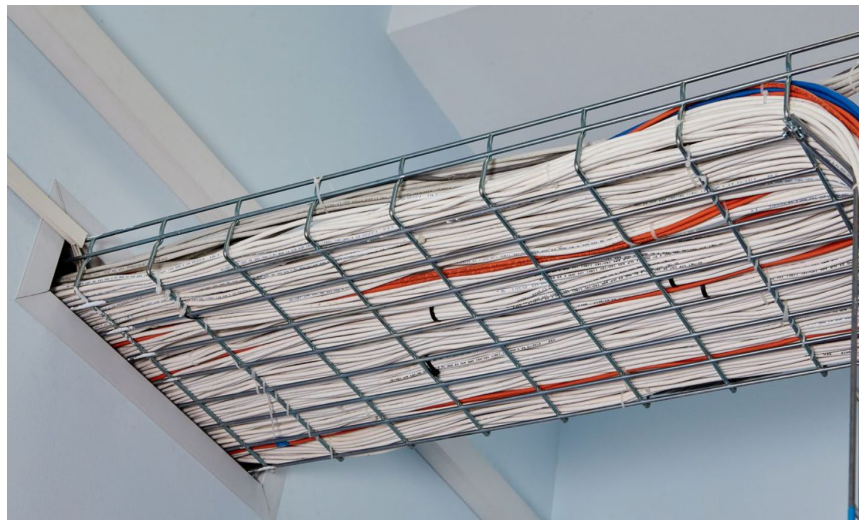
- Cable tray where possible shall match that of the existing installation.
- All components shall be treated with an anti-corrosive treatment, free of burrs and sharp edges.
- All bends and T-joints shall be manufactured, and no components shall be made on site.
- All cut edges shall be de-burred and treated with an anti-corrosive paint.
- Mounting shall be via Unistrut.
- Cable loading shall follow the manufacturer's guidelines.
- KOUNIS KT3/KT5 Ladder Tray Medium\Heavy Duty is the preferred product



(Diagram 6.2.3.1a Illustration cable trays)

Cable Mesh

- The cable Mesh shall be open wire mesh hot-dipped galvanised from Cable Cage Systems.
- Basket width available shall include 150, 300, 400, 500 and 600mm, dependent on cable load.
- Depth shall be either 54mm or 105mm dependent on cable load.
- All mounting hardware, bends, T-offs and cable waterfalls shall be by the same manufacturer.
- Installation unless otherwise specified in the specific scope of works shall be to the manufacturer's guidelines.
- For under floor pathways, floor height permitting, cable basket shall be mounted on Unistrut; where this is not achievable the cable basket may be secured directly to the floor slab.
- As per standards requirements a minimum of 60% of the cable basket capacity must remain after the initial installation is complete, i.e., the maximum fill factor shall be 40%.
- KOUNIS Cable Mesh is the preferred product



(Diagram 6.2.3.2a Picture cable mesh)

Catenary Wire

Catenary wire may be used as a feeder pathway to cable tray or cable basket as follows:

- Catenary wire shall be comprised of a minimum of seven strand galvanised steel wire.
- Treated with an anti-corrosive paint
- The in-ceiling cable support structure shall comprise catenary wire suitably anchored and supported to the ceiling slab and tensioned by way of turnbuckles.
- The number of Category 6A cables that can be run on a single catenary is limited to 24; once this number is exceeded either cable tray or cable basket shall be used.

Conduit, Internal

- Conduits shall be used where cable is required to run within the floor slab, and in such locations where normal pathways are not practical.
- Conduit shall also be used for locations and services that are deemed to have a security risk, e.g. IP security cameras and door access.
- Intermediate wiring joints are not permitted in conduit or wiring ducts.
- Inspection tees, elbows and bends are permitted but must ensure compliance with Panduit cabling specifications for bend radius.
- Where metal conduit is used, ends shall be reamed or filed free of burrs and conduit threads entering junction boxes or fittings shall be at least 10mm long.
- Where non-metallic conduit is used, all joints shall be secured with the manufacturer's approved adhesive.
- Any conduit cast in-slab should protrude the surface of the slab a minimum 100mm, and located as close as practical to sidewalls, and exit the slab perpendicular to the surface.
- A durable draw rope shall be provided in all conduits to assist in subsequent cable installation.
- As per standards requirements a minimum of 60% of the conduit capacity must remain after the initial installation is complete, i.e., the maximum fill factor shall be 40%.
- Consideration should be given to the upgrade requirements of any given site before selecting the required numbers of conduit. The requirements shall be specified in the Detail Design document.
- Pull boxes shall be installed along conduit and ducting routes where there is a change in direction and at distances not exceeding 12 metres between pull boxes.

External Copper Cable General Requirements

- Cable used outdoors shall be Outside Plant rated they shall be laid in conduit within a trench.
- All cables used within the outdoor environment shall be Gel filled to prevent water ingress.
- Where cables have metallic armouring or metallic barrier foiled sheath all metallic components shall be connected to the building protective earth to ensure equipotential bonding as per AS/NZS 3000 and AS/CA S009.
- Cables run in the Outside Plant environment shall have the applicable sheath ratings preventing deterioration from external elements, i.e. cables exposed to direct sunlight shall have a suitable UV resistant sheath.
- All horizontal cabling will terminate to the same level MER, SER or DER.
- Refer to Appendices for approved cable part numbers.

NOTE: Cable category and type shall be dependent on application support and distance. Check the scope of works for exact site detail.

Cable Installation (Outdoors)

- Cables under roadways shall be laid in roadway ducting within approved conduit. These ducts shall project at least 300 mm beyond the kerb lines and unless specified otherwise, shall be supplied and installed by the contractor.
- The conduits shall be heavy duty, rigid UPVC in accordance with AS 2053, or heavy-duty, fibrous cement conduit in accordance with AS2053.
- All conduits shall be laid at a minimum cover depth of 500 mm, in a bed of clean sand, with a minimum cover of 75 mm above the top of the conduit.
- The trench shall be backfilled and consolidated to finished ground level.
- Protection slabs making up the roadway ducting lids shall be pre-cast concrete having a thickness of not less than 40 mm, and a classification of not less than Grade 15 to AS 1480 shall be used unless otherwise specified in the project specification.
- A white marker tape complying with AS 2648, part 1 shall be laid continuously along the route of the cable approximately 300 mm above protection slabs.
- The minimum requirement is for two 100-mm diameter conduits.

- All conduits should be sealed so rodents cannot seek refuge in them.
- All conduits should be installed so that a slope exists to assist drainage. A slope of no less than 10 mm per metre is recommended.
- A conductive trace wire shall be installed continuously along the route of in ground conduits (either in or on the top of the conduit) for future services location requirements.

Communications Pits

- For trenched runs, a Communications Pit labelled “COMMUNICATIONS” shall be located every 50 m or at every change in direction of minimum size 800 mm deep and 600 mm X 600 mm square.
- The pits shall be of sufficient size to contain cabling loops without exceeding cabling minimum bend radius requirements. This does not apply to any bored runs.
- Each pit shall be provided with a seepage hole cast into the bottom surface to allow the disbursement of any accumulated water. The pit should be located on a minimum of 100 mm of sand.
- Bell-mouths shall be installed on conduits terminating in communications pits.
- Pits will be provided with appropriate strength lids depending on the placement of the pits.
- These pits will be used in the installation of the cable and to store spare cable looped to aid in disaster recovery.
- Locked or lockable pit lids may be required for security reasons and to prevent unauthorised entry (refer project specifications). Lids shall be sealed to prevent rodent occupation.
- Pits shall have suitable high-density lids such as in P5 or P6 pits capable of bearing heavy loads.

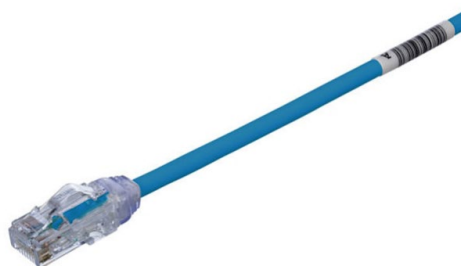
Painting and Corrosion Protection

- The Contractor shall be responsible for corrosion protection and the painting treatment of all brackets, supports, cable ladders and weather shields being supplied and/or installed by the Contractor.
- The Contractor shall also be responsible for the restoration to the supplier’s finish or
- approved matching equivalent on any damaged paintwork to equipment and accessories.
- Where no special painting procedure is specified, all metal surfaces shall be wire brushed to remove all traces of rust, scale, grease, and prime coated with one coat of an approved rust inhibiting paint.
- The finishing coats, including colour and type of paint, shall be approved by the principle.

7.7 Patch Leads

All network patch cables will be of type:

- PANDUIT TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, Blue



(Diagram 6.5.1a Image PANDUIT TX6A Patch Cord)

8 Wireless Access Points Installation

8.1 Overview

Installing a wireless access point revolves around choosing the right physical location to ensure strong, consistent coverage. Effective RF planning is crucial to minimise interference and optimise channel use across 2.4, 5, and 6 GHz bands. Reliable

cabling and PoE+ provisioning are essential to power the AP and maintain full performance. Finally, validation testing confirms that coverage, roaming, and throughput meet the intended design.

This initiative presents La Trobe University with the opportunity to enhance overall engagement for students, staff, and all campus visitors. It supports stringent bandwidth requirements and facilitates the introduction of advanced technological features. These improvements are essential for delivering world-class services and maintaining the University's status as a leading institution.

8.2 Wireless access point Installation methodology

A consistent installation approach for wireless access points (WAPs) is essential because Wi-Fi behaves as a predictable RF system, not a “plug-and-play” device. When APs are installed inconsistently—different heights, orientations, densities, cabling paths, or mounting methods—the wireless network becomes unstable, inefficient, and harder to support.

- Detailed design of the installation locations and mounting options will be provided by the LTU IS Digital Workplace Services, network infrastructure team.
- Detailed designs may be requested via the IS projects manager or infrastructure lead
- Preparation of detailed designs require the following prerequisites:
- Plans which include:
 - HVAC
 - Luminance
 - Hydraulic
 - Fire Services
 - Building Management Services
 - Rooms intended purpose with FFE (Fixed Furniture and Equipment)
 - Room occupancy (Capacity)
 - Room Numbers
 - Walls and Ceiling and Substrate construction materials
- Plans to be provided in the following format:
 - AutoCAD DWG
 - Acrobat PDF (to scale)
- Detailed designs will be provided to the project via Adobe PDF markup
- AP installation locations and comments related to installation mounts to be detailed on project drawings
- Final approval of drawings to be approved by LTU IS Digital Workplace Services, network infrastructure team
- Any modification to installation location or mount post approval requires re-approval from the LTU IS Digital Workplace Services, network infrastructure team
- Structured cabling to be inspected and approved prior to AP installation
- APs are labelled in preparation for installation
- APs are provided to the project via the IS projects manager or infrastructure lead
- APs to be installed in the nominated locations as per the detailed design and labelling

8.3 Physical Installation considerations

- Access Points are to be installed or relocated using only approved LTU mounts and brackets
- Installations mounted to ceiling are preferred
- All installations are to be planned and approved by an LTU Network Engineer

- Installations are to be performed following the methodology detailed below
- Structured cabling to be installed at no greater distance then 1000mm (Typical)
- Structured cabling to be terminated with an LTU approved jack and Surface Mount Box (Typical)



(Diagram 7.1.1 Image approved access point ceiling installation)

8.4 Ceiling Height and Spatial Considerations

Mounting Location & Height

- Installations are to be 2400 – 3000AFFL (Typical)
- Access Points to have a clearance of 700mm radius from any other service
- Access Points to be lowered to the height of any other service within 3500mm radius
- If the ceiling is open or higher than 3000mm above the finished floor, install APs with threaded rods or dropper poles, ensuring they do not exceed 3000mm AFFL.
- Ceiling-mount is preferred for omnidirectional APs to maximise coverage.
- Maintain consistent height across a deployment for predictable propagation.

Obstructions & Building Materials

- Avoid placing APs near concrete, brick, metal ducting, lift shafts, or dense shelving.
- Keep APs away from corners, walls, and enclosed spaces that distort RF patterns.
- Keep clear of HVAC units, pipes, and electrical cabinets that block or reflect RF.
- Ensure the AP isn't hidden above ceiling tiles or behind signage unless designed for it.

Interference Sources

- Stay clear of microwaves, motors, LED drivers, wireless cameras, and other RF-noisy devices.
- Avoid mounting near large glass panes or metal surfaces that cause reflections.

Mounting Hardware & Safety

- Use manufacturer-approved brackets for ceiling tiles, plasterboard, concrete, or rails.
- Ensure the AP is secure, level, and compliant with fire-rating and building codes.
- Avoid placing APs where they can be easily tampered with or bumped.

Aesthetics & Accessibility

- Consider visibility in public spaces — balance performance with visual impact.
- Ensure the AP is accessible for maintenance but not intrusive or vulnerable.

9 Audio-Visual Systems

Audio-visual (AV) standards are the backbone of reliable, scalable, and interoperable AV systems across academic, enterprise, and public environments. These standards define the technical, operational, and performance benchmarks that ensure AV components—from microphones and displays to control systems and networked endpoints—work seamlessly together, regardless of brand or platform.

AV standards serve several critical functions:

- Interoperability: Ensure devices and systems from different manufacturers can communicate and function cohesively.
- Consistency: Provide uniform performance expectations across installations, reducing variability and troubleshooting.
- Scalability: Enable futureproofing by aligning with evolving technologies and deployment models.
- Compliance: Support adherence to safety, accessibility, and regulatory requirements (e.g., ADA, ISO, IEC).
- Efficiency: Streamline procurement, installation, and maintenance through standardized specifications and workflows.

9.1 Audio-Visual Equipment Assessment and Approval Process

All vendors and manufacturers that would like their products and services approved by the Manager, Workplace Technology are required to supply a sample of their product or service for evaluation against the following four stages:

- Minimum Requirements
- Technical Selection Criteria
- Procurement Evaluation
- Endorsement from Manager Technology Mobilisation & Manager, Workplace Technology

Minimum Requirements

Manufacturers are required to be ISO companies certified to ISO 9001. This certification is an international standard that specifies requirements for a quality management system (QMS). It is intended to help Organisations ensure that they meet the needs of customers and other stakeholders while meeting statutory and regulatory requirements related to the products they create.

Fit, Form and Function

Products are required to operate for their intended purpose, in conditions considered suitable and typical of their installation. Meeting or exceeding the AV Performance criteria detailed in this document. Where a new product is developed it will be graded against the merits of its purpose, design, and ingenuity.

Ability to supersede existing products and broaden applicable use in AV systems.

Aligning with our strategy, products that can replace multiple other products in a design are preferred. As are solutions that can cater for several AV elements in a single part, e.g. A product that can act as a controller, DSP, amplifier, or a camera, microphone, speaker soundbar combination alleviating the need to have separate components to create an AV system. Where this is not possible products that can perform a function in as many scenarios as possible, allowing for greatest flexibility and application in a greater number of installations. Also, the ability to source multiple products offered from a single manufacturer is highly desirable.

Manufacturers Support Arrangements.

The following is to be considered for the maintenance of devices and support from manufacturers. Manufacturers are to provide a website/s that allows registration of devices. The ability for LTU support staff to subscribe to notifications regarding the release of new firmware and support materials. The ability for LTU support staff to gain access to versions of firmware, product information, and manuals. Mechanisms that allow LTU support staff the ability to raise support requests and complete RMA procedures. Support requests and RMA processes escalations via telephone to call centres that operate during normal Australian business hours. An RMA process that allows diagnosis of fault within 24hours (elapsed) and provide replacement parts within 72 hours (elapsed). Where options are limited, the following is the preferred order of priority:

A website capable of SSO integration with LTUs Azure tenant which includes:

- Asset registration
- Asset information (make, model, serial number)
- Asset warranty information
- Asset firmware update notification
- Ability to apply firmware updates.
- Asset health (near real time)

- Online product support case creation and RMA procedures
- Phone support during Australian normal business hours
- Interoperability via API with third-party monitoring applications

Maintenance System Interoperability

To ensure devices can be supported and maintained in the field LTU is deploying a third-party monitoring application that will provide the following information for all network-enabled devices:

- device uptime
- consumed hours
- health
- telemetry information
- Asset information (make, model, serial number)
- Asset firmware version
- Number of recorded defects and remediations
- Alerting and incident creation
- Where options are limited, the following is the preferred order of priority.
- Custom API/Driver (developed by third-party monitoring application)
- SNMP v3
- SNMP v2
- ICMP

Remote Access

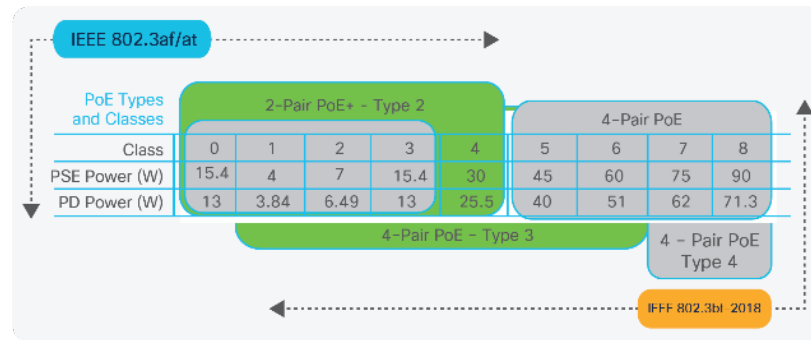
Remote access for any maintenance or troubleshooting activity must be over secure channels such as SSH or HTTPS. Where possible remote access interfaces must only be accessible to LTU support staff to prevent users from accessing such interfaces.

Network Connectivity

All devices connecting to the LTU data network are to be compatible with LTUs DHCP system and be enabled by DEFAULT. Network attached devices are to have as a minimum.

- 1Gbs ethernet interfaces
- Require no greater than UPOE Type 4 – Class 7,8 802.3bt (71.3w), POE++ 90w

Type	Class	Power over twisted pairs	PoE standard	Maximum power from PSE	Maximum power to PD
1	0 to 3	2 pairs	802.3af (PoE)	15.4W	12.95W
2	4	2 pairs	802.3at (PoE+)	30W	25.5W
		4 pairs	Cisco UPOE	60W	51W
3	5, 6	4 pairs	802.3bt (60W)	60W	51W
4	7, 8	4 pairs	802.3bt (90W)	90W	71W



Note: Devices with 10/100MB network interfaces are no longer supported on the LTU network. It is expected that AV consultants and integrators will bring this to the attention of the principle and Technology Mobilisation when providing equipment selections or recommendations.

Quality of Service (QoS)

LTU operates mechanisms for cross-stack marking, classification, and scheduling superior performance for data, voice, and video traffic at wire speed. QoS includes granular wireless bandwidth management and fair sharing, 802.1p Class of Service (CoS) and Differentiated Services Code Point (DSCP) field classification, Shaped Round Robin (SRR) scheduling, Committed Information Rate (CIR), and eight egress queues per port. AV equipment needing specific QoS settings requires approval from Manager Technology Mobilisation and the LTU network management team to ensure settings are not in conflict with existing settings.

Network Security

LTU deploy a multitier approach to ensure a secure network and Information Services environment. As AV devices converge and become netcentric it is critical that all security measures are deployed to minimise any vulnerability. The following security features are required:

- DHCP capable
- Configurable host name
- Disable unsecure ports, as a minimum this includes:
 - 21 TCP – FTP
 - 23 TCP – Telnet
 - 25 TCP – SMTP
 - 80 TCP – HTTP
- Any generic usernames and passwords can be changed. (LTU will issue usernames and passwords)
- Integrate with Active Directory (where deemed necessary by Technology Mobilisation)
- Capable of performing firmware and software updates (where deemed necessary by Technology & Enablement)

Passwords

Device must be capable of having a La Trobe University approved username and password. For security reasons these will be issued upon request. Any item removed for service or repair by a manufacturer, or third party must be capable of having its password set to the default configuration. Any replacement device must have the original username and password replaced with a suitable La Trobe password to ensure that service desk staff can remotely manage the device. This process will be managed by Technology Mobilisation and the Desktop/AV Support teams.

Risk Assessment

AV devices undergo a review and approval process conducted by Manager AV Projects in conjunction with various other IS staff, to identify any security vulnerabilities or assess the level of risk. This includes but not limited to:

- Identified cyber security alerts, compromises, and advisories from ACSC and other relevant authorities.
- Documented open protocols and ports.
- Required access to the internet, including all protocols and ports necessary for the normal operation of the device, internet access to perform updates (firmware/software), maintenance, monitoring, and RMA procedures.

- Required user accounts and passwords, limitations on modifying these attributes including password length and complexity.
- The device's support of PKI (certificates)
- Available security measures that can be enabled
- Where options are limited, the following is the preferred order of priority:
- Third-party monitoring integration
- Compatible with La Trobe issued Username and password.
- Factory username and La Trobe University issued password.
- Operation whilst isolated from the LTU network.

La Trobe University is currently reviewing network access of AV equipment as we plan for the introduction of Software Defined Access (SDA). A device identity security solution that helps protect Organisations against cyberthreats by monitoring, detecting, and preventing unauthorized privileged access to critical resources. SDA works through a combination of people, processes, and technology.

Sustainability

At La Trobe University, sustainability is more than a commitment—it's a core principle that shapes our campuses, operations, and future-focused initiatives. Guided by our strategic plan and aligned with the United Nations Sustainable Development Goals (SDGs), we are embedding environmentally responsible practices across every facet of university life.

Environmentally Conscious Infrastructure

- **Energy Efficiency:** Our campuses are powered by high-efficiency systems, including LED lighting, smart building automation, and solar energy installations that reduce our carbon footprint.
- **Sustainable Materials:** We prioritise the use of recycled, low-impact, and locally sourced materials in construction and refurbishment projects, supporting circular economy principles.
- **Green Building Standards:** New developments are designed to meet or exceed Green Star and NABERS ratings, ensuring long-term environmental performance.
- **Operational Sustainability**
- **Carbon Neutrality:** La Trobe was the first Australian university to commit to Net Zero emissions by 2029, with major milestones already achieved through renewable energy, carbon offsets, and emissions reduction strategies.
- **Water and Waste Management:** We implement closed-loop water systems, rainwater harvesting, and comprehensive recycling programs to minimise waste and conserve resources.
- **Sustainable Transport:** Our campuses support active and low-emission transport options, including electric vehicle charging stations, bike hubs, and improved public transit access.
- **Education, Research & Engagement**
- **Curriculum Integration:** Sustainability is embedded across disciplines, empowering students to become future leaders in environmental stewardship.
- **Research Impact:** Our researchers are tackling global challenges—from biodiversity conservation to climate resilience—through interdisciplinary collaboration and innovation.
- **Community Leadership:** We partner with local councils, industry, and Indigenous communities to co-create sustainable solutions that benefit both people and planet.

Selection Criteria Weighted Evaluation
WEIGHTED EVALUATION TABLE

Category	Weight	Description
PERFORMANCE	25%	
Performance	25%	Ability to deliver functional requirements. Also takes into account usability and aesthetics.
SUPPORT	30%	
5-year warranty	10%	If provided at an additional cost this should be scored 100%, with the cost scoring "Price (Op Ex)" category lower.
Local technical support	5%	Victoria-based technical support required for full score. Inter-state support will be evaluated as "good".
24 hours RMA	5%	24 hours will be excellent, 48 hours very good, 72 hours good.
Remote monitoring	5%	Ability for critical components to be remotely monitored
Remote troubleshooting	5%	Ability to remotely change settings, reboot and update firmware
Compatibility	5%	Ability for components to be remotely monitored using existing platforms
SUSTAINABILITY	10%	
Minimum parts and vendors	10%	This is to be assessed across a full system. Designs with a smaller number of parts or vendors receive higher scores.
CONSISTENCY	10%	
Common components with existing systems	10%	To reduce number of spares required, as well as training requirements, proposals based on existing designs receive higher scores.
RELIABILITY	20%	
Availability	10%	Equipment available within 2 weeks is excellent, 2-4 weeks very good, 4-8 weeks good.
Network requirements	5%	Systems with less demanding network requirements will score higher.
Offline capacity	5%	Systems that can perform critical tasks offline receive higher scores
SCALABILITY	5%	
Scalability	5%	Ability for components to cater for larger spaces, or larger quantity of connections or peripherals

Scoring Table

Each category should be scored from 1 to 10, following the below details:

Score	Description
9-10	Product is an excellent fit to the requirements
7-8	Product is a very good fit to the requirements
5-6	Product is a good fit to the requirements
3-4	Product is a poor fit to the requirements
1-2	Product is a very poor fit to the requirements
0	Product does not meet the requirements

9.2 Audio-Visual Project Documentation Platform

La Trobe University utilises a Microsoft SharePoint-based platform to facilitate collaboration between internal stakeholders and external delivery partners. Upon AV Integrator engagement, a SharePoint project site will be created with access provisioned to all relevant personnel.

Purpose:

- Store and manage all AV project documentation centrally
- Enable version control and shared visibility across teams
- Provide a single source of truth throughout project delivery and into maintenance

Documentation Requirements

- **During project delivery:** All required project documentation is stored and maintained on the SharePoint site.
- **At project handover:** Key documents are transferred to the LTU Desktop/AV Support repository.
- **Post-handover:** The SharePoint site is archived for reference.

Audio-Visual projects require a substantial amount of documentation. All documents related to a given project must be uploaded and maintained within the project SharePoint site until handover. At that time, documents are to be copied to the LTU Desktop/AV Support repository, and the project SharePoint site archived.

The documentation scope varies by project value and complexity, but the following are commonly required:

	01. Support Info
	02. AV Schematic - Drawings - Asset Schedule
	04. Equipment configuration files, Signage and Posters
	05. Photos
	06. Inspection Test Protocols

9.3 AV Performance Criteria

Responsibilities

It is the joint responsibility of the AV Consultant and AV Integrator to ensure that all installed AV systems meet or exceed:

- The minimum performance benchmarks defined in this document
- All relevant Australian Standards and statutory regulations
- Industry best practices, including applicable AVIXA and AETM guidelines

In the event of any conflict between documents, the following hierarchy of precedence must be followed:

- Legislated Safety Requirements
- Australian National Standards
- La Trobe AV Standards (this document)
- AVIXA Standards
- AETM AV Design Guidelines

Compliance

Where site limitations or constraints prevent compliance with a specific performance criterion, this must be escalated to the Principal and Technology Mobilisation as early as possible.

Large lecture theatres and specialist environments may require bespoke calculations and assessments, including:

- Acoustic modelling
- Sight line studies (horizontal and vertical)
- Audio coverage mapping
- Rack and system layouts

If the default viewing distances or angles cannot be achieved using a single display (preferred), additional displays must be introduced to ensure adequate coverage.

Note: All AV system designs must use La Trobe University's tested and approved AV equipment. (Refer to Appendices)

Acoustics

The physical acoustic properties of an environment have a direct impact on the performance of the electroacoustic system which in turn impacts learning outcomes. An internationally accepted measurement of the acoustic environment is the Speech Transmission Index (STI). The architectural parameters that affect STI are outside of the scope of this document and generally not applicable during a redevelopment or lifecycle upgrade of a space. What is to be considered as in scope is when:

- An existing space has proven to be problematic and simple acoustics strategies, such as wall panels and soft furnishings could provide an improvement, then they must be considered in the design or recommended to the principal.
- Green field projects where the services of an Acoustic Consultant must be engaged to assist with room acoustics, room insulation, service noise mitigation design or any other design relevant to the performance of the electroacoustic system.

Audio Coverage

Audio coverage shall conform with the AVIXA A102.01:2017. This standard is the benchmark that specifies a minimum acceptable reference, typically used as a general guide. Results within the acceptable range are expected although it is anticipated that this may not be possible in some circumstance due to existing physical factors.

Following is the minimum, acceptable, requirements that the AV systems must be designed to meet:

- Quality	- Desirable	- Acceptable	- Unacceptable
- System Noise – Above Ambient, LAeq dB(A)	- < 0	- 0 – 5	- > 5
- Program System SPL, dB(A)Slow	- <85	- 75 – 85	- < 75
- Program Frequency Response (100Hz – 10kHz)	- ± 3 dB	- +3/-6dB	- > +3/-6dB
- Speech System SPL, LAeq dB(A)	- 65 – 70	- 60 – 65	- < 60
- Speech Frequency Response (100Hz – 10kHz)	- ± 3 dB	- +3/-10dB	- > +3/-10dB
- Coverage Uniformity (%)	- > 90	- > 75	- < 75
- Speech Transmission Index (STI)	- > 0.68	- 0.68 – 0.56	- < 0.56

Acoustic Reinforcement

Audio systems are to incorporate an audio processing capability from an external Digital Signal Processor (DSP). The AV Consultant is to provide the following information as part of the design documentation:

- Audio coverage plan including speaker placement (may be part of the AV plan).
- System Requirements
 - Program audio reinforcement
 - Speech reinforcement
 - Hearing augmentation
 - Audio processing
 - All wired and wireless microphones are processed by the DSP.

Amplification

Amplifiers must be Class D, capable of outputting the required power plus 20% overhead. The amplifier must have a minimum of four channels and be compatible with low and high impedance speakers.

Speakers

Speakers must be passive in all teaching spaces. They may be surface speakers, ceiling speakers, or a combination of both, depending on the physical characteristics of the space.

- Max SPL above 105 dB
- Sensitivity above 90 dB
- Multiple transformer taping
- White and Black options

Positioning of speakers must be mindful of providing best audio cover while mitigating acoustic feedback risks. To achieve this preference is for surface speakers to be wall mounted above 2000 AFFL and in front of the lectern position. The above speaker specification does not apply to performance spaces. These spaces are bespoke, and requirements will vary accordingly.

Hearing Augmentation

LTU is committed to promoting a healthy and safe environment and recognises its obligations under the Occupational Health and Safety Act 2004 and Occupational Health and Safety Regulations. All Consultants must work to assist LTU to comply with the provisions of the Act.

As a minimum, the hearing augmentation system shall comply with the following:

- IR systems must provide greater than 95% coverage within acceptable tolerances.
- A minimum of one IR receiver for every 25 persons or part thereof must be provided in each space.
- Infra-red modulators, transmitters must be as per the current preferred equipment list.
- Coverage must be even across the designated IR coverage area.
- Hearing augmentation signage must be installed.
- The system must be designed to minimise the effects caused by:
 - Electrical and other cabling.
 - Metal objects, such as ductwork.
 - Other sources.

