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Goodman Property Services

Oakdale West Estate

Waste Management Plan

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Goodman Property Services
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Sydney NSW 2000
Australia

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Oakdale West Estate

Waste Management Plan

PREPARED BY:

SLR Consulting Australia Pty Ltd
ABN 29 001 584 612
2 Lincoln Street
Lane Cove NSW 2066 Australia
(PO Box 176 Lane Cove NSW 1595 Australia)
T: +61 2 9427 8100
sydney@slrconsulting.com www.slrconsulting.com

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610.15612-R1	v1.1	23 March 2017	Lisa Hack I-hui Waung	Lisa Hack	Lono Tyson
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1 INTRODUCTION

SLR Consulting Australia Pty Ltd (SLR Consulting) was commissioned by Goodman Property Services to prepare a Waste Management Plan (WMP) for the construction and operation of warehouse and distribution facilities located at Oakdale West, Horsley Park, NSW, as part of Stage 1 Development Application works.

The WMP has been undertaken in accordance with the Secretary's Environmental Assessment Requirements (SEARs) for the State Significant Development (SSD 15_7348) application.

1.1 Scope

This WMP applies to the construction and on-going operation of the proposed development.

The provisions contained in this WMP must be implemented for all stages of the development, and may be subject to review upon expansion or changes in operational procedures.

- See **Section 5** for the Construction WMP.
- See **Section 6** for the Operational WMP.

1.2 Objectives

The principal objective of this WMP is to identify all potential wastes likely to be generated at the site during development and operational phases of the Project, including a description of how waste would be handled, processed and disposed of (or re-used/recycled), in accordance with Council requirements.

The specific objectives of this WMP are as follows:

- to encourage the minimisation of waste production and maximisation of resource recovery;
- to ensure the appropriate management of contaminated/hazardous waste;
- to identify procedures and chain of custody records for waste management; and
- to assist in ensuring that any environmental impacts during the operational life of development comply with Secretary's Environmental Assessment Requirements (SEARs) and the conditions of other relevant regulatory authorities.

2 BETTER PRACTICE FOR WASTE MANAGEMENT AND RECYCLING

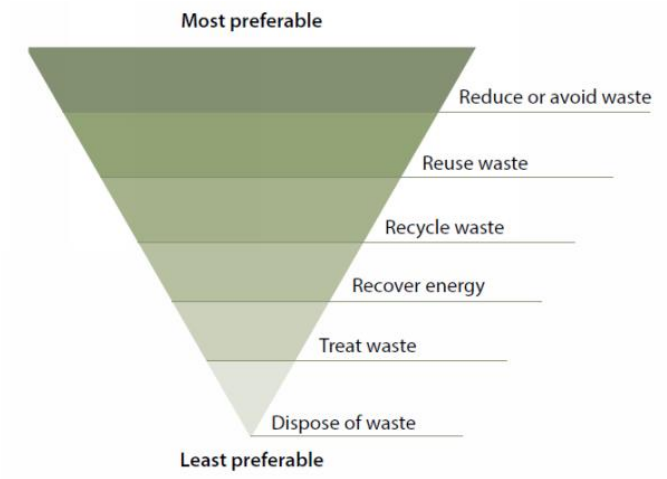
2.1 Waste Management Hierarchy

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

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

The waste hierarchy pictured below demonstrates a classification of waste management options in order of their environmental impacts, as established under the Waste Avoidance and Resource Recovery Act 2001.

Figure 1 Waste Hierarchy[1]



Source: NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2011)

2.2 Benefits of Implementing Better Practice for Waste Management and Recycling

The benefits of implementation better practices for waste management and recycling include:

- Enhanced social and environmental reputation of an organisation.
- Reduced costs associated with waste disposal.
- Benefits to all stakeholders and the wider community.
- Improved environmental outcomes.

[1] NSW Waste Avoidance and Resource Recovery Strategy 2014-21 (EPA 2014)

3 WASTE LEGISLATION AND GUIDANCE

The legislation and guidance outlined in **Table 1** below should be referred to during construction and operational phases of the development.

Table 1 Waste legislation and guidance summary

Legislation	Objectives
Secretary Environmental Assessment Requirements (SEARs)	As outlined in SSD 15_7348 – provide a construction and operational waste management plan.
Waste Avoidance and Resource Recovery Act 2001	To promote extended producer responsibility in place of industry waste reduction plans. Specific objectives include: • To encourage efficient use of resources. • To minimise the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste. • To ensure that industry shares with the community the responsibility for reducing and dealing with waste. • To ensure the efficient funding of waste and resource management planning, programs and service delivery.
Protection of the Environment Operations Act (POEO) 1997 & Amendment Act 2011	Administered by the NSW Environmental Protection Authority (EPA) to enable the Government to establish instruments for setting environmental standards, goals, protocols and guidelines. *Important Note: The owner of a premises, the employer or any person carrying on the activity which causes a pollution incident is to immediately notify the relevant authorities when material harm to the environment is caused or threatened.* A list of each relevant authority is provided in the POEO Amendment Act and will be noted in the site's incident register.
POEO (Waste) Regulation 2014	Contains provisions relating to the waste levy, waste tracking, management requirements for certain waste types, payment schemes for councils, consumer packaging recycling and other miscellaneous provisions.
NSW EPA's Waste Classification Guidelines (Part 1) 2014	To assist waste generators to effectively classify, manage, treat and dispose of waste to ensure the environmental and human health risks associated with waste are managed appropriately and in accordance with the POEO Act and is associated regulations.
Building Code of Australia (BCA) and relevant Australian Standards	The BCA has the aim of achieving nationally consistent, minimum necessary standards of relevant health and safety, amenity and sustainability objectives efficiently.
Council's Waste Management Planning Requirements	To promote responsible waste disposal/recycling options by providing information and advice on waste services available in the area. Information available to contractors includes the Western Sydney Recycling Directory with details of waste contractor services and the materials they will accept for recycling/disposal.
EPA's Waste Avoidance and Resource Recovery (WARR) Strategy 2014-21	A key component of the State Government's vision for the environmental and economic future of the state that will be supported financially by the *Waste Less, Recycle More* funding initiative providing long-term targets for 6 key result areas including reduced illegal dumping.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	The EPA's Better Practice Guidelines (2012) encourage efficient waste minimisation and resource recovery for commercial and industrial facilities and is used as a benchmark document when assessing waste production rates within Australia and details a range of waste management provisions.
Australian Packaging Covenant	Each building should be encouraged to establish an Action Plan to demonstrate their contribution to the achievement of the Australian Packaging Covenant's (APC) goals. The three main performance goals of the APC are: • Design: Optimise packaging to use resources efficiently and reduce environmental impact without compromising product quality/safety. • Recycling: Efficiently collect and recycle packaging. • Product Stewardship: Demonstrate commitment of all signatories.

