Lend Lease

One Sydney Harbour - State Significant Development 6964

R4B Waste Management Plan

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Job number 232836-00

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Contents

Appendices

1 Introduction

This Waste Management Plan (WMP) has been prepared on behalf of Lend Lease to accompany a Development Application for a residential tower development known as Building R4B within Stage 1B of Barangaroo South.

The Development Application seeks approval for the development of a residential building, with some retail spaces on lower levels. The basement of the building (Stage 1B Basement) has been approved under a separate approval process.

1.1 Overview of Proposed Development

The Development Application seeks approval for the construction of Residential Building R4B within Barangaroo Stage 1B. This building will be serviced by a shared Stage 1B basement (Building R4A, Building R5 and the Stage 1B basement are subject to separate waste management plans).

The Stage 1B residential precinct covers Buildings R4A, R4B and R5, which will provide residential accommodation along with a number of retail outlets. For the purpose of this WMP the proposed residential precinct will consist of:

- R4A with 327 residential units and 430 m^2 of retail space;
- R4B with 297 residential units and 461 m^2 of retail space;
- R5 with 151 residential units and 889 m^2 of retail space.

This WMP relates to Building R4B only.

1.2 Site Location

Barangaroo is located on the north western edge of the Sydney Central Business District, bounded by Sydney Harbour to the west and north, the historic precinct of Millers Point (for the northern half), The Rocks and the Sydney Harbour Bridge approach to the east; and bounded to the south by a range of new development dominated by large CBD commercial tenants.

The Barangaroo site has been divided into three distinct redevelopment areas (from north to south) – the Barangaroo Reserve, Barangaroo Central and Barangaroo South.

The Stage 1B Building R4B site area is located within Barangaroo South Stage 1B as shown in Figure 1.

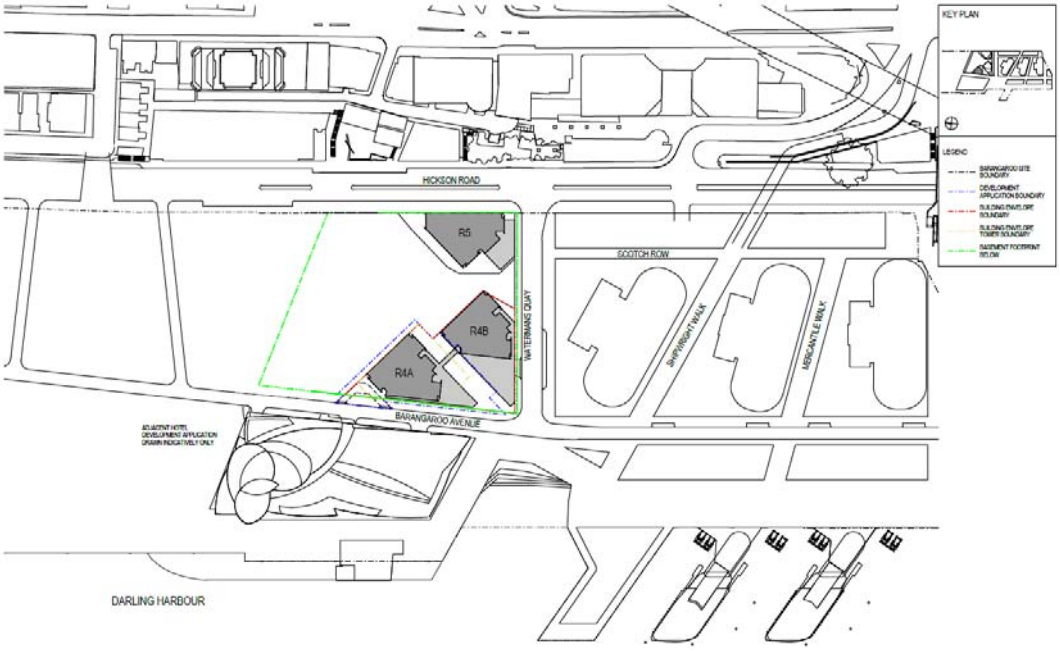

Figure 1 Site Location plan

1.3 Purpose of the Waste Management Plan

This document addresses aspects of waste management relating to requirements of the SSDA under the NSW Environmental Planning and Assessment (EP&A) Act (1979), Secretary's Environmental Assessment Requirements (SEARs), and the project's Green Star objectives.

This WMP identifies waste sources and proposes management measures for the project design, construction and operation. The format of this document can assist with the completion of a Construction Waste Management Plan (CWMP), which will be required by the contractor prior to the construction of the development. It may also assist with the development of a waste auditor report required as part of a Green Star submission.

The key purposes of the WMP are to:

- Address the waste management requirements for the proposal to a standard suitable for approval under Part 4 of the EP&A Act;
- Provide guidance for the project in waste minimisation from construction activities;
- Increase economic feasibility of the project through effective waste separation, recycling and re-use measures; and
- Identify waste management requirements for construction and operation.

