



## **WORLD CLASS END OF LIFE PROGRAM - ORANGE HOSPITAL**

### **REVIEW OF ENVIRONMENTAL FACTORS (REF) PRELIMINARY WASTE MANAGEMENT PLAN**

**June 2024**

DOCUMENT ADMINISTRATION

Revision History

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## 1.0 Introduction

### 1.1 WCEOLP - Orange Hospital Main Works

The World Class End of Life program (WCEoLP) commits to ensuring NSW has the best palliative care services and support in Australia. This will increase access to end-of-life care locally, deliver purpose-built facilities that support contemporary models of care, improve patient safety and quality of care and improve environments for patients, carers and staff.

The Orange Hospital aims to expand the palliative care beds capacity to 3 Palliative Care beds in addition to the existing 2 within the existing Orange Hospital building. These proposed 3 beds will be additional to existing hospital operations.

The World Class End of Life Program will provide patients with access to the best quality care in a home-like environment and provide spaces to optimise quality of life. Palliative care is unique as it cannot cure, however it can reduce the severity of symptoms and suffering of patients with serious illness. In addition, it can provide spaces which enable families to be together in a calm, tranquil and homelike environment. Access to natural light, fresh air, access to the outdoors to provide the best quality of life for the time left.

The proposed scope of works includes:

- 3 Bedrooms - Special, Inboard Ensuite
- Lounge - Patient / Family
- Beverage Bay
- Dirty Utility
- Courtyard
- Public Toilet

### 1.2 Hospital and Site Description

Orange hospital is part of the Western NSW Local Health District (WNSWLHD) and is located at 1530 Forest Rd, Orange NSW 2800 (within Orange City Council). The site is legally described as Lot 10 DP 1174672. The Orange Hospital Redevelopment project was delivered under a Public Private Partnership (PPP) procurement model on the Bloomfield campus. The project commenced in February 2008 and was completed in March 2011.

Orange Hospital It comprises a three-story Level 5 hospital and provides a comprehensive range of district level services:

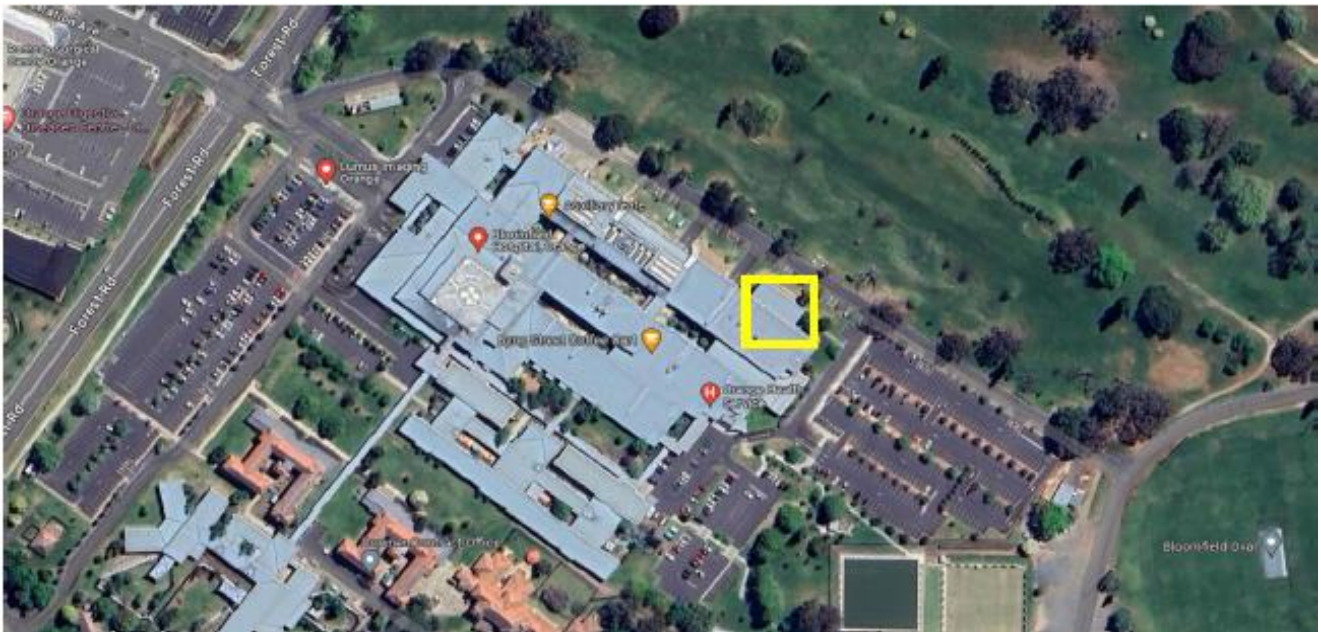
- Emergency
- General Medical and Surgical Services
- Intensive Care and High Dependency Unit
- Coronary Care Unit
- Maternity
- Neonatal
- Pediatrics
- Renal Dialysis
- Breast Screen
- Cancer Care Centre
- Acute Mental Health Services

Orange hospital sits 4km south of Orange CBD and approximately 55km west of Bathurst and 250km west of Sydney. Orange Health Service is a 270-bed major non-metropolitan referral hospital, serving approximately 300,000 people.

Primary access to the site is via car or taxi with access off Forest Road or single-lane entry to the site from Huntley Road connecting to the hospital via internal access roads.

Orange train station is 4km from the Bloomfield campus and is served by the 537 Bus.

*Figure 1: Aerial view of Orange Hospital*



### 1.3 Purpose of this plan

This report supports the Review of Environmental Factors (REF), pursuant to section 5.5 of the Environmental Planning and Assessment Act 1979 (EP&A Act).

The purpose of this report is to provide:

- Estimation and details of waste generated throughout the main works package; and
- A preliminary description of measures to be implemented to handle waste during facility operation.

Details of the amounts, handling methods and destinations of waste generated during construction will be provided by the construction contractor appointed to the project.

## 2.0 Legislation, policy and guidelines

### 2.1 NSW State Legislation and Policy

#### 2.1.1 The *Protection of the Environment Operations Act 1997* (Part 4)

The *Protection of the Environment Operations Act 1997* covers the requirements for waste generators in terms of storage and correct disposal of waste. The Act establishes the waste generator as having responsibility for the correct management of waste, including the final deposit.

