

Aspect Industrial Estate, Mamre Rd Kemps Creek – Stage 1: Waste Management Plan

A submission to Mirvac Pty Ltd

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Glossary

Terminology	Description
AS	Australian Standard
C&D	Construction and Demolition
DCP	Development Control Plan
ENM	Excavated Natural Material
EPA	Environment Protection Authority
LGA	Local Government Area
MGB	Mobile Garbage Bin
MRP	Mamre Road Precinct
MSW	Municipal Solid Waste
PCC	Penrith City Council
PDCP	Penrith Development Control Plan 2014
PLEP	Penrith Local Environmental Plan 2010
SEPP	State Environmental Planning Policy
WMP	Waste Management Plan
WSA	Western Sydney Aerotropolis
WSEA	Western Sydney Employment Area
WSP	Waste Service Provider
WSRA	Waste Storage and Recycling Area

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1 Introduction

MRA Consulting Group (MRA) was engaged by Mirvac Pty Ltd, to prepare a Waste Management Plan (WMP) for the first stage of a proposed Aspect Industrial Estate (the site) development consisting of industrial units and cafe, located at 788-864 Mamre Road, Kemps Creek and situated in the Penrith City Council Local Government Area (LGA).

The Site is legally described as Lots 54 – 58 in DP 259135, with an area of approximately 56.3 hectares (ha). The site is located east of Mamre Road, Kemps Creek within the Penrith Local Government Area (LGA), providing direct vehicular access via Mamre Road to the M4 Motorway and Great Western Highway to the north and Elizabeth Drive to the south.

The site is located approximately 4km north-west of the future Western Sydney Nancy-Bird Walton Airport, 13km south-east of the Penrith CBD and 40km west of the Sydney CBD.

The Department of Planning, Industry and Environment (DPIE) rezoned Mamre Road Precinct, including the site, in June 2020 under the State Environmental Planning Policy (Western Sydney Employment Area) 2009 (WSEA SEPP). The rezoning of this precinct responds to the demand for industrial land in Western Sydney. The site primarily zoned IN1 General Industrial with a small sliver of land zoned E2 Environmental Conservation.

The Aspect Industrial Estate is governed by Secretary's Environment Assessment Requirements (SEARs) number SSD-10448. The SEARs outlines specific requirements for Waste Management at the site – *Including details of the quantities and classification of waste streams generated during construction and operation and proposed storage, handling and disposal requirements.*

The Penrith Development Control Plan 2014 (PDCP) lists the following objectives related to waste management, which have each been addressed in this WMP:

- To facilitate sustainable waste management within the City of Penrith in accordance with the principles of Ecologically Sustainable Development (ESD);
- To manage waste in accordance with the 'Waste Hierarchy' to:
 - Avoid producing waste in the first place;
 - Minimise the amount of waste produced;
 - Re-use items as many times as possible to minimise waste;
 - Recycle once re-use options have been exhausted; and
 - Dispose of what is left, as a last resort, in a responsible way to appropriate waste disposal facilities;
- To assist in achieving Federal and State Government waste minimisation targets as set out in the Waste Avoidance and Resource Recovery Act 2001 and NSW Waste Avoidance and Resource Recovery Strategy 2007;
- To minimise the overall environmental impacts of waste by:
 - Encouraging development that facilitates ongoing waste avoidance and complements waste services offered by both Council and/or private contractors;
 - Requiring on-site source separation and other design and siting standards which assist waste collection and management services offered by Council and/or the private sector;
 - Encouraging building designs and construction techniques that minimise waste generation;
 - Maximising opportunities to reuse and recycle building and construction materials as well as other wastes in the ongoing use of a premise; and
 - Reducing the demand for waste disposal.

2 Background

2.1 Description of Proposed Development

The proposed stage 1 development is an industrial development of two industrial sheds and a café. The proposed units located on a site of are 35,060m² for Warehouse 1 and 20,735m² for Warehouse 3, not including additional office space for each industrial unit (2,160m² office space in total).

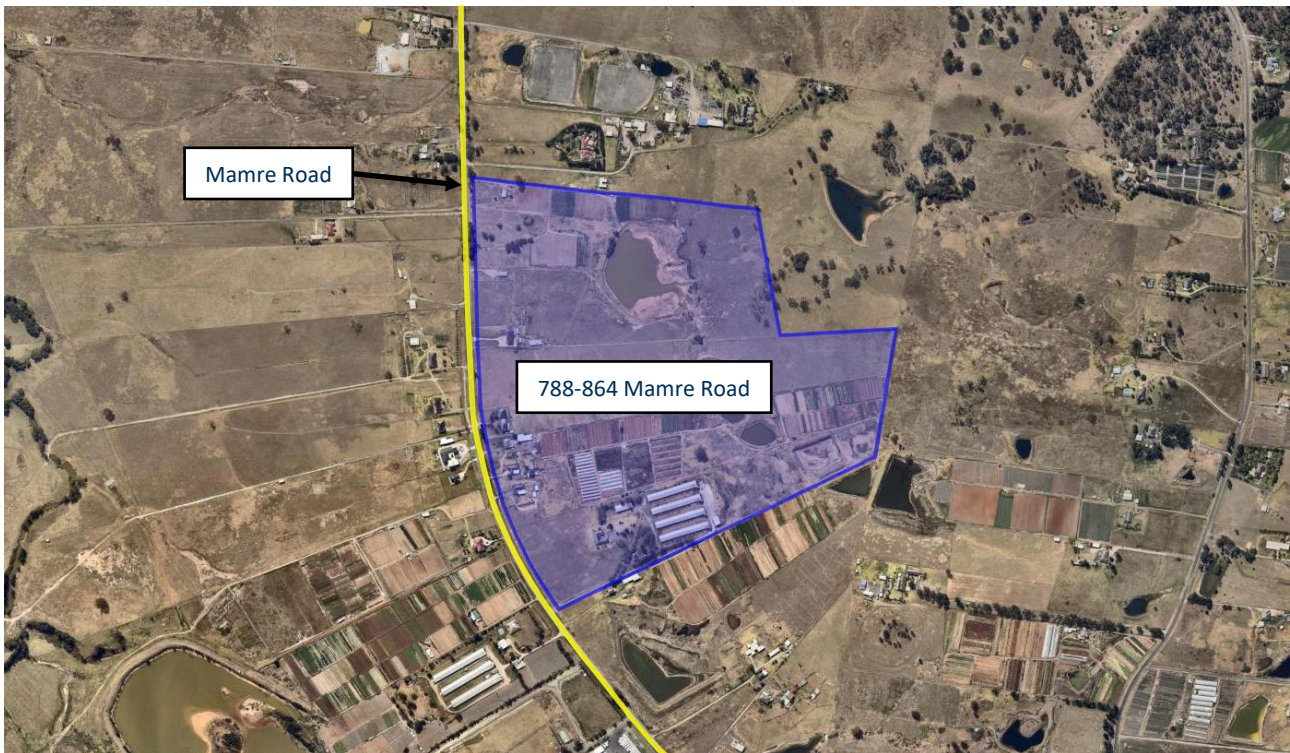
Consistent with the above, this report has been prepared to support a Development Application under Part 4 of the Environmental Planning and Assessment Act 1979 (EP&A Act) for the purpose of:

