Learning Support Spaces

Design Standard

Revision: B
Date: 07 October 2022

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TAFE NSW would like to pay our respect and acknowledge Aboriginal and Torres Strait Islander Peoples as the Traditional Custodians of the Land, Rivers and Sea. We acknowledge and pay our respect to the Elders; past, present and emerging of all Nations.

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This document was commissioned by TAFE NSW and prepared by Architectus Pty Ltd.

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This document is a design standard only. The project team retains responsibility for the coordination, design, procurement and delivery of any design project which will include taking all reasonable steps to make sure that designs comply with all applicable Australian Standards required by the NCC, WHS Legislation, Statutory planning approval processes, TAFE NSW Procedures & Policies, and all other relevant statutory requirements.

Rev	Issue date	Issue	Amendments since previous issue
A	03 June 2022	Revision A	Amended with Stakeholder Feedback
B	07 Oct 2022	Final for approval	Comments incorporated

TAFE NSW Meadowbank by Architectus

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Introduction

1 Introduction

1.1 Overview

The 'Learning Support Spaces Design Standard' is intended to improve the quality of spaces that support learner activities outside of timetabled classes, and achieve consistency in quality and provision of these spaces across TAFE NSW. This design standard provides specific guidelines for the planning, design and construction of these spaces.

Space types covered by this standard include:

- Libraries
- Learner meeting spaces
- Rest, recharge and collaboration spaces
- Learner common spaces
- Cultural spaces
- Parenting rooms

This Design Standard applies to all projects which include these spaces which may include new buildings, alterations or additions to existing buildings, or a cluster of spaces within a building.

The objectives of this Design Standard are to:

- Define the guiding design strategies for the successful delivery of Learning Support Spaces across TAFE NSW, including:
  - Respecting and enhancing TAFE NSW's diverse and inclusive culture
  - Adapting to current and emerging learning needs
  - Delivering efficient, flexible and diverse spaces
- Provide performance-based requirements to allow flexibility for design and delivery of these spaces that are adaptable to multiple scales, locations and the changing needs of our users
- Provide high level guidance towards the briefing, project planning and design processes

1 Introduction

1.2 Audience

The table below broadly defines the numerous and diverse groups this Design Standard is written for and their contribution to the planning, design, delivery, and ongoing maintenance.

Group	Members	Group's Role
Consultants	▪ Architects/Interior Architects ▪ Education Specialists ▪ Engineers and specialist consultants ▪ Project Managers ▪ NSW Government Agencies	▪ Guide planning and design. ▪ Understand principles, strategies and how the design of Learning Support Spaces can contribute to improved user experience, learning, and teaching. ▪ Collaborate with the TAFE NSW project team and TAFE NSW operations and end users throughout the design project ▪ Identify opportunities for innovation including but not limited to learning environments, industry partnerships and sustainable design.
TAFE NSW Project Team	▪ Programme Managers ▪ Design Managers ▪ Strategic Asset Planning ▪ Sustainability Group ▪ Teaching & Learning Representatives ▪ Procurement Group ▪ Logistics ▪ Systems Group ▪ Safety & Security Group ▪ Physical Access Advisory Group ▪ Work Health & Safety	▪ Establish project requirements and define the project brief and scope based on project complexity and scale. ▪ Manage the delivery of the project including inputs from users, designers, consultants, contractors and end users throughout the life of project. ▪ To continually review the design and deliverables across multiple disciplines against the requirements of this Design Standard. ▪ To guide project stakeholders through the design development and facilitate collaboration with all stakeholders
TAFE NSW Operations and End Users	▪ Library strategy group ▪ Teaching Staff ▪ Learner Support Services ▪ Diversity and Inclusion Team ▪ Cultural groups and associations ▪ Learners ▪ Facilities Management ▪ Education Planning & Services Delivery ▪ Product Group ▪ Student Experience Group ▪ Student Engagement Team ▪ Change Management Group ▪ Customer & Stakeholder Relations ▪ Delivery Implementation & ▪ Performance ▪ Industry Partners	▪ Understand design principles and strategies & how the design can better support learning, teaching and user experience. ▪ Understand how spaces can be used for innovative delivery and adapted to meet future needs. ▪ Monitor or assist with evolving user needs across the project life cycle. ▪ Inform service delivery planning and identification of future trends in vocational education.
Contractors & Suppliers	▪ Construction Contractors and subcontractors ▪ Product suppliers	▪ To construct learning support spaces in accordance with the design and this Design Standard ▪ To provide advice to the project team regarding products or systems that comply with this Design Standard ▪ To provide training to end users as to how to use and operate all spaces and systems.

1 Introduction

1.3 Standards & Documents

The following standards and documents, as relevant to the project, should be read in conjunction with the Design Standard. This list is not exhaustive and other documents may apply.

1.3.1 External Requirements

Statutory Requirements

- State Environmental Planning and Assessment Legislation
- All Commonwealth, State and Local Government Legislation
- National Construction Code/Building Code of Australia
- Work Health and Safety Act
- Disability Discrimination Act
- Disability (Access to Premises - Buildings) Standards
- Disability Standards for Education
- Safework NSW Authority Requirements
- Fire & Rescue NSW Requirements
- Multicultural NSW Act 2000
- NSW Anti-Discrimination Act
- Government Sector Employment Act 2013
- Any other authority having jurisdiction

NSW Government Policies & Strategies

- NSW Department of Planning and Environment
  - Government Resource Efficiency Policy (2019)
  - Workplace Design Principles (2020)
  - Net Zero Plan Stage 1: 2020-2030
- Government Architects NSW
  - Better Placed - a Strategic Design Policy for the Built Environment of NSW (2017)
- NSW Treasury
  - Treasury Circular Breastfeeding Policy (2014)
- Department of Communities and Justice
  - NSW Disability Inclusion Plan 2021-2025

External Certification Schemes

- Green Building Council of Australia (Green Star)
- Tertiary Education Facilities Management Association (TEFMA)

1 Introduction

1.3 Standards & Documents

1.3.2 TAFE NSW Requirements

TAFE NSW Overarching Policies

- Environmental Sustainability Design Guideline
- Innovative Reconciliation Action Plan 2020-2022
- Diversity and Inclusion Policy
- Work Health and Safety Policy
- Disability Inclusion Action Plan and Implementation Guide
- Multicultural Plan 2020-2022
- Asset Management Policy

TAFE NSW Interconnected Training Network

- All other Design Standards relevant to project

1 Introduction

1.4 Definitions

Abbreviation	Definition
AFL	Above Floor Level
AI	Artificial Intelligence
AR	Augmented Reality
AS	Australian Standard
AV	Audio Visual
BCA	Building Code of Australia
BMS	Building Management Systems
BYOD	Bring Your Own Device, refer to TAFE NSW Electrical Services Design Standards
CCTV	Closed-circuit Television
CLP	Connected Learning Point, as defined in the TAFE NSW Connected Learning Point Design Standard
Connected Learning	Virtually connects learners and teachers at different TAFE NSW campuses and other remote learners
DIAP	TAFE NSW Disability Inclusion Action Plan
FFE	Furniture, Fittings & Equipment
GFA	Gross Floor Area
IT	Information Technology
ITN	Interconnected Training Network
LSS	Learning Support Space
MFD	Multifunction Devices (printers/scanners)
MTH	Multi Trade Hub
NCC	National Construction Code [Formerly BCA]
NR	Noise Rating
PAAG	Physical Access Advisory Group
TEFMA	Tertiary Education Facilities Management Association
This Design Standard	TAFE NSW Learning Support Spaces Design Standard
VR	Virtual Reality
UFA	Usable Floor Area
WCs	Water Closets/Bathrooms
WHS	Work Health & Safety

Applications

2 Applications

2.1 Scope

2.1.1 Defining a Learning Support Space

Learning Support Spaces are a collection of facilities provided on campus to support learners in their learning and sense of community. This Design Standard will define the spaces categorised as Learning Support Spaces including libraries, learner commons, parenting rooms and cultural spaces.

These must be safe, welcoming, supportive and engaging spaces for learners to learn and interact with staff, industry representatives and each other. These spaces must incorporate Universal Design Principles and align with contemporary learning and teaching practices.

This Design Standard recognises that libraries are no longer places to simply borrow and read books and that learners come to library spaces to seek information, research, read and also to participate in group activities and socialise. Contemporary libraries play a diverse role and host many functions, activities and services which include collaborative meeting spaces, quiet spaces for focussed work, technology supported study spaces as well as places to rest, wait and recharge.

Learner commons provide spaces to support learner wellbeing, interaction, rest and study across TAFE NSW campuses. These spaces may be integrated with other facilities such as libraries, or dispersed across a campus adjacent to other teaching, learning or support areas.

TAFE NSW embeds a culture of inclusion and support for all learners, staff and visitors. Our people come from culturally and linguistically diverse backgrounds, have a range of abilities, form many different communities and are from many different stages of life. This design standard also includes spaces for reflection, meditation, prayer, cultural activities, safe spaces and parenting rooms to support the many needs of our users.

2 Applications

2.2 Project Application

2.2.1 Application Of This Design Standard To Project Types and Scales

Due to differing project requirements, priorities may vary from project to project. The below outlines the level of adherence to this Design Standard that is required for the scale of the project.

New Buildings and Major Refurbishments

This Design Standard applies to all new building projects and major refurbishments that include learning support spaces as defined by this standard. These projects must comply with this Design Standard.

Minor Refurbishments

This Design Standard applies to all minor refurbishment projects. While it is acknowledged that these projects may have tight scoping and spatial constraints, TAFE NSW Learning Support Spaces must provide spaces and settings that support learner groups. These projects should make every effort to comply with this Design Standard, in particular the design strategies.

Project Type Definitions

- New buildings are projects that include the construction of stand-alone buildings, buildings connected to existing buildings, and additions to or extensions of existing buildings for new facilities.
- Major refurbishments are projects that include substantial changes to internal spaces of existing buildings, such as gutting and reconfiguration of internal walls and spatial layouts.
- Minor refurbishments are projects that include refitting of existing internal spaces, with little or no changes to internal walls and spatial layouts.

2 Applications

2.2 Project Application

2.2.2 How This Design Standard Applies

Relationship to Other Requirements

This Design Standard is intended to support and assist the design and delivery of Learning Support Spaces. All Learning Support Space projects must comply with this Design Standard.

This Design Standard must also be read in conjunction with:

- Statutory and legislative requirements
- Contractual Agreement with TAFE NSW
- The Project Brief and relevant project requirements
- Other TAFE NSW Design Standards

Where there is a conflict between this Design Standard and any statutory or legislative requirement, the more onerous standard applies.

Mandatory/Must:

Where the word “must” is used, this indicates that a statement is mandatory

Preferred/Should:

Where the word “should” is used, this indicates that a statement is a recommendation

Contractual Responsibility

The content of this Design Standard does not relieve any consultant, contractor or supplier from their contractual responsibility relevant to the project.

This document does not relieve any user of their responsibility to comply with the requirements of all relevant statutory codes, standards and guidelines.

If this document appears to contradict or deviate from good practice or any statutory requirements, this issue is to be brought to the attention of the TAFE NSW party/parties who are responsible for the delivery of the Learning Support Space project.

Queries

Any project specific queries are to be raised through their TAFE NSW Project Lead.

Design Strategies

3 Design Strategies

3.1 Brief and Scope

A project return brief must be developed for each project that includes Learning Support Spaces and must include:

- The agreed project brief and scope of work
- An accommodation schedule
- The number of enrolments the project will support, including projected growth
- The capacity of the building or space at any one time
- The types of spaces required to be provided
- Projected use profile of the spaces
- Stakeholder group(s) to be included in consultation
- Environmental constraints and opportunities
- Budget constraints and opportunities

3.1.1 Developing The Return Brief

The return brief must be established at the commencement of the project and reviewed at the beginning of each project phase. The brief will reflect the needs of the various components that form part of the project including any learning support space requirements.

Project requirements may change during the life of the project due to changes in enrolment projections, skills demand, government initiatives, partnerships and policies, so it is important to review the document regularly.

The return brief must be developed in collaboration with relevant TAFE NSW stakeholders, which may include but is not limited to:

- Investment and Capital Delivery Team
- Strategy and Research Group
- Strategic Planning
- Product Group
- Student Engagement Team
- Relevant teaching and library staff
- Physical Access Advisory Group (PAAG)
- Work Health and Safety Group
- Systems Group
- Managers TAFE Services or TAFE Service Coordinator where relevant to a particular site
- Cultural Groups and Associations
- Any other project stakeholders

Learner Consultation

It is recommended to undertake learner consultation which is relevant to the specific site where the project is taking place. Consultation should seek feedback from learners with a range of study and support needs, and with different use profiles.

3 Design Strategies

3.1 Brief and Scope

Project Considerations

Once the project requirements have been established, the project team must map the spatial requirements of the Learning Support Spaces to determine the accommodation schedule. Each space must be fit for purpose and appropriately sized to enable the activities required. The following provides a list of prompts to assist in further developing the project scope:

Space

- Quantity, size and capacity of space(s) to be provided
- Whether spaces are new or refurbished, and if refurbished the condition of the existing spaces
- Whether any spaces have specific requirements such as visual and acoustic privacy

Campus relationships

- Review the Campus masterplan, where available
- Undertake a gap analysis of what facilities are already available on site or that are shared with other providers on adjacent sites. Where gaps are identified, these spaces must be provided.
- Analysis of spatial relationships on campus and ideal location for proposed facilities (i.e. best connection to existing facilities or spaces).
- Adjacency requirements with other functions on site such as administration, learner services, canteens, CLPs, learning and teaching spaces, etc.

Course Profile and enrolments

- Courses delivered from the site and enrolments for each course
- Projected future growth

Occupancy

- Number of staff, learners and visitors expected to use the space
- Assessment of existing opening hours and security on campus and analysis of whether this meets the needs of the learner cohort
- User groups who will be using the spaces including cultural groups and/or associations
- Whether the proposed building design can be operated under the current staffing model. If not, how will additional staffing be funded?

Library

- Type of library service to be provided (i.e. staffless, staffed)
- Number of staff and work practices of library staff
- Size of book collection including digital collections and any books not on display such as course resources
- Size of other equipment to be loaned through the library including IT and course equipment hire

Learner Commons

- Percentage of GFA to be allowed as learner commons
- Whether learner commons will be located centrally or dispersed across the site
- Types of spaces to be provided as learner commons

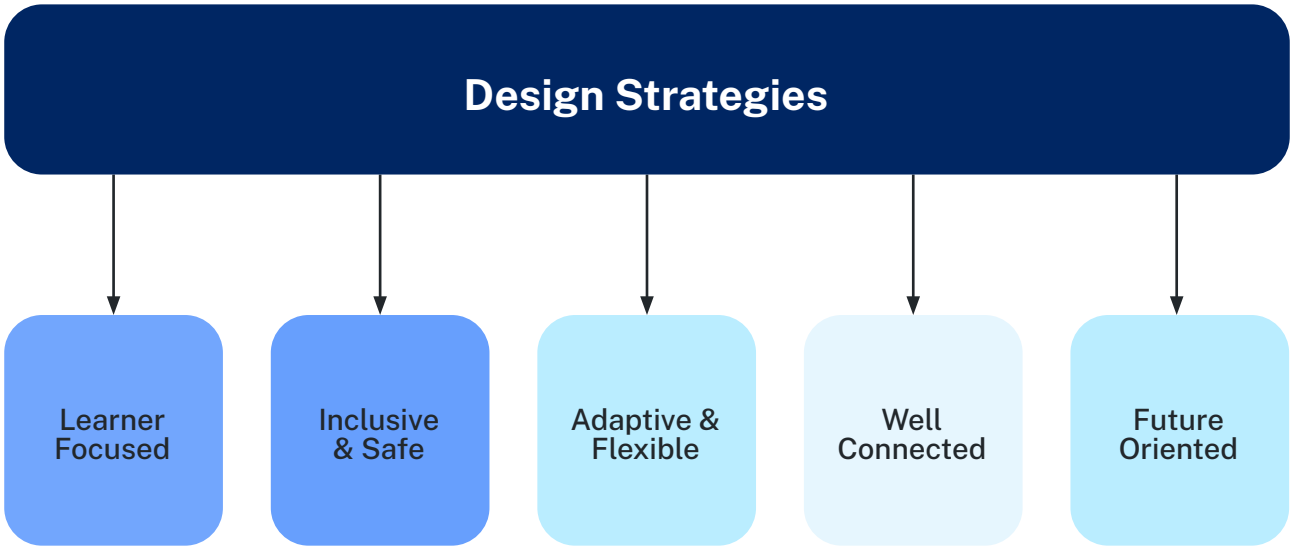
Construction

- Timing, staging, and undertaking works in occupied areas

3 Design Strategies

3.2 Overview

The following pages identify the design strategies and requirements which must be considered when planning, designing or delivering a Learning Support Spaces. The design strategies are listed under five categories; Learner Focused, Inclusive & Safe, Adaptive & Flexible, Well Connected and Future Oriented. These five design strategies describe key expectations for the Learning Support Spaces.