4 PROJECT DESCRIPTION

Goodman Property Services (Aust) Pty Ltd is developing the Oakdale West site (Lot 11 in DP 1178389) at Erskine Park for the purposes of providing a warehouse and distribution complex. The Oakdale West site is a portion within the wider Oakdale Estate development and forms part of a progressive development designed to make Oakdale a regional distribution park of warehouses, distribution centres and freight logistics facilities.

The Oakdale West project is a staged development which includes bulk earthworks, civil works and the construction of infrastructure and stormwater management.

4.1 Overview of Proposed Development

The overall Oakdale West Estate is a 154 hectare (ha) site located within the Oakdale Estate, a 421 ha area of land within the Western Sydney Employment Area. Oakdale West Estate is the third of four stages of the broader Oakdale Estate under the management of Goodman Limited.

Oakdale West is essentially a greenfield site at present which has been used for stock grazing. The surrounding areas are primarily rural in nature, but, the area to the north is becoming more industrial. Land uses in the surrounding area include:

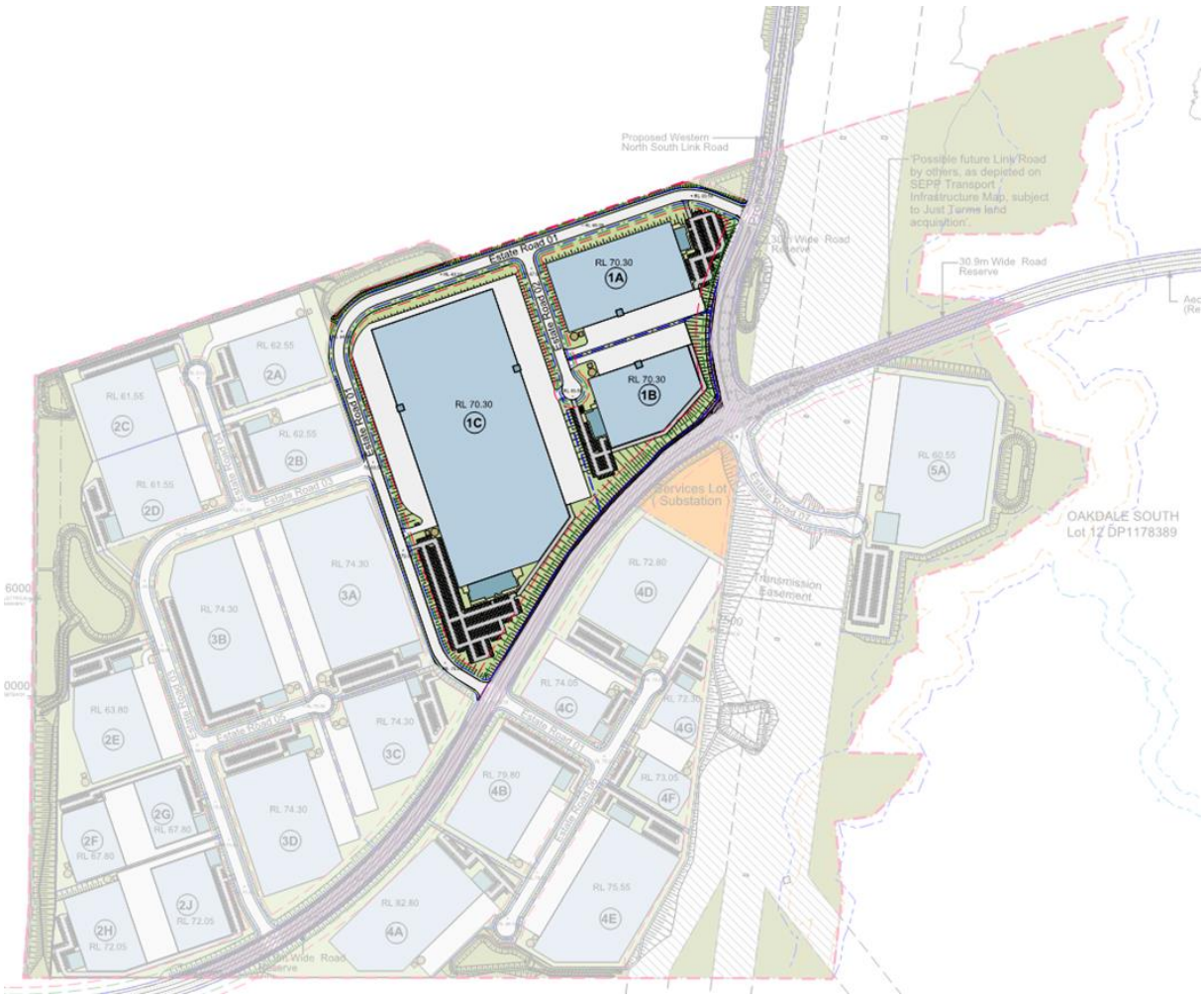
- Rural (grazing, market gardens, etc) and rural residential to the south-east, south and west.
- Sydney Water Pipeline and industrial land to the north (industrial zones at Eastern Creek to the north and Erskine Park to the north-west).
- To the west land uses include a number of sensitive uses such as an aged care facility (Catholic Health Care) and three schools: Mamre Anglican School, Emmaus Catholic College and Trinity Primary School. Other land uses include recreational and sporting facilities.

Oakdale West Estate will be developed as five separate precincts, commencing with Precinct 1. Development of Precinct 1 will involve:

- Bulk earthworks.
- Installation of trunk infrastructure.
- Landscaping and public domain works.
- Development (comprising the construction and operation) of three warehouse and distribution facilities in Precinct 1 (Warehouses 1A, 1B and 1C).

The Precinct 1 development area comprises 22.41 ha. An overview of the site is provided in **Figure 2** to **Figure 5** overleaf. Building areas are outlined in **Table 2**.