- A Concept Masterplan for the site comprising 11 industrial buildings, internal road network layout, building locations, gross floor area (GFA), car parking, concept landscaping, building heights, setbacks and built form parameters.
- Stage 1 development of the site including:
 - The demolition, removal of existing rural structures and remediation works;
 - Heritage salvage works (if applicable);
 - Clearing of existing vegetation on the subject site and associated dam dewatering and decommissioning;
 - Realignment of existing creek and E2 Environmental Conservation zone;
 - Onsite bulk earthworks including any required ground dewatering;
 - The importation, placement and compaction of spoil material, consisting of:
 - Virgin Excavated Natural material (VENM) within the meaning of the POEO Act; and/or
 - Excavated Natural material (ENM) within the meaning of the NSW Environmental Protection Authority's (EPA) Resource Recovery Exemption under Part 9, Clauses 91 and 92 of the POEO (Waste) Regulation 2014 – The Excavated Natural Material Order 2014; and/or
 - Materials covered by a specific NSW EPA Resource Recovery Order and Exemption which are suitable for their proposed use.
 - Boundary retaining walls;
 - Catchment level stormwater infrastructure, trunk services connections, utility infrastructure, roads and access infrastructure (signalised intersection with Mamre Road) associated with Stage 1;
 - Construction, fit out and 24 hours a day/ 7 days per week use of warehouse and distribution centre within Stage 1;
 - Detailed on lot earthworks, stormwater, services and utility infrastructure associated with the construction of warehouse and distribution centre within Stage 1;
 - Boundary stormwater management, fencing and landscaping; and
 - Staged subdivision of Stage 1.

2.2 Location

The development site is located in the suburb of Kemps Creek, situated in the Penrith City Council area, at 788-864 Mamre Road (Figure 1).

Figure 1: Proposed Development site at 788-864 Mamre Road and surrounds



Source: Nearmap, 2019.

2.3 Zoning and Land Use

The Department of Planning, Industry and Environment (DPIE) rezoned Mamre Road Precinct, including the site, in June 2020 under the *State Environmental Planning Policy (Western Sydney Employment Area) 2009* (WSEA SEPP). The rezoning of this precinct responds to the demand for industrial land in Western Sydney. The site primarily zoned IN1 General Industrial with a small sliver of land zoned E2 Environmental Conservation.

The site is identified as Lot 54, 55, 56, 57, and 58 of DP 259135. The site was recently rezoned on the 12th June 2020, from RU2 (according to PLEP) to IN1 (General Industrial) with a small sliver of land zoned E2 (Environmental Conservation) under the SEPP WSEA 2009. The site is surrounded by similarly zoned land uses (see Figure 2 for the Mamre Road precinct map). Previous land use of the site was agricultural and residential in nature.

The IN1 zone is defined by the following objectives:

- To facilitate a wide range of employment-generating development including industrial, manufacturing, warehousing, storage and research uses and ancillary office space.
- To encourage employment opportunities along motorway corridors, including the M7 and M4.
- To minimise any adverse effect of industry on other land uses.
- To facilitate road network links to the M7 and M4 Motorways.
- To encourage a high standard of development that does not prejudice the sustainability of other enterprises or the environment.
- To provide for small-scale local services such as commercial, retail and community facilities (including child care facilities) that service or support the needs of employment-generating uses in the zone.

The E2 Environmental Conservation zone is defined by the following objectives:

- To protect, manage and restore areas of high ecological, scientific, cultural or aesthetic values.
- To prevent development that could destroy, damage or otherwise have an adverse effect on those values.

Surrounding land zoning is largely IN1 with some smaller areas of E2 (Environmental Conservation) zoning.

2.4 Strategies

Waste management for the site considers better practice, necessary equipment, and integration with other guidance documents including the NSW Waste and Avoidance and Resource Recovery Strategy (NSW EPA 2014), and National Waste Policy: Less Waste, More Resources (EPHC 2009). The key policy aims that are considered are:

- Avoidance (to prevent the generation of waste);
- Reduce the amount of waste (including hazardous waste) for disposal;
- Manage waste as a resource; and
- Ensure that waste treatment, disposal, recovery and re-use are undertaken in a safe, scientific and environmentally sound manner.

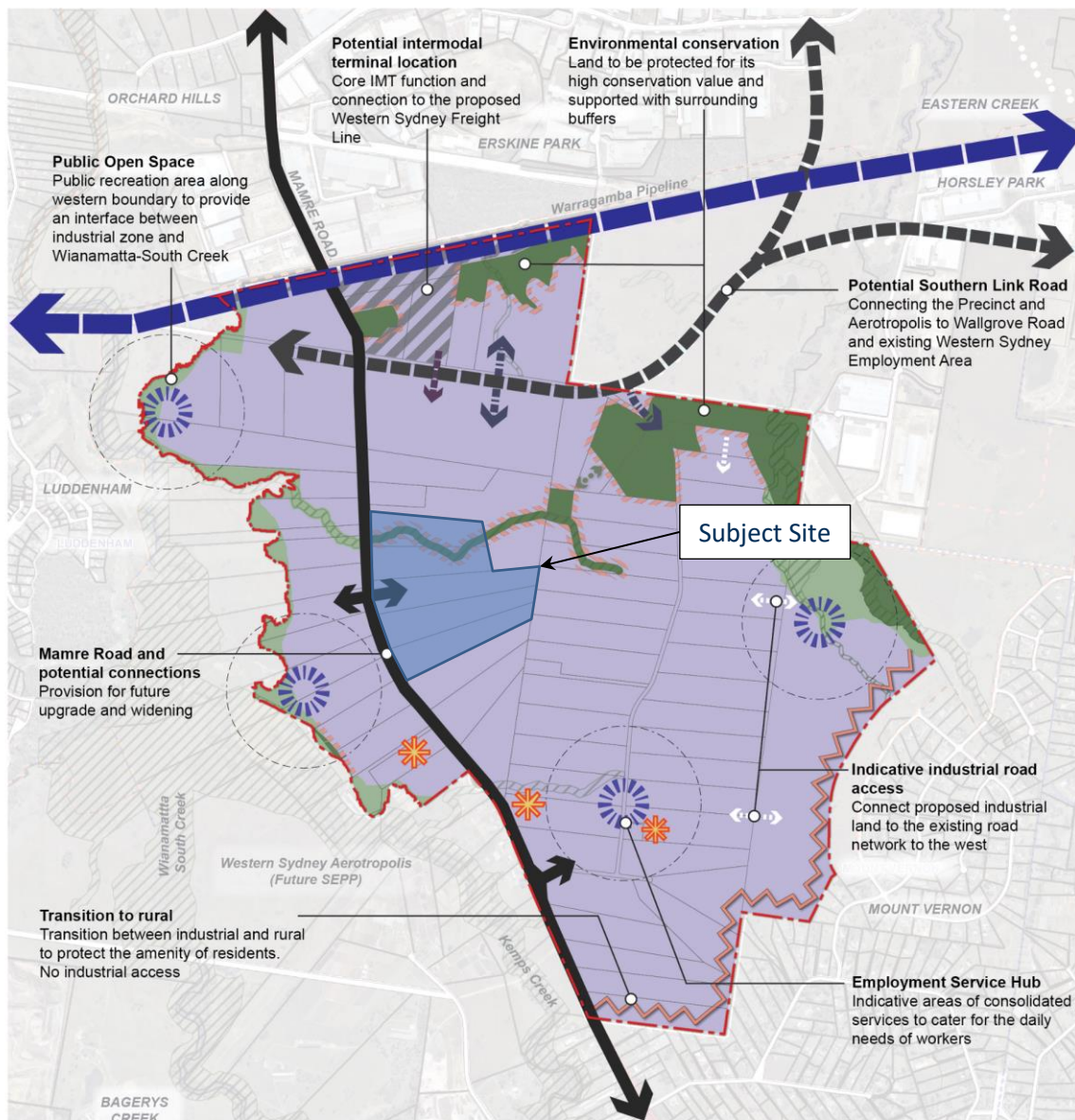
The site is subject to the Penrith Development Control Plan (PDCP), including objectives and principles outlined in Section 1.