2 Legislative requirements

2.1 SEARs Requirements

Specific issues addressed in the report respond to the Secretary's Environmental Assessment Requirements (SEARs) in relation to waste management for the planning application, those being:

12. Contamination

- *Demonstrate compliance with the requirements of SEPP 55.*
- *If remediation works are required, the EIS must include a Remedial Action Plan (RAP). The RAP must be accompanied by a Site B audit statement prepared by an EPA accredited site auditor and the RAP must be prepared in accordance with the contaminated land planning guidelines under section 145C of the Environmental Planning and Assessment Act 1979 and relevant guidelines produced or approved under section 105 of the Contaminated Land Management Act 1997*

Relevant Policies and Guidelines

- *The current guidelines under section 145C of the Environmental Planning and Assessment Act 1979 are the guidelines "Managing Land Contamination, Planning Guidelines, SEPP 55 – Remediation of Land" 1998.*

18. Waste

- *Assess the waste impacts and their management during construction and operation. Consideration should also be given to the assessment and management of any acid sulfate soil and potential acid sulfate soil.*

Relevant Policies and Guidelines

- *Waste Classification Guidelines Part 1: Classifying Waste 2014 (EPA)*
- *Waste Classification Guidelines Part 4: Acid Sulfate Soils 2014 (EPA)*
- *Acid Sulfate Soils Manual 1996 (ASSMAC)*
- *Waste Avoidance and Resource Recovery Act 2001*

Note that the Remedial Action Plan (RAP)[1] and the Waste Management Plan for Remediation and Landforming Works at Block 4 Barangaroo[2] address point 12 of the SEARs listed above.

Point 18 is addressed throughout this WMP, except for acid sulfate soils, which are addressed in the Acid Sulfate Soils Management Plan[3].

[1] AECOM (2013), *Remedial Action Plan: NSW EPA Declared Remediation Site 21122 and Block 4 (Stage 1b) Development Works, Barangaroo, Millers Point, NSW*
[2] AECOM (2013), *Waste Management Plan, Remediation and Landforming Development Application SSD 5897 – 2013, Barangaroo Block 4, Hicksons Road, Millers Point, NSW*
[3] AECOM (2013), *Acid Sulfate Soils Management Plan: Barangaroo Declaration Area Number 21122, Hickson Road, Millers Point, NSW*

2.2 NSW state legislation

2.2.1 The Protection of the Environment Operations Act, 1997

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 final disposal.

2.2.2 The Protection of the Environment Operations (Waste) Regulation 2014

The 2014 Waste Regulation and associated Waste Levy Guidelines were introduced in November 2014 following an extensive review of the waste regulatory framework by the NSW EPA. The 2014 Waste Regulation establishes the Proximity Principle (among numerous other items), which aims to address the environmental and human health impacts in NSW associated with the unnecessary transportation of waste over long distances. The Waste Levy aims to maintain the integrity of the waste levy framework, and break the business model of rogue operators whose activities distort the waste market.

2.2.3 Waste Avoidance and Resource Recovery Act 2001

Due to concerns about waste management practices and increasing volumes of waste, the NSW government introduced the Waste Avoidance and Resource Recovery Act 2001, superseding the Waste Minimisation and Management Act 1995 following its five year review.

The object of the Waste Avoidance and Resource Recovery Act is to encourage the most efficient use of resources, to reduce environmental harm, and to provide for the continual reduction in waste generation in line with the principles of ecologically sustainable development (ESD).

The WMP is a requirement for a new development in NSW and is written with reference to the NSW Waste and Resource Recovery Strategy 2014-21, made under the Act.

The following hierarchy for managing waste, from most desirable to least desirable, meets the objects of the Act:

- Avoid unnecessary resource consumption;
- Recover resources (including reuse, reprocessing, recycling and energy recovery); and
- Dispose (as a last resort).

2.2.4 The NSW Waste Reduction and Purchasing Policy 2007 (WRAPP)

The NSW Waste Reduction and Purchasing Policy (WRAPP) requires all state government agencies and state owned corporations to develop and implement a WRAPP plan to reduce waste in four scheduled waste sources:

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

WRAPP is not directly applicable to the project, but has been used as a guiding document for waste initiatives.

2.2.5 NSW Waste Avoidance and Resource Recovery Strategy 2014–21 (WARR)

The NSW Waste Avoidance and Resource Recovery (WARR) Strategy 2014–21 sets a number of priority areas for waste management.

The WARR Strategy includes the following targets for 2021-22:

- Avoiding and reducing the amount of waste generated per person in NSW;
- Increasing recycling rates to 70% for municipal solid waste, 70% for commercial and industrial waste and at least 80% (targeting 97%) for construction and demolition waste;
- Increasing waste diverted from landfill to 75%;
- Managing problem wastes better, establishing 86 drop-off facilities and services across NSW;
- Reducing litter, with 40% fewer items (compared to 2012) by 2017; and
- Combatting illegal dumping, with 30% fewer incidents (compared to 2011) by 2017.

The WARR Strategy is supported by Waste Less, Recycle More, a NSW Government initiative funded by the waste levy, providing $465.7 million for waste and recycling improvements across NSW.

2.3 Council of the City of Sydney *Guidelines for Waste Management in New Developments*, 2014

The Council of the City of Sydney *Guidelines for Waste Management in New Developments* ('CoS Waste Guidelines') was developed in 2014 in support of the NSW Waste and Resource Recovery Strategy (2014-21 Strategy). The CoS Waste Guidelines is the guiding document for many of the waste initiatives and requirements for the proposed adaptive reuse project.

The specific sections which pertain to the proposed development include:

- Section A – General Requirements;
- Section B – Multi-Unit Residential Developments;
- Section C – Mixed Residential/Commercial Developments; and
- Section E – Commercial Developments: Specific Provisions.

