



Project Marvel

Waste Management Plan

Mapletree

Suite 9.01, Level 9
580 George St, Sydney, NSW, 2000

Prepared by:

SLR Consulting Australia

Tenancy 202 Submarine School, Sub Base
Platypus, 120 High Street, North Sydney NSW
2060, Australia

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Basis of Report

This report has been prepared by SLR Consulting Australia (SLR) with all reasonable skill, care and diligence, and taking account of the timescale and resources allocated to it by agreement with Mapletree (the Client). Information reported herein is based on the interpretation of data collected, which has been accepted in good faith as being accurate and valid.

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1.0 Introduction

SLR Consulting Australia Pty Ltd (SLR) has been commissioned by Mapletree SR Australia Management Pty Ltd, (the Client) to prepare a waste management plan (WMP) in support of a state significant development application (SSDA). This application seeks approval for a warehouse development at 20 Kelso Crescent, Moorebank (the Development). The site is located within Liverpool City Council’s (Council) area.

This WMP applies to the waste generated from construction and operational stages of the Development and has been prepared using architectural drawings supplied by the Client.

The development will be the subject of an SSDA and industry specific SEARs will apply. These are shown in Table 1 below. SLR has also referred to the Liverpool Development Control Plan 2008¹ to assist in preparing this waste management plan.

Table 1 Conditions for Waste Management

Waste Conditions	Relevant Sections in this WMP
<p>Waste Management</p> <ul style="list-style-type: none"> Identify, quantify and classify the likely waste streams to be generated during construction and operation 	<p>For waste classification please refer to:</p> <ul style="list-style-type: none"> Table 3 Potential waste types and their management methods and Table 9 Potential operational waste types, classifications and management methods <p>For waste quantities please refer to:</p> <ul style="list-style-type: none"> Table 5 Estimated types and quantities of demolition waste Table 7 Estimated types and quantities of construction waste and Table 11 Estimated operational waste and recycling quantities. <p>For proposed storage, handling and disposal requirements for demolition and construction waste please refer to:</p> <ul style="list-style-type: none"> Section 6.6 Reuse, Recycling and Disposal Section 6.7 Waste Storage and Servicing Section 6.10 Monitoring and Reporting and Section 6.11 Roles and Responsibilities <p>For proposed storage, handling and disposal requirements for operational waste please refer to:</p> <ul style="list-style-type: none"> Section 7.4 Waste Storage Area Size Section 7.5 Waste Movements, Collection and Servicing Section 7.8 Cleaning, Maintenance and Security Section 7.10 Roles and Responsibilities

¹ <https://www.liverpool.nsw.gov.au/development/liverpools-planning-controls/liverpool-development-control-plan>



Waste Conditions	Relevant Sections in this WMP
<ul style="list-style-type: none"> Provide the measures to be implemented to manage, reuse, recycle and safely dispose of this waste. 	Please refer to: <ul style="list-style-type: none"> Section 6.6 Reuse, Recycling and Disposal Section 6.7 Waste Storage and Servicing
<ul style="list-style-type: none"> Identify appropriate servicing arrangements for the site 	Please refer to: <ul style="list-style-type: none"> Section 6.7 Waste Storage and Servicing
<ul style="list-style-type: none"> If buildings are proposed to be demolished or altered, provide a hazardous materials survey 	This is not covered by this waste management plan but will be subject to a separate report

2.0 Objectives

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

The specific objectives of this WMP are as follows:

- To encourage the minimisation of waste production and maximisation of resource recovery.
- To assist in ensuring that any environmental impacts during the operational life of the Development comply with the SEARs guided by Council's requirements and other relevant regulatory authorities.

3.0 Project Description

The proposed development will comprise of a double storey ramp up warehouse with mezzanine office over a minimum total gross floor area of 34,410 m². The site has access from both Kelso Crescent and Seton Road. This is shown in Figure 1 below.





Figure 1 Site location

The development involves demolition of existing buildings and structures on the site and construction of the proposed two storey building to accommodate five warehouses and associated offices, car parking and hardstands. These are shown in Figure 2 and Figure 3 below.



