Charles Sturt University

Revision 1.0

Infrastructure Design Standards

Module S21: Waste Management

Division of Finance (Strategic Infrastructure)
Charles Sturt University

Document Control

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Contents

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

2.1. Operational Waste Management

2.1.1. Office Waste

Charles Sturt University is committed to ongoing reductions in the volumes and types of solid waste that is sent to landfill. This objective requires effective waste collection systems to be implemented across all campuses in combination with ongoing education and engagement programs. Waste collection facilities provided as part of any new development should provide, as a minimum, the following:

2.1.1.1. Individual Workstation

Each workstation is to be provided with a 600mL desktop mini bin (Figure 1) and an optional under-desk paper and cardboard recycling box (Figure 2).

The 1 litre desktop bin can be sourced from EcoBin and the under-desk paper and cardboard bin can be sourced from the University's current waste contractor. Facilities Management can supply relevant contact details for the University's waste contractor details for the relevant campus.

Figure 1: Desktop Mini Bin 1L Red

Figure 2: Paper Recycling Bin 25L Blue

2.1.1.2. Central (Internal) Waste Collection Facilities

60L 'Landfill Only', 'Mixed Recycling' and 'Paper Recycling' Eco Bins (Figure 3) are to be placed no more than ~ 20m from any individual workstation. Suggested locations of these facilities include the following:

- Staff common areas / kitchens
- Open plan office areas
- Stairwells (where it can be achieved without impeding access)

Suitable signage is to be provided and placed above the internal collection facilities. This can be sourced from Sustainability at Charles Sturt (Figure 4).

A single 60L paper and cardboard bin should be located at all multi-function printing devices.

Figure 3: 60L 'Landfill Only', 'Mixed Recyclables' and 'Paper and Cardboard' Eco Bins

2.1.1.2.1 Landfill Only (General Waste)

General waste encompasses all non-recyclable waste destined for landfill disposal. This category excludes bulky items, which are designated for collection in skips, and hazardous waste (such as chemical, biological, and radioactive materials). All items unsuitable for recycling should be placed in the red bins. This includes:

- Food waste (if no organic disposal function available)
- Disposable plastic utensils and plates
- Styrofoam cups and containers
- Plastic cling wrap
- Broken or unusable office equipment (if not considered e-waste)
- Non-recyclable plastics (e.g., candy wrappers, chip packets)
- Used tissues and napkins
- Disposable coffee cups
- Non-recyclable packaging materials (e.g., bubble wrap, plastic film)

2.1.1.2.2 Paper Recycling

At every desk and in photocopier rooms, designated paper recycling bins will be provided for recyclable paper items. Recyclable paper products include:

- Photocopy and printer paper
- Cardboard including packaging boxes, cardboard tubes, cereal boxes (flattened)
- Note and writing paper

- Envelopes (without plastic windows)
- Newspaper and magazines
- Cardboard packaging
- Office memos and documents
- Paper-based packaging materials
- Junk mail and flyers

All confidential or sensitive materials should either be shredded or placed in a secure bin designated for recycling.

2.1.1.2.3 Mixed Recycling

These materials are collected in yellow recycling bins and sent to recycling facilities where they are sorted and processed for reuse. Mixed recyclable products include the following items noting that if people are uncertain as to the recyclability of a waste item, rubbish should be placed in general waste to avoid contamination:

- Glass such as bottles, jars (rinsed)
- Plastics including Bottles (water, soda, juice), food containers (rinsed)
- Metals covering aluminium cans, steel cans (rinsed), aluminium foil (clean)

Figure 4: Waste Separation Informational Poster

2.1.2. Central (External) Waste Collection Facilities

A central, suitably screened storage enclosure should be provided to store 240L mobile garbage (wheelie) bins (MGB's).

Care should be given to ensuring that the bins can be wheeled from this central storage area to a collection point accessible by a side-lift garbage truck. Care should also be given to ensuring that the access from the central storage area to the collection point is a hard-surfaced foot path.

Sustainability at Charles Sturt should be consulted to estimate the number and type of MGB's (and hence the space for the compound) required for the building. MGB's are to be purchased with the following coloured lids:

- Paper & Cardboard – Blue
- Commingled Recycling – Yellow
- General Waste – Red

Bins are to be stickered as either 'general waste', 'commingled recycling' or 'paper and cardboard'. The University's standard 'bin stickers' can be provided by Sustainability at Charles Sturt.

In the case of a laboratory, clinical facility, or facility that will have specialist waste requirements (e.g. food and beverage), consultation involving Facilities Management staff and other stakeholders (e.g. Faculty of Science and Health representatives) will need to occur to ensure that suitable provision is made for waste handling and storage in these facilities. It is noted that these groups will generally have oversight in terms of regulatory compliance therefore collaboration is essential. See section 2.2 for Trade Waste and Section 2.3 for Laboratory and Clinical Waste.