Key requirements of the CoS Waste Guidelines include:

- A dedicated room or space for a waste and recycling storage area is to be provided wholly on site. The storage area is to provide adequate capacity for storing all the waste and recycling likely to be generated between collection cycles, based on expected waste generation and selected bin types.
- Where a residential development and commercial development occupy the same site, the waste and recycling handling and storage systems for residential waste and commercial waste (including waste originating from retail premises) are to be separate and self-contained.
- All commercial premises must have a dedicated and enclosed waste and recycling storage area which has adequate storage to meet generation rates;
- Businesses or building managers must have written evidence of a valid and current contract (held on site) with a collector for waste (garbage) and recycling collection for disposal or processing; and
- Where applicable, all businesses are encouraged to include where applicable provisions in their waste contracts that allow for the collection and recycling of significant waste streams.

Numerous other requirements are specified within the CoS Waste Guidelines. These have been addressed throughout this WMP where required.

2.4 Green Star

A Green Star assessment is being sought for this development under the Green Building Council of Australia (GBCA) Green Star Multi Unit Residential v1 rating tool, under a requirement to achieve a 5 Star rating. Two submissions are required: a submission for a 'Design' Certified Rating; and a submission for an 'As Built' Certified Rating (in operation).

A number of the Green Star goals for this project relate to waste management in the areas of design, demolition/construction, and operation. These objectives are summarised below in Table 1.

This WMP has not been developed for use as the waste auditor report required as part of the future Green Star submission under MAT-1 (recycling waste storage), but will inform the development of such a report and will also inform the development of a Building User Guide (MAN-5) and a Construction Waste Management Plan to be prepared by the contractor (MAN-7).

Table 1: Environmentally sustainable objectives for waste management

Relevant Green Star Credit	Initiative	Target	Environmental Benefit	Requirements
Multi Unit Residential V1 MAN-5	Building User's Guide *Up to 1 point*	To encourage and recognise information management that enables building users to optimise the building's environmental performance – to include a materials and waste policy.	Reduces waste sent to landfill; responds to resource depletion.	Development of a Building User's guide, relevant for building management and residents, including a Materials and Waste Policy to address: • What can be recycled; • Where recycling storage areas are, and • Schedules for waste and recycling removal.
Multi Unit Residential V1 MAN-7	Waste Management (construction) *Up to 2 points*	To encourage and recognise management practices that minimise the amount of construction waste to landfill (at least 80%, targeting 97% of all construction waste to be reused or recycled).	Reduces waste sent to landfill; responds to resource depletion.	Appointment of a Contractor to: • Develop a Waste Management Plan, retain waste records and submit quarterly reports to the building owner, and • Achieve a 60% (1 point) or 80% (2 points) rate of recycle or re-use for construction/ demolition waste.
Multi Unit Residential V1 MAT-1	Recycling Waste Storage *Up to 2 points*	To encourage and recognise the inclusion of storage space that facilitates the recycling of resources used within buildings to reduce waste going to landfill.	Reduces waste sent to landfill; responds to resource depletion.	Points are awarded for: • Provision of a dedicated storage area for waste recycling; • Convenience of recycling; • Waste chutes for recycling and general waste; • Compost facilities, and • Facilities for over-sized household items.

3 Waste management approach

3.1 Method for estimation of waste generation

Waste volumes for the proposed development have been estimated in order to determine waste storage and collection requirements.

Waste generation is calculated from the appropriate waste generation rate and according to number of units or total gross floor area (GFA), according to the intended occupancy type.

Relevant waste generation rates in this development relate to:

- Multi-unit residential; and
- General retail.

3.2 Waste generation rates

All waste generation estimates are based on the relevant waste generation rates provided in the CoS Waste Guidelines.

The proportion of landfill that is comprised of organic waste has been estimated at 30 per cent. This is based on a 2013 study into commercial and industrial waste and recycling in Australia by industry division by Encycle. Of the organics generated, an estimated 70 per cent is recovered. This figure is a stretch target, and will vary greatly with the specific tenancy.

3.3 Method for estimation of waste storage and management requirements

Waste storage area requirements are calculated from the estimation of waste generation and bin compaction ratio, based upon the bin sizes within the CoS Waste Guidelines and from site waste contractors (Table 2).

Waste storage requirements and management practices for common waste storage areas are in accordance with the General, Space, Access and Amenity requirements detailed in Section A (‘All Developments’), Section B (‘Residential Provisions’) and Section C (‘Commercial Provisions’) of the CoS Waste Guidelines.

Table 2: Waste bin capacity and area requirement

Bin Capacity (L)	Bin floor dimensions (m)	Bin GFA (m^2)
120	0.49 x 0.56	0.27
240	0.58 x 0.74	0.43
360	0.62 x 0.85	0.53
660	1.37 x 0.85	1.16
1100	1.37 x 1.25	1.71

3.4 Assumptions and limitations

The findings of this WMP have been incorporated into the proposed building design.

It should be noted that the rates provided are best practice estimates using the CoS Waste Guidelines. Actual observed rates of waste generation will vary according to specific tenants and their behaviours.

All waste estimations in this document are based upon the following supplied building design schedule and plans:

- Drawing BR4B_ASD_PA1_2000, revision 9, Lend Lease, 25 May 2015.
- Drawing BR4B_ASD_PA1_2001, revision 9, Lend Lease, 25 May 2015.
- DA GEN III – Area Schedule DETAILED (Rev 1 010715), Lend Lease.
- Barangaroo Development Brief – Basement - Stage 1B, Revision G – 16 April 2015

All waste facilities and equipment are required to be designed and constructed in accordance with City of Sydney requirements in the CoS Waste Guidelines, the Building Code of Australia (BCA), and Australian Standards.