Figure 2 Overview of the Oakdale West Estate showing Precinct 1 Development Area

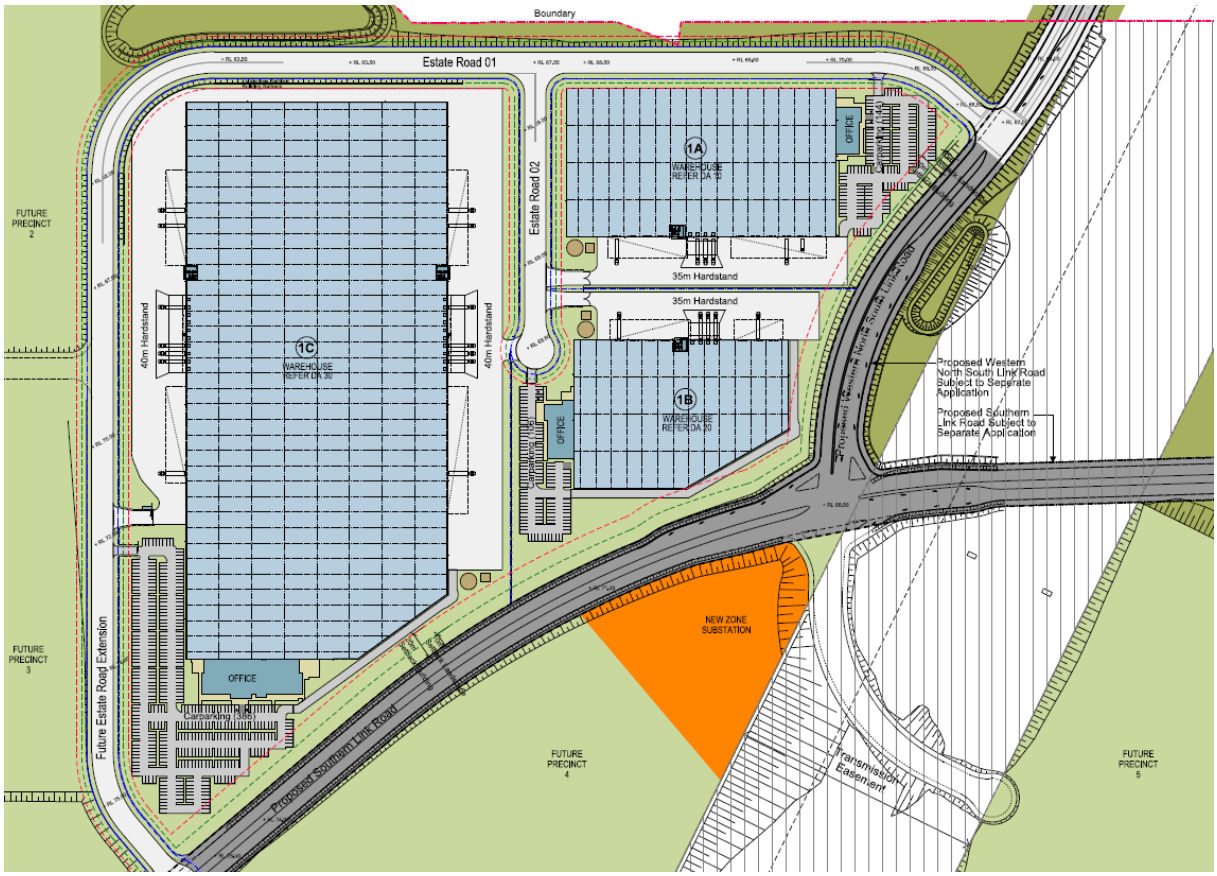


Source: Goodman / SBA Architects (2017)

Table 2 Building Areas

Site Area (m^2)	Lot 1A	Lot 1B	Lot 1C
Warehouse	21,115	15,190	75,255
Office (2 levels)	1,180	800	3,725
Dock office (2 levels)	190	190	380
Total Building Area	22,485	16,180	79,360
Awning	1,985	1,410	4,850
Hardstand area	6,773	6,055	27,980
Light duty area	4,425	2,832	9,994
Car parking	144	106	386

Figure 3 Oakdale West Estate, Horsley Park – Lot Warehouses 1A, 1B and 1C



Source: Goodman / SBA Architects (2016)

5 CONSTRUCTION WASTE MANAGEMENT

Construction stages of developments have the greatest potential for waste minimisation.

Key construction activities will include:

- construction of new warehouse buildings;
- construction of access ways; and
- construction and modification of entries/exists from main roads and access ramps connecting (not calculated as part of this WMP).

5.1 Targets for Resource Recovery

The performance of each development contributes to overall NSW State recycling targets, which for the construction and demolition (C&D) sector, is 75% (increasing to 80% by the year 2021) of total C&D waste recycled (see NSW WARR Strategy 2014-21).

Waste minimisation measures that can be implemented to assist in achieving this resource recovery target are provided in the following sections. Waste audits will determine the actual percentage of wastes that were recycled and disposed of at landfill during the Project.

5.2 Waste Streams and Classifications

The development is likely to generate the following broad waste streams:

- excavation material;
- construction wastes;
- plant maintenance waste;
- packaging waste;
- packaging waste;
- green waste from site clearing activities;
- work compound (on-site employee) waste; and
- wastewater.

Possible waste types along with their waste classification are provided below in **Table 3**. For further information on how to determine a waste's classification, refer to the EPA's Waste Classification Guidelines (2014).

Table 3 Potential Waste Generation and EPA Classifications (Construction Related)

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Site Preparation, Excavation and Construction		
Sediment fencing, geotextile materials	General solid (non-putrescible) waste	Reuse at other sites where possible or disposal to landfill
Concrete (solids and washouts) and asphalt	General solid (non-putrescible) waste	Reuse at other sites where possible or disposal to landfill
Steel reinforcing, other metal (e.g. wire mesh)	General solid (non-putrescible) waste	Off-site recycling
Conduits and pipes	General solid (non-putrescible) waste	Off-site recycling
Timber formwork	General solid (non-putrescible) waste	Reuse on-site or off-site recycling
Metals and bulk electrical cabling	General solid (non-putrescible) waste	Off-site recycling

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Plasterboard	General solid (non-putrescible) waste	Off-site recycling or disposal
Bricks	General solid (non-putrescible) waste	Off-site recycling
Glass	General solid (non-putrescible) waste	Off-site recycling
Light bulbs	Hazardous waste	Off-site recycling
Plant Maintenance		
Tyres	Special waste	Off-site recycling or disposal
Empty oil and other drums / tins (e.g. fuel, chemicals, paints, spill clean ups)	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 cleaned by washing or vacuuming.	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
Air and oil filters and rags	General solid (non-putrescible) waste	General solid (non-putrescible) waste
Batteries	Hazardous waste	Off-site recycling
Packaging		
Packaging materials, including wood, plastic (including stretch wrap or LLPE), cardboard and metals	General solid (non-putrescible) waste	Off-site recycling
Wooden crates	General solid (non-putrescible) waste	Reused for similar projects, returned to suppliers, or off-site recycling
Work Compound and Associated Offices		
Recyclable beverage containers (glass and plastic bottles, aluminium cans), tin cans	General solid (non-putrescible) waste	Co-mingled recycling at off-site licensed facility
Clean paper and cardboard	General solid (non-putrescible) waste	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers (soiled paper and cardboard, food stuffs, polystyrene)	General solid (non-putrescible) waste mixed with putrescible waste	Disposal at landfill
Pump-out waste and septage (sewage)	Liquid (trade) waste	Off-site disposal at licensed facility or disposal direct to sewer where arranged with Council

5.3 Waste Generation Rates

The Construction Site Manager will need to specify the types and quantities of wastes produced during construction and on this basis, the numbers and capacity of skip bins can be determined.