3 Design Strategies

3.3 Strategy 1: Learner Focused

Strategy	Background	Design Requirements
S1.1: Collaborative	TAFE NSW supports and fosters meaningful connections between learners, staff and industry partners. Spaces must support interdisciplinary learning, industry engagement and collaboration.	▪ Spaces must foster collaboration and exploration, in real life and virtually, through the provision of contemporary spaces which are well connected, diverse, flexible, user focused and supported by technology ▪ Design spaces to suit the needs of the users specific to each project ▪ Support in person and digital collaboration through the provision of technology ▪ Provide a diverse range of space types to suit user preferences
S1.2: Access to resources	Access to a range of resources including spaces and equipment is critical to maintaining and supporting customer experience and learning outcomes. Resources must be easy to locate on campus, easy to book or use and encourage access by all users.	▪ Locate library and learner commons on site close to main entry points and highly utilised spaces for learners ▪ Provide signage and wayfinding to identify all facilities ▪ Ensure physical and digital resources are easy to book, borrow or access
S1.3: Support learners on learning journey	Acknowledge the importance of access to TAFE NSW learner services and support networks to improve customer experience and learning outcomes.	Design spaces that enable physical and digital access to learner support services. Incorporate spatial adjacencies to other facilities, which may include: ▪ Aboriginal learner support services ▪ Disability support services ▪ Counselling and career development services ▪ Further education ▪ Study Support ▪ Library Services ▪ Learning Support
S1.4: Variety of spaces	Not all tasks are equal and not all tasks can be carried out in all spaces; some tasks may be noisy whilst others are better carried out in quiet spaces. Rooms and areas must be designed to suit the work type, function, group size, privacy and any other requirements. Learners must be able to choose spaces that support their tasks, needs and preferences.	▪ Provide a variety of diverse space settings to support different types of activities ▪ The design of each space should suggest its intended use through furniture and finishes selections ▪ Each space must be fit for purpose and address acoustics, privacy requirements, comfort level, group size and function
S1.5: Engaging Spaces	People linger in spaces where they feel comfortable. It is important to create spaces which are easy to access and where learners feel comfortable and supported.	Spaces should; ▪ Support interaction, learning and growth by being suitable for their intended activity ▪ Locate and design noisy spaces to not impact on quiet spaces ▪ Provide calm, comfortable environments for focus work, contemplation and rest where distractions and acoustic impacts are limited ▪ Provide sufficient facilities and spaces to encourage learners to stay and interact on campus

3 Design Strategies

3.4 Strategy 2: Inclusive & Safe

Strategy	Background	Design Requirements

S2.1: Sense of belonging	TAFE NSW is committed to creating a sense of place and belonging for all users including learners, staff and visitors.
	
	Create spaces within each site to encourage learners and the community to stay and enjoy the facilities while supporting their learning.
		▪ Create spaces that foster a sense of belonging by:
		  · Providing zones for learners, specific learner groups and cultural associations to showcase and celebrate their work
		  · Allowing space for artwork that reflects the local community
		  · Providing display areas, noticeboards and spaces that can showcase learner work
		▪ Design spaces as elements of the "sticky" or "magnetic" campus by:
		  · Providing adequate and comfortable amenities such as kitchens, lounges, spaces to rest and relax away from study
		  · Understand site specific patterns of learner use and what facilities need to be available at particular times of the day or week

S2.2: Cultural inclusion	All designs for TAFE NSW must support cultural awareness and enable all users to feel culturally safe and secure, regardless of their culture or language.	▪ Include stakeholders from all relevant cultural and community groups during the design phase:
		  · Understand the local demographics and key users including particular barriers they face to engaging and particular spatial requirements
		  · Maintain dialogue with stakeholders during the design and delivery of the project
		▪ Design for Country: create environments that are inclusive of the local indigenous cultural context in consultation with the indigenous stakeholder groups on campus and the campus Aboriginal Education and Engagement Coordinator

S2.3: Accessibility and universal design	TAFE NSW is committed to having an accessible physical and digital environment for staff and learners with a disability. All spaces covered by this Standard must embed inclusivity and accessibility.	▪ Incorporate Universal Design Principles into the design of all spaces ▪ Seek best practice design outcomes to accommodate users of all abilities. This may include users with limited mobility, who are vision or hearing impaired or who are neurodiverse
S2.4: Wayfinding	Support all users to easily navigate through the space, building and site. Understand that users may have different communication needs and provide systems to assist all users.	▪ Provide clear circulation zones which cannot be interrupted by furniture, fixtures and equipment. Furniture and equipment must not be positioned to impede circulation zones, change the wayfinding, expected path or cause trip hazards ▪ Provide intuitive wayfinding to main help/assistance zones ▪ Define main circulation zones through use of changed surface materiality and/or by bounding with fixed elements ▪ Ensure adequate circulation for assistance animals

3 Design Strategies

3.4 Strategy 2: Inclusive & Safe

Strategy	Background	Design Requirements
S2.5: Privacy	All spaces have varying degrees of visual and acoustic privacy based on the activities occurring and requirements of the space.	▪ Ensure stakeholder consultation and user research is carried out to define requirements and provide spaces with a range of appropriate visual and acoustic privacy levels ▪ Ensure visual and acoustic privacy is provided where functionally necessary ▪ Ensure that shared spaces have a consistent requirement for acoustic and visual privacy ▪ Review the location of spaces requiring a higher level of visual and/or acoustic requirements and position them in more discrete locations as opposed to adjacent busy areas and main thoroughfares
S2.6: Safety	Learners, staff and visitors have a right to be safe when attending TAFE NSW. All designs must support the physical and social health and well-being of all users.	▪ Engage with stakeholders to understand the hours of operation and any known safety concerns and constraints ▪ Plan safe and secure egress paths for all users during the design phase ▪ Isolated and out of sight spaces should be avoided to ensure visibility and supervision ▪ Ensure safe access to and from areas known to be accessed outside of normal hours. This may require additional lighting, upgrades to paths, duress and CCTV systems. Review safe paths of travel from all spaces to adjacent transportation and car parking ▪ Discuss with stakeholders a strategy for the storage of IT/AV ancillary items. Equipment should be welcoming and easy to use, but not easy to remove from the space to maintain usability for all

3 Design Strategies

3.5 Strategy 3: Adaptive & Flexible

Strategy	Background	Design Requirements
S3.1: Efficient spaces	Efficient use of space achieves better value for money and reduces the required building footprint and operational costs, often making space for other opportunities. Efficiencies can be found where spaces can be used for a variety of purposes and perform multiple functions.	▪ Actively look for opportunities for spaces to share uses . Examples include meeting rooms that could form a seminar space, kitchenettes adjacent casual spaces which form a learner lounge, cultural spaces which can support quiet or meditation spaces. ▪ Provide furniture which can support a range of modalities or be easily reconfigured to support various activities within the space ▪ Create spaces which are suitable for their intended use or activity (fit for purpose) ▪ Ensure spaces are spatially efficient and highly functional ▪ Provide spaces which are not subject or course specific ▪ Provide systems to support effective booking and timetabling
S3.2: Flexible and adaptable spaces	Design spaces that can adapt to changing needs over time including changes in learning needs, course delivery and future growth. Allow for a range of functions to be performed in each space. Ensure that spaces are designed purposefully, and consider how flexibility can support a wider range of uses without impacting their primary function.	▪ Provide mobile furniture and equipment to enable learners and staff to personalise their space. Ensure mobile furniture and equipment is easy to use and sufficient storage is provided when not in use ▪ Design building services to support adaptable and flexible spaces. Consider services grids and services zones to support user needs ▪ The use of operable walls must be on a critical needs basis. Investigate other suitable options where it is desired for multiple spaces to operate as one space

3 Design Strategies

3.6 Strategy 4: Well Connected

Strategy	Background	Design Requirements
S4.1: Location, connection and intersection	Design spaces which are well connected to other facilities on and off site, digital platforms and spaces, and which foster a sense of connection. Support learners to be well connected both physically and virtually including connection to their peers, staff, support services and industry partners.	▪ Test appropriate locations for the facilities proposed by master planning options across the site. Consider size, adjacencies, campus heart location, room for growth and ground floor location ▪ Document levers of high intersection, where many learners and cohorts cross during their travels to other areas across the campus – this intersection point may be know as the heart of the campus ▪ Provide virtual and physical connections to other areas on and off site ▪ Provide connections between functional spaces such as collaboration spaces, kitchens and tea points, social spaces, foyers, main entries and the outdoors
S4.2: Light and views	Visual and physical connection to the outdoors and biophilic design principles improves human well-being.	▪ Locate areas with access to natural light and views ▪ Ensure lighting is available to adequately light the spaces outside of daylight hours ▪ Ensure that glare control measures are provided to any spaces where presentations are made or to suit AV requirements ▪ Provide access to natural light and views to the exterior or adjacent spaces also offers an opportunity to celebrate learner work and outcomes by putting the learning and teaching on show.
S4.3: Intuitive AV, IT, connection and assistance	Provide technology to support connection within spaces, and virtually between sites. Technology should be intuitive, easy to use and support innovation and experimentation.	▪ Provide current technology that can be accessed by the intended users of all spaces. Ensure that design and servicing of spaces support future technological changes. ▪ Where possible, provide consistent technology across sites to streamline usability ▪ Provide pre-programmed settings for the building services such as lights, AV equipment, blinds and the like, via BMS ▪ Provide instruction manuals and training for users ▪ Ensure digital security of all technology and systems

3 Design Strategies

3.7 Strategy 5: Future Oriented

Strategy	Background	Design Requirements
S5.1: Technologically advanced	Technology supports the delivery of contemporary teaching, learning and research. Technology also enables the delivery of remote teaching and learning through digital platforms. Technology can be used to enhance delivery and/or improve access opportunities. New technologies constantly emerge and TAFE NSW facilities must respond accordingly.	▪ Provide convenient, easy to use and equitable access to technology across all spaces ▪ Provide technology within physical spaces to virtually connect teachers and learners across TAFE NSW through connected delivery ▪ Provide spaces that can support innovative and emerging technologies ▪ Support digital needs through modern, widespread and scalable wired and wireless networks ▪ Connect spaces to the TAFE NSW room booking system(s) and BMS ▪ Use the design of spaces as an exemplar and learning tool for any applicable course area. For example construction, engineering, sustainability etc ▪ Ensure technology and any fixed elements which house the technology such as furniture, joinery, wall linings, ceilings and the like can adapt or be easily updated to suit new technologies and future advances ▪ Technology and connectivity must be intuitive and easy to use. ▪ Ensure technologies are universally accessible to all

S5.2: Sustainability	TAFE NSW has an obligation to achieve Government sustainability targets, which extends to new developments.	▪ Reduce carbon emissions to equal or better than the requirements under the NSW Government Net Zero Plan Stage 1: 2020-2030
		▪ Lead the implementation of sustainable strategies to reduce the environmental impact of the project
		▪ Use construction materials efficiently and consider the use of the following where appropriate:
		  · Recycled/re-used content
		  · Locally & sustainably sourced products and materials
		▪ Incorporate low energy use systems/fittings/equipment, energy harvesting, renewable energy systems and energy storage
		▪ Design spaces with reuse in mind and consider the maintenance and run costs post completion of the project, whilst in the design phase
		▪ Incorporate maintenance and operational costs into project planning and budget and ensure whole of life costs are prioritised over capital expenditure savings
		▪ Showcase these systems where they can be used as a training tool

3 Design Strategies

3.7 Strategy 5: Future Oriented

Strategy	Background	Design Requirements
S5.3: Wellness	Well designed spaces support the wellbeing of people who use them. Spaces should be designed to enhance human comfort and recognise the varying needs of individual people.	Designs must: ▪ Provide high air quality including well ventilated spaces, smoke free spaces, openable windows, local temperature control and air conditioning systems ▪ Provide access to natural light and views, control of lighting to suit tasks, blinds or glare control measures ▪ Provide meaningful physical connection to functional exterior spaces ▪ Have access to amenities such as good drinking water, kitchen or tea points and spaces for rest ▪ Provide noise control between spaces and acoustics suitable for the tasks to be undertaken ▪ Include spaces and furniture which have good ergonomics and promote opportunities to move around ▪ Have material selections which don't strobe or off-gas ▪ Incorporate Biophilic design
S5.4: Responsive to future changes	TAFE NSW evolves constantly to suit economic and social needs. Changes may occur through the lift of the asset based on: ▪ Local or regional industry demands (e.g. skills shortage, licence changes etc.) ▪ Teaching delivery plans, training packages, course profiles, growth or reduction of demand ▪ Emerging technologies and changing working methods ▪ Future learner populations, demographics and cultural needs ▪ Impacts of climate change on the occupants and increased instances of natural disasters such as floods, droughts, bush fires, cyclones and extreme temperatures	The project team must plan for change through: ▪ Consultation with TAFE NSW stakeholders beyond the established stakeholder group at the beginning of each stage to ensure project needs are aligned ▪ Master plan how and where the campus may expand in the future ▪ Incorporate flexible services and 'plug-ins' to allow for easy adaptive reuse, retrofit & refurbishment ▪ Develop spatial allowance based on enrolment forecasts, and review this at each project phase ▪ Consider multi-purpose spaces and joint partnerships with other government bodies to maximise resource utilisation ▪ When designing for expected growth, ensure spaces can be used in a meaningful interim scenario where learner capacity is not fully achieved ▪ Rationalise floor layouts based on a standardised building grid to enable efficient strip out and refit of spaces

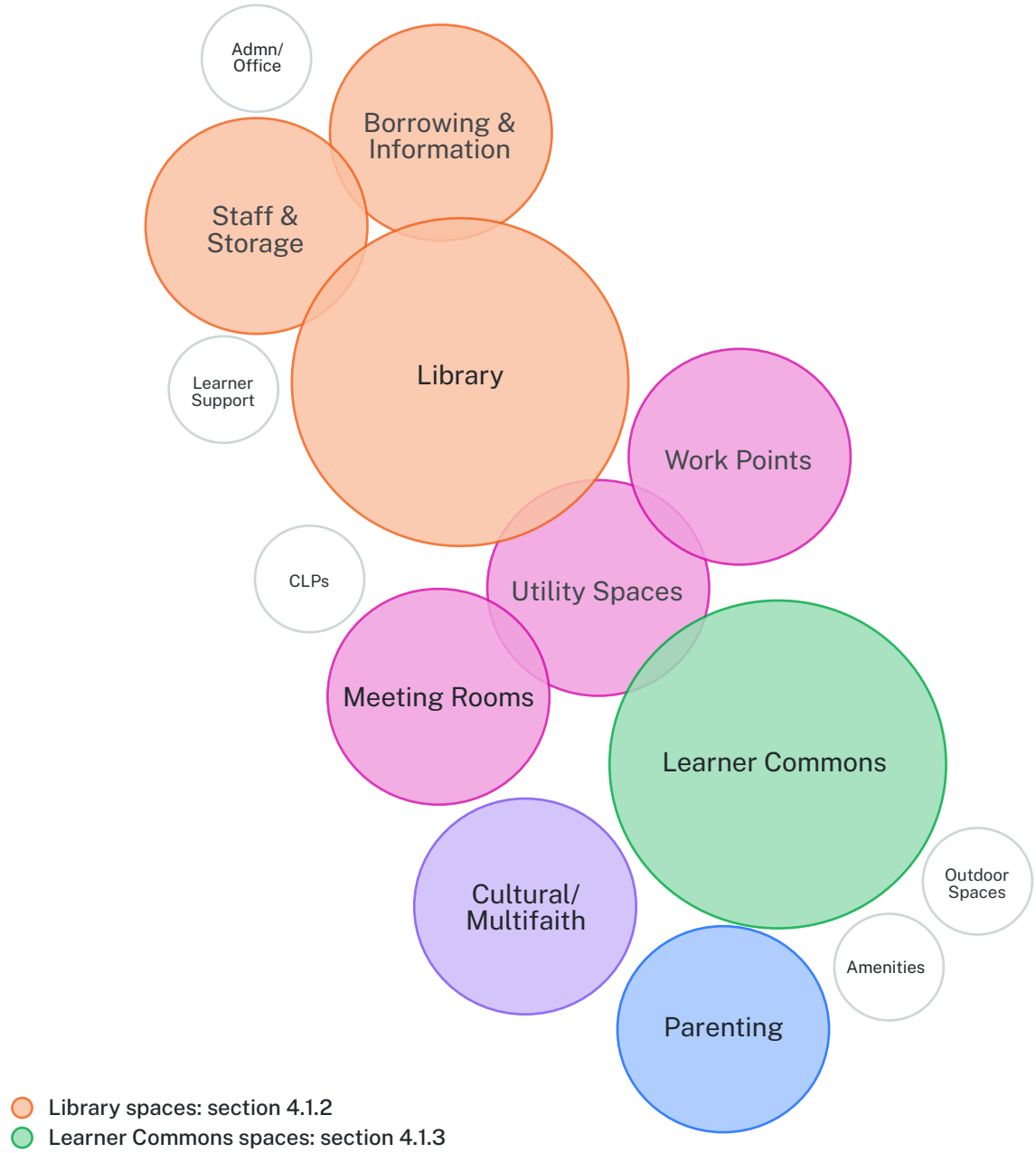
Technical Sections

4 Technical Sections

4.1 Space Types

4.1.1 Overview

The following diagram provides an overview of spaces covered in this standard and the required adjacencies to other Learning Support Spaces. The following sections detail the individual space types and their specific requirements.