4 Construction waste

4.1 Construction waste streams

Construction works for this development are to take place with consideration of the project's Green Star pathway objectives, particularly in regards to use of recycled building materials and recycling of construction waste streams. The primary goal for waste management in the construction phase is to ensure at least 80%, targeting 97%, of waste is recycled or reused.

An overview of the major waste streams resulting from construction is provided below in Figure 2. Waste streams which are predicted to generate the greatest volume are highlighted in orange.

Further detail regarding construction waste management is provided below in sections 4.2 – 4.3. Excavation waste streams are not included in this diagram, as basement excavation is subject to a separate DA.

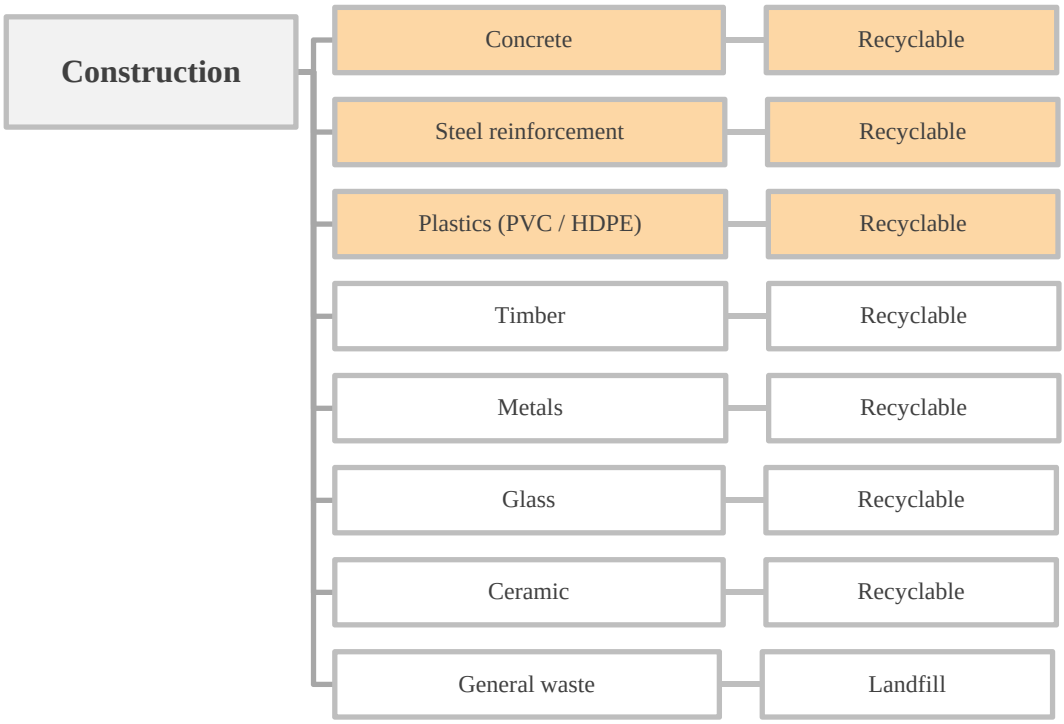

Figure 2: Construction waste streams

4.2 Construction waste management

Waste generation and management during construction is the responsibility of all on site, as it relates to materials procurement, handling, storage and use. Waste generated during construction will be reused and recycled as a priority, or disposed to landfill otherwise.

During construction, suitable areas on site (or off site, if necessary), will be provisioned which provide adequate space and access for:

- Storage of building materials;
- Storage of demolition and construction waste;
- Sorting of demolition and construction waste; and
- Removal of demolition and construction waste for recycling, re-use or landfill.

Specific locations within the site suitable for storage of construction waste will be identified by the contractor prior to application for the Construction Certificate.

Construction waste management will be performed to meet the specific goals of the project 'principle led' Green Star pathway. Within the Management category of Green Star, the Waste Management (MAN-7) indicator addresses construction waste management and is worth a maximum of 2 points:

- **MAN-7**: **Construction Waste Management -** To encourage and recognise management practices that minimise the amount of construction waste to landfill (at least 80%, targeting 97%, of all construction waste to be reused or recycled to achieve 2 points).

As a requirement of MAN-7, the construction contractor will develop a Construction Waste Management Plan (CWMP) in order to ensure that construction waste is minimised and diverted from landfill where ever possible. The MAN-7 indicator is the only directly applicable Green Star indicator to be influenced by the Construction Waste Management Plan.

A construction waste tracking sheet is to be completed by the construction contractor during this phase of the project, as provided in the CoS Waste Guidelines. This sheet is attached in Appendix B.

As per the SEARs, waste impacts and their management during construction must be assessed. Strategies, responsibilities and monitoring activities for minimising waste impacts during construction will be developed in further detail by the contractor. These will be outlined in the detailed contractor Construction Waste Management Plan (CWMP), which will be required by the contractor to achieve a Construction Certificate prior to commencement of development activities.

5 Operational waste estimate

The SEARs requires that waste impacts and their management during operation be assessed. In order to assess and manage these impacts, operational waste estimates must first be conducted. The process for estimating operational waste generation is included in this section.

5.1 Area schedule

This section provides an overview of occupancies and gross floor areas (GFA) for space uses within the proposed development which will contribute to waste generation.