2.5 Assumptions

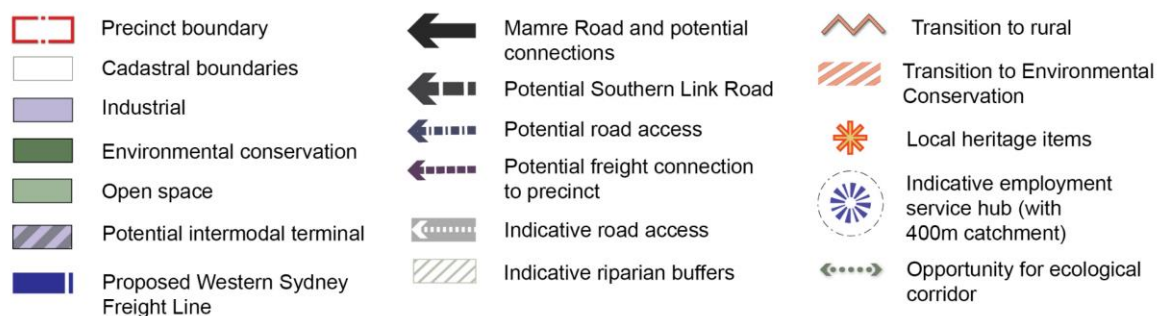
This report is a WMP, forming part of the development documentation and assumes:

- Drawings and information that have been used in waste management planning for this WMP are the final design set for the demolition plan and development plan from the project architect, SBA Architects (September, 2020);
- Waste generation volumes are based on waste generation rates outlined in NSW EPA *Better Practice Guidelines for Resource Recovery in Residential Dwellings*, and waste management equipment and infrastructure recommendations have been made according to estimated waste generation and PDCP waste guideline suggestions;
- This WMP is a living document and therefore, waste management equipment and systems described in this report are subject to change based on future operations and available technology.

Figure 2: Mamre Road Precinct Map



Structure Plan



Mamre Road Precinct
Structure Plan - June 2020



3 Construction and Demolition

Construction and demolition activities at the site will generate a range of wastes, commonly referred to as Construction and Demolition (C&D) waste. Throughout the development process, all materials generated on site will be reused and recycled where possible, minimising the disposal (landfilling) of materials other than those that are contaminated or unsuitable for reuse or resource recovery.

Waste storage of C&D waste during construction and demolition operations will involve stockpiling of excavated and reusable material, and placement of skip bins for separation of mixed C&D materials for recycling. A skip bin for residual waste or contaminated material will also be made available at the site for disposal where necessary. Skip bins may require alternative placement during construction operations as space becomes restricted, to facilitate safe and efficient storage of materials. Skip bins and stockpiles should be placed within property boundaries to avoid illegal dumping.

The quantities, densities and bulking factors for waste and recyclables will differ on site based on actual materials and handling practices employed. Demolition and excavation waste estimations have been addressed separately to construction waste estimations for the proposed development, to better inform resource recovery opportunities for waste material generated during each stage of the development.

C&D waste storage areas will be kept clear and tidy to maintain vehicular access, encourage separation of waste materials and for WHS reasons. Site waste management principles and facilities will be a focus for the induction of all construction or other contractors working at the site.

3.1 Demolition Waste

This section details the demolition waste materials expected for the proposed development, including their quantities and management options, and was designed with consideration of the requirements in the PDCP. The information below presents options for materials reuse, recycling and disposal where applicable (e.g. excavation material may be reused as a construction fill or disposed to landfill if contaminated). All materials are intended to be sent to a suitable, licensed landfill or resource recovery facility.

Table 1 below describes the expected demolition material quantities and appropriate management methods for the proposed development, related to the demolition or deconstruction of:

- Demolition or deconstruction of:
 - Five single-storey residential dwellings;
 - Eleven sheds; and
 - Associated ancillary structures.
- Removal of vegetation and earthworks; and
- Dam dewatering and decommission.

Table 1: Estimation of demolition materials for reuse, recycling and landfill

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Concrete	2,600m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: on-site for filling or under gravel carpark.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
					C&D Processor: crushing and recycling for recovered products.
Bricks/pavers	560m ³	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D Processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.
Timber	N/A	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Insulation material	400m ³	✓	-	-	Reuse: returned to supplier or manufacturer for reuse.
Metal (ferrous and non-ferrous)	<5m ³	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: metals recovery and recycling.
Plasterboard	80m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse/recycling: surplus and offcut material returned to manufacturer for reuse where possible or sent to a suitable recycling facility for processing and recovery.
Glass	<5m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: surplus and offcut material returned to manufacturer for reuse where

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
					possible. Aggregate for concrete production. Glass recycler: recovery and recycling.
Fixtures and fittings	5m ³	✓	✓	-	Reuse: secondhand building materials. C&D Processor: recovery and recycling.
Floor coverings	30m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: recovery and recycling.
Garden organics	10m ²	✓	✓	-	Garden organics resulting from the removal of vegetation and trees. Onsite: Woodchipped for use in landscaping. Organics Processor: storage on-site (from minor excavations) processing for recovered product.
Mixed Recyclables	<2m ³	-	✓	-	Commercial contractor: recycling of paper, cardboard and mixed material containers (plastic, metal, glass).
Residual waste	15m ³	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.
Hazardous/special waste (e.g. spills and contaminated wastes)	Unknown	-	-	✓	It is possible that asbestos bearing material may be disturbed or removed during demolition works. Appropriate management methods specified by a licensed asbestos and site hygienist should hazardous be found at the site.

3.2 Construction Waste

Works would include the construction of:

- Construction of 2 industrial warehouses including ancillary office space;
- One café near the site entrance;
- Internal access, parking and roadways; and
- Sitewide landscaping.

Table 2 below describes the estimated waste quantities through the construction and excavation phases of the proposed development. The following table also highlights appropriate management methods for material types expected to be generated throughout construction.

The information below presents multiple options for materials reuse, recycling and disposal where applicable (e.g. return to manufacturer, recycled at construction and demolition (C&D) processor, or disposed to landfill if contaminated).

