

# Waste Management and Recycling in Multi-unit Developments

Better Practice Guide



Waste Management and Recycling  
in Multi-unit Developments.  
Better Practice Guide.  
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Sustainability Victoria 2019



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Photo: Peter Clarke – Courtesy of Breathe Architecture

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## How to use this guide

While this guide is a stand alone information resource, it is specifically developed to assist architects, building designers, developers, planners and waste management officers to effectively plan, design and assess appropriate garbage, recycling and organics management systems and facilities for Multi-unit Development (MUDs).

### What is in this guide?

<b>SECTION A Background Information</b>	▶	<b>Background information, introduction and state policy framework applicable to MUDs</b>
<b>SECTION B Essential Requirements</b>	▶	<b>Essential requirements applicable to all types of development regardless of the dwelling type or building size</b>
<b>SECTION C Design Options</b>	▶	<b>Better practice design options for different multi-unit development types</b>
<b>SECTION D Appendices</b>	▶	<b>Better practice guidance, infrastructure requirements and management options</b>

### Design options for different multi-unit developments

Section C: Design Options for different MUDs sets out the relevant better practice options. The first option describes the minimum standard for waste management and recycling of MUDs in Victoria. These have been listed in the Better Practice Summary table overleaf. Alternative options have also been described in Section C.

Development Type for Assessment
Two or more residential dwellings on a lot
Low-rise or walk-up apartments (up to 4 storeys)
Mid to high-rise apartments (≥4 storeys)
Mixed use developments
Precinct scale developments



## Better practice process



ORDER	ESSENTIAL REQUIREMENT	RELEVANT SECTION
1 ▼	Ensure that waste management and required infrastructure is considered early in the design phase	ALL SECTIONS
2 ▼	Speak to your local council for any specific requirements or local policies	–
3 ▼	Consider the Better Practice Design Option most applicable to your development	SECTION C: DESIGN OPTIONS & BETTER PRACTICE SUMMARY table, overleaf
4 ▼	Use the Waste Generation Rates and Waste Infrastructure Options table to determine bin sizes, and other infrastructure required	APPENDICES 1, 2, 3 & 9
5 ▼	Ensure that there is adequate space for storage and collection of garbage, recyclables and areas are signed appropriately	SECTION B: ESSENTIAL REQUIREMENTS APPENDICES 9, 10, 11 & 12
6 ▼	Use the management strategies to ensure other waste streams: organics, e-waste and hard waste have been accommodated	APPENDICES 4–6
7 ▼	Ensure the Waste Management Plan (WMP) has considered the waste hierarchy table to improve the sustainability of the development	FIGURE 1 PRINCIPLE OF WASTE HIERARCHY & SECTION C: DESIGN OPTIONS
8 ▼	Ensure that the design has considered potential noise, odour and other amenity impacts to improve liveability and amenity levels for future residents, as well as any existing surrounding residents. <i>(e.g. Ensure noise impacts from collection vehicles are considered, and design access and waste collections areas away from entry and window areas)</i>	SECTION B: ESSENTIAL REQUIREMENTS
9 ▼	Use the WMP checklist to ensure all of the relevant management options have been considered	APPENDIX 13
10 ▼	Use the WMP template to assist in preparing the WMP	APPENDIX 14
11 ▼	Lodge the WMP along with your planning permit (where required) to the relevant authority for their assessment	–





## Better practice summary

MUD GROUPS	ORGANICS	COMMINGLED RECYCLING	GARBAGE	OTHER HARD WASTE/ CHARITY BINS & E-WASTE
<b>ALL MUDS</b> (the requirements listed here have not been repeated for each development type below)	<ul style="list-style-type: none"> <li>Space within each dwelling for organics collection/storage (e.g. kitchen caddy)</li> <li>Mobile Garbage Bins (MGB) and storage area for disposal of source separated organic waste for on-site treatment or council collection</li> </ul>	<ul style="list-style-type: none"> <li>Space within each dwelling for collection/storage for a minimum of two days' worth of recycling.</li> <li>On-site separation and collection of commingled recycling</li> <li>Storage of recycling bins in a communal storage area</li> <li>Utilise council waste collection service for transport to a (Materials Recovery Facility) MRF</li> </ul>	<ul style="list-style-type: none"> <li>Space within each dwelling for collection/storage for a minimum of two days' worth of garbage.</li> <li>On-site collection of garbage</li> <li>Storage of garbage waste bins in a communal storage area</li> <li>Utilise council waste collection service for transport to an Advanced Resource Recovery Facility (if available), otherwise to landfill</li> </ul>	<ul style="list-style-type: none"> <li>Temporary storage on-site for hard waste in a communal storage area.</li> <li>Utilise council hard waste collection service</li> <li>Building management can organise hard waste pick-up depending on volumes generated</li> </ul>
<b>TWO OR MORE RESIDENTIAL DWELLINGS ON A LOT</b> <i>Victoria Planning Provisions Clause 55</i>	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>Space within each dwellings garden or garage for storage of 80L, 120L or 240L MGB for organics</li> <li>Kerbside presentation of MGBs for council collection</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>Space within each dwellings garden for on-site composting or area for communal composting (e.g. worm farm)</li> </ul>	<ul style="list-style-type: none"> <li>Space within each dwellings garden or garage for storage of 240L MGB for recycling. MGB size should be chosen based on council's kerbside collection system.</li> <li>Kerbside presentation of MGBs for council collection</li> </ul>	<ul style="list-style-type: none"> <li>Space within each dwellings garden or garage for storage of MGB for garbage</li> <li>MGB size should be chosen based on council's kerbside collection</li> <li>Kerbside presentation of MGBs for council collection</li> </ul>	<p>In addition the requirements for hard waste provided for all MUDs the following should be considered:</p> <ul style="list-style-type: none"> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development provision for the storage/collection of e-waste should be considered</li> </ul>



MUD GROUPS	ORGANICS	COMMINGLED RECYCLING	GARBAGE	OTHER HARD WASTE/ CHARITY BINS & E-WASTE
<b>LOW-RISE: UP TO FOUR RESIDENTIAL STOREYS</b> <i>Victoria Planning Provisions Clause 55.07</i> 	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>Communal storage area maintained by caretaker which includes shared MGBs for separated organics (garden or FOGO)</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>Communal organics processing equipment/area (composting) maintained by the caretaker, or</li> <li>alternative organics management provided for</li> </ul>	<ul style="list-style-type: none"> <li>Storage of recycling bins in a communal storage area</li> <li>Kerbside presentation where appropriate of MGBs for council collection</li> </ul>	<ul style="list-style-type: none"> <li>Storage of garbage bins in a communal storage area</li> <li>Kerbside presentation where appropriate of MGBs for council collection</li> </ul>	<p>In addition the requirements for hard waste provided for all MUDs the following should be considered:</p> <ul style="list-style-type: none"> <li>Placement of a communal on-site charity bin (a 1m<sup>2</sup> bin per 50 apartments), managed by not-for-profit group, council or a private contractor</li> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development provision for the storage/collection of e-waste should be considered</li> </ul>
<b>MEDIUM TO HIGH-RISE: GREATER THAN FOUR RESIDENTIAL STOREYS</b> <i>Victoria Planning Provisions Clause 58</i> 	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>Communal storage area maintained by caretaker which includes shared MGBs for separated organics (garden or FOGO)</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>Communal organics processing equipment/area (composting) maintained by the caretaker, or</li> <li>alternative organics management provided for</li> </ul>	<ul style="list-style-type: none"> <li>Dual chute system with openings on each floor for collection of recyclables to a central storage area on-site, whereby the chute empties into an MGB</li> <li>Use of compactor if required to manage collection frequency and storage requirements</li> <li>Kerbside presentation of MGBs for council collection or on-site collection, if provided by council</li> </ul>	<ul style="list-style-type: none"> <li>Dual chute system with openings on each floor for collection of garbage to a central storage area on-site, whereby the chute empties into an MGB</li> <li>Use of compactor if required to manage collection frequency and storage requirements</li> <li>Kerbside presentation of MGBs for council collection or on-site collection</li> </ul>	<p>In addition the requirements for hard waste provided for all MUDs the following should be considered:</p> <ul style="list-style-type: none"> <li>A communal on-site charity bin managed by council or a private contractor (a 1m<sup>2</sup> bin per 50 apartments)</li> <li>E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>Move in/move out waste including oversized cardboard catered for</li> </ul>

MUD GROUPS	ORGANICS	COMMINGLED RECYCLING	GARBAGE	OTHER HARD WASTE/ CHARITY BINS & E-WASTE
<b>MIXED-USE DEVELOPMENTS</b> 	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Organics processing equipment for commercial food organics waste</li> <li>› Community gardens for collection and processing of residential food and gardens organics.</li> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> </ul>	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Waste storage and collection area for commercial waste separate from residential waste area</li> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> </ul>	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Waste storage and collection area for commercial waste separate from residential waste area</li> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> </ul>	<p>In addition the requirements for hard waste provided for all MUDs the following should be considered:</p> <ul style="list-style-type: none"> <li>› A communal on-site charity bin managed by council or a private contractor (a 1m<sup>2</sup> bin per 50 apartments)</li> <li>› E-waste collection bin(s) – size and collection frequency to be determined with council or waste contractor</li> <li>› Move in/move out waste including oversized cardboard catered for</li> </ul>
<b>PRECINCT DEVELOPMENT OPPORTUNITIES</b> 	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> <li>› Commercial scale organics processing technologies such as composting and AD.</li> <li>› Community gardens for collection and processing of residential food and gardens organics</li> </ul>	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> </ul>	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> <li>› Waste to energy</li> </ul>	<p>In addition to those requirements listed above for each building type:</p> <ul style="list-style-type: none"> <li>› Establishment of a drop-off reuse/ repair community centre</li> <li>› Move in/move out waste including oversized cardboard catered for</li> </ul>

# Development types



## TWO OR MORE RESIDENTIAL DWELLINGS ON A LOT

- › This development type has two or more dwellings on the same parcel of land.
- › This development type is generally one to two-storey with all entrances at ground level. They often have a small yard and/or a car space per dwelling.
- › Elements of this development type may also be relevant to nursing homes, retirement villages and the residential component of caravan and holiday parks.



## LOW-RISE APARTMENTS UP TO 4 STOREYS

- › This category includes two to three-storey walk-ups, small blocks of generally 4–12 units, with a number of separate dwellings on each storey. They are called walk-ups because they are not required to have a lift, and access to the upper levels is by stairs.
- › Elements of this development type are also relevant to the residential component of smaller scale hotels and serviced units.



## MEDIUM TO HIGH-RISE DEVELOPMENT: ≥4 RESIDENTIAL

- › These developments are medium to large blocks of units that are over four storeys high, with one or more dwellings on each storey.
- › Blocks of units with four or more storeys must have lift access to the upper levels.
- › Where these developments have only one unit per floor, better practice for low-rise apartments may also be relevant.



## MIXED USE DEVELOPMENTS

- › Mixed-use developments incorporate residential dwellings and commercial establishments within the same development, and range from shop-top housing to commercial and retail developments with residential above in low-rise or larger medium to high-rise developments.



