

APPENDIX M

OUTLINE WASTE MANAGEMENT PLAN - SLR CONSULTING AUSTRALIA PTY LTD



global environmental solutions

505-523 George Street, Sydney
Outline Waste Management Plan
Mirvac and Coombes Property Group



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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Mirvac and Coombes Property Group to provide an outline Operational Waste Management Plan (OWMP) in accordance with City of Sydney's Development Control Plan and relevant guidance documentation¹ for a proposed mixed use development in the south of Sydney's CBD.

The detailed design for the development is yet to be finalised, however, Mirvac and Coombes Property Group has provided SLR with a yield schedule which provides a basis for the likely waste generation rates, waste material composition and anticipated waste storage requirements.

1.1 Objectives

The specific objectives of a WMP are:

- to encourage minimisation of waste production and maximisation of resource recovery;
- to encourage improved environmental outcomes through waste management;
- to ensure the appropriate management of contaminated or hazardous waste;
- to identify procedures and chain of custody for waste management; and
- to ensure the long term sustainability of resource use through more efficient, cost effective use of materials.

Where appropriate, the WMP aims to meet the principles of the waste management hierarchy by promoting waste as a resource through:

- **Avoidance:** Waste avoidance through prevention or reduction of waste generation. Waste avoidance is best achieved through better design and purchasing choices.
- **Reuse:** Waste reuse, without substantially changing the form of waste.
- **Recycle:** Waste recycling through the treatment of waste that is no longer usable in its current form to produce new products.
- **Energy recovery:** Energy recovery through thermal treatment of residual waste materials and from green waste processing.
- **Disposal:** Waste disposal, in a manner that causes the least harm to the natural environment.

The principal objective of this outline OWMP is to identify all potential wastes likely to be generated on site during the operational phases of the Project, including a description of how waste is likely to be stored, handled, processed and disposed of, or reused and recycled.

The remainder of this OWMP will consider the specific provisions required to minimise and manage waste produced from a mixed use development in accordance with the City of Sydney's Policy for Waste Minimisation in New Developments.

As the development moves into the detailed design stage a more comprehensive waste management plan, including the construction and development plan, will be developed in conjunction with further consultation with the City of Sydney.

¹ Council of the City of Sydney Policy for Waste Minimisation in New Developments

2 TYPICAL WASTE COMPOSITION FOR MIXED USE DEVELOPMENTS

The proposed development will consist of a mixed use scheme of approximately:

- 588 residential apartments comprised of studio, one, two and three bedroom apartments over 70 floors;
- 10,000m² of retail; and
- 26,000m² of car parking and storage

The development is will generate the following broad waste streams:

- General solid (putrescible);
- General solid (non-putrescible) waste; and
- Hazardous (limited).

Potential waste types along with their waste classification are provided below in **Table 1**.

Table 1 Potential Waste Generation and EPA Classifications (Operational)

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Residential and Retail		
General garbage (including non-recyclable plastics)	General solid (putrescible) waste	Disposal at landfill
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid (non-putrescible) waste	Co-mingled recycling at off-site licensed facility
Bulky Household goods	General solid (putrescible) waste OR Hazardous waste (refrigerators)	Disposal at landfill OR offsite disposal at licensed facility
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid (non-putrescible) waste	Off-site recycling
Bulk cardboard	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Wooden crates / pallets	General solid (non-putrescible) waste	Reused for similar projects, returned to suppliers, or off-site recycling
Spent Smoke Detectors ¹	General solid (putrescible) waste OR Hazardous waste (some Commercial varieties)	Disposal at landfill OR offsite disposal at licensed facility
Light bulbs	Hazardous waste	Off-site recycling
E-waste	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling
Maintenance and chemical wastes (i.e. plant oil and cleaning products)	Hazardous waste if the containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and from which residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if the containers have been	Transport to comply with the transport of Dangerous Goods Code applies in preparation for off-site recycling or disposal at licensed facility. (Note: Discharge to sewer subject to Trade Waste Agreement with local Council.) ¹

	cleaned by washing or vacuuming.	
Air -conditioning parts and filters	General solid (non-putrescible) waste	Disposal to landfill

Source: <http://www.environment.nsw.gov.au/waste/envguidlms/index.htm>

Note 1: The Australian Radiation Protection and Nuclear Safety Agency (ARPANSA) require that when more than 10 smoke alarms (particularly americium-241 sources) are collected for bulk disposal they must be treated as radioactive waste and the requirements of the National Health and Medical Research Council's *Code of practice for the near-surface disposal of radioactive waste in Australia* (1992) must be met. Contact ARPANSA for more information. http://www.arpansa.gov.au/radiationprotection/factsheets/is_smokedetector.cfm

For further information on how to determine a waste's classification, refer to the EPA's *Waste Classification Guidelines* (2008).