Table 2: Construction waste generation estimate.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Excavated material	Approx. 500,000m ³	✓	✓	-	On site: stockpiled at the site for later use in back filling activities. Reuse: It is expected that over 150,000m ³ will be required for backfilling at the site. Excess material can be taken offsite for use as fill material if it meets the relevant Resource Recovery orders/exemptions. Recycling: excess material can be taken to a suitably qualified facility for processing and blending with compost products. Any contaminated material will require remediation either on or offsite, treatment or disposal at a suitably qualified landfill.
Concrete	1,200m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. C&D Processor: crushing and recycling for recovered products.
Bricks/pavers	<20m ³	✓	✓	-	On site: cleaned and separated wherever possible for reuse or to enhance resource recovery. C&D Processor: recovery for reuse where possible, crushing and recycling for recovered aggregate products.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Timber	<10m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse. C&D Processor: recovery and recycling for recovered product (e.g. mulch) or organics processing.
Metal (ferrous and non-ferrous)	50m ³	-	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse. C&D Processor: metals recovery and recycling.
Plasterboard	120m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse/recycling: surplus and offcut material returned to manufacturer for reuse where possible or sent to a suitable recycling facility for processing and recovery.
Glass	<10m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. Glass recycler: recovery and recycling.
Fixtures and fittings	<5m ³	✓	✓	-	On site: reuse wherever possible or return to manufacturer. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. C&D Processor: recovery and recycling.

Type of waste generated	Quantity	Reuse	Recycling	Disposal	Methods for reuse, recycling and disposal
Floor coverings	<10m ³	✓	✓	-	On site: to be separated wherever possible to enhance resource recovery. Reuse: Surplus and offcut material returned to manufacturer for reuse where possible. C&D Processor: recovery and recycling.
Packaging (used pallets, pallet wrap)	4,000m ³	✓	✓	-	Reuse: returned to manufacturer for reuse where possible. On site: to be separated wherever possible to enhance resource recovery. C&D processor: recycling of timbers and plastic.
Garden organics	20m ³	✓	✓	-	Minimal garden organic waste from landscaping. Organics Processor: Storage on-site (from minor excavations) processing for recovered product (e.g. mulch or other blended recovered fines) or organics treatment.
Recyclable Containers	<5m ³	-	✓	-	Commercial contractor: recycling.
Paper/ cardboard	50m ³	-	✓	-	Commercial contractor: recycling of fibres with segregation of paper, cardboard or other streams.
Residual waste	50m ³	-	-	✓	Separate recyclables where possible and disposal at principal licensed waste facility.
Hazardous/ special waste (e.g. spills and contaminated wastes)	Unknown	-	-	✓	Appropriate management methods specified by a licensed asbestos and site hygienist should hazardous or special waste be found at the site.

3.3 Waste Contractors and Facilities

To ensure best practice waste management, appropriate contractors and facilities have been proposed based on their location and service offerings (Table 3).

Table 3: Waste service contractors and facilities

Role	Details
Recommended Waste Collection Contractor	<p>The following are local skip bin operators for consideration in the management of excavation and construction waste for the site:</p> <ul style="list-style-type: none"> • Transwaste Skips; • Orange Skip Bins; • Phillips Skip Bins; • BinsExpress Skip Bins; • Bingo Bins; or <p>Or another supplier as elected by the building contractor.</p>
Principal Off-Site Recycler	<p>The following are local C&D processing facilities for consideration in the management of C&D waste generated at the site:</p> <ul style="list-style-type: none"> • Brandown Quarries Kemps Creek; • SUEZ Kemps Creek Resource Recovery Centre; • Bingo St Marys; • DADI Genesis Recycling Facility; or <p>another appropriate facility as elected by the waste management contractor.</p>
Principal Licensed Landfill Site	<p>Dial a Dump Genesis Xero (Eastern Creek), or other appropriate facility as elected by the waste management contractor.</p>

3.4 Site documentation

This WMP will be retained on-site during the demolition, excavation and construction phases of the development, along with other waste management documentation (e.g. contracts with waste service providers).

Responsibility for the WMP, waste documentation and processes during the excavation and construction phases will be with the site manager or builder.

A logbook that records waste management and collection will be maintained on site, with entries including:

- Time and date;
- Description of waste and quantity;
- Waste/processing facility that will receive the waste; and
- Vehicle registration and company name.

Waste management documentation, the logbook and associated dockets and receipts must be made available for inspection by an authorised Council Officer at any time during site works.

4 Operational Waste Management

Ongoing waste management requirements for the site will result of the daily operation of industrial units, ancillary offices and a café. Waste storage and management areas will be separate for each building as identified in attached plans (see Appendix A). Centralised waste storage areas for each building will be maintained outside each building, in a location that is easily accessible by building tenants and waste collection vehicles for servicing.

Stage 1 of the proposed development comprises of two lots of industrial units each with ancillary office space. There will also be a café which will service the entire site.

Waste generation rates have been sourced from the NSW EPA *Better Practice Guidelines for Resource Recovery in Residential Dwellings* (Appendix F).

4.1 Estimated Waste and Recycling Generation

The waste volume calculation for both waste and recycling for the proposed development is shown below. Table 4 Below outlines waste generation rates applicable for the proposed uses at the site, as derived from the PDCP and NSW EPA guidelines where the PDCP does not provide specific reference to a use.

Table 4: Model waste generation rates according to PDCP

Premises type/use	Waste generation (L/100m ² /day)	Recycling Generation (L/100m ² /day)
Cafe	300	200
Office	10	10
Warehouse	10	10

With consideration to the above model waste generation rates, Table 5 below outlines the expected waste generation rates for the proposed development. Waste generation has been calculated based on site specific breakdown of commercial and industrial uses proposed. The Café has been included for consideration in this proposal (despite being part of future stages) to allow for groundwork to accommodate for waste generation and storage requirements.

Table 5: Site Waste and Recycling Generation

Area	Use	Area (m ²)	Daily Waste generation (L)		Weekly Waste generation (L)	
			General Waste	Recycling	General Waste	Recycling
Warehouse 1	Warehouse	35,060	3,506	3,506	24,542	24,542
	Office	1,460	146	146	1,022	1,022
Warehouse 3	Warehouse	20,735	2,074	2,074	14,518	14,518
	Office	700	70	70	500	500
Café	Café	122	366	244	2,562	1,708
Total			7,242	7,182	43,144	42,290

**Recycling waste may be able to be reduced with the use of a commercial paper/cardboard baler or other recycling waste diversion methods. This should be done per building or individual industrial tenancy with uses which generate a substantial proportion of paper/cardboard compared to other recyclable material.*

Greater resource recovery can be achieved by further diverting paper and cardboard materials from the above recycling volumes. This stream is cleaner and means the materials collected are less contaminated and much more likely able to be converted into recycled paper and fibre products. Service costs for waste collection may also be able to be reduced as typically paper and cardboard bin lifts are cheaper than that of comingled recycling.

4.2 Waste Storage Requirements

With consideration to the scale of the development and number of individual site uses, a separate waste management and storage area will be allocated for each building. Site waste storage areas for each building will be sized and located to accommodate necessary waste storage bins and other associated waste management equipment according to estimated site waste generation rates outlined in Section 4.1.

Individual tenancies will be responsible for retaining smaller internal bins for each relevant waste stream which can then be emptied into larger bins for collection as necessary. Internal bins should be retained in the café, offices, industrial units (on the industrial floor) and any other areas where waste will be generated in large quantities without direct access to the building waste storage area. Staff at each tenancy will be responsible for transferring waste from each unit to the recycling collection bins and general waste bins or compactor for each warehouse.