#### 2.1.2 Waste avoidance and resource recovery strategy 2014-2021 (superseded by NSW Waste and Sustainable Materials Strategy 2041)

The Waste avoidance and resource recovery strategy 2014-2021 provides a clear framework for waste management, aligning with the NSW Government's waste reforms within *NSW 2021: A plan to make NSW number one*. In addition to significant investment, the strategy set directions for a range of priority areas. Targets have been clearly identified and set within this strategy. The target nominated to divert waste from landfill by 2021-2022 included:

- municipal solid waste from 52% to 70%;
- commercial and industrial waste from 57% to 70%;
- construction and demolition waste from 75% to 80%;
- all waste diverted from landfill from 63% to 75%.

#### 2.1.3 *Waste Avoidance and Resource Recovery Act 2001 No 58*

Resulting from the concerns raised around waste management practices and increasing volumes of waste, the NSW government introduced the aforementioned Act, superseding the *Waste Minimisation and Management Act 1995*.

The Act aims to encourage the most efficient use of resources and introduce environmental harm in accordance with the principles of ecologically sustainable development. The Act required Resource NSW to develop a waste strategy for the state to assist in achieving those requirements and objectives of the *Protection of the Environment Operations Act 1997*.

The Waste Management Plan is a requirement for a new development in NSW and is written with reference to the *NSW Waste Avoidance and Resource Recovery Strategy 2014-2021*, made under the Act. The Strategy seeks to ensure that resource management options are considered against the following hierarchy:

- i) Avoidance of unnecessary resource consumption;
- ii) Resource recovery (including reuse, reprocessing, recycling and energy recovery);
- iii) Disposal.

#### 2.1.4 NSW waste reduction and purchasing policy 2007 (WRAPP)

The NSW Government, through its endorsement of the *NSW Waste Avoidance and Resource Recovery Strategy 2003*, has committed to sustainable waste minimisation and resource recovery until 2014. This strategy, under the *Waste Avoidance and Resource Recovery Act 2001*, assigned Resource NSW the responsibility to shift the focus of waste management in NSW from disposal to waste avoidance and recovery. A crucial part of this strategy is the Waste Reduction and Purchasing Policy (WRAPP).

This policy further required all state government agencies and State-Owned Corporations (SOCs) to implement plans to reduce waste in four primary waste sources:

- Paper products;

- Office equipment and components;
- Vegetation material; and
- Construction and demolition materials.

WRAPP mandates all State Government agencies and SOCs to reduce waste and opt for materials with recycled content.

#### 2.1.5 NSW waste and sustainable materials strategy (to 2041)

The *NSW Waste Avoidance and Resource Recovery Act 2001 No 58* commits the NSW Government to refreshing and updating its waste strategy every five years – to review and continually improve the state's policies and targets for waste reduction and landfill diversion. (This strategy updates the previous *Waste Avoidance and Resource Recovery Strategy 2014–2021*.)

This strategy sets out three focus areas.

1. **Meeting our future infrastructure and service needs** - As waste volumes continue to grow, infrastructure and services will need to keep pace. We need to ensure we have the capacity to meet our critical future needs, such as residual waste capacity, as well as stimulating investment in a pipeline of innovation.
2. **Reducing carbon emissions through better waste and materials management** - Transitioning to a circular economy means increasing our resource efficiency and reducing our carbon footprint. If we can make our materials more productive by improving their durability through design, reusing or repairing them, recycling and remanufacturing them or extracting their embodied energy, we can reduce our reliance on emissions-intensive virgin materials.
3. **Building on our work to protect the environment and human health from waste pollution** - If poorly managed, waste can cause enormous damage to our natural environment and threaten the health and well-being of our community. Pollution from waste can be caused by littering, illegal dumping and mishandling of hazardous wastes, and it costs NSW millions of dollars each year. Maintaining strong regulations will help to stop this waste pollution, while engaging with businesses and consumers will help to drive positive behavior change.

## 2.2 Local Government Requirements

### 2.2.1 Orange City Council Development Control Plan

The Development Control Plan was developed and implemented by the Orange City Council and made effective from 2004. Orange City Council has prepared Orange Local Environmental Plan 2011 (new LEP). The current 2004 DCP provides details and criteria for assessing development to support the statutory provisions of Orange LEP 2000 only. Consequently, this necessitates a review of the current Development Control Plan to ensure consistency and workability of the controls contained within this document.

It is the responsibility of the contractor to dispose appropriately of the waste generated during construction, in line with the requirements of this plan and referenced governing legislation.

- A waste management plan (WMP) for the work must be submitted to the Principal Certifying Authority (PCA) at least 2 days before commencement of the works on-site.

### 2.2.2 Western New South Wales Local Health District – Environmental Sustainability Strategy 2023-2027

WNSWLHD seeks to achieve:

- Implement sustainable practices in healthcare waste management.
- Adhere to the waste hierarchy to conserve resources and minimize landfill contributions.



- Manage food waste through sustainable methods.
- Ensure the safe and sustainable disposal of pharmaceuticals.
- Stabilisation in the generation of the top three waste streams:
- Clinical Waste
- General Waste to landfill
- Comingled recycling.

What are WNSWLHD's targets?

- Develop a Sustainable Healthcare Waste Minimisation and Management Framework by 2023.
- Reduce landfill waste by 10% by 2025.
- Increase recycling efforts to encompass 20% of total waste by 2025.
- Divert 50% of food waste from landfills by the end of 2027, with an interim target of 20% by 2025.
- Implement pharmaceutical waste recycling in healthcare facilities by 2024.