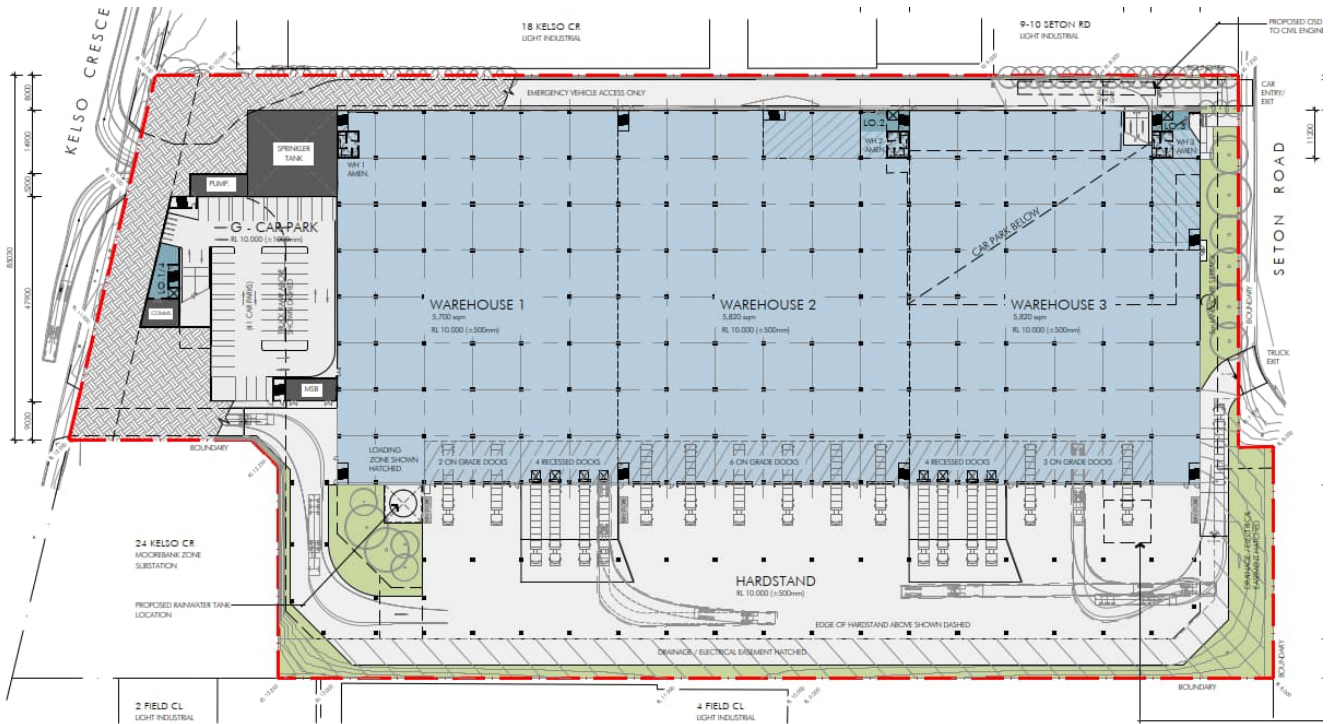


Figure 2 Level 1

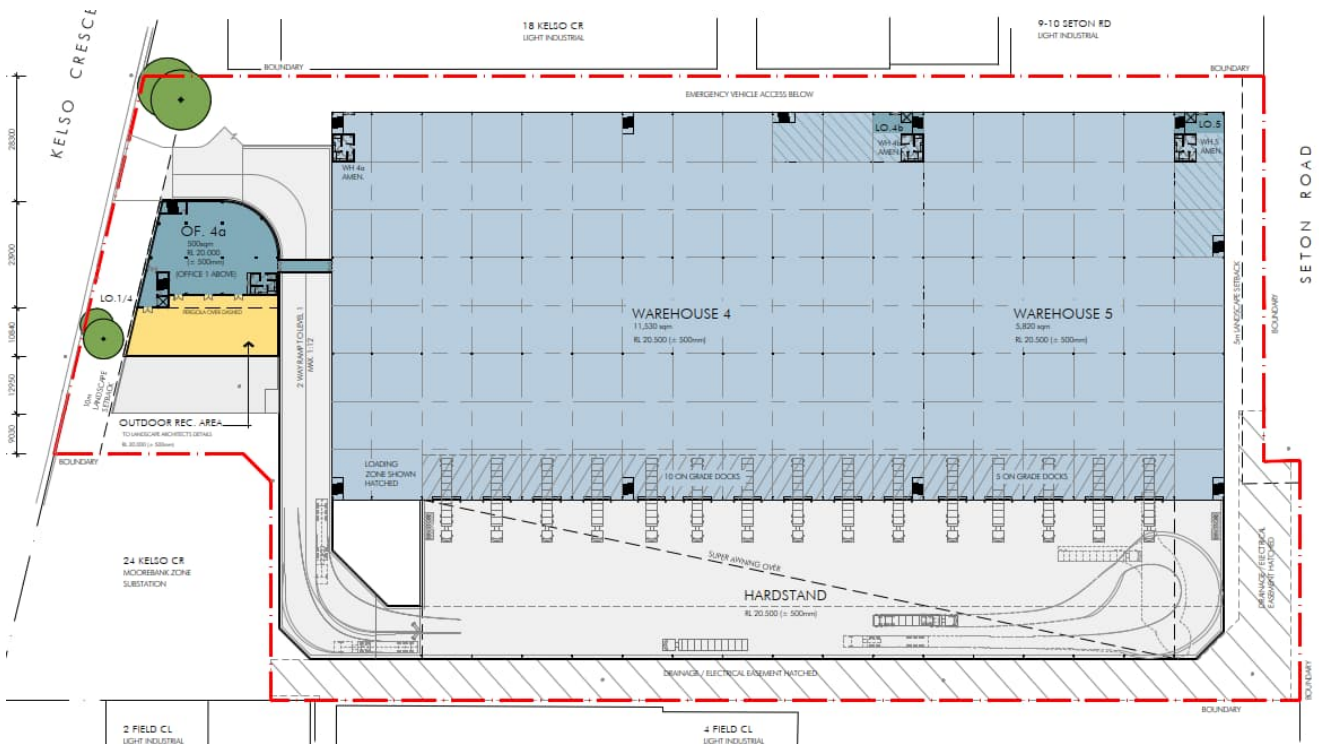


Figure 3 Level 2



4.0 Better Practice Waste Management and Recycling

4.1 Waste Management Hierarchy

This WMP has been prepared in line with the waste management hierarchy shown in Figure 4, which summarises the objectives of the *Waste Avoidance and Resource Recovery Act 2001*.

The waste management hierarchy comprises the following principles, from most to least preferable:

- Waste **avoidance**, prevention or reduction of waste generation. Achievable through better design and purchasing choices.
- Waste **reuse**, reuse without substantially changing the form of the waste.
- Waste **recycling**, treatment of waste that is no longer usable in its current form to produce new products.
- Energy **recovery**, processing of residual waste materials to recover energy.
- Waste **treatment**, reduce potential environmental, health and safety risks.
- Waste **disposal**, in a manner that causes the least harm to the natural environment.

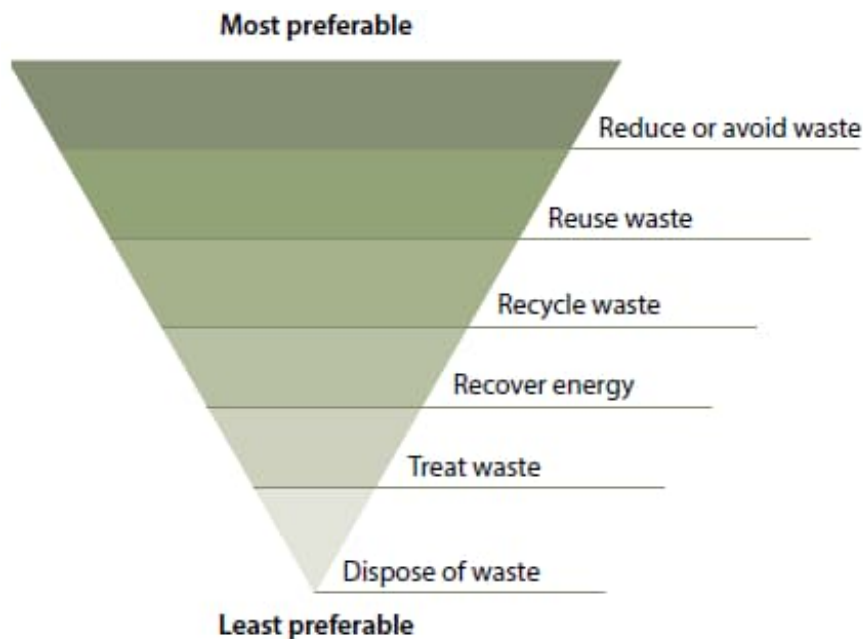


Image from NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21.

Figure 4 Waste management hierarchy

4.2 Benefits of Adopting Better Practice

Adopting better practice principles in waste minimisation offers significant benefits for organisations, stakeholders and the wider community. Benefits from better practice waste minimisation include:

- Improved reputation of an organisation due to social and environmental responsibility.



- Lowered consumption of non-renewable resources.
- Reduced environmental impact, for example, pollution, from materials manufacturing and waste treatment.
- Reduced expenses from lower waste disposal.
- Providing opportunities for additional revenue streams through beneficial reuse.

5.0 Waste Legislation and Guidance

5.1 Liverpool Development Control Plan 2008

5.1.1 Part 1 General Controls for all Development

5.1.1.1 14. Demolition of Existing Developments

Section 14 of Part 1 of the DCP relates to demolition of existing developments. The relevant sections state that:

Demolition

6. Asbestos, if identified in the building, must be removed and disposed of in accordance with the requirements of Work Cover. Where the amount or type of asbestos materials to be removed requires a licensed asbestos contractor to undertake the removal and disposal, both Council and the Principle Certifying Authority must be advised in writing of the name, address and asbestos license details of the contractor undertaking that work and the name and address of the facility to which the materials will be taken.

11. A Waste Management Plan (WMP) is to be submitted with the Development Application. The WMP must include realistic estimates of the volume or area of all types of waste material to be generated from the demolition and excavation activities. Details of how each of those materials will be re-used, recycled or disposed of is to be provided, including the locations to which the materials will be taken.

12. The waste management plan together with proof of lawful disposal for all waste that is disposed of, or otherwise recycled from the site must be retained on site. Proof is to include a log book with associated receipt/invoices, waste classification, and site validation certificate. All entries must include:

- *Time and Date*
- *Description and size of waste*
- *Waste facility used*
- *Vehicle registration and company name*

Both the log book and the associated receipts (sic) must be made available for inspection by authorised Council Officer at any time during site works.

16. All construction and demolition waste must be inspected, graded and sorted in accordance with current EPA standards. Once sorted, it must be either recycled or disposed of according to its classification.



5.1.1.2 25. Waste Disposal and Re-use Facilities

Section 25 covers waste storage facilities in new developments. The relevant sections state:

This section applies to all applications that propose:

2. Demolition of an existing building.
3. Construction of any development including alterations and additions.
4. Any development that requires a waste bay or the like.

Non-residential development

Note: Council does not provide waste services to non-residential premises. Owners and operators of non-residential premises must engage a private commercial waste contractor to remove and legally dispose of the waste their premises generates.

1. Development applications for all non-residential development must be accompanied by a waste management plan that addresses:

- best practice recycling and reuse of construction and demolition materials,
- use of sustainable building materials that can be reused or recycled at the end of their life,
- handling methods and location of waste storage areas, such that handling and storage has no negative impact on the streetscape, building presentation or amenity of occupants and pedestrians, and
- procedures for the on-going sustainable management of green and putrescible waste, garbage, glass, containers and paper, including estimated volumes, required bin capacity and on-site storage requirements.

Waste Management Facilities

1. Waste management facilities shall be provided for in all new buildings (except dwelling houses, Attached dwellings, Semi-Detached Dwellings and Dual Occupancy). These shall be designed to ensure that the storage and collection of waste and recyclables is user friendly for both the occupant and the waste collection contractor.