A guide/estimate of the potential waste percentages is provided based on published waste generation rates for construction and demolition projects, as indicated in **Table 4**.

Table 4 Guideline to Waste Composition and Volumes – Construction of General Buildings

Material	Split of Waste % (General Building)	Conversion Factors (tonnes per m^3)
Hard material	32%	1.20
Timber	24%	0.34
Plasterboard	15%	0.33
Concrete	9%	1.27
Metals	6%	0.42
Plastics	6%	0.25
Cardboard	4%	0.20
Green waste	3%	0.15
Soil	1%	1.20
Other	0.3%	0.30

Source: UK WRAP 2014

The UK Department for Environment, Food and Rural Affairs (Defra) and the UK Building Research Establishment (BRE) have developed a number of benchmark indicators to help determine approximate tonnages of waste produced during various construction projects including civil engineering and commercial retail works. The benchmarks include Environmental Performance Indicators (EPI) which measure the volume (m^3) of waste produced per 100 m^2.

The EPI indicators provided in **Table 5** below have been used for the purposes of this WMP to estimate the amounts of demolition and construction wastes generated by the Project.

Table 5 Environmental Performance Indicator for Waste Volumes from New Developments

Project Type	Average Volume (m^3) of Waste per 100m^2
Industrial Buildings	14.0
Civil Engineering	28.1

5.3.1 Estimation of Waste Volumes

The estimated waste volumes for the warehouse and office space areas are presented below in **Table 6**, **Table 7** and **Table 8**. The waste arisings are based on the EPI estimates presented above in **Table 5.**

Actual waste tonnage and composition will vary however this estimate is provided so that the Construction Site Manager can make provision for on-site or off-site re-use and recycling opportunities.

Table 6 Estimated Waste Volumes and Materials for Lot 1A

Material	Split %	Waste (m^3)	Conversion Factor	Waste (tonnes)
Hard material	40%	2,154	1.20	2,585
Timber	16%	862	0.34	293
Plasterboard	7%	377	0.33	94
Concrete	10%	539	1.27	269
Metals	14%	754	0.42	151
Plastics	8%	431	0.25	181
Cardboard	2%	108	0.20	43
Greenwaste	2%	108	0.15	16
Soil	0%	0	1.20	0
Chemicals / paint	1%	54	0.30	16
TOTAL	**100%**	**5,386**	**-**	**3,649**

Table 7 Estimated Waste Volumes and Materials for Lot 1B

Material	Split %	Waste (m^3)	Conversion Factor	Waste (tonnes)
Hard material	40%	1,601	1.2	1,921
Timber	16%	640	0.34	218
Plasterboard	7%	280	0.33	70
Concrete	10%	400	1.27	200
Metals	14%	560	0.42	112
Plastics	8%	320	0.25	134
Cardboard	2%	80	0.2	32
Greenwaste	2%	80	0.15	12
Soil	0%	0	1.2	0
Chemicals / paint	1%	40	0.3	12
TOTAL	**100%**	**4,002**	**-**	**2,711**

Table 8 Estimated Waste Volumes and Materials for Lot 1C

Material	Split %	Waste (m^3)	Conversion Factor	Waste (tonnes)
Hard material	40%	7,301	1.2	8,761
Timber	16%	2,920	0.34	993
Plasterboard	7%	1,278	0.33	319
Concrete	10%	1,825	1.27	913
Metals	14%	2,555	0.42	511
Plastics	8%	1,460	0.25	613
Cardboard	2%	365	0.2	146
Greenwaste	2%	365	0.15	55
Soil	0%	0	1.2	0
Chemicals / paint	1%	183	0.3	55
TOTAL	**100%**	**18,251**	**-**	**12,365**

5.4 Waste Avoidance Measures

The Construction Site Manager will identify opportunities for waste avoidance by:

- applying practical building designs and construction techniques;
- appropriate sorting and segregation of demolition and construction wastes to ensure efficient recycling of wastes;
- selecting construction materials taking into consideration to their long lifespan and potential for reuse;
- ordering materials to size and ordering pre-cut and prefabricated materials;
- reuse of formwork;
- planned work staging;
- use of naturally ventilating buildings to reduce ductwork;
- use of prefabricated components for internal fit outs;
- reducing packaging waste on-site by returning packaging to suppliers where possible and practicable, purchasing in bulk, requesting cardboard or metal drums rather than plastics, requesting metal straps rather than shrink wrap and using returnable packaging such as pallets and reels;
- careful on-site storage and source separation;
- subcontractors informed of site waste management procedures; and
- co-ordination and sequencing of various trades.

The Construction Site Manager should also advise on material selection for the reduction of embodied energy and resource depletion. This includes the use of recycled concrete and steel, the reduction of PVC use, the use of low volatile organic compounds (VOC) paints and adhesives, and the use of postconsumer reused timber or Forest Stewardship Council (FSC) certified timber. Designs enabling disassembly and reuse of materials are also desirable.

The following measures will also be completed to improve onsite waste management and to provide more reliable figures:

- record waste generated and disposal methods used during the construction;
- conduct waste audits of current projects;
- compare projected waste quantities with actual waste quantities produced during the construction period;
- review at past waste disposal receipts; and
- record this information to help in waste estimations for future waste management plans.

5.5 Re-use, Recycling and Disposal

Effective management of construction materials and demolition/construction waste, including options for reuse and recycling where applicable and practicable, will be conducted. Only project wastes that cannot be cost effectively reused or recycled are to be sent to landfill or appropriate disposal facilities.