WNSWLHD's Key Components of Waste Management Framework are:

- Waste is categorised into seven types: clinical, cytotoxic, pharmaceutical, chemical, general, recyclable, and radioactive.
- Guidelines include providing waste handlers with proper training, personal protective equipment (PPE), and access to safety data sheets.
- The Waste Management Committee oversees transportation, collection, handling, and storage of waste.
- Purchasing policies ensure procurement compliance with relevant manuals.
- Mandatory education and training for staff handling waste.
- Identification of waste streams and services within facilities.
- Conducting internal and external audits to measure compliance.
- Documenting waste minimisation and segregation strategies.
- Conducting Job Safety Analysis (JSA) for various waste handling practices.
- Outlining hygiene and cleaning procedures.
- Specific procedures for handling different types of spills, including blood, chemicals, cytotoxic substances, and hazardous drugs.
- Providing spill kits and identifying their locations.
- Annual audit checklists to ensure ongoing compliance with waste management regulations.

Sustainability in Action:

- In a January 2023 staff survey, over three-quarters of respondents reported actively engaging in waste minimization activities at work.
- Operating Theatre staff at Orange Health Service have diverted more than 761 kg (equivalent to 76 wheelie bins) of hard plastics from landfill, which are now being used to create equipment such as chairs for use within health facilities.
- Bathurst and Orange Hospitals collaborate with River Medical to ethically repurpose and decommission equipment, beds, and furniture. In 2022, over 10 tonnes of unused equipment were diverted from landfill, with 60% repurposed and 39% recycled.
- Over 217 items of mixed IT equipment have been sent from the Dubbo Health Information Communication & Technology Hub to be refurbished and recycled through the Ethan Indigenous Technology Repurposing

program. Ethan Indigenous has donated 15 refurbished laptops to Aboriginal and Torres Strait Islander youth, with more donations planned for 2023.

### 3.0 Targets, Monitoring and Measurement

Accurate and high-quality waste data is crucial for effective waste management at Orange Hospital. This data enhances accuracy, transparency, and confidence, facilitating meaningful comparisons and benchmarking within and between different portfolios and waste contractors. Strategic resource planning benefits from good waste data, providing insights into the efficiency of equipment and operations, ensuring correct invoicing and fee accuracy, and aiding in achieving greater resource recovery through precise measurement of current and future waste performance.

#### 3.1 Waste targets

Orange Hospital is dedicated to attaining high sustainability standards in waste management. This Waste Management Plan (WMP) establishes a systematic approach to waste management and monitoring. It is informed by the Protection of the Environment Operation Act 1997 (POEO), the Protection of the Environment Waste Regulations 2005, and the PD2020\_049 Waste Management Guidelines for Health Care Facilities.

#### 3.2 Monitoring and Measurement

Data on waste generation at Orange Hospital will be systematically collected, collated, and recorded by the waste service provider. This process is essential for monitoring and measuring progress towards waste targets.

##### 3.2.1 Operations

The waste service provider for Orange Hospital must adhere to the Waste Management Plan (WMP) and comply with operational safety standards. They are required to provide accurate measurements for each waste bin collected, per waste stream, ensuring the integrity of measurement scales. Any observed contamination in recycling bins must be reported as an incident and treated as general waste.

The waste service provider will also supply colour-coded equipment, in line with Australian Standard 4123, and maintain a regular collection schedule to keep bins no more than three-quarters full, ensuring hygiene and odour control.

##### 3.2.2 Contamination Audit

An annual contamination audit of each recycling stream is recommended for Orange Hospital. This audit, which should be conducted by an independent expert, should assess the level of non-acceptable items in the waste sample, determining the contamination rate.

##### 3.2.3 Reporting

The waste service provider will issue regular operational waste management reports to Orange Hospital, detailing the types and amounts of waste generated and any contamination incidents.

#### 3.3 Review of WMP

A thorough review of Orange Hospital's Waste Management Plan (WMP) should occur annually to ensure the plan's effectiveness, compliance, and alignment with sustainability goals. This comprehensive review should be conducted collaboratively by the waste service provider and representatives of Orange Hospital.

The annual review should consider, at a minimum:

1. **Performance evaluation:** Assessing waste management effectiveness and performance against reduction and recycling targets.

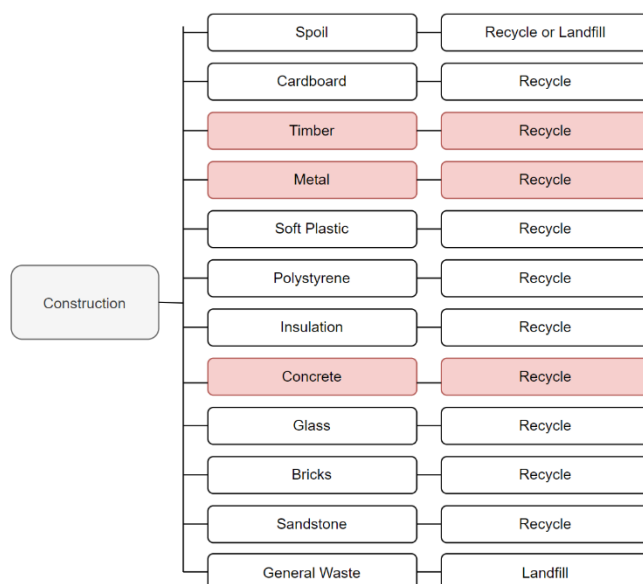
2. **Operational efficiency check and compliance with regulations:** Reviewing waste collection schedules, segregation practices, and facility effectiveness as well as adhering to local and national waste management standards.
3. **Stakeholder Feedback and Training:** Gathering input from staff for improvements and evaluating training effectiveness.
4. **Exploring Sustainability Opportunities:** Incorporating eco-friendly disposal methods and innovative waste management technologies, as well as re-aligning with the current Council / Local Health District's sustainability approaches.
5. **Financial Assessment:** Analysing costs of waste management to identify potential savings.
6. **Setting Achievable Future Goals:** Establishing realistic targets aligned with sustainability objectives.
7. **Documentation for Record-Keeping:** Recording review outcomes for future reference and compliance

## 4.0 Construction Waste

### 4.1 Waste streams

Construction works for this development are to take place with consideration of the Council's development control plan and relevant legislation listed herein this Waste Management Plan, or those implemented by the NSW Government or government bodies. Construction should occur with stringent consideration and implementation of the methodology for recycled materials and recycling of construction waste streams as outlined in this plan. The functional goal for waste management in construction is to enable and ensure the highest proportion of waste is recycled or reused. An overview of the major waste streams resulting from construction related activities is demonstrated in the below figure. The waste streams predicted to generate the greatest volume of waste for this development have been highlighted below.