2.1.3. Public Place Recycling Stations (Internal)

Charles Sturt University has installed 'Three Bin Multi-Sort' public place recycling stations from Source Separation Systems (Figure 5) in publicly accessible facilities.

These bins are to be installed in spaces that are publicly accessible (libraries, student social spaces, lecture theatres, cafeterias etc.). Care should be given to ensuring that these bins are located close to building entry/exit points.

Multi-sort units are to be purchased with three lids and installed in the configuration shown in Figure 5. That is, two red general waste lids on the sides and one yellow mixed recycling lid in the centre. This is with exception of some CHEERS food outlets in Orange and Wagga Wagga campuses who have 1 general waste, 1 comingled and 1 FOGO food waste compartment.

'No Coffee Cup' stickers (not visible in photo) are to be sourced from Sustainability at Charles Sturt and placed on the 'yellow lid' of all purchased PPR enclosures. While biodegradable coffee cups can be purchased at the University, these are NOT recyclable.

Figure 5: Three Bin Multi-Sort' public place recycling stations

2.1.4. Batteries

Battery recycling on campus is a crucial component of the university's sustainability efforts. With the proliferation of portable electronic devices across campus, the disposal of batteries has become a significant environmental concern. Recognising this, the university has implemented a comprehensive battery recycling program to ensure the proper disposal and recycling of used batteries. Rechargeable and single-use batteries can be recycled in the battery recycling boxes located throughout campus (Figure 6).

Through strategically placed collection points across campus, students, faculty, and staff are encouraged to responsibly dispose of their used batteries. Clear signage and educational campaigns are also utilised to raise awareness about the importance of battery recycling and to instruct individuals on how to properly dispose of their batteries (Figure 7).

Once collected, the used batteries are transported to designated recycling facilities where they undergo a rigorous recycling process. This process involves sorting batteries by type (e.g., alkaline, lithium-ion) and then dismantling them to extract valuable materials such as lithium, cobalt, and nickel. These recovered materials can then be used to manufacture new batteries or other products, reducing the need for virgin materials, and minimising environmental impact.

Figure 6: Battery Recycling Bin

Figure 7: Battery Recycling Fact Sheet

In addition to reducing waste and conserving resources, battery recycling on campus serves as a tangible example of the university's commitment to environmental sustainability and responsible stewardship of natural resources. By actively participating in the battery recycling program, members of the university community contribute to the preservation of the environment for future generations while promoting a culture of sustainability on campus.

2.1.5. Bulky Waste Disposal (Furniture)

Facilities Management oversees the management and disposal of hard and bulky wastes. University staff are advised to liaise with Facilities Management in the event of broken or surplus furniture. Reusable furniture will be appropriately labelled, stored, or donated to local non-for profit or charitable organisations. Sustainability at Charles Sturt can assist in furniture donations. Furniture deemed non-reusable will be collected by Facilities Management and disposed of. Asset disposal form compilation and submission are required by the asset owner as part of this process.

2.1.6. E-Waste Disposal

Electronic waste (e-waste) disposal is the responsibility of the Division of Information Technology (DIT). To initiate e-waste collection, log an IT Service Desk ticket with DIT and supply appropriately completed asset disposal forms. Projects with larger e-waste volumes are advised to consult with DIT as part of Gate 2 deliverables.

2.1.7. Printer Toner Cartridge Recycling

Charles Sturt partners with Ricoh as part of the Ricoh Consumables Recycling Program (Figure 8) encompasses ink and toner cartridges, bottles, waste toner containers, photo-conductor units, maintenance kits and other consumable products through our recycling program. The central point of collection will be within stores or with a representative at each campus, who will facilitate collection and pick up of used cartridges and equipment.

Figure 8: Toner Cartridge Recycle Fact Sheet

2.1.8. Organic Waste Collection

Organic waste collection services are planned to be progressively implemented for all of Charles Sturt's major campuses (Figures 9 and 10). Sustainability at Charles Sturt is to be consulted regarding whether a system has commenced on the campus and what supporting infrastructure may be required to ensure that this system can be utilised by building occupants.

Figure 9: Updated Organics Fact Sheet

Figure 10: Organic Waste Box

2.2. Trade Waste

Trade waste systems are essential for the safe collection, treatment, and disposal of liquid waste generated from commercial and industrial activities. This waste, often containing harmful chemicals, contaminants, and solids, cannot be directly released into sewer systems without proper treatment.

2.2.1. Regulations

In accordance with the relevant regulations, all approvals for waste management activities must comply with established standards which generally align with the Liquid Trade Waste Management Guidelines 2021 released by the NSW Department of Planning, Housing and Infrastructure. This includes ensuring that any waste disposal into council sewers, and the installation or alteration of waste treatment devices, meet the standards outlined in regulations under the Act or the Environmental Planning and Assessment Act 1979. Section 68 of the Local Government Act 1993 requires that all trade waste dischargers to a council sewerage system must have an approval from Council. This applies to both new and existing trade waste dischargers. Note that councils may set specific conditions. Refer to See Section 4.4.

