Charles Sturt University

Revision 1.0

Infrastructure Design Standards

Module S07: Ergonomics

Division of Finance (Facilities Management)
Charles Sturt University

Document Control

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Enquiries Contact	Division of Finance (Facilities Management)

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1. Introduction

1.1. Overview

The Charles Sturt University Infrastructure Design Standards (the Standards) outline the University's expectations for its built forms to achieve consistency in the quality of the design and construction of those built forms.

The Standards have been developed to provide guidance to the design team and to assist Facilities Management to drive a consistent approach to the design, construction, commissioning, handover, and operation of new capital projects to ensure the new asset is fully integrated into campus life and conforms to the University's standards and policies.

The successful integration of any new project into the day-to-day operation of campus life cannot be underestimated and is vital to ensuring the new asset provides a fully functional platform for Facilities Management clients and the University. The Standards will ensure Facilities Management is successful in supporting the University's strategic objectives now and into the future. The pitfall of viewing any new project as a standalone entity must be avoided as any new project is an extension of the existing campus.

The Standards are aligned with Charles Sturt's requisites for aesthetic appeal, life cycle maintenance and environmental sustainability, while ensuring that there is sufficient scope for innovation and technological advancements to be explored within each project.

1.2. The University

The history of Charles Sturt University dates to 1895, with the establishment of the Bathurst Experiment Farm. Formed progressively through the merge of regional institutions in south-western and western NSW, Charles Sturt was formally incorporated on 19 July 1989 under the Charles Sturt University Act 1989. As one of Australia's newer universities, Charles Sturt has been built on a tradition of excellence in teaching and research spanning more than 100 years.

With over 40,000 current students studying both on-campus and online, Charles Sturt University is the largest tertiary education institution in regional Australia. The University operates six main campuses across New South Wales in Albury-Wodonga, Bathurst, Dubbo, Orange, Port Macquarie, and Wagga Wagga, alongside specialist campuses in Canberra, Parramatta, and Goulburn. Charles Sturt University is structured around three Faculties: Arts and Education; Business, Justice and Behavioural Sciences; and Science and Health.

1.3. University Vision and Values

Charles Sturt University is committed to building skills and knowledge in its regions by offering choice and flexibility to students, while collaborating closely with industries and communities in teaching, research, and engagement. As a significant regional export industry, the University brings both strength and learning back to

its regions, positioning itself as a market-oriented institution. Its goals are to remain the dominant provider of higher education in its regions and a sector leader in flexible learning.

Charles Sturt University believes that wisdom has the power to transform communities. With perseverance and dedication, the University contributes to shaping resilient and sustainable regions for the future. Acknowledging the deep culture and insight of First Nations Australians, the University's ethos is encapsulated by the Wiradjuri phrase *yindyamarra winhanganha,* which translates to "the wisdom of respectfully knowing how to live well in a world worth living in." Through its values, Charles Sturt University fosters a welcoming community and learning environment that supports innovation, drives societal advancement, and gives back to the regions it serves.

1.4. Using the Infrastructure Design Standards

The Infrastructure Design Standards are written to advise Charles Sturt University performance requirements and expectations that exist above and beyond existing industry codes and standards.

The Infrastructure Design Standards do not repeat codes and standards.

Performance to Codes and Standards are a non-negotiable regulatory minimum of any design solution, to be determined for each project by the design team.

The Standards are to be used by all parties who are engaged in the planning, design, and construction of Charles Sturt's facilities. This includes external consultants and contractors, Charles Sturt's planners, designers, and project managers as well as faculty and office staff who may be involved in the planning, design, maintenance, or refurbishment of facilities. All projects must comply with all relevant Australian Standards, NCC, EEO as well as Local Government and Crown Land Legislation.

