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FORESIGHT
ENVIRONMENTAL

Macquarie Centre Redevelopment

Stage 1 Concept DA
Waste Management Plan
Issue 3

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Issue	Date	Consultant/s	Major Revisions
1	9/11/2015	Patrick Arnold Scott Ebsary	Initial draft issue - Overview of waste spatial requirements
2	19/11/2015	Patrick Arnold Scott Ebsary	Waste management plan ready for DA review
3	30/11/2015	Patrick Arnold Scott Ebsary	Title change and updated figures based on drawings issued 26/11/2015
4	10/12/2015	Patrick Arnold Scott Ebsary	Update of introduction

For additional information about this document contact the consultants listed above or email us at info@foresightenvironmental.com

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1. Introduction

1.1 Background

This report has been prepared on behalf of AMP Capital (AMPC) in support of a Stage 1 Development Application (DA) for the mixed use redevelopment of Macquarie Shopping Centre (Macquarie Centre). The Stage 1 DA seeks concept approval for the redevelopment of Macquarie Centre by establishing:

- Building envelopes and design parameters for future development on the site, including the proposed uses within the podium and tower components.
- The distribution of floor space across the site.
- Future pedestrian and vehicle connections to and within the site.

This report supports the proposed future redevelopment of the Macquarie Centre in relation to site waste management.

1.2 Site Description

Macquarie Centre is approximately 11.25 hectares in area and is located at the corner of Waterloo Road, Herring Road and Talavera Road, Macquarie Park. The site is legally described as Lot 100 in DP 1190494.

The site is bound by Herring Road to the north west, Talavera Road to the north east, commercial uses to the south east and Waterloo Road to the south west. Located within the Macquarie Park Corridor, the site has excellent access to public transport, situated immediately adjacent the Macquarie University Railway Station and the Herring Road Bus Station. Located between the M2 Hills Motorway and Epping Road, the site also enjoys excellent vehicle connectivity.

Macquarie Centre was originally constructed in 1981. The centre has undergone various stages of redevelopment and extensions. A major refurbishment occurred in 2000, 2003 and most recently in 2014, creating a fresh food court, David Jones expansion, addition of second full line supermarket (Coles), a value supermarket (Aldi), with new speciality food and convenience stores. Today Macquarie Centre is the largest shopping centre in NSW and the 8th largest shopping centre in Australia and includes a wide range of retail, entertainment and service offerings.

The shopping centre currently spans five levels accommodating 368 stores, including major retailers such as David Jones, Myer, Target, Big W, Aldi, Coles and Woolworths. The centre also houses a large number of mini major international retail stores including H&M, Zara, Uniqlo, Forever 21, GAP and Sephora. A number of entertainment offerings exist in the centre including a cinema complex and ice skating rink. The site currently has a gross floor area of 170,850m² and accommodates 4,755 car spaces.

1.3 Development Proposal

The Stage 1 DA seeks concept approval for the mixed use redevelopment of Macquarie Centre under s.83B of the Environmental Planning & Assessment Act 1979.

The first stage will seek concept approval only for:

- Mixed use development to enable a range of land uses. The final mix of land uses will be subject to and determined under the relevant Stage 2 detailed DAs.
- Building envelopes for the proposed basement, expanded podium and tower forms.
- The four tower envelopes fronting Herring Road will have maximum heights ranging from 90m and 120m above existing ground level. The building envelope for Tower 1 is of sufficient dimensions to accommodate alternate tower forms.
- Maximum additional gross floor area (GFA) of 148,000sqm.
- The new retail podium along Herring Road will replace the existing structure. This will provide an active frontage with separate pedestrian entries to Herring Road and the creation of a vibrant atrium space.
- The creation of 'Station Plaza' between the train station and shopping centre, framed by active uses and a landmark building known as the "Shard".
- The building envelopes for the proposed basement and upper levels of the expanded podium will accommodate a maximum of 2,175 additional car spaces.
- New vehicle and pedestrian access points.