Additionally, approvals for waste treatment devices must adhere to maintenance and operational guidelines as directed by the relevant local council, ensuring devices are kept in sanitary condition. Sewage management facilities cannot be used until the council has confirmed that they have been installed or altered according to the approved specifications. A discharger who fails to obtain Council's approval or fails to obtain Council's approval or fails to comply with the conditions of approval may be prosecuted under section 120 (1) of the Protection of the Environment Operations Act 1997. In addition, Councils may issue a penalty notice under section 222 of that Act.

2.2.2. Systems

Gravity systems use gravity to direct wastewater towards treatment facilities. In these systems, grease arrestors are commonly installed underground to capture and manage contaminants. Pressure systems, on the other hand, rely on pumps to move wastewater, making them ideal for above-ground grease arrestors. Pressure/gravity systems integrate both methods to effectively transport and treat wastewater.

Grease arrestors play a crucial role in trade waste systems by capturing oils, grease, and fats (FOGs) from wastewater, thereby preventing these contaminants from entering sewer systems. The operation of a grease arrestor involves wastewater entering the unit, where FOGs float to the top, solids settle at the bottom, and cleaner water remains in the middle, ready to be discharged. These arrestors are commonly found in commercial kitchens, restaurants, food processing facilities, automotive garages, and laundries. They come in various sizes, ranging from 750 to 5,000 litres, with specific dimensions determined by Trade Waste permits.

Installation of trade waste systems must be carried out by licensed industrial plumbers in accordance with Water Authority regulations. Regular maintenance is essential for ensuring the system's effectiveness. This typically involves cleaning and pump-outs every 1 to 3 months, or as specified by permit requirements. Maintenance must be performed by licensed contractors, and thorough records of all activities must be maintained.

Trade waste application requirements may vary depending on the local and state government regulations it is advisable to consult with a hydraulic and planning consultant to confirm specific requirements for each project. As with general trade waste activities, laboratories must obtain trade waste approval from local Councils through a Trade Waste Application

2.3. Laboratory and Clinical Waste

Laboratory and clinical environments are pivotal in university research, learning and teaching along with community and third-party collaboration. Laboratory and clinical waste are generated by various healthcare and research elements of the University including medical centres, dentists, pharmacies, veterinary facilities, research laboratories, wet and dry laboratories, anatomy laboratories and pathology facilities. This waste includes a diverse array of materials that pose significant health, safety, and environmental risks if not managed properly. Given the increasing emphasis on sustainability, managing laboratory waste is both a legal obligation and an ethical responsibility.

Any project that involves laboratory or clinical waste requires the consultation with appropriate university stakeholders such as the Faculty of Science and Health, Schools, Research, University Committees (i.e. Radiation Safety Committee), third-party partners, and Facilities Management. These groups will have their own documentation and standard operating procedures that can be drawn upon as part of design. Depending on the scope and context of projects, Laboratory and Clinical waste management may require the engagement of appropriate consultants to ensure waste streams and protocols are in place to align with legislative and regulatory requirements.

2.3.1. Types of Laboratory and Clinical Waste

- Needles and Sharps: These include needles, blades, and other sharp objects that can cause injury or infection. Proper disposal in designated sharps containers is essential to prevent needle-stick injuries and the spread of infections.
- Human or Animal Tissues: Tissues and organs removed during surgeries or necropsies must be handled with care to avoid exposure to infectious agents and comply with regulations.
- Body Fluids: Blood, vomit, and other bodily fluids must be managed to prevent contamination and health risks. They often require specialized containment and treatment methods.
- Bandages and Dressings: Used bandages and dressings, which may be contaminated with blood or other bodily fluids, need to be disposed of in a manner that prevents the spread of pathogens.
- Instruments: Surgical and medical instruments that come into contact with patients must be sterilized or treated to ensure they do not pose a risk to health.
- Samples and Blood: Diagnostic samples and blood must be handled according to strict protocols to prevent cross-contamination and ensure proper disposal.
- Medical Devices: Items such as infusion sets, respiratory equipment, and other medical devices that may be contaminated need careful handling and disposal.
- Radioactive Medical Waste: Waste containing radioactive materials from diagnostic imaging or treatments must be managed according to stringent regulations to prevent radiation hazards.