The system must ensure that the audio DSP is configured correctly to provide a mixed feed of program and microphone audio. The management of hearing augmentation receivers is consistent across all campuses and locations with receivers being made available in each space where it is fitted. It is the responsibility of the AV Integrator to coordinate with Technology Mobilisation to document the location of the receivers.

How to access the hearing augmentation receivers should be covered by the AV Integrator during user training.

Programming and Control

La Trobe University deploy a Q-SYS control systems based on La Trobe University approved GUI template. The AV Integrator will be responsible to complete programming requirements and detailing information for all devices and test that the supplied programming delivers the required functionality. Some projects may require additional control functionality beyond the La Trobe University approved GUI template.

- Emergency Warning Intercommunication System (EWIS) Integration (where fitted). EWIS integration to mute the in-room audio system must be installed in the following circumstances:
 - Where high SPL audio systems are deployed, typically in a theatre or event style environment.
 - As required by the relevant legislation.
 - As detailed in Section 5.07.05 Occupant Warning Systems / EWIS of the Latrobe University Design Standards
 - As directed by the principal.

Lighting

Lighting has a major impact on the perceived quality of a displayed image. Both ambient and artificial lighting must be controlled to ensure optimum performance of the display system. The artificial lighting system must also be correctly designed and interfaced with the AV control. As with acoustics, the design of the lighting system is outside of scope and not applicable during a redevelopment or lifecycle upgrade. What is to be considered in scope is the following:

- An existing lighting system with integration capability. In this instance the lighting system must be integrated with the AV system.
- Where the lighting system is being redeveloped as part of the overall project. In this instance the AV Consultant and/or AV Integrator must coordinate with the Electrical Consultant and/or Electrical Contractor to ensure that the lighting system conforms with the requirements listed below:
 - In the case of green field projects, the AV Integrator must coordinate with the Electrical Consultant to ensure the lighting design conforms with the requirements listed in the sections below.

- Where the installed lighting system is not covered by the previous points and would have a detrimental effect on the AV system. In this case this must be brought to the principal's attention at the earliest possible opportunity.
- In situations where there is no separate "Display area - zone" (see below), or there is excessive spill on the display surface that will degrade the performance of the display system then the AV Consultant or AV Integrator must bring this to the attention of the principal at the earliest possible opportunity.

Ambient Lighting

Ambient lighting must be controlled to ensure the display system conforms to this standard. To ensure this, the following techniques may be utilised:

- Black out blinds. Motorised and integrated to the AV system is the preferred option.
- Grey out blinds. Motorised and integrated to the AV system is the preferred option.
- Repositioning the main presentation area to avoid ambient light spill – subject to architectural restraints and prior approval by the principal.

Artificial Lighting

Ambient lighting must be controlled to ensure the display system conforms to this standard. To ensure this, the following Artificial lighting system must be designed to ensure the display system conforms to this standard. As a minimum the following techniques may be utilised:

- Well defined zones such as:
 - Display area – The area immediately above and adjacent to the display device.
 - No lights are to be installed within 1500mm of a display or surface used to present content
 - Lights within 2000mm of a primary display or surface are to have a dedicated switch to allow turning off the light
 - Adjustable light levels must accommodate various use cases (e.g., lectures, projection, video conferencing).
 - Direct lighting on display surfaces must be avoided to prevent glare and image washout.
 - Backlighting for presenters is recommended in hybrid or video-enabled teaching environments.
 - Lighting systems must support integration with control systems, including:
 - Scene recall
 - Dimming zones
 - Occupancy-based automation
 - Presentation Area – The area typically at the front of the class around the lectern that the academic may occupy during a presentation.
 - Lectern (Podium or bench) – The main joinery item and close surrounding areas where an academic would present from. Where there is more than one, separate control of each is required.
 - Whiteboard – The area immediately above or adjacent to an installed whiteboard.
 - Backlighting – Typically a controlled light to illuminate the Academic from the rear. Its primary use is to make the academic stand out from the background when a camera is used to capture or transmit video. Depending on the vertical angle of the backlighting it may also function as task lighting. A separate backlight with individual control should be installed for the lectern and presentation area.
 - Task lighting – In certain situations, specific, highly focused lighting is required to illuminate an area such as the top of a podium lectern. Typically, this is a local device, such as a Little-lite gooseneck type product installed by the AV Integrator. The AV Consultant is to ensure that a suitable solution is deployed as part of the overall project.
 - Audience area – The areas where students are typically seated.
 - Aisles – Steps and passageways.
- All zones are to be controlled by commercial dimmers. Typically, this includes the following manufacturers:

- Dynalite
- Other manufacturers require prior approval from the principal.
- Where electronic dimmers are not installed the following is required as a minimum. In order of preference:
 - 2 zones of mechanically dimmed lighting
 - Display area
- Remaining areas
 - 2 zones of switched lighting
 - Display area
- Remaining areas
 - 1 zoned of switched lighting.

All lighting fixtures must be capable of providing flicker free dimming down to 10%. Wherever possible (lighting control system dependant) the AV system will recall a preprogramed lighting state. All individual channel levels are to be programmed into the lighting control system. The AV Consultant is to ensure that all required coordination between the AV Integrator and the electrical contractor is included in their documentation.

Video Distribution - AVoIP

Video distribution via AVoIP aligns with LTU AV strategy to deploy systems that are flexible, utilising a fewer quantity of parts and fewer manufacturers. AVoIP systems are to be capable of:

- Outputting 4K60, 4:4:4 signals, have scaling capabilities and be able to embed and de-embed audio signals, which will be available to a dedicated DSP via analog or digital transmission.
- AVoIP encoders and decoders located within the AV rack must be fitted via a 1RU mounting bracket or chassis, simplifying installation, heat management.
- AVoIP capable of USB distribution, particularly for managing the interactive component of Touch Interactive Whiteboards and Displays.
- Be capable of =>6 encoders per system
- Be capable of =>8 decoders per system
- Each AVoIP device must be programmable and monitored.

9.4 AV Infrastructure Requirements

Audio-Visual Cables (Audio, Line, Control & Various)

The following cable types are to be used on La Trobe University installations. All cables must be manufactured from a reputable manufacturer and be fit for purpose and meet all statutory requirements and standards.

- CABLE TYPE	- DESCRIPTION	- BRAND	- ALTERNATIVE
- Digital Video	- HDMI & Display Port	- Kramer	- Seek Advice
- Analogue Audio – Balanced mono	- 26 AWG stranded 1 pair twisted core with aluminium foil and drain	- BELDEN 2221	- Seek Advice
- Analogue Audio – Balanced stereo	- 26 AWG stranded 2 pair twisted core with aluminium foil and drain	- BELDEN 1172A	- Seek Advice
- Analogue Audio – Unbalanced mono/stereo	- 1 Pair shielded 22AWG	- BELDEN 8761	- Seek Advice
- Speaker - Low impedance	- 12 AWG stranded 2 cores Double insulated, striped, multi strand.	- BELDEN 1311A	- Seek Advice
- Speaker – High impedance	- 16 AWG stranded 2 core tinned copper conductors, PVC insulation, twisted pair, PVC jacket.	- BELDEN 8471	- Seek Advice
- RS232/485	- 24 AWG two pair data with aluminium foil	- BELDEN 8723	- TCIP02E

Cable Termination

For consistency and to simplify fault-finding, La Trobe University specify the following cable label requirements:

- CABLE TYPE	- DESCRIPTION	- BRAND	- ALTERNATIVE
- Jacks UTP (HDBaseT, TCP/IP, AVoIP applications)	- Mini-Com® STP RJ45 Cat 6A TG Jack Module, Blue (CJS6X88TGVLY)	- Panduit (Blue)	- N/A
- Analogue Audio – Balanced stereo	- XLR, PHOENIX	- Neutrik	- N/A
- Analogue Audio – Unbalanced mono/stereo	- PHOENIX	- Neutrik	- N/A
- Speaker – Low, High impedance	- Neutrik NL4FRX SpeakON Connector -Right-Angled	- Neutrik	- N/A
- Speaker – Low, High impedance (Wall Plate)	- Neutrik NL4MP 4-pin Speakon Socket Jack	- Neutrik	- N/A
- RS232/485	- D-9, PHOENIX	- Beldin 9723	- N/A

Cable Installation

Cabling installation must comply with the following:

- Separation of cables in the field and rack as per AS3000.
- Drawing as per manufacturer's specification.
- Bend radii as per manufacturer's specification.
- Cables must be horizontally supported by cable tray or catenary. All cable trays and catenaries must be installed according to the appropriate standards.
- All cables that contain data or video cables must be loomed with Velcro style ties. Nylon cable ties must not be used.
- All cables must be installed as a "home run" and no joins will be accepted.
- Where cables are installed in a rack or an area of collocated equipment the following requirements must be met:
- All equipment must be securely mounted.
- Non-rack mounted equipment must be installed on an appropriate shelf or installed with a suitable mounting bracket.
- Signal cables must be grouped and loomed together.
- Low and high-powered signal cables must be physically separated to minimise interference.
- All cables must be installed with sufficient strain relief.
- The manufacturers recommended bend radius must not be exceeded.
- Where premanufactured cables are used the shortest length that meets the requirements of this document must be used.
- Lacing bars must be installed for cable management.
- Velcro ties must be used for all signal cables. **Nylon cable ties must not be used.**
- Fly and patch leads must be approved and commercially manufactured. No field manufactured leads will be accepted.
- Where more than one cable is deployed as a fly lead or loom, they must be installed in appropriately sized Techflex or equivalent black expandable braid cable sheath.
- All fly leads must be secured against theft or unauthorised removal. Fly leads that are connected directly to an end device that is not accessible to the user is considered secure only if the fly lead cannot be removed by pulling on it. Fly leads that have connections that are user accessible or can be removed by 'pulling' must be secured by a 'P clip' or similar method. Cable standards are detailed below.

Cable Labelling

For consistency and to simplify fault-finding, La Trobe University specify the following cable labelling requirements for audio-visual systems, label and mark equipment using a consistent scheme across all services and elements of the project. All equipment and patch panels, each jack on the face plate, wall outlets and cables to show their designation as per the AV schematic drawing. Provide labels that are manufactured from or approved equal material and adhere to size and lettering.

Labels are to be strong adhesive polypropylene, white background with black lettering, labels are to be self-adhesive.

- Font: Helvetica
- AP Name and MAC address in 2 lines as shown in image above LED.
- Comms room and Field outlet details to be labelled under LED
- Width: 24MM
- Length: 60MM
- Margin: 2MM
- Font size: 20
- Orientation: Landscape
- I have attached the configuration images for the reference.
- Label to be placed in the location as shown in image

Electrical Cabling Requirements

All electrical and cabling installations supporting LTU systems—including Audio-Visual, IT, communications, building automation, and security—must comply with Infrastructure & Operations (I&O) Design Standards, specifically Section 5.03 – Electrical Services.

The objective is to ensure a consistent, compliant, and coordinated approach to electrical integration across all disciplines. This section complements other LTU standards and shall defer to higher-level standards where applicable.

Where any departure from this section is necessary, it must be discussed and agreed upon with the Principal and Technology Mobilisation prior to implementation.

Power Supply and Distribution

LTU's systems rely on structured electrical provisioning designed for long-term reliability, serviceability, and technician safety. Key requirements include:

- Segregation: Power circuits serving systems must be isolated from lighting and high-load circuits. Separate circuits are required for:
 - System infrastructure (e.g., network switches, control processors, Audio-Visual PDUs servicing lecterns)
 - Room infrastructure (lighting, blinds)
- Consistent phase: All system components in a room must be powered from the same electrical phase.
- Dedicated power: Each device must have a dedicated General Power Outlet (GPO) or be supplied via an appropriately rated PDU.
- Circuit capacity: Maximum 10 outlets per 10A RCBO circuit in air-conditioned environments.
- All 15A and above outlets require individual circuits.
- Outlet placement:
 - GPOs behind equipment must be discreet but accessible for servicing.
 - Avoid locating GPOs inside joinery unless the furniture is fixed.
- Installation practices:
 - Avoid joints in power cables; use loop-in/loop-out wiring.

- Support cables with proper fixings at regular intervals.
- Ensure bending radii comply with manufacturer specifications.
- Power Supply and Distribution (Room-Level Notes)
- Ceiling-mounted equipment:
- Provide service access via powered lifters or removable panels if >2600 mm AFFL.
- Where applicable, connect to lockable switchgear.
- Low Power devices (Touch panels, cameras, and signage players):
- Prefer PoE (Power over Ethernet) unless manufacturer requires 240V mains.
- Coordinate power provisioning with data cabling to avoid duplication or conflict.
- Compliance with LTU Design Standards:
- Ensure all electrical works align with LTU Infrastructure Standards, especially under the Power Provisioning and Maintainability sections.

Surge Protection

All system installations must include Surge Protection Devices (SPDs) to safeguard connected equipment from transient voltages caused by lightning or power anomalies.

Minimum requirements:

- Standards compliance: AS 4262.1 and AS 4262.2
- Surge rating (Imax): ≥ 20 kA (8/20 μ s) phase to neutral; 10 kA neutral to earth
- Voltage protection level (Up):
 - <600 V at 3 kA
 - 700 V at 500 A
- Visual indicators: Must be provided to show operational status
- Location: installed at a central, accessible point, such as the main distribution board, equipment rack, or incoming electrical panel
- Protection method: SPDs should be housed in compliant enclosures and protected by a breaker rated equal to or less than the SPD's load

Lightning Protection

The Electrical Consultant must undertake a lightning risk assessment in accordance with AS/NZS 1768.

If protection is recommended:

- Install external lightning protection systems integrated with building infrastructure
- Coordinate earthing and bonding with all nearby metallic enclosures
- Report final protection measures to the Consultant and Technology Mobilisation for approval

Electromagnetic Interference (EMI)

All components must comply with ACMA's EMC Framework to avoid electromagnetic interference with electrical, AV and IT systems. Installers must ensure:

- Maintain proper cable separation between power and data/AV lines
- Use screened or shielded cabling where required
- Comply with AS/NZS 61000 and AS/NZS 3000
- Where intersections are unavoidable, cross power and data cables at 90° angles
- Use of shielded cabling may allow for reduced separation distances, but must be verified against manufacturer specifications

- Telecommunications Cable Separation from Power and Equipment					
-	- Safety – No Barrier	- Safety - Barrier	- EMI Minimisation – No Barrier or Non-Metallic Divider	- EMI Minimisation – Aluminium Barrier	- EMI Minimisation – Steel Barrier
- Unscreened power cable and unscreened IT cable	- 50mm	- 0mm ¹	- 200mm	- 100mm	- 50mm
- Unscreened power cable and screened IT cable	- 50mm	- 0mm ¹	- 50mm ²	- 20mm	- 5mm
- Screened power cable and unscreened IT cable	- 50mm	- 0mm ¹	- 50mm ²	- 10mm	- 2mm
- Screened power cable and screened IT cable	- 50mm	- 0mm ¹	- 50mm ²	- 0mm	- 0mm
- High Voltage – single core	- 450mm	- 450mm	- 1500mm to 3000mm	- -	- -
- High Voltage – multi core	- 30mm	- 175 mm measured from the outside of the cable sheaths	- 1500mm to 3000mm	- -	- -
- Equipment - lighting	- -	- -	- 300mm	- -	- -
- Equipment - transformers, motors, sources of EMI	- -	- -	- 1220mm	- -	- -
- Lightning - down conductors	- -	- -	- 9000mm	- -	- -

- 1 With barrier of durable, continuous insulating material or metal, timber or metal stud, nogging, joist or rafter.
- 2 Minimum distance for safety is 50mm.

High Voltage Power Separation

All system cabling—including control, data, and communications—must maintain safe separation from high-voltage (HV) infrastructure:

- Minimum 3 m clearance from HV distribution runs
- Minimum 6 m separation from HV panels and transformers at termination points, unless otherwise documented in the approved design

Low Voltage Power Separation

To minimise electrical interference and ensure system integrity:

- Maintain a minimum 50 mm separation between low-voltage (LV) power circuits and system cabling
- Where LV power crosses system cabling:
 - Use a 25 mm-lap perforated metallic barrier, or
 - Ensure 90° crossing angle to reduce coupling and radiated noise

Cabling – General Requirements

All electrical and data cabling must:

- Be appropriately rated and installed per AS/NZS 3080, AS/NZS 3008, and AS/CA 5009
- Follow loop-in/loop-out principles (no splicing or mid-run connectors)

- Include support at minimum intervals:
- 2 m horizontal
- 1 m vertical
- Use Velcro ties only (no nylon/plastic cable ties)
- Maintain bend radii recommended by the manufacturer
- Include labelling at both ends within 100 mm of termination, per AVIXA F501.01
- Where located in walls, slabs, or ceilings:
 - Use PVC-U conduit or catenary systems
 - Avoid obstructing thermal or acoustic insulation
 - Provide access points for concealed GPOs and data terminations
 - Use bushings at knockouts in steel framing

All cabling must be accessible, maintainable, and allow for full removal or replacement without damage to building finishes.

Testing and tagging

All mains-powered equipment installed as part of LTU systems must be tested and tagged in accordance with AS/NZS 3760:2010 – In-service Safety Inspection and Testing of Electrical Equipment.

Minimum Requirements:

- Devices must be fitted with a “New to Service” tag in compliance with applicable legislation.
- Devices that are second-hand, reused, or modified (e.g., shortened power cables for rack integration) must undergo portable appliance testing and be tagged prior to installation.
- The following information must be recorded and made available:
 - Equipment type
 - Serial number
 - Installation location
 - Date of testing
 - Name of the tester
 - Testing authority or company

Outlets

List of Common Outlets approved for use is found in Appendices

Individual Outlet Label - AZZ

- CONTENT	- FUNCTION	- DETAILS
- A	- Sequential function letter, 1 digit	- A, B, C, ...
- Z	- Sequential function number, 2 digits	- 02

For consistency and to simplify fault-finding, La Trobe University specify the following cable labelling requirements.

Lettering Heights:

- Danger, warning, and caution notices: minimum 10 mm for main heading, minimum 5 mm for remainder.
- Equipment labels within cabinets: minimum 3.5 mm.
- Equipment nameplates: minimum 40 mm.
- Identifying labels on outside of cabinets: minimum 5 mm.
- Isolating switches: minimum 5 mm.

- Self-adhesive flexible plastic labels:
 - Labels less than 2000 mm above floor: 3 mm on 6 mm wide tape.
 - Labels minimum 2000 mm above floor: 8 mm on 12 mm wide tape.
 - Other locations: minimum 3 mm.

Locate labels so that they are easily seen and are either attached to, below or next to the item being marked. Fix labels securely using screws, rivets, proprietary self-adhesive labels, or double-sided adhesive tape and as follows:

- If labels are mounted in extruded aluminium sections, use rivets or countersunk screws to fix the extrusions.
- Use aluminium or monel rivets for aluminium labels.
- Vapour barriers: do not penetrate vapour barriers.
- Metric si units: provide all lettering and numbers in metric SI units.
- All labelling is to be as per AVIXA F501.01 Cable Labelling for Audio-visual Systems
- A label schedule must be provided as part of the deliverables.

Labels must adhere to the following convention with a prefixed two letter naming convention:

- CABLE TYPE	- DESCRIPTION	- NAMING CONVENTION
- Audio	- Mic, line, speaker	- AA01, AA02, AA03, ...AA99
- Video	- HDMI, Display Port, SDI	- AV1, AV2, AV3, ...AV99
Control	- Serial RS-232, /422/485, Relay, IR, I/O	- AC01, AC02, AC03, ...AC99
- AVData	- HDBaseT, USB, USB-C	- AD01, AD02, AD03, ...AD99
- Network (Fixed Cables)	- Ethernet category cabling, RJ45, SFP, Fibre	- AVLAN001, AVLAN002, AVLAN003, ...AVLAN999
- Power	- Mains & DC supplies	- AP01, AP02, AP03, ...AP99
- Specific	- Vendor Specific Cables	- AS01, AS02, AS03, ...AS99
- Future	- any	- AF01, AF02, AF03, ...AF99

10 Audio-Visual Installation

10.1 Wall Reinforcement

It is the responsibility of the AV Consultant to provide recommendations to architect and builder on the installation of additional strengthening members to be used when a flat panel display is mounted to a partition or stud wall. Structural members may include mounting brackets that span multiple studs, structural rated ply or additional noggins in the wall cavity. (See: Appendices Strengthening recommendations for flat panel displays). In the instance where these recommendations have not been issued, or were not followed, it is the responsibility of the AV Integrator to coordinate appropriate measures with the builder to ensure displays are mounted securely. The AV Integrator should provide Technology Mobilisation with photographic evidence that the installation of additional strengthening members took place and meets LTU standards.

10.2 Audio-Visual Racks

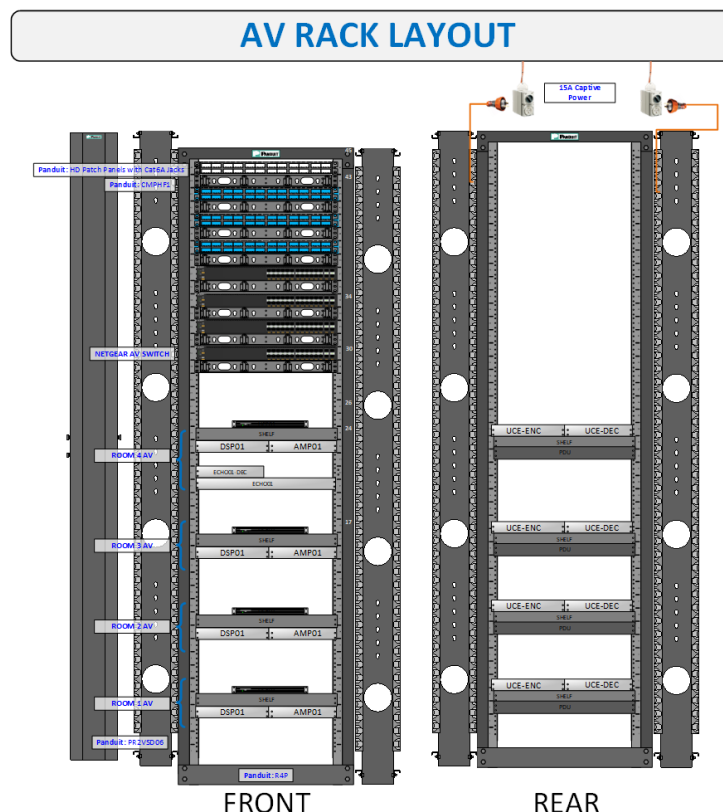
Where multiple pieces of AV equipment are co-located, a suitable equipment rack must be installed. Equipment, power supplies and cabling must be installed in a tidy manner, secured by rack brackets and Velcro ties, and utilizing the least number of connections possible.

- In instances where two cables must be joined, and this join lacks a locking mechanism a heat shrink will be required to mitigate any risk of cables disconnecting.

10.3 Audio-Visual Layout

The AV Integrator must ensure that the rack layouts consider the following:

- Provide sufficient, effective airflow and cooling.
- Group similar devices to allow for simplified cabling and cables separation.
- Position user accessible equipment so that the user has clear unobstructed access to the equipment while maintain security to all other equipment.
- Where a device has a service port it must be accessible. If the port is not easily accessible, then an internal patch lead is to be provided and remote socket installed with an appropriate label.
- Position heavy items such as amplifiers at the bottom of the rack.
- Provide black or vent panels to all free rack spaces



10.4 Room Booking Panels

Room booking panels shall be installed at the entrance to all spaces equipped with licensed collaboration systems. Each panel shall provide a clear display of upcoming meetings, indicate the current occupancy status of the room, and enable users to book the space directly from the panel for ad hoc reservations. The panels shall integrate with the nominated room booking platform to ensure real-time synchronisation of booking and occupancy information.

- Room booking panels shall be of the type specified in the approved AV equipment schedule and parts list.
- Panels shall be installed with the bottom edge positioned 1000 mm above finished floor level (AFFL) to provide compliant accessibility for users, including persons using wheelchairs.
- Each room booking panel shall be connected to the network using an approved patch lead compatible with the nominated AV and network infrastructure.
- The structured cabling serving each room booking panel shall terminate within the accessible ceiling space directly above the panel location. A patch lead shall be installed from the ceiling termination point and routed within the wall cavity or approved conduit to the room booking panel, providing a concealed and serviceable connection.

- All installation works shall be completed in accordance with the manufacturer's installation requirements, the project AV documentation, and the relevant communications cabling standards.
- Room booking panel installation to be on the latch side of entrance doors wherever possible

10.5 Post-Installation

Within 30 days of practical completion the AV Integrator will deliver to Technology Mobilisation the following As -built documentation:

- Equipment Schedule (Host Name Document) with the inclusion of device serial numbers.
- Installation date.
- AV Schematic.
- AV layout plan.
- Hearing augmentation compliance certificates.
- Acoustic testing results (if testing was requested by the principal).
- Audio coverage results (if testing was requested by the principal).
- Copies of any engineering certificates (if any mounting or structure required independent engineering advice).
- Test and Tag register.
- Copy of installed control code – Compiled and uncompiled
- Copy of installed audio designs
- Copies of any device configuration data that is not captured by GVE or other centrally deployed CMDB.
- Any warranty information, including expiry date.
- Any remotes, spares, documentation, or accessories supplied with the equipment.
- All drawings must be supplied in electronic form, PDF, in no larger than A1 size.

10.6 Acceptance Testing

To ensure that the AV installation is delivered to the requirements specified in this document and to ensure a minimum level of quality, the AV Consultant, or Technology Mobilisation where no AV Consultant has been engaged, must ensure the following is completed:

- The AV Consultant (or Technology Mobilisation staff) must complete the commissioning checklist to be detailed by Technology Mobilisation.
- Coordinate with the AV Integrator for the rectification of any defects.
- Advise the principal of any defects that will remain outstanding post Practical Completion at the earliest possible opportunity.
- Verify all deliverables are accurate and delivered prior to Practical Completion.
- Once the room is defect free the AV Consultant is to notify the principal so that La Trobe University staff can conduct an acceptance assessment. Any defects identified by La Trobe University staff will be added to the AV Consultant's defect list. The AV Consultant must ensure that these defects are rectified in a time frame advised by La Trobe University.

10.7 Handover and Defect Management

Practical completion will be granted when the following minimum requirements have been fulfilled by the AV Integrator:

- Completed Project Asset and Equipment schedule has been submitted to Technology Mobilisation, with all serial numbers included.
- System has been tested and commissioned using an LTU approved test plan. A test plan may be provided by LTU Technology Mobilisation upon request.
- System has been inspected by Technology Mobilisation and the AV Consultant and has been deemed to be operational and practically complete.
- All documentation has been approved by the AV Consultant and submitted to Technology Mobilisation.
- All control system source codes, DSP and switcher and other device configuration files have been handed over to Technology Mobilisation and become the intellectual property of the University.
- All training has been completed.
- All accessories, software, fly-leads and remote controls have been handed over to Technology Mobilisation. All packages of information handed over to Technology Mobilisation shall be scheduled in a transmittal, copied to the Project Services project manager and AV Consultant
- Any decommissioned equipment needs to be documented via the Asset and IP schedule and sent to Technology Mobilisation Team for instruction. Items will need to be delivered to either Field Services, end user or e-waste.

10.8 Notice of Practical Completion issued by AV Consultant or Technology Mobilisation

The issuance of a Notice of Practical Completion by the AV Consultant is contingent upon the rectification of any installation defects by the AV Integrator. Defects should be tracked via an online spreadsheet, which will be the Asset and IP spreadsheet for projects run by Technology Mobilisation, or via builder or AV consultant for major construction works.

Installation defects are classified as follows:

SEVERITY	CHARACTERISTICS	EXAMPLES
- Critical	- Space is unable to be used, no workaround exists.	- Network not active for computers. - Displays not working. - User interface not working. - OHS related issues.
- Major	- Functionality is limited or contains significant performance issues. A workaround can be temporarily implemented to allow use of space.	- Some sources not working. - Lighting presets not finalized. - No source audio present. - Some components not supplied. - Performance issue may include poor audio quality, distorted video signal.
- Minor	- Space is usable though some known errors are present, and some functionality may be limited. Some aspects of space may not conform to specification and applicable standards.	- Fly-lead missing / adapters not supplied. - Equipment not secured, such as touch panel. - Hook for fly-leads not present. - EDID not set correctly. - Display not aligned. - AV equipment is not on network for monitoring and remote support.
- Trivial	- Issues that do not impact on useability of space.	- Grammatical errors on user interface. - Errors in document submissions such as user guides and as-built drawings.

10.9 Working at La Trobe University Sites

All contractors and consultants engaged at La Trobe University must comply with:

- All relevant statutory and regulatory obligations, including current Workplace Health & Safety (WHS) legislation.
- University-specific policies and procedures, including I&O and AV-related standards.
- Refer to: La Trobe I&O Design Standards
- Refer to La Trobe Information Services Standards (this document)

AV Consultants and Integrators must ensure:

- Their system designs and installations present no Work Health and Safety risks during operation or maintenance.
- Potential hazards are identified and mitigated during the design phase.
- Residual risks are formally documented and escalated to the Principal and the Manager, Technology Mobilisation.