- The area must be suitably located on premises in terms of accessibility for both the occupants and the waste and recycling contractor.

3. Provision of ongoing waste management facilities shall include:

- Bin bays are to be well ventilated and screened to a minimum height of 1.5m by a structure and landscaping. Construction materials are to be compatible with the proposed development and adjoining development.

- Bin bays or waste service rooms are to be sufficiently open and well lit to allow safe use after dark



- A hose cock for hosing the garbage bin bay and a sewer drainage point are to be provided in or adjacent to the bin storage area. The drainage point should have a fine grade drain cover sufficient to prevent coarse pollutants from entering the sewer. If the hose cock is located inside the bin storage bay it is not to protrude into the space indicated for the placement of bins. Responsibility for cleaning of all waste storage areas should be determined when designing the system and clearly stated in the waste management plan.

Access to waste and recycling storage

4. Waste service rooms or compartments where provided, shall be enclosed and of design compatible with the proposed development. Adequate ventilation shall be provided for the room or compartment. Suitable arrangements for transfer of any interim storage to the main bin bay are to be indicated in the WMP.

5. Waste and recycling collection vehicles should be able to service the development efficiently and effectively and with no need to reverse.

Other Waste Considerations

4. Signage should be in English, and consideration given to other languages reflective of the most recent demographics of Liverpool LGA. Illustrative graphics will form a minimum 50% of the area of the signage. Council can provide appropriate bin bay usage signs if required. Signage is to be prominently posted in each bin bay, or waste service room indicating that:

- Garbage is to be placed wholly within the garbage bins provided.
- The area is to be kept tidy.

5.1.2 Part 7 Development in Industrial Areas

5.1.2.1 6. Building Design, Streetscape and Layout

Service Areas

Service areas including waste, recycling areas and external storage areas are to be located away from principal street frontages and screened from view.

5.1.2.2 10. Site Services

Waste management

Owners are to provide their own waste management services. These facilities will vary depending on the needs of the site. Any waste management equipment must not be visible from the street. Waste bins must be provided in a designated area that is easily and safely accessible for workers.

5.2 Other Legislation and Guidance

The legislation and guidance outlined in Table 2 below should be referred to during the demolition, construction and operational phases of the Development.



Table 2 Legislation and guidance

Legislation and Guidance	Objectives
State and National legislation and guidelines	
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 of Australian Governments National Construction Code 2016	The National Construction Code 2016 sets the minimum requirements for the design, construction and performance of buildings throughout Australia.
NSW EPA's Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities 2012	These better practice guidelines present information on waste minimisation and resource recovery as well as information on commonly used waste management provisions. The guidelines also provide benchmarks for assessing waste production rates in Australia.
NSW Waste and Sustainable Materials Strategy 2041: Stage 1 – 2021-2027	Replacing the <i>NSW Waste Avoidance and Resource Recovery Strategy (2014-21)</i> , the NSW Waste and Sustainable Materials Strategy 2041 focuses on the transition of NSW to a circular economy. The strategy focuses on minimising what is thrown away, and to use and reuse resources more efficiently, making them as productive as possible. The strategy identifies the need to identify infrastructure needs, the mandating of separation of some organic waste streams, and incentivising biogas generation from waste materials.
NSW EPA Resource Recovery Orders and Resource Recovery Exemptions	The NSW EPA has issued a number of resource recovery orders and resource recovery exemptions under the POEO (Waste) Regulation 2014 for a range of waste types that may be recovered for beneficial re-use. These waste types typically include those from demolition and construction works, as well as operational waste such as food waste. <ul style="list-style-type: none"> Resource recovery orders present conditions which generators and processors of waste must meet to supply the waste material for beneficial re-use. Resource recovery exemptions contain the conditions which consumers must meet to use waste for beneficial re-use.
NSW EPA's Waste Classification Guidelines 2014	The NSW EPA <i>Waste Classification Guidelines</i> assists waste generators to effectively 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 <i>POEO Act 1997</i> and its associated regulations.
<i>Protection of the Environment Operations Act (POEO) 1997 and Amendment Act 2011</i>	The <i>POEO Act 1997</i> and <i>POEO Amendment Act 2011</i> are administered by the NSW Environment Protection Authority (NSW EPA) to enable the NSW Government to establish instruments for setting environmental standards, goals, protocols and guidelines. They outline the regulatory requirements for lawful disposal of waste generated during the demolition, construction and operational phases of a development, as well as the system for licencing waste transport and disposal.
The Work Health and Safety Regulation 2017	The Work Health and Safety Regulation 2017 provide detailed actions and guidance associated with the topics discussed in <i>The Work Health and Safety Act 2011</i> . The primary aim of the regulation is to protect the health and safety of workers and ensure that risks are minimised in work environments. Workplaces are to ensure that they are compliant with the requirements specified in the regulations. The regulations discuss items such as actions that are prohibited or obligated in work environments, the requirements for obtaining licences and registrations, and the roles and responsibilities of staff in workplaces.
<i>Waste Avoidance and Resource Recovery Act 2001</i>	The <i>Waste Avoidance and Resource Recovery Act 2001</i> aims to promote waste avoidance and resource recovery and repeals the <i>Waste Minimisation and Management Act 1995</i> . Specific objectives of the <i>Waste Avoidance and Resource Recovery Act 2001</i> include: <ul style="list-style-type: none"> encouraging efficient use of resources



Legislation and Guidance	Objectives
	<ul style="list-style-type: none">• minimising the consumption of natural resources and the final disposal of waste by encouraging the avoidance of waste and the reuse and recycling of waste• ensuring industry and the community share responsibility in reducing/dealing with waste, and• efficiently funding of waste/resource management planning, programs and service delivery. <p>As of 2016, the addition to the Act of Part 5 defines the legislative framework for the “Return and Earn Container Deposit Scheme” whereby selected beverage containers can be returned to State Government authorities for a monetary refund.</p>



6.0 Construction and Demolition Waste and Recycling Management

6.1 Targets for Resource Recovery

Targets for new development are expected to contribute to state-specific targets. The NSW Waste and Sustainable Materials Strategy 2041 (DPIE, 2021) sets a target of 80% average recovery rate from all waste streams by 2030. Analysis by DPIE (2021) indicates that construction and demolition waste recovery rates in 2018-2019 were 77%.

It is anticipated that the waste minimisation measures in the following sections will assist the Development to meet these targets. Waste reporting and audits can be used to determine the actual percentage of wastes that are being, or have been, recycled during the demolition and construction stages of the Development.

6.2 Waste Streams and Classifications

The demolition and construction of the Development is likely to generate the following broad waste streams:

- Construction waste
- Plant maintenance waste
- Packaging waste, and
- Work compound waste from on-site employees.

A summary of likely waste types generated from demolition and construction activities, along with their waste classifications and proposed management methods, is provided in Table 3.

For further information on how to classify a waste type refer to the NSW EPA (2014) *Waste Classification Guidelines*². Further information on managing demolition and construction waste is available from the NSW EPA website³.