2.3.2. Classification of Laboratory and Clinical Waste

From a best practice perspective, clinical waste is categorised into specific types, each requiring distinct handling and disposal procedures:

- Clinical or Biohazardous Waste: Includes any waste that could potentially be infectious or harmful, such as used gloves, bandages, and contaminated materials. It requires careful segregation and treatment to mitigate health risks.
- Cytotoxic Waste: Waste that contains or is contaminated with cytotoxic drugs, which are used in chemotherapy and other treatments. This waste is highly hazardous and requires specialized handling and disposal.
- Pharmaceutical Waste: Includes expired, unused, or contaminated pharmaceuticals. Proper disposal prevents environmental contamination and misuse.
- Anatomical Waste: Consists of human or animal body parts and remains that must be treated and disposed of in compliance with health regulations to ensure dignity and prevent health risks.
- Sanitary Waste: Non-hazardous waste such as used tissues and sanitary products that, while not infectious, still require proper disposal to maintain hygiene.
- Laboratory Waste: Includes chemicals, cultures, and other waste from laboratory processes that require specific treatment to handle chemical hazards and biological risks.
- X-rays: Film and other materials containing photographic chemicals from X-ray procedures need special disposal methods to manage chemical and radiographic hazards.
- Amalgam: Dental amalgam waste, which contains mercury, must be collected, and disposed of according to guidelines to prevent mercury contamination.

2.3.3. Regulatory Compliance and Disposal

All clinical waste must be assessed and managed in accordance with relevant regulations and guidelines to ensure proper disposal. The handling and transport of clinical waste are governed by the Australian Code for the Transport of Dangerous Goods, and waste streams that fall under this classification must be pre-treated to meet the Waste Classification Guidelines (Section 4.5). Conventional landfills are not suitable for these waste streams due to their hazardous nature, requiring specialized treatment and disposal processes to mitigate environmental and health risks.

Proper segregation, collection, transport, and disposal of medical waste are crucial to preventing health hazards and environmental contamination. Adhering to regulatory standards ensures that clinical waste is managed safely and effectively. Refer to the Health Practitioner Regulation (New South Wales) Regulation 2016 Schedule 3 Part 2 Section 8.

University Dental Schools and Clinics shall comply with the Clinical and Related Waste Management for Health Services Policy Directive released on 14 December 2020. This Policy Directive provides a minimum standard for waste management that must be met by health services to reduce uncertainty when staff move between NSW Health entities. The policy ensures handling and containment of specific clinical waste streams is in line with NSW legislation, licensing, and waste minimisation. See Section 4.5.

2.4. Construction Waste Management

Construction and demolition activities often result in a diverse array of waste materials, many of which hold potential value through recycling. The University advocates the waste management hierarchy, which is a set of priorities for the efficient use of resources and underpins the objectives of the Waste Avoidance and Resource Recovery Act 2001 (Figure 11). By following this hierarchy, the University aims to prioritise waste avoidance and reduction, followed by reuse, recycling, and responsible disposal as a last resort. This approach aligns with the university's commitment to sustainability and environmental stewardship, ensuring that resources are used efficiently, and waste generation is minimised throughout construction and demolition projects on campus.

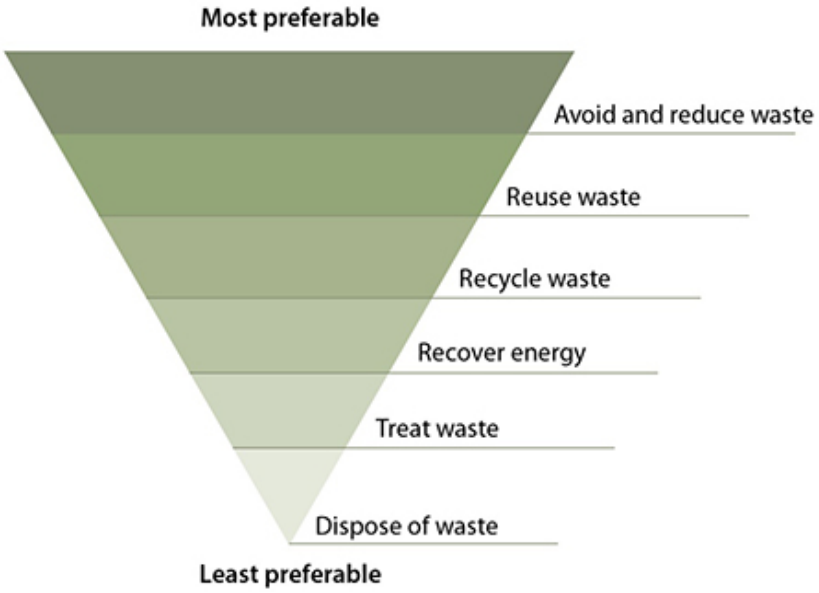

Figure 11: Waste hierarchy. Ordered by most preferable: avoid and reduce; reuse; recycle; recover energy; treat; dispose of waste. **Source:** NSW Environmental Protection Agency (EPA)

The waste hierarchy principles emphasise the following key steps throughout the construction and demolition waste management process:

1. **Avoidance and Reduction**
    - Evaluate different design and construction plans to identify opportunities for waste minimisation.
    - Develop a waste management plan in alignment with local government guidelines.
    - Opt for materials with minimal packaging or those that are pre-cut or fabricated to reduce waste generation.
2. **Reuse**
    - Identify and categorise reusable waste materials.
    - Establish systems for segregating and storing reusable items.
    - Explore potential onsite and offsite applications for reusing materials.
3. **Recycling**
    - Identify all recyclable waste generated onsite.