The following procedures are to be implemented:

- all solid waste timber, brick, concrete, rock that cannot be reused or recycled will be taken to an appropriate landfill site and disposed of in an approved manner;
- all metals will be recycled where economically viable;
- waste oil will be recycled or disposed of in an appropriate manner;

- all asbestos, hazardous and/or intractable wastes are to be disposed of in accordance with Workcover Authority and EPA requirements;
- washdown equipment/plant/machinery and concrete delivery trucks within a specified, appropriately bunded, washdown bay or return to the batching plant before washing out. Liquid waste is often produced from the washing down of plant and apparatus. There may be a local sewer that this waste water can be connected to; alternatively, this could be transferred into a localised waste water treatment facility or plant;
- completion of refuelling activities in designated areas with appropriate spill containment measures to avoid overspill to sensitive areas;
- provision of portable, self-contained toilet and washroom facilities at the site ensuring these units are regularly emptied and serviced by a suitably licensed contractor;
- where applicable, provide coloured, clearly labelled coordinated and easily accessible, co-mingled and paper/cardboard recycling bins on-site for employee use nearby common areas for large work compounds/work sites;
- dispose of general waste via a council approved system; and
- investigate any opportunities for materials exportation and reuse with other local construction operations. This will have two benefits: minimising energy through reduction of material reprocessing, encouraging material reuse.

5.5.1 Site Specific Procedures

The Construction Site Manager will also consider implementation of the following procedures:

- all used crates will be stored for reuse unless damaged;
- all cardboard waste is to be recycled via on-site recycling compactors which shall be collected by an appropriate recycling contractor;
- all glass and metals that can be economically recycled will be.
- all re-enforcing mesh to be utilised within the construction stages of the construction;
- colour bond roof material off cuts to be stockpiled on site for reuse or recycling;
- waste concrete will be disposed of at a crushing/recycling plant where practicable;
- waste bricks will be crushed and utilised on site. All half/damaged bricks and blacks will be stored on site to be removed for offsite crushing and recycling;
- excavation material will be reused on-site where possible with all excess reused on other projects or sold;
- All other solid waste including bitumen paving, tile, timber, rock and soil will be taken to an appropriate materials recycling facility/landfill site and processed in an approved manner; and
- All garbage will be disposed of via a council approved system.

5.6 Waste Storage and Servicing

5.6.1 Waste Segregation

The project will be managed ensuring effective source separation and appropriate collection of waste during demolition and construction works to minimise waste and maximise the potential for materials to be re-used and recycled.

For construction stages, consider minimum dedicated skips/bins/stockpiles for these materials:

- timber/wood;
- steel/scrap metal;
- bricks;
- concrete;
- general waste; and
- other waste (i.e. for the collection of materials that may be re-used on future projects).

Where limited room is available for segregation of construction materials, consultation with recycling facilities will be undertaken to determine which materials can be disposed of within the same skip and still be easily sorted post collection.

Separate receptacles for the safe disposal of hazardous waste types (light bulbs, batteries, etc.) will also be provided. Specialised bins for cigarette butts should also be provided to ensure these do not become a potential source of fire if thrown in bins / skips or litter washed into stormwater drains.

5.6.2 Space and Siting Requirements

Waste storage areas will be accessible and allow sufficient space for storage and servicing requirements. The storage areas will also be flexible in order to cater for change of use throughout the Project. Where space is restricted, dedicated stockpile areas are to be delineated on the site, with regular transfers to dedicated skip bins for sorting.

The positions of the designated waste holding areas on site will change according to building works and the progression of the development, but must consider visual amenity, OH&S and accessibility in their selection. Appropriate siting of waste stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

All waste placed in skips or bins for disposal or recycling shall be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Waste containers and storage areas are to be kept clean and in a good state of repair. Stockpiles of materials will be managed in accordance with relevant Environmental Guidelines.

5.6.3 Servicing and Transport

The frequency of the waste removal will, in most cases, be dictated by the volume of material being deposited into each of the dedicated skips. Skips/bins are to be checked on a daily basis by the Site Manager to ensure that no overflow occurs. If skips/bins are reaching capacity, removal and replacement should be organised for the next 24 hours. All skips/bins leaving the site will be covered with a suitable tarpaulin to ensure that the spillage of wastes from the skips whilst in transit is eliminated.

All waste collection for construction works are to be conducted between 7am and 7pm Monday to Friday, and between 7am and 1pm on Saturdays, or as per Council requirements. All site generated building waste collected in the skips and/or bins will leave the site and be deposited in the approved and appropriately licensed recycling centre, transfer station or landfill site.

5.6.4 Space and Amenity

Waste storage areas will be accessible and allow sufficient space for storage and servicing requirements. The storage areas will also be flexible in order to cater for change of use throughout the Project.

Where space is restricted, dedicated stockpile areas are to be delineated on the site, with regular transfers to dedicated skip bins for sorting. The positions of the designated waste holding areas on site will change according to building works and the progression of the development, but must consider visual amenity, OH&S and accessibility in their selection.

All waste placed in stockpile areas/skips for disposal or recycling shall be adequately contained to ensure that the waste does not fall, blow, wash or otherwise escape from the site. Appropriate siting of waste stockpile locations will take into account slope and drainage factors to avoid contamination of stormwater drains during rain events.

Waste containers are to be kept clean and in a good state of repair.

5.6.5 Contaminated / Hazardous Waste

During the construction phases of the development, there must be a commitment to engage qualified and certified contractors to remove all contaminated/hazardous materials (e.g. asbestos) and dispose of all contaminated/hazardous waste at an appropriately licenced facility, where applicable.

In the event that any contaminated or hazardous materials are unexpectedly uncovered during demolition or excavation works, the Construction Site Manager is to stop work immediately and contact the relevant hazardous waste contractor prior to further works being undertaken in the area.

Contaminated material stockpiled on site will be minimised as far as possible and should be stored on HD polythene liner, in a bunded location which is protected from inclement weather. Sediment fences should also be installed around the base of stockpiles and the stockpiles should be covered. Where excavated material requires validations, samples should be taken for NATA laboratory testing as per the requirements of the contamination assessment prior to restoration works, backfilling exercises and disposal.

Any trucks carrying contaminated materials should be securely and completely covered immediately after loading the materials, to prevent windblown emissions and spillage.

Decontamination of all equipment prior to demobilisation from the site is important in order that contaminated materials are not spread off-site. This should be achieved using dry cleaning methods as far as practicable and collection of material for disposal. The following additional measures should be employed on site:

- as far as possible, all tracked surfaces to be kept free of contaminated material; and
- all equipment should be cleaned in an area contained contaminated soils so that they remain within the area, or on a lined surface and collected spoil should be treated as contaminated material.

5.6.6 Liquid Waste / Stormwater / Wastewater Management

Any liquid wastes or dangerous goods wastes generated by the construction activates (e.g. due to damage or leakage of containment) will be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility.