The Stage 1 DA does not seek approval for

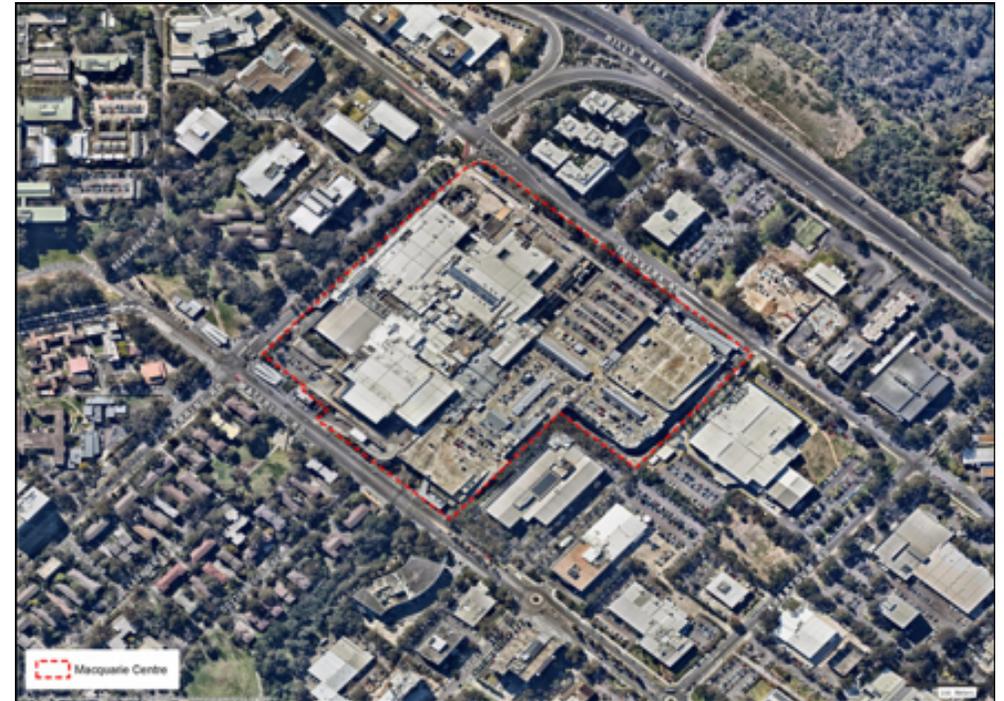
- Any works, including demolition, excavation, construction and public domain improvements.
- The final arrangement of land uses.
- Layout, mix and number of residential units.
- A specific number of car spaces (as this will be determined having regard to the final mix of land uses).
- The design of the building exteriors including facades and roofs.
- Public domain and landscape design.
- Such approvals will be sought via subsequent development applications following receipt of development consent for the Stage 1 DA.

The overview of the indicative mix of land uses within the proposed building envelopes is identified in Table 1 below.

Table 1 – Overview of indicative mix of land uses

COMPONENT	PROPOSED
Basement	Loading docks, car parking and associated vehicle circulation, waste rooms, utilities, future connection to existing train station (subject to consent from RailCorp) and retail premises.
Podium	Retail premises, commercial premises, food and drink premises, entertainment facilities, recreation facilities (indoor), recreation area, car parking and associated vehicle circulation, community uses (subject to further discussions with Council) and communal open space associated with the towers.
Tower 1	Mixed use development comprising commercial premises and/or residential accommodation and/or serviced apartments above a retail podium.
Towers 2, 3 and 4	Mixed use development comprising residential accommodation and/or serviced apartments above a retail podium.