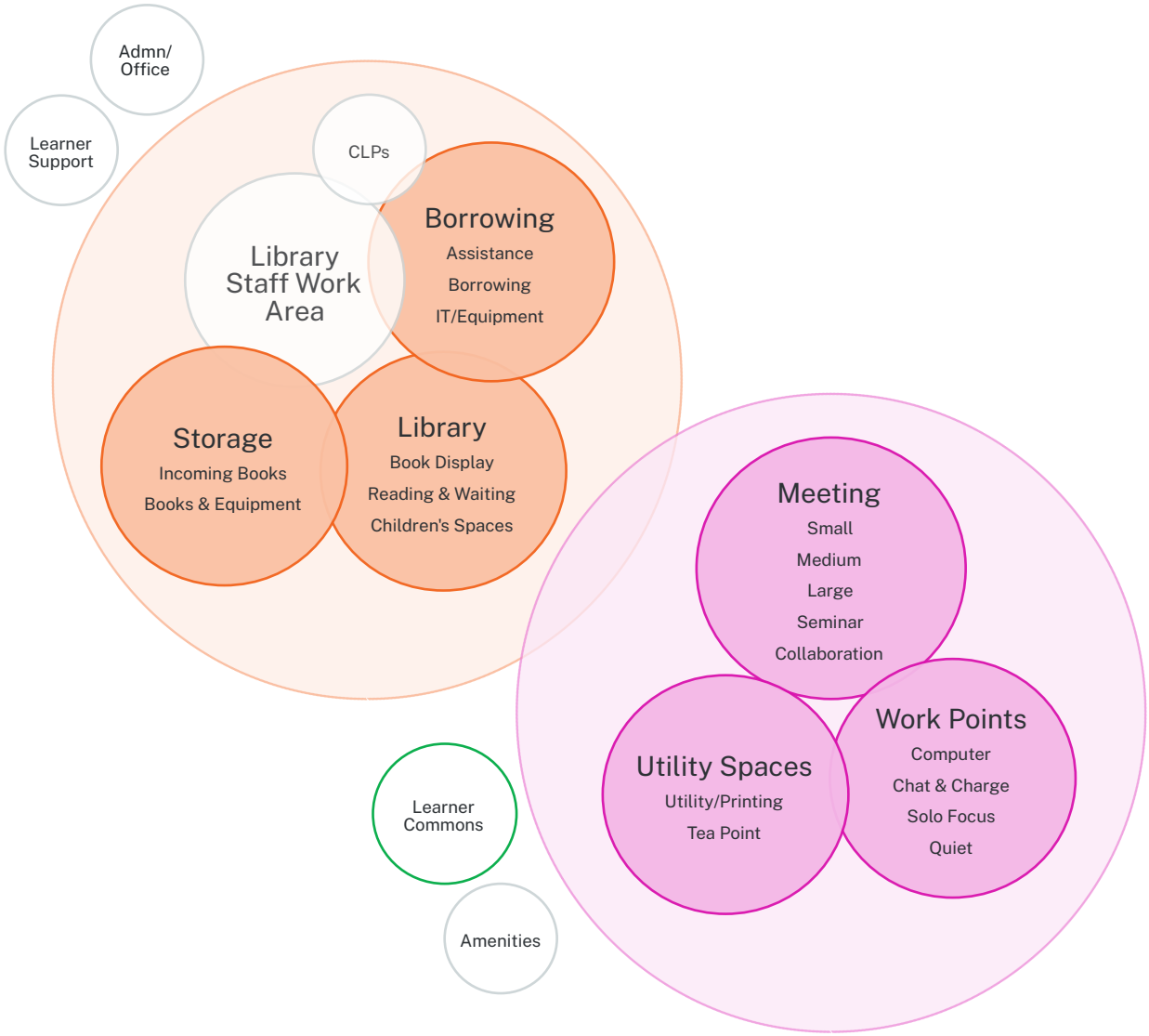
- Library spaces: section 4.1.2
- Learner Commons spaces: section 4.1.3
- Library/Learner Commons shared spaces: section 4.1.4
- Cultural/Multifaith spaces: section 4.1.5
- Parenting spaces: section 4.1.6
- Spaces not included in this Standard

4 Technical Sections

4.1 Space Types

4.1.2 Library Cluster

The following diagram provides an overview of the spaces which may be included within a library. This includes spaces from the Library cluster contained in this section and the shared cluster contained in section 4.1.4.



- Library Spaces
- Library/Learner Commons Shared Spaces
- Adjacent spaces not included in this Standard
- Adjacent Learning Support Spaces

4 Technical Sections

4.1 Space Types

Library Spaces

Library spaces include general spaces which are supported by a range of ancillary spaces. They include spaces for reading, studying, waiting and for displaying books. These spaces are typically located centrally within the library and have good sight lines from staff spaces, information and borrowing counters and the library entrance

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Book Display	An area which can hold and display categorised books and other reading material	▪ Borrowing scanning station ▪ Book storage areas ▪ Work and collaboration spaces	Must provide sufficient shelving to support the proposed collection. For larger libraries consider grouping collections to define spaces. Mobile shelving can be used to support flexibility, however defined zones should be provided.	Subject to size of site, library and size of physical collection	6-9 sqm per 1000 volumes dependant on shelf size and configuration. Shelving along outer walls is preferred for visibility and space design. Allow 1500mm between shelves for accessibility.
Reading & Waiting Areas	A comfortable space or series of spaces where users can read books, rest, work and spend time between commitments	▪ Book display/ collection ▪ Assistance / concierge ▪ Borrowing station ▪ Charge stations	Provide a variety of seating options for solo and small group access (up to 4 people) such as comfortable settings and reading/studying settings. Investigate innovative solutions for integrating connectivity such as charge points and Wifi.	Clusters of reading shall support small groups of 1-4	2-3 sqm per seat to be accommodated
Children's Spaces	A comfortable space to support learners who may visit with their children, or to support sites with childcare centres	▪ Book display ▪ Reading/waiting areas	Storage integrated into reading areas/book display to provide an area for children's books and equipment. A small setting of child appropriate furniture may be considered	Up to 4 adults and 4 children plus prams	2-6 sqm

4 Technical Sections

4.1 Space Types

Borrowing and Information Spaces

Borrowing and information spaces are spaces where library visitors can meet library staff, seek assistance and borrow books, equipment or other resources.

These spaces must be easily located close to the library entrance with clear lines of sight from other areas in the library. Assistance desks and counters must be universally accessible for staff, learners and visitors and fixed in one location to support navigation.

For smaller sites, all information counters listed below may be combined into one assistance point. For larger sites, particularly on multiple levels, multiple assistance points may need to be provided.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Assistance/ Concierge Desk	A space where learners, staff and guests can ask for assistance	▪ Borrowing scanning station ▪ IT/equipment borrowing ▪ Reading and solo work areas ▪ Library staff work areas	▪ Easy to locate, adjacent to library main entrances ▪ Enables staff to work ▪ Ergonomically, facilitate agile work, and support free movement to and from desk	1 Staff Member and 1-2 learners/staff/ visitors	6 sqm per desk
Borrowing/ Scanning Station	A space where loans for books and other loanable material can be processed	▪ Assistance/ concierge ▪ IT/equipment borrowing ▪ Incoming books ▪ Library staff work areas	▪ Technology required for borrowing must be fixed into the station and fully serviced ▪ Ensure flexibility to support updated technology over time. ▪ Provide space adjacent to the station for trolley parking.	1 Staff Member and 1-2 learners/staff/ visitors per station	6 sqm per desk
IT/Equipment Borrowing	A space where technology, equipment and other resources can be stored, accessed, processed and loaned to learners	▪ Assistance/ concierge ▪ Borrowing/scanning station ▪ Library staff work areas ▪ Equipment storage	▪ Locate with sufficient storage to suit site specific needs for relevant equipment or materials to be stored. Consult with project stakeholders.	1 Staff Member and 1-2 learners/staff/ visitors	6 sqm per desk

4 Technical Sections

4.1 Space Types

Staff and Storage Spaces

Work areas for library staff should provide sufficient space for staff to undertake library administration, management and day to day work activities. These spaces must be located with good access to information counters and assistance desks, and with good lines of sight to the remainder of the library. On small sites, library staff work areas may be co-located with administration staff work areas.

Sufficient storage must be provided to suit collections not on display (such as subject loan collections), and equipment that may be loaned through the library. Provide space within the storage area for processing new books or sorting books prior to return to shelves. Consult with stakeholders to understand the types of materials and equipment required to be stored.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Library Staff Work Areas	A space where library work staff can perform daily tasks	▪ Assistance/ concierge ▪ Book, IT, equipment borrowing ▪ Incoming books	▪ Refer to TAFE NSW Workplace Accommodation Design Standard	-	-
Incoming Books	A space where books can be returned to the library. Size and type is dependent on individual project requirements and constraints	▪ Library staff work areas ▪ Book storage ▪ Assistance/ concierge (may be combined)	▪ Confirm book return requirements with site stakeholders including hours of operation for book returns ▪ Some sites may operate with a joinery or furniture solution which is only available during library hours ▪ Larger sites with out of hours access may require a proprietary returns chute which must be secure ▪ (Lockable), fireproof and resistant to water ▪ Allow space for Book Trolleys to support the identified returns method	1-2 people for short periods of time	2-5 sqm
Book & equipment Storage	A space where returned books can be processed, sorted and put away and where new books are delivered and processed	▪ Library staff work areas ▪ Incoming books ▪ Book display	▪ Shelving requirements as per Library Shelving in section 4.4 ▪ Ensure adequate circulation for library trolleys ▪ Sufficient space for all required books and equipment to be stored	1-2 people for short periods of time	Dependent on library and collection size

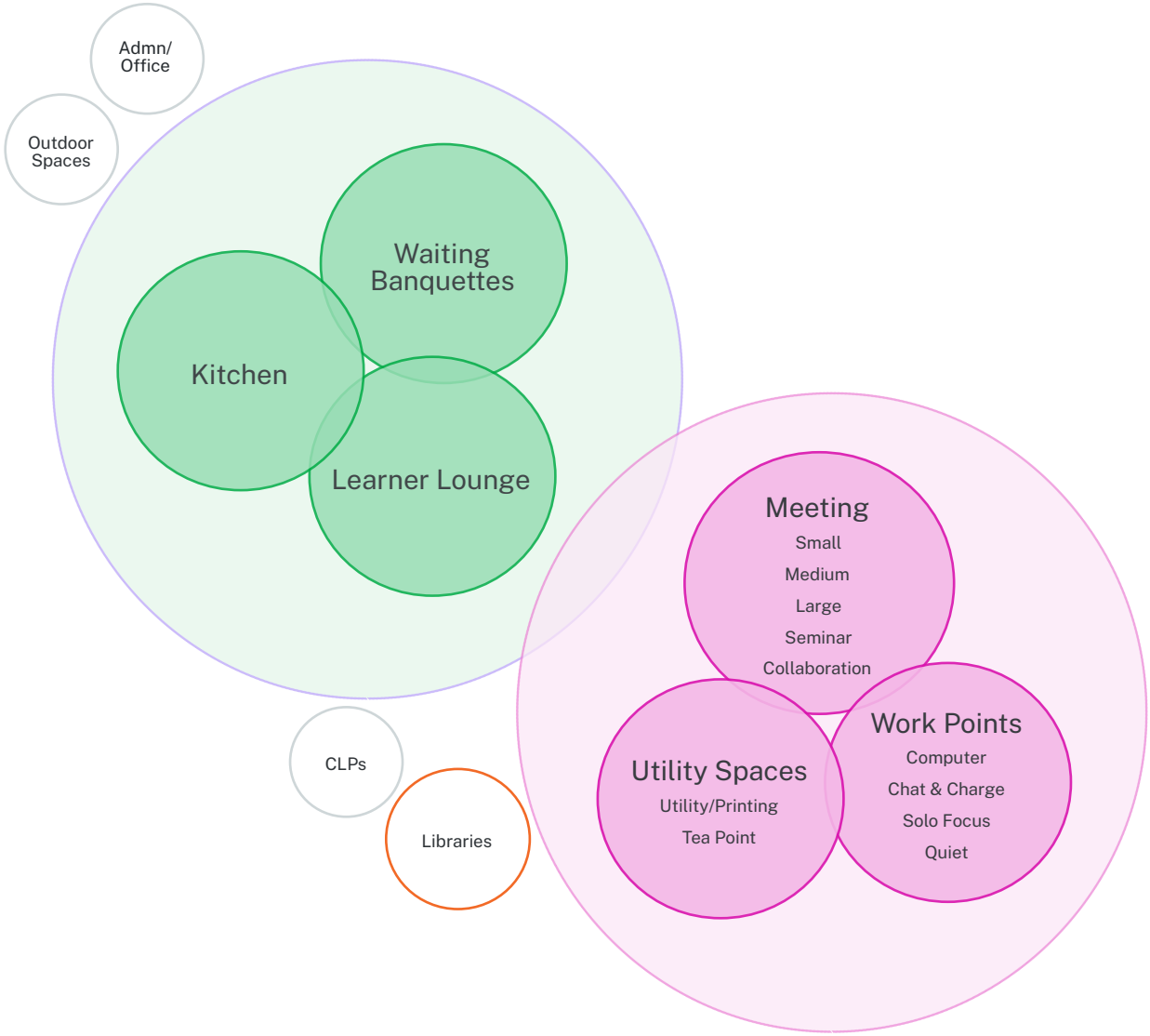
4 Technical Sections

4.1 Space Types

4.1.3 Learner Commons Cluster

The following diagram provides an overview of the spaces which may be included within learner commons. This includes spaces from the learner commons cluster contained in this section and the shared cluster contained in section 4.1.4.

Learner Common Spaces could be a large dedicated space containing various spaces and rooms or these spaces could be formed by activating circulation zones and the 'in between' spaces. Learner Commons should be positioned near libraries, main service points, teaching and learning spaces, CLPs and main campus pathways, circulation zones and gathering points.



- Learner Common Spaces
- Library/Learner Commons Shared Spaces
- Adjacent spaces not included in this Standard
- Adjacent Learning Support Spaces

4 Technical Sections

4.1 Space Types

Learner Commons

Learner commons spaces are spaces to support learner life on site between classes and during breaks. These spaces should be comfortable, welcoming and support learners to undertake a range of activities outside of study.

These spaces must provide a range of comfortable, accessible and adaptable furniture to suit a variety of needs and provide sufficient charge points to support learners charging their own devices.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Learner Lounge	An informal space where learners can gather, collaborate, relax, or undertake solo work	▪ Learner kitchen ▪ Tea point ▪ Collaboration areas ▪ Waiting banquettes	Can be stand-alone or combined with Learner Kitchen or Tea Point. Provide a variety of seating options for solo and small groups (up to 4 people) such as: ▪ Comfortable armchairs with high backs and tables or laptop tables ▪ Reading Tables: standard height tables and chairs ▪ Reading Bars: bar height tables with stools	Groups of 3-6 for up to 30-60 depending on size of cohort, campus and location.	2.5 sqm per person
Learner Kitchen	An informal space where learners can store and prepare small meals, snacks and drinks	▪ Learner lounge	As per requirements for a tea point with the following additional equipment: ▪ Fridge/Freezer or bar fridge ▪ Dishwasher ▪ Vending machine ▪ Coffee/Pod machine Where space allows additional food preparation benches, bench and bar stool seating may be installed.	Combined with learner lounge	5 sqm
Waiting Banquettes	A comfortable space for users while waiting for classes, meetings, friends, etc	▪ Teaching and learning areas ▪ Meeting rooms	▪ Joinery or furniture seating solution that may be located in small groups or along circulation spaces outside of teaching and learning spaces.	Dependent on length	1.5 sqm per person
Chat and Charge Bar	A space where people can pause in transit, carry out quick tasks, check messages/ emails, etc	▪ Teaching and learning areas ▪ Meeting rooms	Joinery or furniture standing bench which is either height adjustable or provided with a range of heights. May be located along circulation spaces outside of teaching and learning spaces. Ensure that minimum circulation widths are maintained in addition to the width of the Chat and Charge Bar	Dependent on length	0.5 sqm per person
Storage Lockers	A space where learners/guests can securely store personal items	▪ Teaching and learning areas ▪ Meeting rooms	For general learner lockers, refer to TAFE NSW Furniture Design Standard. Specific larger size lockers may need to be provided in consultation with teaching teams. Lockers must be either Digi-lock or self-lock (management release). Provide connection to TAFE NSW security system and Bluetooth booking app	-	-

4 Technical Sections

4.1 Space Types

4.1.4 Shared Spaces Cluster

Spaces listed in the shared spaces cluster may be located in both the library cluster or the learner commons cluster. These spaces may have different functions or use dependent on location, but the same spatial properties.