## PRECINCT SCALE DEVELOPMENTS

- › These are generally mixed-use developments incorporating residential and commercial uses across a number of buildings. They can also include urban renewal areas that are well-planned and offer the potential for shared services and precinct-wide alternative waste management solutions to be deployed.
- › Depending on the scale of the development, volumes of waste and materials may be greater, which presents both challenges and opportunities.

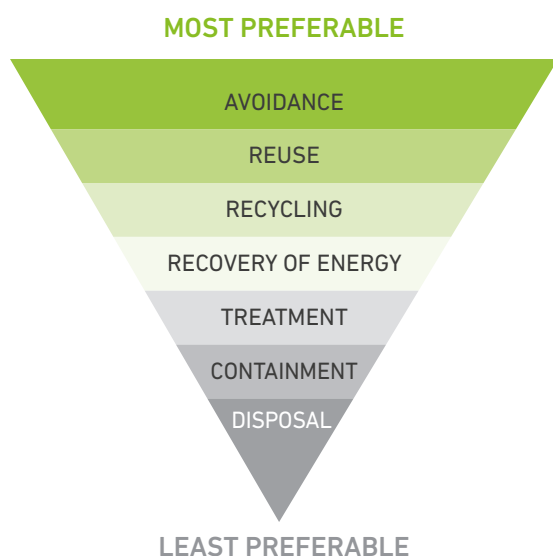
## Alternative waste management systems

It is acknowledged that every site and development is unique, and in some cases an alternative system maybe more suitable than the options listed in this guide.

It is critical that you discuss waste management service options with your local council early in the project planning as council service preferences can determine what options are available.

The options identified in this guide (and appendices) are not intended to limit innovative workable alternatives; however, we recommend that the following questions be considered when assessing an alternative system:

FIGURE 1  
PRINCIPLE OF WASTE HIERARCHY



### QUESTIONS & CONSIDERATIONS FOR THE ASSESSMENT OF AN ALTERNATIVE SYSTEM:

- Q. Can either council or a private collection service adequately access and service the development?
- Q. Have any council specific requirements been addressed?
- Q. Has the system accommodated for, or incorporated suitable storage areas for: e-waste management, hard waste and organic waste, in addition to the bin storage areas?
- Q. Has the system been designed to reduce contamination (of recyclables and organic materials)?
- Q. Has the system considered any noise, odour or other amenity impacts for residents and surrounding properties, and mitigated any likely impacts?
- Q. Are there additional opportunities for more sustainable waste management (e.g. where a precinct scale development approach is undertaken)?
- Q. Has the waste system been designed in line with the principle of waste hierarchy identified in the *Environment Protection Act 1970*?



## Appendices

The appendices of this guide include information, tools and resources to support putting the guide and its principles into practice.

APPENDIX	DESCRIPTION
Appendix 1 Residential Waste Generation Rates	Provides information on domestic/residential garbage and recycling rates to estimate the likely garbage and recycling generation for the development.
Appendix 2 Commercial Waste Generation Rates	Provides information on commercial garbage and recycling rates to estimate the likely garbage and recycling generation for the development.
Appendix 3 Waste Management Trigger Tool	A list of typical thresholds/triggers which can be used when identifying the type of waste management system and infrastructure required for a MUD.
Appendix 4 Organics Recovery Strategy	Provides information on organics management and recovery.
Appendix 5 E-Waste Management	Reuse, storage, collection and disposal.
Appendix 6 Hard Waste Management	Reuse, storage, collection and disposal.
Appendix 7 Australian Standards	Australian Standards that apply to waste management and recycling.
Appendix 8 Waste Generation and Storage Layout Examples	Provides hypothetical developments and likely waste generation rates with calculations.
Appendix 9 Waste Management Equipment	Provides information on garbage and recycling handling equipment.
Appendix 10 Collection Vehicles	Provides dimensions of waste collection vehicles commonly used for domestic waste collections from MUDs.
Appendix 11 Vehicle Access/Turning Circles	Provides information on vehicle access requirements, including road and driveway construction and geometry, and vehicle turning circles and manoeuvring requirements.
Appendix 12 Standard Signage	Provides information on standard signs that should be displayed in waste rooms and on bins.
Appendix 13 Waste Management Plan Checklist	Includes a checklist to ensure that the MUD has been designed in accordance with best practice principles.
Appendix 14 Waste Management Plan Template	Provides a template that may be utilised when completing a waste management plan.



A

## **Background Information**



# What is better practice?

This guide has been developed to assist those involved in designing, planning, developing, building and managing multi-unit developments (MUDs) to incorporate better practice waste management and recycling into all stages of a development's life.

It outlines essential points to consider when designing a waste management system for medium or high-density residential, mixed-use and precinct-scale developments. Although it has not been developed for single dwellings, some of the guidance and better practice options are relevant to this type of development.

## Better practice

Better practice encourages appropriate action and behaviour regarding waste management and increases the amenity, ease of use of waste services, environmental performance and reputation of developments.

Waste management systems in MUDs should incorporate any or all of the following:

- › **GARBAGE SERVICES** – to manage residual domestic wastes, i.e. the wastes not collected by a dedicated recyclables or organics collection service.
- › **RECYCLING SERVICES** – to manage dry recyclable materials. Services vary between councils, but generally cover waste generated in a typical household: paper and cardboard, glass bottles and jars, steel cans and aerosols, aluminium packaging and plastic containers and soft plastics.

Recyclables may be collected as separate streams of each material type or as a commingled (mixed) stream. Commercial waste streams often include bulk cardboard among other waste streams.

- › **ORGANICS SERVICES** – to manage garden and food organics, which may include a bin-based collection system, on-site composting or an alternative system.
- › **BULKY OR HARD WASTE SERVICES** – to manage bulky household items, such as furniture, whitegoods or e-waste. Materials collected in bulky waste services may differ across local government areas.
- › **CHARITABLE DONATION SERVICES** – to collect new and good quality used clothing, accessories and bedding for sorting and potentially on-selling by charities for reuse.



Better practice waste management therefore establishes the design, provision and maintenance of services and infrastructure that enable garbage, recycling, organics and bulky waste services to be operated in the best possible way in order to improve resource recovery.

Better practice management is effective and safe such that residents can use them with ease and collection contractors can access and service them easily. The design, installation and ongoing management of better practice systems encourage residents to use the services appropriately. This includes greater participation in the services provided, a reduction in waste generation, increased resource recovery and minimal contamination of recyclables and organics.

## Why incorporate better practice

It is important to tackle waste generation and put in place resource recovery services (such as recycling and organics services) to reduce the environmental impacts of our consumption and disposal habits.

Resource recovery services to single-dwelling domestic households can divert more than 50 per cent of domestic waste from landfill. The current recovery level from MUDs is often significantly less than this. It is therefore important to incorporate better practice waste management systems in all new MUDs to increase resource recovery and to improve overall environmental and social outcomes.

Low participation rates in recycling most often occur if the system is not convenient. Providing occupiers with a readily accessible means of disposing of both waste and recycling in one convenient location, is likely to improve recycling rates and reduce resource loss to the general waste stream.

The lack of recycling collection services to existing developments further affects overall recycling rates. This may happen, if historically a development only uses a privately contracted garbage collection service and/or a council has not required a waste management plan as part of the development's approval process. Councils should encourage these developments to expand the private garbage collection services to include recyclables collection. Councils should also avoid using private contractors who do not incorporate recyclables collection, and not offer a refund to site owners for a privately provided service if this is the case.

Better practice waste management can also help maintain a development's aesthetic appeal and assist in improving on-site waste management practices. Facilities for garbage, recycling and organics are essential aspects of a development that are often overlooked or undervalued. Waste management is often considered too late in the design process and is therefore retrospectively applied with waste areas/facilities designed to 'fit' around existing design limitations or constraints. Further, space inside apartments should be designed to allow for separate storage of recyclables from the garbage stream with sufficient space for organic food waste in a separate container.

It is an important role of the designer, planner, developer and operator to adequately consider the likely impact of the design on the subsequent ability of future parties to collect waste and provide services in a safe and efficient manner. If designed and managed properly, they are virtually invisible to the occupants. If designed or managed poorly, they are a perpetual irritation, which can become worse as the building ages. Planning at the design stage is essential. It can save a great deal of difficulty and inconvenience for residents, building managers and collectors throughout the life of the development.

## What is in this guide?

This guide provides a list of essential issues to be considered when designing better practice waste management systems for MUDs. Examples of system options, based on actual developments, are provided as a guide to better practice. However, architects and building designers should not feel constrained by these examples. The main features, advantages and disadvantages of suggested better practice systems are provided for a range of developments to help consider and evaluate alternative approaches.

Any garbage and recycling requirements for residential development categories not included in this guide should be discussed with the relevant council.

This guide does not address waste management requirements solely for commercial and industrial developments, although some of the information is applicable regardless of use.

While it is intended that the guide provides better practice options for new development, some of the guidance would also be applicable to improve existing waste management, or when upgrading existing MUDs.

## What is my role? – A step by step guide

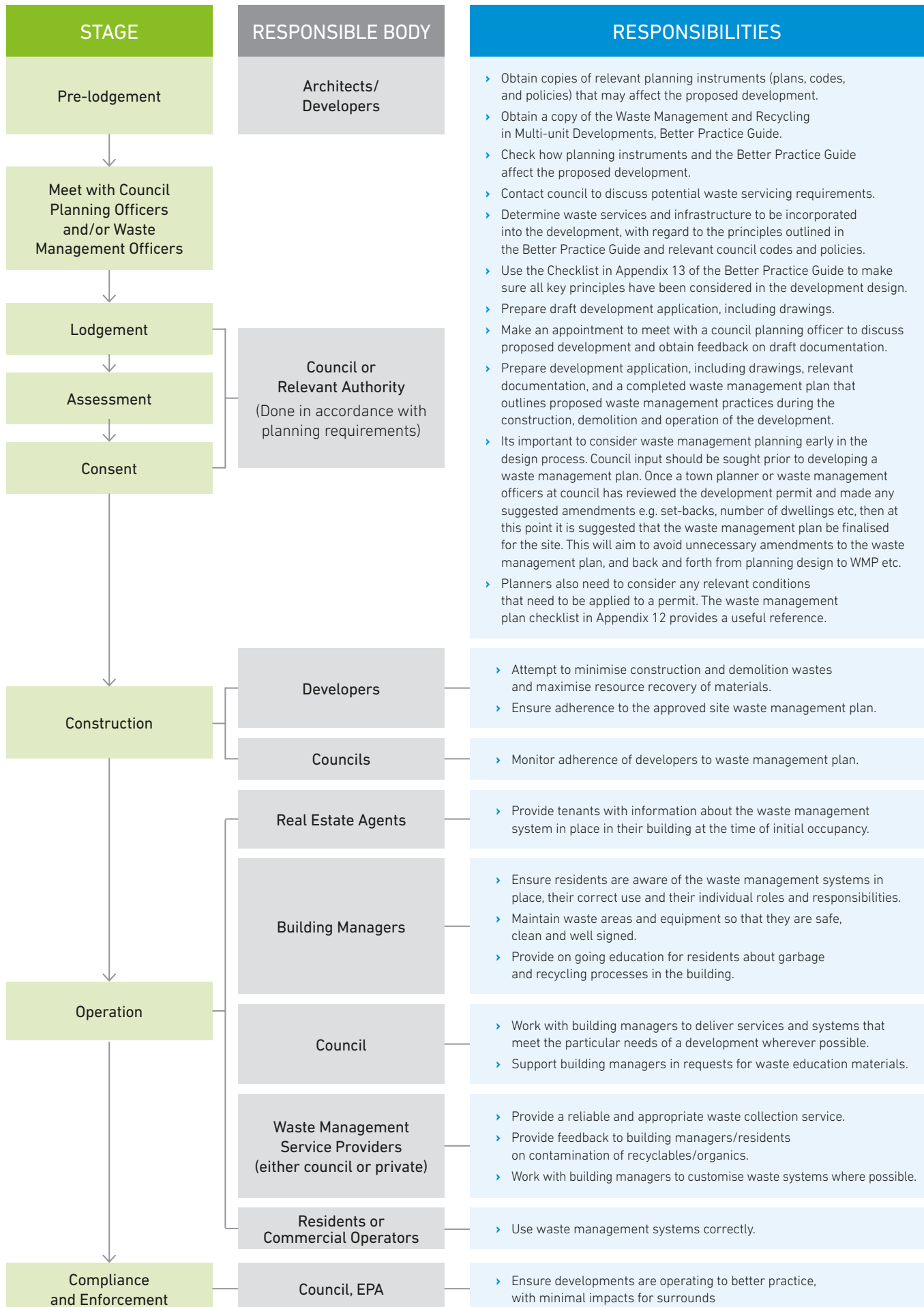
*A Step by Step Guide to the Waste Management System in MUDs* overleaf, provides an overview of how the guide fits into the overall development process and the various roles and responsibilities of key stakeholders.