Figure 1 – Aerial Photograph



2. Assumptions

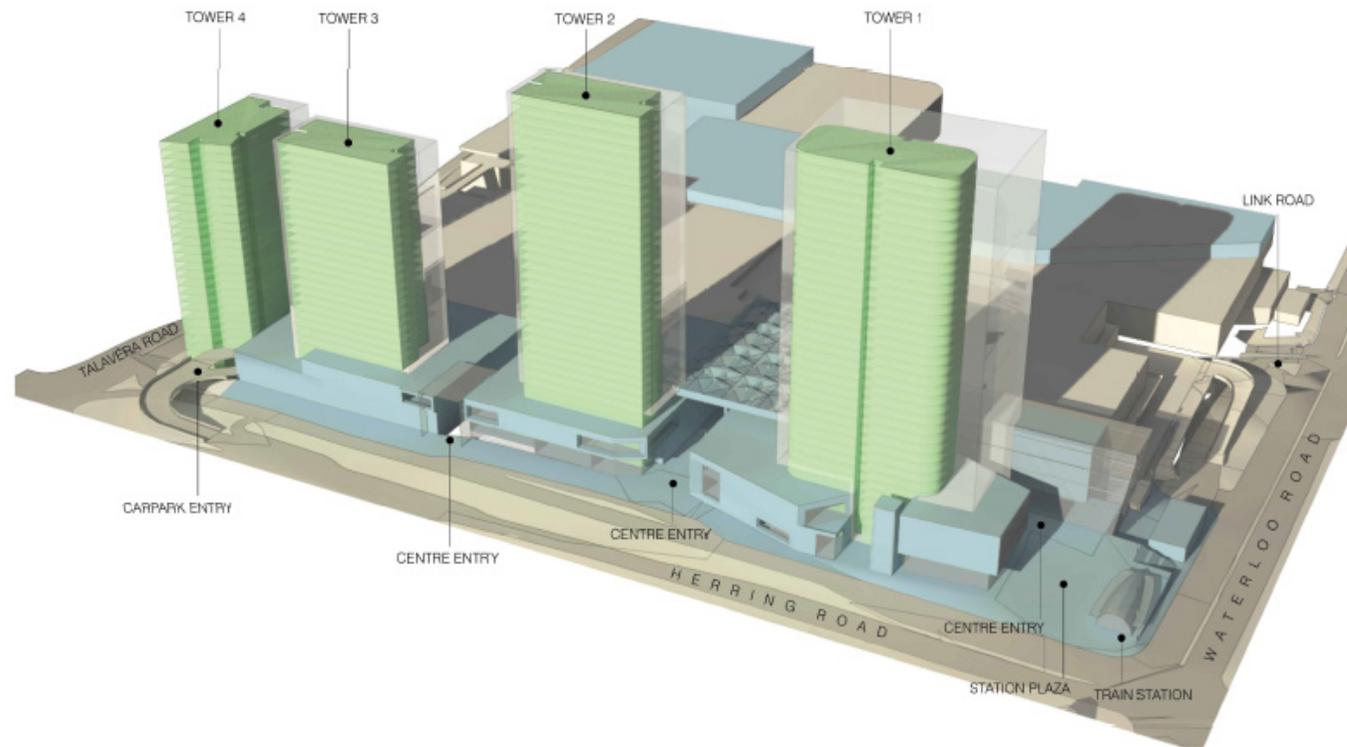
2.1 Development Size

This document has been produced to address two development scenarios. The first scenario is based on four residential towers, the second is based on one commercial and three residential towers. Both scenarios will include an additional retail component. Tower 2 and 3 will share a dock while Tower 1 and 4 will have their own dedicated dock.

2.2 Generation & Composition

Residential waste generation is based on the City of Ryde S7.2 Schedule 2 where it recommends 120L/unit/week for General Waste and Recycling. It should be noted that the 660L/15units and 1100/25 units equates to 44L/unit which is below the recommendation of the “Better Practice Guide for Waste Management in Multi-Unit Dwellings” of 120L/week for general waste. No assumption has been made on segregation of mixed recyclables and paper/cardboard. The “Better Practice Guide for Waste Management in Multi-Unit Dwellings” assumes a 40/60 split between mixed recycling and paper/cardboard. This has also been assumed within these calculations in order to improve efficiency of equipment used.

Commercial and retail waste generation has been calculated based on Foresight Environmental’s theoretical modeling. This model is based on the waste generation and composition of previous physical audits of similar properties.



3. Waste Generation & Storage Areas

Based on the information provided, benchmark data from similar developments and City of Sydney guidelines, the primary waste streams are expected to be generated in the ongoing operation of the following land use:

Residential

- General Waste
- Cardboard and Paper Recycling
- Mixed Recycling (plastics, glass, aluminium, steel)
- Bulky Waste (Residential only - mattresses, white goods, etc.)

Commercial

- General Waste
- Cardboard and Paper Recycling
- Mixed Recycling (plastics, glass, aluminium, steel)
- Ad Hoc Streams - Toner cartridges, Batteries & E-waste

Retail

- General Waste
- Cardboard and Paper Recycling
- Mixed Recycling (plastics, glass, aluminium, steel)
- Food Waste
- Plastic (soft plastic and polystyrene)
- Cooking Oil

All waste storage areas in this document will have the following features:

- Ventilation: The bin storage room will be ventilated to external air or mechanically exhausted in accordance with AS 1668.2-2002
- Vermin Prevention:
 - The bin storage room will feature tightly fitted doors
 - Opening will be vermin proof
 - Cleaners are to ensure that bin lids are closed when unattended
- Noise: Noise will not be an issue due to the location of the waste storage room away from public.
- Floor: Structural concrete slab with smooth epoxy topping finish with coved wall and floor junctions. Graded drains to approved sewer connections – fitted with an in-floor dry basket arrestor approved by Sydney Water Corporation.
- Walls: Brick work/concrete block or similar finished in a light coloured, washable paint
- Ceiling: Structural concrete slab over
- Lighting: Base building lighting with switches inside and outside waste room (sensors may also be used)
- Water Supply: hot and cold tap and hose connection
- Signage: clear signage identifying the various streams and appropriate use will be prominently displayed (see section on signage)
- Access to a flat dock area for easy handling and decanting of Mobile Garbage Bins
- All collection points should have a clearance of greater than 3.5m. Waste storage areas with compactors require a clearance of 5m or greater.

The ongoing maintenance and up-keep of the waste storage room will be the responsibility of cleaning staff. They will be tasked with ensuring bins are stored neatly and are cleaned as required.

3.1 Legend

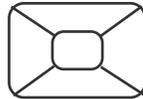
Colour Coding

General Waste/ Landfill
Paper/Cardboard
Mixed Recycling/Comingled
Food Waste
Plastics
Cooking Oil