1.5. Modules

The Standards are divided into the following modules for ease of use, but must be considered in its entirety, regardless of specific discipline or responsibilities:

- S01 Overview and Universal Requirements
- S02 Active Transport
- S03 Acoustics
- S04 Building Management System
- S05 Electrical and Lighting
- S06 Energy Management
- **S07 Ergonomics**
- S08 Fire and Safety Systems
- S09 Floor and Window Coverings
- S10 Furniture
- S11 Heritage and Culture
- S12 Hydraulic

- S13 Information Technology
- S14 Irrigation
- S15 Mechanical Services
- S16 Roof Access
- S17 Termite Protection, Vermin Proofing and Pest Management
- S18 Security Systems
- S19 Signage
- S20 Sustainable Building Guidelines
- S21 Waste Management
- S22 Project Digital Asset and Data Requirements
- S23 Commissioning, Handover and Training

1.6. Related Documents

1.6.1. University Documents

The Standards are to be read in conjunction with the following relevant University documents, including but not limited to:

- Facilities and Premises Policy along with supporting procedures and guidelines
- Charles Sturt University Accessibility Action Plan 2020 - 2023
- Relevant operational and maintenance manuals
- Charles Sturt University Asbestos Management Plan
- Charles Sturt University Signage Guidelines
- Charles Sturt University Modern Slavery Statement
- Charles Sturt University Sustainability Statement
- Charles Sturt University Work Health and Safety Policy
- Charles Sturt University Risk Management Policy
- Charles Sturt University Resilience Policy
- Charles Sturt University Health, Safety and Wellbeing Policy

1.6.2. Federal Legislation

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- National Construction Code (NCC)
- Disability Discrimination Act 1992 (DDA)
- Environment Protection and Biodiversity Conservation Act 1999 (EPBC)
- Work Health and Safety Act 2011

1.6.3. NSW State Legislation

The planning, design and construction of each Charles Sturt University facility must fully comply with current relevant Federal legislation, including but not limited to:

- Work Health and Safety Act 2011
- Environmental Planning and Assessment Act 1979 (EP&A Act)
- Building and Development Certifiers Act 2018
- Heritage Act 1977
- Protection of the Environment Operations Act 1997 (POEO Act)
- Design and Building Practitioners Act 2020
- State Environmental Planning Policies (SEPPs)
- Local Government Act 1993

1.6.4. Federal Regulations and Standards

- Relevant Australian or Australian/New Zealand Standards (AS/NZS)
- Safe Work Australia Model Codes of Practice
- Work Health and Safety Regulations 2011
- Disability (Access to Premises – Buildings) Standards 2010
- National Environment Protection Measures (NEPMs)

1.6.5. NSW State Regulations and Standards

- SafeWork NSW Codes of Practice
- Disability (Access to Premises – Buildings) Standards 2010
- Building and Development Certifiers Regulation 2020
- NSW Work Health and Safety Regulation 2017
- Protection of the Environment Operations (General) Regulation 2022
- NSW State Environmental Planning Policies (SEPPs)
- Fire and Rescue NSW Fire Safety Guidelines
- NSW Local Council Development Control Plans (DCPs)

1.6.6. Manufacturer Specifications and Data Sheets

All installation must be carried out in accordance with manufacturer specifications and data sheets to ensure product performance over its intended life and so as not to invalidate any warranties.

1.6.7. Project-Specific Documents

Requirements specific to a particular project, campus, or other variable, will be covered by project specific documentation, such as client briefs, specifications, and drawings. These Standards will supplement any such

project specific documentation. The Standards do not take precedence over any contract document, although they will typically be cross-referenced in such documentation.

Extracts from the Standards may be incorporated in specifications; however, it must remain the consultant's and contractor's responsibility to fully investigate the needs of the University and produce designs and documents that are entirely 'fit for purpose' and which meet the 'intent' of the project brief.

1.7. Discrepancies

The Standards outline the University's generic requirements above and beyond the above-mentioned legislation. Where the Standards outline a higher standard than within the relevant legislation, the Standards will take precedence. If any discrepancies are found between any relevant legislation, the Standards and project specific documentation, these discrepancies should be highlighted in writing to the Manager, Capital Works.