**Note:** This is a simplified representation of the development application, approvals and construction process. Contact council for detailed information about each of these stages.

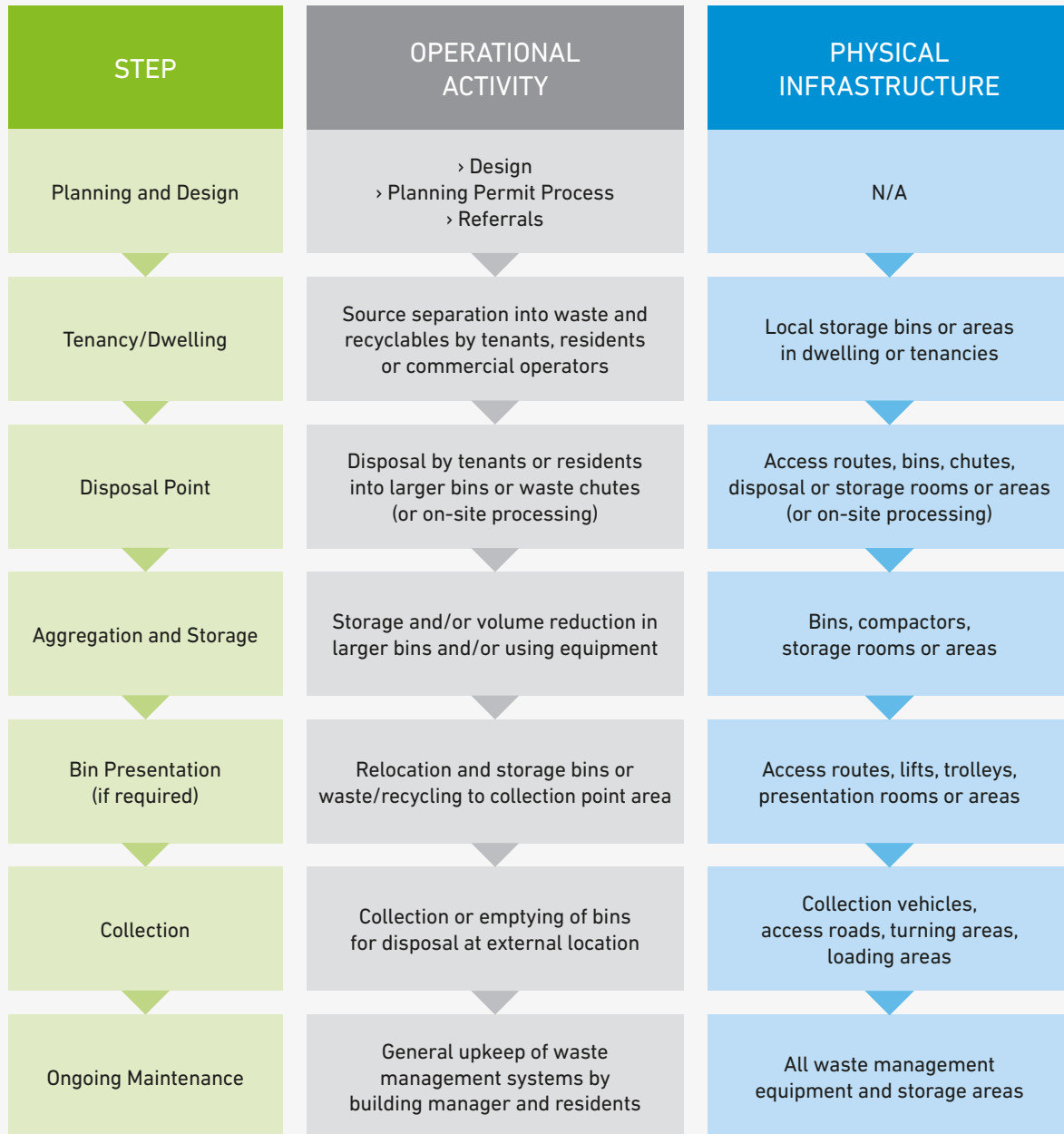
Multi-unit Development Workshop, Sustainability Victoria, 2018



# A Step by Step Guide to the Waste Management System in MUDs



## The Waste Management System







## Links to other planning requirements, tools and guidelines

This guide provides further direction on matters addressed in the Victoria Planning Provisions and applicable strategic documents. It does not supersede or replace information provided in state or local planning requirements.

During the design phase, facilitating discussions between key stakeholders (council, developer, waste contractor and building manager or Owners Corporation) allows all parties to reach a shared understanding of the competing demands involved in a development. This enables development of an optimal waste management solution for the proposal in accordance with both regulatory and local requirements.



### Better Practice

Poor design decisions can have serious repercussions for the management of the building. Failure to address on-site management and collection of garbage and recycling can severely impact servicing options. It is important to integrate waste management into the design process early, as retrofitting a building is both difficult and costly.

A waste management plan should be prepared during the design phase for submission with any planning permit application for development. It will then be subject to approval of the responsible authority to ensure an appropriate waste and recycling management system is incorporated into the development.



### Further Information

Refer to [Appendix 13 & 14](#) for information on [Waste Management Plans](#).

## Better Apartment Design Standards

The *Better Apartments Design Standards (Standards)* was a joint initiative of the Department of Environment, Land, Water and Planning (DELWP) and the Office of the Victorian Government Architect (OVGA). The *Standards* were implemented in the Victoria Planning Provisions and all planning schemes

via Amendment VC136 in 2017 under Clause 58 and amended Clause 55 requirements to improve the liveability and sustainability of apartments across Victoria.

The *Standards* were developed in consultation with community members, architects, planning and design practitioners, technical experts, the development industry, councils and State Government agencies. Waste and Recycling was identified as one of the 16 new apartment standards.

The *Standards* should be considered in conjunction with this guide, which aligns with the requirements of the design standards and guidelines where appropriate.

## Apartment Design Guidelines for Victoria

The *Apartment Design Guidelines for Victoria* (DELWP 2017) assists applicants, architects, building designers and planners when designing and assessing apartment developments. The *Guidelines* act as a supporting initiative to the *Better Apartments Design Standards*.

The *Guidelines* explain the apartment standards and provide guidance on matters to consider when assessing the objectives of the apartment standards. The *Guidelines* also support greater consistency in the assessment of planning permit applications for apartment developments.

Section 2 (Building Performance) of the *Guidelines* provides guidance to waste and recycling. In addition, Clauses 11.03-1R (Activity Centre Planning) and 15.01-1R (Urban Design Principles) of the Planning Policy Framework (PPF) require planning to consider the *Guidelines*.

## Plan Melbourne 2017–2050

*Plan Melbourne 2017–2050* sets out the Victorian Government's strategy to manage the long term growth of metropolitan Melbourne and its population. The strategy identifies the infrastructure, services and major projects that are required to support growth.

Direction 6.7 seeks to reduce waste and improve waste management and resource recovery. Specifically, Policy 6.7.2 seeks to improve waste and resource recovery systems to meet the logistical challenges of medium and higher-density developments. Plan Melbourne states that the government has set a target for at least 95 per cent of all new MUDs to accommodate resource recovery collections by 2026.

This guide supports Plan Melbourne as it seeks to provide guidance for waste and resource recovery in MUDs.

## Other legislation

Councils and developers must consider a broad range of legislation and regulations when planning for waste management. This includes planning for people with disabilities in the design of waste collection and recycling facilities.

## Planning Policy Framework

The principles and better practice options presented in this guide should be considered alongside the *Planning Policy Framework* (PPF) and relevant local planning policies. The following provisions of the PPF are relevant to waste and resource recovery in MUDs.

### Clause 15.02-1S Sustainable Development

Seeks to encourage land use and development that is energy and resource efficient, and support a cooler environment that minimises greenhouse gas emissions. Environmentally sustainable development, particularly in waste and recycling management can assist to reduce overall greenhouse gas emissions.

### Clause 19.03-6S Waste and Resource Recovery

Seeks to reduce waste and maximise resource recovery so as to minimise environmental, community amenity and public health impacts and reduce reliance on landfills. Strategies to achieve the objective of Clause 19.03-6S seek to:

- Ensure future waste and resource recovery infrastructure needs are identified and planned for to safely and sustainably manage all waste and maximise opportunities for resource recovery.
- Protect waste and resource recovery infrastructure against encroachment from incompatible land uses by ensuring buffer areas are defined, protected and maintained.
- Ensure waste and resource recovery facilities are sited, designed, built and operated so as to minimise impacts on surrounding communities and the environment.
- Encourage technologies that increase recovery and treatment of resources to produce energy and other marketable end products.
- Enable waste and resource recovery facilities to locate in close proximity in order to share separation distances, reduce the impacts of waste transportation and improve the economic viability of resource recovery.
- Site, design, manage and rehabilitate waste disposal facilities in accordance with the Waste Management Policy (Siting, Design and Management of Landfills) (Environmental Protection Authority, 2004).
- Integrate waste and resource recovery infrastructure planning with land use and transport planning.

## Planning Policy Framework



### Clause 55.07-11 and Clause 58.06-3 Waste and Recycling Objectives

Standard B45 (Clause 55.07-11) and Standard D23 (Clause 58.06-3) outline the requirements for waste and recycling facilities in apartment developments.

Clause 55.07-11 applies to apartment developments of four storeys or less (excluding a basement) and Clause 58.06-3 applies to apartment developments of five or more storeys (excluding a basement) in a residential zone and all apartment developments in other zones. The *Waste and Recycling Objectives* outlined in Clause 55.07-11 and Clause 58.06-3 seek:

- To ensure dwellings are designed to encourage waste recycling.
- To ensure that waste and recycling facilities are accessible, adequate and attractive.
- To ensure that waste and recycling facilities are designed and managed to minimise impacts on residential amenity, health and the public realm.