4.2.1 Café waste

The café has a relatively low rate of waste generation compared to proposed industrial units. Mobile garbage bins will be sufficient to manage general waste and recycling from the café. Table 6 below summarises the bin infrastructure and collection frequency options for these site uses.

Table 6: Cafe Bin Infrastructure and Collection Frequency

Waste Stream	L/Week	Option 1	Option 2
General Waste	2,562	3 x 1,100L bins / collected weekly	2 x 1,100L bins / collected twice per week
Comingled Recycling	854	1 x 1,100L bins collected weekly	1 x 660L bin / collected twice per week
Paper and Cardboard	854	1 x 1,100L bins collected weekly	1 x 660L bin / collected twice per week

It is expected that of the general waste stream for the proposed café use, a substantial proportion of this waste is likely to be food. Should a significant amount of food waste be produced by the proposed café, it may be suitable for a separate waste collection for food on a regular basis. Should the café tenancy choose to manage food waste, collections should occur 2-3 times a week to avoid the generation of odour.

4.2.2 Industrial Units

Given the large volumes of general waste predicted to be generated onsite, there are several options that site management can use for stage 1 of the industrial estate. Table 7 below outlines the number and type of waste management containers that may be suitable for the proposed industrial uses, including frequency of waste collection.

Table 7: Industrial unit waste storage and collection options

Area	Waste Stream	L/Week	Option 1	Option 2	Option 3
Warehouse 1	General Waste	25,564	1 x 6m ³ / collected five days per week	1 x 4.5m ³ / collected six days per week	10,000L compactor (5:1) / collected as required
	Commingled Recycling	12,782	1 x 4.5m ³ / three days per week	1 x 3m ³ / five days per week	10,000L compactor (5:1) / collected as required
	Paper and Cardboard	12,782	1 x 4.5m ³ / three days per week	1 x 3m ³ / five days per week	Carboard Baler / bales collected as required
Warehouse 3	General Waste	15,018	1 x 6m ³ / collected three days per week	1 x 4.5m ³ / collected four days per week	10,000L compactor (5:1) / collected as required
	Commingled Recycling	7,509	1 x 3m ³ / collected three times per week	1 x 4.5m ³ / two days per week	10,000L compactor (5:1) / collected as required
	Paper and Cardboard	7,509	1 x 3m ³ / collected three times per week	1 x 4.5m ³ / two days per week	Carboard Baler / bales collected as required

Front-Lift Bins collected on a regular basis

Site management may elect to incorporate regular collection of bulk waste (front lift) bins for the management of general waste and recycling onsite.

These are calculated assumptions and actual requirements will be dependent on the waste generated by the associated industrial tenancies once operation has commenced. With the presence of food in the waste, more frequent collections may be required to prevent odour.

Waste Compaction Units

Space may be provisioned for the storage of a waste compactor in each warehouse. The waste compactor will be a hook-lift or Roll-On Roll-Off (RORO) unit which is collected at a schedule agreed with the elected private waste contractor. This type of compactor has a capacity of 10,000L and a compaction ratio of 5:1. A fully loaded and compacted unit would therefore have a capacity of 50,000L. A compactor of this size typically has a footprint of 9.2m². Compactor units can also be fitted with keycard and weighing to record disposal by multiple tenancies or users (see Appendix C for further details).

Each warehouse as part of stage 1 of the development can have its own waste compactor to service industrial units. General waste from café activities can also be disposed of using the warehouse 1 compactor if sited for easy access.

Large volumes of recycling waste are expected to be generated as a result of onsite warehouse activity. Equipment to reduce volumes of cardboard and plastic waste will allow the number of bins required onsite to be reduced.

Cardboard Baler

A paper and cardboard baler may be appropriate for use in each of the industrial units as this material is typically bulky and easily separated from other recycling streams. Paper and cardboard is also valuable as a separated commodity and may be able to be collected for free or sold for a profit, rather than incurring a fee for collection. Further information and examples of commercial cardboard balers is included in Appendix C.

Each warehouse as part of the Stage 1 development can have its own baler to service industrial units.

4.3 Waste Management Equipment

A range of bins will be utilised at the site for the management of different waste streams. It is expected that the site will make use of mobile bins and bulk bins (see Appendix B for bin specification), the dimensions of which are outlined as follows (Table 8 and

Table 9), according to the NSW EPA (2019) *Guidelines for Waste Management in New Developments*.

Table 8: Mobile garbage bin specifications

Bin Capacity	140L	240L	360L	660L	1,100L
Height (mm)	1,065	1,080	1,100	1,250	1,470
Depth (mm)	540	735	885	850	1,245
Width (mm)	500	580	600	1,370	1,370
Footprint (m ²)	0.27	0.43	0.53	1.16	1.71

Table 9: Bulk bin dimensions

Bin Capacity	1.5m ³	2m ³	3m ³	4.5m ³	6m ³
Height (mm)	910	1,250	1,225	1,570	1,650
Depth (mm)	905	935	1,505	1,605	1,850
Width (mm)	1,800	1,800	1,800	1,800	2,000
Footprint (m ²)	1.63	1.68	2.71	2.89	3.70

All bins will be in accordance with AS4123.7-2006 mobile waste containers – colour, markings, and designation requirements. Private bins shall be labelled to identify the waste generator and site address.

Bins will be serviced by the contracted WSP according to the agreed collection schedule upon commencement of operation.

4.4 Bulky Waste Management

Site tenancies are expected to generate some bulky waste items (fit-out, whitegoods, etc), including items that would be returned to suppliers from deliveries (such as pallets, crates, etc). Additional space for the storage of bulky waste items will be available for each tenancy, nearby the bin storage areas.

Bulky waste will be serviced as required and can be organised between individual tenancies and their waste contractor(s). Bulky waste collection vehicles will be similar in size to those that will provide waste collection for general waste and recycling and therefore, no additional access considerations are likely to be necessary for bulky waste collection access.

5 Site Waste Management Systems

5.1 Waste Management System Summary

The various waste streams generated on-site are summarised as follows:

- **Waste:** General waste shall be placed within a tied plastic bag prior to transferring into the general waste bin or waste compactor. Receptacles will be situated in each designated waste management and storage area for individual industrial units;
- **Commingled recyclables:** All recyclables will be stored in commingled bins (including paper, cardboard, mixed plastic, glass, aluminium, steel). All recyclables should be decanted loose (not bagged) with containers un-capped, drained and rinsed prior to disposal into the recycling bin.
- **Paper and cardboard:** Based on *BinTrim: Reducing business waste (NSW EPA, 2017)*, Paper and cardboard can represent more than 75% of all recyclables generated by various commercial and industrial uses. It may be suitable for industrial unit tenancies to incorporate a separate paper and cardboard collection or cardboard baler to reduce waste collection costs and improve resource recovery potential. All cardboard should be flattened prior to placement into a cardboard bin or baler.
- **Film Plastic:** Some industrial tenancy uses may produce a significant amount of plastic film waste which can be managed with a separate collection. A 1m³ bag and frame setups are considered appropriate for film plastic and can be collected by a range of major waste contractors and specialist service providers.
- **Garden Waste:** Minimal garden waste is expected to be generated on site. Any garden waste generated through the maintenance of landscaped areas around the site would be managed and removed by the landscape management contractor.
- **Food Waste:** A substantial proportion of waste generated from the café is likely to be food waste. Management methods such as composting or vermiculture are considered impractical due to the nature of the site. Alternative methods such as the following are proposed for the site, space permitting (specific application to be determined):
 - Sustainable ordering practices and return of damaged, expired or surplus foodstuffs to suppliers (where possible),
 - Separate food waste collection and depackaging / composting service,
 - Food donation service, and
 - On-site food waste macerator, dehydrator or digester.
- **Other (Problem) Waste:** The disposal of hard, bulky, liquid or potentially hazardous wastes shall be organised between industrial tenants and their respective waste contractors as necessary. Grease traps are present on-site and are mainly expected to be used by the café. Collection would need to be coordinated between tenancies and their contracted WSP.