Work Points

Work points provide a range of spaces where learners, staff or visitors can undertake quiet work or study individually or in pairs. A range of options must be provided to suit learners' preferences or technological requirements. Spaces should be designed for quiet study and located away from louder spaces. A range of both bookable and non-bookable spaces must be provided.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Computer Benches	A space where technology can be used for work or leisure	▪ Utility/printing areas ▪ Collaboration areas ▪ Charge stations	Refer to TAFE NSW Furniture Design Standard	Dependent on size of library, campus and learner cohort	2-2.5 sqm per person
Charge Stations	A space where; ▪ Personal electronic devices can be charged ▪ Users can rest their items or work on their device	▪ Assistance/concierge ▪ Reading/waiting areas ▪ Computer benches ▪ Collaborative areas ▪ Main circulation zones ▪ Kitchen/tea point	An item of joinery which includes power and USB charge points and horizontal surfaces for working on devices. Charge stations are generally non-bookable.	Dependent on size of library, campus and learner cohort	0.5 sqm per charge point
Solo Focus Areas	Individual open quiet study space(s) or booths for one person	▪ Information/concierge ▪ Borrowing/scanning station ▪ Library staff work areas ▪ Book display/ collection	Accessible joinery booth with desk and chair (consider sit-stand adjustable) or accessible proprietary workstation with screens (consider sit-stands).	1	1-2.5 sqm per person
Quiet focus rooms	A small, enclosed meeting room for 1-2 people. Rooms may be used for solo study, for phone calls and for virtual meetings for short periods of time up to 2 hours	▪ Meeting rooms ▪ Computer benches ▪ Book display, storage Positioned away from noisy spaces including Collaboration Areas	Provide a variety of spaces to suit quiet solo or paired work. The space may be either a small, dedicated room or an Individual booth/pod (refer to TAFE NSW Furniture Design Standards). Furniture configurations may include: ▪ Comfortable armchairs with coffee height or standard height table ▪ Ergonomic, sit-stand desks with ergonomic task chairs	1-2	6-10 sqm

4 Technical Sections

4.1 Space Types

Meeting Rooms

Meeting spaces should be provided in a variety of sizes to support different groups and meeting requirements. Meeting spaces support a range of activities such as

- Groups of learners undertaking group or collaborative study,
- Meetings between staff and individual or small groups of learners
- Supported learning where learners meet with support staff
- Teaching small groups of learners.

It is important to document the activities that occur on a particular site and to locate meeting rooms appropriately as some functions may have different requirements. A range of both bookable and non-bookable spaces must be provided to suit different needs.

On small sites meeting rooms may need to be equipped with facilities to support quiet room, multi-faith rooms or parenting rooms where no dedicated facility is available. Where this occurs, additional design consideration must be given to the location, acoustic and visual privacy of the room to ensure that it is suitable for all intended functions.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Small Meeting Rooms	A small, enclosed meeting room for 2-6 people	▪ Other meeting rooms (various sizes) ▪ Collaboration areas ▪ Computer benches	▪ All meeting rooms shall contain technology, AV, services connection points (power, data, HDMI), writable/pinnable wall surfaces and acoustically absorptive wall, floor and ceiling finishes. ▪ Provide lighting control and blinds to facilitate presentations ▪ Consider visual privacy requirements dependent on location ▪ Position with access to natural light and views and other library facilities	2-6	10-12 sqm
Medium Meeting Rooms	A medium sized enclosed meeting room for 7-12 people	▪ Other meeting rooms (various sizes) ▪ Collaboration areas ▪ Computer benches ▪ CLPs	Refer to small meeting rooms for general meeting room description. ▪ Where appropriate, two medium meeting rooms may be combined to create a large meeting room using openable doors or operable walls. ▪ Where Supported Learning will occur within this space, provide additional visual privacy and locate the space in a discrete “destination” location. Additional equipment and storage may be required to support these activities	7-12	14-24 sqm
Large Meeting Rooms	A large, enclosed meeting room for 12-25 people	▪ Other meeting rooms (various sizes) ▪ Collaboration areas ▪ Computer benches ▪ CLPs	Refer to small meeting rooms for general meeting room description. ▪ Where appropriate, two large meeting rooms may be combined to create a seminar room using openable doors or operable walls	12-25	24-50 sqm

4 Technical Sections

4.1 Space Types

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Seminar Spaces	Space for 50-200 people to listen to a talk seated in theatrette, to host an exhibition, information or orientation session, or other events	▪ Collaboration areas ▪ Meeting rooms ▪ Reading/waiting areas ▪ Book collection/ display ▪ Foyer(s)	On smaller sites, other spaces may be used to support this requirement where a dedicated room is not available. This space may be created by; ▪ Combining two large meeting rooms, or meeting rooms with part of the book collection space. ▪ Using part of a building's main foyer space ▪ Providing mobile furniture in library spaces including reading and Collaboration areas for infrequent use Appropriate, mobile and stackable chairs and nesting flip top tables must be provided with access to services	50-200	1-1.5 sqm per person
Collaboration Areas	A space for active learning between small groups of people (usually 3-4 or up to 6).	▪ Book display ▪ Utility/printing ▪ Computer benches ▪ Meeting rooms ▪ Kitchen/tea Point ▪ Amenities ▪ CLPs Shall be distanced from; ▪ Reading areas, solo booths, focus quiet rooms and meeting rooms	Collaboration areas may be enclosed or open. Other spaces such as the seminar space may open onto collaboration areas to increase available space for events. Provide a variety of adaptable and accessible furniture types, for group sizes of up to 6, which are mobile and flexible to support the varied way that the area will be used. Ensure the space is suitable for collaborative work including; ▪ Acoustic absorbency for reverberation and to minimize transfer to other spaces ▪ Well connected with adequate plug-in points and access to large smart boards/ screens Provide access to other furniture and equipment such as wall mounted or magnetic whiteboards to write and pin up onto, storage for personal items, pen trays and bag hooks/pigeonholes	Groups of 3-6 for up to 30-60 depending on size of cohort, campus and location.	2.5sqm per person to be accommodated OR 0.1 to 0.8sqm UFA/EFTSL (TEFMA Ref 3).

4 Technical Sections

4.1 Space Types

Utility Spaces

Utility spaces support other spaces provided in both the library and learner commons spaces. There may be multiple spaces of each type dispersed through the campus. They are generally located adjacent other spaces or along high access points such as circulation corridors.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Utility/ Printing Areas	A space for printing documents by staff, learners and visitors.	▪ Computer benches ▪ Collaboration areas ▪ Meeting Rooms ▪ Focus quiet rooms ▪ Solo work areas ▪ Main circulation zones	Utility/Printing Areas may be provided as an alcove or space adjacent other spaces and does not require a dedicated room. These spaces should be co-located with other learner commons or study facilities at a maximum provision of one per floor. Refer to TAFE NSW Workplace Accommodation Design Standard	Dependent on size of library, campus and learner cohort	6-12 sqm
Tea Point	Self service tea, beverage and food preparation point	▪ Chat and Charge ▪ Main circulation zones ▪ Meeting rooms ▪ Collaboration areas	Must include ▪ Microwave ▪ Bar fridge ▪ Boiling/Chilled water unit ▪ Sink, bench space and cupboard Joinery, in particular the sink area, must be accessible.	-	2-3 sqm

4 Technical Sections

4.1 Space Types

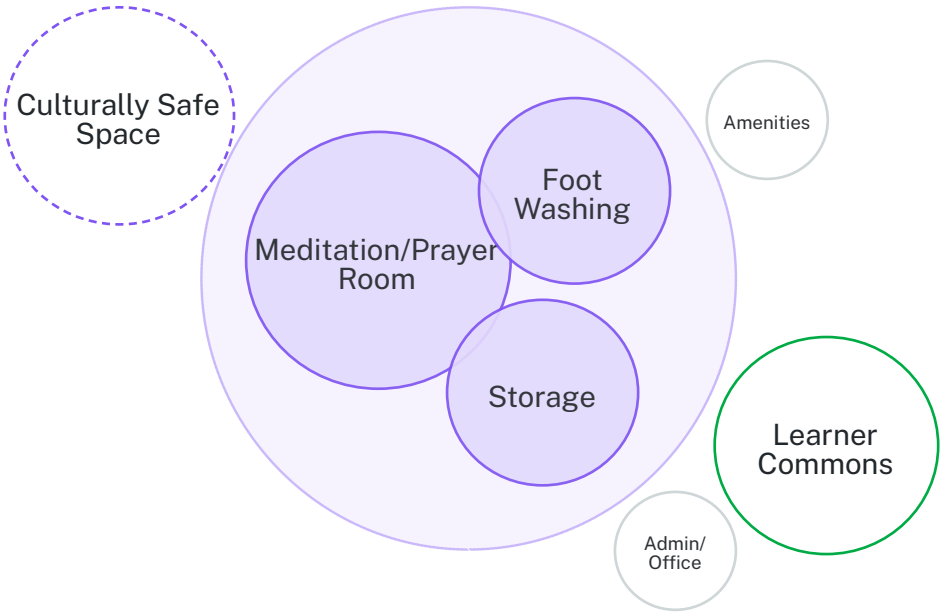
4.1.5 Cultural/Multifaith Cluster

Cultural spaces support learners to undertake quiet reflection, meditation, or prayer, or to support a range of cultural or social groups who desire a safe space to meet. The rooms should not be designated to any particular religion but designed to support any group who may need to access the space.

Consultation with stakeholders must be undertaken to determine specific requirements which respond to the local site context and to determine who potential users might be.

Some religions customarily require additional amenities such as foot washing facilities. These may be provided where identified as required.

The following diagram provides an overview of Cultural/Multifaith Rooms and the required adjacencies to other spaces.



- Cultural/Multifaith Spaces
- Cultural/Multifaith Space covered in other Standard
- Adjacent Learning Support Spaces
- Adjacent spaces not included in this Standard

4 Technical Sections

4.1 Space Types

Cultural/Multifaith Spaces

The following table details the components of this cluster and its spatial requirements.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Culturally Safe Space	A culturally safe space for use by Aboriginal and Torres Strait Islander staff and learners	-	Refer to TAFE NSW Culturally Safe Space guideline	-	-
Meditation/ Prayer Room	A private area dedicated for quiet meditation or prayer	▪ Foot washing facilities	Space must be acoustically and visually private and located at a destination location rather than adjacent a main thoroughfare. Where windows are provided, provide block-out blinds. Flooring must be carpeted. Consultation with stakeholders must include: ▪ Are any specific amenities required such as foot washing facilities? ▪ Are separate male and female facilities required? Can separation be provided by an opaque curtain or are separate rooms required? ▪ Is it possible to broadcast prayer between rooms? If so, provide speakers, a sound system, hearing loop, microphone, lectern, and PA system The room shall allow for stackable, mobile furniture including chairs and tables. Storage for prayer mats and religious items must also be provided	Dependent on size of campus and cohort	0.5 – 1.5 sqm per person
Male Foot Washing Facilities	A space where males can wash their feet prior to entering the prayer space	▪ Prayer/ Meditation Room ▪ Separate from female footwash	The room must be acoustically and visually private and there must not be any visibility to the female facilities. The flooring and walls must be tiled or anti-slip and water-resistant impervious flooring. The footwashing facility must provide: ▪ A raised foot wash with loose stool seating constructed from water resistant materials ▪ Storage for towels and prayer mats ▪ Paper towel and soap dispensers and bin ▪ Shoe storage and bench for putting on/taking off shoes with storage for shoes (pigeonholes) beneath	Dependent on size of campus and cohort	Min. 10 sqm
Female Foot Washing Facilities	A space where females can wash their feet prior to entering the prayer space	▪ Prayer/ Meditation Room ▪ Separate from male footwash	As per male footwashing facilities. The room must be acoustically and visually private and there must not be any visibility to the male facilities	Dependent on size of campus and cohort	Min. 10 sqm
Accessible Foot Washing Facilities	An accessible unisex foot washing facility, where feet can be washed prior to entering the prayer space	▪ Prayer/ Meditation Room	As per male and female footwashing facilities. An accessible and gender-neutral foot washing facility can be provided in a combined Accessible Toilet by providing an accessible foot washing station in lieu of a shower. Ensure compliance with AS1428.1 and AS1428.2	Dependent on size of campus and cohort	Min. 12 sqm

4 Technical Sections

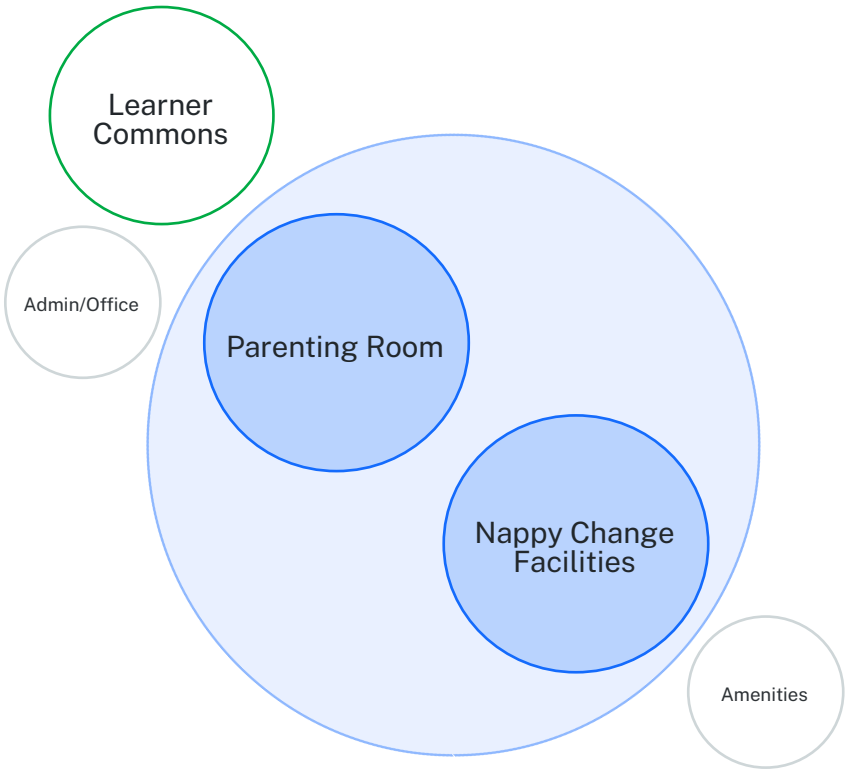
4.1 Space Types

4.1.6 Parent Room Cluster

Parenting rooms are required to support staff, learners or visitors to care for babies or toddlers. These spaces may support parents visiting site with their child who need to feed and care for their child. Or parents expressing milk for their children while on site. The NSW Government supports all staff who require breaks for breastfeeding or expressing milk and suitable spaces must be provided on every site to accommodate this.

Parenting spaces must be easy to find and access, be acoustically and visually private, be located away from main circulation spaces and have clear signage and wayfinding. They must be accessible by parents of any gender.

The following diagram provides an overview of Parent Rooms and the required adjacencies to other spaces.



- Parent Room Spaces
- Parent Room Cluster
- Adjacent Learning Support Spaces
- Adjacent spaces covered in other Standards

4 Technical Sections

4.1 Space Types

Parent Cluster Spaces

The following table details the components of this cluster and details its spatial requirements.

Space	Use/Activity	Adjoining Spaces	Spatial Properties/Description	No. Occupants	Area Allowance (sqm/sqm per person)
Parenting Room	Designated private space for baby and toddler care and feeding. Convenient, quiet option to feed or express in privacy	▪ Nappy change facilities ▪ WCs ▪ Kitchen/tea point	A dedicated Parenting Room shall be provided separate but adjacent to a nappy change facility. The facility must: ▪ Have flooring which is resilient, anti-slip and easy to clean ▪ Include a wipeable, comfortable armchair with arms and a loose coffee table ▪ Include a sink with hot & cold water, a bar fridge, a microwave and lockable storage cupboards, ▪ Provide a separate hand basin with soap dispenser, hand sanitiser dispenser, paper towel dispenser and a bin ▪ Include power and USB points for breast pumps or charging devices ▪ Be accessible for wheelchairs, prams and strollers (including twin prams) ▪ Have a lockable "occupied" entry door which is easily managed (either light to open by hand or button access) and a room booking system ▪ Have a place to pin up notices ▪ Provide local control of heating/cooling systems to suit individual needs	1 adult, 1-3 small children/ babies	8 – 10 sqm
Nappy Change Facilities	Facilities to change nappies, separate to the Parenting Room	▪ Parenting rooms	A nappy change facility must be provided adjacent the parenting room. The minimum requirement is a fold down nappy change bench in an accessible bathroom. Where a dedicated nappy change room is provided it must include: ▪ Custom nappy change bench or station ▪ Hand washing sink with, soap, paper towels and hand sanitiser ▪ Nappy disposal bins Large facilities may also consider toddler toileting facilities including: ▪ Toddler toilet ▪ Low handbasin and mirror with soap and paper towel	1 adult with 1-3 small children/ babies	6 sqm

4 Technical Sections

4.2 Behaviours & Modalities

4.2.1 Libraries

During the design phase it is important to work with Stakeholders to define the types of a activities that will occur in the library spaces. This will help to define the types of spaces that should be provided.