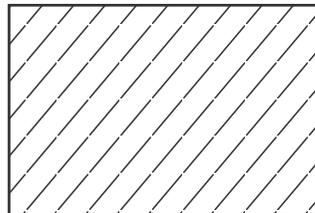
Equipment



Mobile Garbage Bin (MGB) - 120/240 Litres



Mobile Garbage Bin (MGB) - 660/1100 Litres



Caged Area



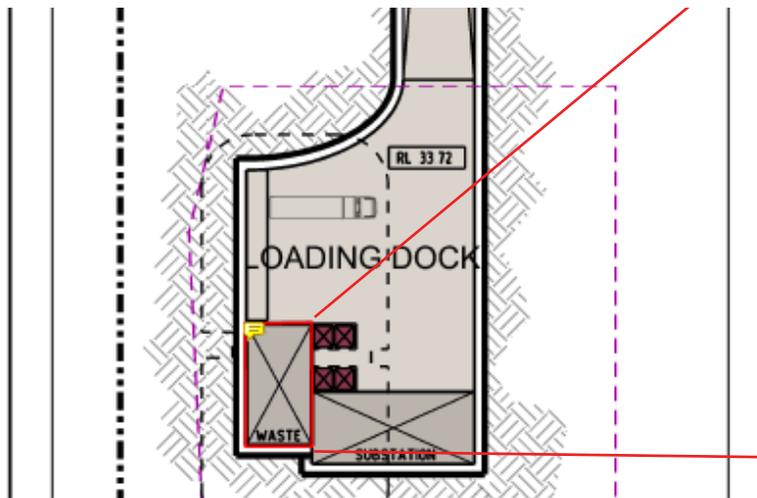
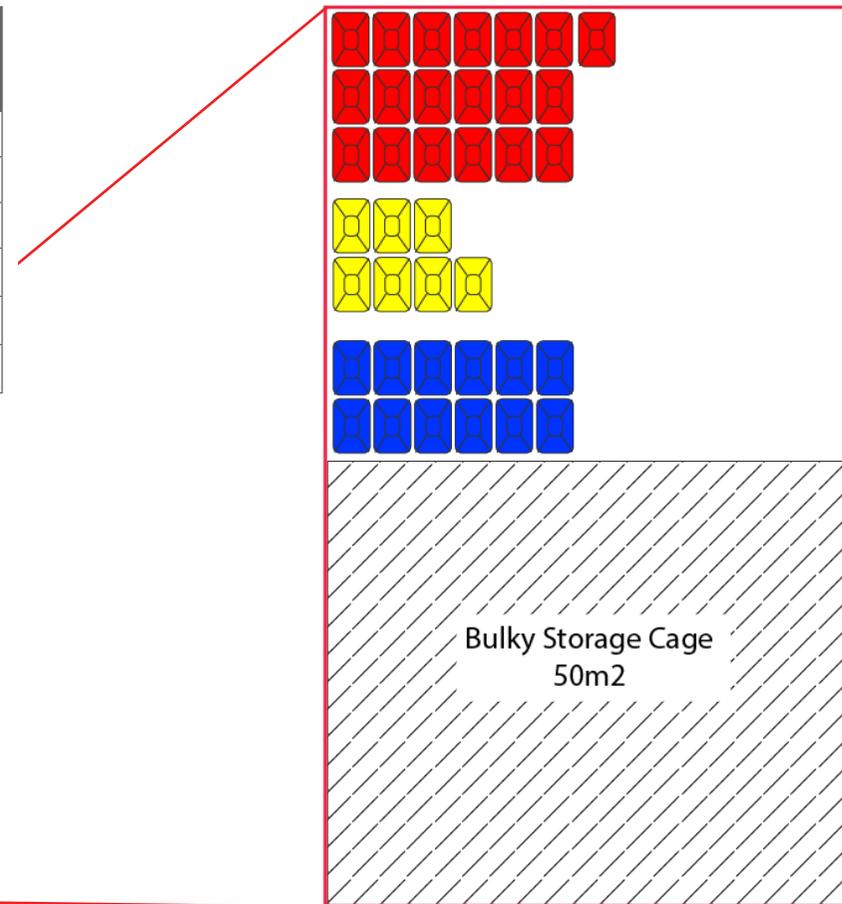
Compactor Unit

3.2 Tower 1 Waste Storage Area - Option 1 (Residential Use)

The following layout has been provided as a worst-case scenario during full occupancy. This layout will also suffice if the tower were to be used as serviced apartments and/or student accommodation as these types of dwellings are expected to generate less waste than conventional residential dwellings. Equipment numbers and collection frequency can be reduced by a factor of 2-3 if a compaction unit is used in conjunction with a chute system.

Table 2 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Frequency/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	2,520	36,000	MGB	660L	3	19	37,620 (L)	19.90
Paper/Cardboard	1,350	22,500	MGB	660L	3	12	23,760 (L)	12.57
Mixed Recycling	810	13,500	MGB	660L	3	7	13,860 (L)	7.33
TOTAL	4,680	72,000				36		39.79
Additional 50% for manoeuvring								59.69
Additional 50m2 for bulky good waste								109.69