5.2 Collection Method and Loading Areas

Based on the anticipated waste generation rates for the site, a private contractor will be required to collect waste generated at the site. Tenants will be responsible for engaging and maintaining a waste collection contract for the regular servicing of waste generated at each industrial unit and other relevant uses. Mirvac will include general waste management details in lease agreements according to this waste management plan.

The recommended arrangements access and collection servicing for the site are as follows (see Appendix A for indicative travel path for waste collection vehicles):

- Entrance to the site via Mamre Road;
- Collection of general waste (for general waste option 1) and recycling front lift bins will occur directly from each building waste storage area;
- Collection and replacement of waste compactors (for general waste option 2):
 - Drop off and collection of waste compactors will occur outside of regular business hours to minimise impact on staff and visitors to the site, as well as local residents (timings to be determined in service contract);
 - The contractor will initially drop off an empty waste compactor to replace the full one (one for each industrial unit);
 - Site management is to indicate the correct waste compactor receiving general waste, through the form of temporary signage and restriction of access to full compactor);
 - The contractor will return to collect the full waste compactors in a timely manner.
- Steel front lift bins shall be collected by a front-lift vehicle. Due to their weight, steel bin will be stored in a position that minimises the need to shift bins to/from the collection vehicle. Typical front-lift vehicle dimensions are as follows:
 - 11.5m length,
 - 6m operational height, and
 - 30 tonne gross vehicle mass.
- Any plastic wheelie bins (240L - 1100L) shall be collected by a rear-lift vehicle (similar vehicle to collect cardboard, e-waste and film plastic bales) with typical dimensions as follows:
 - 8.8m length,
 - 4m operational height, and
 - 24 tonne gross vehicle mass.
- Identifiable areas will be required where users, visitors and WSP staff can recognise and avoid any risk associated with moving vehicles, and bin moving and handling;
- Exit from the site will be via the exit point back onto Mamre Road.

Note: *Compaction of refuse and the breaking up of bottles will not occur in the vehicle while the collection vehicle is standing stationary at or near the site.*

Table 10 below outlines relevant requirements and specifications related to the use of collection points and loading areas.

Table 10: Collection points and loading areas requirements and specifications

Component	Requirement	Specification
Collection point	Allow safe waste collection and loading operations	<ul style="list-style-type: none"> - Adequate clearance and manoeuvring space; - Sufficient clearance for the safe handling of materials and equipment; and - Loading bays do not impede upon traffic and pedestrian safety.
Vehicle loading space	Space for adequate lift clearance	<ul style="list-style-type: none"> - Adequate operational clearance for bin lifting mechanisms.
Operating times	Appropriate collection times to limit noise and traffic disturbance	<ul style="list-style-type: none"> - Collection times will be arranged during off-peak traffic times to ensure minimal disturbance to site users and general traffic flows associated with the use of the site.

5.3 Site Waste Management Responsibilities

Site tenancy users will be responsible for general operation of waste management systems, maintaining waste management contracts, maintaining waste storage areas and associated waste contamination reduction.

Should any issues impacting on the operational efficiency, safety and suitability of waste management be identified, site users should inform their waste contractor to revise waste management procedures as necessary.

Site tenants will be responsible for the following with regards to waste management:

- Using this WMP to inform waste management operations, design and infrastructure;
- Providing educational materials and information to users outlining:
 - Waste management system and use/location of associated equipment,
 - Sorting methods for recycled waste, awareness of waste management procedures for waste minimisation, maximising recovery and reducing contamination of recyclables,
 - Improving facility management results (lessen equipment damage, reduce littering, and achieve cleanliness).
- Making information available to users, site staff and visitors about waste management procedures;
- Ensuring correct signage is installed and maintained in waste storage and service areas;
- Encouraging waste avoidance and achievement of resource recovery targets;
- Providing operational management for delivery of waste objectives;
- Holding a valid and current contract with licensed collector(s) for waste and recycling collection;
- Ensuring waste service providers access the site appropriately;
- Ensuring timing of waste collections does not clash with peak traffic periods in relation to general operation of the site tenancies;
- Organising waste, recycling and bulky pick-ups by elected contractor for the site (if not directly managed by site users);
- Organising, maintaining and cleaning the waste storage and service areas;
- Using contracts to define the allocation of responsibilities with cleaners and users;
- Monitoring any vermin and pest issues and arranging appropriate controls (traps or fumigating) and maintenance of doors or other points of potential entry; and

- Ensuring all tenants do not prevent or impede correct access of the site for waste collection.
- Holding a valid and current contract with a licensed collector for any specialty waste collections and disposal;
- Allocating space for a dedicated and enclosed waste and recycling storage area for intermediate storage before disposal to designated waste storage areas;
- Disposing of waste and recycling at their designated building's waste storage area;
- Maintaining general cleanliness when using waste storage areas to prevent the occurrence of odour, vermin or amenity issues;
- Notify site management of waste storage use and efficiency should additional bins or services be required (that are covered under general waste arrangement as outlined in lease agreements);
- Notify site management hazards or damages related to the building waste storage areas, including but not limited to:
 - Damaged bins,
 - Illegally dumped items,
 - Apparent miss-use of waste storage areas (such as vandalism, contamination, etc), and
 - Odour, vermin or amenity issues.

5.4 Waste Storage and Recycling Areas

The waste storage areas provide centralised storage that has adequate capacity to receive and store the maximum likely generation of waste and recycling between collection times. Waste storage areas must be sited and constructed to improve amenity, minimise odour, protect surrounding areas and promote user safety. Construction must conform to Building Code of Australia, Australian Standards and local laws. Specifications include:

- Sited away from areas of high pedestrian traffic to minimise odour and amenity impacts;
- Enclosed to minimise exposure and reduce risk of odour and amenity impacts;
- Signage for safety and waste bin identification;
- Safety precautions, staff training and signage for plant;
- Noise attenuation for waste management and waste storage areas that limits effects to residents from compactor, bin transfer and collection vehicle noise;
- Floors constructed of concrete or other approved solid, impervious material that can be cleaned easily;
- Adequate supply of water with hose cock as close as practicable to the doorway or storage area;
- Ventilation in accordance with Australian Standards AS1668; and
- Security and lighting.

Additional measures shall be put in place for the wash bay, and Area B which will be entirely enclosed:

- Light colour finish for all room surfaces;
- Smooth, even surface covered with vertical wall and plinth faces;
- Grading and draining to an approved drainage fitting located in the room;
- Doorway ramp (if not level);
- Close fitting and self-closing door; and
- Suitable construction including limited entry paths to prevent vermin.