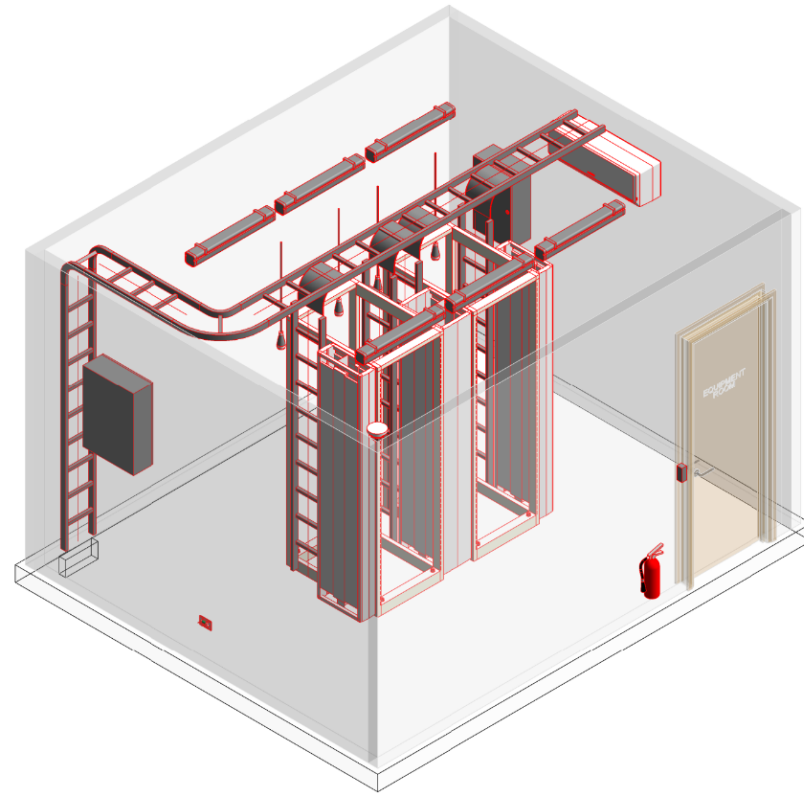
Rapid Induct

All contractors, subcontractors, and their personnel must complete the following requirements before commencing work on campus:

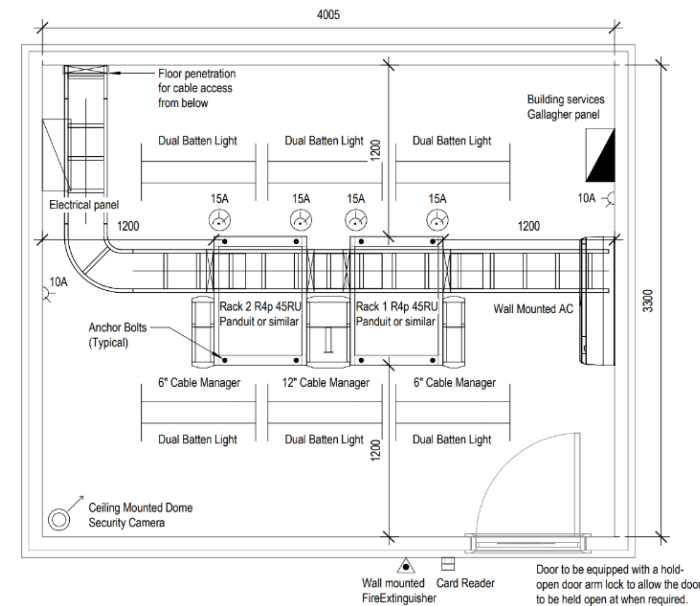
- La Trobe University induction program (mandatory before site access).
- Working with Children Check (WWCC) "Employee": must be valid and current.
- Check-in/out of site at relevant site office: All external personnel must sign in before starting work and sign out upon completion of their shift.
- Review the Safety in Design guidelines via the University's online portal.
- Duty of care: Contractors must ensure the safety of their team, LTU staff, students, and the public at all times.

11 Appendices

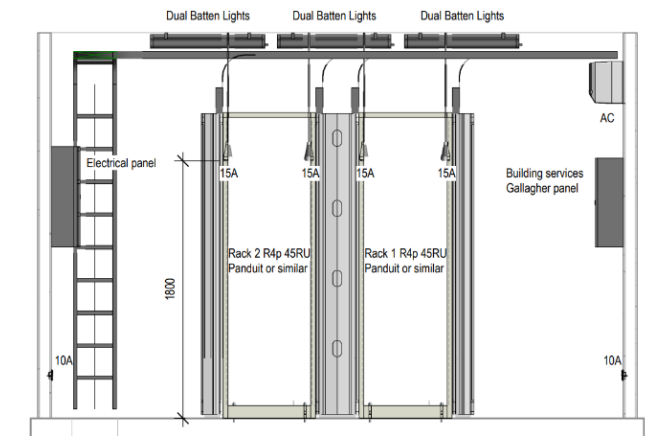
11.1 Main Equipment Room (MER)



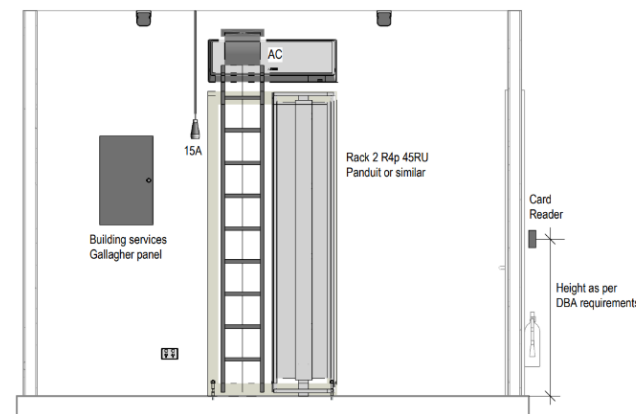
1 3D Isometric View



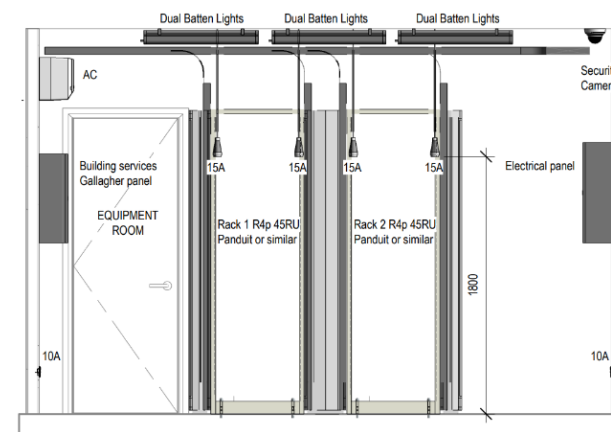
2 ICT Standard Comms Room Type 2



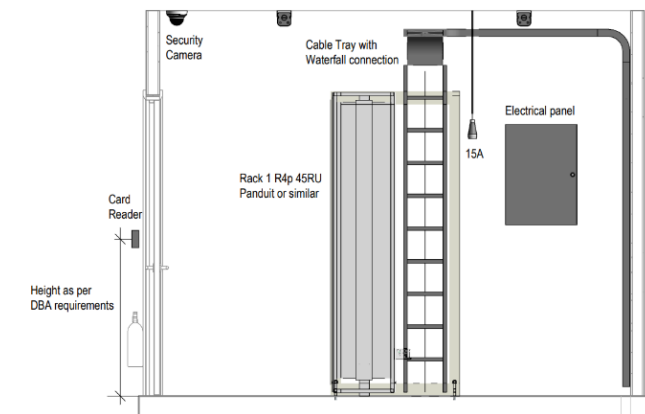
3 North Elevation Type 2



4 East Elevation Type 2

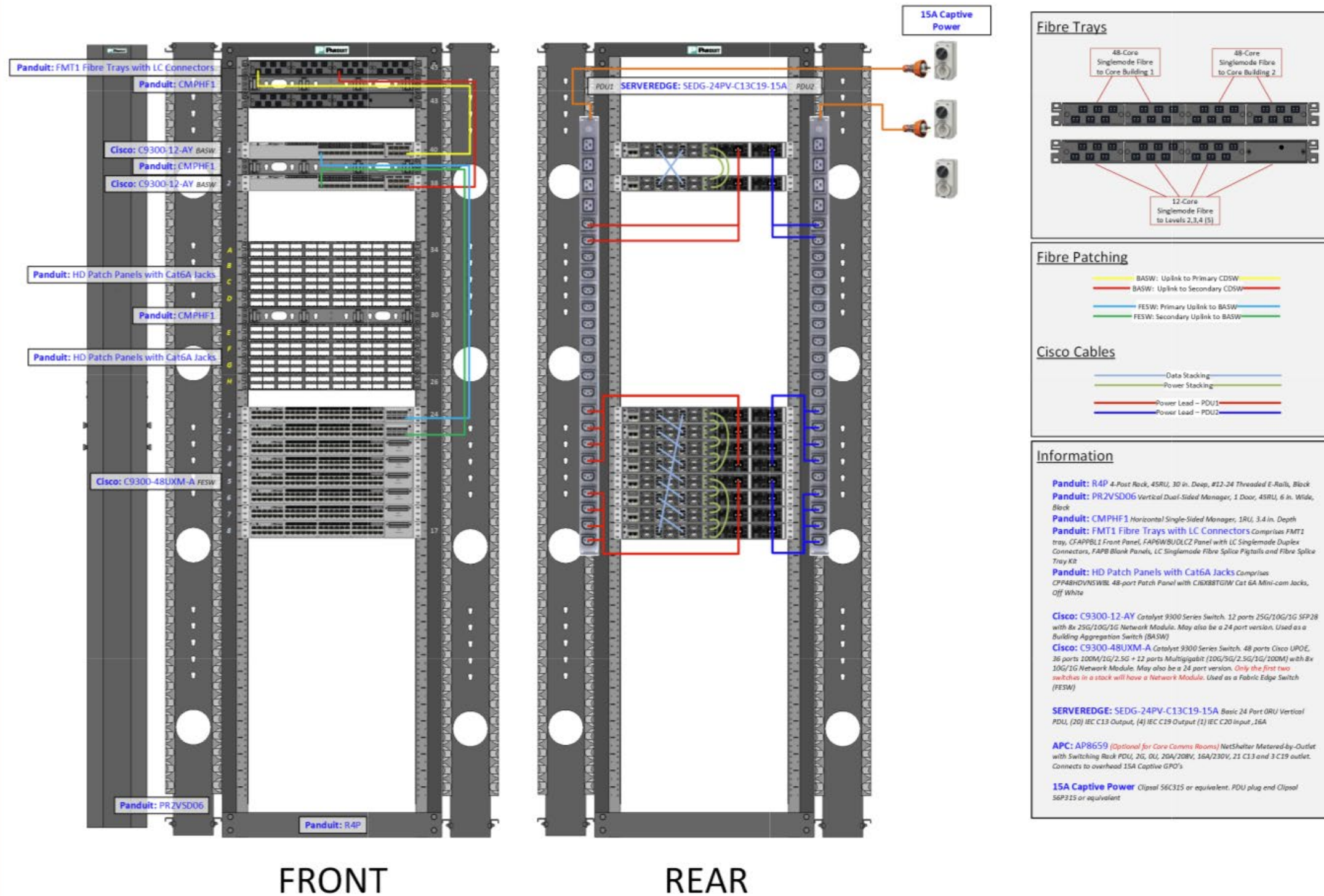


5 South Elevation Type 2



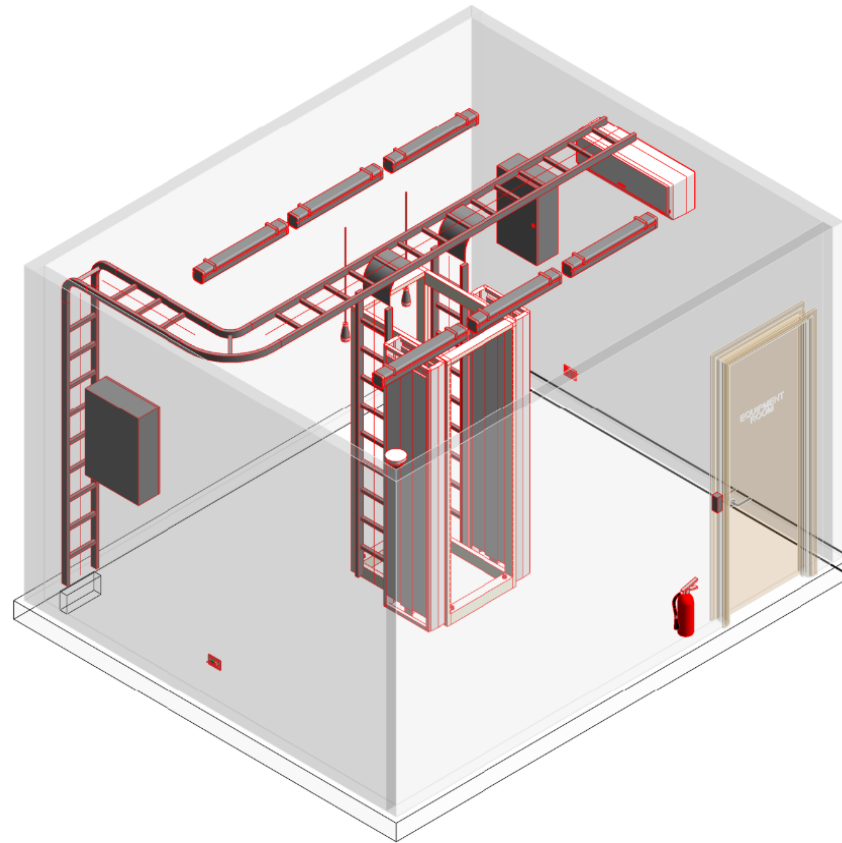
6 West Elevation Type 2

Main Equipment Room : COMMS RACK LAYOUT (Typically Level 1)

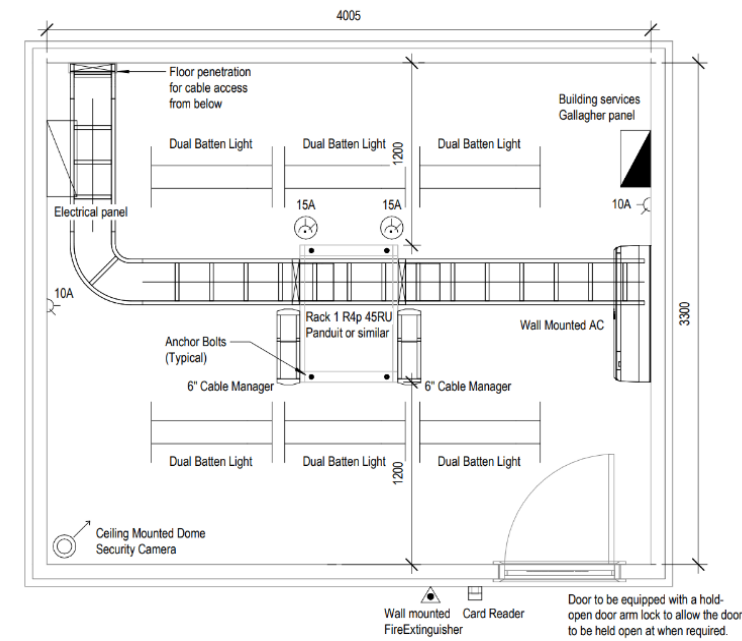


V2.1
9 December 2025

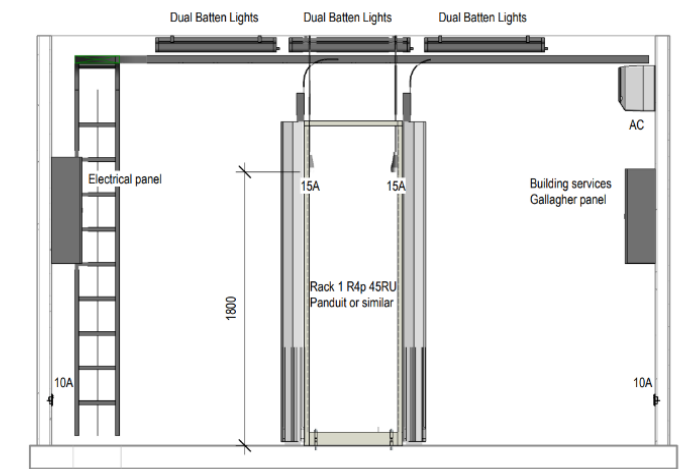
11.2 Satellite Equipment Room (SER)



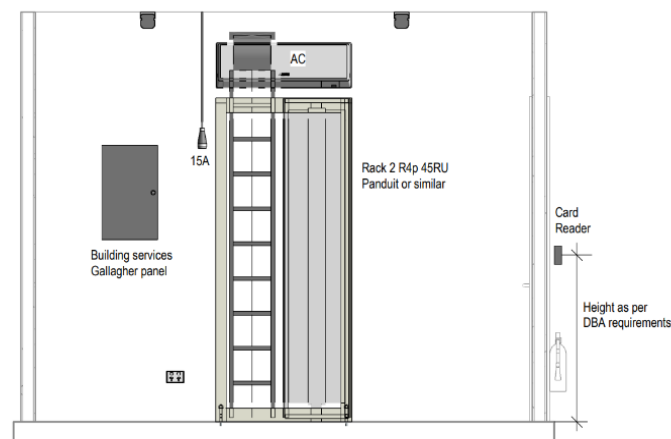
1 **3D Isometric View**



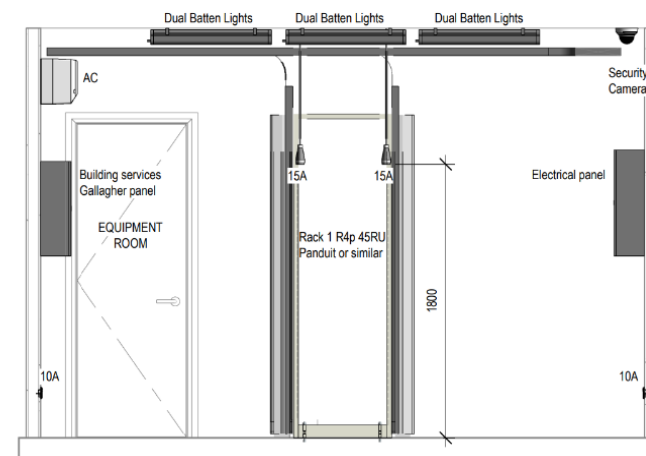
2 **ICT Standard Comms Room Type 1**



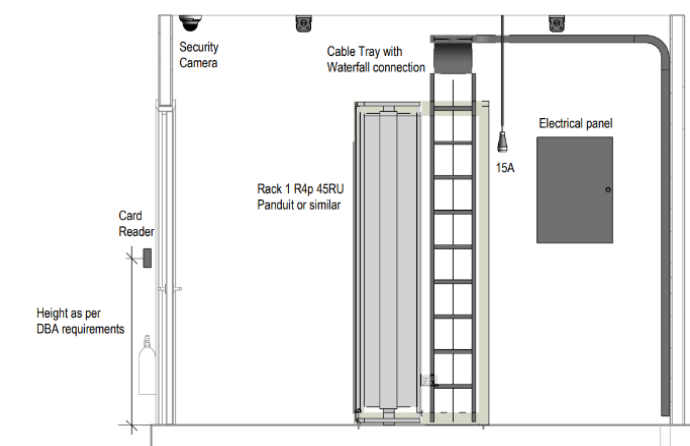
3 **North Elevation Type 1**



4 **East Elevation Type 1**

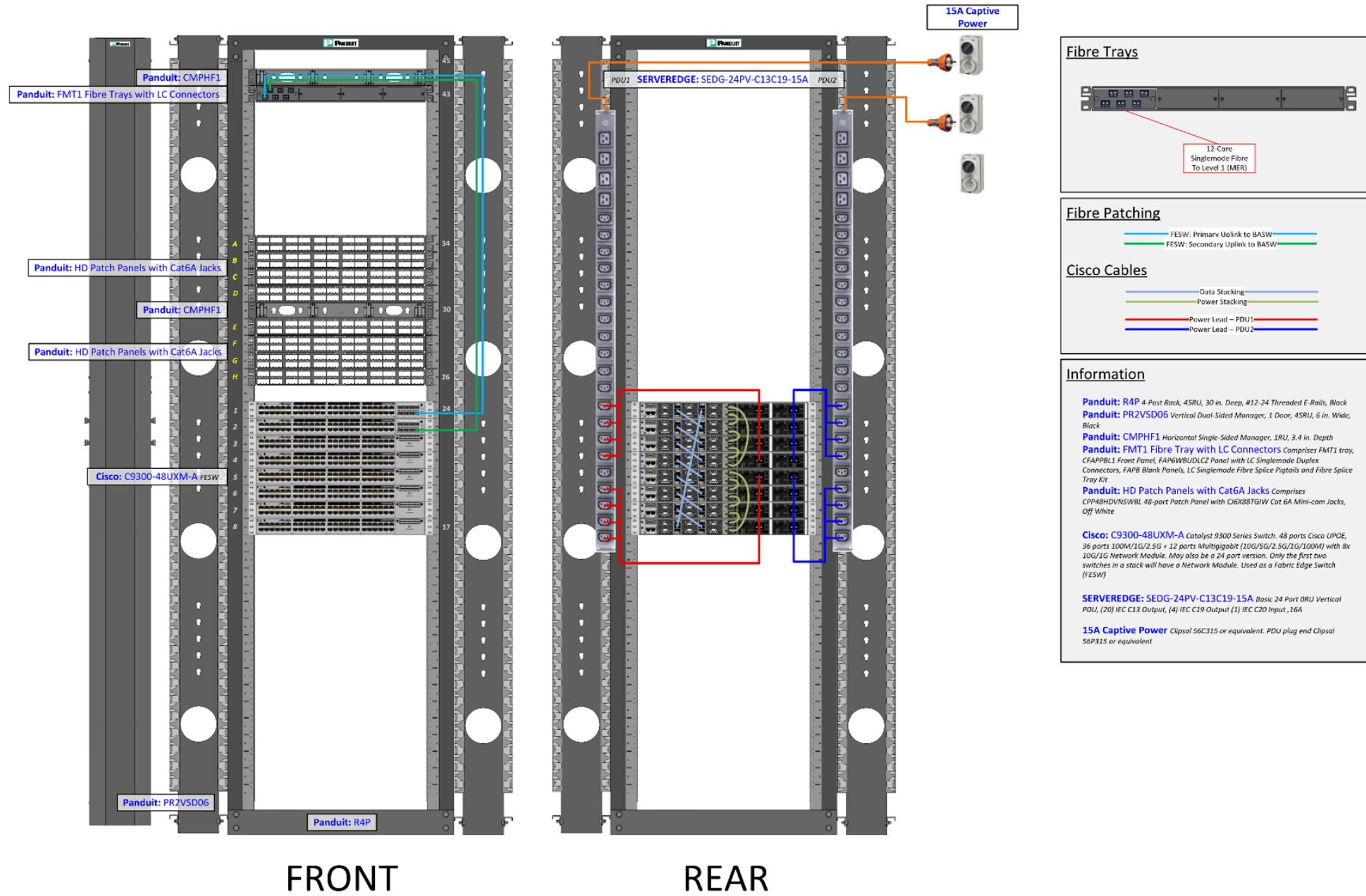


5 **South Elevation Type 1**



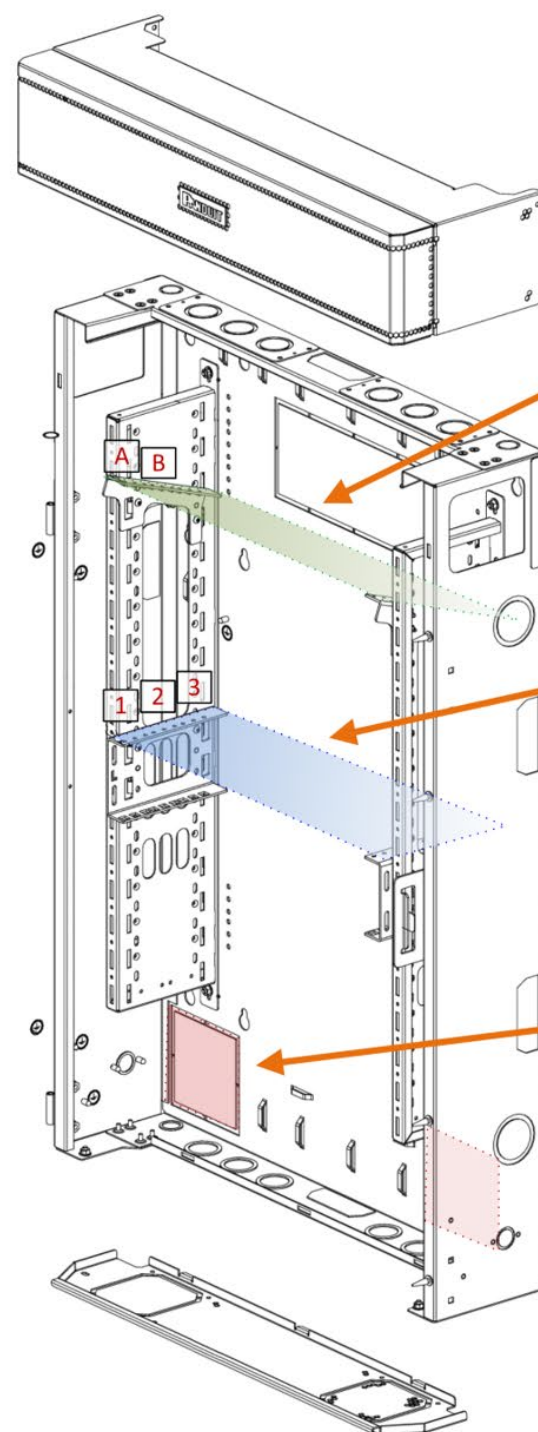
6 **West Elevation Type 1**

Satellite Equipment Room : COMMS RACK LAYOUT (Typically Levels 2+)

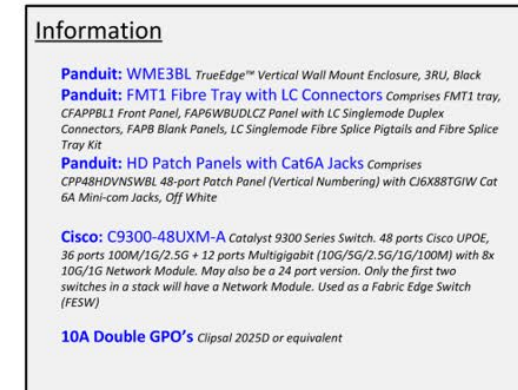
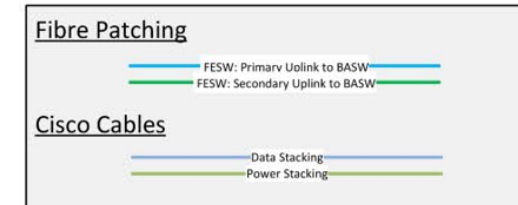
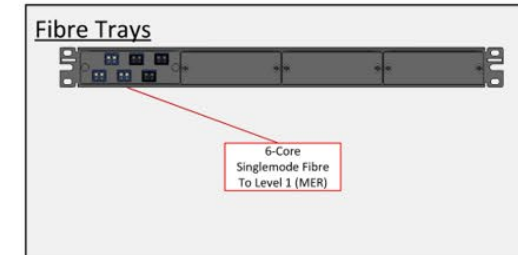


V2.0
16 September 2025

Distribution Equipment Room: TrueEdge 3RU CABINET LAYOUT



WME3BL
TrueEdge™ Vertical Wall
Mount Enclosure, 3RU, Black



V2.0
16 September 2025

11.4 Equipment Room Approved Parts List

Panduit Part No.	Description
CFAPPBL1	The Opticom® flat fibre patch panel is used with FMT1 trays and holds up to four Opticom® Cassettes or FAP adapter panels. It is compatible with all 19" wide EIA rack mount installations, is black powder coated steel, and fits in a 1 RU footprint.
CJ6X88TGIW	Mini-Com® Cat 6A UTP RJ45 TG Jack Module is designed to terminate 4-pair, 22-26 AWG twisted pair cable. TG style termination eliminates the need for a termination tool. Each jack is individually serialised for traceability and is compatible with Mini-Com Modular Patch Panels and Faceplates. The jack module is off white for comms and blue for AV . Order in multiples of 50 (BOX)
CMPHF1	The Open-Access™ Horizontal D-Ring Cable Manager. Made of a steel frame with modular plastic snap-in D-rings, the cable manager is lightweight and durable, and but flexible enough to endure seamless moves, adds, and changes. It is compatible with any standard EIA 19 inch (483mm) rack or cabinet. The manager is 1 RU and 3 in. deep D-rings on the front only. The cable manager is black.
CPP48HDVNSWBL	Mini-Com® High Density Modular Patch Panel accepts up to 48 Mini-Com Modules for unshielded applications in 1 RU and mounts to 19 inch and 23 inch racks and cabinets. The panel includes pre-printed numbers that follow a vertical sequence and is black.
FAP6WBUDLCZ	The Opticom® LC fibre adapter panel is OS2 and is loaded with 6 LC duplex fibre optic adapters. The fibre optic adapters are blue with zirconia split sleeves.
FAPB	The Opticom® blank fibre adapter panel is used to reserve space for future use. The blanking panel is plastic and is black in colour.
FLKL924	
FLKLZ12	12 Fibre Cable, OM4, Indoor Outdoor TB, LSZH, 900um
FLKRZ12	12 Fibre Cable, OM4, Indoor/Outdoor TB, Riser, 900um Buffered
FMT1	The Opticom® fibre tray is designed to organize fibre distribution cabling. When used with the CFAPPBL1 patch panel, it accommodates up to 4 QuickNet cassettes or FAP adapter panels. It is black powder coated steel and features 4 ports in a 1 RU footprint. It measures 1.77 inches H x 19 inches W X 11.16 inches D (44.9mm x 482.2mm x 283.4mm).
FSN - OS2	OS2 9/125 µm cable
FST6	Fibre splice tray kit for up to twelve mechanical or fusion splices. Fits in Panduit FMT series enclosures. Stack up to four high using FSTHE stacking unit in rack mount enclosures.
NKFP91BN1NKM001	The NetKey 1 Fibre pigtail is OS2, LC to pigtail with 900um buffered cable and is 1 metre in length. This kit contains 12 pigtails each with different colour fibre.
NKFP92ELLSM002	NetKey® 2 Fibre Patch Cord, OS2, LC Duplex, 2m
PR2VSD06	The PatchRunner 2 Vertical Cable Manager pairs ultra-high-density capability and versatility, freeing up valuable floor space. The fully pre-assembled manager lowers overall costs. The dual-sided manager has a metal backbone with molded plastic fingers , and includes one full-length metal, dual-hinging, push-to-close door. The manager is 45 RU, 6 inches wide, and is black.
R4P	The 4-Post rack combines the stability of a cabinet with the accessibility of an open rack to deliver maximum flexibility. The 45 RU rack is 23 inches wide overall (with 19 inch standard EIA mount) and 30 inches (762mm) deep, with adjustable mounting rails that have #12-24 EIA universal mounting hole spacing, and printed numbering. A range of cable managers and accessories work with the rack. The rack is UL listed for 2,500 pounds (1134 Kgs) and is made of welded steel. The rack is black.
UTP28X0.2MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 0.2m, Blue UTP28X0.2MBU
UTP28X0.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 0.5 m, Blue UTP28X0.5MBU
UTP28X1.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 1.5m, Blue UTP28X1.5MBU
UTP28X1MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 1m, Blue UTP28X1MBU
UTP28X2.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 2.5m, Blue UTP28X2.5MBU
UTP28X2MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 2m, Blue UTP28X2MBU
UTP28X3.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 3.5m, Blue UTP28X1MBU
UTP28X3MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 3m, Blue UTP28X3MBU
UTP28X4.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 4.5m, Blue UTP28X4.5MBU
UTP28X4MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 4m, Blue UTP28X4MBU
UTP28X5.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 5.5m, Blue UTP28X5.5MBU
UTP28X5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 5m, Blue UTP28X5MBU
UTP28X6.5MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 6.5m, Blue UTP28X6.5MBU
UTP28X6MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 6m, Blue UTP28X4.5MBU
UTP28X7MBU	TX6A™ 10Gig™ UTP Patch Cord, Metric Cat 6A 28 AWG UTP Copper Patch Cord, 7m, Blue UTP28X7MBU