## Statewide Waste and Resource Recovery Infrastructure Plan

The Victorian Government's *Statewide Waste and Resource Recovery Infrastructure Plan 2018* (SWRRIP) sets priorities for waste and resource management in Victoria to 2044. The strategy:

- › identifies the need to increase the resource recovery rate from the municipal sector
- › identifies increased recovery of resources for recycling, and improved waste management systems and infrastructure as a guiding objective for local government
- › encourages local government to review planning processes to ensure recycling is supported in the design of new residential buildings.

This guide has been developed to align with the goals and strategic directions of the SWRRIP where relevant to MUDs. Table 1 overleaf describes the opportunities to recover the various waste streams.

## Built Environment Sustainability Scorecard

The *Built Environment Sustainability Scorecard* (BESS) is an assessment tool created by Victorian local governments. It assists builders and developers at the planning approval stage to show how a development demonstrates sustainable design.

BESS seeks to support Sustainable Design Assessment in the planning approval process and subsequently, provides a consistent and streamlined process for both councils and applicants. Waste is identified as one of the nine environmental categories BESS assesses and provides actions regarding building re-use, food and garden waste and, convenience of recycling. It is intended that the BESS and Better Practice Guide will align in their assessment.

## Green Building Council Australia

The Green Building Council Australia has designed Green Star — Design & As Built, which assesses the sustainability outcomes from the design and construction of new buildings or major refurbishments, across nine categories. Management forms one of the nine categories which aims to encourage and reward the adoption of practices and processes that support better practice sustainability outcomes throughout the different phases of a project's design, construction and ongoing operation.

Better practice waste and resource recovery management systems and facilities for MUDs will contribute to achieving the aim of the management category and other broader categories through the promotion of sustainable outcomes for waste and resource recovery.

## Planning enforcement

MUDs must operate in accordance with the approved waste management plans. Relevant authorities will undertake compliance inspections to ensure that developments are operating in accordance with approved plans. This will ensure appropriate site operations, potential amenity impacts are minimised and potential off site impacts are avoided. Non-compliance can result in enforcement action being taken by the responsible authority.

It is suggested that once a waste management plan has been endorsed, it should be reinforced via a planning permit condition.

## E-Waste management

The Victorian Government has committed to banning e-waste from landfill and developed a policy package that includes both regulatory and non-regulatory measures aimed at keeping e-waste out of landfill. The regulatory measures also specify how e-waste is to be managed safely. The non-regulatory measures include upgrades to Victoria's existing e-waste collection network and an education and awareness campaign.

The regulatory measures, in the form of waste management policies under the Environment Protection Act 1970, were enacted in July 2018, with a commencement date of 1 July 2019.



### Better Practice

E-waste storage locations and sizes will need to be taken into consideration when designing MUDs, this will assist to avoid these items being inadvertently put in the garbage chute, bin or bulky waste collection.



### Further Information

Refer to **Appendix 5** for further detail on the Management of E-Waste in MUDs.

Visit the Engage Victoria website [www.engage.vic.gov.au/waste/e-waste](http://www.engage.vic.gov.au/waste/e-waste) or contact the DELWP Waste and Resource Recovery team at [wastepolicy@delwp.vic.gov.au](mailto:wastepolicy@delwp.vic.gov.au)

## Increasing resource recovery in MUDs

Victoria has experienced considerable growth in MUDs, particularly in the CBD and inner suburbs. In many areas growth has occurred without consistent guidance on the requirements for waste and recycling facilities. This has created issues for councils, developers, collection contractors and the recycling industry.

Recycling rates are often lower in MUDs than compared to single dwellings. This may be due to a number of reasons, including:

- › Lack of regulatory support
- › Cost and economic considerations
- › Inadequate planning for waste management
- › Inconsistent systems and approaches
- › Cultural diversity
- › Insufficient ongoing management and education

- › A lack of common understanding between all stakeholders (council planners, waste managers, collection contractors developers and consultants)
- › Lack of understanding of waste management technologies
- › Difficulties associated with organics recovery.

Improvements to waste management standards are necessary to increase recycling in MUDs. This guide provides information regarding better practice for waste management to address the above factors.

The Victorian waste and resource recovery system managed an estimated 12,865,000 tonnes of materials in 2016–17, of which around 8,618,000 tonnes were recovered (67 per cent) and around 4,274,000 tonnes were sent to landfill (Victorian Recycling Industry Annual Report 2016–17). The following table lists the quantities of the main material streams managed, recovered and landfilled in Victoria in 2016–17.

As described in Table 1 Main materials managed, recovered and landfilled in 2016–17, food organics in particular has the most potential to be further recovered. This material can be composted and then reused in the agricultural industry, or household gardens.

**TABLE 1**  
**MAIN MATERIALS MANAGED, RECOVERED AND LANDFILLED IN 2016–17 (TONNES)**

Materials		Recovered (t)	Landfilled (t)	Total Managed (t)	Recovered (% by weight) (%)
Organics	Food	66,000	909,000	975,000	7
	Garden	515,000	263,000	778,000	66
	Wood/timber	227,000	308,000	535,000	42
	Other organics <sup>a</sup>	287,000		287,000	100
Paper/Cardboard		1,445,000	479,000	1,924,000	75
Glass		135,000	82,000	217,000	62
Plastics		131,000	423,000	554,000	24
Tyres and rubber <sup>b</sup>		41,000	6,000	47,000	87
Metals		1,699,000	71,000	1,770,000	96
Aggregates, Masonry and Soils		4,068,000	963,000	5,031,000	81
Textiles		4,000	156,000	160,000	3
Other			587,000	587,000	0
<b>Totals</b>		<b>8,618,000</b>	<b>4,247,000</b>	<b>12,865,000</b>	<b>67*</b>

\*Overall recovery rate

a Includes agriculture waste, sawdust, bark and woodchips.

b Data for tyre and rubber streams is incomplete and should not be considered as a true representation of the current state for this material stream. Work is underway as part of the national tyre stewardship program.

Source: Victorian Recycling Industry Annual Report 2016–17

## Resource recovery and climate change

The significance of a coordinated global approach to resource management and climate change should not be ignored. The United Nations Framework Convention on Climate Change, supported by the Kyoto Protocol and more recently the Paris Agreement, and the UN Sustainable Development Goals are key policy drivers globally.

One of the biggest challenges to Victoria over the next 30 years will be mitigating and adapting to the unavoidable impacts of climate change. If waste and material streams are not managed efficiently then it could add further pressure on the sustainability and resilience of communities.

The major cause of greenhouse gas emissions from the waste and resource recovery sector arise from the breakdown of putrescible waste in landfills. When these materials break down they generate by-products, one of which is methane gas. Methane is at least 21 times more potent than carbon dioxide and is estimated to account for around 86 per cent of the total greenhouse gases from the waste sector. It is therefore important to reduce the materials sent to landfills. Applying design measures in MUDs to recover food organics is one way to improve the recovery rates.

## Recycling guidelines

The recycling guidelines are contained within *Optimising Kerbside Collection Systems*, Sustainability Victoria, 2017, which provides a comprehensive list of household items (referred to as 'core materials') that can be collected for recycling and how they should be presented. They have been developed through consultation with industry and provide the following information:

- › the common household items that can and cannot be collected at the kerbside for both commingled recycling and organics collection services;
- › how items should be presented for recycling (e.g. labels on or off); and
- › reasons why certain items or aspects of packaging cannot be accepted.

The core materials are presented by service type and include\*:

Commingled Recycling		Organics Recycling
Plastic bottles	Glass	Food organics
Plastic packaging	Paper	Garden organics
Metal packaging	Cardboard	
Food and beverage cartons		

\*Guidelines for other materials may be developed as required

Sustainability Victoria recognises that the recycling guidelines may not be applicable to all local governments due to differences in local contexts, including technology, markets for recovered materials and existing contracts.

## Using the recycling guidelines

The recycling guidelines should be used by local government, and building managers to inform discussions with service providers and communications with households.

The guidelines have been established with household kerbside recycling in mind, but they may also be applicable to recycling that happens in the work place or public setting.

When exploring how to use the recycling guidelines the following should be considered:

- › how the guidelines compare to existing services and what is currently accepted for recycling in your local area and/or region; and
- › how the guidelines can be used to inform consistent messaging for recycling.

Sustainability Victoria suggests that local government, waste and resource recovery groups and industry consider the following actions:

- › regularly review and update information (i.e. on corporate websites) on what can and cannot be recycled;
- › provide clear explanations as to why certain items cannot be accepted, using words and phrases that households understand;
- › consider how to target communications to focus on core materials and common household items with low capture rates; and
- › consider how to target communications to focus on common contaminants and the behaviours that lead to contamination.

## Waste and Resource Recovery Groups

Victoria has seven regional waste and resource recovery groups. They are responsible for facilitating a coordinated approach to the planning and delivery of infrastructure and services for all waste streams, including municipal solid waste. The Metropolitan Waste and Resource Recovery Group in particular, have been great advocates towards improving resource recovery in MUDs, by developing guidance and education programs for local government and other stakeholders to increase recycling rates.



### Further Information

Visit the Metropolitan Waste and Resource Recovery Group website [www.mwrrg.vic.gov.au](http://www.mwrrg.vic.gov.au).



### Further Information

Refer to the document *Optimising Kerbside Collection Systems*, Sustainability Victoria, 2017 for which materials can and cannot be recycled.

## Commingled recyclables

The commingled recycling stream is a mixed material stream consisting of paper, cardboard, cans, plastics and glass. It is primarily collected through the municipal kerbside collection system and drop-off services.

In 2015–16, just over 609,000 tonnes of commingled materials entered the waste and resource recovery system through local government provided collection services. Of this, around 559,000 tonnes were recovered for reuse or reprocessing, which equates to 91.7 per cent of this material stream.

This is positive and substantially higher than the recovery rates of organics materials, in particular food waste, which only recovered seven per cent. However, there is still an opportunity to increase the commingled recovery rate. Plastic bag contamination is a key issue for recycling, in particular for MUDs.

## Actions to Increase Recycling

### ACTIONS TO INCREASE THE RECOVERY OF COMMINGLED RECYCLABLES



A solution to plastic bag contamination implemented in some buildings is to include an additional small side bin next to each recycling bin for plastic bags used to carry the recycling. Historic waste audits completed by City of Melbourne showed that this resulted in a decrease in contamination.



Improve point source separation of recyclables to increase diversion of commingled recyclables from the garbage bin to the recycling bin. This would be achieved through ongoing education and awareness to residents and businesses on what is recyclable.



Reducing contamination of the commingled recycling bin. Residents and business owners need to understand the importance of using the right bin due to the impacts on recovery.



Design MUDs in a way that allows waste and recyclables to be easily discarded and separated to assist residents in the correct disposal of each waste stream.



#### Further Information

Refer to the document *Optimising Kerbside Collection Systems*, Sustainability Victoria, 2017 for which materials can and cannot be recycled.

## Organics

In 2016–17, an estimated 975,000 tonnes of food organics were managed by the waste and resource recovery system in Victoria. Of this, only 66,000 tonnes (seven per cent) were recovered with 909,000 tonnes going to landfill. In comparison 66 per cent of garden organics was recovered and 42 per cent of wood/timber was recovered.