Table 3 Potential waste types and their management methods

Waste Types	NSW EPA Waste Classification	Proposed Management Method
Construction		
Sediment fencing, geotextile materials	General solid waste (non-putrescible)	Reuse at other sites where possible or disposal to landfill
Concrete	General solid waste (non-putrescible)	Off-site recycling for filling, levelling or road base
Bricks and pavers	General solid waste (non-putrescible)	Cleaned for reuse as footings, broken bricks for internal walls, crushed for landscaping or driveway use, off-site recycling

² Available online from <https://www.epa.nsw.gov.au/your-environment/waste/classifying-waste/waste-classification-guidelines>

³ <http://www.epa.nsw.gov.au/your-environment/waste/industrial-waste/construction-demolition>



Waste Types	NSW EPA Waste Classification	Proposed Management Method
Gyprock or plasterboard	General solid waste (non-putrescible)	Off-site recycling or returned to supplier
Sand or soil	General solid waste (non-putrescible)	Off-site recycling
Metals such as fittings, appliances and bulk electrical cabling, including copper and aluminium	General solid waste (non-putrescible)	Off-site recycling at metal recycling compounds and remainder to landfill
Conduits and pipes	General solid waste (non-putrescible)	Off-site recycling
Timber	General solid waste (non-putrescible)	Off-site recycling, Chip for landscaping, Sell for firewood <i>Treated:</i> reused for formwork, bridging, blocking, propping or second-hand supplier <i>Untreated:</i> reused for floorboards, fencing, furniture, mulched second hand supplier Remainder to landscape supplies.
Doors, Windows, Fittings	General solid waste (non-putrescible)	Off-site recycling at second hand building supplier
Insulation material	General solid waste (non-putrescible)	Off-site disposal
Glass	General solid waste (non-putrescible)	Off-site recycling, glazing or aggregate for concrete production
Asbestos	Hazardous waste	Off-site disposal at a licenced landfill facility.
Fluorescent light fittings and bulbs	Hazardous waste	Off-site recycling or disposal; contact <i>FluoroCycle</i> for more information ⁴
Paint	Hazardous waste	Off-site recycling, Paintback collection ⁵ or disposal
Synthetic Rubber or carpet underlay	General solid waste (non-putrescible)	Off-site recycling; reprocessed and used in safety devices and speed humps
Ceramics including tiles	General solid waste (non-putrescible)	Off-site recycling at a crushing and recycling company
Carpet	General solid waste (non-putrescible)	Off-site recycling or disposal; reused for landscaping, insulation or equestrian uses
Plant Maintenance		
Empty oil and other drums or containers, such as fuel, chemicals, paints, spill clean ups	Hazardous waste: Containers were previously used to store Dangerous Goods (Class 1, 3, 4, 5 or 8) and residues have not been removed by washing or vacuuming. General solid waste (non-putrescible): 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.

⁴ Available online from <http://www.fluorocycle.org.au/> or <http://www.environment.gov.au/settlements/waste/lamp-mercury.html>

⁵ Available online from <https://www.paintback.com.au/>



Waste Types	NSW EPA Waste Classification	Proposed Management Method
Air filters and rags	General solid waste (non-putrescible)	Off-site disposal
Oil filters	Hazardous waste	Off-site recycling
Batteries	Hazardous waste	Off-site recycling, Contact the Australian Battery Recycling Initiative ⁶ for more information
Packaging		
Packaging materials, including wood, plastic, including stretch wrap or LLPE, cardboard and metals	General solid waste (non-putrescible)	Off-site recycling
Wooden or plastic crates and pallets	General solid waste (non-putrescible)	Reused for similar projects, returned to suppliers, or off-site recycling. Contact <i>Business Recycling</i> for more information ⁷
Work Compound and Associated Offices		
Food Waste	General solid (putrescible) waste	Dispose to landfill with general garbage
Recyclable beverage containers including glass and plastic bottles, aluminium cans and steel cans	General solid waste (non-putrescible)	Co-mingled recycling at off-site licensed facility or deliver to local NSW container deposit scheme 'Return and Earn' facility ⁸
Clean paper and cardboard	General solid waste (non-putrescible)	Paper and cardboard recycling at off-site licensed facility
General domestic waste generated by workers such as soiled paper and cardboard and polystyrene	General solid waste (non-putrescible) mixed with putrescible waste	Disposal at landfill

6.3 Demolition Waste Types and Quantities

6.3.1 Demolition Waste Generation Rates

Council's documents provide no demolition waste generation rates. As an alternative, SLR has adopted the 'factory' waste generation rates from Appendix A of *The Hills' Development Control Plan* for estimating the type and quantities of waste generated from demolition of the proposed buildings.

⁶ <http://www.batteryrecycling.org.au/home>

⁷ Available online from <http://businessrecycling.com.au/search/>

⁸ Available online from <http://returnandearn.org.au/>



The demolition waste generation rates used are shown in Table 4 below.

Table 4 Demolition waste generation rates

Rate Type	Area (m ²)	Waste types and quantities (m ³)				
		Timber/ Gyprock	Concrete	Bricks	Metal	Other
Factory	1,000	4	448	205	23	18
Hardstand ⁹	1,000		300		60	50

6.3.2 Buildings for Demolition

The current site layout with boundary is shown in Figure 5 below with buildings numbered and hardstand area shown.

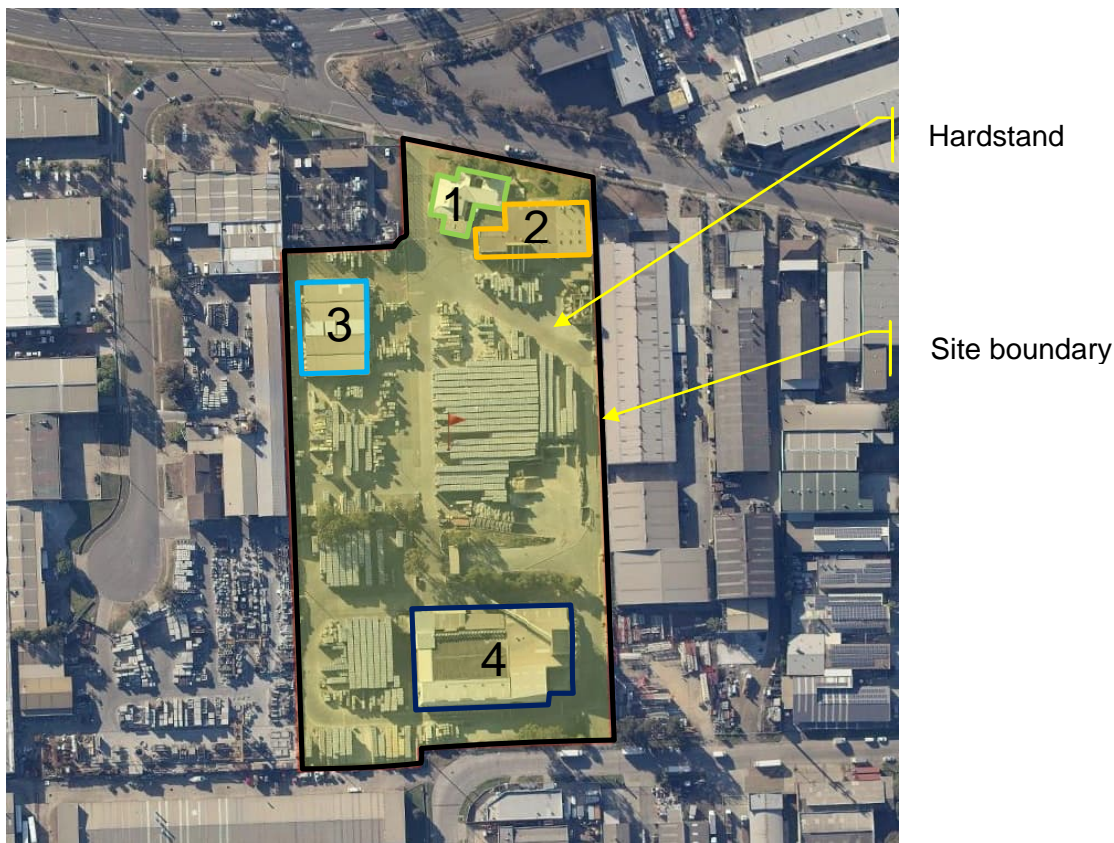


Figure 5 Current site layout with boundary

Images from Six Maps and Google Earth show that the buildings appeared to be mostly constructed as follows:

- Building 1 – Single storey building with brick walls and corrugated metal roof.
- Building 2 – Single storey warehouse with cement block walls and bonded metal roof

⁹ Assumed depth of 300 mm



- Building 3 – Single storey warehouse with bonded metal walls and roof
- Building 4 – Single storey warehouse with cement block walls, bonded metal roof and tower.

The site also appears to have once stored a large number of pallets of tiles. These are assumed to have been removed from the site and the site is otherwise empty and vacant.

The image from SixMaps (Figure 5) has been used to calculate the areas of each building and hardstand areas. These areas are shown in Table 5 along with estimates of the quantities of demolition waste that may be generated.