*Figure 1: Overview of expected construction waste streams*



## 4.2 Waste generation estimates

At the current stage of design, there is no significant earthmoving or excavation to take place at Orange Hospital due to the nature of the construction. However, some demolition work may be required. It should be noted that these plans are based on the current design and may change as the design and cost plans evolve.

## 4.3 Construction waste management

Waste generation and management during construction is the responsibility of the principal contractor and is to be handled in accordance with the approved Construction Waste Management Plan (CWMP). As per section 4.1, waste generated because of construction and defoliation activities will be reused and recycled as a priority, and only disposed to landfill as a last resort.

During the construction phase, suitable areas onsite (off site as necessary) will be allocated which provide the required access for:

- separated storage of building materials;
- separated storage of construction waste;
- separated sorting of construction waste; and
- removal of construction waste for recycling, re-use or landfill disposal.

Any waste generated during construction which is unable to be re-used or recycled will be disposed of at an EPA approved waste management facility. The details of waste types, volumes and destinations will be recorded by the contractor using the tracking sheets appended to this plan (or similar). Prior to transporting waste materials to offsite facilities, it will be verified that the transporter and facility is licensed to handle the specific materials.

## 5.0 Operational Waste

### 5.1 Waste generation

Waste generation calculations will be provided by contractor prior to construction for the waste produced in a hospital facility per bed, per day amounts and specific waste management plan.

### 5.2 Operational waste streams and labelling

All waste containers and bin liners in healthcare settings must be color-coded and labelled as per the specifications in the below tables, titled 'Waste streams', for easy identification. When dealing with Division 6.2 Infectious Substances, it is crucial to adhere to the Australian Dangerous Goods (ADG) Code, particularly for waste classified under Category A Infectious Substances and Category B Infectious Substances. This includes ensuring that portable and mobile bins are correctly marked, labeled, and placarded according to Chapters 5.2 and 5.3 of the ADG Code. Health service staff should also consult the SafeWork NSW fact sheet for guidelines on packing and transporting clinical waste, and coordinate with transporters to provide a transport document that accurately describes the contents being moved, ensuring compliance with safety and regulatory requirements.

Table 1: Management of clinical waste streams: anatomical, sharps and other clinical waste






Waste stream	Anatomical waste	Clinical sharps waste	Clinical waste (Incl. Pathological Waste)
<b>Definition</b>	Identifiable human body parts such as limbs, organs, placenta and recognisable or large pathological specimens resulting from investigation or treatment of a patient It does not include deceased bodies	Any clinical object capable of inflicting a penetrating injury which may or may not be contaminated with blood and or body substance. This includes needles, ampoules and any other sharp objects or instruments designed to perform penetrating procedures[1]  May contain clinical material or Genetically Modified Organism (GMO)[2] waste	Clinical waste with the potential to cause injury, infection or offence: <ul style="list-style-type: none"> <li>Unrecognisable human tissue (excluding hair, teeth, nails and anatomical waste)</li> <li>Bulk blood or other body fluids (or body substances)</li> <li>Material and equipment visibly stained by blood or body fluids (includes incontinence pads and disposable nappies that come from an infectious patient)[3]</li> <li>Lab specimens, cultures or other waste from lab investigations</li> <li>Waste from medical or veterinary research</li> <li>Genetically Modified Organisms (GMOs)</li> </ul>
<b>Bin colour</b>	Yellow	Yellow	Yellow
<b>Lid colour of bin</b>	Orange	Yellow	Yellow
<b>Plastic bin liners</b>	Orange	N/A	Yellow
<b>Labelling of bins and if applicable liners</b>	Anatomical waste	Clinical sharps	Clinical waste
<b>Symbol</b>			
<b>Symbol (description)</b>	Black biological hazard	Black biological hazard	Black biological hazard
<b>Label (if containing viable PC1 or PC2 GMOs)</b>		Contains GMOs	Contains GMOs
<b>Specific requirements</b>	For incineration only	For incineration or autoclaving and shredding Sharps containers must be rigid-walled and meet the requirements specified in AS/NZS 4031 and AS/NZS 4261[4,5] Autoclave tape and bag indicators must be used to show autoclaving has been completed	For incineration or autoclaving [6] and shredding. Autoclave tape and bag indicators must be used to show autoclaving has been completed. Fluid may be able to be discharged into sewer depending on Liquid Trade Agreement between the health service and water utility All clinical waste once treated by a process acceptable to NSW Health[7] may be reclassified in accordance with the Waste Classification Guidelines[8] before recycling or disposal. There are special precautions regarding disposal of waste related to cases of viral haemorrhagic fever[9]
<b>Relevant Act/Regulation /Australian Standard</b>	AS/NZS 3816:1998 Management of clinical and related waste AS/NZS 4123:2008 Mobile Waste Containers	AS/NZS 3816:1998 Management of clinical and related waste AS/NZS 4123:2008 Mobile Waste Containers <i>Protection of the Environment Operations Act 1997</i> <i>Protection of the Environment Operations (Waste) Regulation 2014</i>	AS/NZS 3816:1998 Management of clinical and related waste AS/NZS 4123:2008 Mobile Waste Containers <i>Protection of the Environment Operations Act 1997</i> <i>Protection of the Environment Operations (Waste) Regulation 2014</i>
<b>EPA licence requirements</b>	No	No	No

Table 2: Management of clinical waste streams: cytotoxic, pharmaceutical and radioactive