Wastewater storage tanks (where applicable) will be carefully monitored to ensure overflow does not occur and no liquid wastes or wash down waters will be disposed of via the stormwater drainage system.

5.6.7 Spills Management

Spills on the worksite are most likely to involve fuel, hydraulic oil or engine oil spilled from plant items, and paints and solvents.

If a spillage occurs, site staff will immediately identify the spilled materials and notify the Construction Site Manager. Then contain the spill as soon as possible so it doesn't spread.

Containment measures for spillages will be provided at appropriate locations and in close proximity to staff car park areas, dangerous goods stores areas and main Project work areas (e.g. a spill kit containing non-combustible absorbent material).

Material Safety Data Sheets (MSDS) will also be located nearby spill kit areas for advice on spillage clean-up and disposal.

5.7 Signage

Standard signage will be posted in all storage/waste collection areas and all skips/drums/bins are required to be labelled correctly and clearly to identify materials stored within.

Where applicable, general and co-mingled recycling bins placed nearby staff tearoom/break areas will be colour coded with clear labels.

Refer to the EPA's website under 'waste tools' for construction waste and recycling signs.

Figure 4 Australian Standard Signs

Source: http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm

5.8 Training and Awareness

All staff (including sub-contractors and site staff) employed during the construction phases of the development must undergo induction training regarding waste management for the development site.

Induction training is to cover, as a minimum, an outline of the WMP including:

- legal obligations;
- emergency response procedures on site;
- waste storage locations and separation of waste;
- implications of poor waste management practices;
- correct use of General Purpose Spill Kit; and
- details of responsibility and reporting (including identification of personnel responsible for waste management and individual responsibilities).

It is the responsibility of the Construction Site Manager or Environmental Management Representative (EMR) to notify Council of the appointment of waste removal, transport or disposal contractors.

5.9 Monitoring and Reporting

Records of waste volumes recycled, reused or contractor removed are to be maintained and reported to the Principal Contractor on a quarterly basis. Additionally, dockets/receipts verifying recycling/disposal in accordance with the WMP must be kept and presented to Council when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists/logs recorded for reporting to the Construction Site Manager or EMR on a weekly basis or as required. These inspections will be used to identify and rectify any resource and waste management issues.

Waste audits are to be carried out by the EMR to gauge the effectiveness and efficiency of waste segregation procedures and recycling/reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and include the contact details of the 24 hour EPA Pollution line. Likely incidents to occur during the construction phase of the Project may involve fuel or chemical spills, seepage of mishandling of hazardous waste, or unlicensed discharge of pollutants to environment.

5.10 Incident Response

Likely incidents to occur during the construction phase of the Project may involve fuel or chemical spills, seepage or mishandling of hazardous waste, or unlicensed discharge of pollutants to the environment.

All environmental incidents are to be dealt with promptly to minimise potential impacts. An incident register must be maintained on-site at all times and include the contact details of the 24 hour EPA Pollution line.

5.11 Roles and Responsibilities

All personnel have a responsibility for their own environmental performance and compliance with all legislation. It will be the responsibility of the Contractor to implement the WMP, and an employee responsibility to ensure that they comply with the guideline at all times.

Where possible, an Environmental Management Representative (EMR) should be appointed for the Project. Suggested roles and responsibilities are provided below.

Table 9 Recommended Roles and Responsibilities

Construction Site Manager	Ensuring plant and equipment are well maintained. Ordering only the required amount of materials. Keeping materials segregated to maximise reuse and recycling. Ultimately responsible for routinely check waste sorting and storage areas for cleanliness, hygiene and OH&S issues, contaminated waste materials, and also ensuring that all monitoring and audit results are well documented and carried out as specified in the WMP.
Environmental Management Representative (EMR)	Approaching and establishing the local commercial reuse of materials where reuse on-site is not practical. Establishing separate skips and recycling bins for effective waste segregation and recycling purposes. Training and awareness of the requirements of the WMP and specific waste management strategies adopted for the Project. Contaminated waste management and approval of off-site waste transport, disposal locations and checking licensing requirements. Approval of off-site waste disposal locations and checking licensing requirements. Assessment of suspicious potentially contaminated materials, hazardous materials and liquid wastes. Monitoring, inspection and reporting requirements.

Daily visual inspections of waste storage areas may be delegated to other on site staff. All subcontractors will be responsible for ensuring that their work complies with the WMP through the site induction and contract engagement process.

6 OPERATIONAL WASTE MANAGEMENT

Ineffective waste management for commercial premises can lead to environmental pollution, offensive odours, litter, attraction of vermin and occupational safety and hygiene problems.

Effective waste management reduces costs through the reuse of resources and minimisation of fees associated with removal, transportation and disposal of waste, and improves environmental outcomes locally, regionally and globally.

Effective waste management is achieved through the implementation of a WMP for the operational life of the development.

6.1 Targets for Resource Recovery

The performance of each development contributes to overall NSW State recycling targets, which for the commercial and industrial (C&I) sector, represents 57% (increasing to 70% by 2020-21) of total C&I waste recycled (see NSW WARR Strategy 2014-21).

Waste minimisation measures that can be implemented to assist in achieving this resource recovery target are provided in the following sections. Waste audits will determine the actual percentage of wastes that were recycled and disposed of at landfill during operations.

6.2 Waste Streams and Classifications

The operation of the Project will generate the following broad waste streams:

- employee wastes (i.e. general waste and co-mingled recycling);
- packaging wastes (cardboard, paper, plastic, timber/ pallets, polystyrene);
- office wastes;
- garden organics from landscaped areas;
- bulky waste items such as furniture and e-waste;
- amenity wastes; and
- stores, plant and general maintenance wastes.

Potential waste types along with their waste classification are provided below in **Table 10**. For further information on how to determine a waste's classification, refer to the EPA's Waste Classification Guidelines (2014).