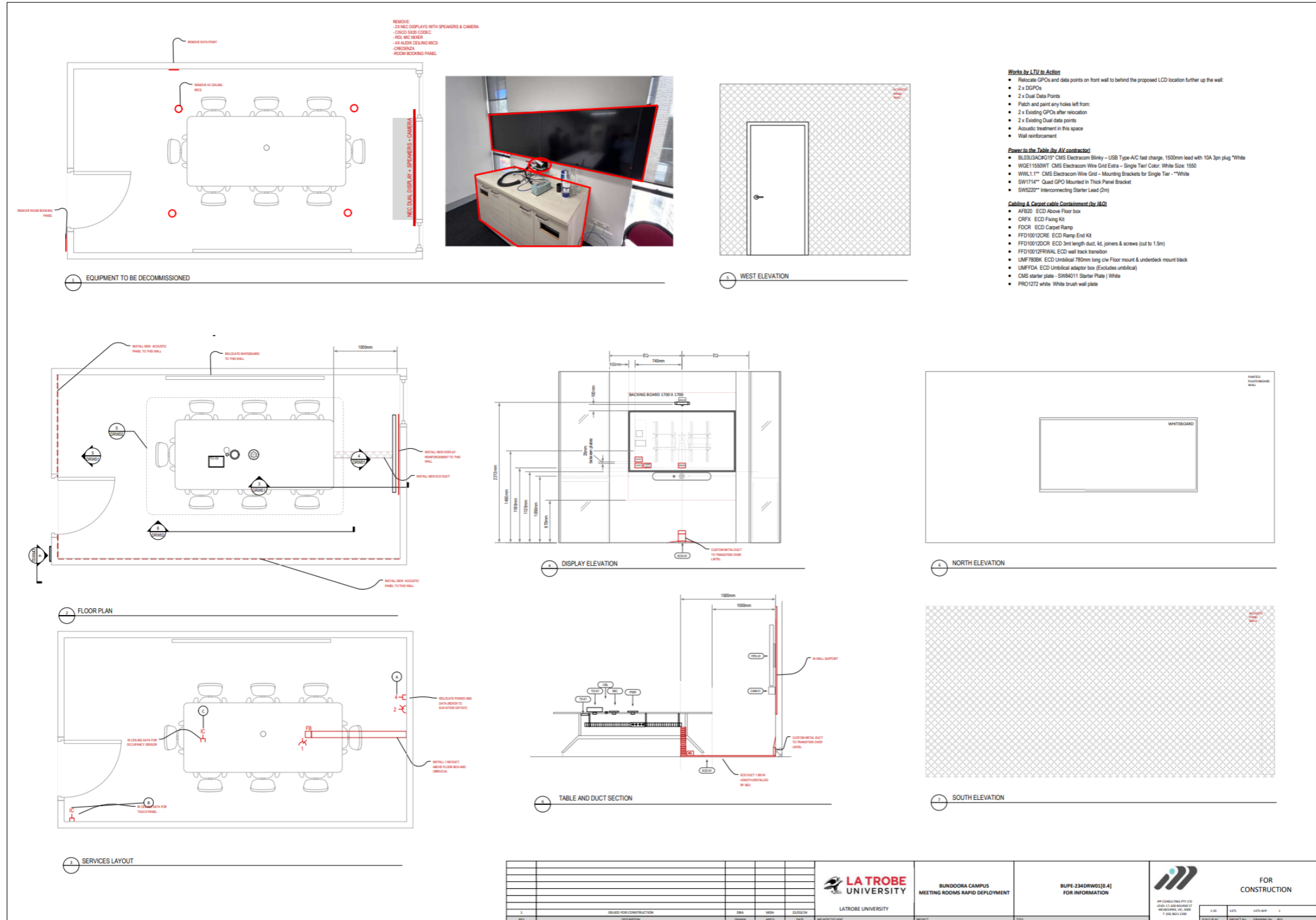
SERVEREDGE Part	Description
SEDG-24PV-C13C19-15A	Basic 24 Port 0RU Vertical PDU, (20) IEC C13 Output, (4) IEC C19 Output (1) IEC C20 Input ,16A

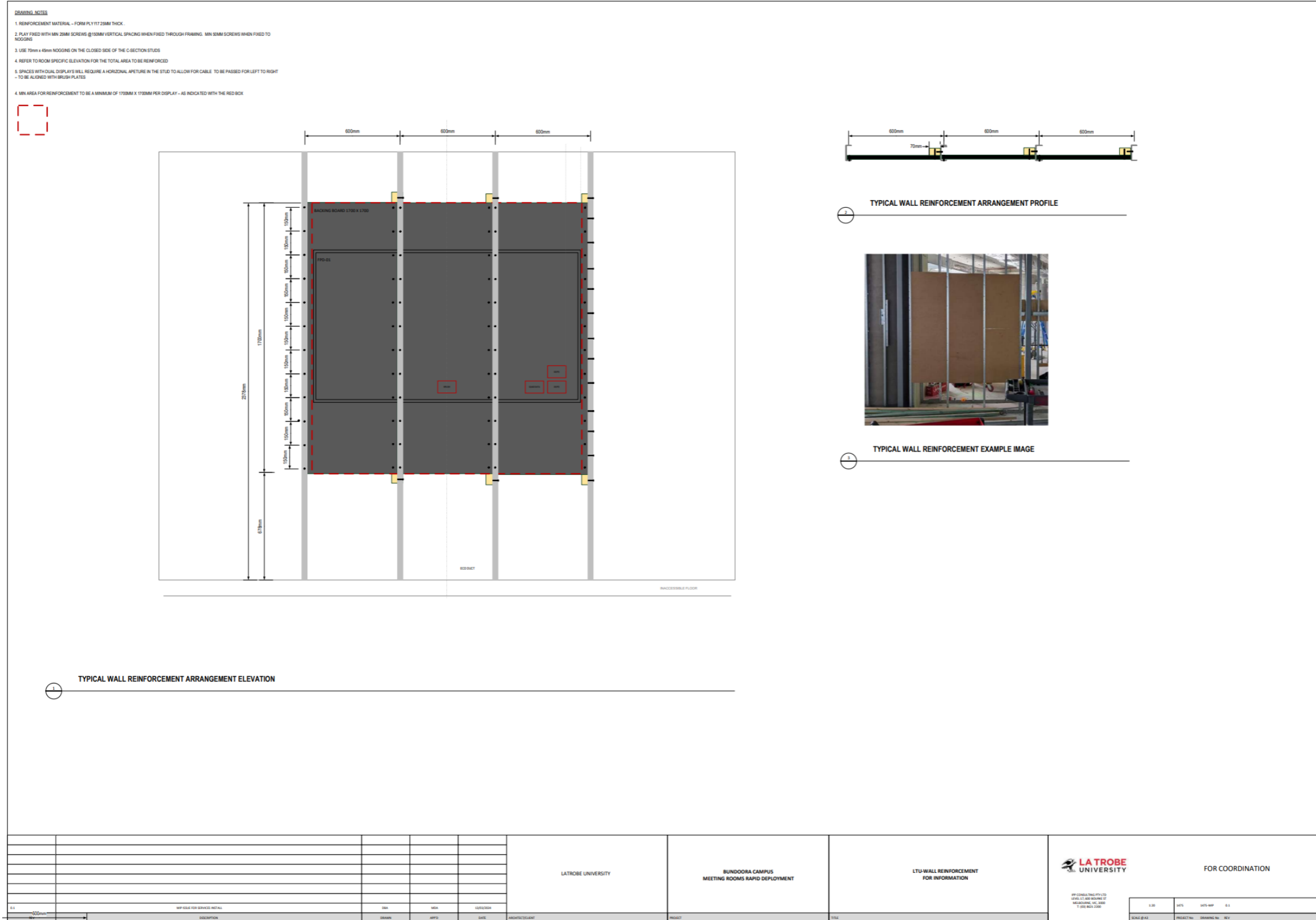
APC Part	Description
AP8659	NetShelter Metered-by-Outlet with Switching Rack PDU, 2G, 0U, 20A/208V, 16A/230V, 21 C13 and 3 C19 outlet. NOTE: Optional for Core Comms Rooms

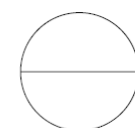
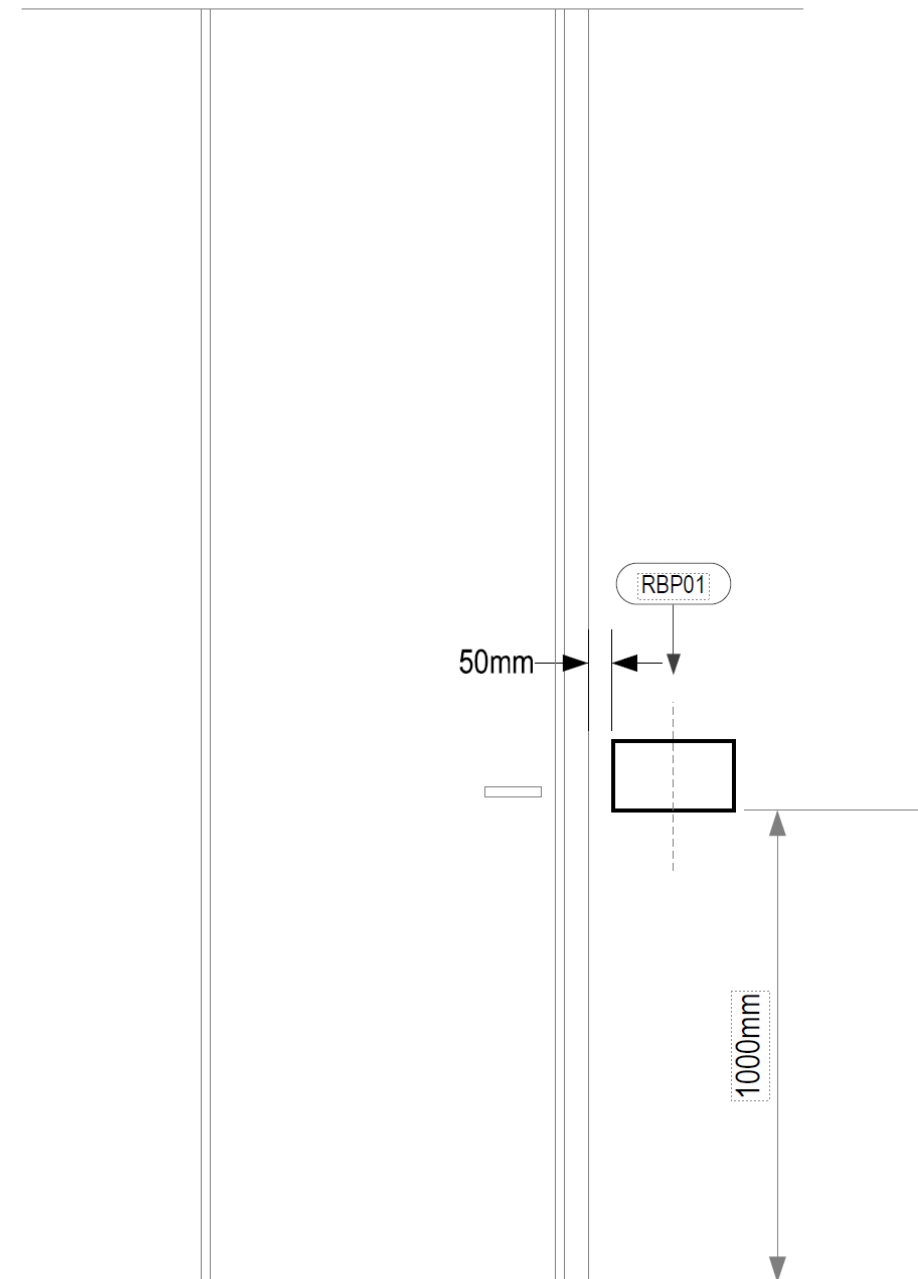
Cisco Part	Description
4PT-KIT-T2=	Cisco four-point mounting kit NOTE: Extra item
C1-ADD-OPTOUT	Cisco DNA Premier Add-On Session Opt Out (No Fulfillment)
C9300-24UX-A	Catalyst 9300 24-port mGig and UPOE, Network Advantage
C9300-48UXM-A	Catalyst 9300 48-port(12 mGig, 36 2.5Gbps) Network Advantage
C9300-DNA-A-24	C9300 DNA Advantage, 24-port Term Licenses
C9300-DNA-A-24-5Y	C9300 DNA Advantage, 24-Port, 5 Year Term License
C9300-DNA-A-48	C9300 DNA Advantage, 48-Port Term Licenses
C9300-DNA-A-48-5Y	C9300 DNA Advantage, 48-Port, 5 Year Term License
C9300-DNA-L-A-5Y	DNA Advantage 5 Year License
C9300-NM-8X	Catalyst 9300 8 x 10GE Network Module NOTE: Remove item for switches 3-6 of stack
C9300-NW-A-24	C9300 Network Advantage, 24-port license
C9300-NW-A-48	C9300 Network Advantage, 48-port license
C9300X-12Y-A	Catalyst 9300X 12x25G Fibre Ports, modular uplink Switch
C9300X-DNA-12Y-A	C9300 DNA Advantage, Term License
C9300X-NM-8Y	Catalyst 9300X 8x 25G/10G/1G Network Module
C9300X-NW-A-12	C9300 Network Advantage, 12-port license
C9K-ACC-SCR-4	12-24 and 10-32 SCREWS FOR RACK INSTALLATION, QTY 4
CAB-C15-CBN	Cabinet Jumper Power Cord, 250 VAC 13A, C14-C15 Connectors
CAB-GUIDE-1RU	1RU CABLE MANAGEMENT GUIDES 9200 and 9300
CAB-SPWR-150CM	Catalyst Stack Power Cable 150 CM -Upgrade
CAB-SPWR-30CM	Catalyst Stack Power Cable 30 CM
CAB-TA-AP	Australia AC Type A Power Cable
D-DNAS-EXT-S-5Y	Cisco DNA Spaces Extend for Catalyst Switching - 5Year
D-DNAS-EXT-S-T	Cisco DNA Spaces Extend Term License for Catalyst Switches
NETWORK-PNP-LIC	Network Plug-n-Play Connect for zero-touch device deployment
PI-LFAS-AP-T-5Y	PI Dev Lic for Lifecycle & Assurance Term 5Y
PI-LFAS-T	Prime Infrastructure Lifecycle & Assurance Term - Smart Lic
PWR-C1-1100WAC-P	1100W AC 80+ platinum Config 1 Power Supply
PWR-C1-1100WAC-P/2	1100W AC 80+ platinum Config 1 Secondary Power Supply
PWR-C1-715WAC-P	715W AC 80+ platinum Config 1 Power Supply
PWR-C1-715WAC-P/2	715W AC 80+ platinum Config 1 SecondaryPower Supply 715W AC 80+ platinum Config 1 SecondaryPower Supply
SC9300UK9-175	Cisco Catalyst 9300 XE 17.5 UNIVERSAL UNIVERSAL

Cisco Part		Description
SC9300UK9-175	Cisco Catalyst 9300 XE 17.5 UNIVERSAL UNIVERSAL	
STACK-T1-1M	1M Type 1 Stacking Cable NOTE: Optional only when switch stack grows bigger than 4 switches	
STACK-T1-50CM	50CM Type 1 Stacking Cable	
TE-C9K-SW	TE agent for IOSXE on C9K	
TE-EMBEDDED-T	Cisco ThousandEyes Enterprise Agent IBN Embedded	
TE-EMBEDDED-T-5Y	ThousandEyes - Enterprise Agents	

11.5 Audio-Visual Drawings and Elevations Sample







BOOKING PANEL ELEVATION

11.7 Audio-Visual Approved Parts List

Functional Identifier	Category	Brand	Model	Description
Teaching and Learning Room Equipment				
RPC	Micro PC	HP	microPC-AV	Micro PC Latrobe supplied
PREV	Monitor	HP	24inch	24inch Monitor
PC-LAP-ENC	Encoder	Q-SYS	Q-SYS NV-21-HU kit	4K60 4:4:4 Network Video Endpoint or Decoder PSU Included
PC-LAP-ENC-PWR	Power supply	Q-SYS	Q-SYS NV-21-HU KIT	12 V DC 9A PSU NV-21-PSU
PREV01-DEC	Encoder	Q-SYS	Q-SYS NV-21-HU	4K60 4:4:4 Network Video Endpoint or Decoder
UCExx-ENC	Encoder	Q-SYS	NV-32-H	Q-SYS NV-32-H (Core Capable) Network Video Endpoint for the Q-SYS Ecosystem
UCExx-DEC	Decoder	Q-SYS	Q-SYS NV-21-HU	4K60 4:4:4 Network Video Endpoint fdecoder
DOC01	Document Camera	Luimens	DC172	Flexible arm Interactive 4k Document Camera
DISPxx	Flat Panel Display	Sharp	PN-ME552	55" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISPxx	Flat Panel Display	Sharp	PN-ME652	65" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISPxx	Flat Panel Display	Sharp	PN-ME752	75" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISPxx	Flat Panel Display	Sharp	PN-ME862	86" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISPxx	Flat Panel Display	Sharp	PN-ME982	98" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
LEDx108	LED Video Wall	ABSEN	X108	108 Inch MICRO LED, ALL-IN-ONE LED SCREEN 16:9, (P1.25mm, 2400mm W x 1350mm H), FHD (1920 x 1080), 600nits brightness, 39.3mm Thickness, Android 11.0 Operating System, 4GB System Memory, Inputs: HDMI x1, USB2.0 x4, Outputs: HDMI x1, Audio Out x1, SPDIF x1.
LEDx136ProV2	LED Video Wall	ABSEN	X136 V2	136" MICRO LED, ALL-IN-ONE LED SCREEN (P1.56mm, 3000mm W x 1687.5mm H), FHD Resolution (1920 x 1080), 600nits brightness, 40mm Thickness, COB LED technology, 15000:1 contrast ratio, 160° viewing angle, 3840Hz refresh rate. Inputs: HDMI 2.0 x2, HDMI 1.4 x2, USB2.0
LEDx136ProV2	LED Video Wall	ABSEN	X136 Pro V2	136" MICRO LED, ALL-IN-ONE LED SCREEN (P1.25mm, 3000mm W x 1687.5mm H), 2K+ Resolution (2400 x 1350), 600nits brightness, 40mm Thickness, COB LED technology, 15000:1 contrast ratio, 160° viewing angle, 3840Hz refresh rate. Inputs: HDMI 2.0 x2, HDMI 1.4 x2, USB2.0
LEDx163V2	LED Video Wall	ABSEN	X163 V2	163" MICRO LED, ALL-IN-ONE LED SCREEN (P1.56mm, 3600mm W x 2025mm H), 2K+ Resolution (2304 x 1296), 600nits brightness, 40mm Thickness, COB LED technology, 15000:1 contrast ratio, 160° viewing angle, 3840Hz refresh rate. Inputs: HDMI 2.0 x2, HDMI 1.4 x2, USB2.0
LEDx136-4k	LED Video Wall	ABSEN	X136-4K	136 Inch MICRO LED, ALL-IN-ONE LED SCREEN 16:9, (P0.7mm, 3000mm W x 1687.5mm H), 4K (3840 x 2160), 600nits brightness, 39.3mm Thickness, Android 11.0 Operating System, 4GB System Memory, Inputs: HDMI x1, USB2.0 x4, Outputs: HDMI x1, Audio Out x1, SPDIF x1.
LEDx163-4k	LED Video Wall	ABSEN	X163-4K	163 Inch MICRO LED, ALL-IN-ONE LED SCREEN 16:9, (P0.9mm, 3600mm W x 2025mm H), 4K (3840 x 2160), 600nits brightness, 39.3mm Thickness, Android 11.0 Operating System, 4GB System Memory, Inputs: HDMI x1, USB2.0 x4, Outputs: HDMI x1, Audio Out x1, SPDIF x1.
LEDSR	LED wall controller	Novastar	Novastar H5	H5 with x H_2xHDMI2.0+2xDP1.2 Input Card 1 x H_20xRJ45 sending card
LIGHT	House Lighting control interface	Q-SYS	QIO S4	QSYS control with 4 bi directional RS232 ports
PRJ	Data Projectors	Epson	EB-PU1008W	8500lm WUXGA Large Venue 3LCD Laser Projector - Custom spaces To be used only with Latrobe approval
PRJ	Data Projector	Epson	EB-PQ2010B	10000lm 4k 3LCD Laser Projector - Custom Space To be used only with Latrobe approval
PRJ	Data Projector	Epson	EB-PQ2216B	16000lm 4k 3LCD (Interchangeable Lens - Custom Space To be used only with Latrobe approval
PRJ	Data Projector	Epson	EB-PQ2220B	20000lm 4k 3LCD (Interchangeable Lens) - Custom Space To be used only with Latrobe approval
BRC	Brackets	Ultralift	Spider Lock - Various	Fixed Lockable Projector Mounts
BRC	Brackets	ATDEC	TH-VWP-160	Video wall rail 1600mm part of universal video wall system
BRC	Brackets	ATDEC	TH-VWVP	Video wall portrait display bracket part of the modular Universal Video Wall system (set of 2) Capacity 165kg
BRC	Brackets	ATDEC	AC-AP-4612	This utility panel is designed for mini-PCs, video conferencing, connectivity, and similar devices.
BRC	Brackets	ATDEC	AD-AC-PS	This sliding panel is designed to house equipment such as mini-PC, connectivity, and other technology devices.
BRC	Brackets	Vogel's	PUC 1060	PUC 1060 CONNECT-IT large ceiling plate fixed
BRC	Brackets	Vogel's	PFA 9126	PFA 9126 PFB 34xx bracket kit
BRC	Brackets	Vogel's	PUC 2530	PUC 2530 CONNECT-IT large pole 300cm
BRC	Brackets	Vogel's	PFB 3407	Vogel's Connect-it Mounting Adapter for Flat Panel Display - Silver - 79.83 kg Load Capacity - Aluminium
BRC	Brackets	Vogel's	PFS 3304	PFS 3304 interface display strips 450mm (set of 2)
BRC	Brackets	Vogel's	PFA 9103	PFA 9103 CONNECT-IT large floor plate
BRC	Brackets	Podion	CMH-LAT-V2	Podion Enclosure for patch panel
BRC	Brackets	Podion	PH-HA-307-LS	Podion La Trobe Monitor Arm, AIO PC mount with KB/Mouse shelf

Functional Identifier	Category	Brand	Model	Description
BRC	Brackets	Podion	LM-CM-GA01	Podion Angle-adjustable confidence monitor housing
SCR	Projection Screen	Screen Technics	CinemaSnap Matrix White - Various	Fixed Frame Projection Screens of various sizes - 16:9 ratio, 1.1 Gain - Custom spacesTo be used only with Latrobe approval
SCR	Projection Screen	Screen Technics	ElectriCinema Unity White - Various	Motorised Projection Screen of various sizes - 16:9 ratio, 1.1 Gain - Custom spacesTo be used only with Latrobe approval
ECHOxx	Lecture Capture	Echo360	Echo360 Pro	The EchoVideo Pro (3rd) generation full-service capture device by Echo360.
ECHOxx-LVR	Lecture Capture Recording Light Relay	Q-SYS	QIO-LVR4	Network low-voltage relay
LGT	Echo360 Recording Light	ACX2716	RED LED PILOT LIGHT LAMP 12V	RED LED PILOT LIGHT LAMP 12V
OLAN	Digital Signage Player	Uniguest	NTB-4K-10-S-W (ONELAN)	Uniguest NTB-4K-10-S-W (ONELAN)
IPTV	IPTV Server	Uniguest	TPS0240	Uniguest TPS0240 1RU Rack Mountable IPTV Server
UCE	UC	Crestron	CCC-120-Z-I	Crestron Collab Compute with the Intel, Core™ Ultra 7 for Zoom Rooms™ Software, International
UCExx-TCI	UC	Crestron	TSW-1080-UC-B	10.1 in. Wall Mount Touch Screen, Unified, Communication Version
CONV	UC	Q-SYS	I/O-USB Bridge	I/O-USB Bridge
CAMAUD	Camera	Q-SYS	Q-SYS NC 12x80	IP-PTZ camera, 12x Optical Zoom, 80° Horizontal Field of View
CAMAUD	Camera	Q-SYS	Q-SYS NC 110	Q-SYS NC Series NC-110 is a fixed-lens, ePTZ conference camera, includes mounting bracket
CAMWB	Camera	Q-SYS	Q-SYS NC 12x81	PTZ whiteboard camera
CAMBRAC	Camera Bracket	Q-SYS	PTZ-CMB1	Ceiling Mount Bracket for PTZ Camera
CAMSR	Seervision Server	Q-SYS	VSA-100	Camera processing, switching, automation, and AI-based camera logic.
DSP	DSP	Q-SYS	Core 8 Flex	Q-SYS network + analog I/O processor with scaling license
DSP	DSP	Q-SYS	Core 24fi	Integrated Core Processor
DSP	DSP	Q-SYS	Corex10	Unified Core Processor
DSP	DSP Extenders	Q-SYS	QIO-ML4i	4 mic/line inputs
DSP	DSP Extenders	Q-SYS	QIO-L4o	4-line outputs
DSP	DSP Extenders	Q-SYS	QIO-ML2x2	2 mic/line inputs; 2-line outputs
DSP	DSP Extenders	Q-SYS	I/O-22	Multi-purpose Q-SYS I/O Peripheral
AMP	Amplifier	Q-SYS	CX-Q 2K4	CX-Q 2K4 – 2000 W total power
AMP	Amplifier	Q-SYS	CX-Q 4K4	CX-Q 4K4 – 4000 W total power
AMP	Amplifier	Q-SYS	CX-Q 8K4	CX-Q 8K4 – 8000 W total power
AMP	Amplifier	Q-SYS	CX-Q 4K8	CX-Q 4K8 – 4000 W total power
AMP	Amplifier	Q-SYS	SPA-Q 60x4	SPA-Q 60x4 - 60 W per channel into 8Ω
SPK	Speakers	QSC	AD-C6T-ZB	Acoustic Design Ceiling Mount Speaker - Model AD-C6T
SPK	Speakers	QSC	PL-DC26	Two-way, dual-6-inch point source loudspeaker for custom spaces
SPK	Speakers	QSC	AD-S6T	AD-S6T Surface Mount Loudspeaker
SPK	Speakers	QSC	PL-SUB10	Passive 10-inch installation subwoofer for custom spaces
MICCE	Microphone	Shure	MXA920	Ceiling Array Microphone
MICTX	Microphone	Shure	MXW1X	MXW1X Hybrid Bodypack Transmitter,
MICTX-CAP	Microphone	Shure	SHR-MX185	Microphone Condenser, Lapel LoZ Cardioid Miniature With RK100PK in-Line Preamp
MICTX	Microphone	Shure	MXW2X/SM58	SHURE MXW2X/SM58 - Handheld Transmitter, Capsule: SM58
MICRC	Microphone	Shure	MXWAPXD2Z11	MXW neXt 2 All-in-One Base Unit incl. Access Point Transceiver, mic-charger and Intellimix DSP
MICGS	Microphone	Shure	A412B	Desktop Base SKU: A412B
MICGS	Microphone	Shure	A412MWS	Shure Goosneck Windscreen
MICGS	Microphone	Shure	MX418	Microflex® Standard Gooseneck Microphone
HRG	Hearing Augmentation Transmitter	Listen Technology	LT-84	Infrared Transmitters with Receivers, Charging Station, Neck loops and headphones.
HRGRC	Hearing Augmentation Receiver	Listen Technology	LR-4200-IR	Intelligent DSP IR Receiver
HRG-BAT	Hearing Augmentation Receiver Batteries	Listen Technology	LR-4200-IR	Batteries
HRGEAR	Hearing Augmentation Headset	Listen Technology	LA-402	Universal Stereo Headphones
HRG-LOOP	Hearing Augmentation Loop	Listen Technology	LA-430	Neck Loop Lanyard for LR-4200
HRG-PWR	Hearing Augmentation Charger and Power Supply	Listen Technology	LA-423	4-Port USB Charger - includes 4x LA-422 Cables
LEC	Lectern	Podion	LU-ORU-1500_LHS/RHS	Wheelchair Lectern ORION-S
LEC	Lectern	Podion	TDP-AVC	Touchdown Point TDP-AVC
LEC	Lectern	Podion	TDP-HA	Touchdown Point TDP-HA