Waste stream	Cytotoxic waste	Pharmaceutical waste	Radioactive waste
<b>Definition</b>	Material contaminated with residues or preparations containing materials toxic or otherwise harmful to cells. This includes any residual cytotoxic drug or laboratory chemical and any discarded material or clinical waste associated with the preparation or administration or excretion of cytotoxic drugs May include Genetically Modified Organisms (GMOs) or tissues containing GMOs	Pharmaceuticals or other chemical substances specified as regulated goods in the Poisons and Therapeutic Goods Act 2008. Includes any substance specified in a Schedule of the Poisons List under the Act, as well as any therapeutic good which is unscheduled Includes expired or discarded pharmaceuticals, filters or other material contaminated by pharmaceutical products	Waste material, including sharps and clinical waste contaminated with a radioisotope which arises from the medical or research use of radionuclides, e.g. during nuclear medicine, radioimmunoassay and bacteriological procedures, and may be in solid, liquid or gaseous form, and which emits a level of radiation above the level set by regulatory authorities
<b>Bin colour</b>	Purple	Yellow	Red[1]
<b>Lid colour of bin</b>	Purple	Orange	Red
<b>Plastic bin liners</b>	Purple	N/A	Red
<b>Labelling of bins and if applicable liners</b>	Cytotoxic waste	Pharmaceutical waste	Radioactive waste plus specific requirements below
<b>Symbol</b>		Nil	
<b>Symbol (description)</b>	White telophase	Nil	Yellow background with distinctive 'trefoil' symbol in black and the lettering 'CAUTION RADIATION' in black
<b>Label (if containing viable PC1 or PC2 GMOs)</b>	Contains GMOs		
<b>Specific requirements</b>	For incineration only Collection, transport and handling only by licensed and registered waste management companies	Storage, destruction and disposal methods must comply with PD2013_043 Medication Handling in NSW Public Health Facilities[2] Pharmaceutical waste must be incinerated at a licensed controlled waste facility. Certain pharmaceuticals may only be destroyed by authorised persons under the <i>Poisons and Therapeutic Goods Act 1966</i> [3] Pharmaceutical waste bins must be lockable	Radioactive material to be stored on-site in appropriate storage area until it decays to below the thresholds of a "radioactive substance" as defined under the Radiation Control Act and Regulation Waste is to be classified with reference to the Safety Guide for the Classification of Radioactive Waste[4] and in accordance with the EPA Waste Classification Guidelines[5] Radioactive waste must be labelled with the substance, activity level and the date at which it is measured Handling and storage to comply with a Radiation Management Plan in accordance with the Code of Practice for Radiation Protection in the Medical Applications of Ionizing Radiation (ARPANSA 2008)[6] Radioactive sharps – see page 9 [7] When radioactive waste is to be transported, health services must comply with the Code of Practice for the Safe Transport of Radioactive Material (ARPANSA 2014)[8]
<b>Relevant Act and Regulation</b>	AS/NZS 4123:2008 Mobile Waste Containers <i>Protection of the Environment Operations Act 1997</i> <i>Protection of the Environment Operations (Waste) Regulation 2014</i>	<i>Poisons and Therapeutic Goods Act 1966</i> <i>Poisons and Therapeutic Goods Regulation 2008</i>	AS/NZS 4123:2008 Mobile Waste Containers <i>Radiation Control Act 1990</i> <i>Radiation Control Regulation 2013</i>
<b>EPA licence requirements</b>	No	No	Yes - Waste Classification Guidelines Part 3: Waste containing radioactive material (EPA, 2014)

### 5.3 Waste generation estimates

In addition, Orange is required to comply with the WNSWLHD Waste Management Plan. WNSWLHD is committed to reducing waste. The scope of works that form the Orange Hospital upgrade project and the works captured within the REF will result in 3 palliative care unit beds.

The contractor will be required to submit a detailed report encompassing the total volume of general waste, recyclable materials, and clinical waste generated by Orange Hospital.

The following waste minimisation and reduction strategies are recommended to be adopted by the facility once the development becomes operational:

- Waste minimisation commences with product choice – choosing products with the smallest amount of packaging available, or packaging removed by company;
- Purchasing products and equipment made from recycled materials;
- Stock that can expire to be kept to a minimum and rotated to ensure oldest stock is used first;
- Packaging to be removed and segregated from clinical waste before contamination occurs, further segregation of paper products can occur at this point;
- Reduction of size of clinical waste bins in areas outside theatre, labour ward and ED to promote good segregation practices;
- Staff education regarding correct segregation at orientation and periodically as needed;
- Waste reduction champions in different areas to promote recycling and segregation practices;
- Reuse of paper for notes, reducing paper use by less printing of electronic documents;
- Staff using their own cups instead of providing polystyrene cups;
- Reuse of binders and other equipment, furniture by offering unused material to other departments;
- Repairing equipment/furniture instead of replacing items (consider contamination);
- New waste minimisation and recycling opportunities to be explored and implemented where possible; and
- Sustainability and energy efficiency to be considered during new development and refurbishing.



## 6.0 Waste and Materials Reuse Management Plan

### 6.1 Waste Management Principles

The *Waste Avoidance and Resource Recovery Act 2001* (WARR Act) establishes the waste hierarchy and requires that resource management options are considered against the following priorities:

1. Avoidance – actions to reduce the amount of waste generated and undertaking activities.
2. Resource Recovery – including reuse, reprocessing, recycling and energy recovery, consistent with the most efficient use of the recovered resources.
3. Disposal – an 'end of pipe' option that must be undertaken carefully to minimise any negative environmental outcomes.

Figure 2: Waste hierarchy (NSW EPA 2015)



In accordance with the WARR Act, Waste Management Principles will be incorporated into a detailed construction waste management plan provided by the head contractor.

These include:

#### 1) Waste Avoidance and Reduction

The preferred option in the waste hierarchy is to avoid the generation of waste or reduce the amount or volume that is produced. Waste avoidance will be facilitated through:

- Careful project planning to minimise the amount of material brought to site. Waste will be avoided by specifying the exact project requirements;
- Good housekeeping practices including material acquisition and inventory control to avoid waste resulting from out-of-date, off specification or excess to project needs;
- Appropriate Storage and Management of materials onsite to limit the potential for damage from weather or plant which will eliminate the need for purchase of replacement products and waste generation.



## 2) Waste Reuse/Recycling

Re-use and recycling of waste will be encouraged where the generation of waste cannot be avoided. Recycling of waste will be achieved through implementation of the following measures:

- Evaluating waste production processes and identifying potentially recyclable materials;
- Identifying and recycling products that can be reintroduced into the construction and operation processes;
- Investigating and auditing external markets for recycling by other operations located in the neighbourhood or region of the site;
- Waste segregation on site – dedicated bins or areas for collection by a licensed waste contractor
- General Waste – Glass, Paper & Cardboard and Aluminium
- Concrete from excavation to be sent to a recycling facilities
- Natural material will be classified as VENM for offsite reuse.