The following list describes the types of behaviours (or activities) which occur in library spaces and the types of modalities (or spaces) that could accommodate these behaviours.

Learning Behaviours

Do Projects

Discuss, share, exchange ideas and knowledge. Plug in.

May occur in: collaboration areas, meeting rooms, computer benches.

Work on Computers

Use personal or TAFE NSW supplied device for study, in a group or alone.

May occur in: computer benches, collaboration areas, meeting rooms, solo focus areas, focus quiet rooms.

Relaxed Furniture

Linger with relaxed posture, engage with others, plug in.

May occur in: reading/waiting areas, children's spaces, tea point.

Interact

Get comfortable while waiting, check and charge phone, have a chat.

May occur in: reading/waiting areas, collaboration areas, assistance/concierge.

Work on Walls

Write on a white board, pin things up.

May occur in: collaboration areas, meeting rooms, connected learning points.

Make

Physically create materials, access to materials, equipment. Space allowed to get messy.

May occur in: collaboration areas, meeting rooms.

Collaborate

Discuss, share, exchange ideas and knowledge. Plug in.

May occur in: collaboration areas, meeting rooms, connected learning points.

Gather

A group of people assembling for a common reason.

May occur in: meeting rooms, collaboration areas, seminar spaces, connected learning points, tea points.

Rehearse

Group practice of a presentation, role play, performance. Access to AV.

May occur in: collaboration areas, meeting rooms, connected learning points.

Solo Study

Discuss, share, exchange ideas and knowledge, plug in.

May occur in: solo focus areas, focus quiet rooms, reading/waiting areas.

Eat and Drink

At a cafe, or from self-catering facilities, indoors or outdoors. Plug in.

May occur in: tea point.

Perform

Music, drama or dance, a person or group of people being watched by others.

May occur in: collaboration areas, seminar spaces, connected learning points.

4 Technical Sections

4.2 Behaviours & Modalities

4.2.2 Learner Commons

During the design phase it is important to work with Stakeholders to define the types of a activities that will occur in learner commons. This will help to define the types of spaces that should be provided.

The below list describes the types of behaviours (or activities) which occur in learner commons and the types of modalities (or spaces) that could accommodate these behaviours.

Learning Behaviours

Do Projects

Discuss, share, exchange ideas and knowledge. Plug in.

May occur in: collaboration areas, meeting rooms, quiet focus areas, learner lounge.

Work on Computers

Use personal or TAFE NSW supplied device for study, in a group or alone.

May occur in: computer benches, quiet focus areas, meeting rooms, collaboration areas, kitchen, learner lounge.

Relaxed Furniture

Linger with relaxed posture, engage with others, plug in.

May occur in: waiting banquettes, learner lounge, collaboration areas, quiet focus areas.

Interact

Get comfortable while waiting, check and charge phone, have a chat.

May occur in: waiting banquettes, learner lounge, kitchen.

Make

Physically create materials, access to materials, equipment. Space allowed to get messy.

May occur in: collaboration areas.

Work on Walls

Write on a white board, pin things up.

May occur in: meeting rooms, collaboration areas, learner lounge.

Chat and Charge

Stop in transit, look at phone/laptop/notes. Have a chat. Charge device.

May occur in: waiting banquettes, kitchen, learner lounge.

Collaborate

Discuss, share, exchange ideas and knowledge. Plug in.

May occur in: collaboration areas, meeting rooms, kitchen, quiet focus areas, learner lounge.

Gather

A group of people assembling for a common reason.

May occur in: meeting rooms, presentation areas, waiting banquettes, kitchen, learner lounge.

Rehearse

Group practice of a presentation, role play, performance. Access to AV.

May occur in: collaboration areas, learner lounge, meeting rooms.

Solo Study

Discuss, share, exchange ideas and knowledge, plug in.

May occur in: solo focus areas, focus quiet rooms, computer benches, learner lounge.

Eat and Drink

At a cafe, or from self-catering facilities, indoors or outdoors. Plug in.

May occur in: kitchen, learner lounge.

Perform

Music, drama or dance, a person or group of people being watched by others.

May occur in: presentation areas, learner lounge.

4 Technical Sections

4.2 Behaviours & Modalities

4.2.3 Cultural/Multifaith Rooms

During the design phase it is important to work with Stakeholders to define the types of a activities that will occur in cultural/multifaith rooms. This will help to define the types of spaces that should be provided.

The below list describes the types of behaviours (or activities) which occur in cultural/multifaith rooms and the types of modalities (or spaces) that could accommodate these behaviours.

Learning Behaviours

Relaxed Furniture

Linger with relaxed posture, engage with others, plug in.

May occur in: culturally safe space, prayer/ meditation room

Interact

Get comfortable while waiting, check and charge phone, have a chat.

May occur in: culturally safe space, prayer/ meditation room

Gather

A group of people assembling for a common reason.

May occur in: culturally safe space, prayer/ meditation room

Perform

Music, drama or dance, a person or group of people being watched by others.

May occur in: culturally safe space, prayer/ meditation room

4.2.4 Parent Rooms

During the design phase it is important to work with Stakeholders to define the types of a activities that will occur in parent rooms. This will help to define the types of spaces that should be provided.

The below list describes the types of behaviours (or activities) which occur in parents rooms and the types of modalities (or spaces) that could accommodate these behaviours.

Learning Behaviours

Eat and Drink

At a cafe, or from self-catering facilities, indoors or outdoors. Plug in.

May occur in: Food and drink preparation areas, feeding and expressing spaces.

Relaxed Furniture

Linger with relaxed posture, engage with others, plug in.

May occur in: feeding and express.

Interact

Get comfortable while waiting, check and charge phone, have a chat.

May occur in: Feeding and expressing spaces, food and drink preparation areas.

4 Technical Sections

4.3 Scenarios

The provision of Learning Support Spaces will differ across TAFE NSW locations due to campus size, local context, spatial considerations, enrolments, future industries, community & industry engagement, identified number of users, variants in the learner cohort, courses delivered and Government input.

The size and composition of Learning Support Spaces must be scaled and adapted to meet the individual needs of each site. The following section provides high level guidance on the components of different sized facilities and the prioritisation of spaces within each cluster. The final size and composition of spaces must be determined to suit each site.

The quantity of space required will vary for each site. Sites that are a hub for several sites within a region may have a higher provision of space, while other sites may have a lower provision. The TEFMA “Space Planning Guidelines Edition 3” suggest a space range of 0.5m2 – 1.5m2 UFA/EFTSL for all learning support spaces including libraries, learner commons, cultural/multi-faith spaces and parenting spaces. It is recommended that the lower end of this space range be used as a guide to the maximum suggested area per site.

Within each scenario, each space has been assigned a priority ranking to determine which spaces are most important to include when designing each type of space. Priority rankings are as per the below table.

Legend	Priority
P1	Highest Priority
P2	Secondary Priority
P3	Supplementary space (if space permits)

4 Technical Sections

4.3 Scenarios

4.3.1 Libraries

The function and activities occurring within a library are changing over time. Libraries are used more for individual study, collaboration and seeking support and the makeup and provision of space should reflect this.

A greater percentage of resources are now being provided digitally, and there are fewer physical resources being provided in libraries. Therefore, a smaller area is required to display books and other resources while a larger percentage of spaces should be provided for individual or group study.

Every campus must have access to a library service. This may be provided by:

- A physical library on site,
- Access to a library offsite with support via a concierge/assistance desk on site where resources from other libraries can be collected,
- Access to the digital library collection via a TAFE NSW device. The TAFE NSW device may be fixed on site or a laptop available for loan.
- The requirement for a physical library and collection on site is linked to the courses that are currently or proposed to be delivered from the campus. The accreditation of some courses requires that learners have access to library facilities.

The following sections provide a prioritised list of requirements for each size of library and an associated accommodation schedule. The accommodation schedules are a worked example of the spaces that could be provided for each library size. This is intended to show guidance for which spaces could be provided and is not mandatory.

4 Technical Sections
4.3 Scenarios

4.3.2 Staffless or Small Library

Requirement

Space	Number	Priority	Comments
Book Display	1	P1	To suit the capacity of the library
Reading & Waiting Areas	1	P1	To suit the capacity of the library
Borrowing/Scanning Station	1	P1	Combined with Assistance/Concierge desk, IT/Equipment borrowing station, Incoming books and staff work point
Collaboration Areas	1	P3	Provide furniture for collaborative study
Utility/Printing Areas	1	P2	-
Small Meeting Rooms	1	P3	If space is not available, locate library adjacent other spaces with meeting capability
Computer Benches	3	P2	Spaces with available computers, or IT docks to support BYOD

Worked Example

Space	Number	Area (m^2)	Total Area	Ratio/Quantity
Book Display	1	$20m^2$	$20m^2$	Shelving along wall perimeter, rows of low shelves on castors.
Reading & Waiting Areas	1	$20m^2$	$20m^2$	20% of library space (excluding circulation)
Borrowing/Scanning Station	1	$6m^2$	6m2	Combined with Assistance/Concierge desk, IT/Equipment borrowing station, Incoming books and staff work point
Collaboration Areas	1	$20m^2$	$20m^2$	Two banks seating up to four people
Small Meeting Rooms	1	$10m^2$	$10m^2$	One with capacity for four people
Computer Benches	1	$9m^2$	$9m^2$	Three stations
Utilities/Printing Area	1	$6m^2$	$6m^2$	MFDs and Bins
Total UFA	-	-	91m2	Total unencumbered floor area excluding circulation

Project Realisation	Simple floor plate Area (m^2)	Complex floor plate Area (m^2)
Subtotal of UFA spaces	$91m^2$	$91m^2$
Circulation (20% of subtotal)	$18.2m^2$	$18.2m^2$
Fit Factor (allow 5% for simple/regular floor plate i.e. square/rectangle or 10% for complex floor plate i.e. angular/circular)	4.55m2	9.1m2
TOTAL	113.75m2	118.3m2

4 Technical Sections

4.3 Scenarios

4.3.3 Medium Library

Requirement

Space	Number	Priority	Comments
Book Display	1	P1	To suit the capacity of the library
Reading & Waiting Areas	1	P2	To suit the capacity of the library
Children's Spaces	1	P3	Small area for book display
Assistance/Concierge Desk	1	P1	Combined with borrowing/scanning
IT/Equipment Borrowing	1	P1	Adjacent storage
Library Staff Work Areas	1	P1	Sized to suit staff numbers
Incoming Books	1	P2	May be internal or external
Book & equipment Storage	1	P2	To suit the capacity of the library
Collaboration Areas	1	P3	To suit the capacity of the library
Utility/Printing Areas	1	P2	-
Tea Point	1	P3	Located within staff working area
Small Meeting Rooms	2	P2	-
Medium Meeting Rooms	1	P2	May combine to form large meeting room
Computer Benches	4-8	P2	-
Solo Focus Areas	4-8	P2	To suit the capacity of the library

4 Technical Sections

4.3 Scenarios

Worked Example

Space	Number	Area (m^2)	Total Area	Ratio/Quantity
Concierge/Assistance Desks	3	6m2	$18m^2$	One counter with five service points
Book Display	1	$40m^2$	40m2	Shelving along wall perimeter, rows of low shelves on castors.
Borrowing/Scanning Station	2	$5m^2$	10m2	Two separate self-scanning stations distributed across library
IT/Equipment Borrowing	1	$6m^2$	6m2	Two separate self-scanning stations distributed across library
Incoming books	1	2m2	2m2	Book returns chute and space for trolley
Book/IT/Equipment Returns & Storage	1	$36m^2$	$36m^2$	One large room
Collaboration Areas	1	$84m^2$	$84m^2$	Six banks seating up to six people
Solo Focus Areas	10	$2.5m^2$	$25m^2$	Ten separate modular configurations
Focus Quiet Rooms	2	$10m^2$	20m2	Two separate rooms for one-two people
Small Meeting Rooms	2	$10m^2$	20m2	Two with capacity for four people
Medium Meeting Rooms	1	$18m^2$	18m2	One with capacity for eight people
Large Meeting Rooms	2	$25m^2$	50m2	Two with capacity for 14 people. Can combine to form seminar space
Reading & Waiting Areas	1	$110m^2$	110m2	20% of library space (excluding circulation)
Computer Benches	1	$60m^2$	60m2	15 stations (3 banks of 5 stations)
Utilities/Printing Area	1	$6m^2$	$6m^2$	MFDs and Bins
Children's Spaces	1	$5m^2$	$5m^2$	One small, designated children's area
Charge Stations	1	$5m^2$	$5m^2$	One designated charge station
Staff workstations	3	$5m^2$	15m2	Bank of six desks with computers in Library staff room
Tea Point	1	$5m^2$	$5m^2$	Tea point located in staff room
Total UFA	-	-	535m2	Total unencumbered floor area excluding circulation

Project Realisation	Simple floor plate Area (m^2)	Complex floor plate Area (m^2)
Subtotal of UFA spaces	$535m^2$	$535m^2$
Circulation (20% of subtotal)	$107m^2$	$107m^2$
Fit Factor (allow 5% for simple/regular floor plate i.e. square/rectangle or 10% for complex floor plate i.e. angular/circular)	26.75m2	53.5m2
TOTAL	668.75m2	695.5m2

4 Technical Sections

4.3 Scenarios

4.3.4 Large Library

Large libraries will rarely be required on TAFE NSW sites. The general requirements and prioritisation has been provided, however the individual project brief must be developed in conjunction with TAFE NSW.

Requirement

Space	Number	Priority	Comments
Book Display	1	P1	To suit the capacity of the library
Reading & Waiting Areas	1	P1	To suit the capacity of the library
Children's Spaces	1	P3	Small area for books and children's furniture
Assistance/Concierge Desk	3	P1	May be combined with borrowing/scanning
Borrowing/Scanning Station	2	P1	May be combined with assistance/concierge
IT/Equipment Borrowing	1	P1	Adjacent storage
Library Staff Work Areas	1	P1	Sized to suit staff numbers
Incoming Books	2	P2	Internal and external options
Book & equipment Storage	1	P2	To suit the capacity of the library
Collaboration Areas	1	P2	To suit the capacity of the library
Utility/Printing Areas	2-3	P1	-
Tea Point	2	P3	-
Small Meeting Rooms	2	P2	-
Medium Meeting Rooms	2	P2	-
Large Meeting Rooms	1	P2	-
Seminar	1	P3	May be a combination of large meeting room and other spaces
Computer Benches	10-20	P1	To suit the capacity of the library
Charge Stations	2	P2	-
Solo Focus Areas	10-20	P1	To suit the capacity of the library
Quiet focus rooms	3-4	P1	-

4 Technical Sections

4.3 Scenarios

4.3.5 Learner Commons

Learner commons may be a large area combining the various space types in one location or they may be dispersed throughout the buildings or across the campus. Learner commons should be strategically located throughout sites to suit the needs of a diverse range of learners to use for study and rest. Some considerations include:

- Co-locating different types of learner commons to provide larger spaces, opportunities for socialisation, improve space efficiency and clustering of services
- Locating learner commons adjacent circulation space to activate spaces
- Locating learner commons outside learning spaces to enable learners to spill out and undertake group discussions or solo study during classes
- On smaller sites or sites where co-located learner commons cannot be accommodated, a higher proportion of learner commons may be located within the library

Space	Percentage	Priority	Comments
Computer Benches/Charge Stations/Utility & Printing Areas	25%	P1	Provide a mix of computer benches and charge stations in prominent locations. Provide access to printing services at key locations across the campus
Solo Focus/Quiet Rooms	20%	P1	Provide spaces for individual or paired focus study in key locations. Consider suitability of adjacent functions for quiet focus.
Meeting Rooms/Collaboration Areas	30%	P2	Provide a mix of meeting rooms and collaboration spaces. Provide both bookable and non-bookable spaces
Kitchen/Tea Point/Learner Lounge including Waiting Banquettes/Chat & Charge Bars	25%	P2	Provide spaces for learner rest and relaxation dispersed throughout the campus. Provide facilities for reheating food and eating.

4 Technical Sections

4.3 Scenarios

4.3.4 Cultural/Multifaith Rooms

A minimum of one space that can be used for reflection, meditation or prayer must be provided on each campus. The space must be located in an area that is easily accessible by staff and learners, but provides sufficient visual and acoustic privacy. Where a dedicated cultural/multifaith room is not possible, small, medium or large meeting room may be adapted to suit this requirement.

The requirements for cultural and multifaith spaces are determined by campus size. Refer to the TAFE NSW project lead for confirmation of campus siwze classification.

Small Campus

Space	Number	Priority	Comments
Private room which can be used for meditation, reflection and prayer	1	P1	May be shared with a small meeting room or quiet room on small campuses, however acoustic and visual privacy and location must be considered. Where shared facilities are provided, include room booking system.