Table 5 Estimated types and quantities of demolition waste

Area	Approximate GFA (m ²)	Waste types and quantities (m ³)				
		Timber/ Gyprock	Concrete	Bricks	Metal	Other
Building 1	632	2.5	283	130	14.5	11.4
Building 2	1,125	4.5	504	231	26	20
Building 3	1,167	4.7	523	239	26.8	21.0
Building 4	2,813	11	1,260	577	64.7	50.6
Hardstand	29,233	-	8,770	-	1,754	1,462
Totals	34,970	23	11,340	1,176	1,886	1,565

6.4 Construction Waste Types and Quantities

The Liverpool DCP does not provide waste generation rates for construction activities, so SLR has adopted the waste generation rates from Appendix A of The Hills Development Control Plan 2012 for estimating the type and quantities of waste generated from construction of the Development.

SLR has adopted the 'Factory' and 'Office' rates to measure waste expected from the Development, as the construction of a factory and office is the most relevant in representing the construction of an industrial warehouse and office precinct.

SLR has also referenced *Light Duty Asphalt Pavements - Design, Specification and Construction 2002* Australian Asphalt Pavement Association, specifically Table 10 Passenger Car Parking Areas, up to 50-500 Bays, for estimating the amounts of materials required for car park construction and assumed 10% waste.



The construction waste generation rates used are shown in Table 6 below.

Table 6 Construction waste generation rates

Rate Type	Per Area (m ²)	Waste types and quantities (m ³)								
		Timber	Concrete	Bricks	Gyprock	Sand or Soil	Metal	Other	Asphalt	Granular Base
Factory	1,000	0.25	2.1	1.65	0.45	4.8	0.6	0.5	0	0
Offices	1,000	5.1	18.8	8.5	8.6	8.8	2.75	5.0	0	0
Car Park 50-500 bays	100	0	0.225	0	0	0	0	0	0.3	1.25
Hardstand	1,000	0	2.1	0	0	4.8	0.6	0.5	0	0

Estimates of the quantities of construction waste generated from the Development are shown in Table 7 below.

Table 7 Estimated types and quantities of construction waste

Building	Element	Area (m ²)	Waste types and quantities (m ³)								
			Timber	Concrete	Bricks	Gyprock	Sand or Soil	Metal	Other	Asphalt	Granular Base
1	Warehouse	5,700	1.4	9.4	2.6	27.4	3.4	2.9	-	12.0	-
	Offices	500	2.6	4.3	4.3	4.4	1.4	2.5	-	9.4	-
2	Warehouse	5,820	1.5	9.6	2.6	27.9	3.5	2.9	-	12.2	-
	Offices	350	1.8	3.0	3.0	3.1	1.0	1.8	-	6.6	-
3	Warehouse	5,820	1.5	9.6	2.6	27.9	3.5	2.9	-	12.2	-
	Offices	350	1.8	3.0	3.0	3.1	1.0	1.8	-	6.6	-
4	Warehouse	11,530	2.9	19.0	5.2	55.3	6.9	5.8	-	24.2	-
	Offices	850	4.3	7.2	7.3	7.5	2.3	4.3	-	16.0	-
Car park		7,650	-	-	-	-	-	-	19.1	17.2	76.5
Hardstand		1,980	-	-	-	9.5	1.2	1.0	-	4.2	-
Total		40,550	17.7	65.1	30.6	166.1	24.1	25.7	19.1	120.5	76.5

The areas shown in Table 7 are based on the areas shown in *12865_DA-101[5].pdf*.

6.5 Waste Avoidance

In accordance with the Liverpool DCP and better practice waste management, the Building Contractor, Building Designer and/or equivalent roles will:

- Develop a purchasing policy based on the approximate volumes of materials to be used so that the correct quantities are purchased.
- Arrange for delivery of materials on an 'as needed' basis to avoid material degradation through weathering and moisture damage.
- Communicate strategies to handle and store waste to minimise environmental, health and amenity impacts.



- Select materials with a low environmental impact over the lifecycle of the building.
- Choose timber from certified plantations and avoid unsustainable timber imports including western red cedar, oregon, meranti, luan or merbau.
- Use leased equipment rather than purchase and disposal.
- Minimise site disturbance and unnecessary excavation.
- Incorporate existing trees and shrubs into the landscape plan.
- Grouping wet areas together to minimise the amount of pipe work required.
- Design the Development to require standard material sizes or make arrangements with manufacturing groups for the supply of non-standard material sizes.
- Design works for de-construction.
- Reduce packaging waste by:
 - Returning packaging to suppliers where practicable to reduce waste further along the supply chain
 - 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.
- Use prefabricated materials.
- Select materials for Project works with low embodied energy properties or materials that have been salvaged or recycled for the construction of the Development including concrete that utilises slag and fly ash content, structural and reinforced steel that uses recycled steel content or bulk insulation products that contain recycled content, such as recycled glass in glass-wool.
- Preferentially use paints, floor coverings and adhesives with low VOC (volatile organic compound) content.
- Reduce the use of polyvinyl chloride products.
- Implement measures to prevent the occurrence of windblown litter, dust and stormwater pollution.
- Ensure subcontractors are informed of and implement site waste minimisation and management procedures.

6.6 Reuse, Recycling and Disposal

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

Refer to Table 3 for an outline of the proposed reuse, recycling and disposal methods for potential demolition and construction waste streams generated by the Development.



In accordance with the Liverpool DCP and best practice waste management, the following specific procedures will be implemented:

- Ensure the site's project management of the site includes minimising waste generation, requiring the appropriate storage and timely collection of waste materials, and maximising re-use or recycling of materials.
- Store wastes on site appropriately to prevent cross-contamination and guarantee the highest possible re-use value.
- Consider the potential of any new materials to be re-used and recycled at the end of the Development's life.
- Determine opportunities for the use of prefabricated components and recycled materials.
- Strip topsoil from areas designated for excavation and store it on site for reuse.
- Reuse excavation material will be on-site where possible.
- Re-use formwork where appropriate.
- Retain roofing material cut-offs for re-use or recycling.
- Retain used crates for storage purposes unless damaged.
- Recycle cardboard, glass and metal wastes.
- Recycle or dispose of solid waste timber, brick, concrete, asphalt and rock, where such waste cannot be re-used on site, to an appropriately licenced construction and demolition waste recycling facility or an appropriately licenced landfill.
- Dispose of all asbestos and/or hazardous wastes in accordance with SafeWork NSW and NSW EPA requirements.
- Deliver batteries and florescent lights to drop off-site recycling facility.
- Return excess materials and packaging to the supplier or manufacturer.
- Dispose of all garbage via a council approved system.

6.7 Waste Storage and Servicing

6.7.1 Waste Segregation and Storage

Waste materials produced from demolition and construction activities are to be separated at the source and stored separately on-site. It is anticipated that the Development will provide enough space on-site for separate storage, for example, separate skip bins or appropriately managed stockpiles, of the following waste types:

- Bricks, concrete and scrap metal
- Metal and steel, in a condition suitable for recycling at metal recycling facilities
- Timber
- Glass
- Hardstand rubble
- Uncontaminated excavation spoil, if present



- Contaminated excavation spoil, if present
- Hazardous waste, if present
- Paper and cardboard
- General co-mingled recycling waste, and
- Non-recyclable general waste.

If there is insufficient space on-site for full segregation of waste types, the Site Manager, or equivalent role, will consult with the waste and recycling collection contractor to confirm which waste types may be co-mingled prior to removal from the site.

6.7.2 Waste Storage Areas

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

There will be separate containers or storage areas for waste and recycling materials. Waste and recycling containers will be located on site in areas designated for waste storage and away from public footpaths and land. All waste placed in skips or bins for disposal or recycling will 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.

Waste storage areas will also:

- Allow unimpeded access by site personnel and waste disposal contractors
- Consider environmental factors which could potentially cause an impact to the waste storage, such as slope, drainage and the location of watercourses and native vegetation
- Allow enough space for the storage of garden waste and other waste materials on-site
- Employ adequate environmental management controls to prevent off-site migration of waste materials and contamination from the waste. For example, consideration of slope, drainage, proximity relative to waterways, stormwater outlets and vegetation
- Consider visual amenity, safety, accessibility and convenience in their selection, and
- Not present hazards to human health or the environment.