- Set up systems for sorting and stockpiling recyclables or utilise specialized waste contractors if cost-effective.
- Clearly mark recycling areas for effective waste separation.
- Ensure that chosen waste recycling contractors comply with regulatory standards.

4. **Disposal**
    - Dispose of waste that cannot be reused or recycled appropriately.
    - Verify that waste disposal contractors meet regulatory requirements.
    - Implement regular waste bin collection schedules.

2.4.1. Pre-Construction Planning

Pre-construction planning is a critical phase of any construction project, setting the foundation for efficient and sustainable waste management practices. It ensures that waste management considerations are integrated into the project from the outset, minimizing environmental impact and optimizing resource utilization. Effective pre-construction planning also fosters collaboration among project stakeholders, including designers, contractors, and waste management professionals, to identify innovative solutions for waste reduction and recycling.

- **Developing a Waste Management Plan:**

  The first step in pre-construction planning is to develop a waste management plan tailored to the specific requirements of the project. This plan should outline strategies for minimising waste generation, maximising reuse, and recycling, and ensuring compliance with local government regulations and industry best practices.

  The waste management plan should establish clear objectives, responsibilities, and procedures for managing waste throughout the construction process. It should also include contingency plans for addressing unforeseen waste management challenges.

- **Identifying Waste Streams:**

  A thorough assessment of the construction project is necessary to identify the various waste streams that will be generated. Common waste streams in construction include concrete, wood, metal, plastics, packaging materials, and hazardous substances.

  By identifying these waste streams early in the planning process, project managers can develop targeted strategies for managing each type of waste efficiently.

- **Estimating Waste Quantities and Setting Reduction Targets:**

  Estimating the quantities of waste that will be generated during the construction process is essential for setting realistic waste reduction targets. This can be done based on factors such as project size, duration, and construction methods.

  Setting waste reduction targets provides a measurable benchmark for evaluating the effectiveness of waste management efforts and encourages continuous improvement throughout the project lifecycle.

It is a general expectation that waste diversion targets for a project will meet or exceed the NSW Government's recovery rate target of 80%.

- **Identifying Opportunities for Waste Minimization, Reuse, and Recycling:**

  Once waste streams and quantities have been identified, the next step is to identify opportunities for waste minimization, reuse, and recycling. This will involve consideration of:

  - Designing buildings for deconstruction to facilitate material recovery at the end of their lifecycle.
  - Selecting construction materials with high recycled content (This is especially applicable for non-structural concrete where recycled aggregate can be used and post-consumer plastic polymers, particularly for use in landscape applications and traffic control devices) and minimal packaging.
  - Embodied carbon
  - Impact on the natural ecosystems from which the material was extracted.
  - Amount of energy used in its production / transportation.
  - Amount of (toxins) waste generated in production.
  - Durability of product
  - Effectiveness of product
  - Risk to human health from deterioration of the product (including fire).
  - Nature of waste
  - Implementing prefabrication and modular construction techniques to reduce onsite waste generation.
  - Leveraging partnerships with recycling facilities and waste contractors to recycle materials such as concrete, metal, wood, and plastics.
  - Implementing practices to segregate and store reusable materials for future use or donation.

  By proactively identifying and capitalising on these opportunities during the pre-construction phase, project teams can significantly reduce waste generation, minimize environmental impact, and optimize resource efficiency throughout the construction process.

2.4.2. Demolition and Construction

2.4.2.1. Training and Induction

Effective waste management during the demolition and construction phases is integral to construction projects at Charles Sturt University. Waste generated during these phases, if not managed properly, can have significant environmental implications. Therefore, implementing robust waste management practices is essential to minimise environmental impact, promote sustainability, and ensure compliance with regulatory requirements. In this context, the University prioritises the efficient handling, recycling, and disposal of construction and demolition waste to align with its commitment to environmental stewardship and responsible resource management.