A total **297 residential units** are proposed for Building R4B.

In addition, a total of **461 m^2 of retail space** will be provided. The specific retail tenancy has not yet been determined. As such, this space has conservatively been attributed to café / food and beverage for the purpose of waste generation estimates.

5.2 Operational waste streams

The waste streams which will be generated during operation of the proposed development are identified below in Table 3.

Table 3: Operational waste streams

Waste Stream	Predominant Source	Destination
Mixed general waste	Entire building	Landfill
Co-mingle recycling	Entire building	Recycle
Cardboard and paper recycling	Commercial (retail)	Recycle
Organic waste	Food services (retail)	Organic collection / treatment
Electronic waste	Entire building	Recycle
Bulky waste	Entire building	Recycle / landfill

5.3 Waste generation estimations

Estimates of daily waste generation for the residential and commercial (retail) aspects of the development are summarised below in Table 4.

Table 4: Waste generation estimations

	Residential (L/day)	Retail (L/day)
Mixed general waste	**5,110**	**790**
Comingled recycling	**5,110**	**300**
Paper and cardboard recycling	**N/A**	**310**
Organic waste	**N/A**	**210**

6 Residential waste facilities

The main waste facilities for **residential waste** are outlined in detail below.

These figures are based on initial estimates and are subject to change as the design of the development progresses.

The location of relevant waste storage areas are provided in the basement plan provided as Appendix A to this WMP.

6.1 Waste storage

Storage provision for waste from Building R4B is as follows:

1. Tenant waste collection rooms

Each residential level will host a tenant waste collection area (one per building core), which will include:

- Access to the dual system waste chute via a hand loaded compartment; and
- Space for temporary storage of larger recyclables such as flattened cardboard boxes.

2. R4B Garbage Room

This room will receive waste and recycling from residential areas via a dual system waste chute. It will host:

- 4 x 660L rotary compactor (general waste);
- General waste: 12 x 660L bins; and
- Co-mingled recycling: 86 x 240L bins (CoS Waste Guidelines specify that recycling should be stored in either 120 or 240 litre MGBs to reduce breakage and contamination).

Recycling and landfill waste streams will be clearly segregated within the room using barriers and colour coded bins.

Minimum GFA required: 95 m^2

3. Space for waste not suitable for bins (i.e. bulky or electronic waste)

In any new development with a waste storage room, an additional dedicated space (such as a room or screened area), is to be provided in close proximity to the waste storage room for the interim storage and management of bulky waste, mattresses, electronic goods, batteries, computers, televisions, and fluorescent bulbs or tubes. A caged section must be provided for gas bottle disposal.

This room will provide a central storage area for these items from the residential areas of Building R4B.

Total GFA required: 24 m^2

7 Retail waste storage facilities

The main waste facilities for **retail waste** are outlined in detail below.

These figures are based on initial estimates and are subject to change as the design of the development progresses.

In addition, the specific retail tenancy has not yet been determined. As such, this space has conservatively been attributed to café / food and beverage for the purpose of waste generation estimates. This is also subject to change as the design progresses.

The location of relevant waste storage areas are provided in the basement plan provided as Appendix A to this WMP.

7.1 Waste storage

Storage provision for retail waste is as follows:

1. R4B retail waste storage room

This room will receive waste from retail areas of R4B via manual handling of bins from individual tenancies and use of a goods lift. Waste will be stored in the retail waste storage room prior to collection. It will host:

- General waste: 3 x 660L bins;
- Organic waste: 1 x 240L bin;
- Co-mingled recycling: 3 x 240L bins;
- Paper and card recycling: 1 x 660L bin; and
- Cardboard baler.

GFA required: 17 m^2

2. Space for waste not suitable for bins (i.e. bulky or electronic waste)

In any new development with a waste storage room, an additional dedicated space (such as a room or screened area), is to be provided in close proximity to the waste storage room for the interim storage and management of bulky waste, mattresses, electronic goods, batteries, computers, televisions, and fluorescent bulbs or tubes. A caged section must be provided for gas bottle disposal.

This room will provide a central storage area for these items from the commercial (retail) areas of Building R4B.

Total GFA required: 4 m^2

8 Waste storage design

8.1 Signage

Recyclables and general waste will be stored in colour coded bins to ensure waste streams are not inadvertently mixed. All waste storage areas and bins will be provided with clear labels and directions for use in order to maximise appropriate separation of waste streams.

8.2 General waste facilities design

All waste storage rooms will be designed according to the provisions stipulated by the CoS Waste Guidelines. Provisions for this development are outlined in Table 5.

Waste vehicles accessing the site loading dock (located within the Stage 1B basement) will have unimpeded access via Globe Street.

The distance between the central waste storage rooms and their respective collection points will not exceed 20 m.