6.7.3 Waste Servicing and Record Keeping

The Site Manager or equivalent role will:

- Arrange for suitable waste collection contractors to remove any construction waste from site
- Ensure waste bins are not filled beyond recommended filling levels
- Ensure that all bins and loads of waste materials leaving site are covered
- Maintain waste disposal documentation detailing, at a minimum:
- Descriptions and estimated amounts of all waste materials removed from site



- Details of the waste and recycling collection contractors and facilities receiving the waste and recyclables
- Records of waste and recycling collection vehicle movements, for example, date and time of loads removed, licence plate of collection vehicles, tip dockets from receiving facility, and
- Waste classification documentation for materials disposed to off-site recycling or landfill facilities.
- Ensure lawful waste disposal records are readily accessible for inspection by regulatory authorities such as Council, SafeWork NSW or NSW EPA, and
- Remove waste during hours approved by Council.

If skips and bins are reaching capacity, removal and replacement will be organised as soon as possible. All site generated building waste collected in the skips and bins will leave the site and be deposited in the approved site lawfully able to accept them.

6.8 Site Inductions

All staff, including sub-contractors and labourers, employed during the demolition and construction phases of the Development will undergo induction training regarding waste management for the Site.

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

- Legal obligations and targets
- Emergency response procedures on-site
- Waste priorities and opportunities for reduction, reuse and recycling
- Waste storage locations and separation of waste
- Procedures for suspected contaminated and hazardous wastes
- Waste related signage
- The implications of poor waste management practices, and
- Responsibilities and reporting, including identification of personnel responsible for waste management and individual responsibilities.

6.9 Signage

Standard signage will be posted in all waste storage and collection areas. All waste containers will be labelled correctly and clearly to identify stored materials.

Signs approved by the NSW EPA for labelling of waste materials are available online¹⁰ and will be used where applicable. A selection of signs prepared by NSW EPA is provided in Figure 6.

¹⁰ NSW EPA approved waste materials signage <https://www.epa.nsw.gov.au/your-environment/recycling-and-reuse/business-government-recycling/standard-recycling-signs>





Figure 6 Examples of NSW EPA labels for waste skips and bins

6.10 Monitoring and Reporting

The following monitoring practices are to be undertaken to improve demolition and construction waste management and to obtain accurate waste generation figures:

- Conduct waste audits of current projects where feasible.
- Note waste generated and disposal methods.
- Look at past waste disposal receipts.
- Record this information to track waste avoidance, reuse and recycling performance and to help in waste estimations for future waste management plans.

Records of waste quantities recycled, reused or contractor removed are to be maintained. This can include docket or receipts verifying recycling and disposal in accordance with this WMP. This evidence will also be presented to regulatory bodies when required.

Daily visual inspections of waste storage areas will be undertaken by site personnel and inspection checklists and logs recorded for reporting to the Site Manager 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 Building Contractor to gauge the effectiveness and efficiency of waste segregation procedures and recycling and reuse initiatives. Where audits show that the above procedures are not carried out effectively, additional staff training will be undertaken and signage re-examined.

6.11 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 Building Contractor to implement the WMP, and an employee and subcontractor responsibility to ensure that they always comply with the WMP.

Where possible, an environmental management representative will be appointed for the Development. Suggested roles and responsibilities are provided in Table 8.



Table 8 Suggested roles and responsibilities for demolition and construction waste management

Responsible Person	General Tasks
Construction Site Manager	Ensuring plant and equipment are well maintained.
	Ordering only the required amounts of materials.
	Keeping materials segregated to maximise reuse and recycling.
	Ultimately responsible for routinely checking waste sorting and storage areas for cleanliness, hygiene and safety issues, contaminated waste materials, and also ensuring that all monitoring and audit results are well documented and carried out as specified in the WMP.
Construction Environmental Manager or equivalent	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.
	Ensuring staff and contractors are aware of site requirements.
	Provision of training of the requirements of the WMP and specific waste management strategies adopted for the Development.
	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 project induction and contract engagement process.



7.0 Operational Waste Management

7.1 Targets for Resource Recovery

Targets for new development are expected to contribute to state-specific targets. The NSW *Waste and Sustainable Materials Strategy 2041* (DPIE, 2021) sets a target of 80% average recovery rate from all waste streams by 2030. Analysis by DPIE (2021) indicates that the commercial and industrial waste recovery rate in 2019 was 53%.

It is anticipated that the waste minimisation measures in the following sections will assist the Development to meet the state's targets. Waste reporting and audits can be used to determine the actual percentage of waste that are being, or have been, recycled during operation.

7.2 Waste Streams and Classifications

The operation of the Development is anticipated to generate the following broad waste streams:

- Domestic wastes generated by employees, including food waste
- Bulk packaging wastes, including polystyrene, plastic wrapping and cardboard boxes
- Office waste
- Garden organic waste from landscaped areas
- Bulky waste items such as furniture and e-waste, and
- Stores, plant and general maintenance wastes.

Potential ongoing waste types, their associated waste classifications, and management methods are provided in Table 9. For further information on how to determine a waste's classification, refer to the NSW EPA (2014) Waste Classification Guidelines. Suggestions for recycling drop off locations and contacts can be found on <https://businessrecycling.com.au/> for each waste type.

Table 9 Potential operational waste types, classifications and management methods

Waste Types	NSW EPA Classification	Proposed Management Method
General Operations		
Clean office paper	General solid (non-putrescible) waste	Paper recycling at off-site licensed facility
Cardboard including bulky cardboard boxes	General solid (non-putrescible) waste	Cardboard recycling at off-site licensed facility
Recyclable beverage containers, glass and plastic bottles, aluminium cans, steel cans	General solid (non-putrescible) waste	NSW container deposit scheme 'Return and Earn', container recycling at off-site licensed facility
Food waste	General solid (putrescible) waste	Dispose to landfill with general garbage
Batteries	Hazardous waste	Off-site recycling, alternatively contact the Australian Battery Recycling Initiative for more information
Mobile Phones	Hazardous waste	Off-site recycling; can be taken to the Mobile Muster program. Contact Mobile Muster for more information
Bulky polystyrene	General solid (non-putrescible) waste	Off-site recycling or disposal at landfill



Waste Types	NSW EPA Classification	Proposed Management Method
Furniture	General solid (non-putrescible) waste	Off-site reuse or disposal to landfill
E-waste	Hazardous waste	Off-site recycling
General garbage, including non-recyclable plastics	General solid (putrescible and non-putrescible) waste	Disposal at landfill
Maintenance		
Glass, other than containers	General solid (non-putrescible) waste	Off-site recycling
Light bulbs and fluorescent tubes	Hazardous waste	Off-site recycling or disposal, contact FluoroCycle ¹¹ or Lamp Recyclers ¹² for more information
Cleaning chemicals, solvents, area wash downs, empty oil or 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 licenced facility.
Garden organics - lawn mowing, tree branches, hedge cuttings, leaves	General solid (non-putrescible) waste	Reuse on-site or contractor removal for recycling at licenced facility

7.3 Waste quantities

As the Liverpool DCP has no operational waste generation rates for industrial facilities, SLR has adopted the 'Offices' and 'Warehouse' waste generation rates from Penrith City Council's *Industrial, Commercial and Mixed-Use Waste Management Guidelines* for estimating the type and quantities of waste generated from the operational activities of the Development. The operational waste generation rates used are shown in Table 10 below.

Table 10 Operational waste generation rates

Type of Pre mises	General Waste Generation (L/100 m ² /day)	Recycling Generation (L/100 m ² /day)
Warehouse	10	10
Offices	10	10

Using the waste generation rates in Error! Reference source not found. above, the approximate weekly waste quantities for the Development have been calculated based on the assumptions below:

- The floor areas shown on the drawing *12865_DA-101[5].pdf*
- A week comprising seven days of operation.

The estimated quantities of operational waste generated by the Development are shown in Table 11.