Table 10 Potential Waste Generation and EPA Classifications (Operational)

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
General Operations		
General garbage (including non-recyclable plastics)	General solid (putrescible and non-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
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard / Bulk Cardboard	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Plastic packaging materials (including stretch wrap, polystyrene)	General solid (non-putrescible) waste	Baled and sent for off-site recycling

Waste Types	NSW Classification	Proposed Reuse / Recycling / Disposal Method
Wooden crates / pallets / timber	General solid (non-putrescible) waste	Reused for similar projects, returned to suppliers, or off-site recycling
E-waste, batteries, printer toners and ink cartridges	Hazardous waste	Off-site recycling (free disposal box / bags and pickup service exists for printer toners and ink cartridges)
Wastewater from amenities and kitchens	Liquid waste	Disposal to sewerage
Sanitary waste	General solid (putrescible) waste	Contractor disposal at licensed facility
Maintenance		
Spent smoke detectors[1]	General solid (non-putrescible) waste OR Hazardous waste (some commercial varieties)	Disposal to landfill OR off-site disposal at licensed facility
Light bulbs / fluorescent tubes	Hazardous waste	Off-site recycling
Cleaning chemicals, laundry chemicals (bleach etc.), solvents, area wash downs, empty oil / paint drums / chemical containers	Hazardous waste if containers used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid (non-putrescible) waste if containers cleaned by washing or vacuuming	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 Sydney Water)[1]
Air-conditioning parts and filters	General solid (non-putrescible) waste	Disposal to landfill
Garden organics / green waste (lawn mowing, tree branches, hedge cuttings, leaves etc.)	General solid (non-putrescible) waste	Option to reuse on site as mulch or to organise collection. Alternatively, contractor/gardener removal for recycling at licensed facility.

Source: http://www.environment.nsw.gov.au/waste/envguidlns/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

6.2.1 Estimated Waste Generation Rates for Operational Development

Published average waste generation rates have been used to calculate the anticipated waste amounts for the proposed development. The estimated waste generation rates are based on EPA guidance for waste generation in commercial and retail premises as presented below in **Table 11**.

Table 11 Guideline Waste Generation Rates

Type of Premises	Facility Area	General Waste Generation	Recycling Generation[1]
Warehouse	Industrial Storage	30 L/100 m^2/day	30 L/100 m^2/day
Offices	Offices	10 L/100 m^2/day	10 L/100 m^2/day

Source: NSW EPA's Better Practice Guidelines for Waste Management and Recycling in C&I Facilities (2012)

Note 1. Recyclable waste generation includes paper and cardboard waste, as well as mixed recyclables (bottles, cans etc.)

The approximate volumes have been converted into tonnes by applying conversation rates taken from Victoria's Ecorecycle Waste Wise Events toolkit for 'garbage' (0.15 tonnes per 1000 L) and 'co-mingled containers' (0.063 tonnes per 1000 L).

Using the above standard industry waste generation rates in **Table 11** above, the approximate daily waste volumes for each Lot have been calculated and are presented in **Table 12** to Error! Reference source not found..

Table 12 Estimated Annual Waste and Recycling Generation for Lot 1A

Complex	Area Type	Garbage Average L/day	Recycling Average L/day	Garbage Average L/wk	Recycling Average L/wk
Lot 1A	Warehouse	6,335	6,335	31,673	31,673
	Office	137	137	685	685
Total	**Volume**	**6,472**	**6,472**	**32,358**	**32,358**
	Tonnes	**1.0**	**0.4**	**4.9**	**2.0**
Lot 1B	Warehouse	4,557	4,557	22,785	22,785
	Office	99	99	495	495
Total	**Volume**	**4,656**	**4,656**	**23,280**	**23,280**
	Tonnes	**0.7**	**0.3**	**3.5**	**1.5**
Lot 1C	Warehouse	22,577	22,577	112,883	112,883
	Office	411	411	2,053	2,053
Total	**Volume**	**22,987**	**22,987**	**114,935**	**114,935**
	Tonnes	**3.4**	**1.4**	**17.2**	**7.2**

Note: Waste generation rates assume warehousing facilities are operational 5 days per week.

6.3 Waste Storage and Servicing Requirements

A dedicated waste storage area will be identified within each building with enough space to contain all the bins and equipment required for the building. This includes bins of suitable sizes (1000 litre bins or larger front-lift bins) and the installation of a cardboard baler will be reviewed within 12 months of operation. Sufficient clearance has been provided to enable collection vehicles to access the bin storage area.

6.3.1 Space Requirements

Waste/recycling storage areas will be constructed of an adequate size to accommodate all waste and recycling bins associated with the development.

Doors/gates to the storage area will be able to be opened from both the inside and outside and wide enough to allow for easy passage of waste/recycling containers.

Sufficient space will be provided for the segregation and storage of varying waste types including provision for the collection of fluorescent tubes, smoke detectors, e-wastes and other recyclable resources.

Sufficient space will also be provided for reuse items such as crates and pallets for occupational safety purposes.

6.3.2 Waste and Recycling Storage Area

To encourage employee recycling, general landfill waste and comingled recycling bins will be positioned in easily accessible areas for effective recycling results, including along walkways and aisles, inside any food retailer's kitchen area, and at pedestrian entry/exit points to the car park levels to deal with waste management on these levels.

The waste and recycling storage area should also incorporate a number of measures to ensure best practice waste management including:

- Storage of cardboard and paper must be in a dry, vermin-proof area and must not be stored for more than two weeks in order to prevent infestation by pests.
- Provisions must be made for the separation of hazardous materials, cardboard, paper and recyclable plastics at each holding area in addition to the centralised waste storage area.
- Waste and recyclables from each holding area within the premises must be transferred to a centralised waste and recycling storage area.
- Centralised storage areas should be conveniently located for servicing multiple tenants, and loading docks located close to areas requiring waste servicing and garbage chutes/ramps. The construction of additional garbage areas, rooms and equipment are to comply with BCA (Building Code of Australia) requirements and Australian Standards.
- The storage area should be under cover (e.g. awning).
- All waste sorting and storage areas are to be kept clean and odour and vermin free. It is the responsibility of the Operations Manager or equivalent personnel to check each waste sorting and storage areas for cleanliness, hygiene and OH&S issues.

6.3.3 Waste Collection Area

Waste and recyclables will be transported to a designated waste collection area the evening or morning prior to the scheduled collection time. Where possible collection times should not coincide with peak operational delivery schedules however all areas identified will not interfere with operational truck movements.

6.3.4 Bulky / Hazardous Waste Management

Sufficient space will be provided within the development for the storage of large and/or bulky items (eg. broken pallets, broken storage units and e-waste (recyclable electronic equipment, including televisions, batteries, fluorescent tubes and smoke detectors)) that cannot be disposed of in the general or recyclable waste stream.

Space will also be allocated to store reusable items such as crates so that storage in a public place is avoided.

Management may consider organising a skip on a monthly basis or as required to remove bulky waste items, or engage a contractor to collect and transport these items for reuse, recycling or disposal at an EPA licensed facility.

A suitably licensed e-waste recycling contractor will be engaged to collect and recycle all e-waste items generated at the facility.