1.8. Departures

The intent of the Standards is to achieve consistency in the quality of the design and construction of the University's built forms. However, consultants and contractors are expected to propose 'best practice / state of the art' construction techniques, and introduce technological changes that support pragmatic, innovative design. In recognition of this, any departures from relevant legislation, or the Standards, if allowed, must be confirmed in writing by the Manager, Capital Works. Any departures made without such written confirmation shall be rectified at no cost to the University.

1.9. Professional Services

All projects at Charles Sturt University require the involvement of adequately skilled and experienced professionals to interpret and implement the Standards. Consultants or contractors lacking proper qualifications and licenses are not permitted to conduct any work.

1.10. Structure of Document

This document is structured into 4 sections:

Section 1 Introduction (this Section).

Section 2 General Requirements – outlines the general requirements or design philosophies adopted at Charles Sturt University.

Section 3 Supporting Documentation – Legislation, Standards, Codes of Practice, University Policies, and other applicable technical references.

Section 4 Specifications (if applicable) – materials specifications and/or preferred lists for materials, processes or equipment used by Charles Sturt University.

2. General Requirements

This ergonomic design standard integrates the principles of construction planning, facility design, and ergonomics to create adaptable, safe, and productive environments in university buildings. By focusing on stakeholder involvement, flexible design, and technological integration, Charles Sturt University can ensure that its facilities promote well-being, accessibility, and long-term sustainability. The goal of this standard is to ensure that university buildings promote the health, comfort, and productivity of students, staff, partners, and visitors while remaining flexible and adaptable to future demands. Through thoughtful design, these spaces will uphold sustainability and foster an inclusive environment that enhances well-being.

2.1. Human-Centered and Functional Design

2.1.1. Stakeholder Engagement Across Phases

Depending on project scope, involve key stakeholders - staff, students, partners - early in the planning and design stages to ensure that workspaces meet the diverse needs of the university community. Stakeholder input helps create user-friendly, safe environments and ensures functionality across various activities like teaching, research, and administration. Involving stakeholders early ensures that workspaces align with both cognitive and physical ergonomic needs, following *Safe Work Australia's Model Code of Practice: Safe Design of Structures*. Ergonomic assessments must be conducted during design to mitigate future risks.

2.1.2. Spaces Designed for Flexibility

University environments need to be multi-purpose, supporting activities ranging from individual work to collaborative research. This requires design flexibility, such as modular spaces and easily reconfigurable furniture. For example, learning and teaching spaces should have movable furniture to allow for transitions between lectures, workshops, and group activities. Designs should comply with ergonomic principles specified in AS/NZS 4442:2018 and related standards to ensure user comfort.

2.1.3. Integration with Broader University Standards

The design must align with the university's overall facility design standards, ensuring that all spaces, whether classrooms, labs, or offices, adhere to ergonomic principles. All spaces must conform to broader university guidelines, such as the *Charles Sturt University Accessibility Action Plan 2024-2025* and associated policies, ensuring consistency in user experience across campus. Consistency in standards across campus buildings promotes uniformity in user experience and ensures that all university environments are ergonomically supportive, regardless of function.

University buildings must be adaptable to future changes in technology, pedagogy, or work styles. For instance, lecture halls should have integrated AV systems that support remote learning or hybrid models. Facilities should also have flexible spaces that can be converted for different academic and research needs as the university evolves.

2.1.4. Workspaces that Support Both Physical and Cognitive Demands

Office spaces, laboratories, and student study areas should offer customisable elements like sit-stand desks, ergonomic chairs, and adjustable lighting. This enables users to modify their environments to meet individual ergonomic needs, reducing the risk of musculoskeletal injuries and enhancing comfort for extended periods of work. Thoughtful design extends beyond physical comfort to consider cognitive demands. Spaces must have clear wayfinding systems, noise control strategies, and appropriate lighting. For instance, natural light and controlled noise levels in libraries and study areas help reduce cognitive fatigue, while quiet spaces encourage focus.