¹¹ <https://www.fluorocycle.org.au/>

¹² <https://www.lamprecyclers.com.au/>



Table 11 Estimated operational waste and recycling quantities

Building	Development area	Area (m ²)	(L/day)		(L/week)	
			General Waste	Recycling	General Waste	Recycling
1	Warehouse	5,700	570	570	3,990	3,990
	Office	500	50	50	350	350
	Total	6,200	620	620	4,340	4,340
2	Warehouse	5,820	582	582	4,074	4,074
	Office	350	35	35	245	245
	Total	6,170	617	617	4,319	4,319
3	Warehouse	5,820	582	582	4,074	4,074
	Office	350	35	35	245	245
	Total	6,170	617	617	4,319	4,319
4	Warehouse	11,530	1,153	1,153	8,071	8,071
	Office	850	85	85	595	595
	Total	12,380	1,238	1,238	8,666	8,666
5	Warehouse	5,820	582	582	4,074	4,074
	Office	350	35	35	245	245
	Total	6,170	617	617	4,319	4,319

7.4 Waste Storage Area Size

7.4.1 Garbage and Recycling Bins

The waste storage areas for the Development must be large enough to adequately store all quantities of operational waste and recycling between collections. Given the nature of the development and its size and scope, a front lift waste collection service is the most likely to be used by waste contractors.

The most common front lift bin capacity is 3 m³ and these have been assumed when calculating bin numbers and storage space for the warehouses.

The proposed bin and compactor dimensions are shown in Table 12.

Table 12 Dimensions and approximate footprint of bins

Bin Capacity	Source	Height (mm)	Depth (mm)	Width (mm)	Footprint (m ²)
3 m ³	Penrith DCP	1,540	1,520	2,060	3.31

To allow for ready access to 3 m³ bins by staff and a collection vehicle at the bin storage areas, at least 200% of the total minimum bin storage area has been allowed for. This can also act as a contingency in the event of spikes in waste generation.



The estimated number of bins required for weekly storage of operational waste and recycling generated by the Development are shown in Table 13 and are based on:

- The estimated quantities of operational waste and recycling shown in Table 11
- The bin dimensions shown in Table 12.

Table 13 Recommended number of bins and storage areas

Building	Bin Capacity	Collection Frequency per Week		Number of Bins Required		Total Number of Bins	Recommended Storage Area (m ²)
		Garbage	Recycling	Garbage	Recycling		
1	3 m ³	2	2	1	1	2	12.5
2	3 m ³	2	2	1	1	2	12.5
3	3 m ³	2	2	1	1	2	12.5
4	3 m ³	3	3	1	1	2	12.5
5	3 m ³	2	2	1	1	2	12.5

7.4.2 Space allowed for waste storage

Proposed locations for waste storage are shown in Figure 7 and Figure 8 below.

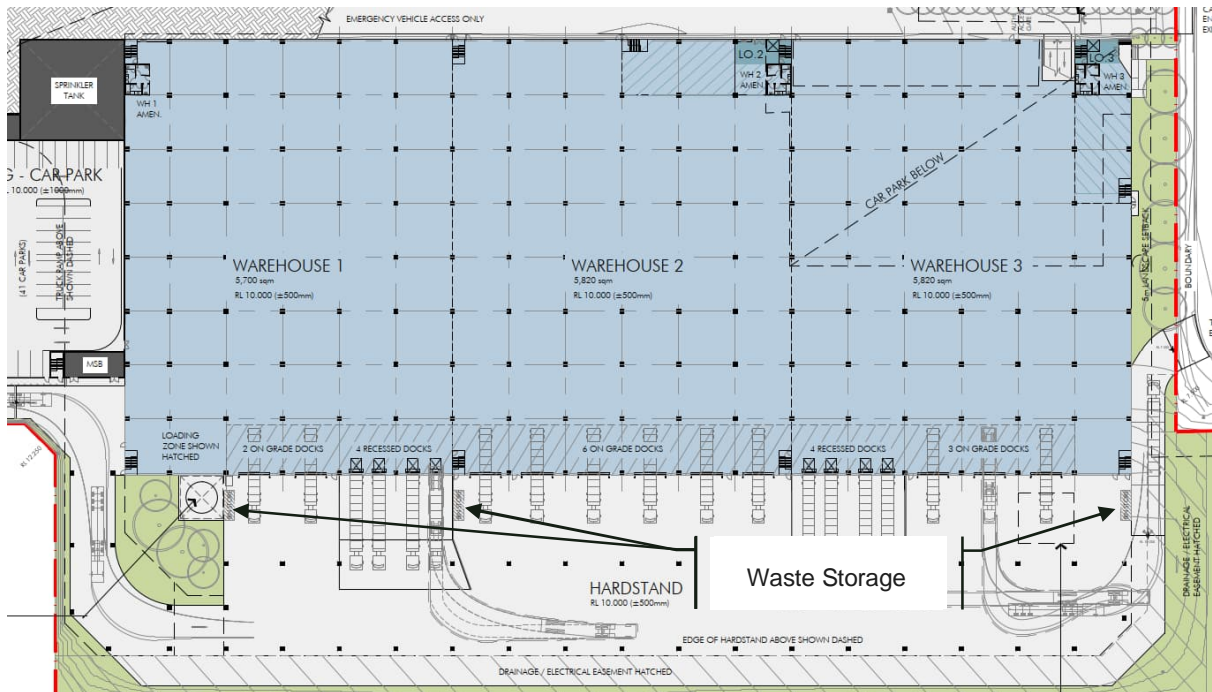


Figure 7 Level 1 proposed waste storage locations



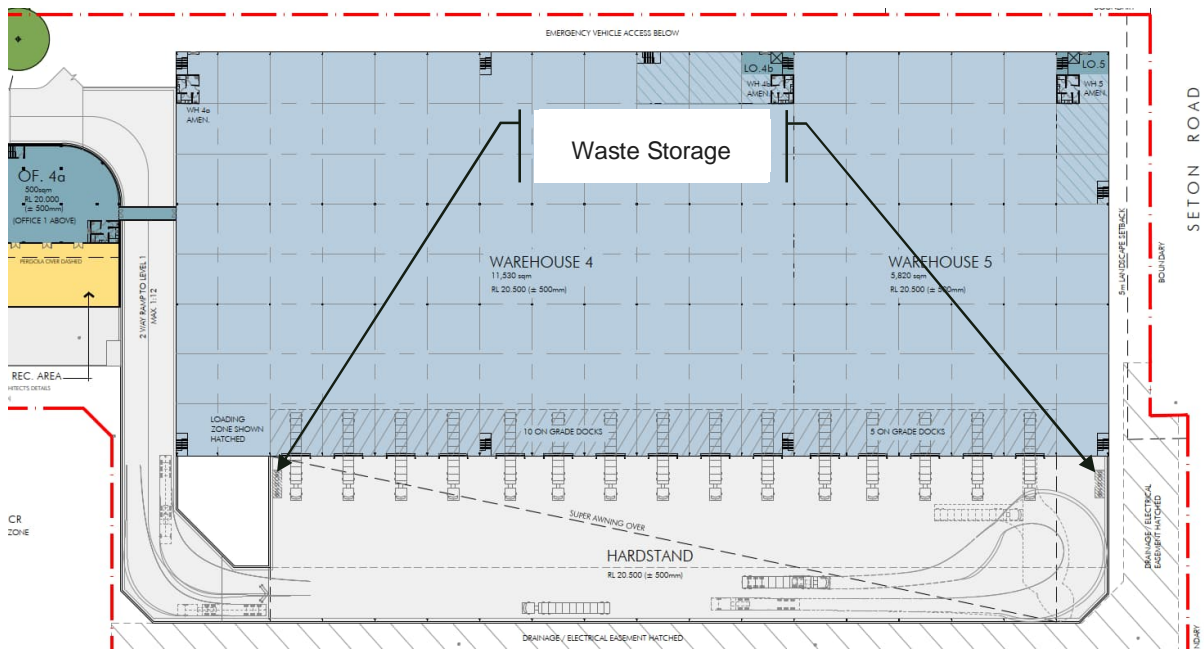


Figure 8 Level 2 proposed waste storage locations

7.5 Waste Movements, Collection and Servicing

Tenants will place waste in the bins in the waste storage areas. Front lift collection vehicles will enter the site in a forward direction and drive onto the bins, lift them into the collection vehicle, place them back in position and reverse off the bin before exiting the site in a forward direction.