Table 5: Waste storage design

Design aspect	Design provision
Surfaces	The floors, walls and ceilings of waste and recycling storage areas (room or bin bays) and chute room(s) must be finished with a rigid, smooth-faced impermeable material capable of being easily cleaned. The floors of waste and recycling storage areas (room or bin bays) must be graded and drained to drainage fitting approved by Sydney Water located in the room(s). The floor must be provided with a ramp to the doorway where necessary.
Structure	The walls, ceilings and floors of the storage rooms will be finished with a light colour. The walls of the waste storage rooms will be constructed of approved solid impervious material and will be cement rendered internally to a smooth even surface coved at all intersections. The storage area will be constructed and finished to prevent absorption of liquids and odours, and will be easily cleanable.
Doors	A close-fitting and self-closing door or gate operable from within the room must be fitted to all waste and recycling storage areas (rooms or bin bays). Doors/gates to the waste storage rooms must provide a minimum clearance of 900mm. At least one door or gate to the waste and recycling storage area must have sufficient dimensions to allow the entry and exit of waste containers of a capacity nominated for the development. Lightweight roller shutter-type doors or grilles should be considered for access to waste and recycling storage areas, as these do not impact on the available storage space. If these types of doors or grilles are used, the requirement for a close-fitting and self-closing door (see RB3) remains, so that waste collectors can access the waste storage area other than through the roller door or grille. The design shall restrict the entry of trespassers, vermin or other animals into the area.
Water	The waste and recycling storage area (room or bin bay) must be provided with an adequate supply of water for cleaning purposes with a hose cock. This does not include within chute rooms.

Design aspect	Design provision
Lighting	Waste and recycling rooms must be provided with artificial light controlled by switches located both outside and inside the room.
Pest control	The waste storage rooms, areas and containers will be constructed in a manner as to prevent the entry of vermin.
Ventilation	The waste and recycling storage area must be adequately ventilated by either: • Natural ventilation openings to external air. The dimension of the openings must not be less than 5 per cent of the bin bay or bin room floor area; or • A mechanical exhaust ventilation system in accordance with relevant Australian standards.
Safety	Any compactors or mechanical devices, if permitted for the mechanical handling and storage of waste, must be fitted with safety operating and cut-off systems. Smoke detectors will be fitted in accordance with AS1670 Automatic Fire Detection and Alarm Systems and connected to the fire prevention system of the building. The waste compactors will be fully fire proofed and child proofed. Only trained building management and waste contracting staff will have access to compactor equipment. All equipment will be protected from theft and vandalism.
Signage	Signs will be provided to demonstrate how to use the waste management system (including segregation of wastes for recycling, use of waste compactor), as well as appropriate safety signage. The different recycling and waste bins will be clearly identified and signed appropriately.
Refrigeration	In some instances, Council may require that waste storage be refrigerated. This is likely if large quantities of food waste are generated on site and waste removal from this site is difficult due to its location or long trading hours. Where a waste room is refrigerated, the temperature must be maintained at or below 5°C with all refrigeration equipment installed with sufficient space for cleaning.
General	All waste management facilities will be compliant with the Building Code of Australia (BCA) and all relevant Australian Standards. Any facet of the waste management system that is visible from outside the building must be in keeping with the dominant design of the remainder of the development.

8.3 Waste chute

General waste and recycling waste from residential floors will be transferred to the residential garbage room via a dual system waste chute system.

On each residential floor, the waste chute will be accessed by a dedicated compartment. The waste chutes will be loaded by residents using a hand-loading door. Signage will be positioned on each chute to ensure appropriate use.

A separate recyclables and waste loading space will also be provided on each residential floor.

A summary of waste chute design specifications are also provided below in Table 6. These are drawn from the CoS Waste Guidelines and additional technical specifications.

Table 6: Waste chute design

Design aspect	Design provision
Chute	Chutes, service openings and inlet hoppers must be constructed of metal or other smooth-faced, durable, fire-resistant and impervious material of a non-corrosive nature, capable of being easily cleaned. Chutes must be cylindrical in cross-section and the internal diameter must be a minimum 500 mm and adequate for material being deposited. Chutes must be vertical without bends or "off-sets" and not reduce in diameter over the fall. Inlet hoppers must be capable of delivering the waste to the chute without using force. Chutes must terminate in the central waste and recycling storage area and discharge the waste directly into a storage container or waste compactor in a manner that avoids spillage and overflow. A cut-off must be provided at or near the base of the chute to effectively close off the chute while the storage container or compacting device is withdrawn. If the terminating end of the waste chute is to discharge into a compactor or skip at an angle, this angle shall not exceed 45º for a general waste chute.
Inlet hoppers	Inlet hoppers must:: • Be designed to close off the service opening in the chute when the device is opened for loading; • Automatically return to the closed position after use; • Permit free flow of waste into the chute; • Not project into the chute; • Permit easy cleaning of the device and connection between the service opening and the chute; • Be not less than one metre (1 m) or more than one and one-half metres (1.5 m) above floor level.
Chute rooms	Chute rooms must: • Be provided in convenient, well lighted and ventilated positions; • Provide space for recycling containers for intermediate storage of recyclables (allowing for at least one 240L MGB for each six (6) residences serviced by that chute room); • Prove access for all persons in accordance with Council's *Access Policy*. Chute rooms must allow for sufficient space to permit easy opening of the inlet hopper, opening of the chute room door and the storage and manoeuvring of the recycling bin(s); • Not be adjacent to a habitable room.
General	The floor below each charging device and service opening must be finished with a smooth impervious material with a minimum area of not less than one square metre (1 m^2) situated centrally below the inlet hopper. The chute, charging device and service opening will be capable of being easily cleaned. Chutes must be ventilated to ensure that air does not flow from the chute through any service opening.

9 Waste management

9.1 Waste management responsibilities

The major responsibilities associated with waste management are outlined below in Table 7. These responsibilities are separate for residential and retail areas of the building.

All contracts with building managers, tenants and cleaners will clearly outline the waste management and collection system, and will clearly allocate waste management responsibilities.