Functional Identifier	Category	Brand	Model	Description
LEC	Lectern	Podion	ORION-1	Wheelchair Lectern ORION-1
LEC	Lectern	Podion	ORION-2	Wheelchair Lectern ORION-2
LEC	Lectern	Podion	POD-P	AV Podium Lectern POD-P
LEC	Lectern	Podion	POD-4-FS	Lectern with 22" Monitor for Signage
TLY	Trolley	Podion	CF-CAT	Mobile TV Trolley CF-CAT
SEN	Occupancy Sensor	Altona	AT-OCS-900-A	Network Enabled Occupancy Sensor
PDU	PDU	APC	AP7920B	Intelligent power distribution unit
TCI	Touch Control Interface	QSC	A TSC-101-G3-TT KIT	10.1" Wall Mounted Touch Screen, Black with table mount accesory TSC-710t-G3
NSW	Network Switch	Netgear	M4350-44M4X4V	44x2.5G, 4x10G/Multi-gig PoE++ (194W base, up to 3,314W) and 4xSFP28 25G (MSM4352) Managed Switch
NSWxx-PSUxx	Network Switch	Netgear	APS2000W	APS2000W - Modular Power Supply Unit 2000W AC
Logitech Meeting Room Equipment				
DISP	Flat Panel Display	Sharp	PN-ME552	55" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp	PN-ME652	65" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp	PN-ME752	75" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp	PN-ME862	86" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp	PN-ME982	98" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
RBP	Room Booking	Crestron	TSS-1080-B-S-LB KIT	10.1 in. Room Scheduling Touch Screen, Black Smooth, includes one TSW-1070-LB-B-S light bar
HT/HR	UC	Logitech	Rally extend	BYOD via USB-C
SBR	UC	Logitech	Rally Bar	UC Video Conference Smart Soundbar & Camera
SBR	UC	Logitech	Rally Bar Mini	UC Video Conference Smart Soundbar & Camera
TCI	UC	Logitech	Tap	10" UC Controller - MS Teams or Zoom - Requires additional mount
TCI	UC	Logitech	TAP Mount	939-001811 Logitech TAP table mount
MIC	UC	Logitech	Mic Pod	989-000430 Logitech RALLY mic pod
MC	UC	Logitech	Mic Pod Mount	952-000002 Logitech RALLY mic table mount graphite
CONV	UC	Logitech	Coupler	952-000181 Logitech rally microphone pod coupler
SEN	Occupancy Sensor	Crestron	CEN-ODT-POE	Occupancy Sensor
QSC Meeting Room Equipment				
DISP	Flat Panel Display	Sharp NEC	PN-ME552	55" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	PN-ME652	65" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	PN-ME752	75" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	PN-ME862	86" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	PN-ME982	98" UHD, 400+ nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
AMP	Amplifier	QSC	SPA-Q 60x4	SPA-Q 60x4 - 60 W per channel into 8Ω
CAMAUD	Tracking Camera	QSC	Q-SYS NC 12x80	PTZ conference camera
CONV	UC	Icron	USB 3.1 Extender	Icron USB 3-2-1 Raven™ 3104 Pro
HRG	Hearing Augmentation Transmitter	Listen Technology	LIS-LS-90-J4	IR Receiver Bundle
HRG-PWR	Hearing Augmentation Charger and Power Supply	Listen Technology	LA-210	Power supply
DSP	DSP	QSC	Core 8 Flex	Q-SYS network + analog I/O processor
MICCE	Microphone	Shure	MXA920	Ceiling Array Microphone
NSW	Network Switch	Netgear	MSM4352	44x2.5G, 4x10G/Multi-gig PoE++ (194W base, up to 3,314W) and 4xSFP28 25G (MSM4352) Managed Switch
UCE	UC	Crestron	CCC-120-Z-I	Crestron Collab Compute with the Intel, Core™ Ultra 7 for Zoom Rooms™ Software, International
UCExx-TCI	UC	Crestron	TSW-1080-UC-B	10.1 in. Wall Mount Touch Screen, Unified, Communication Version
SEN	Occupancy Sensor	Altona	AT-OCS-900-A	Network Enabled Occupancy Sensor
SPK	Speakers	QSC	AD-C6T-ZB	Acoustic Design Ceiling Mount Speaker - Model AD-C6T
TCI	Touch Control Interface	Crestron	TS-1070	10.1 in. Tabletop Touch Screen
RBP	Room Booking	Crestron	TSS-1070-B-S-LB KIT	10.1 in. Room Scheduling Touch Screen, Black Smooth, includes one TSW-1070-LB-B-S light bar
DISP	Flat Panel Display	Sharp NEC	M551	55" UHD, 500 nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	M651	65" UHD, 500 nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	M751	75" UHD, 500 nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	M861	86" UHD, 500 nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
DISP	Flat Panel Display	Sharp NEC	M981	98" UHD, 500 nits, 2 x HDMI inputs, 1 x DisplayPort input, 10W internal speakers
AMP	Amplifier	QSC	SPA-Q 60x4	SPA-Q 60x4 - 60 W per channel into 8Ω
CAMAUD	Tracking Camera	QSC	Q-SYS NC 12x80	PTZ conference camera

Functional Identifier	Category	Brand	Model	Description
CONV	UC	Icron	USB 3.1 Extender	Icron USB 3-2-1 Raven™ 3104 Pro
HRG	Hearing Augmentation Transmitter	Listen Technology	LIS-LS-90-J4	IR Receiver Bundle
HRG-PWR	Hearing Augmentation Charger and Power Supply	Listen Technology	LA-210	Power supply
DSP	DSP	QSC	Core 8 Flex	Q-SYS network + analog I/O processor
MICCE	Microphone	Shure	MXA920	Ceiling Array Microphone
NSW	Network Switch	Netgear	MSM4352	44x2.5G, 4x10G/Multi-gig PoE++ (194W base, up to 3,314W) and 4xSFP28 25G (MSM4352) Managed Switch
SEN	Occupancy Sensor	Crestron	CEN-ODT-POE	Occupancy Sensor
SPK	Speakers	QSC	AD-C6T-ZB	Acoustic Design Ceiling Mount Speaker - Model AD-C6T

11.8 Flat Floor Teaching Hybrid 30 (FFH30)

A Flat Floor Hybrid (FFH) room consists of display, camera and audio systems that enable teaching locally in the room and a high-quality remote experience and recordings.

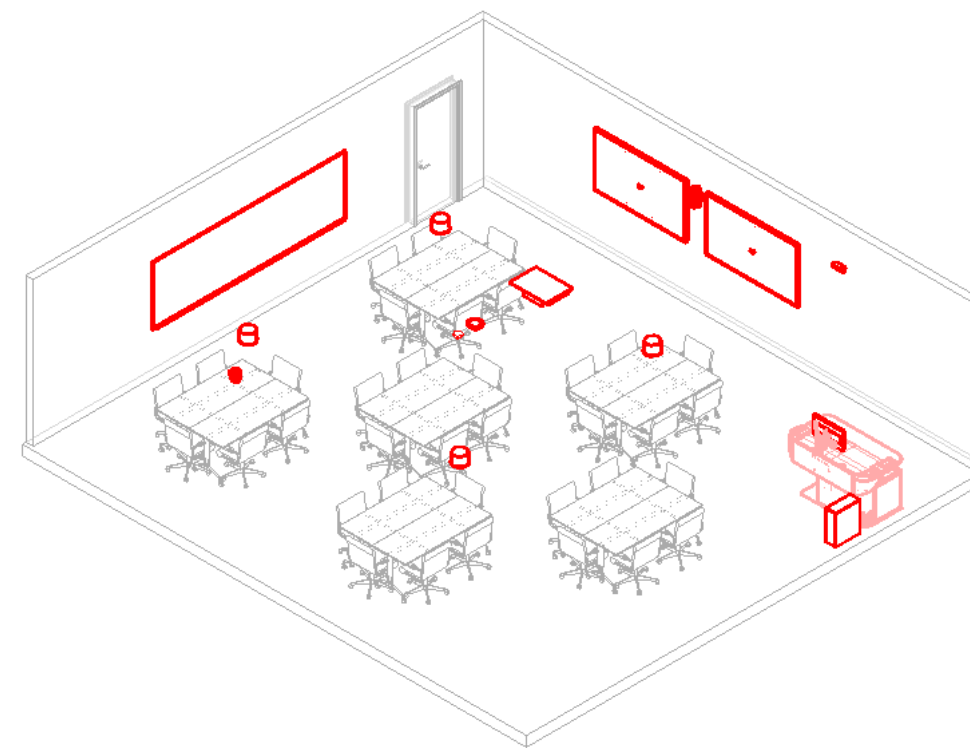
A system suitable for 30-60 students includes the following baseline equipment and functionality:

- Dual 86" displays mounted to the front wall, allowing for clear viewing of presentations or people and presentations at the same time
- A gooseneck mic at the teaching point and a wireless microphone system providing the teacher with voice lift within the room and a clear feed to hearing augmentation systems
- Hybrid connection via a Zoom Room system with dedicated touch panel controller at the teaching point
- A dual-camera system that automatically finds the best view depending on what mode the system is in
- A ceiling audio system with evenly distributed output from ceiling speakers and ceiling microphones that allow for wide coverage and input to the camera triangulation
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel, zoom touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted security camera

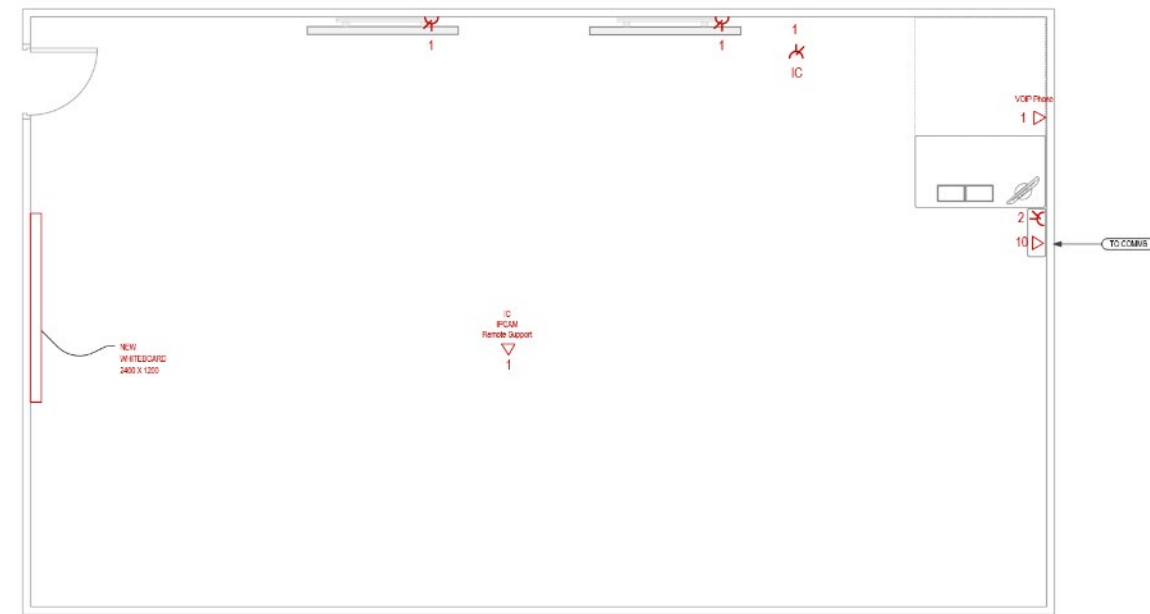
Optional enhancements include:

- Echo 360 recording, with indicator light mounted to the teaching point
- Additional displays can be added in cases that the student tables are setup in clusters
- The system support can support additional input options. Including a microscope, document camera and whiteboard camera.

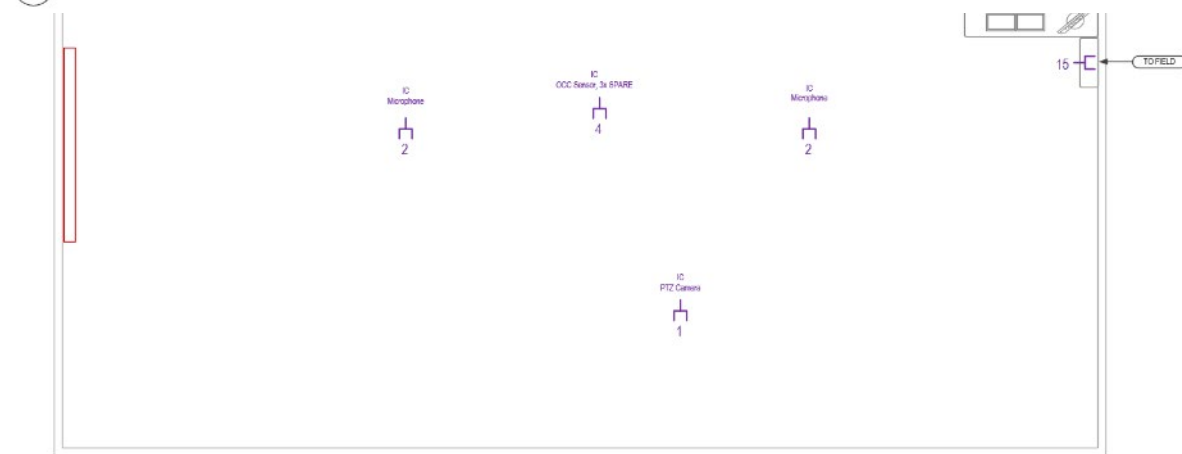
ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	30 – 59
	Area in m2	80 – 120
	Custom Configuration Available	No
DISPLAY	Main Display	Dual Flat Panel
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Yes
	Voice lift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Option
	Additional Options	Additional cameras with AI Camera Controller and Meeting Room Capability
CONTROL	Controller	Touch Panel Controller x2
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	Option
	Whiteboard Camera	Option
	Visualizer	Option



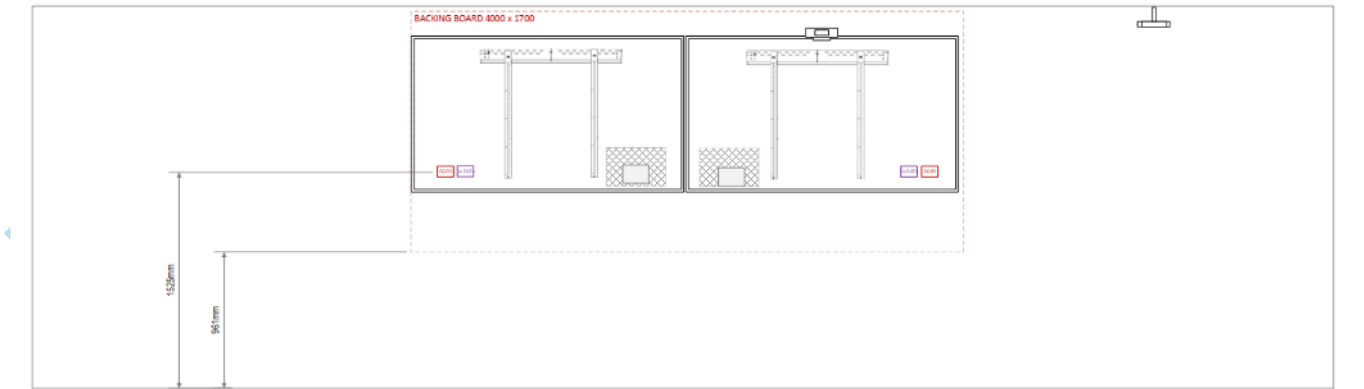
11.9 Flat Floor Teaching Hybrid 30 (FFH30) – Drawings and Elevations Sample



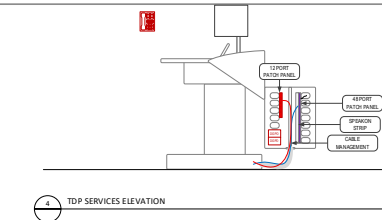
1 SERVICES LAYOUT PLAN (POWER AND COMMS DATA)



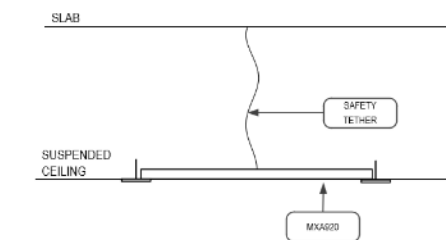
2 SERVICES LAYOUT PLAN (AV CABLING)



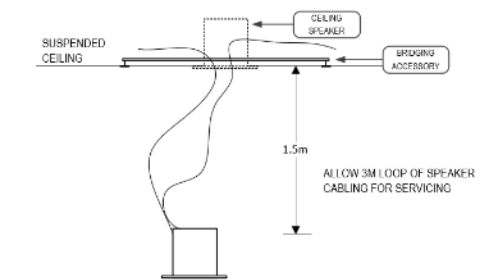
3 DISPLAY ELEVATION



4 TOP SERVICES ELEVATION

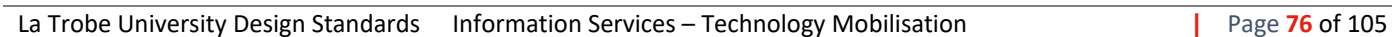


5 CEILING MICROPHONE DETAIL



6 CEILING SPEAKER DETAIL

FFH30 TYPICAL



11.11 Flat Floor Teaching Hybrid 60 (FFH60)

A Flat Floor Hybrid (FFH) room consists of display, camera and audio systems that enable teaching locally in the room and a high-quality remote experience and recordings.

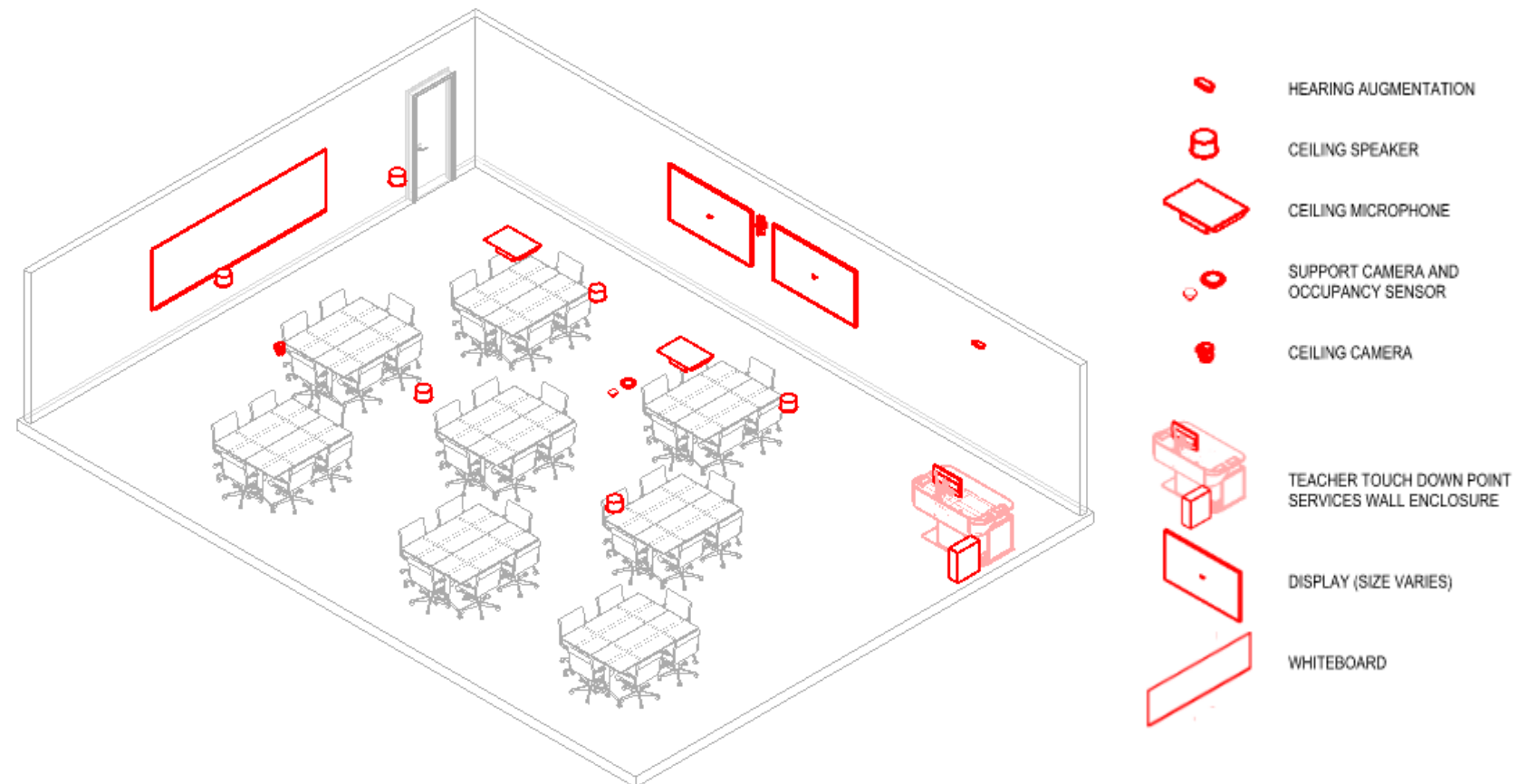
A system suitable for 60-90 students includes the following baseline equipment and functionality:

- Dual 98" displays mounted to the front wall, allowing for clear viewing of presentations or people and presentations at the same time
- A gooseneck mic at the teaching point and a wireless microphone system providing the teacher with voice lift within the room and a clear feed to hearing augmentation systems
- Hybrid connection via a Zoom Room system with dedicated touch panel controller at the teaching point
- A three-camera system that automatically triangulates the best view depending on what mode the system is in
- A ceiling audio system with evenly distributed output from ceiling speakers and ceiling microphones that allow for wide coverage and input to the camera triangulation
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel, zoom touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

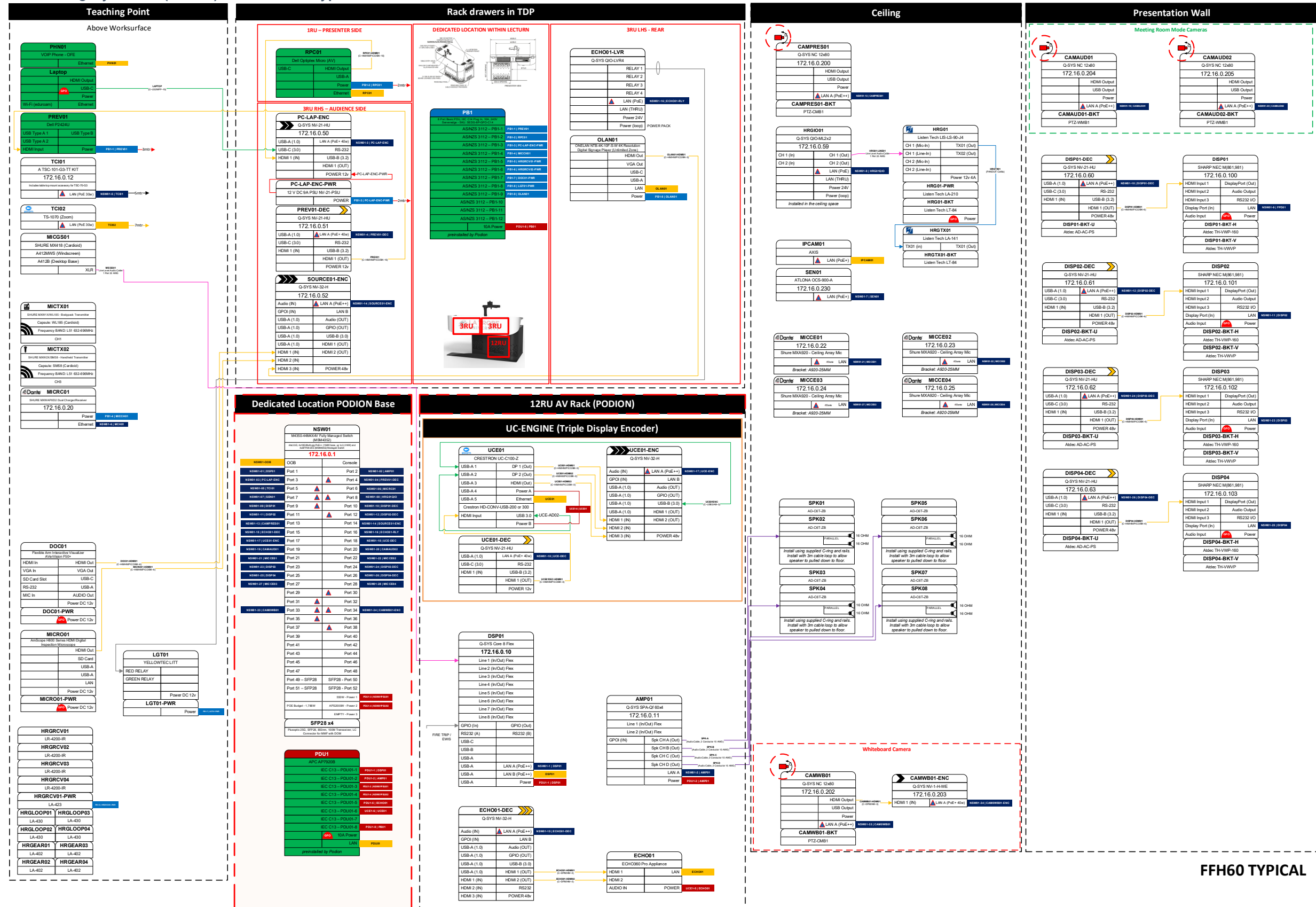
Optional enhancements include:

- Echo 360 recording, with indicator light mounted to the teaching point
- Rear displays can be added in cases that the student tables are setup in clusters
- The system supports multiple option inputs. Including a microscope, visualiser, whiteboard camera and a ONELAN digital signage player

ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	60 – 89
	Area in m2	120 – 180
	Custom Configuration Available	Yes
DISPLAY	Main Display	Dual Flat Panel
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Yes
	Voicelift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Option
	Additional Options	Seervision
CONTROL	Controller	Touch Panel Controller x2
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	Option
	Whiteboard Camera	Option
	OneLan Player	Option
	Visualizer	Option



11.12 Flat Floor Teaching Hybrid 60 (FFH60)-Schematics Typical



11.13 Flat Floor Teaching Hybrid 90 (FFH90)

A Flat Floor Hybrid (FFH) room consists of display, camera and audio systems that enable teaching locally in the room and a high quality remote experience and recordings.

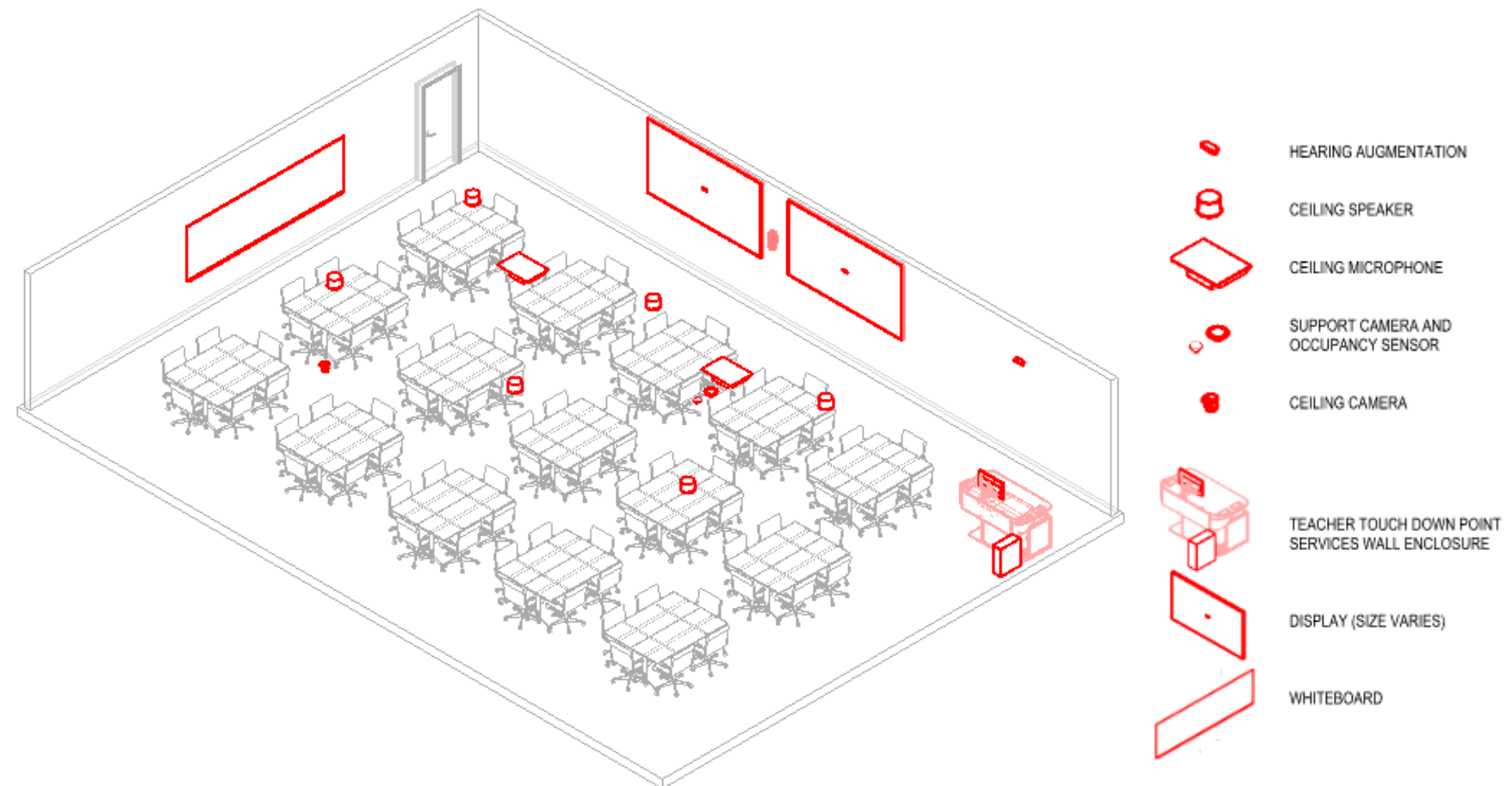
A system suitable for 90 or more students includes the following baseline equipment and functionality:

- Multiple large format displays setout to provide optimum viewing based on the use case
- Two gooseneck mics at the teaching point and a wireless microphone system providing the teacher with voicelift within the room and a clear feed to hearing augmentation systems
- Hybrid connection via a Zoom Room system with dedicated touch panel controller at the teaching point
- A four camera system that automatically triangulates the best view depending on what mode the system is in
- A ceiling audio system with evenly distributed output from ceiling speakers and ceiling microphones that allow for wide coverage and input to the camera triangulation
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel, zoom touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

Optional enhancements include:

- Echo 360 recording, with indicator light mounted to the teaching point
- Multiple displays can be added in cases that the student tables are setup in clusters
- The system supports multiple option inputs. Including a microscope, visualiser, whiteboard camera and a OneLan digital signage player

ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	90+
	Area in m2	180+
	Custom Configuration Available	Yes
DISPLAY	Main Display	Dual or more
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Yes
	Voicelift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Option
	Additional Options	Seervision
CONTROL	Controller	Touch Panel Controller x2
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	Option
	Whiteboard Camera	Option
	OneLan Player	Option
	Visualizer	Option



11.15 Flat Floor Teaching Essentials 30 (FFB30)

A Flat Floor Basic (FFB) room consists of displays and audio systems that enable teaching locally in the room.