Arrangements will be in place so that the waste and recycling storage rooms are not accessible to the general public.

7.6 Communication Strategies

Waste management initiatives and management measures will be clearly communicated to tenants employees, customers and cleaners as required. 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 material, if implemented, and
- greater contribution to targets for waste reduction and resource recovery, the environment and heritage conservation.

To realise the above benefits, the following communication strategies will 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 area
- General waste and recycling bins should be clearly labelled and colour-coded to ensure no cross contamination, where applicable
- Employees and cleaners should adhere to the WMP for compliance, in consultation with tenants, and
- Repair signs and labels promptly to avoid breakdown of communications.

7.7 Signage

The waste storage and collection areas will be provided with appropriate signage. These signs will clearly identify waste management procedures and provisions to contractors, tenants and visitors will be distributed around the Development.

Key signage considerations are:

- Clear and correct labelling on all waste and recycling bins, indicating the correct type or types of waste that can be placed into a given bin, as shown in Figure 9
- Signposts and directions to location of waste storage areas
- Clear signage in all waste storage areas to instruct users how to correctly separate waste and recycling
- Maintaining a consistent style colour scheme and system for signs throughout the Development
- Emergency contact information for reporting issues associated with waste or recycling management.

Colour-coded and labelled bin lids are necessary for identifying bins. Bins will be designed and colour-coded in accordance with the Australian Standard AS 4123: Mobile Garbage Containers.

All signage will conform to the relevant Australian Standard and use labels approved by the NSW EPA.¹³ The design and use of safety signs for waste rooms and enclosures will comply with Australian Standard AS 1319 Safety Signs for the Occupational Environment and clearly describes the types of materials designated for each bin.

¹³ NSW EPA waste signage and label designs <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>





Figure 9 Example of bin labels for operational waste

7.8 Cleaning, Maintenance and Security

Regular cleaning of waste and recycling storage areas will be undertaken by tenants. Tenants will erect and maintain suitable signage in waste storage areas (see Section 7.7). All waste storage areas will be secured and access only available to tenants, facilities managers and collection contractors.

7.9 Monitoring and Reporting

Monitoring will ensure waste and recycling management arrangements and provisions for the Development are functional, practical and are maintained to the standard outlined in this plan, at a minimum.

7.10 Roles and Responsibilities

It is the responsibility of the tenants to implement this WMP and a responsibility of all staff to follow the waste management procedures set out by the WMP. Any subcontractors enlisted by the Client will have roles and responsibilities identified and the Development's waste management system clearly explained. A summary of recommended roles and responsibilities is provided in Table 14.

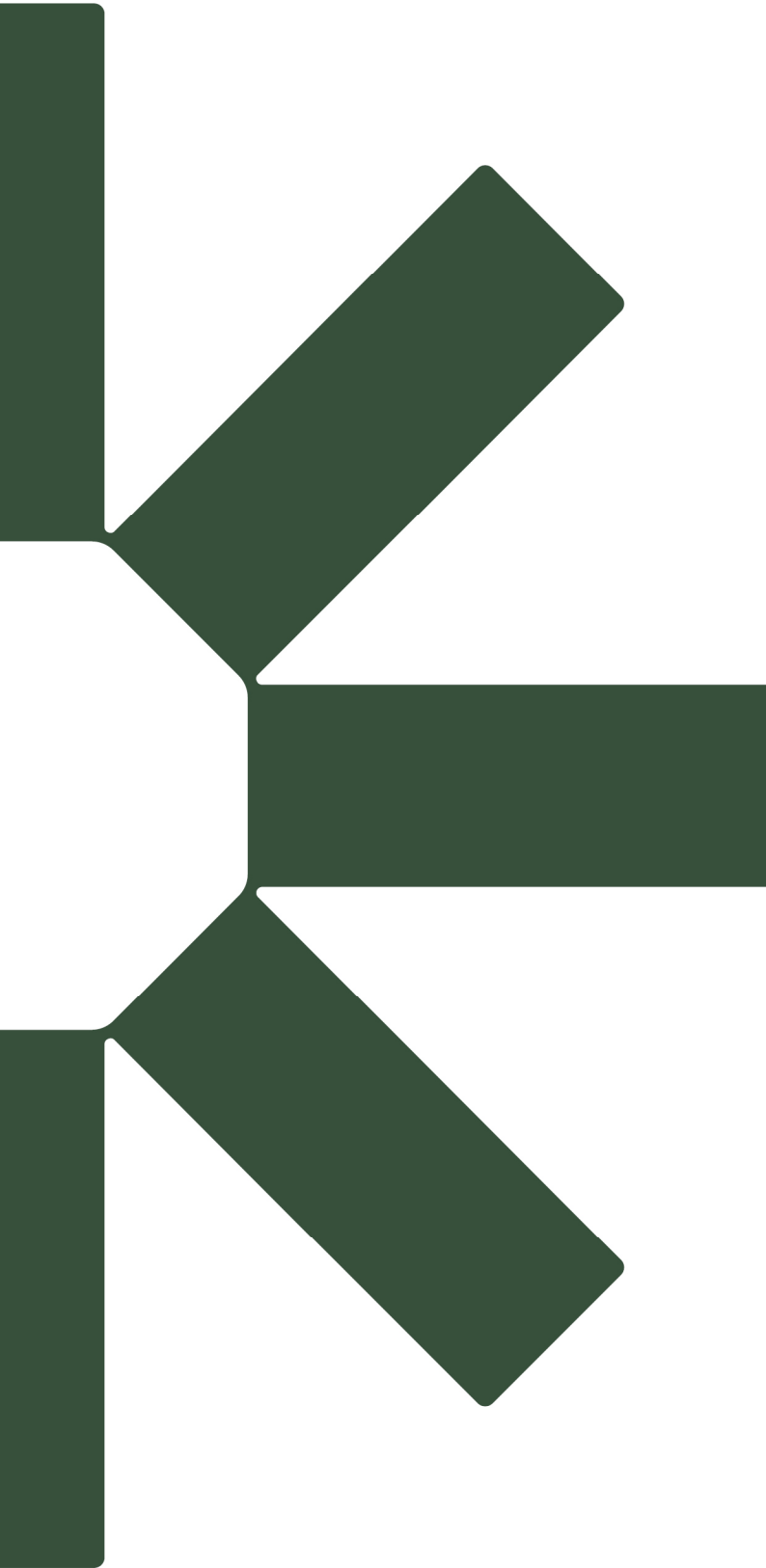
Table 14 Operational waste management responsibility allocation

Responsible Person	General Tasks
Tenants	Ensure the WMP is implemented throughout the life of the development.
	Regularly update the WMP, for example, each year, to ensure the Plan remains applicable.
	Undertake liaison and management of contracted waste collections.
	Organise internal waste audits on a regular basis.
	Manage any complaints and non-compliances reported through waste audits and other means.
	Regularly inspect all waste storage areas and waste management equipment.
	Organise cleaning and maintenance requirements for waste management equipment.
	Monitor bins to ensure no overfilling occurs.



Responsible Person	General Tasks
	<p>Ensure effective signage, communication and education is provided to alert visitors, employees and cleaners about the provisions of this WMP and waste management equipment use requirements.</p> <p>Monitor and maintain signage to ensure it remains clean, clear and applicable.</p> <p>Ensure waste and recycling storage rooms are kept tidy.</p> <p>Ensure that regular cleaning and daily transfer of bins is being undertaken by the cleaners</p> <p>Ultimately responsible for the management of all waste management equipment, cleaning requirements, waste transfer and collection arrangements.</p>
Cleaners and Staff	<p>Removal of general waste, recyclables, cardboard waste and hazardous waste from floor areas for transfer to centralised waste and recycling collection rooms daily or as required.</p> <p>Cleaning of all bins and waste and recycling rooms on a weekly basis or as required.</p> <p>Compliance with the provisions of this WMP.</p>
Gardening Contractor, as applicable	<p>Removal of all garden organics waste generated during gardening maintenance activities for recycling at an off-site location or reuse as organic mulch on landscaped areas.</p>





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