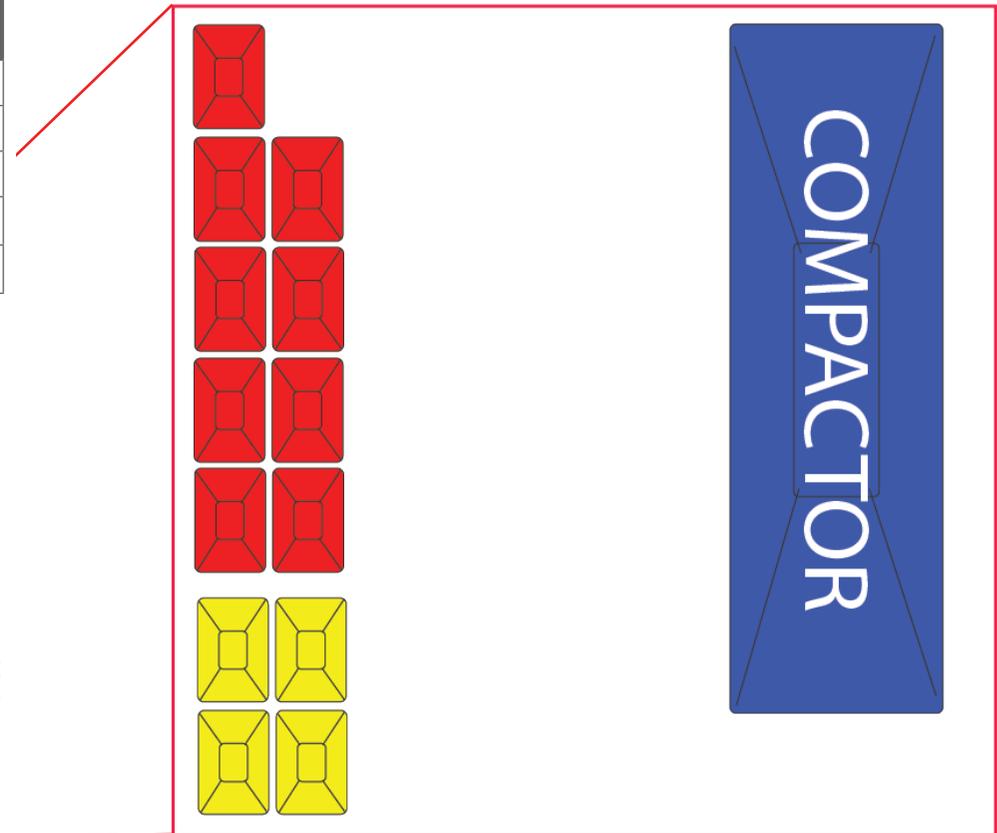
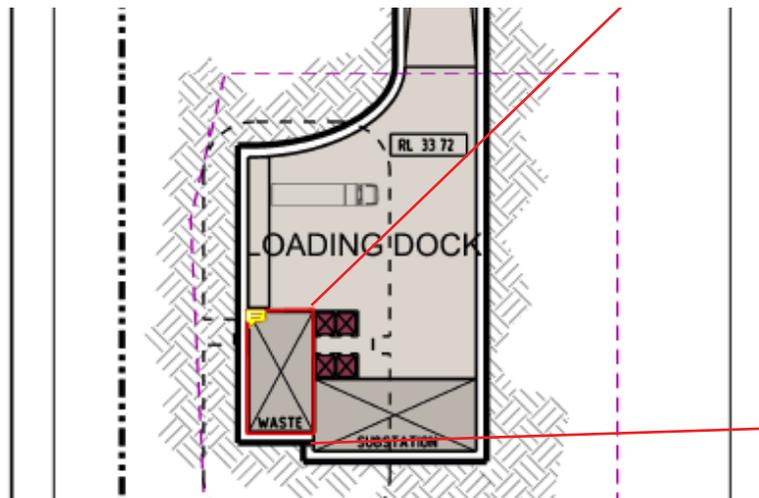


3.3 Tower 1 Waste Storage Area - Option 2 (Commercial Use)

The following is an alternative layout for the Tower 1 Dock should the building be built for commercial application. A higher volume of paper/cardboard will be generated with this tenancy mix and the use of a compactor to collect this material stream.

Table 3 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Freq/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	2,409	18,354	MGB	660L	3	10	19,800 (L)	10.47
Paper/Cardboard	7,127	105,720	Compactor	23m3	2	1	9,000 (kg)	16.17
Mixed Recycling	502	8,365	MGB	660L	3	5	9,900 (L)	5.24
TOTAL	10,038	132,439				16		31.87
Additional 50% for manoeuvring								47.81

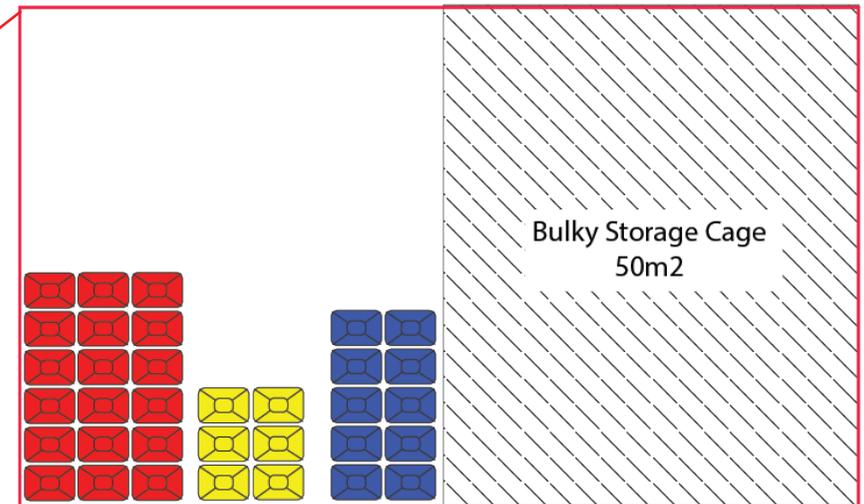


3.4 Tower 2 Waste Storage Area (Residential Use)

The following layout has been provided as a worst-case scenario during full occupancy. This layout will also suffice if the tower were to be used as serviced apartments and/or student accommodation as these types of dwellings are expected to generate less waste than conventional residential dwellings. Equipment numbers and collection frequency can be reduced by a factor of 2-3 if a compaction unit is used in conjunction with a chute system.