3 ANTICIPATED WASTE GENERATION RATES

The City of Sydney provides assumptions for calculating waste generation rates in mixed use developments.

Table 2 details the assumed approximate weight based waste and recycling generation rates for the proposed residential units. Multi-unit dwellings (MUDs) in the City of Sydney are provided with two collection services, one for general waste and one for co-mingled recycling.

The waste generation rates are based on the City of Sydney 2001 baseline but these have been adapted by SLR to reflect differences in unit size and overall trends in waste generation increases across Sydney.

Table 2 City of Sydney Residential Waste and Recycling Generation Rates (Kgs)

Waste Stream	Kg/unit/week (1 bed)	Kg/unit/week (2 bed)	Kg/unit/week (3 bed)
Garbage	6.4	8.0	9.6
Co-mingled recycling	2.1	2.6	3.2
Total	8.5	10.6	12.8

Using the above assumptions the total anticipated annual waste generation by weight shown in **Table 3** is **5,850 kilograms per week or 305 tonnes per annum**.

Table 3 Approximate Waste Generation for Multi-unit Residential Properties

Waste Stream	Kgs per week	Kgs per annum	Tonnes per annum
Garbage	4,382	227,885	228
Co-mingled recycling	1,438	74,775	75
Total	5,820	302,660	303

The following **Table 4** shows the typical waste and recycling volumes as provided by City of Sydney for both residential and commercial properties relevant to this development.

Table 4 City of Sydney Waste and Recycling Generation Rates (Litres)

Type of Premises	Waste Generation	Recycling Generation
Residential Unit*	80L/unit/week	40L/unit/week
Retail (food)**	10L/1.5m ² floor area/day	2L/1.5m ² floor area/day
Retail (non-food)	50L / 100m ² / floor area / day	50L / 100m ² / floor area / day
Community Rooms***	10L / 100m ² floor area / day	10L / 100m ² floor area / day
Childcare***	10L / 100m ² floor area / day	10L / 100 m ² floor area / day

*SLR has assumed 2 bedrooms and will proportionally increase or decrease volumes depending on room numbers

**SLR has assumed 30% of the retail outlets serve food

***SLR has used Office waste estimates for these premises

Using the above assumptions **Table 5** provides indicative waste and recycling volumes for the proposed development. These figures represent the minimum storage volume requirements in all new developments within the City of Sydney and will be used to inform the detailed design phase of the development.

Table 5 Indicative Waste and Recycling Volumes for the Proposed Mixed-Use Development

	Volume (L/week)	Volume (m ³ /week)	Volume (m ³ /annum)
<i>Residential</i>			
Garbage	39,000	39	2,028
Co-mingled recycling	19,500	20	1,014
<i>Sub-total</i>	58,500	59	3,042
<i>Commercial Waste</i>			
Retail (food) garbage	152,726	153	7,942
Retail (food) recycling	30,545	31	1,588
Retail (non-food) garbage	26,727	27	1,390
Retail (non-food) recycling	26,727	27	1,390
Community Rooms garbage	354	0.4	18
Community Rooms recycling	354	0.4	18

Childcare garbage	1,121	1	58
Childcare recycling	1,121	1	58
Sub-total	237,079	237	12,328
Total	295,579	296	15,370

4 STORAGE OF WASTE AND ACCESS TO STORAGE

4.1 Waste and Recycling Chutes for Residential Waste

The residential apartments will be serviced via a centrally located chute for the handling of both general waste and recycling. The technology will be provided by the Elephants Foot eDiverter which will operate a single garbage chute with a disposal chute door on every level and electronically connected to a LED control panel.

To use the system the resident will select the recycling or waste function. This moves a mechanism that guides recycling or waste into the correct collection bin located in the basement. An example of the chute system is shown below in **Figure 1**.

Figure 1 eDiverter Waste Chutes for Residential Multi-use Developments



Source: Elephants Foot

The system can be combined with multiple bin automated carousel or linear system (with compactor) to assist with management in waste collection rooms.

The chute system installed will comply with all Council requirements as detailed in the *City of Sydney Policy for Waste Minimisation in New Developments* and Mirvac can confirm that the following will be incorporated;

- Chutes, service openings and charging devices will be constructed of metal or other smooth faced, durable, fire resistant and impervious material of non-corrosive nature.
- Chutes will cylindrical in section and the internal diameter must be adequate.