6.3.5 Liquid Waste

- Liquid, semi-liquids or moist substances will not be placed in waste containers, unless securely wrapped or contained to prevent the substance from leaking.
- Any liquid wastes or dangerous goods wastes generated by the development (e.g. due to damage or leakage of containment) should be disposed of by a suitably qualified contractor to an appropriately licensed disposal facility.
- No liquid wastes or wash down waters should be disposed of via the stormwater drainage system. Wastewater storage tanks (including stormwater collection tanks) should be carefully monitored to ensure overflow does not occur.

6.3.6 Stormwater Treatment

Car parking areas must drain to a stormwater treatment device capable of removing litter, oil, grease and sediment prior to discharge to the stormwater system.

All wastewater and stormwater treatment devices are required to be regularly maintained and cleaned to ensure these devices remain effective, with all solid and liquid wastes collected from these devices disposed of in accordance with this WMP and the POEO Act.

6.3.7 Spills Management

Containment measures for spillages should be provided at appropriate locations and in close proximity to staff car park areas, dangerous goods stores areas and main warehouse operation areas (e.g. a spill kit containing non-combustible absorbent material). Material Safety Data Sheets (MSDS) should also be located nearby spill kit areas for advice on spillage clean up and disposal.

6.4 Waste Avoidance, Reuse and Recycling Measures

Some examples of how the reduction, re-use and recycling of waste can be achieved are listed below.

6.4.1 Waste Avoidance

- provision of take back services to clients to reduce waste further along the supply chain;
- re-work/re-packaging of products prior to local distribution to reduce waste arisings;
- review of packaging design to reduce waste but maintain ‘fit for purpose’; and
- investigate leasing office equipment and machinery rather than purchase and disposal.

6.4.2 Re-use

- establish systems with in-house and with supply chain stakeholders to ship products in reusable packaging where possible

6.4.3 Recycling

- development of ‘buy recycled’ purchasing policy
- flatten or bale cardboard to reduce number of bin lifts required
- provide recycling collections within each of the offices (e.g. plastics, cans and glass)

6.5 Signage

Education and communication must be regular and ongoing to overcome the transient nature of contractors and visiting staff members. The main signage aspects to consider are:

- general waste (garbage) and recycling bins and storage areas must be clearly and correctly labelled / indicated at all times;
- waste storage areas must have clear signage instructing cleaners and tenants how to correctly separate (if required);
- the location of, and directions to, waste storage areas must be well signposted;
- all hazards or potential dangers associated with the waste facilities should be clearly identified, especially those linked to compaction or other waste handling equipment; and
- emergency contact information should be displayed in case there are any issues with the waste and recycling systems/services in the building.

All signage should conform to the relevant Australian Standard and the NSW EPA's standard recycling signs. The design and use of safety signs for waste rooms and enclosures should comply with AS 1319 Safety signs for the occupational environment. Australian Standards are available from the SAI Global Limited website (www.saiglobal.com).

6.6 Communication Strategies

Waste management initiatives and management measures should be clearly communicated to building managers, owners, tenants and cleaners. Benefits of providing this communication include:

- improved satisfaction with services;
- increased ability and willingness to participate in recycling;
- improved amenity and safety;
- improved knowledge and awareness through standardisation of services;
- increased awareness or achievement of environmental goals and targets;
- reduced contamination of recyclables stream;
- increased recovery of recyclables and organics (where implemented) material; and
- greater contribution to state-wide targets for waste reduction and resource recovery.

To realise the above benefits, the following communication strategies should be considered:

- use consistent signage and colour coding throughout the development;
- ensure all staff are trained in correct waste separation and management procedures;
- provide directional signage to show location of and routes to waste storage areas;
- co-mingled and general waste bins should be clearly labelled to ensure no cross contamination;
- general garbage and co-mingled recycling bins should be colour-coded with clear labels identifying the type of waste that may be disposed of in each bin, where applicable;
- any employees / contractors should adhere to the WMP for compliance, in consultation with Management; and
- repair signs and labels promptly to avoid breakdown of communications.

All signage should conform to the relevant Australian Standard and the NSW EPA's standard recycling signs. The design and use of safety signs for waste rooms and enclosures should comply with AS 1319 Safety signs for the occupational environment. Australian Standards are available from the SAI Global Limited website (www.saiglobal.com).

6.7 Contract Clauses

Waste collection contracts and cleaning contracts should include clauses relating to waste servicing requirements. Lease agreements should also outline and enforce proper use of waste facilities.

Refer to Appendix H of the EPA's *Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities* (2012) for example clauses.

6.8 Monitoring and Reporting

Visual assessment of bins prior to collection should be undertaken by Management within the first few months of RACF rooms being occupied to ensure the waste management system is sufficient for the developments' needs, and on a half-yearly basis to ensure employees are disposing of waste and recycling correctly. Where visual audits show that recycling is not carried out effectively, signage should be re-examined.

6.9 Roles and Responsibilities

It should be the responsibility of Management to implement the WMP and a responsibility of the employees/building caretakers/cleaners to ensure that they comply with the guideline at all times.

Management should routinely check waste sorting and storage areas for cleanliness, hygiene and OH&S issues, and also ensure all monitoring and audit results are well documented and carried out as specified in the WMP.

An outline of waste management responsibilities are presented in Error! Reference source not found..

Table 13 Waste Management Responsibility Allocation

Responsible Person	General Tasks
Building Management	Ensure the WMP is implemented throughout the life of the operation.
	Update the WMP on a regular basis (e.g. annually) to ensure the Plan remains applicable.
	Undertake liaison and management of contractor collections.
	Perform a visual waste inspection of bin fullness once RACF rooms have been fully occupied.
	Manage any complaints and non-compliances reported through waste audits etc.
	Perform inspections of all waste storage areas on a regular basis for cleanliness.
	Organise cleaning and maintenance requirements for waste storage areas and bins as required.
	Ensure effective signage, communication and education is provided to alert new residents/cleaners about the provisions of this WMP.
	Monitor and maintain signage to ensure it remains clean, clear and applicable.
	Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.
Cleaners / Caretaker / Employees	Monitor bins to ensure no overfilling occurs.
	Ensure waste and recycling storage areas are kept tidy.
	Ensure segregation of clinical wastes from general waste and recycling.
	Transfer of bins to the waste storage area and collection point as required.
	Cleaning of all bins and waste and recycling area as required.
Gardening Contractor	Collection and removal (as applicable) of all garden organics generated during gardening maintenance activities for recycling or reuse as organic mulch on landscaped gardens.
	Removal of any large garden organics waste materials which are too large to be recycled via contractor collections (if applicable).