## 3) Waste Handling and Storage

Storage and segregation of waste and waste servicing arrangements will be carefully planned as the public will still be accessing the Hospital during the works. Planning for waste storage areas will be considered throughout the project as there are changing locations of construction areas during the various project phases.

The following measures will be required to apply where onsite waste handling and storage is required.

- Provision of clear signage to mark the location and storage of different types of waste.
- Stockpile Management
- Within designated areas away from drainage lines
- Limited to 2m height
- Covered stockpiles
- Storage on Hard Stand or Plastic sheeting
- Stockpile concrete, bricks and scrap metal separately.
- Clearly marked waste containers with information such as name of waste, composition (solid/liquid), restricted properties of the waste (corrosive, ignitable) and date of the first waste deposited into the container.
- All servicing arrangements will need to consider the safety of site users.

## 4) Waste Tracking and Disposal

Waste generated by the project that cannot be either recycled or reused onsite will be disposed of by a licensed waste contractor to an appropriately licensed landfill or recycling facility. All vehicles conveying waste soils will have covered loads when leaving site.

Prior to disposal, waste will be classified in accordance with the requirements of the NSW EPA Waste Classification Guidelines.

A waste inventory will be maintained.

A tracking system will be used to track the waste quantities and types disposed. Documentation will track wastes, including the handling steps and servicing arrangements followed to manage the wastes from the point of generation through to collection, storage, treatment and final disposal.

On and Offsite waste tracking will record for each waste generated:

- Waste generator facility and address;
- Type and identity of transport vehicles associated with the collection and final disposal of waste;
- Date for recycling, treatment and disposal;
- Type of Waste;
- Quantity of waste;
- Method of recycle, treatment or disposal;
- Description of waste, including restricted characteristics (i.e. what makes it a restricted or non-restricted waste).

Waste tracking forms will be used for all wastes moved off-site. The tracking form will record appropriate information about each waste stream and enable control of the waste disposition by confirming receipt by the designated recipient.

## 6.2 Potential Waste Impacts and Management

Potential impacts associated with poor or inadequate management of wastes generated during the construction and operation of Orange Hospital are outlined in Table 3.

*Table 3: Summary of aspects of waste management and potential impacts*

<b>Aspect of waste management</b>	<b>Potential</b>
Generation of waste (usage of resources)	<ul style="list-style-type: none"> <li>• Extraction of resources.</li> <li>• Energy and water consumption associated with processing.</li> </ul>
On-site storage of waste in an urban setting	<ul style="list-style-type: none"> <li>• Increased dust.</li> <li>• Visual impact.</li> <li>• Increased littering.</li> <li>• Sediment laden runoff.</li> <li>• Odours.</li> <li>• Increased pest animals.</li> <li>• Restricted space/site access.</li> <li>• Health and safety of site users and workers.</li> </ul>
On-site storage and segregation of waste	<ul style="list-style-type: none"> <li>• Reduction in reuse of materials.</li> <li>• Cross-contamination of waste.</li> <li>• Contamination of recycling centres.</li> </ul>
On-site storage of liquid and/or contaminated waste	<ul style="list-style-type: none"> <li>• Contamination of surface soils, groundwater, and surface waters.</li> <li>• Odours.</li> </ul>
Hazardous materials such as clinical waste	<ul style="list-style-type: none"> <li>• Risk to human health.</li> </ul>
Waste transportation	<ul style="list-style-type: none"> <li>• Noise and dust impacts to surrounding sensitive receptors.</li> <li>• Odours.</li> <li>• Mud tracking on roads during construction.</li> </ul>
Non-classified or incorrectly classified waste disposal/transport	<ul style="list-style-type: none"> <li>• Regulatory non-compliance and associated penalties.</li> <li>• Contamination of landfill/recycling centres.</li> </ul>
Unlicensed waste transporters removing waste off-site	<ul style="list-style-type: none"> <li>• Regulatory non-compliance and associated penalties.</li> <li>• Illegal dumping of waste.</li> </ul>

### 6.3 Waste Management Methods

A detailed construction waste management plan will be developed by the Contractor as part of the Construction Environmental Management Plan. The plan will provide further details of the management required for the waste types generated under the works associated with the Orange Hospital Upgrade. As the design progresses, accurate estimates of quantities of building materials prior to construction will ensure that a minimum of waste is generated. Records of waste and recycling collected and disposed of will be collated throughout the construction phase by the Contractor. Un-used materials in a good condition will often be collected by suppliers, facilitating the reduction of the amount of material sent to recyclers or landfill.

The Contractor will be required to achieve compliance with the EPA guidelines.

Following removal of all hazardous materials such as asbestos, lead-based paints, phenols and polychlorinated biphenyls (PCB), where possible, any waste material generated from the Works will be recycled apart from selected soft demolition materials.

A summary of likely waste streams to be generated through construction are identified in Table 4 below, a proposed method for handling, storage and reuse/disposal of each type of waste are also presented.

*Table 4: Waste streams and management during construction*

Activity	Waste stream	Management
<b>Main Works Package</b>	Structural steel	<ul style="list-style-type: none"> <li>Segregation on site (Compound A or B)</li> <li>Transport or collection to a recycling facility.</li> </ul>
	Steel reinforcement	<ul style="list-style-type: none"> <li>Segregation on site. (Compound A or B)</li> <li>Transport or collection to a recycling facility.</li> </ul>
	Concrete	<ul style="list-style-type: none"> <li>Segregation on-site. (Compound A or B)</li> <li>Transport to a recycler or use on-site/off-site in road making activities, building, landscaping and construction works in accordance with the requirements of the Recovered Aggregate Resource Recovery Exemption 2014.</li> <li>Where reuse is not practical concrete has been pre-classified by the EPA as General Solid Waste (non-putrescible) and can be disposed to an appropriately licensed facility by a licensed contractor.</li> </ul>
	Plasterboard	<ul style="list-style-type: none"> <li>Landfill</li> </ul>
	Metals	<ul style="list-style-type: none"> <li>Segregation on-site. (Compound A or B)</li> <li>Transport or collection to a recycling facility.</li> </ul>
	Asphalt (for roads and car parks)	<ul style="list-style-type: none"> <li>Landfill</li> </ul>
	Mechanical - ductwork	<ul style="list-style-type: none"> <li>Segregation on-site. (Compound A or B)</li> <li>Transport or collection to a recycling facility.</li> </ul>
	Electrical - metal cable trays, electrical cables, fibre optic cables	<ul style="list-style-type: none"> <li>Segregation on site. (Compound A or B)</li> <li>Transport or collection to a recycling facility.</li> </ul>
	Hydraulics – UPVC Piper, Copper pipe, HDPE pipe	<ul style="list-style-type: none"> <li>Segregation on site. (Compound A or B)</li> <li>Transport or collection to a recycling facility</li> </ul>