- Chutes will be vertical without bends or “off-sets” and not be reduced in diameter
- Chute branches to charging devices will be capable of delivering the waste to the chute without using force.
- Chutes will terminate in the waste room and discharge the waste directly into a receptacle or waste compactor.
- A cut-off will be provided at or near the base of the chute to effectively close off the chute whilst the receptacle or compacting device is withdrawn.
- Charging devices will:
 - be designed to effectively 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.

Service storage rooms will:

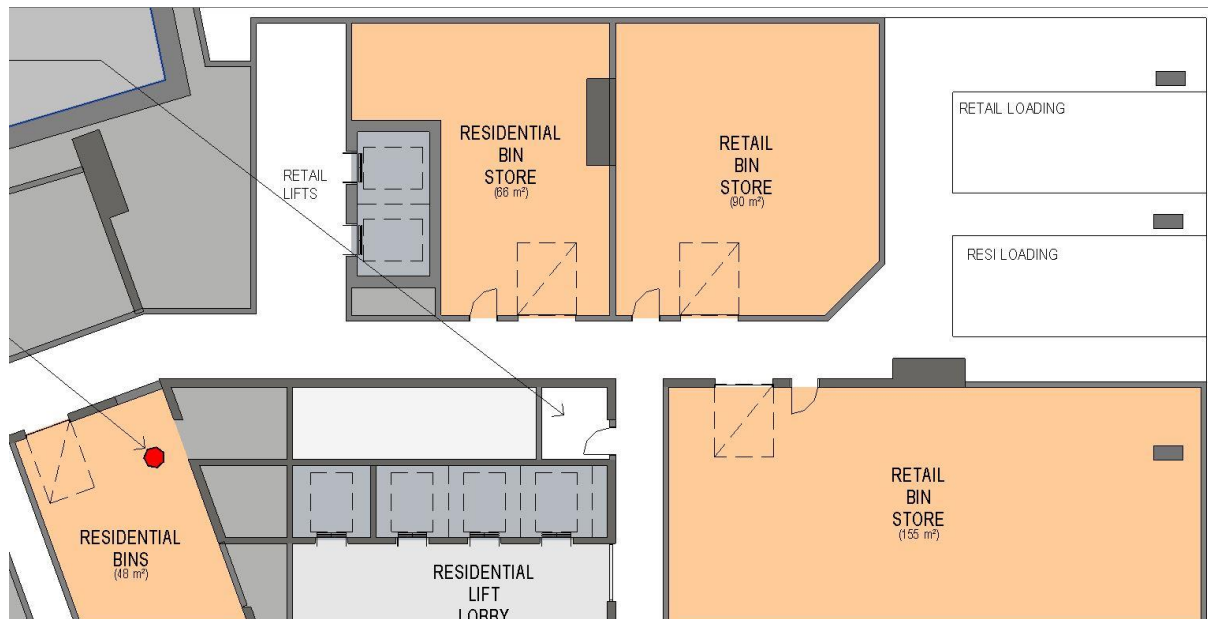
- be provided in convenient, well lighted and ventilated positions;
- be provided with a charging device;
- be not less than one metre (1m) or more than one and one-half metres (1.5m) above the floor level;
- have an area of not more than one-half (1/2) the cross sectional area of the chute.
- The floor below each charging device and service opening will be finished with a smooth impervious material with a minimum area of not less than one square metre (1m²) situated centrally below the charging device
- The chute, charging device and service opening will be capable of being easily cleaned;
- Chutes will be ventilated to ensure that air does not flow from the chute through any service opening.

4.2 Bin Storage Areas for Residential and Commercial Waste

Residential waste will be collected at the bottom of the eDiverter chutes into 1,100 litre plastic bins as recommended by City of Sydney². Commercial waste will be collected and stored in a separate location to the residential waste. Commercial tenants will be responsible for transfer of waste to the respective storage locations. Please see **Figure 2** overleaf and Appendix A for preliminary basement and waste storage designs including approximate chute location.

² Email correspondence dated 05 September 2014

Figure 2 Preliminary Basement Plan Bin Storage and Location of Chute



Following further consultation with the City of Sydney, SLR has prepared two scenarios for the waste storage area requirements:

- Scenario A assumes a weekly collection for both residual waste (garbage) and recycling; and
- Scenario B assumes three collections per week for residual waste (garbage) and one collection per week for recycling.