Table 4 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Frequency/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	2,117	30,240	MGB	660L	3	16	31,680 (L)	16.76
Paper/Cardboard	1,134	18,900	MGB	660L	3	10	19,800 (L)	10.47
Mixed Recycling	680	11,340	MGB	660L	3	6	11,880 (L)	6.28
TOTAL	3,931	60,480				32		33.51
Additional 50% for manoeuvring								50.27
Additional 50m2 for bulky good waste								100.27

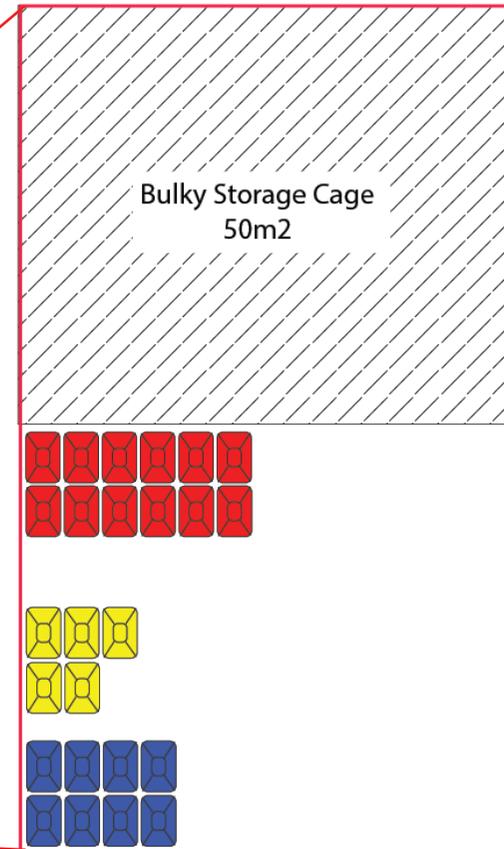
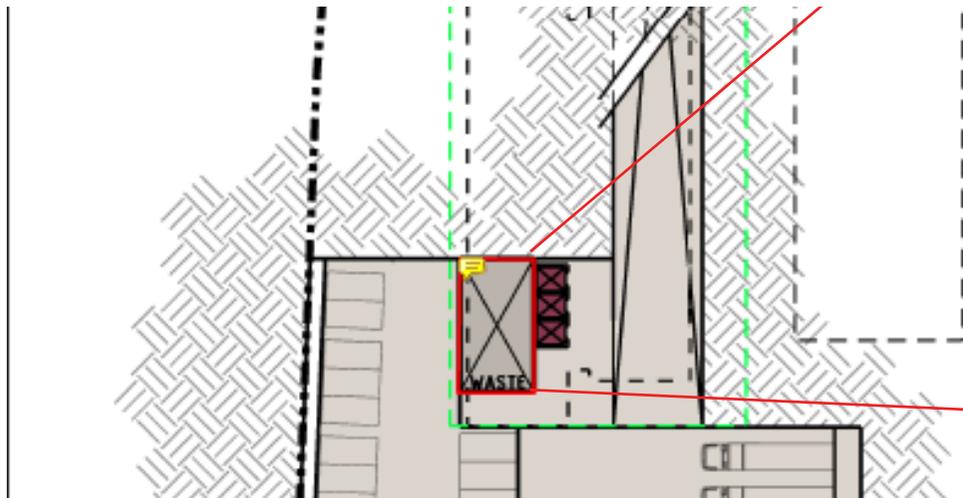


3.5 Tower 3 Waste Storage Area (Residential Use)

The following layout has been provided as a worst-case scenario during full occupancy. This layout will also suffice if the tower were to be used as serviced apartments and/or student accommodation as these types of dwellings are expected to generate less waste than conventional residential dwellings. Equipment numbers and collection frequency can be reduced by a factor of 2-3 if a compaction unit is used in conjunction with a chute system.