Medium Campus

Space	Number	Priority	Comments
Minimum one shared prayer room/meditation space per campus	1	P1	Provide one room which may be shared for prayer or meditation activities. Where shared facilities are provided, include room booking system.
Foot washing	If required	P3	Provide if required in consultation with local community groups

Large Campus

Space	Number	Priority	Comments
At least one dedicated prayer room per campus	1	P1	Provide one bookable space per campus
At least one dedicated meditation space per campus	1	P1	Provide one bookable space per campus
Foot washing	If required	P3	Provide if required in consultation with local community groups

4 Technical Sections

4.3 Scenarios

4.3.5 Parenting Rooms

A minimum of one parenting room must be provided on every campus. The parenting room and associated nappy change facilities must be located in an area that is easily accessible by staff and learners, but provides sufficient visual and acoustic privacy. Nappy change facilities and parenting rooms must be provided in close proximity. Where a dedicated parenting room is not possible, a small meeting room may be adapted to suit this requirement.

The requirements for parenting spaces are determined by campus size. Refer to the TAFE NSW project lead for confirmation of campus size classification.

Small Campus

Space	Number	Priority	Comments
Private room which can be used for feeding or expressing milk	1	P1	May be shared with a small meeting room on small campuses, however acoustic and visual privacy, location and booking priority system must be considered. Where shared facilities are provided, include room booking system.
Accessible bathroom with fold down nappy change bench	1	P1	Accessible bathroom located in close proximity to parenting space

Medium Campus

Space	Number	Priority	Comments
One dedicated parenting space	1	P1	For large campuses with multiple buildings, provide one dedicated parenting space within 200m walk between buildings
Accessible bathroom with fold down nappy change bench	1	P1	Accessible bathroom located in close proximity to parenting space

Large Campus

Space	Number	Priority	Comments
Minimum of one dedicated parenting space	1 or more	P1	For large campuses with multiple buildings, consider one dedicated parenting space within 200m walk between buildings
Dedicated nappy change facility	1	P1	One dedicated nappy change facility

4 Technical Sections

4.4 General Requirements

4.4.1 Design Requirements

Circulation

- All circulation must be accessible and includes circulation around furniture, joinery, fixtures and equipment.
- The hierarchy of circulation routes and workflows must be defined in the planning process and must be kept clear of moveable furniture.
- An appropriate minimum width of circulation pathway is to be maintained throughout. If equipment such as lockers or tea points are positioned alongside circulation pathways, additional space of 800mm depth in front of the equipment is to be provided to avoid encroachments into the circulation path.
- The following circulation widths must be provided. The dimensions stated below are minimum widths and must be adjusted up in accordance with project specific population numbers and other project specific requirements. Provisions for passing and turning must be provided in accordance with statutory accessibility requirements:
    - Primary circulation such as public corridors: min. 2.1 m
    - Secondary circulation within staff areas: min. 1.6 m
    - Secondary circulation within general learning areas: min. 1.6 m
- Where learner commons spaces are provided adjacent to circulation paths, the joinery or furniture must be provided in addition to the dedicated circulation path.
- Covered pathways from accessible car parks to the main building entry should be considered to provide safe passage and shelter from sun and rain.
- Resources handling and delivery requirements must be considered in all circulation provisions.
- Circulation to main assistance areas must be direct, obvious and unobstructed.
- Adequate space must be allowed immediately outside collaboration spaces and meeting rooms to accommodate milling of people before and after use.

Daylight Access

- Seek opportunities to provide more natural daylight than required under the NCC for any spaces where staff, learners and visitors are occupying. Balance requirements for natural light with the TAFE NSW Sustainability Design Standard and any competing statutory requirements.
- Glare control measures such as blinds, screens and other shading elements must be provided to all spaces where working, teaching or learning can occur. Ensure users can adapt the space to suit their needs, provide comfort and suitable glare control to support Interactive Technology functions within the space.
- Blinds must be installed in all spaces where presentations take place

4 Technical Sections

4.4 General Requirements

Natural Ventilation

- The design of natural ventilation must comply with statutory requirements and the TAFE NSW Mechanical Design Standard as a minimum.
- Seek opportunities to provide more natural ventilation than required under the NCC for any spaces where staff, learners and visitors are occupying. Balance requirements for natural ventilation with the TAFE NSW Sustainability Design Standard and any competing statutory requirements.

Acoustics

- Section 5.1 outlines general requirements which must be considered in the acoustic design of the Learning Support Spaces. Further acoustic assessment must be undertaken for each specific project.
- Rooms and spaces which provide connected learning must be designed with the appropriate level of acoustic separation, internal noise level and reverberation control. Refer TAFE NSW Connected Learning Point Design Standard for further details.

Furniture

- For details on furniture selection refer to TAFE NSW Furniture Design Standard.
- Mobile furniture must be easy to move to allow for re-configuration of room layouts. Larger items of furniture must be fixed or weighted to restrict movement or provided with heavy duty lockable castors if flexibility is required at their location.
- Furniture must not obstruct circulation paths and must not be able to be moved into key circulation paths or zones to ensure usability for vision impaired users.
- Include a methodology in the design of the space that clearly delineates circulation paths or zones using a change of floor or ceiling finish, or similar, to clearly indicate where furniture should be positioned to prevent furniture being located in accessible pathways.
- Provide a variety of furniture settings including adjustable sit-stand elements to enable choice of learning and working environments.
- Allow for appropriately sized work surfaces for the activities taking place.
- Ensure visual contrast between FFE and flooring materiality or wall colours for accessibility.

Durability of Finishes

- Provide finishes and materials to suit the intended use or activity (i.e. clean or dirty, wet or dry). Materials must be durable and impact resistant.
- Joinery must be constructed from highly Moisture Resistant Materials and includes a splashback of minimum 300mm high.
- Floor finishes must be resilient, easy to maintain and keep clean and slip-resistant to Code requirements.
- Any space that may be used for learner engagements, events or activities should be provided with resilient flooring that can withstand spillage and can be easily cleaned.

4 Technical Sections

4.4 General Requirements

Adaptability of Spaces

- Designing general flexible spaces may compromise or diminish user experience and will not be accepted. As such, flexible spaces are to be reviewed on an as-needs basis with stakeholders. Where a specific need is documented, this can be supported. Areas that are in high use or need to be changed frequently are unlikely to be successful.
- Spaces for specific purposes also need to be provided and must include a balance of bookable and non-bookable spaces to support different needs.
- Flexibility of infrastructure and services such as power, data, water, etc, is important to support future adaptation of space.

Library Shelving

- Open shelving should generally be a proprietary library shelving system with adjustable shelves. Custom joinery may be provided in select locations only.
- Shelving to be max 1800mm high where adjacent walls and max 1500mm high elsewhere.
- Display shelves should be placed at appropriate heights which support universal design principles.
- Mobile shelving may be considered to allow for adaptation of spaces. Mobile units must be provided with heavy duty lockable castors.
- Ensure corridor spacing between book display bays is adequate for wheelchair access and for circulation of library trolleys.

4.4.2 Services Requirements

Services - General

- Building services infrastructure must be designed with adaptability in mind.
- A services grid must be defined in the planning process.
- Services provisions must be located at the room periphery where possible to allow for flexible space configurations.
- Spare capacity for services and spare access points like power points etc. must be provided in accordance with the TAFE NSW Electrical Services Design Standard.
- All building services must comply with relevant codes and regulations as a minimum. The sustainability strategy for building services must be established early on in the planning phase.
- Building services should be made visible where possible to provide learners with the opportunity to see the learning content applied in real life.
- The provisions for building infrastructure such as services cupboards, risers and plant rooms must be considered early in the design and coordinated with requirements for access, ventilation, acoustics and fire safety.
- Ensure services are designed for flexibility and adaptability to adequately provide for the varied and multiple users of the space(s).

4 Technical Sections

4.4 General Requirements

Interactive Technologies

- The audio-visual design including hearing augmentation must comply with statutory requirements as a minimum.
- Every meeting space, and a range of collaborative group study spaces within the library and learner commons settings should have the capability for connected learning. The Interactive Technologies provisions must comply with the requirements of connected learning and delivery as per the TAFE NSW Connected Learning Points Design Standard.
- Some spaces may require specialist Interactive Technologies provisions for presentations, display or room-enabling interface with immersive and emerging technologies. Refer technical data sheets in section 4.6.

Electrical and Lighting

- The electrical and lighting design must comply with statutory requirements, and TAFE NSW Electrical Services Design Standard and TAFE NSW Lighting Services Design Standard.
- Every space where teaching or learning may occur must have the capability for connected learning. The electrical and lighting provisions must comply with the requirements of connected learning and delivery as per the TAFE NSW Connected Learning Points Design Standard.
- Some spaces may require specialist electrical and lighting provisions. Refer technical data sheets in section 4.6.

Information and Communication Services

- Information and communications systems must comply with statutory requirements, TAFE NSW Structured Cabling System Specification and TAFE NSW SCS Specification for Patch and Fly Leads.
- Information and communications systems must provide for specialist lighting control systems such as DALI, specialist electrical systems, CCTV and other security systems and building management systems. Design requirements must be established at the planning phase in consultation with the TAFE NSW Systems Group to ensure sufficient provision and appropriate systems are implemented into the design.
- The location and size of comms rooms including cable runs and connections to external infrastructure must be considered early on in the planning phase and integrated into the spatial design.
- Wifi must be provided throughout all spaces listed in this document.
- Sufficient charge points must be provided to all spaces listed in this document.
- Data points must be provided to all spaces in the Learning Support Spaces except for ancillary spaces like amenities and store rooms where not required.

Hydraulic

- The hydraulic design must comply with statutory requirements and the TAFE NSW Hydraulic Design Standard as a minimum.
- Some spaces may require specialist hydraulic provisions. Refer technical data sheets in section 4.6.

4 Technical Sections

4.4 General Requirements

Mechanical

- The mechanical design must comply with statutory requirements and the TAFE NSW Mechanical Design Standard as a minimum.
- Extraction systems for exhaust around food preparation areas and MFD's must be provided. Identify the required system and spatial requirements in the planning phase of the project.
- The mechanical design will have a significant impact on sustainability outcomes and the sustainability strategy must be established early in the planning phase. Refer technical data sheets in section 4.6.
- Natural ventilation must be part of the sustainability strategy.

4.4.3 Operation & Management Requirements

Safety

- Work health and safety must be prioritised when planning, designing or delivering a Learning Support Space.

Building Management

- All learning spaces, meeting or consultation rooms, cultural/multi-faith rooms, parenting rooms and shared staff work points must be provided with a room booking system for efficient use and management of spaces. Other spaces may also require a booking system, to be determined in consultation with the stakeholder group.
- A percentage of computer desks, solo study booths, and collaboration settings should also be provided with a booking system for efficient use. A mix of bookable and non-bookable settings should be provided.

Security

CCTV

- Design standards and system must comply with NSW legislative requirements and Australian Standards. The system must seamlessly integrate with TAFE NSW existing platform and fully comply with TAFE NSW CCTV standards and specification requirements

Alarm system

- Design standards and system must comply with Australian Standards. The system must seamlessly integrate with TAFE NSW existing platform and fully comply with TAFE NSW Alarm standards and specification requirements

Access control

- Design standards and system must comply with Australian Standards. Using the TAFE NSW smart campus design standards as key principles, the access control system must seamlessly integrate with TAFE NSW existing platform, including student Identification cards, printers, carpark and building access. Readers must be multi format and blue tooth enabled. The system must fully comply with TAFE NSW Access standards and specification requirements.

4 Technical Sections

4.5 Work Health & Safety

4.5.1 General Requirements

The ''Common Work Health & Safety Concerns'' table identifies common risks and issues that have been identified from past TAFE NSW projects. Each project team must demonstrate that all safety concerns raised have been addressed as part of their involvement with any project to which this Design Standard applies. The safety concerns listed in the table must be included in project-specific Safety-in-Design Registers to ensure that project teams demonstrate how they have been addressed through all phases of any project.

Please note the information in the table is:

- For guidance only,
- Not exhaustive and does not take into account specific circumstances and should not be relied on in that way, and
- Does not alleviate the respective TAFE NSW team, designer, supplier or contractor from their own Work Health and Safety obligations and duties.

Legend	Level of Risk	Action Required
H	High	Implement cost effective risk control measures, and formalise procedures or management responsibility for reducing risk. Amend design to reduce risk, or seek alternative option. Only accept option if justifiable on other grounds.
M	Moderate	Incorporate cost effective risk control measures within the scope of long-term planning. Management responsibility must be specified. Check that risks cannot be further reduced by simple design changes.
L	Low	Manage by routine procedures. Check that risks cannot be further reduced by simple design changes.
Y	Yes	Action Required

4 Technical Sections

4.5 Work Health & Safety

4.5.2 Common Work Health & Safety Concerns

Safety concern raised	Potential Control or Treatment measure	Reference to Design Standards/ Statutory Requirements	Level of Risk	Phase: Project Delivery	Phase: Design	Phase: Construct, Supply, Install	Phase: Operation and End use
Injuries from moving furniture excessively, furniture being too heavy to move, users with vision impairment walking into relocated furniture.	▪ Limit weight of individual element or sign larger components. ▪ Limit ability for furniture to be moved into main circulation pathways.	TAFE NSW Furniture Design Standard	H	-	Y	Y	Y
Injuries from poor ergonomics (back/hip injuries)	▪ Provide a range of furniture to suit different needs.	TAFE NSW Furniture Design Standard	H	-	Y	Y	Y
Fire & emergency	▪ Emergency evacuation, warning & egress to statutory and project specific requirements. ▪ Ensure evacuation and warning signals are accessible to users with hearing or vision loss.	NCC/AS	H	Y	-	-	Y
Slips/trips/falls	▪ Ensure appropriate slip rating to floor finishes at tea points, parents rooms and foot washing locations, foot washing facilities or any locations where water might be used.	NCC/AS SA HB 198: 2014 HB 197:1999	M	-	Y	Y	-
Acoustic separation from loud and quiet spaces	▪ Plan and implement appropriate acoustic separation.	NCC/AS, TAFE NSW Multi Trade Hub Design Standard Section 4.6	M	-	Y	Y	-
Manual handling	▪ Supply movement of goods and trolleys. ▪ TAFE NSW Multi Trade Hub Design Standard provides general requirements for movement pathways e.g. width of doorways.	NCC/AS, Section 4.4 TAFE NSW Multi Trade Hub Design Standard	H	Y	Y	-	-
Injury to neck, back, and/shoulders caused by reaching heights or repetitive strains	▪ Any storage solution must have a fixed shelf at 1800mm AFL and no storage over. ▪ Specify ergonomic furniture, design ergonomically appropriate joinery.	NCC/AS, Section 4.4	M	Y	Y	Y	Y
Lack of general ventilation	▪ Provide sufficient ventilation to all spaces regularly occupied.	NCC/AS, Section 4.4	M	Y	Y	-	-
Isolation of services	▪ Comply with common methods of isolating services.	NCC/AS, TAFE NSW Electrical Services Design Standard	H	-	Y	Y	-
Plug-in devices and charging cables	▪ Provide sufficient charging locations to minimise the need for extension cables or power boards. ▪ Provide charging points that are integrated in furniture, joinery, or in the spaces generally to support user needs.	Section 4.3, Electrical Design Standards	M	-	Y	Y	Y

4 Technical Sections

4.5 Work Health & Safety

4.5.2 Common Work Health & Safety Concerns

Safety concern raised	Potential Control or Treatment measure	Reference to Design Standards/ Statutory Requirements	Level of Risk	Phase: Project Delivery	Phase: Design	Phase: Construct, Supply, Install	Phase: Operation and End use
Hot water spills	▪ Restrict temperature of water at wet areas.	BCA/AS	M	-	Y	Y	Y
Disruption to staff and learners where construction occurs within an occupied site	▪ Hoard and sign site areas appropriately. ▪ Follow appropriate isolation guidelines. ▪ Control dust, smells, vibration and noise during constructions. ▪ Minimise movement of construction materials through occupied space.	-	M	Y	Y	Y	Y
Security after hours or where no security is present	▪ Provide security phone/duress where required	-	M	-	Y	-	Y
Colliding with glazing	▪ As a minimum, clear glazing to be provided with vision strips as required by BCA/AS. ▪ Investigate options such as artwork or similar to provide increased visibility beyond minimum requirements for staff or learners with vision impairment. ▪ Temporary manifestation to be provided during construction phase.	AS 1428	M	Y	Y	Y	Y
Books/items falling on to people/reaching height	▪ Fixed shelf at 1800mm AFL and no storage over.	-	M	Y	Y	Y	Y
Injuries from operating operable walls	▪ Limit use of operable walls to locations where they are strictly necessary. ▪ Select operable walls that are easy to operate. ▪ Train building users to use the operable walls correctly.	-	M	Y	-	Y	Y
Supervision of spaces	▪ Ensure all spaces have an uninterrupted line of sight from staff areas or common areas. Ensure each space has multiple circulation paths.	-	M	-	Y	Y	Y
Lighting/glare	▪ Mitigate glare by specifying non reflective materials, glare reducing glazing film and/or window treatments.	-	L	-	Y	Y	Y
Injury to necks, back, repetitive strain	▪ Specify ergonomic furniture, design ergonomically appropriate joinery.	-	M	-	Y	Y	Y

This sheet forms part of the Learning Support Spaces Design Standards and must not be separated.