Key to this approach is training for all university contractors with all contractors operating within Charles Sturt University premises are required to complete comprehensive site induction training. The Head Contractor holds responsibility for ensuring that each subcontractor adheres to the following principles:

- Implementing proactive measures to minimise waste generation during their activities.
- Establishing procedures to effectively manage and, whenever possible, recycle waste generated from their work, aligning with the overall site recycling strategy.
- Ordering materials in appropriate quantities, opting for minimal packaging and pre-fabrication where feasible, and returning any excess materials to suppliers for reuse.
- Conducting source separation of offcuts to facilitate potential reuse, resale, or recycling.
- The Site Manager assumes accountability for various tasks, including:
    - Establishing secure on-site storage areas for reusable materials and separated recyclables.
    - Contracting suitable waste and recycling service providers for the removal of waste materials.
    - Coordinating efforts among subcontractors to maximize on-site material reuse.
    - Regularly monitoring bins for signs of contamination or leakage.
    - Ensuring the site features prominently displayed signage directing personnel to recycling and stockpiling stations.
- Furthermore, all site employees and subcontractors are expected to:
    - Attend site-specific induction sessions.
    - Familiarise themselves with the types of products being reused or recycled on-site and their respective stockpile locations.
    - Any instances of non-compliance should be addressed through the Head Contractor's Quality Management Systems.

2.4.2.2. Waste Management

On-site waste segregation: Waste materials are separated on-site into dedicated bins or areas, allowing for reuse on-site or collection by a waste contractor for transport to off-site facilities. Source separation is crucial for minimizing damage to salvaged materials. Construction and demolition waste that is sorted at its source can be directly sold into the marketplace, with any remaining unsold waste then sent to landfill. On-site segregation also enhances the efficiency of waste management operations by reducing contamination and improving the quality of recyclable materials. By separating materials like wood, metal, concrete, and glass at the construction site, projects can ensure that recyclable materials are kept in optimal condition, maximising their potential value and ease of processing.

Off-site waste separation: When space constraints prohibit on-site separation, waste can be deposited into a single bin. This material is later collected and taken to a processing plant where it undergoes mechanical sorting for recycling, reprocessing, or landfill disposal. Off-site separation allows for the centralisation of sorting processes, which can be beneficial for facilities equipped with advanced technologies that may not be feasible on-site. However, it may result in increased contamination and reduced value of recycled materials due to the

mix of waste types. Despite this, off-site sorting remains a viable solution when on-site segregation is not practical, helping to manage and reduce waste even in challenging environments.

Specific material management guidelines as follows:

Material	On Site Management	Off Site Management
General Waste	No on-site reuse	Gathered by contractor and disposed at designated waste facility.
Comingled Recyclables	No on-site reuse	Collected by a contractor for recycling.
Green waste	Material should be reused on site either as compost, or mulch	A contractor to be tasked with gathering and transporting materials to the appropriate facility for processing or disposal.
Hazardous materials	No on-site reuse	If hazardous or special waste is identified on site, the management methods prescribed by a licensed asbestos and/or site hygienist should be implemented in alignment with EPA and SafeWork standards.
Excavation material	Where feasible, removed earth can remain on campus for reuse. Sampling and testing may be required to ensure material safety.	A contractor to be tasked with gathering and transporting materials to the appropriate facility for processing or disposal.
Insulation material	No on-site reuse	Gathered by contractor and disposed at designated waste facility.
Plastics	No on-site reuse	A contractor is designated to gather and transport materials to the suitable facility for either processing or disposal.
Carpet/Underlay	No on-site reuse	For **Interface Carpets**, the ReEntry Program makes use of a national reuse partner network and are given a second life through their use in small business, charities, and residential projects. When reuse is not an option, carpet products are designed to be fully recyclable. For other recyclable products, the contractor will facilitate third party recycling. For non-recyclable products, disposal to landfill will be managed by the contractor.
Glass and glazing	No on-site reuse	To be dismantled, separated, and collected by contractor for recycling.
Metals	No on-site reuse	Collected by a contractor for recycling
Plasterboard	No on-site reuse	Uncontaminated plasterboard is completely recyclable and should not be put into landfill. Where feasible, contractor to transport to a plasterboard waste consolidation point for recycling.
Brick and tiles	Potential for cleaning and storage for future projects.	Contractor to gather for sorting and processing. Materials can be reclaimed and repurposed for various applications, such as paving, landscaping, or even as raw materials for new construction projects.
Concrete	Potential reuse on Campus for fill	Collected by contractor and processed at a concrete recycling facility.
Timber	No on-site reuse	Collected by a contractor and processed at timber recovery or disposal facility.
Fixtures and fittings	No on-site reuse	Gathered by a contractor for the recovery and recycling of metals from fixtures and fittings, with any unrecoverable materials disposed of at the main licensed waste facility
Furniture	Refer to section 2.1.5	Refer to section 2.1.5

2.4.2.3. Monitoring and Reporting

In alignment with Section 6.3 of University Tender Contract Preliminaries the following waste monitoring and reporting activities are to be undertaken for all projects:

- Monitor and record the volumes of waste and the methods and locations of disposal.
- Submit a progress report no later than the fifth (5th) Business Day of every second month and a summary report before Completion of the Works, addressing the checklist factors/ questions in tables 1 to 5 in Section 3 Management of waste on construction and demolition projects of the EPA 'Construction and demolition waste' toolkit available at: https://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition
- Note that the provision of the waste management summary report is a condition of achieving Completion.