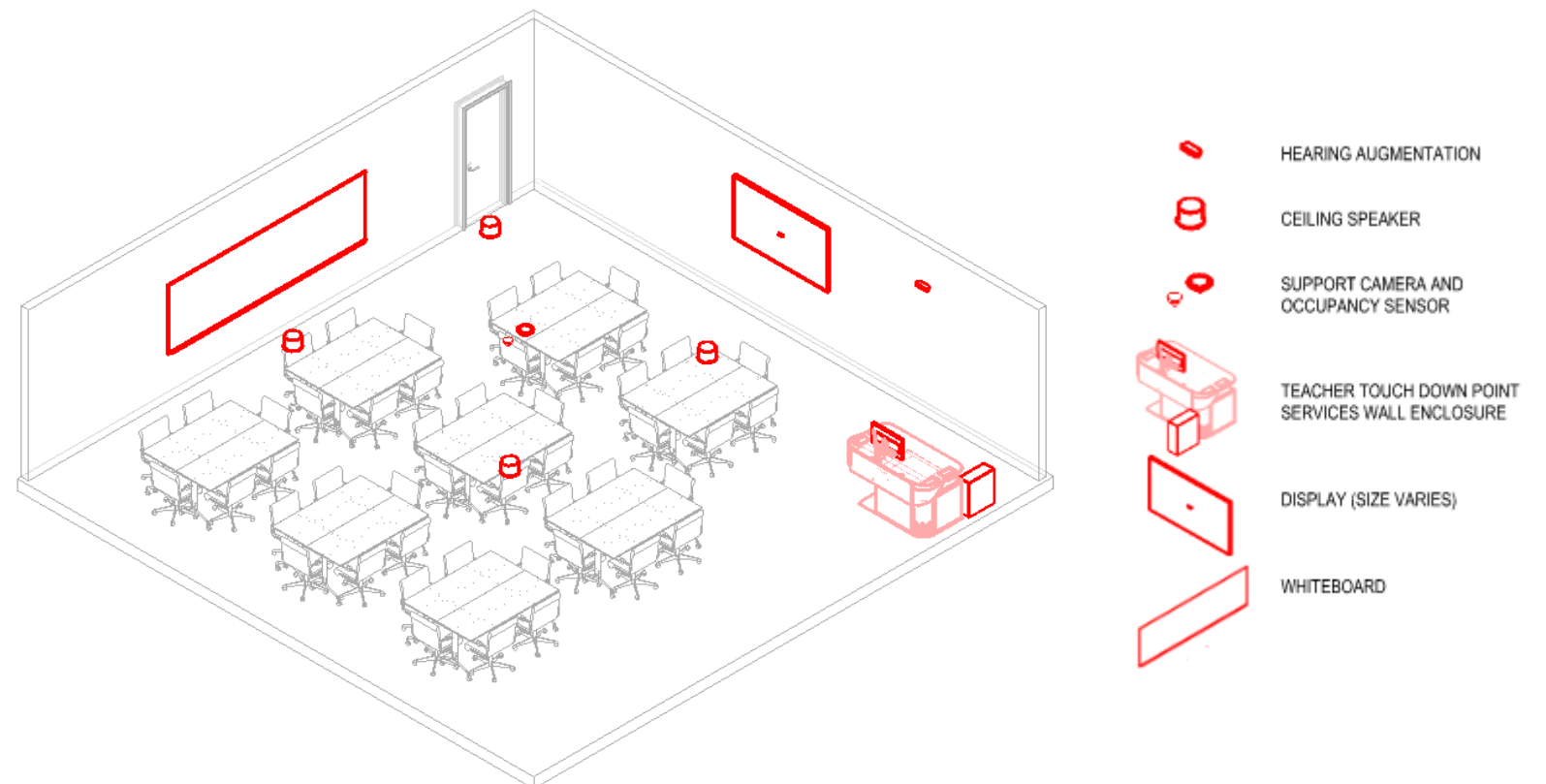
A system suitable for 30 to 59 students includes the following baseline equipment and functionality:

- One or more large format displays mounted to the front wall, allowing for clear viewing of presentations
- A gooseneck mic at the teaching point and a wireless microphone system providing the teacher with voicelift within the room and a clear feed to hearing augmentation systems
- A ceiling audio system with evenly distributed output from ceiling speakers
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

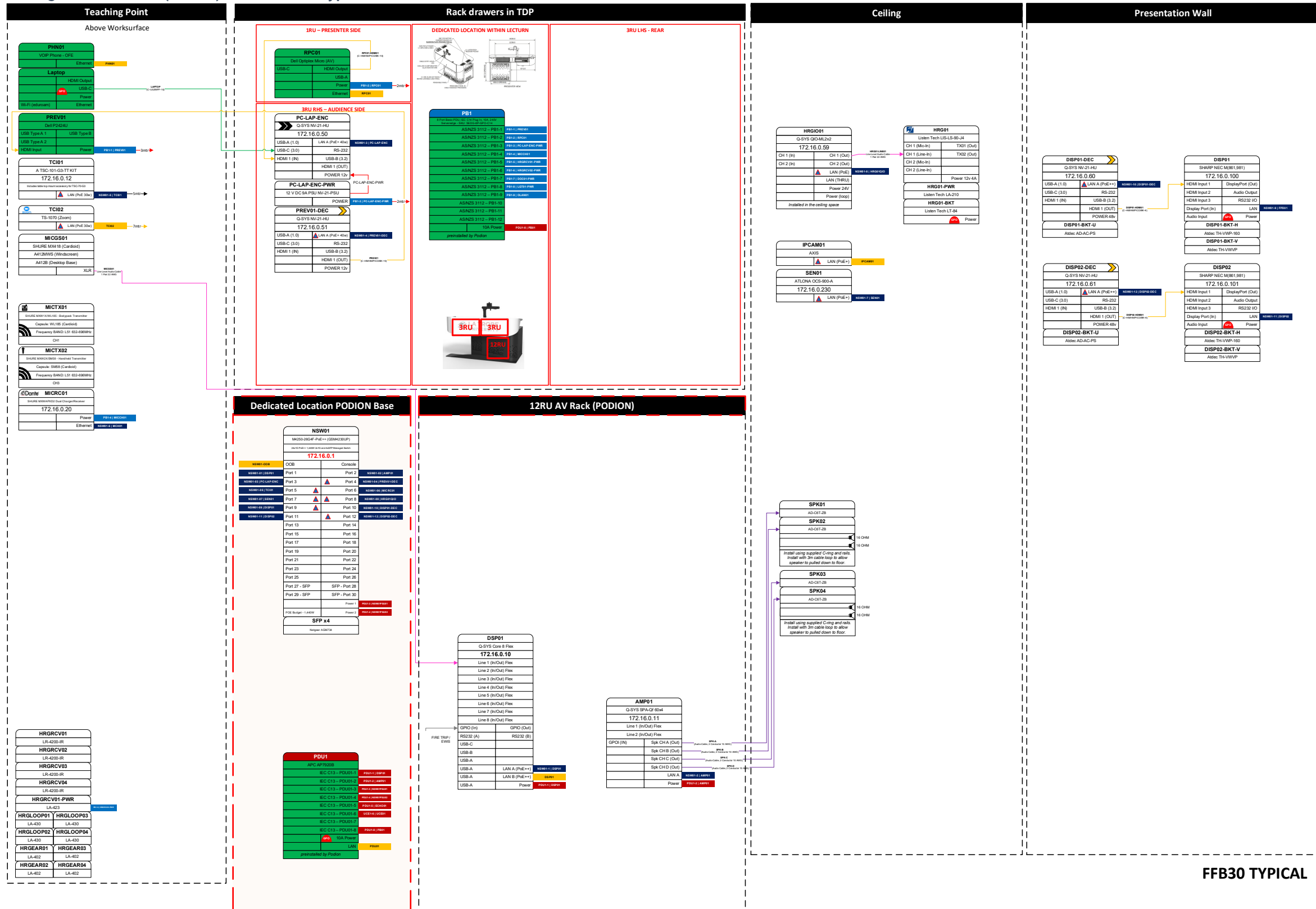
Optional enhancements include:

- Displays can be added to suit room layout or a particular use case
- The system supports multiple option inputs. Including a microscope and visualiser

ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	30 – 59
	Area in m2	80 – 120
	Custom Configuration Available	Yes
DISPLAY	Main Display	86"+
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	No
	Voicelift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	No
	Other Camera Options	None
	Additional Options	None
CONTROL	Controller	Touch Panel Controller
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	No
	Whiteboard Camera	No
	OneLan Player	No
	Visualizer	Option



11.16 Flat Floor Teaching Essentials 30 (FFB30)-Schematics Typical



FFB30 TYPICAL

11.17 Flat Floor Teaching Essentials 60 (FFB60)

A Flat Floor Basic (FFB) room consists of displays and audio systems that enable teaching locally in the room.

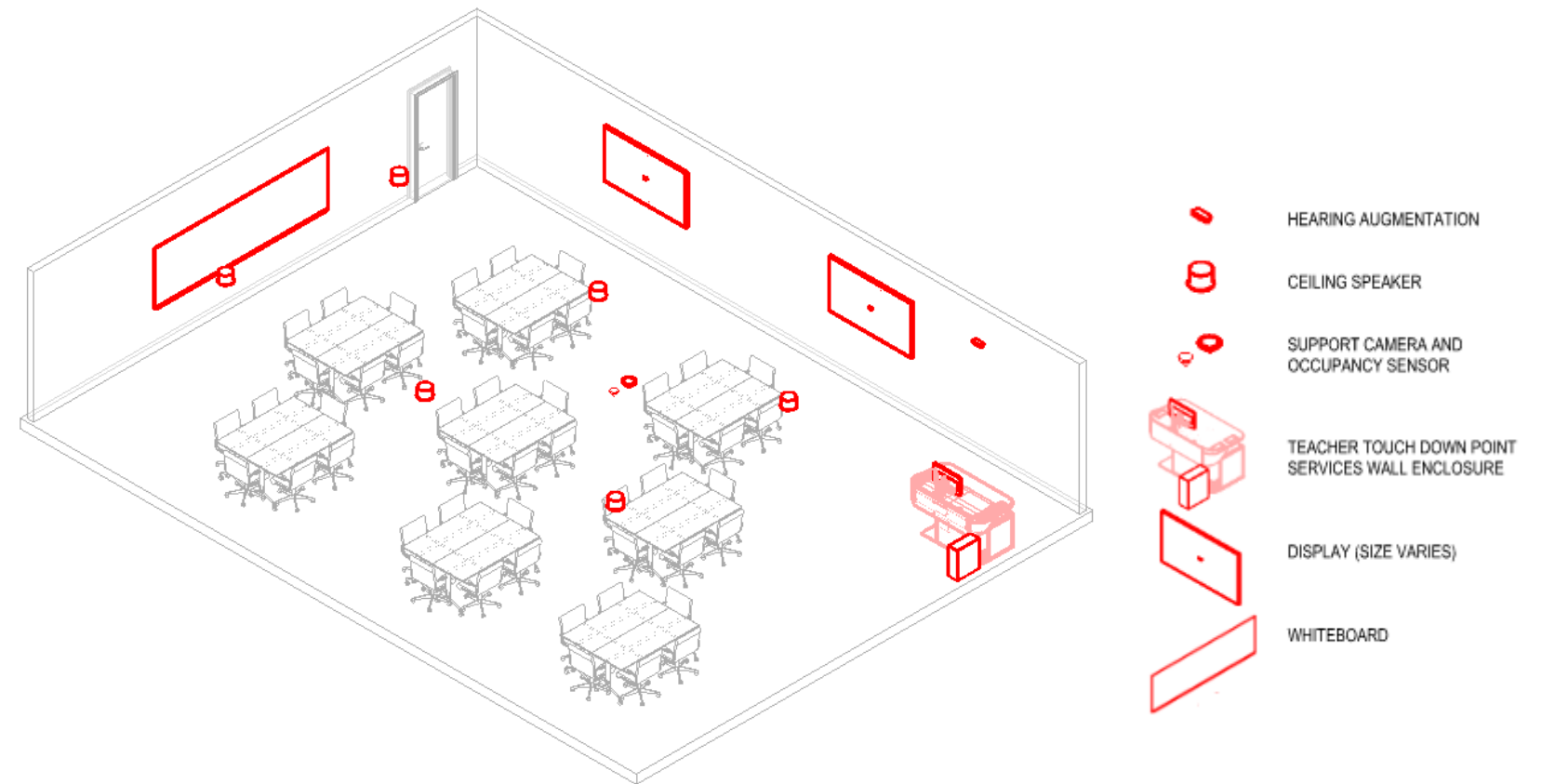
A system suitable for 60 to 90 students includes the following baseline equipment and functionality:

- One or more large format displays mounted to the front wall, allowing for clear viewing of presentations
- A gooseneck mic at the teaching point and a wireless microphone system providing the teacher with voicelift within the room and a clear feed to hearing augmentation systems
- A ceiling audio system with evenly distributed output from ceiling speakers
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

Optional enhancements include:

- Displays can be added to suit room layout or a particular use case
- The system supports multiple option inputs. Including a microscope and visualiser

ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	60 – 89
	Area in m2	120 – 180
	Custom Configuration Available	Yes
DISPLAY	Main Display	86"+
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC
AUDIO	Loudspeaker Type	Laptop (HDMI)
	Conferencing Microphones	Ceiling Mounted
	Voice lift	No
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	Yes
CAMERA	Conferencing Camera	IR Transmitter / Receivers
	Other Camera Options	No
	Additional Options	None
CONTROL	Controller	None
	Room Booking Panel	Touch Panel Controller
	BYOD Conferencing	No
	Remote Monitoring	No
	Motion Sensor	Yes
ADD ONS	Document Camera	Yes
	Echo360 Recording	Option
	Whiteboard Camera	No
	OneLan Player	No
	Visualizer	No



11.18 Flat Floor Teaching Essentials 90 (FFB90)

A Flat Floor Basic (FFB) room consists of displays and audio systems that enable teaching locally in the room.

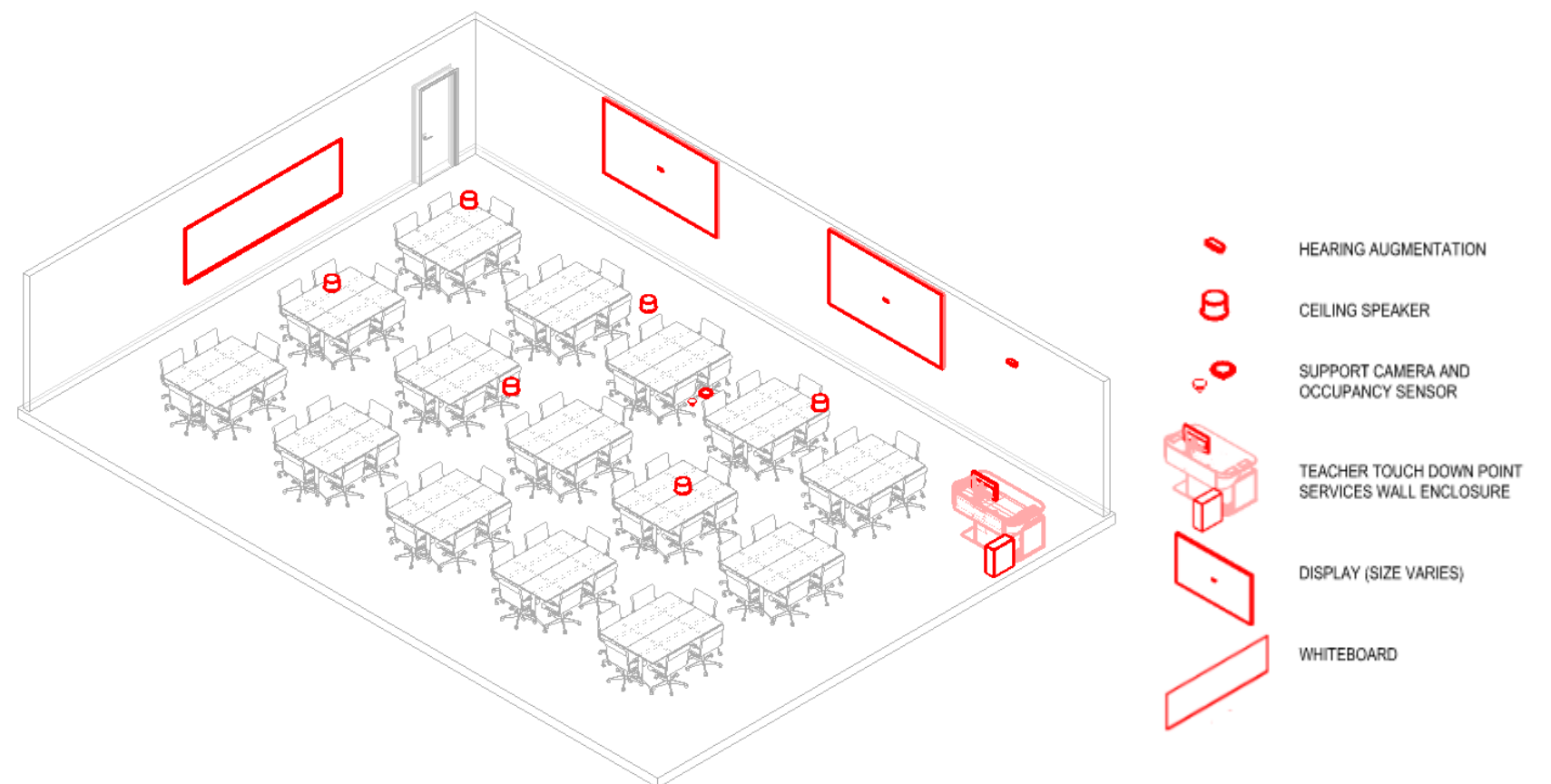
A system suitable for 90 or more students includes the following baseline equipment and functionality:

- One or more large format displays mounted to the front wall, allowing for clear viewing of presentations
- A gooseneck mic at the teaching point and a wireless microphone system providing the teacher with voicelift within the room and a clear feed to hearing augmentation systems
- A ceiling audio system with evenly distributed output from ceiling speakers
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

Optional enhancements include:

- Displays can be added to suit room layout or a particular use case
- The system supports multiple option inputs. Including a microscope and visualiser

ROOM SPECIFICATION	General Room Type	Teaching
	Seating Capacity	90+
	Area in m2	180+
	Custom Configuration Available	Yes
DISPLAY	Main Display	86"+
	Additional Displays	Option
	Confidence Monitor	No
	Relay Displays	Option
	Screen Size	86" Inch +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	No
	Voicelift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	No
	Other Camera Options	None
	Additional Options	None
CONTROL	Controller	Touch Panel Controller
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	No
	Whiteboard Camera	No
	OneLan Player	No
	Visualizer	Option



11.19 Lecture Theatre

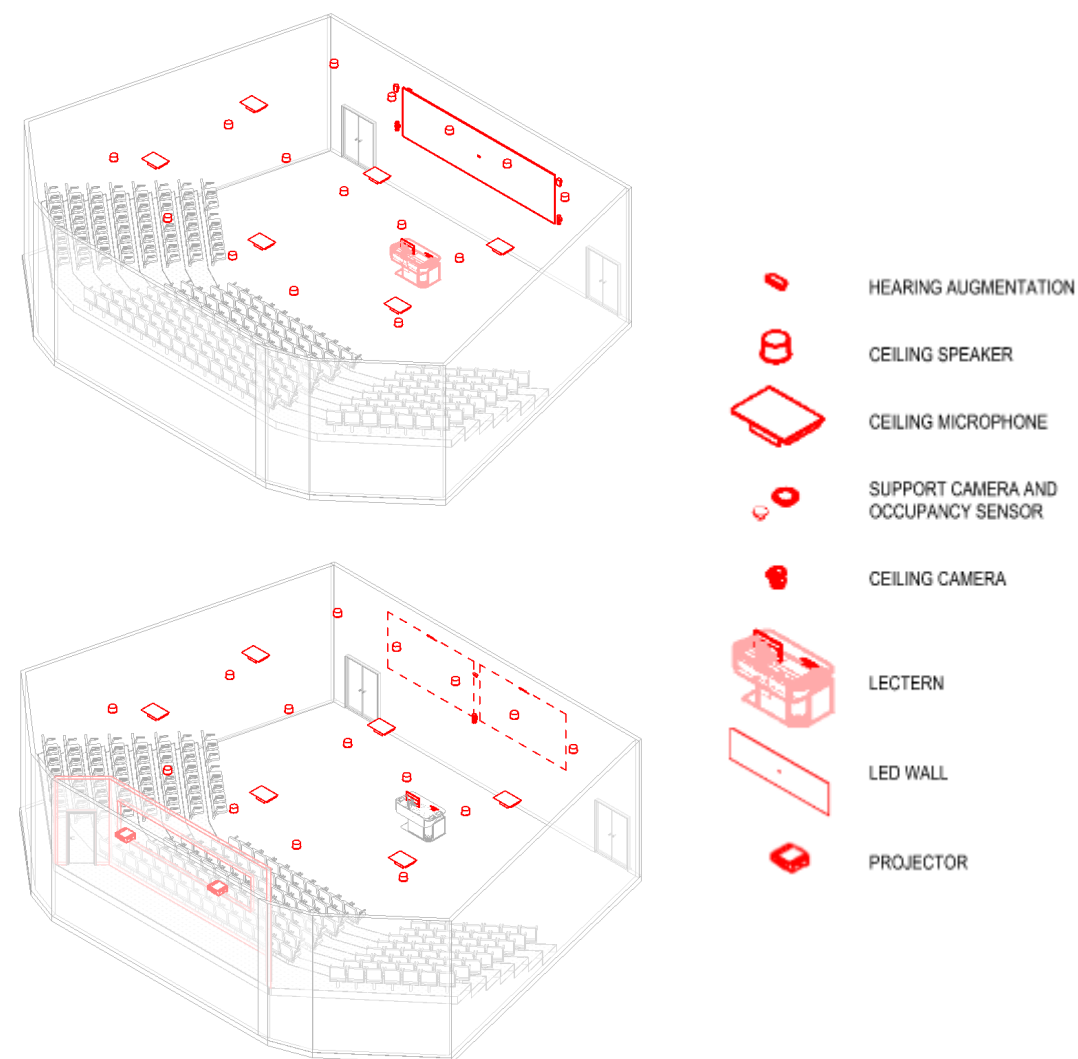
A Lecture Theatre consists of a large display system and comprehensive audio solution for lectures and presentations. An optional enhanced camera system can be included to facilitate remote connection and recordings of lectures. The baseline equipment and functionality for a lecture theatre is:

- A large display surface, typically an LED wall solution, to provide a central viewing point
- Multiple support displays as needed to support the room layout and size, including confidence monitors for the lecturer
- Two gooseneck mics at the teaching point and a wireless microphone system providing the teacher with voicelift within the room and a clear feed to hearing augmentation systems
- Custom design audio system to provide even speaker coverage throughout the Theatre
- A teaching point with equipment rack, preview monitor, room PC, mouse and keyboard, room touch panel, zoom touch panel and laptop input
- The AV system will automatically power off after 120 minutes if no movement is detected in the space via an OCS-900A occupancy sensor
- The space will be remotely monitored for support purposes from a ceiling mounted AXIS M3086-V security camera

Optional enhancements include:

- Hybrid connection via a Zoom Room system with dedicated touch panel controller at the teaching point
- A multi-camera system that automatically triangulates the best view depending on what mode the system is in. Further options exist for presenter tracking
- Ceiling microphones for camera triangulation and pickup of the audience
- Echo 360 recording, with indicator light mounted to the teaching point
- The system supports multiple option inputs. Including a microscope, visualiser, whiteboard camera and a OneLan digital signage player

ROOM SPECIFICATION	General Room Type	Lecture
	Seating Capacity	100+
	Area in m2	180+
	Custom Configuration Available	Yes
DISPLAY	Main Display	Dual 136 or larger"
	Additional Displays	Option
	Confidence Monitor	Yes
	Relay Displays	As required
	Screen Size	136" +
	Display Inputs	Room PC Laptop (HDMI)
AUDIO	Loudspeaker Type	Ceiling and wall Mounted
	Conferencing Microphones	Option
	Voicelift	Yes
	Wireless Microphones	Yes
	Lectern Microphone	Yes
	Hearing Augmentation	IR Transmitter / Receivers
CAMERA	Conferencing Camera	Option
	Other Camera Options	Presenter Tracking
CONTROL	Controller	Touch Panel Controller
	Room Booking Panel	No
	BYOD Conferencing	No
	Remote Monitoring	Yes
	Motion Sensor	Yes
ADD ONS	Document Camera	Option
	Echo360 Recording	Oprion
	Whiteboard Camera	No
	OneLan Player	Option
	Visualizer	Option



11.20 Medium Meeting Room (S86-QSYS)

The Medium meeting room consists of a single display, camera and audio system that enables in person meetings and high-quality remote experience.

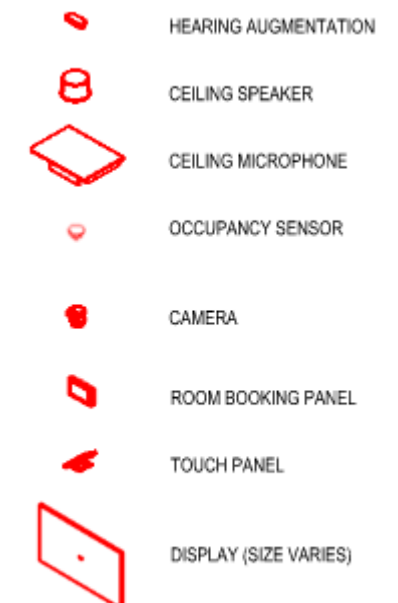
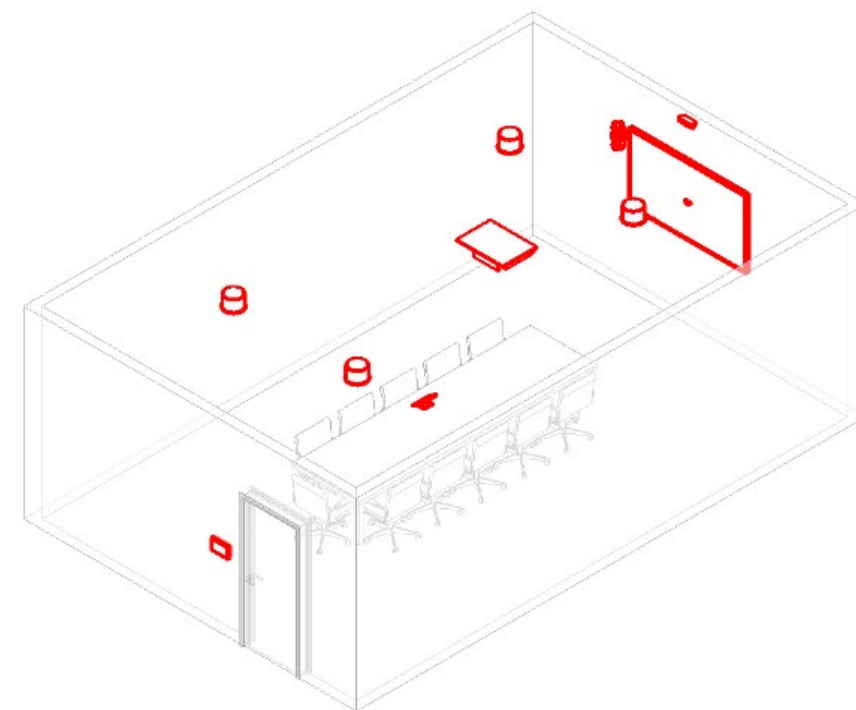
The system suitable for 12-14 consists of the following baseline equipment and functionality:

- Single 86” display mounted to the wall, allowing for clear view of presentation and people.
- Microsoft teams room system with a dedicated touch control panel at the table.
- Two camera system that automatically detects and frames participants for optimal remote viewing
- Room booking panel outside room to display room availability.
- Ceiling mounted microphone and speaker system to capture and delivers clear audio throughout the room

Optional enhancements include:

- BYOD conferencing

ROOM SPECIFICATION	General Room Type	Meeting (w/ H.Aug)
	Seating Capacity	Dec-14
	Area in m2	30
	Custom Configuration Available	No
DISPLAY	Main Display	Single Flat Panel
	Additional Displays	N/A
	Confidence Monitor	No
	Relay Displays	No
	Screen Size	86 Inch
	Display Inputs	Laptop (HDMI) Teams Web Conferencing
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Ceiling Microphone Array
	Voicelift	No
	Wireless Microphones	No
	Hearing Augmentation	IR Transmitters / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Yes
CONTROL	Controller	Touch Panel on Table
	Room Booking Panel	Yes
	BYOD Conferencing	Optional
	Remote Monitoring	N/A
	Motion Sensor	Yes
ADD ONS	Document Camera	No
	Echo360 Recording	No



11.21 Large Meeting Room (D86-QSYS)

The Large meeting room consists of a Dual display, camera and audio system that enables in person meetings and high-quality remote experience.