ABR	Compliance levels:
M	Mandatory - Must comply
S	Site specific - to site specific statutory requirements
O	Optional - Subject to project specific requirements
-	Not required

4 Technical Sections

4.6 Technical Data Sheets

4.6.1 Library Cluster

Space	Glare Control	AV	Power/ Data/WiFi	Specialist Lighting	Water Supply Cold/Warm	Water Supply Hot	Water Supply Boiling	Heating & Cooling	Natural Ventilation	Access Control	Room Booking
Book Display	M	-	M	O	-	-	-	M	M	-	-
Reading & Waiting Areas	M	-	M	S	-	-	-	M	M	-	-
Children's Spaces	M	-	M	O	-	-	-	M	M	-	-
Assistance/Concierge Desk	M	O	M	O	-	-	-	M	M	-	-
Borrowing/Scanning Station	M	O	M	O	-	-	-	M	M	-	-
IT/Equipment Borrowing	M	O	M	O	-	-	-	M	M	O	-
Incoming Books	O	-	M	O	-	-	-	S	S	-	-
Book & equipment Storage	O	-	M	-	-	-	-	S	S	M	-

Spaces not covered by this standard:

- Library Staff Work Areas, refer to TAFE NSW Workplace Accommodation Design Standard

4.6.2 Learner Commons Cluster

Space	Glare Control	AV	Power/ Data/WiFi	Specialist Lighting	Water Supply Cold/Warm	Water Supply Hot	Water Supply Boiling	Heating & Cooling	Natural Ventilation	Access Control	Room Booking
Learner Lounge	M	O	M	O	-	-	-	M	M	-	-
Learner Kitchen	M	O	M	O	M	S	M	M	M	-	-
Waiting Banquettes	O	O	M	O	-	-	-	M	M	-	-
Chat and Charge	O	O	M	O	-	-	-	M	M	-	-

This sheet forms part of the Learning Support Spaces Design Standards and must not be separated.

ABR	Compliance levels:
M	Mandatory - Must comply
S	Site specific - to site specific statutory requirements
O	Optional - Subject to project specific requirements
-	Not required

4 Technical Sections

4.6 Technical Data Sheets

4.6.3 Shared Spaces Cluster

Space	Glare Control	AV	Power/ Data/WiFi	Specialist Lighting	Water Supply Cold/Warm	Water Supply Hot	Water Supply Boiling	Heating & Cooling	Natural Ventilation	Access Control	Room Booking
Computer Benches	M	O	M	O	-	-	-	M	M	-	O
Charge Stations	-	-	M	-	-	-	-	M	S	-	-
Solo Focus Areas	M	O	M	O	-	-	-	M	M	-	O
Quiet focus rooms	M	M	M	O	-	-	-	M	S	O	O
Small Meeting Rooms	M	M	M	O	-	-	-	M	S	O	O
Medium Meeting Rooms	M	M	M	O	-	-	-	M	M	O	M
Large Meeting Rooms	M	M	M	O	O	-	O	M	M	O	M
Seminar Spaces	M	M	M	O	O	-	O	M	M	O	M
Collaboration Areas	M	M	M	O	-	-	-	M	M	-	-
Tea Point	O	-	M	O	M	-	M	O	O	-	-

Spaces not covered by this standard:

- Utility/Printing Areas, refer to TAFE NSW Workplace Accommodation Design Standard

This sheet forms part of the Learning Support Spaces Design Standards and must not be separated.

ABR	Compliance levels:
M	Mandatory - Must comply
S	Site specific - to site specific statutory requirements
O	Optional - Subject to project specific requirements
-	Not required

4 Technical Sections

4.6 Technical Data Sheets

4.6.4 Cultural/Multifaith Cluster

Space	Glare Control	AV	Power/ Data/WiFi	Specialist Lighting	Water Supply Cold/Warm	Water Supply Hot	Water Supply Boiling	Heating & Cooling	Natural Ventilation	Access Control	Room Booking
Meditation/ Prayer Room	O	M	M	O	O	O	O	M	S	M	O
Male Foot Washing Facilities	-	-	O	-	M	O	-	M	S	-	-
Female Foot Washing Facilities	-	-	O	-	M	O	-	M	S	-	-
Accessible Foot Washing Facilities	-	-	O	-	M	O	-	M	S	-	-

Spaces not covered by this standard:

- Culturally safe spaces, refer to TAFE NSW Culturally Safe Space guideline

4.6.5 Parent Room Cluster

Space	Glare Control	AV	Power/ Data/WiFi	Specialist Lighting	Water Supply Cold/Warm	Water Supply Hot	Water Supply Boiling	Heating & Cooling	Natural Ventilation	Access Control	Room Booking
Parents Room	O	-	M	-	M	M	O	M	S	M	O
Nappy Change Facilities	-	-	O	-	M	O	-	M	S	-	-

Acoustics

5 Acoustics

5.1 Introduction

5.1.1 Section Overview

This Section provides technical guidance for the acoustic design of all spaces listed within this standard.

An acoustic consultant with demonstrated experience the acoustic design of education buildings should be engaged for each project to provide a design that complies with the requirements in this Section. The acoustic consultancy should be a member firm of the Association of Australasian Acoustical Consultants (AAAC), or individuals preparing the design to be a member of the Australian Acoustical Society (AAS).

Acoustic specific standards and literature have informed this section and are listed on the final page of this section for reference.

Acoustic Objectives

The overall objective of this Section of the LSS Design Standard is to set out acoustic design parameters for spaces that enable effective teaching and learning. More specifically, it seeks to address the following aspects of the user experience as they relate to acoustic performance and where appropriate for room usages:

- Allowing for clear spoken communication (speech intelligibility)
- Providing speech privacy between enclosed spaces
- Minimising noise disturbance (activity noise, building services noise)
- Considering general room acoustic comfort (reverberation)
- Control perceptible vibration.

5 Acoustics

5.2 Room-to-Room Sound Insulation

5.2.1 Airborne Sound Insulation

Room-to-Room Airborne Sound Insulation Ratings

Internal airborne sound insulation rating criteria are to be determined based on the typical activity noise level in the source room and the degree of noise tolerance in the receiving room.

Based on these factors, airborne sound insulation performance criteria are derived as the Weighted Standardised Level Difference ($D_{nT,w}$ rating) between two spaces, as shown for new build spaces in Table 5.1 and refurbished spaces in Table 5.2.

Table 5.1 Room-to-room sound insulation criteria – New build

Noise tolerance in receiving room	Low (L) activity noise in source room	Average (A)activity noise in source room	High (H)activity noise in source room	Very high (VH) activity noise in source room
High (H)	N/A	≥ $D_{nT,w}$ 35	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 55
Medium (M)	≥ $D_{nT,w}$ 40	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 50	≥ $D_{nT,w}$ 55
Low (L)	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 50	≥ $D_{nT,w}$ 55	≥ $D_{nT,w}$ 55

Table 5.2 Room-to-room sound insulation criteria – Refurbishment

Noise tolerance in receiving room	Low (L) activity noise in source room	Average (A)activity noise in source room	High (H)activity noise in source room	Very high (VH) activity noise in source room
High (H)	N/A	≥ $D_{nT,w}$ 30	≥ $D_{nT,w}$ 35	≥ $D_{nT,w}$ 45
Medium (M)	≥ $D_{nT,w}$ 30	≥ $D_{nT,w}$ 40	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 45
Low (L)	≥ $D_{nT,w}$ 35	≥ $D_{nT,w}$ 40	≥ $D_{nT,w}$ 50	≥ $D_{nT,w}$ 50

Note:

- $D_{nT,w}$ criteria apply only where there is a solid/sealed partition separating two spaces without operable elements. Where this is not the case, these criteria are unlikely to be achievable in all cases.
- The $D_{nT,w}$ rating is calculated according to ISO 717-1:2020 [1]. For design assessment, the reference reverberation time shall be the upper limit for the mid-frequency reverberation time criterion (Tmf,max) for the receiving room in Table 4.6, applied to all one-third octave bands from 100 Hz to 3.15 kHz. In commissioning measurements it is appropriate to use measured reverberation times in all one-third octave bands, provided that the mid-frequency reverberation time Tmf, max complies with the standard given in Table 4.6.
- The $D_{nT,w}$ is to be assessed with each pair of spaces in an adjacency as both source and receiver, and the most onerous (highest) $D_{nT,w}$ of the two ratings is taken to apply for the adjacency.
- These apply in adjacencies where there are no doors and where there is not extensive glazing (i.e. >1 m2 glazed area).

5 Acoustics

5.2 Room-to-Room Sound Insulation

Noise Activity and Tolerance

Noise activity and tolerance ratings are applied to Learning Support Space types Tables 5.3.1 to 5.3.6. Noise activity and tolerance ratings should be considered on a case-by-case basis for each project. Where a room type is not listed in Tables 5.3.1 to 5.3.6 the closest similar room type should be used, and justification for the substitution made clear in acoustic reporting.

Table 5.3.1: Library cluster noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Library staff work areas and service counters	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40
Book display	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40
Reading & waiting areas	L	L	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35
Children's spaces	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40

Table 5.3.2: Learner Commons cluster noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Chat and Charge	A	H	≥ $D_{nT,w}$ 35	≥ $D_{nT,w}$ 30
Waiting Banquettes	L	H	N/A	N/A
Storage Lockers	L	H	N/A	N/A
Learner Lounge/ Learner Kitchen	H	H	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35

5 Acoustics

5.2 Room-to-Room Sound Insulation

Table 5.3.3: Shared space cluster noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Collaboration areas	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40
Computer benches	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40
Utility/Printing Areas	L	H	N/A	N/A
Tea points	H	H	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35
Meeting rooms	A	L	≥ $D_{nT,w}$ 50	≥ $D_{nT,w}$ 40
Presentation areas	H	L	≥ $D_{nT,w}$ 55	≥ $D_{nT,w}$ 50
Solo focus areas	L	L	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35
Quiet focus rooms	L	L	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35

Table 5.3.4: Cultural/Multifaith cluster noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Multifaith, Prayer and Meditation	L	L	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35
Foot Washing Facilities	L	L	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35

Table 5.3.5: Parenting cluster noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Parenting Room	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40
Nappy Change	A	M	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 40

Table 5.3.6: Miscellaneous noise generation and sensitivity by room and associated performance ratings

Room Use	Activity noise generation: source room	Noise tolerance: receiving room	Sound insulation rating: New build	Sound insulation rating: Refurbishment
Circulation	L	H	N/A	N/A
Plant Rooms	VH	H	See Note Below	See Note Below
WCs	H	H	≥ $D_{nT,w}$ 45	≥ $D_{nT,w}$ 35

Note: The requirement of two adjacent plant rooms are the same in New builds and refurbishments. $D_{nT,w}$ rating is to be determined based on detailed plant noise assessment (expect at least ≥ $D_{nT,w}$ 50 as a starting point)

5 Acoustics

5.2 Room-to-Room Sound Insulation

Partitions to circulation with doors and extensive glazing

Partitions adjoining circulation that include a doorset and/or extensive glazing, the performance requirements in Table 5.4 apply.

Table 5.4: Sound insulation criteria for partitions with doors or extensive glazing

Room Use	Minimum R_w rating: Wall with Glazing	Minimum R_w rating: Doorset
Normally occupied room types	≥ R_w 40	≥ R_w 30 (hinged door) ≥ R_w 25 (sliding door)
All other spaces	Assess on a case-by-case basis	Assess on a case-by-case basis

Note:

- The R_w rating is determined by laboratory testing and can be demonstrated by submission of appropriate acoustic test reports for the constructions being used.
- Because of the complexity of sealing arrangements, sliding doors will typically not provide significant sound insulation without use of proprietary door sets from a specialist supplier. Sliding doors are only to be used in locations where there are compelling functional or educational requirements that cannot be achieved with a hinged doorset. This reason should be coordinated within the design team and explained in acoustic reporting.
- "Doorset" refers to the door leaf, sealing arrangement, framing and door hardware.

Operable Walls

Moveable partitions typically perform below the level of sound insulation of drywall constructions with similar laboratory ratings due to the number of moving parts, compression seals, etc. Where moveable partitions are employed, these will require careful specification, detailing and installation. They will also require periodic inspection and servicing to ensure the sound insulation performance is maintained.

Operable walls are only to be used in locations where there are compelling functional or educational requirements that cannot be achieved with a hinged doorset.

Operable walls rated between R_w 40 and R_w 50 are to be proprietary operable wall products sourced from a specialist operable wall supplier. The installed performance rating is to be certified/warranted by the operable wall supplier.

Operable walls should not be used for partitions requiring greater than around Rw 50 (such products are very heavy and typically come at high cost, and sound insulation performance over time is unreliable).

If operable walls are included in the project design, this should be justified in the Return Brief based on the functional requirements and explained in acoustic reporting as described for sliding doors above.

5 Acoustics

5.2 Room-to-Room Sound Insulation

5.2.2 Impact Sound Insulation

Impact sound insulation criteria are provided in Table 5.5. For vertical adjacencies, criteria are to be met in the space below the impact (e.g. footfall) and typically relate to the ceiling and floor constructions above. The criteria also apply between horizontal adjacencies and are normally met via specification of appropriate floor finishes in the source room.

Table 5.5: Impact noise criteria

Room Use	Weighted standardised impact sound pressure level, $L'_{nT,w}$
Library Spaces Cultural/Multifaith Rooms	≤ L'_{nTw} 50
All other normally-occupied spaces (Learner Commons; Parent Rooms)	≤ L'_{nTw} 55

Note:

- The $L'_{nT,w}$ rating is calculated according to ISO 717-2:2020 [2]. For design assessment, the reference reverberation time T shall be the upper limit for the mid-frequency reverberation time criterion ($T_{mf,max}$) for the receiving room in Tables 5.6.1 to 5.6.6, applied to all one-third octave bands from 100 Hz to 3.15 kHz. In commissioning measurements it is appropriate to use measured reverberation times in all one-third octave bands, provided that the mid-frequency reverberation time $T_{mf,max}$ complies with the standard given in Tables 5.6.1 to 5.6.6.

As a guide, the following are generally more effective floor/ceiling types for impact noise control:

- Carpeted flooring, or resilient underlay below other floor finishes
- Sealed, non-perforated ceiling types (e.g. plasterboard), particularly if resiliently mounted.

Whereas the following are generally less effective for impact noise control and may require impact noise mitigation (e.g. resilient underlay):

- 'Hard' floor finish types – e.g. timber, tile, concrete
- Exposed soffit (no ceiling)
- Perforated and batten ceiling types.

5 Acoustics

5.3 Room Acoustics

5.3.1 Room Acoustics

The choice of architectural finishes is important in determining the acoustic quality of an environment. Architectural finishes may be categorised as acoustically 'hard' or 'soft' depending on the behaviour of a sound wave after interaction with the surface. Acoustically 'hard' finishes, such as glass, stone or tile, reflect most of the energy of a sound wave. Spaces with these finishes are typically reverberant and may be perceived as 'live'. Acoustically 'soft' finishes, such as carpet, mineral fibre ceiling tiles or foam, absorb a proportion of the acoustic energy of the sound wave.

Noise from a given source in a reverberant room will be louder than in a more controlled room due to the build-up of reverberant energy over time.

In education buildings, room acoustic performance is important for effective spoken communication, control of the build-up of activity noise, and general acoustic comfort. The room acoustic performance ratings of most significance for TAFE NSW spaces are the reverberation time (RT or T_{60}) and speech intelligibility Speech Transmission Index (STI).

5.3.2 Reverberation Time

Mid-frequency reverberation time should be controlled as per Tables 5.6.1 to 5.6.6. These are generally based on the recommended values in AS/NZS 2107:2016 [2]. 'Mid-frequency' refers to the arithmetic average of the reverberation time values in the octave bands centred at 500 Hz and 1 kHz.

Table 5.6.1 Library mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Library staff work areas and service counters	0.6 to 0.8
Book display	0.6 to 0.8
Reading & waiting areas	0.4 to 0.6
Children's spaces	0.4 to 0.6

Table 5.6.2 Learner commons mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Chat and Charge	≤0.8
Waiting Banquettes	≤0.8
Storage Lockers	0.8
Learner Lounge/Learner Kitchen	≤1.0

5 Acoustics

5.3 Room Acoustics

Table 5.6.3 Shared spaces mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Collaboration areas	≤0.6
Computer benches	0.6 to 0.8
Utility/Printing Areas	N/A
Tea points	≤1.0
Meeting rooms	≤0.6
Presentation areas	0.4 to 0.6
Solo focus areas	≤0.6
Quiet focus rooms	≤0.6

Table 5.6.4 Cultural/multifaith room mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Multifaith, Prayer and Meditation	0.4 to 0.6
Foot Washing Facilities	0.4 to 0.6

Table 5.6.5 Parents room mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Parenting Room	N/A
Nappy Change	N/A

Table 5.6.6 Miscellaneous mid-frequency reverberation time criteria

Room Use	Mid-frequency reverberation time criteria, T_{mf} seconds
Circulation	≤0.8
Plant Rooms	Refer to Services Standards
WCs	N/A

5 Acoustics

5.3 Room Acoustics

5.3.3 Speech Intelligibility

Clear speech communication is key to the success of the teaching and learning experience. Speech Transmission Index (STI) is a measure of speech transmission quality and expresses the ability of a communication path to relay the information contained in speech, where the communication path is the path sound takes between the speaker and the listener.