2.2. Principles of Safe Design

2.2.1. Proactive Hazard Mitigation

Incorporating ergonomic and safety measures from the design phase reduces the need for costly modifications post-construction. This involves eliminating or minimising hazards such as excessive physical demands, repetitive motions, or poor ventilation. For example, placing frequently used equipment at reachable heights prevents the risk of injury from lifting or overreaching.

Accessibility should be central to the design of all university buildings. Incorporate features such as ramps, elevators, and spacious walkways that comply with Australian accessibility standards. Ensuring smooth access not only benefits individuals with disabilities but also supports universal design, catering to all users. Refer to the *Safe Work Australia Model Code of Practice: Hazardous Manual Tasks, SafeWork NSW Code of Practice Hazardous Manual Tasks* and AS/NZS 1428 series.

2.2.2. Ergonomic Design for Academic and Research Spaces

In academic environments like classrooms and libraries, spaces must support both individual work and group collaboration. Incorporate ergonomically designed chairs and tables that can be easily reconfigured for different purposes. For example, flexible seating arrangements in lecture halls facilitate easier transitions between lectures and group discussions.

In research labs and workshops, equipment layout should minimise awkward postures, and materials should be stored in a way that reduces manual handling risks. Height-adjustable workbenches, automated handling systems, and proper ventilation are critical ergonomic elements in research and laboratory environments.

2.3. Systematic Integration in Construction and Facility Design

2.3.1. Task-Specific Design and Space Allocation

Conduct ergonomic task analyses specific to various academic functions. For instance, lecture halls should be designed with tiered seating that maintains clear sightlines, while research facilities must have workspaces that encourage good posture and minimize repetitive motions.

Optimize the design to create multipurpose areas that maximize space efficiency while allowing for flexible use. For example, a single classroom can serve as a standard lecture room, an interactive workshop space, or a research seminar area with minimal adjustments.

2.3.2. Smart Infrastructure and Technology

Modern buildings should include smart technologies like automated climate control, adaptive lighting systems, and occupancy sensors that enhance comfort and reduce energy consumption. Smart lighting can automatically adjust to optimize both energy efficiency and visual comfort, reducing eye strain and mental fatigue.

Workstations could incorporate sensors that alert users to adjust their posture or take breaks, ensuring that ergonomics is integrated seamlessly into daily routines. Smart desks that automatically adjust from sitting to standing mode can help reduce physical strain over long periods of work.

2.4. Training and Continuous Improvement in University Environments

2.4.1. Ergonomics Training for Facility Users

All facility users - students, staff, and partners - should receive ergonomic training specific to their environments. This training could include sessions on proper desk setup, equipment handling, and strategies to minimise cognitive load in work and study environments.

Facility maintenance teams must be trained in the ergonomics of building systems, such as the safe handling of furniture and the correct use of ergonomic tools when conducting repairs or adjustments to equipment.

2.4.2. Post-Occupancy Evaluation

After construction is complete and facilities are in use, conduct post-occupancy evaluations to gather feedback on the ergonomic design. Regularly scheduled evaluations help identify areas that require adjustment, ensuring that the environment remains functional and safe for all users over time.

Conduct ergonomic assessments regularly to ensure that workstations, classrooms, and labs remain in alignment with evolving ergonomic best practices. Facility audits should assess the use of space, ergonomic

equipment performance, and feedback from users to drive improvements. Sustainability and Technology Integration in University Buildings

2.4.3. Sustainable Design Features

Use sustainable, non-toxic materials that enhance indoor air quality and reduce environmental impact. Materials like low-VOC paints, sustainably sourced wood, and recycled materials contribute to a healthier indoor environment, reducing exposure to harmful chemicals and promoting better health.