Table 7: Waste management responsibilities

	Task	Responsibility
WASTE STORAGE AREAS	Cleaning of temporary and central waste storage areas, service lifts, transfer areas and collection areas.	Building management
	Removal of retail waste and recycling to the designated bins in the Retail Waste Storage Room (Basement 1).	Retail tenants
WASTE COMPACTION	Safety training for appropriate staff for use of waste compaction equipment.	Building management
	Procurement of servicing of waste compactor equipment to a frequency specified by the equipment manufacturer.	Building management
	Regular cleaning and servicing of waste compaction equipment.	Building management
SIGNAGE	Provision of signage in all communal waste collection and storage areas to demonstrate how to use the waste management system, and what materials are acceptable in recycling bins and chutes.	Building management
	Provision of prominently displayed signage identifying: • Waste and recycling storage areas; • Waste and recycling compartments	Building management
	Clear warning / safety signage for compactor equipment and general restriction of access to compactor rooms	Building management
	Provision of clear labels on all waste and recycling receptacles to identify which materials may be placed in which bin / chute.	Building management
WASTE COLLECTION	Transfer of residential bins between the central waste storage areas and loading dock / vehicle.	Building management
	Transfer of retail bins between the central waste storage area and loading dock / vehicle.	Waste contractor
	Return of waste bins to their appropriate storage areas after emptying into waste collection truck in the loading dock.	Building management

9.2 Logistical considerations

Particular considerations for management of different waste streams are summarised below in Table 8.

Table 8: Waste stream management considerations

Waste Stream	Source	Management considerations
Landfill waste	Residential	General waste will be transferred from the upper levels to basement 1 residential compactor rooms via the dual system residential waste chute. The waste bins will then be moved from the central storage room to the bin collection area in the loading dock by building management to await collection. The bins will be returned to the central storage room once empty by building management. Due to the size and weight of the bins containing compacted waste, a bin tug may be employed for this purpose.
	Retail	Landfill waste will be transferred from retail tenancies (Building R4B) to bins in the basement waste storage room via manual handling and goods lifts. Bins will be transferred directly to the loading dock and waste collection truck by waste collection contractors. Once emptied, the contractor will then return the bins to the central storage room.
Organic ('wet') waste	Residential	Residents will have access (if they desire) to on-site composting facilities or a collection service for organic waste. The location of any composting equipment is to be resolved in detailed design.
	Retail	Organic waste generated by tenants may be collected in dedicated 240L organic waste bins and transferred to the central waste storage room in basement 1 for collection. Bins will be transferred directly to the loading dock and waste collection truck by waste collection contractors. Once emptied, the contractor will then return the bins to the central storage room.
Co-mingle recycling	Residential	Co-mingle waste will be transferred from the upper levels to basement 1 residential compactor rooms via the dual system residential waste chute. The bins will then be moved from the central storage room to the bin collection area in the loading dock by building management to await collection. The bins will be returned to the central storage room once empty by building management.
	Retail	Co-mingle waste will be manually transferred by commercial tenants to bins in the central waste storage room in basement 1 to await collection. Bins will be transferred directly to the loading dock and waste collection truck by waste collection contractors. Once emptied, the contractor will then return the bins to the central storage room.
Cardboard and paper recycling	Retail	Cardboard and paper recycling will be collected separately wherever possible and transferred to the cardboard baler in the central retail waste room. Cardboard baling equipment will be utilised only by trained staff members.

Waste Stream	Source	Management considerations
Electronic waste	Residential	Residents will be offered access to electronic waste receptacles in common areas. Electronic waste will then be transferred to a receptacle within the Main Garbage Room area by building management. Larger electronic waste, such as televisions and other equipment, will be collected by building management and placed in in the residential bulky goods storage room and scheduled for collection.
	Retail	Small electronic waste will be transferred by commercial tenants to a receptacle within the commercial central waste storage area. Larger electronic waste, such as televisions and other equipment, will be transferred to the retail bulky goods storage room and scheduled for collection.
Hard rubbish	Residential	Hard rubbish is to be moved by building management to the residential bulky goods storage room. Building management will then schedule collection as necessary.
	Retail	Hard rubbish is to be moved by retail tenants to the retail bulky goods storage room. Building management/ retail tenants will then schedule collection as necessary.

9.3 Waste compaction

The proposed waste compaction equipment for general residential waste in Building R4B consists of the following;

- 4 x 660L rotary compactor for residential general waste.

The compactor equipment will only be accessed by specified building management staff with suitable training and safety induction. All necessary safety induction training, childproofing and safety signage for access and use of the compactor equipment will be provided by building management.

All compactor equipment will be located in a locked and secured area, to be accessible only by trained management staff and licenced contractors.

The waste compactors will be serviced as necessary, to a schedule determined by the equipment manufacturer.

10 Waste collection

10.1 Waste collection frequency

Waste collection frequencies are summarised below in Table 9 (residential waste) and Table 10 (retail waste).

Waste collection services for each waste stream will be provided by appropriate licenced contractors. Written evidence will be provided and held on site at all times of a valid and current contractor with a licenced collector for waste and recycling collection and disposal.

For the purposes of this assessment, waste & recyclables collection has been assumed to be by an approved waste manager/operator (operating under a precinct waste management agreement).

Waste collection arrangements for the proposed development are described below.

Commercial (retail) areas are assumed to be in operation five days per week.