### Better Practice

Improving recovery of food organics is a priority of the SWRRIP and Regional Plans. Food organics are putrescible, contain nutrients and energy value, which is lost when disposed of at landfill. Decomposition at landfills produces odours, leachate and greenhouse gases which can adversely impact on community amenity, the environment and public health. Managing these issues at landfills is a long term imposition on current and future generations.

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The three main sources of food organics entering Victoria's waste and resource recovery management system are:

- › food organics discarded by households primarily in the garbage bin
- › food organics discarded by small business and commercial entities
- › food related materials from food manufacturers.

The Victorian Regional Waste and Resource Recovery Implementation Plans identified combined food and garden organics collection systems as an opportunity to increase recovery of food organics from households. In June 2016, 11 councils initiated a Food Organics and Garden Organics (FOGO) service (a program aimed at increasing recovery of organics) and by June 2017, this had increased to 14 councils.

Data collection on the tonnes recovered through FOGO systems only began in 2015–16. Early indications estimate that around 7,000 tonnes of food organics may have been collected through these services. We expect to see an increase in local governments offering FOGO kerbside collection service, and organics collection at MUDs.

## Food organics management

Food organics can be collected from dwellings using caddies or compostable bags where appropriate, which are then disposed of, either through an organics chute system or placed into bins at a communal location for collection and processing off-site or processing on-site. Biodegradable or oxo-degradable bags, are not appropriate and will contaminate the compost product, reducing its value or limiting its use. Only compostable liners that are certified to (AS 4736-2006 and AS 5810-2010) should be used to line kitchen caddies to collect food organics. Check with your local collection service to ensure compostable bags are accepted or if an alternative is preferred.

While it is physically possible to include a dedicated organics chute into the building design, these systems are not without management challenges. Building managers need to educate residents about maintenance procedures and materials should be frequently collected so that offensive odours do not build up and create amenity impacts for residents.

A number of products are also available for composting by individual apartment dwellers and should be considered where communal collection and processing is not appropriate.

## Composting

An Organics Recovery Strategy has been developed as detailed in Appendix 4. This strategy describes options to recover organic materials including food waste from MUDs for on-site processing and re-use. If a development has a communal garden area, space should be allocated for a communal compost unit or worm farm. However, experience with communal composting arrangements shows this option should only be considered if there is a caretaker, gardener, or dedicated resident group able to manage the compost unit.

## Alternative organics management options

Where on-site composting or kerbside collection for off-site composting is not available, other options for organics collection and processing are available and should be considered. These include:

- › Dehydrators
- › In-sink waste disposal units
- › Food macerators (for commercial)
- › Domestic bio-digesters
- › Anaerobic digestion (Waste to Energy)



### Further Information

Refer to [Appendix 4](#) for Organics Recovery Strategy.



## E-Waste management

Electronic waste, or 'e-waste', describes electrical or electronic equipment with a power cord or battery (including batteries) at the end of its useful life and covers a range of electronic items including: televisions, computers, mobile phones, kitchen appliances and white goods. E-waste contains both hazardous materials (which can harm the environment and human health) and valuable materials, which are worth recovering. For both these reasons, it is important e-waste is well managed.

E-waste is growing three times faster than general municipal waste in Australia. Some specified electronic wastes pose a greater environmental and human health risk. The term 'specified e-waste' means waste rechargeable batteries, cathode ray tube monitors and televisions, flat panel monitors and televisions, information technology and telecommunications equipment, lighting and photovoltaic panels.

Everyone has the following responsibilities when it comes to the management of e-waste:

- › Store, handle and transport e-waste appropriately to prevent breakage and contamination with other wastes.
- › Ensure e-waste is received by an appropriate e-waste reprocessor or collector (local transfer station or retailers participating in product stewardship schemes).



### Better Practice

Poor practices for the collection, storage and handling of e-waste can lead to air, soil and water pollution due to fugitive dusts, volatilisation<sup>1</sup>, leaching and runoff. E-waste that is not whole poses a higher risk and must be managed accordingly. Additional measures will therefore be required for storing and handling e-waste that is broken into pieces, crushed or shredded.



### Further Information

Refer to **Appendix 5 E-waste Strategy** for the management of e-waste.

Examples of e-waste



<sup>1</sup> J.-E. Park, Young-Yeul Kang, Woo-Il Kima, Tae-Wan Jeon, Sun-Kyoung Shin, Mi-Jeong Jeong, Jong-Guk Kim; Emission of polybrominated diphenyl ethers (PBDEs) in use of electric/electronic equipment and recycling of e-waste in Korea; Science of the Total Environment 470–471 (2014) 1414–1421



## Waste to Energy

Waste to Energy (WtE) is a process where waste is used to generate a usable form of energy. Examples of usable forms of energy include electricity, heat and transport fuels. There are by-product associated with WtE, which must be managed in accordance with regulations, and may require disposal to landfill.

WtE is common overseas, but in Australia the industry is in early development. This is due to many different factors. Authorities are increasingly looking at alternatives and more sustainable ways to manage organics and residual waste, including WtE. The infrastructure and technologies used to produce energy from waste vary in scale. The associated efficiencies and costs will also vary, as well as the types and volumes of materials to be processed. Technologies are changing rapidly with smaller modular and containerised solutions being investigated.

Anaerobic digestion of organics is a smaller scale WtE application most likely to be found in MUDs. WtE may be more applicable to large precinct developments (or uses with greater control over waste volumes and contamination e.g. hospitals, universities, hotels), and although some of these uses may be beyond the scope of the guide, see Precinct Scale Developments section for further guidance in this regard.

Installing WtE technology may have implications for design and ongoing operations. During the planning and design of MUDs, WtE may need to be considered in terms of physical design, connection to the electricity grid (where relevant) and collection/disposal options for outputs.

WtE facilities are regulated:

- › the Energy from waste guideline (EPA publication 1559.1, July 2017) provides guidance on the thermal efficiency and regulatory requirements that apply to WtE facilities
- › they may be subject to relevant planning approvals from local councils
- › they may require a works approval and a licence from the EPA
- › they may be subject to regulations (and commercial negotiations) for connection to the electricity grid.

Environmental issues such as waste management, odour, air emissions and noise would all need to be considered in the assessment, and mitigation measures may need to be established.



### WASTE TO ENERGY

- › **WtE:** is lower in the waste hierarchy than recovery and reuse, but is preferred to landfill as it captures the energy value of waste and reduces the use of landfills.



#### Further Information

Contact your Distribution Network Service Provider (DNSP): CitiPower, Jemena, Powercor, AusNet Services and United Energy Distribution, and Essential Energy are Victoria's DNSPs.



#### Further Information

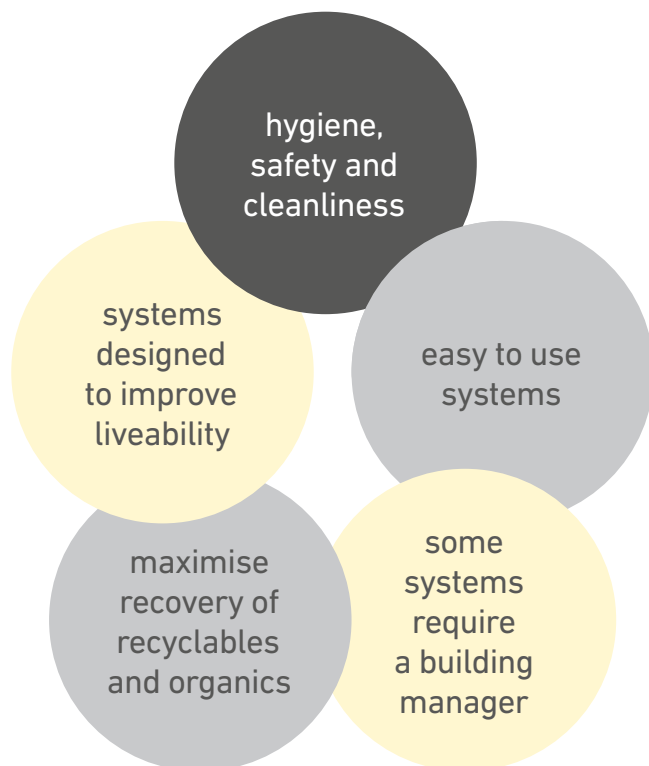
Refer to *Resource Recovery Technology Guide*, Sustainability Victoria, 2018 for information on WtE technologies.



B

**Essential**  
Requirements

## Underlying principles



# Requirements applicable to all multi-unit developments

This chapter discusses the general requirements that apply to all development types and should be considered when designing garbage, recyclables and organics management systems. Reference should be made to the waste management plan checklist in Appendix 13, which will assist in identifying the key issues to be considered in the building design and that facilities have been designed in accordance with better practice principles.

This guide does not supersede or replace state and local regulatory requirements. Consultation with key stakeholders, including council engineers, planners and waste managers regarding specific requirements for facility design and placement should occur early in the design process.

## The underlying principles that were used to develop this guide are:

- › hygiene, safety and cleanliness
- › systems should be as simple as possible to use
- › some systems, particularly in high-rise developments, require a caretaker or building manager
- › systems should aim to maximise source separation and recovery of recyclables and organics
- › systems should be designed to minimise amenity impacts, and improve the liveability of apartments.

## Council service provision

Local government has an obligation to provide domestic waste management services, however services vary between local government areas. Early consultation with the local council is vital in ensuring local requirements are addressed.

Pursuant to Section 162 of the *Victorian Local Government Act 1989*, a council may declare an annual service charge for the collection and disposal of refuse on all parcels of rateable land for which the service is available, whether or not the service is actually used.

## Contracts

The structure of service contracts plays an important role in ensuring efficient servicing of MUDs. Indemnity and waste service flexibility are two important contractual issues to be considered when deciding on an appropriate better practice system for a development. It is important to talk to council as early as possible to identify potential servicing issues.



### Better Practice

Requirements for on-site collection vary between council areas. During design development, check with the local council regarding the availability of on-site servicing before assuming it is possible.

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## Indemnity

Some councils may provide on-site collection if:

- › there is insufficient space on the kerbside to temporarily place bins for waste
- › collection or bins would encroach on the frontage of adjoining properties
- › kerbside collection would be unsafe
- › kerbside collection would cause significant traffic disruption
- › kerbside collection would occur in an excessively restrictive area
- › council considers kerbside collection would be inappropriate.

Most councils, however, will not enter private property with their vehicles unless indemnity against liabilities, losses, damages and other costs arising from the on-site collection service has been provided. In some council areas, all bins must be presented at the kerb of a public road, and no on-property service is offered at all.

To enable better practice waste management in MUDs, developers should:

- › decide the preferred waste management system to install, considering the principles outlined in this guide
- › check with council if on-site collection is required or allowed, before submitting the development application
- › if on-site collection is required:
  - ensure design of facilities can safely accommodate on-site collection
  - liaise with council to find out if it can provide the on-site service
  - identify necessary indemnity arrangements.

## Service flexibility

The design of the waste management system should accommodate services provided by council if possible. Some councils may only be able to offer MUDs the same (or similar) services as those offered to single dwellings. Often, particularly for medium to high-rise MUDs the efficient provision of cost-effective garbage and recycling collection services may require the use of an alternative service option, such as bulk bins or underground systems.