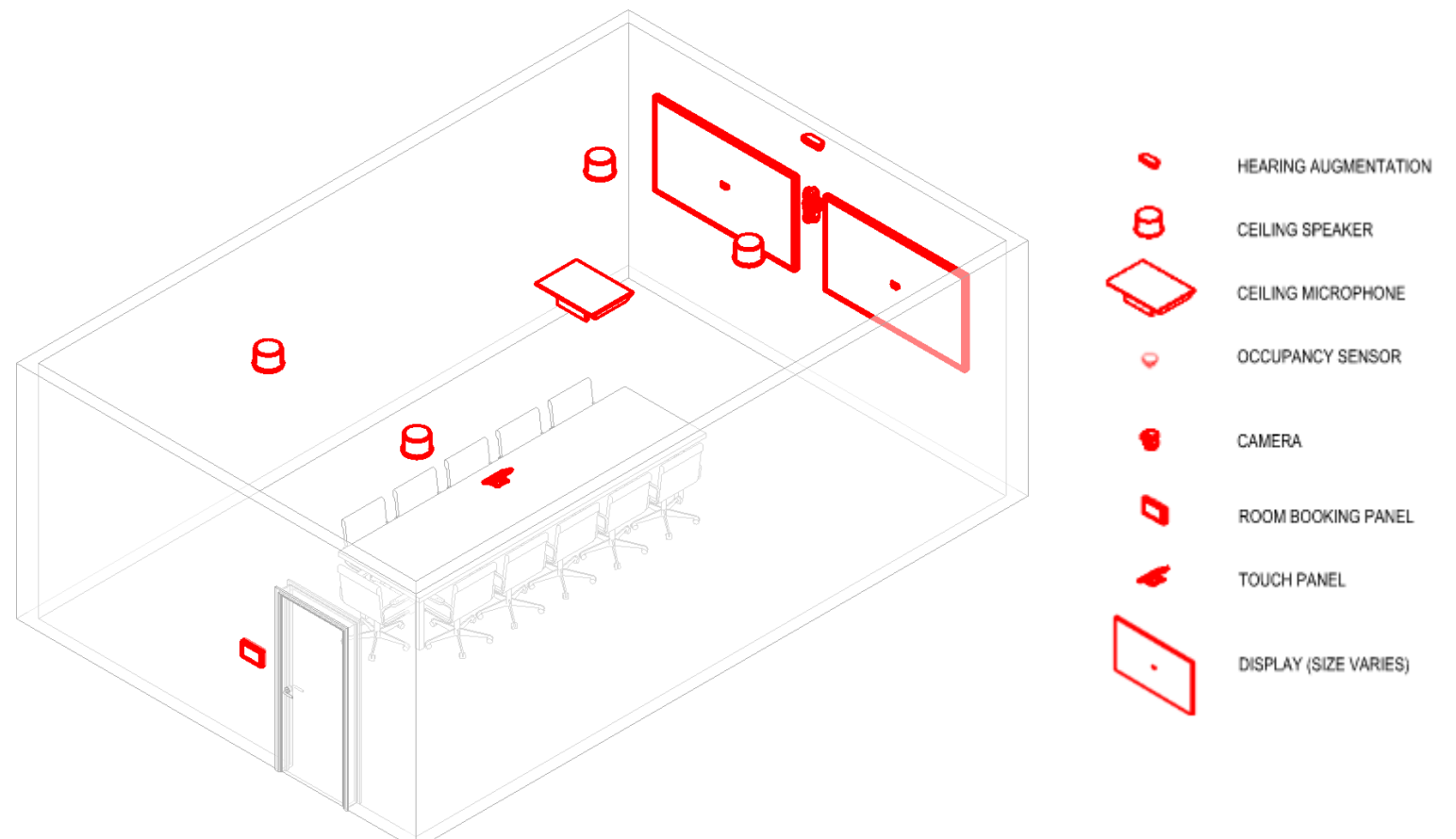
The system suitable for 16-20 consists of the following baseline equipment and functionality:

- Dual 86” display mounted to the wall, allowing for clear view of presentation and people.
- Microsoft teams room system with a dedicated touch control panel at the table.
- Two camera system that automatically detects and frames participants for optimal remote viewing
- Room booking panel outside room to display room availability.
- Ceiling mounted microphone and speaker system to capture and delivers clear audio throughout the room

Optional enhancements include:

- BYOD conferencing

ROOM SPECIFICATION	General Room Type	Meeting (w/ H.Aug)
	Seating Capacity	16-20
	Area in m2	35
	Custom Configuration Available	No
DISPLAY	Main Display	Dual Flat Panel
	Additional Displays	N/A
	Confidence Monitor	No
	Relay Displays	No
	Screen Size	86 Inch
	Display Inputs	Laptop (HDMI) Teams Web Conferencing
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Ceiling Microphone Array
	Voicelift	No
	Wireless Microphones	No
	Hearing Augmentation	IR Transmitters / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Yes
CONTROL	Controller	Touch Panel on Table
	Room Booking Panel	Yes
	BYOD Conferencing	Optional
	Remote Monitoring	N/A
	Motion Sensor	Yes
ADD ONS	Document Camera	No
	Echo360 Recording	No



11.22Extra Large Meeting Room (LED136-QSYS)

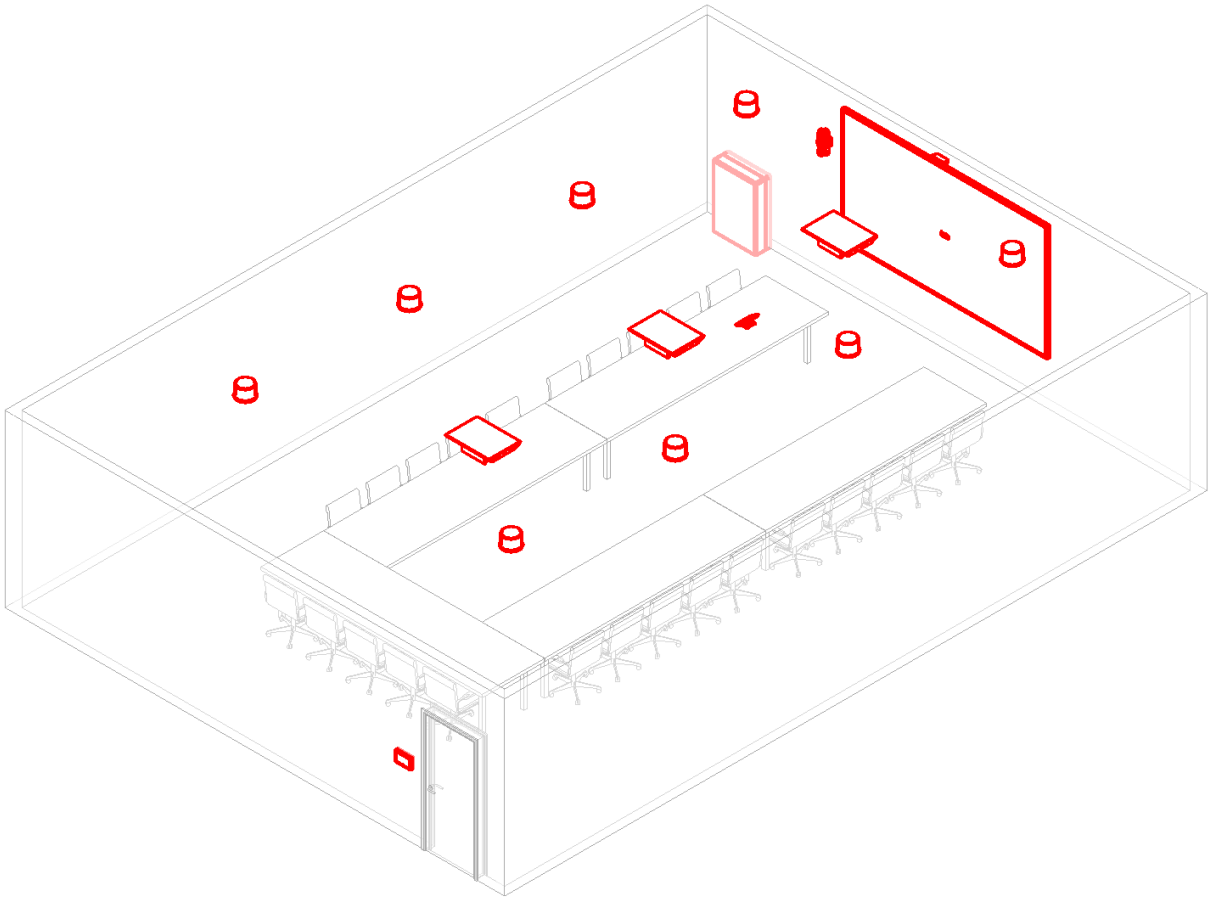
The Extra Large meeting room consists of a LED Wall display, camera and audio system that enables in person meetings and high-quality remote experience. The system suitable for 30 people and consists of the following baseline equipment and functionality:

- 136” LED wall display mounted to the wall, allowing for clear view of presentation and people.
- Microsoft teams room system with a dedicated touch control panel at the table.
- Two camera system that automatically detects and frames participants for optimal remote viewing.
- Room booking panel outside room to display room availability.
- Ceiling mounted microphone and speaker system to capture and delivers clear audio throughout the room

Optional enhancements include:

- BYOD conferencing

ROOM SPECIFICATION	General Room Type	Meeting (w/ H.Aug)
	Seating Capacity	30+
	Area in m2	60
	Custom Configuration Available	No
DISPLAY	Main Display	LED wall 136”
	Additional Displays	N/A
	Confidence Monitor	No
	Relay Displays	No
	Screen Size	136 Inch
	Display Inputs	Laptop (HDMI) Teams Web Conferencing
AUDIO	Loudspeaker Type	Ceiling Mounted
	Conferencing Microphones	Ceiling Microphone Array
	Voicelift	No
	Wireless Microphones	No
	Hearing Augmentation	IR Transmitters / Receivers
CAMERA	Conferencing Camera	Yes
	Other Camera Options	Yes
CONTROL	Controller	Touch Panel on Table
	Room Booking Panel	Yes
	BYOD Conferencing	Optional
	Remote Monitoring	N/A
	Motion Sensor	Yes
ADD ONS	Document Camera	No
	Echo360 Recording	No



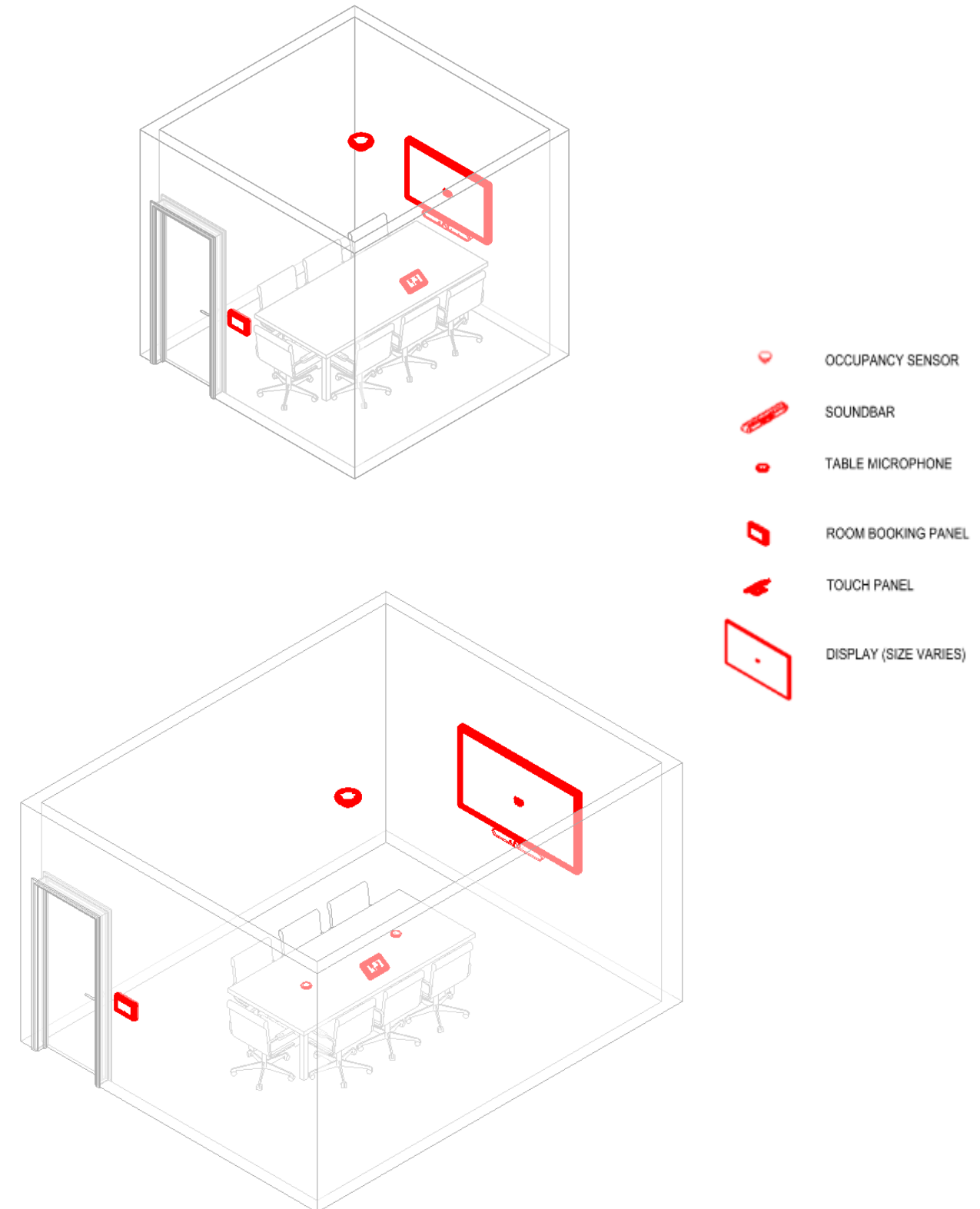
-  HEARING AUGMENTATION
-  CEILING SPEAKER
-  CEILING MICROPHONE
-  OCCUPANCY SENSOR
-  CAMERA
-  ROOM BOOKING PANEL
-  TOUCH PANEL
-  DISPLAY (SIZE VARIES)

11.23 Small/Medium Meeting Room (Soundbar)

The Small/Medium meeting room consists of a wall mounted display and All-In-One Sound Bar & Webcam system creating a space for high-quality remote experience. The system suitable for up to 8 people and consists of the following baseline equipment and functionality:

- 55"-86" wall mounted display, allowing for clear view of presentation and people.
- Microsoft Teams room system with a dedicated touch control panel at the table.
- All-In-One Sound Bar & Webcam with optional table extension mics.
- BYOC conferencing via a USBC cable located on the table.
- A room booking panel with LED lights outside room to display room availability.
- A room occupancy sensor to identify when the room is in use

ROOM SPECIFICATION	General Room Type	Meeting
	Seating Capacity	Up to 8
	Area in m2	20
	Custom Configuration Available	No
DISPLAY	Main Display	Up to 86"
	Additional Displays	N/A
	Confidence Monitor	No
	Relay Displays	No
	Screen Size	Up to single 86 Inch
	Display Inputs	Laptop (HDMI) Teams Web Conferencing/USB
AUDIO	Loudspeaker Type	Conference Bar
	Conferencing Microphones	Conference Bar
	Voicelift	No
	Wireless Microphones	No
	Hearing Augmentation	No
CAMERA	Conferencing Camera	Yes
	Other Camera Options	No
CONTROL	Controller	Touch Panel on Table
	Room Booking Panel	Yes
	BYOD Conferencing	Yes
	Remote Monitoring	N/A
	Motion Sensor	Yes
ADD ONS	Document Camera	No
	Echo360 Recording	No



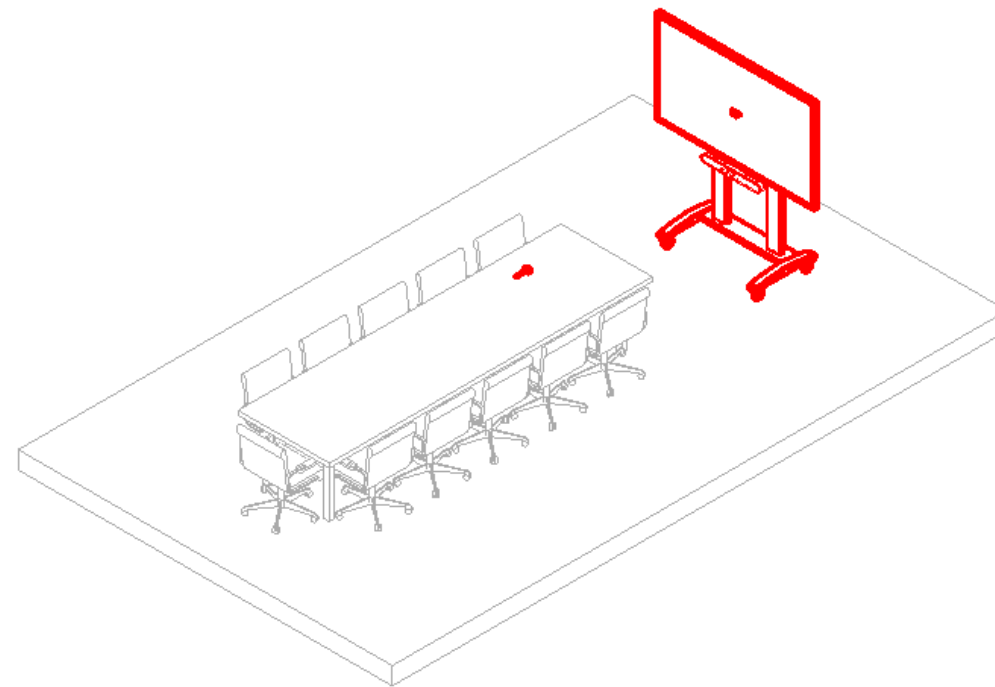
11.24HDi Portable Display

The portable display consists of an interactive display with soundbar mounted to a display cart.

The system consists of the following baseline equipment and functionality:

- 65”-86” interactive display
- User connectivity:
 - Option 1: Wireless presentation solution with USB adapter for user connection
 - Option 2: PC fixed to display with wireless mouse and keyboard allowing users to log in
- All-In-One Sound Bar & Webcam.

ROOM SPECIFICATION	General Room Type	Meeting or Small teaching
	Seating Capacity	Up to 20
	Area in m2	-
	Custom Configuration Available	No
DISPLAY	Main Display	65” to 86”
	Additional Displays	N/A
	Confidence Monitor	No
	Relay Displays	No
	Screen Size	65” to 86” Interactive
	Display Inputs	Option 1: Laptop (via wireless) Option 2: Local PC
AUDIO	Loudspeaker Type	Conference Bar
	Conferencing Microphones	Conference Bar
	Voicelift	No
	Wireless Microphones	No
	Hearing Augmentation	No
CAMERA	Conferencing Camera	Yes
	Other Camera Options	No
CONTROL	Controller	No
	Room Booking Panel	No
	BYOD Conferencing	Option
	Remote Monitoring	N/A
	Motion Sensor	No
ADD ONS	Document Camera	No
	Echo360 Recording	No



11.25AV PODION Portable Display

podion.

cf-cat

PRODUCT OVERVIEW & SPECIFICATIONS



DESCRIPTION

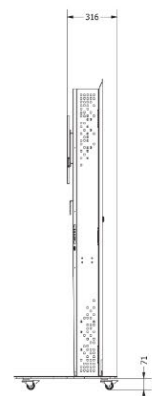
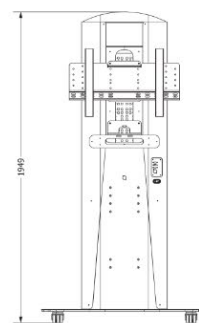
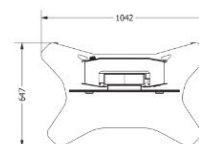
CF-CAT is a modern trolley with secure AV connectivity and an option electronic height adjustment (CF-CAT-HA). It's the perfect solution for collaborative spaces and wherever the TV needs to be moved around. Used by University of Melbourne and Chisholm University.

KEY FEATURES

- Electronic height adjustment
- Lockable heavy duty castor wheels
- Internal equipment mount points
- Internal cable management
- Convection cooling
- Lockable back door (combination lock)
- Height adjustable equipment brackets
- Soundbar mount
- Available in height adjustable (CF-CAT-HA)



PRODUCT NAME:	CF-CAT
PRODUCT DESCRIPTION:	COLLABORATIVE AUDIO VISUAL TROLLEY
PRODUCT CATEGORY:	MOBILE TV TROLLEYS
OVERALL FOOTPRINT:	1042mm-647mm (41" x 25")
SCREEN HEIGHT ADJUSTMENT	ELECTRONIC HEIGHT ADJUSTABLE OPTION 300mm (12")
BODY MATERIAL:	STEEL
HEIGHT:	1949mm (77")
DISPLAY SIZE	UP TO 75" (1900mm)
AV CONNECTIVITY:	HDMI, USB, USB-C THROUGHPUTS
COLORS/FINISHES:	MATTE BLACK/WHITE



11.26AV PODION Cable Cover

podion.

ltu.cc
PRODUCT OVERVIEW & SPECIFICATIONS

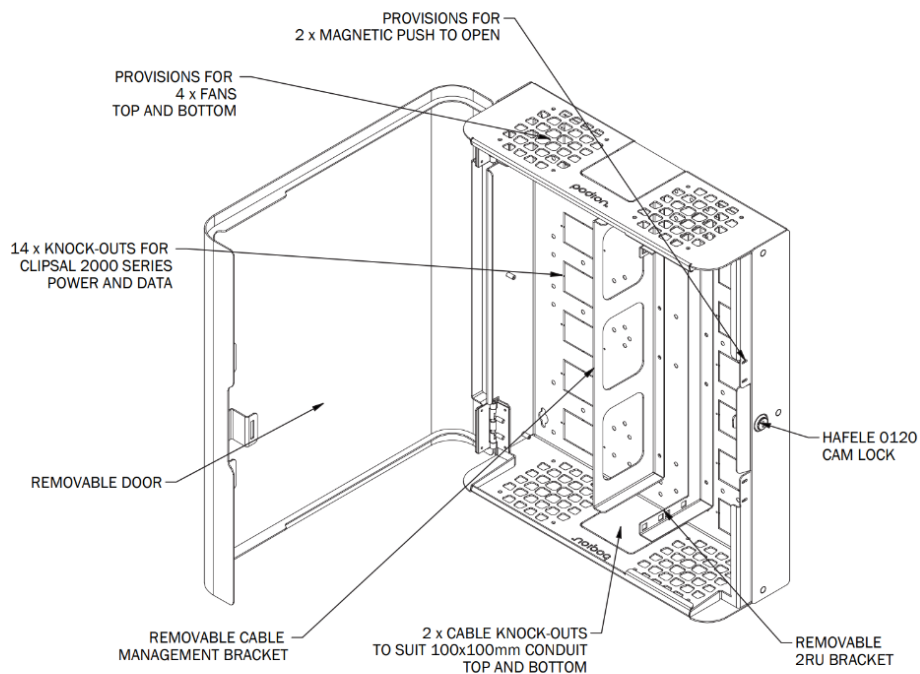
REV-A

DESCRIPTION

Wall Mounted Patch Cover for La Trobe University.

INCLUDES:

- 1 x Cable management bracket, adjustable to 11 positions
- 1 x 2RU removable bracket, adjustable to 11 positions
- 1 x Hafele 0120 cam lock
- 2 x cable knock-outs to suit 100 x 100mm conduit
- Provisions for Panduit patch panel - CWPP12WBL, adjustable to 7 positions
- Removable door with spring loaded hinges for easy access
- Provisions for 4 x fans
- Provisions for 2 x push to open magnetic door latch
- Provisions for Clipsal 2000 series for power and data



11.27AV PODION Hearing Augmentation Cabinet

podion.

ltu·hac

INT.

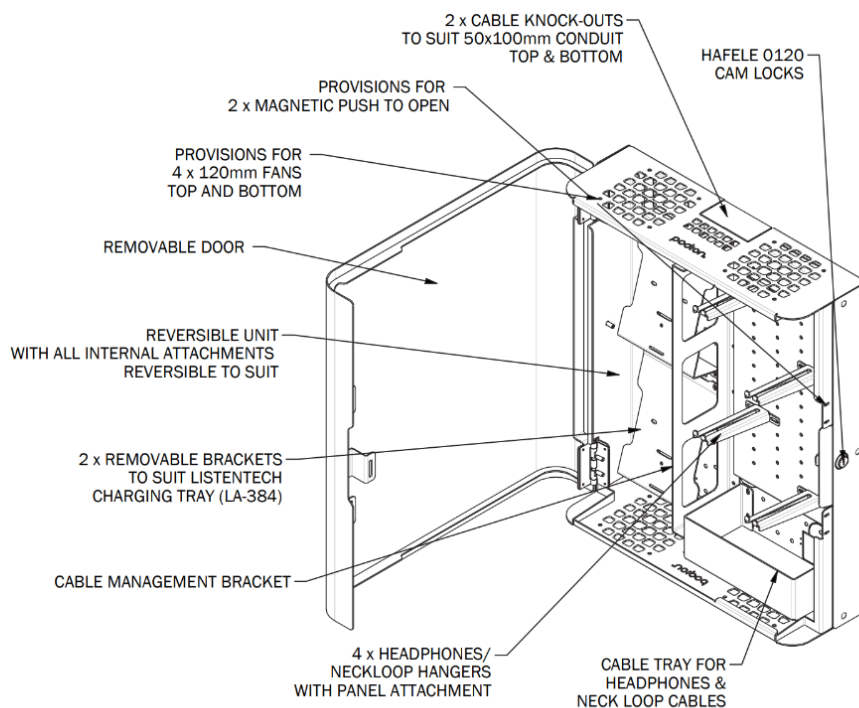
PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Wall Mounted Hearing Augmentation Cabinet for La Trobe University.

INCLUDES:

- 1x cable management bracket, adjustable to 11 positions
- 1x hafele 0120 cam lock
- 2x cable knock-outs to suit 50 x 100mm conduit
- Removable door with spring loaded hinges for easy access
- 2x removable brackets with provisions for listentech charging tray (LA-384)
- 4x adjustable hooks with attachment panel, provisions for 8x headphones (LA-402) and 8x neck loops (LA-438)
- 1x cable management tray for headphones and neck loops cables
- Provisions for 4x 120mm fans
- Provisions for 2x push to open magnetic door latch
- Provisions for Clipsal 2000 series for power and data



11.28AV PODION Lectern LTU-JBL

podion.

ltu·jbl

REV-B

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

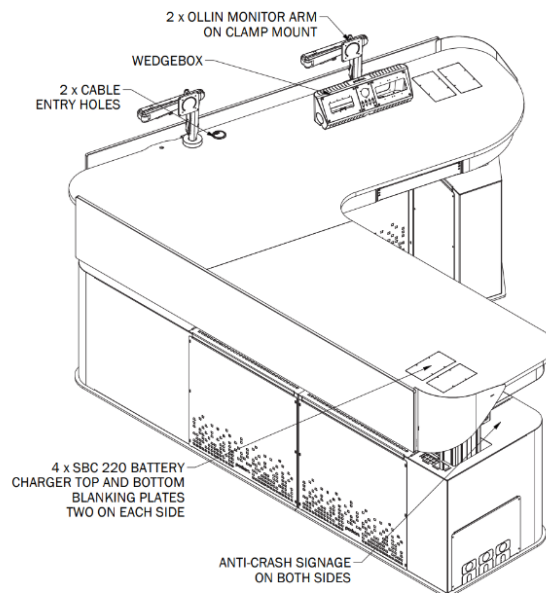
Wheelchair Accessible Height Adjustable Lectern

INCLUDES:

- 2845mm W x 2425mm D in Oyster Grey
- Electronic height adjustment: 865 - 1165mm H
- 2x 12RU roll in racks
- 3x 2RU slide-out rack behind logo panel
- 2x Lockable door with La Trobe vinyl logo
- 4x active cooling fans - located above roll in racks
- Cabinet-level cable management corridor
- Anti-crash signage
- 1x cable chains
- 1x 1RU Micro PC shelf on presenter side
- 2x full depth 1RU shelf in each roll in rack - 4 total
Located at RU 7 and 11 from bottom
- Serveredge 2RU Horizontal Basic 12 Port PDU -
SEDG-12P-GPO-C14 - located in vertical corner RU
- APC NetShelter Switched Rack PDU - AP7920B -
located in vertical corner RU

Benchtop Accessories

- 2x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 4x SBC 220 Battery Charger holder top and bottom
blanking plates installed
- 1x hinged storage pocket (supply loose)
- 1x Listen Tech Battery Charger holder with USB
power supply bracket (supply loose)
- Wedgebox



11.29AV PODION Lectern LTU-LL

podion.

ltu·ll

REV-D

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Wheelchair Accessible Height Adjustable Multi-media Lectern. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

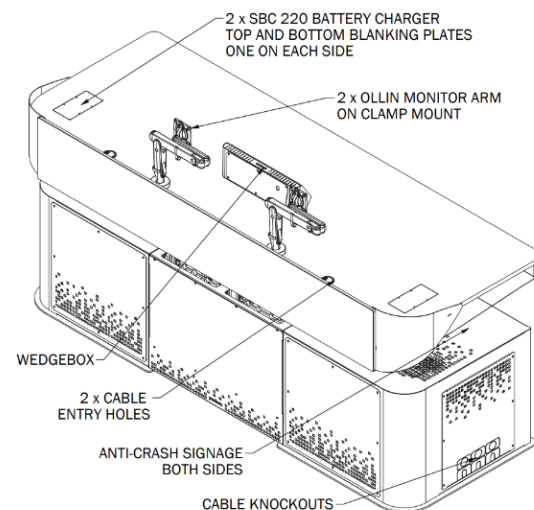
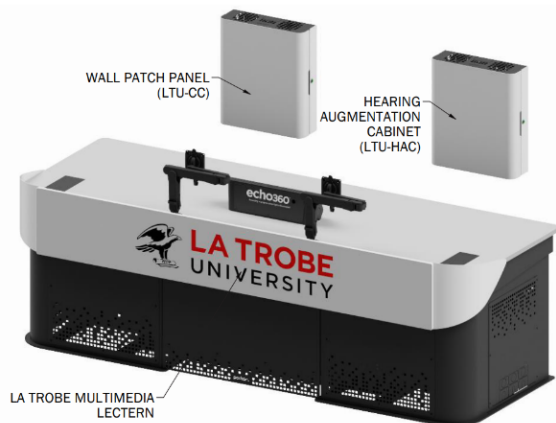
- 1x La Trobe Multimedia Lectern, details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE MULTIMEDIA LECTERN DETAILS:

- 2800mm x 1000mm benchtop in Oyster Grey
- Electronic height adjustment: 865 - 1165mm H
- 2x 12RU roll in racks
- 3x 2RU slide-out rack behind logo panel
- Lockable door with La Trobe vinyl logo
- 3x Hafele 0120 cam locks
- 4x active cooling fans
- Cable knockouts
- Cabinet-level cable management corridor
- Internal cabinet mounting rail
- 3x horizontal cable manager with finger ducts
- 2x cable chains
- Anti-crash signage
- 1x 1RU Micro PC cradle, compatible with HP EliteDesk 8 Mini
- 2x full depth 1RU shelf in each roll in rack - 4 total
Located at RU 7 and 11 from bottom
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located presenter side of top slide out racks
- APC NetShelter Switched Rack PDU - AP7920B - located in vertical corner RU at presenter LH side

BENCHTOP ACCESSORIES:

- 2x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x Hinged storage pocket (supply loose)
- 1x Wedgebox (LTU-WB), details on page 3



11.30AV PODION Lectern LTU-ORION 1

podion.