2.4.2.1. Corrective Actions

If a subcontractor is found to have improperly contaminated a bin or an element of the construction site, the Site Manager will be notified through a non-conformance report (NCR) procedure. The subcontractor will be responsible for implementing and documenting all corrective actions as specified in the non-conformance procedure, with all associated costs borne by the subcontractor.

2.4.2.2. Post Project Evaluation

After completing the project, it's crucial to assess the effectiveness of the waste management plan. Key questions to consider include:

- Were the anticipated waste volumes produced?
- How effective was the on-site bin placement?
- What feedback was received from on-site personnel?
- Were there any compliance issues with contractors?

This evaluation helps identify potential areas for improvement in future projects, ultimately aiding in the avoidance of similar issues.

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

Local Government Act 1993 (NSW)

Albury Local Environmental Plan 2010 (NSW)

Bathurst Regional Local Environmental Plan 2014 (NSW)

Dubbo Regional Local Environmental Plan 2022

Orange Local Environmental Plan 2011 (NSW)

Port Macquarie-Hastings Local Environmental Plan 2011 (NSW)

Wagga Wagga Local Environmental Plan 2010 (NSW)

Environmental Planning and Assessment Act 1979 (NSW)

Waste Avoidance and Resource Recovery Act 2001 (NSW)

Protection of the Environment Operations Act 1997 (POEO Act) (NSW)

Protection of the Environment Operations (Waste) Regulation 2014 (NSW)

Plastic Reduction and Circular Economy Act 2021 (NSW)

Contaminated Land Management Act 1997 (NSW)

Anatomy Act 1977 (NSW)

Health Practitioner Regulation 2016 (NSW)

Water Management Act 2000 (NSW)

Environment Protection Act 1997 (ACT)

Waste Management and Resource Recovery Act 2016 (ACT)

Public Health Act 1997 (ACT)

Planning and Development Act 2007 (ACT)

3.2. Supporting Standards

Standard Number	Standard Title
HB 202-2000	A management system for clinical and related wastes — Guide to application of AS/NZS 3816-1998, Management of clinical and related wastes
AS/NZS 1547:2012	On-site domestic wastewater management
AS 2243.1:2021	Safety in laboratories, Part 1: Planning and operational aspects
AS 2243.2:2021	Safety in laboratories, Part 2: Chemical aspects and storage
AS/NZS 2243.3:2022	Safety in laboratories, Part 3: Microbiological safety and containment
AS/NZS 2243.4:2018	Safety in laboratories, Part 4: Ionizing radiations
AS 3816:2018	Management of clinical and related wastes
AS/NZS 4801:2001	Occupational health and safety management systems - Specification with guidance for use

Standard Number	Standard Title
AS/NZS 5377:2013	Collection, storage, transport, and treatment of end-of-life electrical and electronic equipment
AS/NZS ISO 14001:2016	Environmental management systems - Requirements with guidance for use
AS/NZS ISO 14004:2018	Environmental management systems - General guidelines on implementation
AS/NZS ISO 14040:2006	Environmental management - Life cycle assessment - Principles and framework
ISO 28901:2011	Soil quality - Guidance for burial of animal carcasses to prevent epidemics

3.3. Local Government

Albury City Council – Liquid Trade Waste

https://www.alburycity.nsw.gov.au/business/responsibilities/liquid-trade-waste

Albury City Council – Trade Waste Policy July 2017

https://www.alburycity.nsw.gov.au/policies/trade-waste-policy

Bathurst Regional Council – Trade Waste

https://www.bathurst.nsw.gov.au/Business/Trade-Waste

Bathurst Regional Council – Trade Waste Policy April 2011

https://www.bathurst.nsw.gov.au/files/assets/public/v/2/business/tradewaste/trade_waste_policy_web.pdf

Dubbo Regional Council – Trade Waste

https://www.dubbo.nsw.gov.au/ArticleDocuments/364/Fact%20Sheet%20-%20General%20Trade%20Waste%20Questions.pdf.aspx?Embed=Y

Dubbo Regional Council – Trade Waste Policy July 2022

https://www.dubbo.nsw.gov.au/ArticleDocuments/241/Council%20Policy%20-%20Liquid%20Trade%20Waste.pdf.aspx?Embed=Y

Orange City Council – Trade Waste

https://www.orange.nsw.gov.au/liquid-trade-waste/

Port Macquarie Hastings Council - Liquid Trade Waste Disposal

https://www.pmhc.nsw.gov.au/Business/Operating-a-business/Registrations-and-licences/Liquid-trade-waste-disposal#:~:text=Our%20Liquid%20Trade%20Waste%20Regulation,provide%20a%20formal%20conditions%20document.