Table 6 Scenario A Waste Storage Requirements

Type of Premises	Number of Waste Bins	Number of Recycling Bins	Area (m2) for Waste Bins	Area (m2) for Recycling Bins	Total Waste Bins	Total Area (m2)
Residential Unit	36	18	65	33	54	98
Retail (food)	139	28	251	51	167	302
Retail (non-food)	25	25	45	45	50	90
Community (Office)	1	1	2	2	2	4
Childcare	2	2	4	4	4	8
Total	203	74	367	135	277	502

Table 7 Scenario B Waste Storage Requirements

Type of Premises	Number of Waste Bins	Number of Recycling Bins	Area (m2) for Waste Bins	Area (m2) for Recycling Bins	Total Waste Bins	Total Area (m2)
Residential Unit	16	18	29	33	34	62
Retail (food)	47	28	85	51	75	136
Retail (non-food)	25	25	45	45	50	90
Community (Office)	1	1	2	2	2	4
Childcare	2	2	4	4	4	8
Total	91	74	165	135	165	300

Both scenarios assume waste is uncompacted.

4.3 Bulky Items and Recyclable Electronic Goods (Residential Waste)

A room or caged area of a minimum volume of 8 cubic meters shall be provided in each building for the storage prior to disposal of larger bulky items and electronic equipment that cannot be disposed of in the general or recyclable waste system.

The building management will arrange for collection with Council on a regular basis.

4.4 Storage of Hazardous and Liquid Wastes (Commercial Waste)

4.4.1 Liquid wastes

Sufficient storage space will be allocated for separate storage of liquid wastes (oils etc). These liquid waste storage areas will be bunded, and drained to a grease trap, in accordance with the requirements of Sydney Water.

4.4.2 Electronics

Sufficient space will also be allocated for the separate storage of recyclable electronic goods such as batteries, equipment containing printed circuit boards, computers, televisions, fluorescent tubes and smoke detectors.

4.4.3 Gas Bottles

Quantities of LP gas cylinders stored on a site will be kept as low as is reasonably practicable within the limits of safe storage facilities, and collected and disposed of on a regular basis. LP gas cylinders will be handled and stored in accordance with chapter 6A of the *OHS Regulation* and clause 10.14 of AS/NZS 1596:2002 – *The storage and handling of LP Gas*, which requires that cylinders must be:

- handled carefully and not allowed to fall upon one another, or subjected to undue shock
- secured to prevent movement or physical damage
- safe-guarded against physical damage to the valves, in accordance with AS2473.1:2006 – Valves for compressed gas cylinders – Specifications, type testing, and manufacturing tests and inspections

- positioned so that the safety relief device will always vent the vapour space – if venting does occur it should vent into a well-ventilated area away from possible sources of ignition.

Collection of hazardous and liquid wastes will be managed by building management.

5 COLLECTION VEHICLES ACCESS TO INTERNAL WASTE STORAGE

The outline design stage of this development has also given consideration to the minimum dimension requirements for City of Sydney waste collection vehicles to access the proposed internal waste collection area of the building.

The City's policy document³ provides the following minimum building clearance to allow access for waste collection vehicles.

Table 8 Minimum Clearance for Waste Collection Vehicles

Rear loading collection vehicle for MGBs	
Length overall	9.54m
Width overall	2.6m
Operational height	4m
Travel height	3.8m
Weight (payload)	26 tonnes

Furthermore, early consultation with the City of Sydney waste team has indicated that the City would accept a height clearance of 3.6m.

The above mentioned policy document also provides the following additional requirements for collection from enclosed buildings;

- The provision of space clear of structural members or vehicle parking spaces adequate to allow typical three-point turn of collection vehicles (minimum turning circle radius is 12.5m);
- The basement floor must be of industrial-type strength pavement and designed for a maximum wheel loading of 7 tonnes per axle in order to accommodate waste and recycling collection trucks.

6 MANAGEMENT OF WASTE IN MIXED USE DEVELOPMENTS

In addition to the waste types, generation rates and access to storage requirements there are a number of other areas where the design of a new development will need to be informed by operational waste management requirements.

The waste management plan for this development will provide details on the following;

- Location of waste and recycling storage areas for both residential and commercial tenants;
- Provision of suitable access to waste and recycling facilities for residential and commercial tenants;

³ Council of the City of Sydney Policy for Waste Minimisation in New Developments

- Provision of additional waste and recycling bins at all main exits (commercial and residential) to reduce the impact on the City's litter bins in the area;
- Waste management protocols for segregation and storage, clear signage etc for both residential and commercial users;
- Consideration of possible amenity impacts such as noise and odour from waste and recycling management and discussion of mitigation measures implemented into the design; and
- Details of management plans for both residential and commercial waste and recycling.

7 CLOSURE

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APPENDIX A: PRELIMINARY BASEMENT WASTE COLLECTION AND STORAGE