Speech intelligibility is influenced by the room acoustics, ambient noise and, where applicable, audio systems within a space. The STI rating is given as a number between 0 and 1, where a higher value represents greater transmission quality of speech.

Table 5.7 Speech intelligibility criteria

Room Use	Scenario	Speech Transmission Index (STI)
Library and Learner Commons Spaces	Listening to 'wanted' speech (e.g. instruction or critical listening within the same group)	≥0.6 (Note 1)
Collaboration Areas	Listening to 'unwanted' speech (e.g. speech from unrelated activities/separate groups while listener is undertaking focussed work)	≤0.3

Note 1: A higher STI rating may be appropriate for listeners with special hearing or communication needs.

STI Modelling

For open plan Library and Learner Commons spaces where learning/a focussed activity is proposed to be undertaken while unrelated activities are occurring in the same space (or in an adjacent space that is not fully enclosed), a three-dimensional computer prediction model should be used to determine the design requirements to meet STI criteria in Table 5.7.

STI computer prediction modelling requirements are as follows:

- STI is to be calculated in accordance with IEC 60268-16:2020 [4]
- STI is to be calculated based upon the expected layout and activity scenarios (number of occupants and their locations)
- STI modelling is to assume a background noise level at the listening location that includes
  - Internal ambient noise building services and external noise ingress noise, (per Tables 5.9.1 to 5.9.6 criteria)
  - Other activity noise sources that audible at the listening location
- STI modelling is to use the sound power levels given in Table 5.8 for the source talker and for activity background noise sources.

Table 5.8: Sound power levels (dB re 10^{-12} W) for STI modelling based on Octabe band centre frequency (Hz/kHz)

Source	125 Hz	250 Hz	500 Hz	1 kHz	2 kHz	4 kHz	8 kHz
Speech at normal level (per person)	55	65	69	63	56	50	45
Speech at raised level (per person)	59	70	75	72	64	57	48
Open plan space – general working (per 15 occupants)	62	62	62	62	57	52	47

5 Acoustics

5.3 Room Acoustics

5.3.4 Room Acoustic Quality

Flutter Echo Control

Flutter echo is known to negatively impact on speech intelligibility (particularly over audio/video conference), and room acoustic comfort. This effect occurs where acoustically reflective finishes are parallel facing, causing repeated reflections.

Coordination between the acoustic consultant and architect to treat flutter echo is important, as design clashes often arise when trying to provide sound absorbing wall finishes in appropriate location to control flutter echo (i.e. considering room geometry, locations of writable surfaces, AV screens, glazed partitions).

Sound absorbing finishes (e.g. wall panels) on two non-parallel walls and a sound absorbing ceiling are recommended where practical to control 'flutter echo' in the following types of enclosed rooms:

- Meeting rooms and seminar rooms
- Cultural/Multifaith rooms

Sound Focusing

Sound focussing occurs where large, curved surfaces are prevalent and can cause a variety of unusual room acoustic effects. These geometries should be subject to specific acoustic review and sound absorbing or diffusing finishes may be required.

5 Acoustics

5.4 Internal Noise Levels

5.4.1 Background Noise Levels

The internal background noise criteria listed in Tables 5.9.1 to 5.9.6 should be met considering both building services and external ambient noise ingress contributions to each space, but excluding occupant activity noise.

Note:

- Where a space is naturally ventilated, a relaxed criteria of 5 dB above the normal operation new build criteria is acceptable. The ventilators or windows should be assumed to be open for the design. Where the relaxed criteria for naturally ventilated spaces cannot be met with windows open, forced ventilation will need to be introduced and the indoor ambient noise level requirements apply.
- 'Emergency operation' refers to when the building is in emergency mode or emergency equipment is being tested (diesel generators; smoke exhaust fans; etc.).

Table 5.9.1 Library maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$
Library staff work areas and service counters	40	45	65
Book display	40	45	65
Reading & waiting areas	40	45	65
Children's spaces	0.4 to 0.6	45	65

Table 5.9.2 Learner commons maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$)
Chat and Charge	45	50	65
Waiting Banquettes	45	50	65
Storage Lockers	45	55	65
Learner Lounge/Learner Kitchen	45	50	65

5 Acoustics

5.4 Internal Noise Levels

Table 5.9.3 Shared spaces maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$
Collaboration areas	40	45	65
Computer benches	40	45	65
Utility/Printing Areas	45	50	65
Tea points	45	50	65
Meeting rooms	40	45	65
Presentation areas	35	40	65
Solo focus areas	40	45	65
Quiet focus rooms	40	45	65

Table 5.9.4 Cultural/Multifaith room maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$
Multifaith, Prayer and Meditation	40	45	65
Foot Washing Facilities	40	45	65

Table 5.9.5 Parents room maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$
Parenting Room	40	45	65
Nappy Change	40	45	65

Table 5.9.6 Miscellaneous maximum internal background noise level criteria

Room Use	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - New build	Maximum normal operation internal background noise level (mechanically ventilated spaces), dB $L_{Aeq(30min)}$ - Refurbishment	Maximum emergency operation internal background noise level (mechanically and naturally ventilated spaces), dB $L_{Aeq(30sec)}$
Circulation	45	50	65
Plant Rooms	Refer to TAFE NSW Services Standard	Refer to TAFE NSW Services Standard	Refer to TAFE NSW Services Standard
WCs	50	55	65

5 Acoustics

5.4 Internal Noise Levels

Noise Mitigation

Potential noise mitigation treatment to building services includes:

- Selection of low-noise plant
- Use of in-duct attenuators to control plant noise
- Internal insulation lining to ductwork
- External mass-loaded cladding of ductwork and pipework
- Sealing of building services penetrations (ductwork, pipework, cabling, etc.) through sound insulating partitions
- Careful selection of ductwork types and input to ductwork reticulation to control noise breakout and regenerated noise
- Sound insulating enclosures and access panels for plant located above open/perforated/batten ceiling types
- Vibration isolators (hangers/mounts) to reduce vibration transmission to the building structure.

5.4.2 Rain Noise

Noise in internal spaces generated by rain on the roof should be designed to be no more than 5 dB above the normal operation background noise level criteria, as below:

Maximum dB $L_{Aeq(period)}$ rain noise level = Normal operation background noise level + 5 dB

The above criterion is to be based on typical design conditions for non-tropical Australia with a rainfall intensity of 25 mm/hour.

The above criterion is achieved via specification of the roof build-up and/or ceiling below.

5.4.3 Lift Noise

Lift noise and vibration criteria are as follows:

- Lift noise levels from normal operation of lifts should not exceed internal normal operation background noise levels (normal operation) in Tables 5.7.1 to 5.7.5
- Lift operation noise at 1.5 m in front of closed lift doors: 50 dB L_{Amax}
- Lift noise inside the lift car: 55 dB $L_{Aeq,1\text{-hour}}$
- Vibration levels from normal operation of lifts should not exceed the Preferred values in Tables 5.9.1 and 5.9.2.

Refer also to TAFE NSW Vertical Transportation Design Standard.

5.4.4 Aircraft Noise

Aircraft noise intrusion should be assessed for new builds in accordance with AS 2021:2015. [12]

5 Acoustics

5.5 Vibration

5.5.1 Vibration Criteria

Human Comfort

Equipment/machinery generating vibration within the development shall be designed such that the resultant vibration does not exceed the criteria detailed in 'Assessing Vibration: A Technical Guideline' [3]. Acceptable values for continuous and impulsive vibration from 1 Hz–80 Hz for spaces applicable to TAFE NSW developments are presented in Tables 5.10.1 and 5.10.2

Table 5.10.1: Continuous vibration criteria

Location	Preferred values - RMS 1-80Hz (m/s^2) Z-axis	Preferred values - RMS 1-80Hz (m/s^2) X-and Y-axes	Maximum values - RMS 1-80Hz (m/s^2) Z-axis	Maximum values - RMS 1-80Hz (m/s^2) X-and Y-axes
Educational Institutions	0.020	0.014	0.040	0.028
Offices	0.020	0.014	0.040	0.028
Workshops	0.04	0.029	0.080	0.058

Table 5.10.2: Impulsive vibration criteria

Location	Preferred values - RMS 1-80Hz (m/s^2) Z-axis	Preferred values - RMS 1-80Hz (m/s^2) X-and Y-axes	Maximum values - RMS 1-80Hz (m/s^2) Z-axis	Maximum values - RMS 1-80Hz (m/s^2) X-and Y-axes
Educational Institutions	0.64	0.46	1.28	0.92
Offices	0.64	0.46	1.28	0.92
Workshops	0.64	0.46	1.28	0.92

Radiated Noise

Noise generated by vibration entering the structure and causing re-radiated noise should be controlled to 10 dB below the internal background noise levels given in Tables 5.7.1 to 5.7.5. This may be achieved through locating equipment appropriately and provision of suitable anti-vibration mounts and inertia bases.

5 Acoustics

5.6 Environmental Noise Emissions

5.6.1 Environmental Noise Emissions Criteria

Offsite Receivers:

Operational noise emissions to nearby premises should be designed with consideration to the local planning requirements and project authority approval conditions as required. Otherwise, if there are no specific authority approval requirements, the design shall be in accordance with NSW Noise Policy for Industry [4] criteria. This includes noise from normal operation building services plant and activity noise from on-campus venues (cafés, bars, etc.).

On-site Receivers:

Environmental noise emissions from normal operation building services plant should be designed to not exceed 55 dB $L_{Aeq(15min)}$ at any normally occupied outdoor area on-campus and at the building facade external to noise sensitive spaces.

5 Acoustics

5.7 Demonstration of Compliance

The need for site testing will be dependent on the project brief/required scope. Any other testing requirements (e.g. for Green Star accreditation) will need to be satisfied in addition to those outlined in this Section.

The site tests and reporting are to be completed by a qualified acoustic consultancy that is a member firm of the Association of Australasian Acoustical Consultants (AAAC) or individual acoustics consultants to be a member of the Australian Acoustical Society (AAS).

5.7.1 Room-to-room Airborne Sound Insulation

Measurement Locations:

- Airborne sound insulation measurements must be taken by the Contractor's acoustic consultant for a representative sample of adjacencies within the project. A representative sample would cover at least 10% of adjacencies of each airborne sound insulation criterion, or each fundamentally different construction type, whichever is larger.
- Measurements are to be undertaken for 100% of rooms with the following types (if they are enclosed spaces):
  - Meeting rooms
  - Presentation areas
  - Cultural/Multifaith rooms.
- A test program should be proposed to TAFE NSW and agreed to before testing.

Methodology:

- Measurements must be taken in accordance with the requirements of ISO 16283-1:2014 [5], with single-number values rated using in compliance with ISO 717-1:2020 [1].
- The measurements must determine the apparent sound insulation ($D_{nT,w}$ or D_w for doorsets) of the elements (walls, floors and doors) for comparison with the specified sound insulation requirements. For $D_{nT,w}$ compliance assessment, the reference reverberation time shall be the measured reverberation time in each 1/3 octave band.
- Measurements are to be undertaken with all room finishes installed and with the room fully furnished but unoccupied.
- Note that site sound insulation tests typically need to be conducted when the space is unoccupied (except by those conducting the tests), as the tests involve generating high noise levels and require low background noise levels (i.e. no occupant activity noise). For facilities that are operational, this typically means allowing for test to be completed outside of normal operating hours. A time allowance for acoustic testing should be indicated on the project program.
- Compliance of doorsets is to be assessed as follows:
  - For partitions with a door, the installed D_w rating measured with a microphone at 1m from either side of the partition/door is required to be no less than 4 dB lower than the specified R_w rating of the doorset. This shall apply at any location along the partition, including adjacent to the door.
- For operable walls, the in-situ D_w performance shall be no less than 6 dB lower than the R_w rating.
- A report detailing the test results and compliance assessment is to be prepared in the format specified in ISO 16283-1:2014 [5] with all relevant data and testing conditions required.

5 Acoustics

5.7 Demonstration of Compliance

5.7.2 Room Acoustics

Measurement Locations:

- Reverberation time measurements must be taken by the Contractor's acoustic consultant in at least 30% of the spaces that have reverberation time criterion for the project.
- Measurements are to be undertaken 100% of rooms with the following types:
  - Meeting rooms
  - Presentation areas
  - Open plan library spaces (Reading, Collection, Solo Work areas, Collaboration areas)
  - Cultural/Multifaith rooms
- The specific spaces to be tested will need to be agreed with TAFE NSW before testing.

Methodology

- Measurements are to be conducted in accordance with ISO 3382-2:2008 [8] and ISO 3382-1:2009 [9].
- Measurements are to be undertaken with all room finishes installed and with the room fully furnished.

5.7.3 Internal Background Noise Levels

Measurement Locations:

- Internal background noise level measurements must be taken by the Contractor's acoustic consultant in at least 30% of the spaces.
- Measurements are to be undertaken in 100% of rooms with the following types:
  - Meeting rooms
  - Presentation areas
  - Open plan library spaces (Reading, Collection, Solo Work areas, Collaboration areas)
  - Cultural/Multifaith rooms
- The specific spaces to be tested will need to be agreed with TAFE NSW before testing.

5 Acoustics

5.7 Demonstration of Compliance

Methodology

- Measurements must be conducted during normal operating hours and with normal operation plant functioning at the design condition.
- Measurements must be performed only after the building's mechanical system has been fully balanced.
- Note that background noise level tests typically need to be conducted when the space is unoccupied (except by those conducting the tests), as the tests require low background noise levels (i.e. no occupant activity noise).
- Take sound measurements at a height approximately 1200 mm above the floor and at least 1000 mm from a wall, column, and other large surface capable of altering the measurement results.
- Sound pressure levels must be recorded in octave bands between 63 Hz and 8000 Hz.
- Each measurement must be of at least 30 seconds duration.
- Take sound measurements with the HVAC systems off to establish the background sound levels and take sound measurements with the HVAC systems operating.

5.7.4 Impact Noise

Measurement Locations:

- Spaces requiring impact noise tests will be determined by TAFE NSW for each project. Generally, it is recommended that impact noise measurements be undertaken in occupiable spaces that have a 'hard' floor finish directly above (e.g. concrete, timber, tile flooring).

Methodology

- Measurements are to be taken in accordance with the requirements of International Standard ISO 16283-2:2020 [9], with single-number values rated using in compliance with ISO 717-2:2020 [10].
- The measurements must determine the $L'_{nT,w}$ rating of the floor for comparison with the design criteria.
- [11]A report detailing the test results and compliance assessment is to be prepared in the format specified in ISO 16283-2:2020 [9], with all relevant data and testing conditions required.

5.7.5 External Noise Levels at Nearby Premises

Requirements to be determined based on authority approval conditions for each project. Otherwise, if there are no specific authority approval requirements, assessment shall be undertaken in accordance with NSW Noise Policy for Industry [4].

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5.8 References

1. International Organization for Standardization, International Standard ISO 717-1:2020 Acoustics — "Rating of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation", 2020.
2. Standards Australia Limited/Standards New Zealand, Australian/New Zealand Standard AS/NZS 2107:2016 Acoustics — Recommended design sound levels and reverberation times for building interiors, 2016.
3. Department of Environment and Conservation NSW, "Assessing Vibration: A Technical Guideline", 2006.
4. State of NSW and Environment Protection Authority, Noise Policy for Industry, 2017.
5. International Organization for Standardization, International Standard ISO 16283-1:2014 "Acoustics — Field measurement of sound insulation in buildings and of building elements — Part 1: Airborne sound insulation", 2014.
6. International Organization for Standardization, International Standard ISO 3382-2:2008 Acoustics — "Measurement of room acoustic parameters — Part 2: Reverberation time in ordinary rooms", 2008.
7. International Organization for Standardization, International Standard ISO 3382-1:2009 Acoustics — "Measurement of room acoustic parameters — Part 1: Performance spaces", 2009.
8. Standards Australia Limited/Standards New Zealand, Australian/New Zealand Standard AS/NZS 2460:2002 "Acoustics — Measurement of the reverberation time in rooms", 2002.
9. International Organization for Standardization, International Standard ISO 16283-2:2020 "Acoustics — Field measurement of sound insulation in buildings and of building elements — Part 2: Impact sound insulation", 2020.
10. International Organization for Standardization, International Standard ISO 717-2:2020 Acoustics — "Rating of sound insulation in buildings and of building elements — Part 2: Impact sound insulation", 2020.
11. Department for Education (UK) and Education Funding Agency (UK), Building Bulletin 93 "Acoustic design of schools: performance standards", 2015.
12. Standards Australia Limited, Australian Standard AS 2021:2015 "Acoustics - Aircraft noise intrusion - Building siting and construction", 2015.

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