Activity	Waste stream	Management
<b>Site Office and Worksites</b>	General Office Waste – paper, printer cartridges	<ul style="list-style-type: none"> <li>Segregation of recyclable wastes and storage on-site</li> <li>Collection and transport to a recycler</li> </ul>
	Domestic Wastes – food scraps, glass bottles, cans, packaging.	<ul style="list-style-type: none"> <li>Segregation of recyclable wastes and storage onsite</li> </ul>
	Septic and Sanitary systems waste	<ul style="list-style-type: none"> <li>Sewerage treatment plant</li> </ul>
<b>Plant Maintenance and Chemicals Management</b>	Drums and Containers	<ul style="list-style-type: none"> <li>Segregation of recyclable wastes and storage onsite (Compound A or B)</li> <li>Collection and transport to a recycling facility</li> </ul>
	Waste Oil, great, lubricants, oily rags and filters	<ul style="list-style-type: none"> <li>Segregation of recyclable wastes and storage onsite (Compound A or B)</li> <li>Collection and transport to a recycling facility</li> </ul>

The storage of waste created by the site through demolition, excavation and general construction works will be specified within the site establishment zones.

#### 6.4 Hazardous Materials Management

Dangerous goods (such as petrol, diesel, oxy-acetylene, oils, glues etc) will be stored in a lockable compound with sufficient ventilation in accordance with relevant codes of practice and standards. Material safety data sheets on all of these flammable and potentially harmful liquids will be provided by the Contractor undertaking the Works.

A separate report has been commissioned to cover the requirements under SEPP 33 – Hazardous and Offensive Development. This assessment has concluded that the quantities of Dangerous Goods to be stored at the proposed facility and the associated vehicle movements do not exceed the thresholds required to classify the facility as 'hazardous'. Therefore, no further assessment is required.

##### 6.4.1 Hazardous Materials Audit

A licensed demolition contractor and/ or the Contractor are to inspect the site to determine the presence of any hazardous materials in accordance with the requirements of AS2601.

##### 6.4.2 Hazardous Materials Management Plan

- A Hazardous Materials Management Plan will be prepared in accordance with the requirements of AS2601 prior to the commencement of any demolition works;
- The removal, handling and disposal of asbestos materials are to be undertaken only by an appropriately licensed contractor and in accordance with the requirements of the NSW WorkCover Authority and the NSW Office of Environment and Heritage (NSW OEH);
- All asbestos and other hazardous materials are to be appropriately contained and disposed of at a facility holding the appropriate licence issued by the NSW OEH; and
- A sign displaying the words 'DANGER ASBESTOS REMOVAL IN PROGRESS' is to be displayed on sites where buildings to be demolished contain asbestos materials.

## 7.0 Waste Storage Design and Collection

### 7.1 Signage

In areas designated for waste disposal, storage, and collection, signage explaining the use of the waste management system will be installed. These signs will indicate the appropriate materials for each recycling bin. Bins will be distinctly marked with labels and colour coding to prevent the accidental mixing of different waste streams. Standardised bin lid colouring will be implemented as required by the council to identify the storage of general waste, co-mingled recycling, paper/card recycling, food organics, garden organics, etc. These steps are implemented to promote the correct segregation of waste materials and facilitate resource recovery.

Furthermore, clear Work Health and Safety (WHS) signs will be provided where necessary, especially in areas dedicated to waste and recycling, to ensure a safe and compliant environment.

### 7.2 General waste facilities design

The Waste Management Plan for the Orange Hospital upgrade outlines the safest and most hygienic design aspects to be considered for waste storage rooms, in accordance with the Council's DCP. The plan covers several key areas of facility design and requires the following.

**Residential Bin Storage Area:** This area must be spacious enough to comfortably house the required bins, with each bin requiring a space of at least 700mm by 750mm. Bins should be easily accessible and removable for servicing, necessitating unobstructed access and a minimum passageway width of 1 meter. The area should feature a concrete floor and brickwork walls at least 1100mm high to screen bins from the street. There should be no gates at the entry, and landscaping is required to minimise streetscape impact.

**Waste and Recycling Storage Rooms:** These rooms must also be adequately sized to fit the necessary bins. The layout should facilitate easy access to all bins, with garbage bins placed closest to the access door to reduce recycling contamination. The room requires a smooth, coved concrete floor, graded to a floor waste connected to the sewerage system if storing putrescible waste. A tap with hose connection for cleaning, brickwork or concrete block walls with cement-rendered surfaces, and a rigid, non-absorbent ceiling are also necessary. The walls and ceiling should be painted with light-colored washable paint. The room needs a self-closing door, accessible from inside without a key, and finished with a smooth, impervious material. Ventilation is required, either naturally or mechanically, along with controllable artificial lighting. Clear signage for correct waste facility use is also mandated.

**Garbage Chutes:** Suitable only for garbage due to safety concerns, the chutes must be cylindrical, at least 500mm in diameter, made of non-corrosive metal or similar material, and be completely vertical. The chutes should have smooth internal surfaces for free garbage flow and not open onto habitable spaces. Service openings, located in a dedicated room, should have a closing device and be self-closing. The chute should end in the waste room, directly above a waste container or compactor, with a cut-off device for servicing. Cleaning ease, proper ventilation, and a weather-proof, bird-proof vent at the top are also required.