Table 5 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Frequency/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	1,154	22,200	MGB	660L	3	12	23,760 (L)	12.57
Paper/Cardboard	833	13,875	MGB	660L	3	8	15,840 (L)	8.38
Mixed Recycling	500	8,325	MGB	660L	3	5	9,900 (L)	5.24
TOTAL	2,886	44,400				25		26.18
Additional 50% for manoeuvring								39.27
Additional 50m2 for bulky good waste								89.27



3.6 Retail Only Waste Storage Area

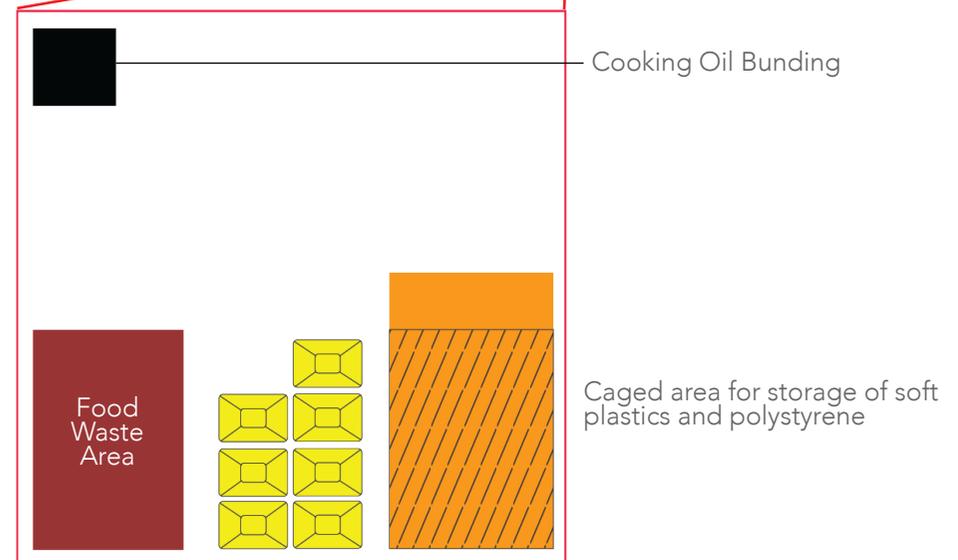
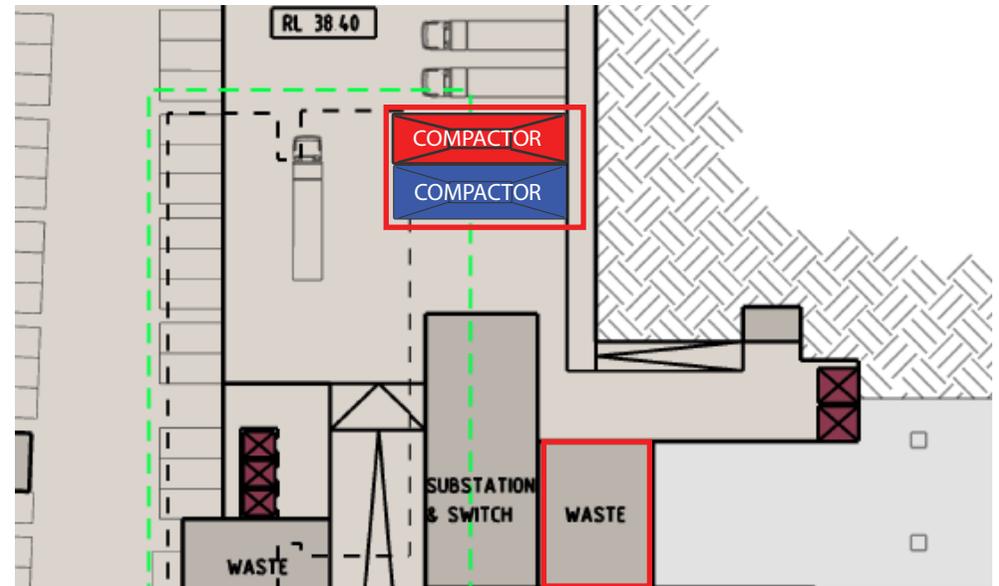
This waste area will require two loading bays for a general waste and paper/cardboard compactor. To maximise diversion of recyclable materials, the compactors will be adjacent to the waste storage room where additional recycling streams will be captured.

An organics unit, Pulpmaster, has been detailed due to the high volumes of food waste expected to be generated by the food retailers.

A soft plastics baler unit has been detailed due to the high volumes of soft plastics expected to be generated by fashion retailers.

Table 6 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Freq/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	9,010	128,712	Compactor	23m3	1	1	9,375 (kg)	16.17
Paper/Cardboard	10,317	174,962	Compactor	23m3	2	1	11,250 (kg)	16.17
Mixed Recycling	1,363	22,714	MGB	660L	5	7	23,100 (L)	7.33
Food Waste	6,867	19,621	Pulpmaster	4000L Tank	24	1	8,000 (kg)	11.66
Polystyrene	470	23,513	Cage	20m3	1	1	25,000 (L)	10.00
Soft Plastics	1,037	29,640	Miltech Baler	306HD	3	1	1,250 (kg)	0.65
TOTAL	29,065	399,162						61.97
Additional 50% for manoeuvring (not including compactors)								44.45