Incorporating solar panels, energy-efficient lighting, and smart HVAC systems reduces the building's carbon footprint while creating a more comfortable, controlled environment for its occupants. These technologies align with broader university sustainability goals and enhance both ergonomic and environmental performance.

2.4.4. Adaptive and Connected Spaces

Classrooms and offices should be designed to evolve with changing needs, incorporating flexible partitions, mobile furniture, and wireless connectivity. This flexibility allows for spaces to be easily reconfigured for different teaching styles, collaborative projects, or research needs without compromising on comfort and accessibility.

Building automation systems (BAS) should integrate ergonomic tools with building management controls. For example, HVAC systems can be connected to work schedules to adjust temperature and ventilation based on occupancy, creating an optimized environment that supports cognitive function and comfort.

2.5. Inclusive and Flexible Design for University Communities

2.5.1. Design for Diverse Populations

Design buildings and spaces that cater to diverse populations, including individuals with disabilities and varying physical abilities. For example, ensure that lecture halls, libraries, and communal spaces are equipped with height-adjustable desks, wide entryways, and technology aids for individuals with visual or hearing impairments.

Ensure that all facilities, such as restrooms and changing areas, are designed to be inclusive, gender-neutral, and fully accessible. Incorporating inclusive design in communal areas fosters a sense of belonging and ensures that facilities are usable by everyone.

2.5.2. Designing for an Aging Workforce

Design workspaces that accommodate the physical challenges that may come with aging. Features like anti-fatigue mats, seating with lumbar support, and adjustable lighting can significantly improve the comfort and productivity of older faculty and staff. Additionally, the building layout should minimize the need for long walks or climbing stairs, providing convenient access to key facilities like offices and meeting rooms.

3. Supporting Documentation

These below lists are not all-inclusive and those associated with the project are responsible for identifying and complying with all standards relevant to the scope of works.

3.1. Supporting Legislation

Work Health and Safety Act 2011 (NSW)

Work Health and Safety Regulation 2017 (NSW)

Work Health and Safety Act 2011(ACT)

Work Health and Safety Regulation 2011(ACT)

NSW Local Government Local Environmental Plans (LEP)

3.2. Supporting Standards

Standard Number	Standard Title
AS 1428.1:2021	Design for access and mobility, Part 1: General requirements for access - New building work
AS 1428.2-1992	Design for access and mobility, Part 2: Enhanced and additional requirements — Buildings and facilities
AS 1428.4.2:2018	Design for access and mobility, Part 4.2: Means to assist the orientation of people with vision impairment — Wayfinding signs
AS 1428.5:2021	Design for access and mobility, Part 5: Communication for people who are deaf or hearing impaired
AS/NZS 4442:2018	Office desks, office workstations and tables intended to be used as office desks — Mechanical, dimensional and general requirements and test methods
AS/NZS 4438:1997	Height adjustable swivel chairs
AS/NZS 1680.1:2006	Interior and workplace lighting

3.3. Industry Codes of Practice

Safe Work Australia Model Code of Practice Hazardous manual tasks

https://www.safeworkaustralia.gov.au/doc/model-code-practice-hazardous-manual-tasks

SafeWork NSW Code of Practice Hazardous manual tasks

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0020/50078/Hazardous-manual-tasks-COP.pdf

3.4. University Documents

Charles Sturt University Disability and Work or Study Adjustment Policy

https://policy.csu.edu.au/document/view-current.php?id=23

Charles Sturt University Accessibility and Inclusion Plan 2024-2025

https://cdn.csu.edu.au/__data/assets/pdf_file/0006/3889806/Accessibility-and-Inclusion-Plan.pdf

3.5. Other Resources

Safe Work Australia Guidance on the Principles of Safe Design for Work

https://www.safeworkaustralia.gov.au/system/files/documents/1702/guidanceontheprinciplesofsafedesign_2006_pdf.pdf