5.5 Signage

Signage that promotes resource recovery, waste minimisation, safety and amenity follows the Australian Standard for safety signs for the occupational environment (Standards Australia 1994).

Signage will be designed to consider language and non-English speaking backgrounds, vision impairment and accessibility (see Appendix C, Figure 9 to Figure 10). Illustrative graphics must form a minimum 50% of the area of the signage. Signage is to be prominently posted in each waste storage area indicating:

- Garbage is to be bagged and placed into waste bins;
- Details regarding acceptable recyclables and the location of their respective receptacles;
- Commingled recyclables are to be disposed of loose (not bagged);
- *No standing* and *danger* warnings applying to the area surrounding waste storage and collection areas;
- Contact details for arranging the disposal of bulky items;
- Information on keeping the areas tidy.

5.6 Prevention of Pollution and Litter Reduction

To minimise dispersion of litter and prevent pollution (to water and land via contamination of runoff, dust and hazardous materials), site tenants shall be responsible for the following:

- Maintenance of open and common site areas;
- Ensuring waste storage areas are well maintained and kept clean, including:
 - Prevention of overflow,
 - Keeping lids closed, and
 - Checking for bung leaks and damage bins.
- Securing the waste storage area from vandalism and the escape of litter;
- Identification and appropriate disposal of goods with hazardous material content (paints, fluorescent tubes, smoke detectors);
- Acting to prevent dumping and unauthorised use of waste areas; and
- Requiring contractors to clean up any spillage that may occur during waste servicing or other work.

The above will minimise the dispersion of site litter, prevent stormwater pollution and thus, reduce the risk of impact to local amenity and the environment.

5.7 Waste Management Plan Revisions

For any relevant future Council requests, changes in legal requirements, changes in the development's needs and/or waste patterns (waste composition, volume, or distribution), or to address unforeseen operational issues, the operator shall be responsible for coordinating the necessary Waste Management Plan revisions, including (if required):

- A waste audit and new waste strategy;
- Revision of the waste system (bin size/quantity/streams/collection frequency);
- Re-education of users/staff;
- Revision of the services provided by the waste collector(s); and
- Any necessary statutory approval(s).

6 Access Requirements and Limitations

6.1 Best practice requirements

The following best practice methods shall be incorporated where relevant/practicable to ensure site waste management is completed safely and effectively:

- Tenancies shall ensure that bins are not overfilled or overloaded.
- Waste incineration devices are not permitted, and any offsite waste treatment and disposal shall be carried-out in accordance with regulatory requirements.
- For bin traffic areas, should any ramp gradients be present, bin weight, and/or distance can affect the ease/safety of bin transfers. In the case of a potential safety concern, use of a suitable tug or cart will be considered.
- Site tenants and contracted WSPs shall observe all relevant WHS legislation, regulations, and guidelines. The relevant entity shall define their tasks.
- All staff/contractors should be provided with equipment manuals, training, health and safety procedures, risk assessments, and adequate personal protective equipment (PPE) to control/minimise risks/hazards associated with all waste management activities.

6.2 Limitations

This report is based on the following conditions:

- Waste generation figures outlined in the demolition and construction sections are approximate only and should be confirmed by building and demolition contractors through demolition and construction operations.
- Excavation figures are high level estimates and require confirmation by volumetric survey against proposed levels.
- The figures presented in this report are estimates only. The actual amount of waste will depend on the development's occupancy type, occupancy rate, waste generation profile, the user's disposition toward waste and recycling and the overall approach to waste management maintained at the site. Tenancies will adjust their waste management needs based on actual waste and recycling volumes experienced through regular operation (if the actual volumes of the streams are greater than estimated, then the number of bins and/or the number of collections per week shall be increased).
- This report shall not be used to determine/forecast operational costs, or to prepare feasibility studies, or to document operational/safety procedures.

7 References

- Australian Building Codes Board (2016) National Construction Code (NCC).
- Australian Government (2017) National Food Waste Strategy: Halving Australia's Food Waste by 2030, Minister for the Environment and Energy.
- Environment Protection and Heritage Council (2009) National Waste Policy: Less Waste, More Resources. Available at: <http://www.nepc.gov.au/system/files/resources/906a04da-bad6-c554-1d0d-45216011370d/files/wastemgt-rpt-national-waste-policy-framework-less-waste-more-resources-print-ver-200911.pdf>.
- Environment Protection Authority (EPA) (2017) BinTrim: Reducing Business Waste, NSW Government.
- NSW EPA (1997) Protection of the Environment Operations Act.
- NSW EPA (2012) Better Practice Guidelines for Waste Management and Recycling in Commercial and Industrial Facilities.
- NSW EPA (2014) NSW Waste Avoidance and Resource Recovery Strategy 2014-21.
- NSW EPA (2016) Recycling Signs, Posters and Symbols. Available at: <http://www.epa.nsw.gov.au/wastetools/signs-posters-symbols.htm>.
- NSW EPA (2019) Better practice guidelines for resource recovery in residential developments.
- NSW Government (1979) Environmental Planning and Assessment Act.
- NSW Government (2000) Environmental Planning and Assessment Regulation.
- NSW Government (2009) State Environmental Planning Policy (Western Sydney Employment Area)
- Penrith Council (2014) Penrith Development Control Plan.
- Penrith Council (2010) Penrith Local Environmental Plan.
- Standards Australia (1994) AS 1319: Safety signs for the occupational environment, Homebush, NSW: Standards Australia.
- Standards Australia (2008) AS 4123 Mobile waste containers.
- WorkCover (2011) Managing Work Environment Facilities Code of Practice.