To enable better practice waste management in MUDs:

- › Designers/developers should check with council about the garbage and recycling service options available and whether they are suitable for the proposed development.
- › Councils should seek a better practice contract structure that provides for variations to services during the agreed contract period.

## Contract structure

In addressing council servicing of MUDs, the structure of recyclables collection and sorting contracts needs to be addressed. It is also recognised that some councils use in-house collection contracts rather than separate contractors. Traditionally, kerbside recycling collections are based on a per household collection cost, with one bin per household. It may be preferable to use another format at sites where the number of households is high and the sharing of bins occurs.

Better practice contract structure for recycling services in MUDs should consider:

- › the most relevant basis for calculating servicing costs, e.g. per household or per bin lift different contract requirements for multi-occupancy residential sites relative to detached housing
- › the expansion of multi-occupancy residential sites over the life of a contract, including
- › increased use of skips
- › clear definition of contract responsibilities
- › the use of smaller vehicles in specific areas
- › performance standards and key performance indicators.



## Health and safety

Waste management systems and services should be designed and operated to prevent the potential risk of injury or illness associated with the collection, disposal or recycling of material.

This includes risk to:

- › residents using the service
- › building management and cleaning staff (if applicable) who maintain the service
- › collection staff providing the service; and
- › any other person engaged in or affected by the system.

The designer, developer and operator therefore have an important role in considering the potential impact of the design on the ability of others to make collections and provide services in a safe manner. Developing a serving solution that minimises manual handling should be promoted. This requires foresight during the design and planning phase of the MUD.

Collection methods and systems used for waste management in MUDs must comply with the Occupational Health and Safety Act (2004) and associated regulations. This includes the *Occupational Health and Safety Guidelines for the Collection, Transport and Unloading of Non-hazardous Waste and Recyclable Materials (Worksafe 2003)* which provide guidance on how to prevent injury and illness caused by the collection of domestic waste and highlights examples of common hazards and risk control measures.

Irrespective of the size of the development, all services within MUDs must comply with Occupational Health and Safety (OH&S) requirements. A preliminary risk and hazard analysis should be completed during the design phase to identify potential risks to health and safety associated with the proposed services and design layout. The early identification of risks will enable modifications to the proposed design to preferably eliminate, or minimise, the consequence or likelihood of human injury or damage to property and equipment.

A final risk assessment should be conducted to identify hazards and risks and any subsequent management and mitigation strategies.



## EXAMPLES OF DESIGN CONSIDERATIONS TO HELP ELIMINATE OR CONTROL RISKS

- › Education programs that address safe and appropriate sorting/disposal
- › Adequate storage and collection of food waste to ensure that any amenity impacts are reduced
- › Appropriate storage and collection of e-waste to ensure that potentially hazardous materials are contained appropriately
- › Sufficient space to accommodate waste so that bins do not become overloaded or overcrowded
- › Areas are maintained so all garbage and recycling is contained within appropriate bins
- › An appropriate collection point that is not restricted by obstacles and traffic hazards.
- › Adequate storage space for easy manoeuvring of bins within the property and to the collection point
- › Paths for movement of bins of an appropriate grade and free from steps
- › Collection points that enable the mechanical pick-up of bins
- › Collection points that are easily accessible for the collection vehicle and have appropriate overhead clearances, strength, width and geometric design
- › Adequate access and turning space for vehicles, in particular to avoid the need to reverse
- › Vehicle access and turning areas free from obstacles that may impair driver visibility





## Storage space within a dwelling

Three bins are recommended to provide sufficient space within the kitchen, or other convenient location in each dwelling for interim storage of at least two days worth of garbage, recyclables and food waste.

## Bin storage requirements

Storage space for bins is an ongoing issue, particularly when refurbishing existing buildings or adding additional waste collection streams to existing premises. Placing a central storage area in existing developments may affect parking and open space. Therefore, consider increasing the frequency of collection or using skip bins, which can reduce the amount of space required.

Individual bins should be provided to each property if there is sufficient street frontage and on-site storage space. If street frontage and on-site storage space is limited, garbage, recycling and organics bins should be shared between units. The number of bins shared between units is based on the amount of garbage, recyclables and organics generated by the residents.

When bins are shared within MUDs, a central storage area is required. Alternatively, multiple storage areas may be necessary, particularly for larger developments or those spread over more than one building.

Despite specific site arrangements, the building design needs to incorporate sufficient space within the property boundary to store, in separate bins or containers, the volume of garbage and recycling (including organics, e-waste and hard waste if appropriate) likely to be generated at the MUD during the period between collections. There should also be adequate space allowed for signage and educational materials located within and adjacent to the refuse storage area, bins and equipment.



### THE RECOMMENDED ALLOWANCE FOR GARBAGE AND RECYCLABLES GENERATION

- **GARBAGE:**  
80–120L per household per week
- **RECYCLABLES:**  
80–240L per household per week
- **ORGANIC WASTE:**  
To be determined with local service provider

To assess the storage requirements, calculate using the generation rates (refer to Appendix 1 Residential and Appendix 2 Commercial), the storage equipment to be used (refer to Appendix 9) and the type of service that can be offered (based on council and contractor guidelines).

The storage area should be designed to provide easy access to allow adequate room for manoeuvring bins for collection, cleaning of the storage area, and undertaking maintenance and servicing requirements. It is undesirable to locate other services and utilities (such as electrical meter boards, gas meters or conduits) in bin storage areas, as it clutters the area and increases the risk of damage to facilities during collection or cleaning.

The greatest difficulty in calculating space allocation is predicting the collection services that will be provided in the future. Service requirements should be discussed with the local council, but some flexibility must be allowed in the building design for future needs.

Examples of how flexibility can be incorporated into the building design include:

- Identifying suitable locations for waste storage and collection points that would enable future on-site collection if required
- Ensuring waste storage areas are kept clear of potential obstacles that would make it difficult to modify existing bin sizes. For example, in communal bin areas, using fixed structures to separate individual bins should be avoided, as bin sizes and/or configurations may change
- Designing access paths and doorways greater than the minimum width requirements to allow for possible future changes in bin sizes. For example, installing double doors on a communal garbage area allows easy movement of either mobile garbage bins (MGBs) or bulk bins
- Sizing communal bin storage areas to allow for a potential increase in waste generation from the development or a change in allocated council services per dwelling.



### Better Practice

Provision of adequate storage areas both within and external to dwellings is a key element of better practice systems.



#### Further Information

Refer to [Appendix 1](#) for waste generation rates.



#### Further Information

Refer to [Appendix 8](#) for bin storage/layout examples.

## Accessibility

Consideration also needs to be made for people with disabilities, in accordance with The Disability Discrimination Act (1992) in the design of waste and recycling systems.

## Location

Identifying the best location for communal bin storage areas can be difficult, particularly if not incorporated into the development during the design stage. It is a balance between convenience to residents and collectors, space, access, noise, security, planning requirements and architectural integration.

The following points should be considered when deciding where to locate garbage and recyclables storage areas.

# Bin Storage Location

TABLE 2

BETTER PRACTICE	REASONS
✓ Location of the bins should be convenient to residents	Conveniently located bins are more likely to be used appropriately by residents. Avoid stairs and uneven or rough surfaces where possible.
✓ Bins should be in a high pedestrian traffic area	<ul style="list-style-type: none"><li>▶ Locating bins in a high pedestrian traffic area encourages good housekeeping, as the bins are visible to a large number of people. It increases the convenience to residents, as disposing of garbage and recyclables can occur as part of the daily routine of walking to the mail box or entering the parking area. However this may be harder to achieve in larger developments.</li><li>▶ In larger MUDs, bin storage areas should be fully integrated within the development — for example a chute system and organics collection point on each floor.</li><li>▶ Bins located in a rarely frequented area of the property tend to attract dumped waste and encourage poor practices.</li></ul>
✓ If collection of bins is from the kerbside, the waste storage areas should be as close to the kerb as possible	Manual moving of bins from storage areas to the collection point should be minimised if possible to reduce potential health and safety risks. A well-located storage area reduces the time required to take bins out for collection and return them to the storage area after collection.
✓ Storage areas should be out of sight or well screened from the street	<ul style="list-style-type: none"><li>▶ Externally sited bin storage areas should not affect the aesthetics of the development and should blend in with surrounding buildings and landscape.</li><li>▶ Bin storage areas that are too close to the street can be subject to vandalism.</li><li>▶ In larger MUDs, bin storage areas should be fully integrated within the development (basements and ground floors) while maintaining the amenity for occupiers and surrounding buildings and public access ways.</li></ul>
✓ Storage areas should be located an appropriate distance from dwellings	Locating bin bays and collection points away from residents will reduce the impact of noise during bin use and waste collection. It will also increase amenity through reduced odour impacts. Waste rooms should not be located more than 40m from a dwelling.
✓ Storage areas should be located an appropriate distance from the collection points	<ul style="list-style-type: none"><li>▶ The distance from the storage area to the collection point should not exceed 40m.</li><li>▶ This would reduce potential health and safety risks.</li></ul>

### Shared bin designations and colour schemes

Shared bins should be colour-coded in line with the colours detailed in the table below. For other waste or recyclable components not listed in this table, the colour-coding should be consistent with Australian Standard 4123.7—2008.

## Bin Colour Scheme

TABLE 3

RESOURCE TYPE	LID COLOUR	BODY COLOUR	EXAMPLE
WASTE TO LANDFILL	Red	Dark Green or Black	
DRY COMMINGLED RECYCLABLES	Yellow	Dark Green or Black	
GREEN ORGANICS FOR COMPOSTING	Lime Green	Dark Green or Black	
PAPER/CARDBOARD	Blue	Dark Green or Black	

## Bin signage

The correct use of signage will be critical to the success of your waste and recycling system as the most frequent communication method with staff/bin users.

There are two types of signage you can use around the workplace:

- › **Instructional signage:** Gives users information about what material to place in each bin.
- › **Directional signage:** Directing to the nearest waste and recycling deposit areas.

Instructional signage is placed on, above and around bins to communicate what can be placed in each bin.

## Bins and containers

All garbage, recyclables and organics generated by a development need to be stored in the appropriate waste bins or containers with permanent, well-fitting lids and easily accessible to all residents. Recycling facilities should never stand alone and should be located separately, but in close proximity to garbage facilities within the designated storage area and not intermingled.

Waste bins and containers used should conform to the Australian Standard for mobile waste containers (AS 4213) (AS 4213.7 Bin Colours) where the standard is applicable for the selected bin or container type. Waste bins and containers greater than 1700L should be designed to appropriate safety standards.

Dwellings should be designed to include allocated space for storage of separate collection containers for garbage, recyclables, and food organics, as appropriate.

When bins are provided for individual units, or pair of dwellings, ownership should be encouraged by writing unit numbers on individual bins.



### Better Practice

Recycling bins should never stand alone;  
they should always be sited with garbage bins.

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## Waste handling equipment

All waste handling equipment (including chutes and compactors) must conform to the relevant design and safety standards.