ltu·orion·1
PRODUCT OVERVIEW & SPECIFICATIONS

REV-C

DESCRIPTION

Wheelchair accessible multimedia lectern. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

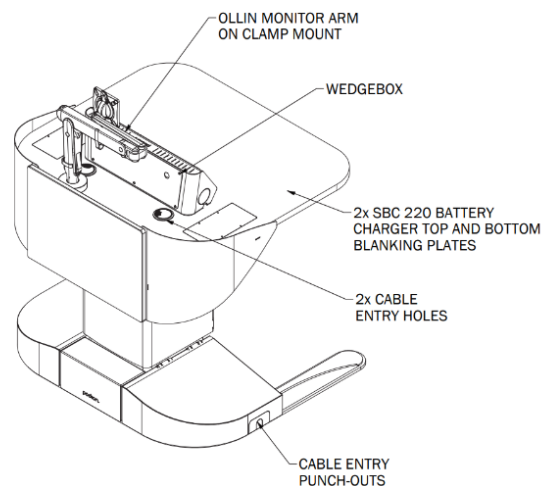
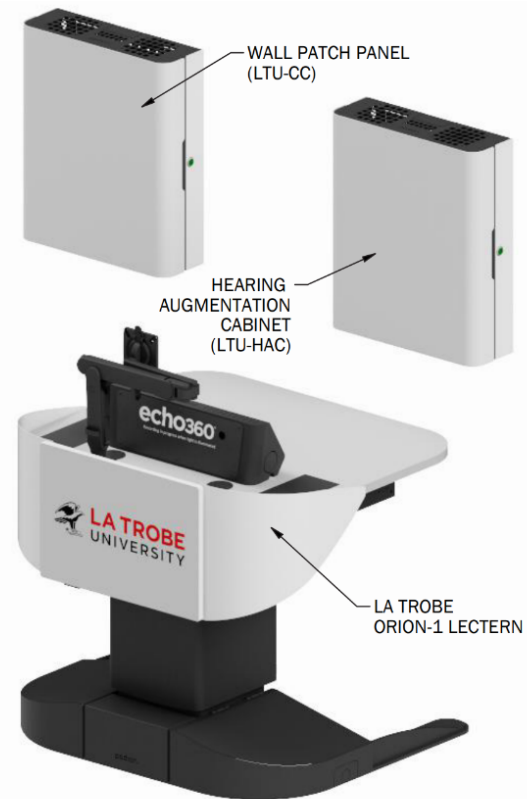
- 1x La Trobe Orion-1 Lectern, details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE ORION-1 DETAILS:

- 850mm x 950mm benchtop in Oyster Grey
- Electronic height adjustment 800-1100mm
- Total rack space: 8RU
- 1x 3RU slide out rack on presenter side
- 1x 5RU slide out rack on audience side
- Lockable logo panel with La Trobe University Vinyl Logo
- Hafele 0120 cam locks
- 2x Fans installed to 5RU rack area
- 1x 1RU micro PC cover plate
- 1x 1RU shelf located in top of 5RU rack
- 2x 1RU vented blanking plates in 3RU rack
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located in top back of 5RU rack on fixed strips with 1.5m extension lead heat shrink connection velcro strapped

BENCHTOP ACCESSORIES:

- 1x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x Hinged storage pocket (supply loose)
- Wedgebox (LTU-WB), details on page 3



11.31 AV PODION Lectern LTU-ORION 2

podion.

ltu·orion·2 **REV-C**

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Wheelchair accessible multimedia lectern. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

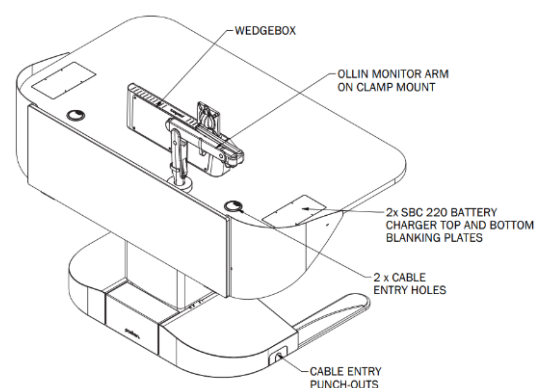
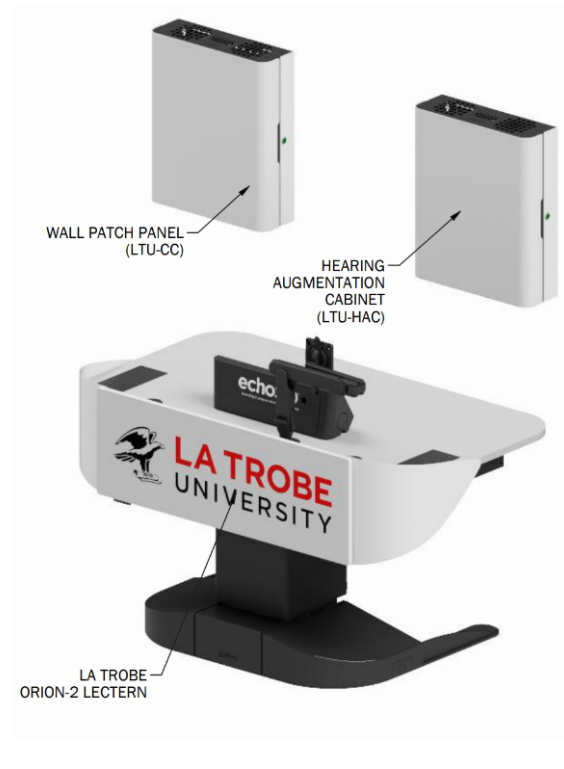
- 1x La Trobe Orion-2 Lectern, details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE ORION-2 DETAILS:

- 850mm x 1500mm benchtop in Oyster Grey
- Electronic height adjustment 800-1100mm
- Total rack space: 16RU
- 2x 3RU slide out rack on presenter side
- 2x 5RU slide out rack on audience side
- Lockable logo panel with La Trobe University Vinyl Logo
- Hafele 0120 cam lock
- 2x Fans installed to 5RU rack area
- 1x 1RU Micro PC bracket with blanking plate, compatible with HP EliteDesk 8 Mini
- 2x 1RU shelf located in top of 5RU rack
- 5x 1RU vented blanking plates in 3RU racks
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located in back of 5RU rack LH presenter side with 1.5m extension lead heat shrink connection velcro strapped

BENCHTOP ACCESSORIES:

- 1x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x Hinged storage pocket (supply loose)
- Wedgebox (LTU-WB), details on page 3



11.32AV PODION Lectern LTU-ORU-1650

podion.

ltu·oru·1650
PRODUCT OVERVIEW & SPECIFICATIONS

REV-E

DESCRIPTION

Wheelchair Accessible Height Adjustable Lectern with reversible design. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

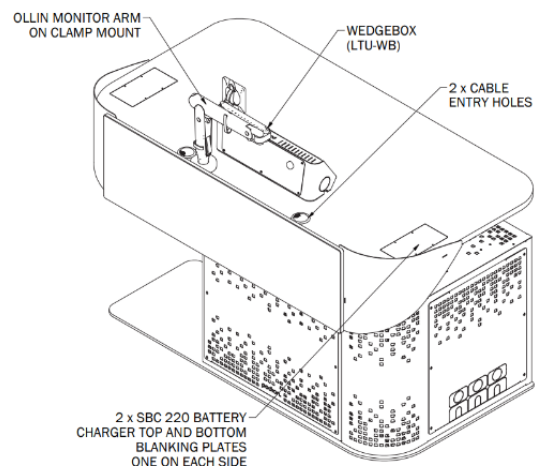
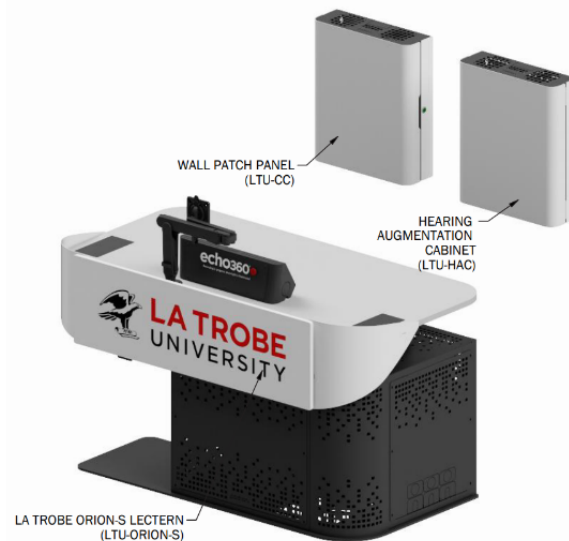
- 1x La Trobe Orion-S Lectern (LTU-ORION-S), details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE ORION-S DETAILS:

- 1x Ollin monitor arm on clamp mount 1650mm x 875mm benchtop with gas strut lift
- Electronic Height Adjustment: 865 - 1165mm H
- 12RU roll in rack
- 2x full depth 1RU shelf in roll in rack position RU 7 & 11 from bottom
- 2 x 3RU slide-out rack behind logo panel
- Lockable logo panel with La Trobe University Vinyl Logo
- 2x Hafele 0120 Cam Lock
- 4x active cooling fans, 2x installed to bottom face of top panel of audience side of roll in rack cabinet and 2x in top rack with 3m cable
- 1x side mounted 2RU bracket for network switch located to left hand side of roll in rack with cable management panel and guard
- 1x 1RU Micro PC bracket with blanking plate, compatible with HP EliteDesk 8 Mini
- 5x 1RU perforated blanking plates on presenter side
- 2x 400mm 1RU shelf in top rack
- 1x cable chain
- Internal cabinet mounting rail guide for roll in rack
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located in center of top rack with 1.5m extension lead heat shrink connection velcro strapped (3m total)
- APC NetShelter Switched Rack PDU - AP7920B - located in back corner of roll in rack cabinet

BENCHTOP ACCESSORIES:

- 1x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x hinged storage pocket (supply loose)
- 1x Wedgebox (LTU-WB), details on page 3



11.33AV PODION Lectern LTU-TDP-5RU

podion.

ltu.tdp.5ru

REV-D

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Height adjustable Touch Down Point. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

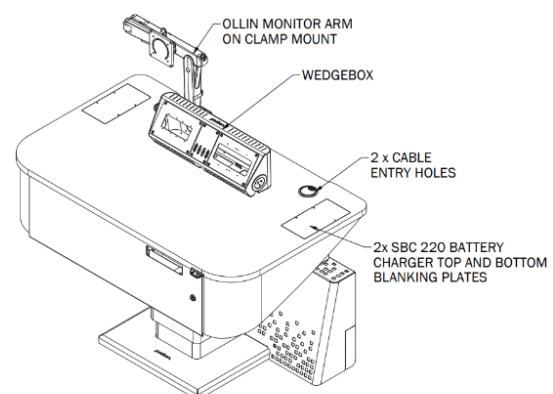
- 1x La Trobe 5RU Touch Down Point, details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE 5RU TOUCH DOWN POINT DETAILS:

- 1195mm x 730mm benchtop in Oyster Grey
- 50mm scalloped back edge
- Electronic Height adjustable: 760 - 1060mm
- 1x 5RU slide-out rack (behind logo panel)
- 1x 5RU half rack with micro PC cradle, compatible with HP EliteDesk 8 Mini
- Lockable door with La Trobe University vinyl logo
- Hafele 0120 cam lock
- 2x 1RU shelves
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located in top of 5RU rack with 1.5m extension lead heat shrink connection velcro strapped

BENCHTOP ACCESSORIES:

- 1x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x Hinged storage pocket (supply loose)
- 1x Wedgebox (LTU-WB), details on page 3



11.34AV PODION Lectern LTU-TDP-AVC

podion.

ltu.tdp.avc

REV-D

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Wall located touch down point with roll in rack. Comes as a bundle with hearing augmentation cabinet and wall patch panel.

BUNDLE INCLUDES:

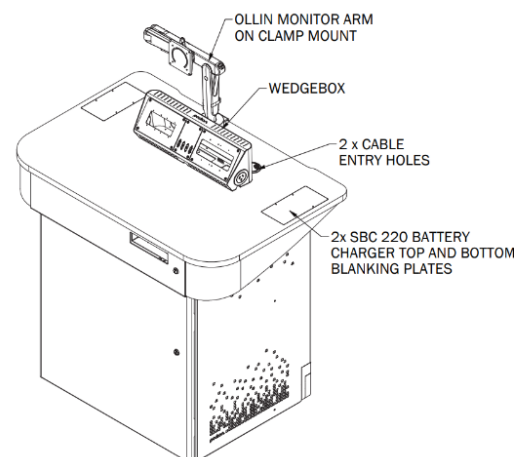
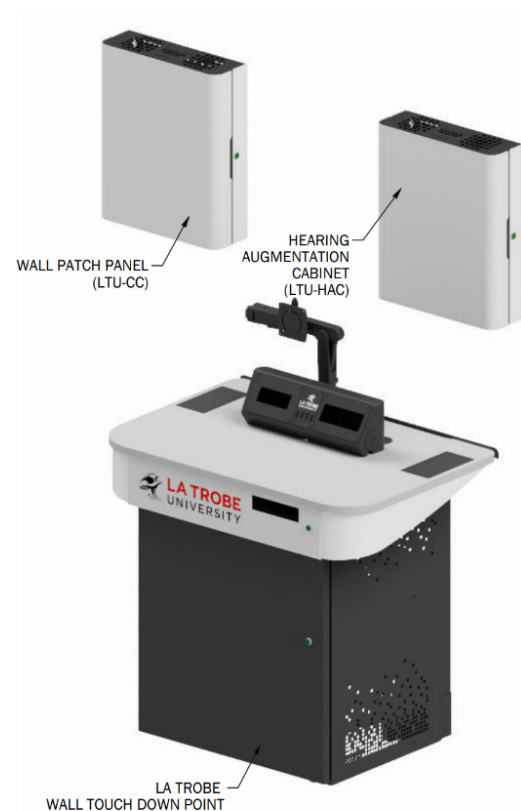
- 1x La Trobe Wall Touch Down Point, details on page 1 & 2
- 1x Hearing Aug Cabinet (LTU-HAC), details on page 4 & 6
- 1x Wall patch panel (LTU-CC), details on page 5 & 6

LA TROBE WALL TOUCH DOWN POINT DETAILS:

- 1125mm x 750mm benchtop in Oyster Grey
- 50mm Scalloped benchtop back edge
- 1000mm height benchtop
- Lockable door with La Trobe University vinyl logo applied
- 2x Hafele 0120 cam locks
- Micro PC Cutout + mounting cradle, compatible with HP EliteDesk 8 Mini
- 12RU Roll-in AV Rack
- 2x 1RU shelf located in roll in rack installed at RU 7 and 11
- Serveredge 2RU Horizontal Basic 12 Port PDU - SEDG-12P-GPO-C14 - located in top left of micro PC rack on fixed strips with 1.5m extension lead heat shrink connection velcro strapped rear
- APC NetShelter Switched Rack PDU - AP7920B - location bottom right on fixed rack strips rear

BENCHTOP ACCESSORIES:

- 1x Ollin monitor arm on clamp mount
- 2x Cable Entry Benchtop Points
- 2x SBC 220 Battery Charger holder top and bottom blanking plates installed
- 1x Hinged storage pocket (supply loose)
- 1x Wedgebox (LTU-WB), details on page 3



11.35AV PODION LTU-W4/8RU

podion.

ltu-w4ru

REV-A

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Expandable Wall-mountable Vertical Rackmount Unit.

CONFIGURATIONS:

- 4RU:
 - 878mm W x 241mm D x 1260mm H
 - Product code: LTU-W4RU
 - Kicker panel at the base
- 8RU:
 - 878mm W x 241mm D x 2410mm H (2 x W4RU vertically stack together)
 - Product code: LTU-W8RU
 - Kicker panel at the base
 - Connecting bracket between two units

Each W4RU unit includes:

- Modular rackmount brackets
 - 2 x Vertical (4RU capacity), can accommodate optional extra brackets (Product code: VRU-4)
 - 1 x Angled (4RU capacity - suitable for shallow components)
- Total RU space vertical depth: 910mm
- Lockable door
- Rear wall knockouts
 - GPO provisions
 - Cable pass-thru
- Cable knockouts throughout unit
- Cable management
 - Cabinet-level cable management corridor
 - Internal cabinet mounting rail
 - Tie-down points throughout
- Active cooling provisions for 8 Fans on top and bottom
- APC NetShelter Switched Rack PDU - AP7920B - installed to angled 4RU bracket



8RU CONFIGURATION



4RU CONFIGURATION

11.36AV PODION Wedgebox

podion.

ltu.wb

REV-A

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

Benchtop mounted AV Wedgebox for La Trobe University.

INCLUDES:

- Mounting plates with provisions for
 - 1x Crestron 1060 (side/reversible)
 - 1x Q-SYS TSC-101-G3 (side/reversible)
 - 4 x USB A/C fly leads (center)
- 1x Rear access panel with decal and provisions for recording light (not supply by Podion)
- 2x Punch outs provision for echo single gpo, one on each side
- 1x Echo single GPO installed to right side from presenter view
- 2x USB A and 2x USB C fly leads installed and La Trobe logo decal applied to center mounting plate

OPTIONAL PARTS:

- Side mounting plate with
 - 1x Echo gpo
 - 1x XLR shock mount
 - 2x Chassis mount
 - 2x Chassis mount with punch outs
- Side blanking plate
- Center blanking plate
- Rear access panel without recording light/decal



11.37AV PODION LTU-POD 4

podion.

ltu.pod.4

INT.

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

A portable, height-adjustable lectern with digital signage for La Trobe University.

INCLUDES:

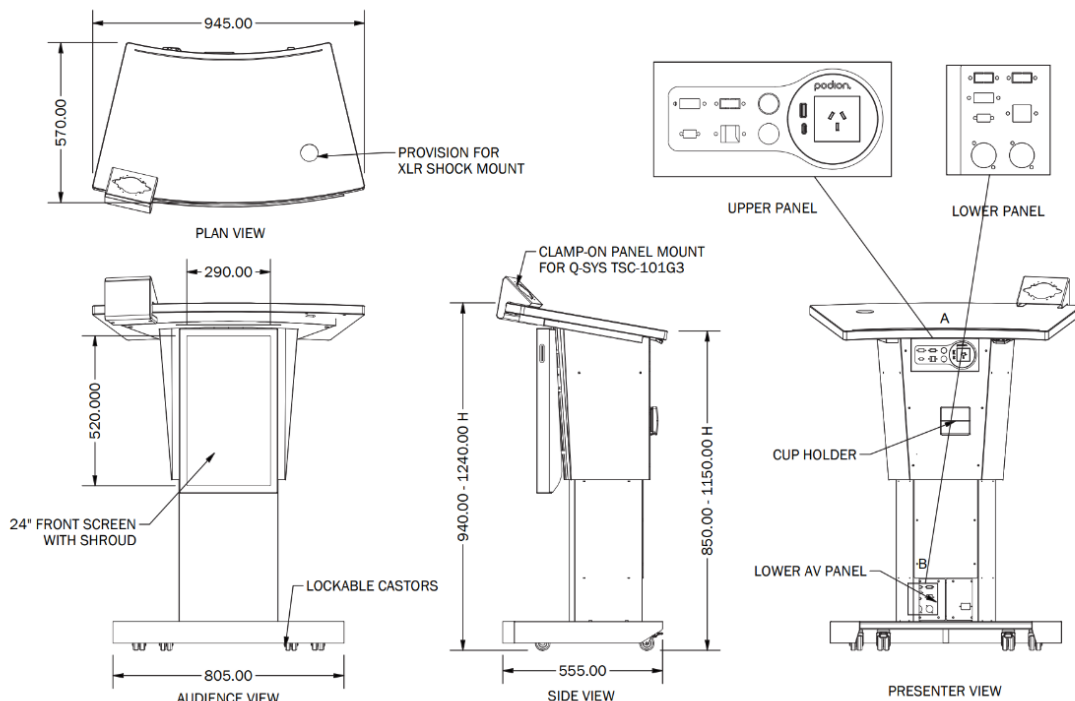
- 945mm x 570mm benchtop
- Electronic height adjustment: 850mm - 1150mm
- 24" front screen with shroud enclosure
- 1 x provision for XLR shock mount
- 1 x clamp-on panel mount to suit Q-SYS TSC-101G3
- Upper integrated AV connectivity panel with provisions for
 - HDMI, USB-C, Ethernet, reading light switch, and GPO
- Lower integrated AV connectivity panel with provisions for
 - XLR output, HDMI, USB-C, ethernet, and IEC power
- 1 x metal rail paper stopper
- 1 x cup holder
- Lockable castors

OPTIONAL ACCESSORIES:

- Media player for digital signage
- Acrylic front screen cover with printed logo
- Goose-neck clamp
- Goose-neck microphone
- Goose-neck LED reading light
- Quilted storage bag



Note: Digital signage with logo shown.
Require optional media player or client custom input.



11.38AV PODION LTU-POD P

podion.

ltu.pod.p

INT.

PRODUCT OVERVIEW & SPECIFICATIONS

DESCRIPTION

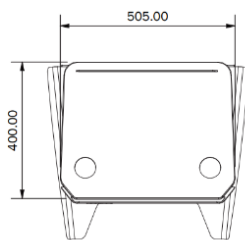
Portable and lightweight roll away lectern for La Trobe University.

INCLUDES:

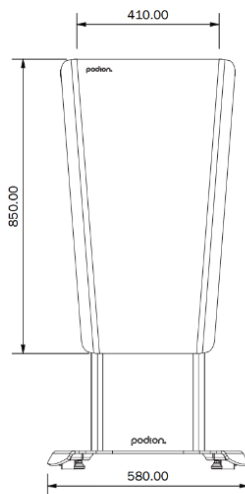
- Latrobe logo panel
- 2 x XLR shock mounts
- 1 x Metal rail paper stopper
- 2 x adjustable levelling feet on audience side
- 2 x built-in wheels on presenter side
- Built-in cable management system

OPTIONAL ACCESSORIES:

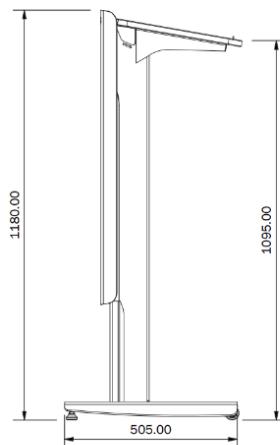
- Goose-neck clamp
- Goose-neck microphone
- Goose-neck LED reading light
- Quilted storage bag



PLAN VIEW



FRONT VIEW



SIDE VIEW



11.39PANDUIT Certificate Sample



Certification Plus™ System Warranty Certificate

Panduit Corp. warrants for a period of 25 years from the Warranty Registration Date to:

La Trobe University Bendigo Campus @ Edwards Road, Flora Hill, Victoria 3552
Australia

herein after known as "Customer", for the structured cabling system designated as

La Trobe Head of Campus Offices @ Edwards Road, Flora Hill, Victoria 3552
Australia

- That each registered link and/or channel will meet or exceed the performance requirements of the designated link and/or channel classification defined in the Commercial Building Telecommunications Cabling Standards listed on this Certificate, provided it is installed in accordance with the designated standard classification.
- That each registered link and/or channel will support all current and all future network applications designed to run on the designated link and/or channel classification defined in the Commercial Building Telecommunications Cabling Standards listed on this Certificate, provided the network equipment operates in accordance with the designated standards, and the connectivity hardware, the cabling, and the installation meet the performance specifications of the designated standards classification.
- That all Panduit connectivity hardware and cable used in the structured cabling system will be free of defects in material and workmanship under normal handling and use. Connectivity hardware is defined as Panduit-branded passive copper and optical fiber connectors and adapters, patch cords, modules, patch panels, cable management and related mounting hardware. All other hardware, including without limitation, active devices used for power, monitoring or control are not covered by this Warranty. Cable is defined as Panduit-branded or another cable manufacturer's branded cable that has been approved by Panduit at the time of the Warranty Registration Date for the performance level specified for each link and/or channel.
 - In the event that any of the connectivity hardware and/or cable (as defined above) used in the structured cabling system fails to perform as specified above in 1's 1.3, Panduit will repair and/or replace the defective connectivity hardware and/or cable or will contract with the Panduit ONE™ Enterprise Structured Cabling Partner accredited in the Deploy Competency, or an Industrial Network Infrastructure Partner accredited in the Deploy Competency or with a Panduit Registered Company (hereinafter, the "Partner"); to complete the work in accordance with the Terms and Conditions set forth in this Certification Plus System Warranty Certificate.
 - If Customer experiences performance problems with the structured cabling system and believes that the connectivity hardware or cable are the cause, Customer should contact their original Partner who performed the installation within 10 business days of the start of the problem. The Partner will notify



Certification Plus™ System Warranty Certificate

Panduit, in the event the original Partner is unresponsive or unable to solve the problem, Customer should contact the Panduit ONE™ Partner Operations team at partnersupport@panduit.com within 10 days of the original performance problem.

SYSTEM PROFILE - The Warranty Registration Date is the date the last test report was completed by the Partner. The following links/channels are covered by this Warranty:					
COPPER LINKS SUBMITTED FOR WARRANTY			FIBER LINKS SUBMITTED FOR WARRANTY		
Profile Type:	Quantity:	Classification:	Profile Type:	Quantity:	Classification:
Copper Horizontal Links	34	Classification EA Permanent Link			
Commercial Building Telecommunications Cabling Standards					
ISO/IEC Standards are the only controlling Commercial Building Telecommunications Cabling Standards and Telecommunications Infrastructure Standards for Industrial Premises for this Certification Plus™ System Warranty					
TERMS AND CONDITIONS - The following terms and conditions apply to this Warranty					
In order for the structured cabling system and/or additional links and/or channels to be covered by this Warranty, the following requirements must be met, or the Warranty will be void:					
1. They must be installed by a Partner who is trained and approved by Panduit at the time of installation of the project and on the Warranty Registration Date.					



Certification Plus™ System Warranty Certificate

- All links and channels must be identified in valid certified passing test reports that are submitted by the Partner to the Panduit ONE™ Partner Operations Team and approved by the Panduit ONE™ Partner Operations Team.
- Each registered cable link and/or channel must be 100% constructed of Panduit connectivity hardware and Panduit-branded cable or cable manufactured by another cable manufacturer that has been approved by Panduit on the Warranty Registration Date and has been approved for the designated link and/or channel classification defined in the Commercial Building Telecommunications Cabling Standards listed on this certificate. This Warranty only covers Panduit connectivity hardware and cable that have been approved by Panduit on the Warranty Registration Date. All other products used in the registered structured cabling system are excluded and not covered by this Warranty.
- The structured cabling system must be designed, installed and maintained throughout the warranty period per the Commercial Building Telecommunications Cabling Standards listed on this certificate, as well as all manufacturers' guidelines and instruction sheets, except where authorized in writing by the Panduit ONE™ Partner Operations Team.
- This Warranty does not cover defects where the structured cabling system has been subjected to misuse, abuse, neglect, accidental damage, fire, flood, water submersion, explosion, acts of God, war or terrorism, improper repair, alteration, installation or design, or any other events outside of Panduit's control.
- This Warranty does not cover the installation or maintenance of the system or products other than connectivity hardware and cable as defined in this Certification Plus™ System Warranty Certificate. This Warranty is void if the defective link and/or channel is comprised of counterfeit products or products that were not purchased by an authorized Panduit distributor or reseller.
- UNDER NO CIRCUMSTANCES SHALL PANDUIT BE OBLIGATED TO PAY FOR REPAIRS THAT EXCEED THE ORIGINAL AMOUNT PAID BY THE CUSTOMER FOR THE PANDUIT CONNECTIVITY HARDWARE AND/OR CABLE USED IN THE AFFECTED LINK AND/OR CHANNEL OF THE STRUCTURED CABLING SYSTEM AND PANDUIT WILL HAVE NO LIABILITY EXCEPT TO THE EXTENT THE PERFORMANCE FAILURE IS DUE TO PANDUIT CONNECTIVITY HARDWARE AND/OR CABLE. SUBJECT TO THE FOREGOING AND TO THE OTHER TERMS AND CONDITIONS OF THIS WARRANTY, REPAIR AND/OR REPLACEMENT OF THE CONNECTIVITY HARDWARE AND/OR CABLE USED IN THE AFFECTED LINK AND/OR CHANNEL OF THE STRUCTURED CABLING SYSTEM IS PANDUIT'S SOLE AND EXCLUSIVE OBLIGATION AND CUSTOMER'S SOLE AND EXCLUSIVE REMEDY.
- THIS WARRANTY IS MADE IN LIEU OF AND EXCLUDES ALL OTHER WARRANTIES, EXPRESSED OR IMPLIED, ARISING BY LAW OR CUSTOM, INCLUDING WITHOUT LIMITATION, IMPLIED WARRANTIES OF MERCHANTABILITY, FITNESS FOR PARTICULAR USE, NON-INFRINGEMENT OR ANY OTHER MATTER. PANDUIT SHALL NOT BE LIABLE FOR ANY OTHER INJURY, LOSS OR DAMAGE, WHETHER DIRECT OR CONSEQUENTIAL, ARISING OUT OF THE USE OF, OR THE INABILITY TO USE, THE STRUCTURED CABLING SYSTEM, IN NO EVENT WILL



Certification Plus™ System Warranty Certificate

PANDUIT BE LIABLE FOR ANY INCIDENTAL, EXEMPLARY OR CONSEQUENTIAL DAMAGES, INCLUDING, BUT NOT LIMITED TO DAMAGES FOR LOST DATA, TIME, PROFITS, REVENUES OR ANY OTHER ECONOMIC DAMAGES ARISING OUT OF THE USE OF OR THE FAILURE OF A SYSTEM. THIS CLAUSE SHALL SURVIVE FAILURE OF AN EXCLUSIVE REMEDY.

9. This Certification Plus™ System Warranty shall be governed by and construed in accordance with the laws of the State of Illinois, USA. The United Convention on Contracts for the International Sale of Goods shall not apply. The Customer acknowledges that as a condition to receiving the Certification Plus™ System Warranty, Customer unconditionally submits to the jurisdiction of the Illinois state and federal courts. If any portion of the Certification Plus™ System Warranty is not enforceable due to local legal requirements, then such specific language shall be modified to meet local legal requirements consistent with Panduit's intent.

Warranty Number: 871835	Warranty Registration Date: October 24, 2025
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