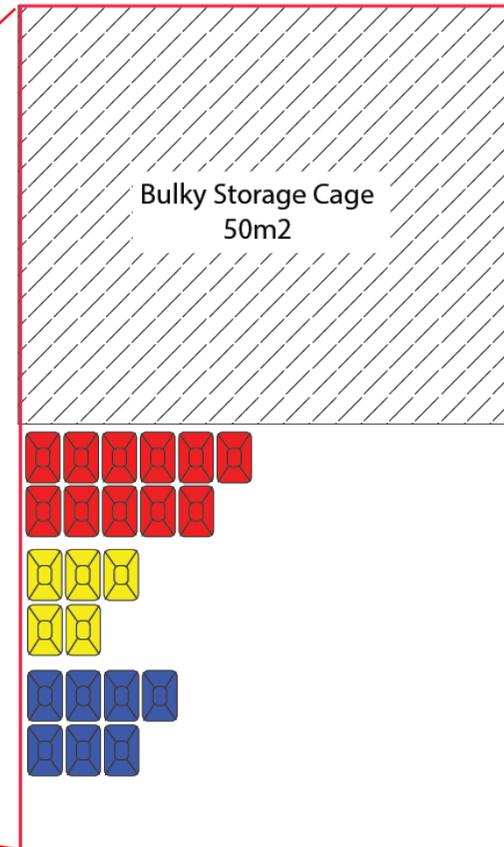


3.7 Tower 4 Waste Storage Area (Residential Use)

The following layout has been provided as a worst-case scenario during full occupancy. This layout will also suffice if the tower were to be used as serviced apartments and/or student accommodation as these types of dwellings are expected to generate less waste than conventional residential dwellings. Equipment numbers and collection frequency can be reduced by a factor of 2-3 if a compaction unit is used in conjunction with a chute system.

Table 7 – Generation rate and equipment proposal

Material Stream	KG/Week	Litres/Week	Unit	Unit Size	Frequency/Week	Units Required	Capacity	Floor Space Required (m2)
General Waste	1,495	21,360	MGB	660L	3	11	21,780 (L)	11.52
Paper/Cardboard	801	13,350	MGB	660L	3	7	13,860 (L)	7.33
Mixed Recycling	481	8,010	MGB	660L	3	5	9,900 (L)	5.24
TOTAL	2,777	42,720				23		24.09
Additional 50% for manoeuvring								36.13
Additional 50m2 for bulky good waste								86.13



4. Waste Handling

The following practices are expected when handling waste from the point of generation to the waste storage area.

Residential

- General Waste - disposed into split chute by residents via chute access points on each floor. Residents select “general waste” before using chute to ensure materials are diverted into the general waste bins at the base of the chute.
- Mixed Recycling (plastics, glass, aluminium, steel cans) - disposed into chutes by residents via chute access points on each floor. Residents select “Recycling” before using chute to ensure materials are diverted into the mixed recycling bins at the base of the chute.
- Cardboard and Paper Recycling - disposed into 660L MGBs stored within chute access rooms on each floor by residents. When full, onsite cleaning/building management staff will transfer cardboard bins to the relevant residential waste storage room within the loading docks to be collected by Council waste services. Cleaners will return bins to the chute rooms on each floor after collection.
- Bulky Waste (Residential only - mattresses, white goods, etc.) - collected periodically by Council or upon request. Residents will either have access to bulky waste storage rooms or will arrange access through building management. Bulky items will be stored until collection. Building management will notify residents of any upcoming scheduled bulky waste collections by Council.

Commercial

- General Waste, Cardboard and Paper Recycling and Mixed Recycling will all be managed within commercial tenancies. Commercial cleaners will be engaged to transfer all tenants’ waste and recycling to the waste storage area within the Tower 1 dock as part of their daily service. Cleaners would typically transfer waste and recycling via a segregated cleaners trolley and then empty the materials into the larger bins stored within the loading dock for collection by a commercial waste contractor.
- Ad Hoc Streams - Toner cartridges, Batteries & E-waste are typically managed by tenants. These streams are usually collected directly from the tenant by a specialty contractor.

Retail

- All retail staff will be responsible for separating their waste and recycling in their back-of-house areas and then transferring these materials to the retail waste storage area of the Tower 2/3 dock for disposal into the systems provided.
- All streams will be collected by a commercial waste contractor on an agreed and appropriate collection schedule.

5. Signage & Colour Coding



All waste and recycling streams should be differentiated with clear signage on all bins and on walls within the waste storage room. Below are examples of appropriate signage incorporating textual information, pictures and colour-coding to communicate the message.

To further reinforce the differentiation between waste and recycling streams, it is highly recommended that the bin storage room be colour-coded to ensure bins are stored in the correct area and to enable easy identification of the streams provided. This can be done by painting borders on the floor indicating where bins should be stored. The colour of the paint should be consistent with the waste stream e.g. yellow paint for mixed recycling, red paint for general waste. The waste room walls can also be painted.



6. Conclusion

The details of this waste management plan confirm that the waste facilities provided in the proposed design adequately cater for the projected waste generation rates at the completion of the development.

All existing docks for Macquarie Centre will continue to operate under the existing conditions - however with the added capacity of the new proposed retail dock there is scope to consolidate some of the existing waste flows into a more centralised system in the future.