## Bin wash areas

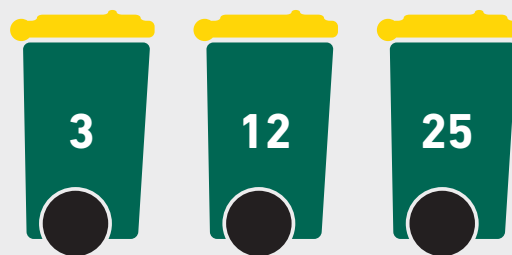
Communal bin storage areas must be easy to clean, with access to water (a tap, soap and a hose) and correct drainage to the sewer. Never allow the water from washing bins and/or waste storage areas to flow into the stormwater drain. Wash areas should be designed in accordance with relevant EPA requirements.

Ideally, having covered floor junctions at walls helps with cleaning and avoids the build-up of dirt and spills.

To maintain hygiene:

- › assign responsibility for keeping communal areas clean
- › wash bins, floors and walls of garbage bays and rooms regularly.

### *Unit numbers indicated on bins*



## Bulky items or hard waste management

A dedicated hard waste storage area and associated collection procedures need to be defined within the waste management plan. Hard waste collection requires coordination amongst residents (ideally through the Owners Corporation or building manager).



### Better Practice

The design of MUDs should provide space for residents to temporarily store unwanted hard waste while awaiting disposal through provision of a suitable enclosure at ground floor or basement level. This is important to avoid illegal dumping of hard waste and ensuring items are not stored on the footpath creating a hazard and impacting on amenity.

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Due consideration should also be given to the siting of charity bins, which need to be stored in a secure but accessible location.

The frequency of collection for hard waste should be considered during the design stage. Hard waste may be collected by council or contractors. Alternatively, tenants or building managers may make collection arrangements themselves.

Many councils in Victoria offer a hard waste collection service once a year or a number of on-demand collections. The details of a collection service provided by council will differ in frequency and the types and sizes of materials collected.

If on-site collection is not available, residents or a caretaker should be employed to move hard waste from the interim storage area to the kerbside (or designated collection point).

## Move in move out waste

For newly developed MUDs, or those with a high turnover, consideration will need to be given to cater for move in/move out waste. It is essential that cardboard storage areas for example are provided, as its common for these types of oversized materials to block chutes. Storage areas may be located in bin rooms and residents advised of suitable storage areas prior to collection. Allocated hard waste storage areas may double up as cardboard/polystyrene/plastics storage areas, when they are not being used for hard waste collection.



### Further Information

Refer to [Appendix 6](#) for Hard Waste Management.

## Collection point

### Location of collection point

During the design process, identify a suitable waste collection point and discuss collection requirements with the relevant council.

Collection points, if possible, should **NOT** be located:

- ✗ near intersections
- ✗ near roundabouts or slow-points
- ✗ along busy arterial roads
- ✗ in narrow lanes
- ✗ where bins may restrict pedestrian access
- ✗ where parking will restrict access to bins
- ✗ near possible obstructions, including trees, bus stops, overhanging buildings and overhead power lines
- ✗ where they pose a traffic hazard
- ✗ on sloping or steep sites
- ✗ on cul-de-sacs
- ✗ with insufficient property street frontage

The collection point(s) should enable collection operations to be carried out on a level surface, away from gradients and vehicle ramps.

If MGBs will be used and collected from the kerb, there should be sufficient space on the street for them to be lined up neatly in (preferably) a single row along the kerb. Remember, cars parked along the street and bins placed two or more rows deep are an obstacle for safe and efficient kerbside collection, as they require collection operators to get out of the collection vehicle and manually move bins to an appropriate position for collection. They can create amenity issues for residents, impede pedestrian access and be a traffic hazard for motorists. Curved roads may also pose a problem (particularly in residential street courts); if possible, place bins where the road is straight.



### Better Practice

Collectors need to be able to move the bins as quickly as possible, preferably with no manual handling.

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Identifying a suitable collection point is particularly important for servicing developments where a large number of bins are to be collected, there is limited direct access to the development (for example battleaxe, or L shaped block or developments with minimal frontage), or if the development has specialised servicing requirements due to equipment used to provide the waste service. For example:

- The collection point for bulk bins or bins containing compacted waste should be located so the bins can be accessed with minimal manual handling.
- Underground systems require suitable access for the collection vehicle to enable safe lifting of the underground containers for servicing (including clearance for lifting arm).

Site specific considerations for waste collection must be reflected in waste management plans, particularly in higher density locations or on sites with restricted access to unhindered kerbside for bin placement. Developers should consider what alternatives are available for locating collection points, particularly for developments built on small blocks with steep gradients, to enable safe presentation and uplift of bins. Innovative solutions may be required, for example there has been successful implementation of on-street parking restrictions to limit the use of specified spaces on refuse collection days between certain hours to enable kerbside waste collection to occur. Similar arrangements may also support regular hard waste and charitable waste collection. Dedicated hard waste and charitable waste collection procedures must also be clearly defined.

### Presentation area

If the collection of bins from either the designated storage location (within the MUD) or a location on the kerbside cause amenity and safety concerns, some councils may require the use of a “presentation” area. A presentation area acts as an intermediate point between the storage area and collection point, which may be on – or off-site.

If a presentation area is used, a building manager, caretaker or other designated person(s) must move the bins from the storage area to the presentation area for collection and return them to the storage area once emptied. If used, presentation areas should be located as close as possible to the collection point.



### Better Practice

Please check with your local council to determine any specific requirements such as minimum clearance distance that must be provided.

## Manoeuvring bins to the collection point

If relocation of bins of up to 360L in capacity is required, the following should be implemented:

- The distance from each unit should not exceed 40m.
- Manoeuvring bins should factor in the use of bin tugs if required.
- The bin transfer grade should not exceed 1:14
- If greater than 360L but less than or equal to 1.0m<sup>3</sup> in capacity, bins should not need to be wheeled more than 5 metres from the interim storage point to the collection point
- If greater than 1.5m<sup>3</sup> in capacity, manual manoeuvring of bins should be avoided wherever possible. If it cannot be avoided (for example, if bins are stored in a room or enclosure), the bins should not need to be wheeled more than 3 metres from the interim storage point to the collection point
- The bin-transfer grade should not exceed 1:30.



**In all cases, bins should NOT be wheeled up or down steps.**

## Accessibility

When designing waste and collection systems, consideration also needs to be made for people with disabilities in accordance with The Disability Discrimination Act (1992).

### Access for service providers

Wherever possible, waste collection vehicle movement should be in a forward direction with no need to reverse. (*Better Apartment Design Standards for Victoria*, DELWP 2016).

Inadequate kerbside frontage space is a key issue in providing kerbside garbage and recycling services to MUDs. The placement of bins at the kerbside can have a significant impact, particularly in areas of high density.

Specific access requirements for collection vehicles will vary depending on the council and their waste collection arrangements. However, collectors always need to be able to move bins from the collection point to the vehicle as quickly as possible, preferably with no manual handling.

**Note: Requirements for manual handling may also differ between councils and respective collection contracts.**

Council traffic engineering sections/departments may want to consider allocating a loading/car parking area to assist with collection of hard waste for example.



### Better Practice

Whatever bin type is used, the developer needs to ensure there is sufficient space for the collection vehicle to drive to the collection point, empty the bin and safely leave the collection point. Wherever possible, collection vehicle movement should be in a forward direction with no need to reverse.

The design aspects to take into account for vehicle access include:

- › the presence of parked cars on access roads
- › heavy vehicle access and turning circle requirements (*refer to Appendix 11*)
- › collection vehicle overhang and possible interference with bins, street furniture and trees
- › clearance height for servicing, particularly when developments are serviced internally, or if an external collection point is near trees or overhead obstacles.
- › Pedestrian thoroughfare and entry areas

### On site collection

If on-site collection is agreed, the on-site collection points should be located:

- › so that collection vehicles minimise interference with the use of access driveways, loading bays or parking bays during collections
- › close to waste storage facilities to permit easy transfer of bins to the collection point, if movement of bins is required
- › in a relatively flat area and on the same level as the collection vehicle (i.e. bins should not be placed for collection on elevated loading bays or nature strips/footpaths)
- › to provide collection vehicles safe access to the collection point and adequate clearance
- › with sufficient manoeuvring area on-site to allow collection vehicles to enter and leave the site in a forward direction and service the development efficiently with little or no need to reverse. (Where insufficient space exists, turn tables may be considered)
- › so oncoming traffic can be clearly seen as the collection vehicle leaves the property
- › away from pedestrian thoroughfares.

If a collection vehicle is required to drive onto a private road or into a private property, the driveway and road needs to be suitable for the collection vehicle in terms of pavement strength, width, geometric design and height clearance (refer to Appendix 10 and 11 for technical specifications). The access points and collection area should be free from overhead obstacles and of an appropriate gradient. When making an on-site collection from within a building, the clearance height must be clear of any air-conditioning ducts, sprinklers or other potential obstructions.

Appropriate heavy vehicle standards should be incorporated into the design development, including those specified in applicable Acts, regulations, guidelines and codes administered by Austroads, Vicroads, WorkSafe Victoria and any local traffic requirements.

In addition to the design aspects, general access to the collection point should be considered during the design development stage, with due consideration to the future operation of the system. Locked gates and security systems that prevent access to waste collection points can cause serious delays and problems in undertaking the service if not well designed. Designers and developers should consider the likely ongoing operational arrangements for access to locked-gate developments and incorporate this in the design. For example, some councils may require a set of keys or remote-control access to enter developments, whereas others may require security systems to be compatible with a single master key held by council.



**Garbage and recycling collections may occur at different times depending on the council area and service provider, therefore access should **NOT** be restricted at any time.**

### Collection frequency

- › Sufficient communal waste and recycling storage on-site to align with the local council collection cycles, generally weekly
- › Where council services are not used (for e.g. commercial tenants within a mixed use MUD), sufficient commercial waste storage should be provided on site to minimise collections and associated truck movements, and ideally would also be weekly for waste and recyclables. More frequent collection may be required where on-site storage space is significantly constrained. In these cases compactors may assist to increase storage room of waste on-site to reduce collection frequencies and truck movements.

## Noise

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### Better Practice

Waste is collected at least once per week and in some areas more frequently and therefore noise can be a significant concern for residents and adjoining properties. Potential noise sources should therefore be mitigated appropriately.

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The main sources of noise associated with domestic waste collection are emptying glass into bins, emptying glass from bins into the collection vehicle and reversing alarms on collection vehicles.

Better practice approaches to reduce noise include:

- › locating bin bays and collection points far enough away from residents to reduce the impact of noise during bin use and waste collection
- › designing the development and access to minimise the need for collection vehicles to reverse
- › selecting appropriate surfacing materials (that will minimise noise) for pathways and driveways that bins will need to be wheeled over
- › insulating chutes (the noise associated with waste falling out the bottom of the chute and with compactors can also be problematic and should be managed appropriately)
- › considering how material will be transferred into bins or static compactors at storage points.



### Better Practice

The main sources of noise associated with domestic waste collection are emptying glass into bins, collection vehicles and reversing alarms. In higher density areas the cumulative impacts of collection can impact on amenity.

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## Odour

A storage area should be well-ventilated to minimise odour problems.