### 7.3 Amenity

The design and implementation of waste management systems and structural elements will be focused on additional building amenities. The key considerations throughout the design stages are as follows:

**Visual Impact:** Visible components of the waste management system must align with the overall design aesthetic of the development.

**Noise Control:** Measures will be taken to significantly reduce noise, eschewing the use of loud waste management equipment. However, if large amounts of food waste are produced, the Council may

mandate refrigeration for waste storage to ease removal challenges posed by the site's location or extended operating hours, thereby preventing disruptive noise.

**Odour Management:** Efforts to minimise odour include using Council-approved waste containers with tightly fitting lids and smooth, washable interiors. Additionally, all waste storage areas will be equipped with mechanical ventilation systems. Combined with adequate ventilation and regular waste collection, these measures will effectively eliminate odour risks.

This approach ensures a harmonious integration of waste management within the project. The approach has been considered by the consultants to current design stages and will continue to be considered by the consultants and contractor (when engaged) during design finalisation and implementation.

#### 7.4 Location and access

Construction zone route maps, service vehicle pathways for waste management, and proposed skip bin locations will be provided by the contractor. The skip bins will be kept within the construction site and its compound throughout the construction period. The final location of the skip bins will be determined by the contractor and approved by the principal.

#### 7.5 Frequency

The arrangements for waste collection services pertaining to each specific waste stream are yet to be finalised. It is mandatory that written proof of the contractor's valid and current license for the collection and disposal of waste and recycling be provided and available on site at all times.

The proposed schedule for waste collection is as follows:

- **Regular Waste Streams:** The collection of standard waste streams, including general waste, co-mingled recycling, paper/cardboard recycling, and food and garden organics, is scheduled to occur weekly, aligning with standard working days.
- **Other Waste Streams:** The collection of other categories of waste, such as hard/bulky waste, electronic waste (e-waste), cooking oil, and similar items, will be conducted less frequently. These collections will be organised on an as-needed basis, ensuring efficient and timely disposal.
- **Hazardous and Sanitary Waste:** The collection frequency for hazardous and sanitary waste is to be determined by the respective specialised waste removal service providers. These collections will be coordinated in consultation with facilities management, tailored to the specific requirements of these waste types.

It is important to note that these waste collection frequencies are initial estimates and are subject to adjustment both during construction and post-occupancy. Once the building is operational and actual waste generation rates are assessed, the collection schedule can be fine-tuned to better align with the observed needs and efficiencies. This adaptive approach ensures that waste management remains responsive to the actual usage patterns of the building, promoting environmental sustainability and operational effectiveness.

## 8.0 Waste Management Initiatives

### 8.1 Best practice separation

#### 8.1.1 Co-mingled & Paper/Cardboard Recycling

Co-mingled and paper/cardboard recycling bins aim to substantially increase the segregation and diversion of recyclable materials from landfill.

It is suggested that the implementation of clear, color-coded signage on these bins to aid in proper waste segregation. Furthermore, prominent and educational posters in key areas should be installed to vividly demonstrate proper recycling methods. This approach is expected to significantly boost the volume of recyclables being correctly sorted and diverted from general waste streams.

### 8.1.2 Food Organic Waste Management

To meet the Orange Hospital's waste reduction targets, as stipulated in the legislation and SEPP, and to foster exemplary waste management practices, the installation of a food organics treatment unit will be considered. The advantages of processing organic waste are:

- By recycling organic waste, Orange Hospital can meet the required diversion targets, thus reducing the substantial expenses associated with landfill disposal. Notably, the cost of recycling bins is approximately a third of that for landfill bins, making the segregation of recyclables economically sensible.
- By-product from this process can be utilised as compost within the grounds or distributed to local community groups.
- Implementing an organics treatment system can decrease the frequency and cost of MBG and skip bin collections. This also leads to a reduction in carbon emissions by lowering transportation needs.
- Diverting waste from landfills, where it would produce emissions, and by minimising transport requirements for waste collection, the overall carbon footprint of the university is reduced.
- Fosters a culture of environmental responsibility among the LC building's occupants, encouraging them to take ownership of their individual waste practices.

## 8.2 Waste Education

### 8.2.1 Roles and Responsibilities

The Head Contractor will be responsible for developing a detailed waste management plan prior to commencement of the construction works. That plan must be consistent with the approach, principles and management methods outlined in this plan, as well as State Environmental Planning Policies and the council's Local Environmental plans and Development Control plans.

The Contractor will also be responsible for:

- Inducting all contractors and visitors about the relevant aspects of this plan.
- Ensuring all waste management contractors have the necessary qualifications and licenses to remove waste from the site.
- Carrying out periodic audits to check compliance with the waste management plan.

### 8.2.2 Training and Induction

During construction, all site personnel and subcontractors will be inducted into the requirements of this plan to in accordance to their level of responsibility. As such, the induction is expected to include the following components:

- The waste hierarchy and associated waste management principles (avoid, reuse, and recycle).
- NSW EPA Waste Classification Guidelines.
- Procedures for handling and storage of wastes.
- Location of waste disposal and storage facilities.
- Actions to be undertaken in the event of a hazardous material spill.

Once the hospital is operating, all staff, volunteers and hospital contractors will, as part of their induction, be briefed on the following aspects of waste management:

- The waste hierarchy and associated waste management principles (avoid, reuse, and recycle).
- Location of waste disposal and storage facilities.
- Actions to be undertaken in the event of a hazardous material spill.

Staff and contractors with specific responsibilities for waste management including for the handling and disposal of hazardous waste will be given additional training as required.



## Appendix A - Construction Waste Management Tracking Sheet example

Waste Tracking - Construction						
Materials on-site			Destination			
Type of Materials	Estd. Vol (m3)	Estd. Wst (t)	Reuse and Recycling		Disposal	
			ON-SITE - specify proposed reuse or on-site recycling method	OFF-SITE - specify contractor and recycling outlet		
Estimated Materials						
Garden Organics						
Bricks						
Tiles						
Concrete						
Timber						
Plasterboard						
Metals						
Other waste eg. Ceramic tiles, paints, PVC tubing, cardboard, fittings						