Table 9: Waste collection summary: residential waste

Waste Stream	Collection Frequency	Licenced Collector
General waste	3 x per week (every 2-3 days)	Approved operator
Co-mingle recycling	2 x per week (every 3-4 days)	Approved operator
Electronic waste	Collection monthly or as necessary	E-waste collector
Hard rubbish	Collection scheduled as necessary	Approved operator

Table 10: Waste collection summary: retail waste

Waste Stream	Collection Frequency	Licenced Collector
General waste	3 x per week (every 1-2 days)	Private contractor
Organic waste	5 x per week	Private contractor
Cardboard/ paper recycling	3 x per week (every 1-2 days)	Private contractor
Co-mingle recycling	3 x per week (every 1-2 days)	Private contractor
Electronic waste	Collection scheduled as necessary	E-waste collector
Hard rubbish	Collection scheduled as necessary	Approved operator

10.2 Waste contractor vehicle access

The route for Council waste collection and private waste contractor access to the loading dock is from Globe Street. Access will at no time cause the flow of traffic on Globe Street to be blocked.

The waste collection vehicle will collect bins directly from the bin holding area in the loading dock.

Vehicle access to the basement has been designed according to a waste collection vehicle with specifications summarised below:

- The gradient of the driveway should be in accordance with AS/NZ 2890.1.2004 Section 2.5.3 or a succeeding equivalent standard.
- A minimum vertical clearance of 3.8 metres, including clearances of all service ducts, pipe work and similar fittings;
- A minimum width of driveway of 3.6 metres; and
- A minimum radius turning circle of 10.5 metres or provision for changing the facing direction of a waste or recycling collection vehicle.

10.3 Amenity

The management systems and constructed elements of this development will be designed and installed so as to enhance outcomes for building amenity. Any potential for noise and odour to arise will be minimised. Specifically:

- **Visual aspects:** The waste management and central storage areas will not be visible from the exterior of the building.
- **Noise:** significant noise-generating waste management equipment will not be utilised in this development. The compactor equipment utilised will generate minimal noise, and will be located in an area containing adequate acoustic insulation. Production of ‘offensive noise,’ as defined under the *Protection of the Environment Operations Act 1997*, will be avoided.
- **Odour**: Any putrescible waste awaiting collection will be stored in a Council approved container with permanently tight fitting lids and smooth, washable internal surfaces. All waste storage areas will be fitted with mechanical vertical ventilation systems. General and organic waste will be collected daily, which will minimise putrescence. Adequate mechanical ventilation and regular collection of waste will eliminate the risk of odour to building inhabitants and neighbours.

11 Next steps

This WMP forms a framework to implement best practice for waste management across all design and planning stages. The waste management approach supports the Green Star requirement for the project to enhance outcomes for waste minimisation, reuse and recycling.

If planning approval is granted for the proposed development, this WMP will:

1. Inform the development of a detailed Waste Policy Design Compliance Certificate for the Construction Certificate application, which is to include details regarding disposal and recycling of different materials expected from demolition, construction, and the transport and destinations of these materials;
2. Inform the development of a building user guide (MAN-5), waste auditor report (MAT-1), and Construction Waste Management Plan (MAN-7) associated with a future Green Star submission;
3. Ensure that detailed design and fit-out of the building is consistent with best practice standards and plans for waste management, and
4. Inform all plans and procedures for operational waste management.

Appendix B

Details of waste management form - Construction

B1 Details of waste management form - construction phase

CITY OF SYDNEY WASTE MANAGEMENT PLAN

A. Construction

Site Address	DA Number

Will you use Site Cleaners?	☐ Yes, for some work or ☐ Yes, for all work or ☐ No	Estimated total volume or weight	_____
Please supply details of site cleaners used	ABN Number_____ Name_____ Phone_____Mobile_____		

If using site cleaners for ALL work, please STOP here. DO NOT continue to complete form. SIGN declaration.

All Excavation Material (including from Swimming Pools excavation)	☐ Less than 10 m^3 ☐ More than 10 m^3	☐ Re-use on-site ☐ Re-use off site ☐ Landfill Disposal

Address if re-used off site _____

Name and Address of licensed landfill _____

Type of Material	Less than 10 m^3	More than 10 m^3	How will you manage this waste?		
			Re-use on-site	Recycle	Landfill
Bricks/concrete	☐	☐	☐	☐	☐
Tiles & stone	☐	☐	☐	☐	☐
Timber (clean) Timber (treated)	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Plasterboard	☐	☐	☐	☐	☐
Glass	☐	☐	☐	☐	☐
Ceiling tiles (acoustical ceiling panels) Tin ceiling tile Cork ceiling tile	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
Metals	☐	☐	☐	☐	☐
Carpet (broadloom) Carpet tiles	☐ ☐	☐ ☐	☐ ☐	☐ ☐	☐ ☐
Furniture (workstations/desks/tables) Office chairs Other (eg; pot plants/stools)	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐	☐ ☐ ☐
e-waste	☐	☐	☐	☐	☐
			How will you manage this waste?		

			Re-use on-site	Recycle	Landfill
Hazardous waste (eg asbestos)	☐	☐	☐	☐	☐
Green Waste	☐	☐	☐	☐	☐
Other (<5% of total material)	☐	☐	☐	☐	☐

Principal Off-Site Recycler	Principal Licensed Landfill Site
_____	_____
_____	_____
_____	_____

Declaration

Name of applicant (Please Print) _____

Signature of applicant _____ **Date**_____