Port Macquarie Hastings Council - Liquid Trade Waste Policy February 2023

https://www.pmhc.nsw.gov.au/Your-Council/Policies-plans-and-strategies/Policies/Liquid-Trade-Waste-Policy

Wagga Wagga City Council – Liquid Trade Waste

https://wagga.nsw.gov.au/services/stormwater-and-sewers/sewers/liquid-trade-waste

Wagga Wagga City Council – Liquid Trade Waste Regulation Policy October 2022

https://wagga.nsw.gov.au/__data/assets/pdf_file/0017/2249/Liquid-Trade-Waste-Regulations-Policy-POL-006..pdf

3.4. Industry Codes of Practice

NSW Department of Planning, Industry and Environment - Liquid Trade Waste Management Guidelines For councils in regional NSW, 2021

https://www.industry.nsw.gov.au/__data/assets/pdf_file/0010/147088/trade-waste-management-guidelines.pdf

Service NSW Waste Management for Business Guidelines

https://www.service.nsw.gov.au/guide/waste-management-for-businesses

NSW Waste and Resource Recovery Infrastructure Strategy

https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/strategic-direction-for-waste-in-nsw

EPA Construction and Demolition Waste Management Guidelines (2019)

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/19p1542-standards-for-managing-construction-waste-in-nsw.pdf

EPA Construction and demolition waste - A management toolkit

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/20p2392-construction-demolition-waste-management-toolkit.pdf

EPA Waste Hierarchy

https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/warr-strategy/the-waste-hierarchy

EPA Waste Classification Guidelines - Part 1: Classifying waste

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/140796-classify-waste.pdf

EPA Waste classification guidelines - Part 2: Immobilisation of waste

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/140815-immobilisation-waste.pdf

EPA Waste classification guidelines - Part 3: Waste containing radioactive material

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/140797-radioactive-waste.pdf

EPA Waste classification guidelines - Part 4: Acid sulfate soils

https://www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/wasteregulation/140798-acid-sulfate-soils.pdf

SafeWork NSW (2019) Code of Practice How to Manage and Control Asbestos in the Workplace

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0014/50081/How-to-manage-and-control-asbestos-in-the-workplace-COP.pdf

SafeWork NSW (2019) Code of Practice How to Safely Remove Asbestos

https://www.safework.nsw.gov.au/__data/assets/pdf_file/0015/50082/How-to-safely-remove-asbestos-COP.pdf

NSW Department of Planning, Housing and Infrastructure Liquid Trade Waste Management Guidelines 2021

https://water.dpie.nsw.gov.au/our-work/local-water-utilities/liquid-trade-waste

NSW Health Clinical and Related Waste Management for Health Services

https://www1.health.nsw.gov.au/pds/ActivePDSDocuments/PD2020_049.pdf

Biohazard Waste Industry Waste Management Association of Australia Industry Code of Practice for the Management of Clinical and Related Wastes 6th Edition 2010

https://www.epa.sa.gov.au/files/4771407_code_of_practice_6th_edition.pdf

Department of Infrastructure, Transport, Regional Development, Communications and the Arts - Australian Dangerous Goods Code

https://www.infrastructure.gov.au/infrastructure-transport-vehicles/transport-strategy-policy/transport-australia/transport-dangerous-goods/australian-dangerous-goods-code

National Transport Commission - Dangerous Goods Code

https://www.ntc.gov.au/codes-and-guidelines/australian-dangerous-goods-code

Transport for New South Wales – Waste Management Guideline May 2023

https://www.transport.nsw.gov.au/system/files/media/documents/2023/waste-management-guideline.pdf

NSW Environmental Protection Authority – Transporting Waste

https://www.epa.nsw.gov.au/your-environment/waste/transporting-waste

Protection of the Environment Operations (Waste) Regulation 2014

https://www.epa.nsw.gov.au/your-environment/waste/waste-overview/waste-regulations/poeo-waste-reg-2014

3.5. University Documents

Charles Sturt University Facilities and Premises Policy
https://policy.csu.edu.au/document/view-current.php?id=465&version=1

Charles Sturt University Facilities and Premises Procedure - Circular Economy and Resource Efficiency
https://policy.csu.edu.au/document/view-current.php?id=572&version=1

Radiation Safety Audit Procedure
https://policy.csu.edu.au/document/view-current.php?id=552&version=1

Sustainability at Charles Sturt
https://www.csu.edu.au/sustainability/home

Sustainability at Charles Sturt Recycle your Toner Cartridges Fact Sheet
https://cdn.csu.edu.au/__data/assets/pdf_file/0004/4188928/M2091-Update_Toner-factsheet_no-bleed.pdf

3.6. Other Resources

Green Building Council of Australia
https://new.gbca.org.au/

Waste Less, Recycle More Initiative
https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/waste-less-recycle-more