Appendix A Site Plans and Waste Collection Vehicle Access

Figure 3: AIE Concept Plan



Figure 4: Site Plans with Bin Storage Areas Mark-up

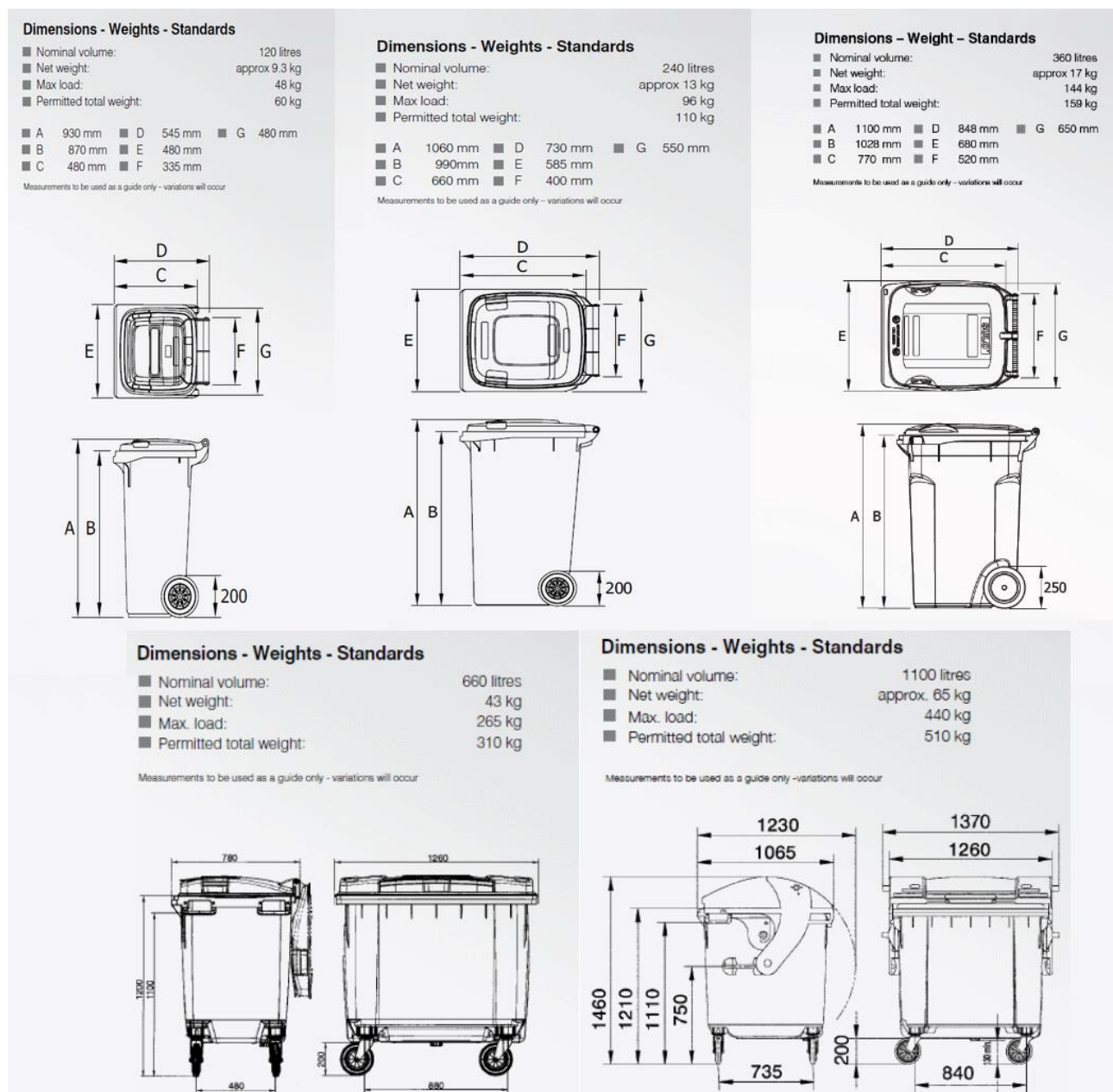


Appendix B Bin Types

This WMP proposes the use of small (rear-lift) bins, and medium (front-lift) bins. Each bin type is specific to each store as the bin size will impact on the vehicle access requirements. This section outlines the dimensions of each bin type. Some bin types below are not in the recommended bin types throughout the WMP, but may be useful for planning purposes should other options be preferred.

Rear-lift wheelie bins are ideal for sites with limited restrictions like specialty retail and small offices. Lightweight and easy to manoeuvre, these small-sized containers are easy to use and can be secured with lockable lids.

Figure 5: Rear-lift mobile bins (120L, 240L, 360L, 660L & 1,110L)



Reference: www.sulo.com.au. Sizes may vary with manufacturer or supplier.

Figure 6: Front-lift steel bulk bin sizes and dimensions

Bin Size/Waste Stream	Height (h)	Width (w)	Depth (d)	
1.5 cubic metre	900 mm	1800 mm	900 mm	
3.0 cubic metre	1200 mm	1800 mm	1325 mm	
4.5 cubic metre	1500 mm	1800 mm	1600 mm	

Source: KS Environmental

Note: figures are indicative only and may vary depending on manufacturer and supplier.

Appendix C Waste Compaction and Baling Equipment Examples

Hook-Lift Compactor

A compactor unit will need to be supplied with 3 phase power. Please refer to the below specifications for a compactor unit suitable for this site:



DIMENSIONS

Width	1665mm
Length	5320mm
Weight	4.5T
Feed Opening	1500 x 2100
Swept Volume	2.3m ³

PERFORMANCE

Power Supply	415V 3-phase
Motor	11kW
Cycle Time	55-86 secs
Compaction Force	38T

Baling Equipment

The table below outlines some equipment suppliers that can offer balers. Please note the list is not exhaustive.

Table 11: Baling Equipment Details

Brand	Model	Dimensions	Cost
Autobaler	LS 150 (single chamber)	H: 3100mm W: 1000mm D: 1250mm Bale weight: <100kg	<\$20,000
	Ti 350 - Ti 500	H: 2025mm to 2030mm W: 2250mm D: 1470mm to 1850mm Bale weight: between 300kg to 550kg	\$30,000 to \$50,000
Miltek	H500 - H600	H: 3100mm to 2170mm W: 1600mm to 1890mm D: 1300mm to 1400mm Bale weight: between 350kg to 500kg	N/A
WasTech	B50	H: 3180mm W: 1860mm D: 1055mm Bale weight: between 400kg to 500kg	between \$40,000 - \$50,000

Note: Pricing is based on previous experience and estimates from equipment suppliers. All figures shall be treated as approximate and may require re-quoting for an accurate representation of actual unit cost and additional fees associated with delivery or otherwise.

Appendix D Standard Signage

Waste Signage

Signs for garbage, recycling and organics bins should comply with the standard signs promoted by the NSW Office of Environment and Heritage (NSW OEH 2008b) and as stated in the Penrith DCP.

Standard symbols for use in signage, bin facade and educational materials are promoted through the NSW Environment Protection Authority. They are available for download from the NSW EPA website (NSW EPA 2016b), in black and white and colour versions. The Australian Standard series AS 4123 (Part 7) details colours for mobile waste containers (Standards Australia 2008).

Figure 7: Examples of standard signage for bin uses



Safety Signs

The design and use of safety signs for waste and recycling rooms and enclosures should comply with AS 1319 (Standards Australia 1994). Safety signs should be used to regulate, and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information. Below are some examples. Clear and easy to read 'NO STANDING' and 'DANGER' warning signs must be fixed to the external face of each waste and recycling room where appropriate.

Figure 8: Example and layout of safety signage

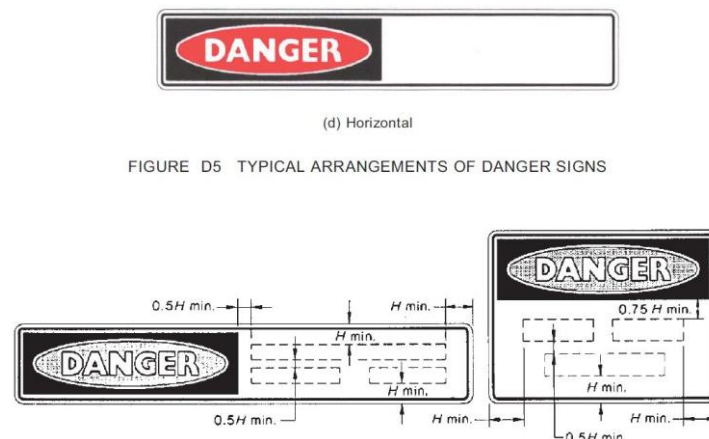


Figure 9: Example waste and recycling signage



Figure 10: Example recycling information signage