For enclosed storage and service areas, the air flowing from interim storage areas and central garbage rooms should not have its exit point sited close to units. Ventilation openings should be protected against flies and vermin and located close to the ceiling and floor, but away from the windows of dwellings.

If a forced ventilation or air-conditioning system is used (for enclosed storage areas), it should be in accordance with the ventilation requirements of the Building Code of Australia and AS 1668.2 The use of ventilation and air-conditioning in buildings should not be connected to the same ventilation system supplying air to the units.

## Hygiene/vermin

Waste not sealed in containers can attract vermin and is unhygienic.



**Do NOT allow bins to sit open for long periods of time.**

Prevent vermin getting into waste collection and storage areas. Where possible keep waste collection and storage areas free of clutter and dumped waste. Remember to locate drains to the sewer and undercover to prevent rainwater infiltration.

## Visual amenity

All waste management facilities (including storage areas) should be adequately screened, not readily visible from any public place and should blend in with the development.

A poorly designed and located bin-storage area can detract from the overall development, encourage misuse of the facilities provided and affect recycling outcomes.

Remember to consult with council engineers, planners and waste managers regarding specific requirements for facility design in accordance with any local development requirements.



## Amenity conditions

The following are provided as examples of conditions that maybe used to minimise amenity impacts:

- › Odours offensive to the senses of human beings must not be discharged, emitted or released beyond the boundaries of the premises
- › The permit holder must ensure that litter originating from the premises is not present beyond the boundaries of the premises
- › All vehicles delivering and removing materials from the premises must have fully secured and contained loads so that no wastes are spilled.

## Security

The design of waste storage areas should allow easy access for residents but should not allow access by non-residents. Either locate the bin storage area out of sight from the road or design bin storage areas that can be locked.

Communal bin areas, if used, need to be sufficiently open and well-lit to allow their use after dark.

All internal garbage and recycling rooms and storage areas should be designed to comply with the Building Code of Australia, with particular regard to fire prevention provisions. Equipment also needs to be protected from theft and vandalism.

## Signs and education

Ongoing education and dedicated management services are critical factors in encouraging residents to utilise the services and systems as intended.

Educational materials like signs not only provide clear instructions on what materials can be collected for recycling and where they go, but provide reasons as to why it is important to sort material for recycling. This will raise awareness and the importance of resource recovery and the environment.

Ensuring educational signage is current, well maintained and clearly visible is recommended to address the fact that many MUDs residents may be transient and may have experienced differences between council services.

Display signs in public areas of the building, notably at the communal waste storage and chute areas. Clearly identify and label all bins with signs instructing residents on how to use the facilities and the correct separation of garbage, recyclables and organics. Signs should also identify who should be contacted to find out more about recycling and other services in the development.

Illustrations and diagrams of actual items work best – especially for items that can be recycled. Icons may be misinterpreted by people from varied backgrounds.

Depending on the community profile of a location or building, different multi-cultural groups should be catered for with appropriate signing in different languages.

In addition, waste fact sheets should be developed and distributed to new arrivals in a development. Also clearly identify any hazards or potential dangers associated with the waste facilities, including those from the use of any waste handling equipment.

Where available, electronic notice board displays should provide information about how to appropriately use the waste and recycling services in the building.



### Further Information

Refer to [Appendix 12](#) for standard signs.



## Ongoing management

With the ongoing management of waste and recycling systems in MUDs it is important to:

- › maintain amenity
- › maximise safety for residents, caretakers and collectors
- › maximise resource recovery, and
- › enable efficient servicing of the development.



### Better Practice

Ongoing management is required to monitor resident behaviour and identify requirements for further education and/or signs. Any negative behaviour, such as dumping waste and recyclables on the floor rather than in bins, needs to be addressed quickly. A fast response is desirable to prevent spreading of negative behaviour.

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It is important to establish and delegate responsibility for the tasks involved in ongoing waste management, including:

- › moving bins to and from the storage point to the collection point (if required) on collection day washing bins and maintaining storage areas arranging for the prompt removal of dumped waste
- › displaying and maintaining consistent signs on all bins and in all communal storage areas
- › managing communal composting areas (if applicable)
- › ensuring all residents are informed of the garbage, recycling, organics and hard waste arrangements.

The size of the development will influence the responsibility for ongoing management and maintenance of bins. Active caretakers are recommended for all developments, particularly those with communal storage areas, and are considered vital for effective ongoing management in large scale developments, whether they be, for example, townhouse, multi-storey or mixed-use developments.

Conditions of consent can require that a development comply with the submitted and approved waste management plan. If a caretaker is required, this should be detailed in the waste management plan; employment of a caretaker will then form part of the conditions of consent, which must be adhered to.

## Costs

Traditionally, servicing of MUDs has been included in councils' overall kerbside collection and sorting contracts.

The cost of servicing MUDs however, may be significantly different to other residential sites. The high concentration of households on the one site can offer a benefit in collection efficiency. MUDs generate less material per household on average, but often have higher levels of contamination.

There may be a different contract rate required for some developments if a collection vehicle driver has to get out and relocate the bins for collection. This additional cost could be charged back to building owners.

The following cost factors should be considered to achieve better practice:

- › potential savings from using static compactors to compress waste into a smaller volume
- › on-site management costs by sites
- › infrastructure purchase costs
- › cost impacts from larger sites providing a non-council contracted private operator and requests for exemptions from council charges
- › costs to ratepayers, building managers and developers.

A waste management plan should outline the labour involved in managing waste and resource recovery within the development post occupation. This should include considerations such as how much time is required to perform a particular function or what the likely cost of labour and maintenance will be (directly impacting on Body Corporate costs of future occupiers).

C

**Design**  
Options





## Better Practice Design Options

This section describes the better practice design options for each MUD type. Option one is considered the minimum standard for waste management and recycling for MUDs in Victoria. Alternative options have also been described and in certain cases may be more suitable.

### Multi-unit development types

- › Two or more dwellings on a lot
- › Low-rise or walk up apartments
- › Mid to high-rise apartments
- › Mixed use developments
- › Precinct scale developments



## Two or more residential dwellings on a lot

### DEVELOPMENT TYPE:

This development type typically includes villas and townhouses, generally one to two-storey with all entrances at ground level. They often have a small yard and/or a car space per dwelling.



### ESSENTIAL DEVELOPMENT REQUIREMENTS

- › Storage space allocated inside each dwelling for a minimum of two days' garbage and recycling
- › Space within each dwelling for organics collection/storage (e.g. kitchen caddy)
- › Access path with sufficient clearance and of a suitable grade to wheel garbage and recycling bins from each residence (or communal bin area) within the property boundary to the collection point
- › Distance from communal storage area to collection point should not exceed 40 metres.
- › Temporary storage on-site for hard waste within each dwelling, garden or communal storage area
- › Signage in communal storage areas to ensure easy separation of recyclables and organics.

## Better practice description

These developments typically include ownership of allocated MGBs. The better practice waste management design option for this development type is provided below. These requirements are in addition to those included in Section B for all developments.

WASTE STREAM	DESCRIPTION
<b>GARBAGE</b> 	<ul style="list-style-type: none"> <li>› Space within each dwellings garden or garage for storage of either 80L or 120L MGBs for garbage</li> </ul>
<b>COMMINGLED RECYCLABLES</b> 	<ul style="list-style-type: none"> <li>› Space within each dwellings garden or garage for storage of 120L or 240L MGB for recycling (or MGB size in accordance with council's kerbside collection system)</li> </ul>
<b>ORGANICS</b> 	<ul style="list-style-type: none"> <li>› Where council offers an organics collection service: <ul style="list-style-type: none"> <li>– Space within each dwellings garden or garage for storage of 80L, 120L or 240L MGB for organics*</li> </ul> </li> <li>› Where council does not offer organics collection service: <ul style="list-style-type: none"> <li>– Space within each dwellings garden for on-site composting or an area for communal composting (e.g. worm farm)</li> </ul> </li> </ul>
<b>HARD WASTE</b> 	<ul style="list-style-type: none"> <li>› Where there are a number of dwellings, temporary storage for hard waste in a communal storage area</li> <li>› Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development, provision for the storage/collection of e-waste should be considered</li> </ul>
<b>STORAGE &amp; COLLECTION</b> 	<ul style="list-style-type: none"> <li>› Bins are stored in each resident's garden or garage</li> <li>› Residents present garbage, recycling and organics (if applicable) MGBs on the kerbside for council collection once per week</li> </ul>

\*MGBs should not exceed 240L due to the potential weight of food organics.

## Alternative options

Where the better practice waste management option described is not able to be fully implemented due to council service restrictions or other site specific constraints, two alternative options are outlined below which are considered the minimum requirements.

**Note: These systems are provided as examples only and are not intended to constrain good, workable alternatives.**

## Other items for consideration

The size of MGBs selected for the development will largely depend on the local council requirements. In some instances for larger developments bulk bins (660L, 1,100L MGBs) may be used to address space restrictions.

This must be determined in consultation with council to ensure the bins can be safely collected by the council collection vehicle.

Residents would need to be educated about appropriate use of the systems implemented; this can be achieved through a number of local or state government initiatives. This may include providing waste management information on relevant websites, or visual communication tools such as flyer handouts. For information about what items can go into each bin, and which items are restricted refer to *Optimising Kerbside Collection Systems*, Sustainability Victoria 2017, Part C Recycling Guidelines.

Some local councils provide information and education about worm farming and composting. Residents can access further information by contacting their local council.

WASTE STREAM	DESCRIPTION
<b>ALTERNATIVE OPTION 1 Shared MGBs with source separation of organic</b>	
Garbage	<ul style="list-style-type: none"> <li>Shared 240L MGBs for garbage in a communal storage area</li> </ul>
Commingled Recyclables	<ul style="list-style-type: none"> <li>Shared 240L MGBs for recycling in a communal storage area</li> </ul>
Organics	<ul style="list-style-type: none"> <li>Where council offers an organics collection service: <ul style="list-style-type: none"> <li>Shared 240L MGBs for organics in a communal storage area*</li> </ul> </li> <li>Where council does not offer organics collection service: <ul style="list-style-type: none"> <li>Space within each dwellings garden for on-site composting or an area for communal composting (e.g. worm farm)</li> </ul> </li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Space allocated for presentation of bulky waste on council collection days</li> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development, provision for the storage/collection of e-waste should be considered.</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Bins are stored in a communal storage area for residents to dispose of their waste</li> <li>A caretaker may be required to transfer bins to and from the collection point</li> </ul>
<b>ALTERNATIVE OPTION 2 Shared MGBs with alternative organics management</b>	
Garbage	<ul style="list-style-type: none"> <li>Shared 240L MGBs for garbage in a communal storage area</li> </ul>
Commingled Recyclables	<ul style="list-style-type: none"> <li>Shared 240L MGBs for recycling in a communal storage area</li> </ul>
Organics	<ul style="list-style-type: none"> <li>For alternative organics options, refer to Appendix 4 Organics Recovery Strategy and Appendix 3 Waste Management Trigger Tool</li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Space allocated for presentation of bulky waste on council collection days</li> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development, provision for the storage/collection of e-waste should be considered.</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Bins are stored in a communal storage area for residents to dispose of their waste</li> <li>A caretaker may be required to transfer bins to and from the collection point</li> </ul>

\*MGB should not exceed 240L due to the potential weight of food organics.





## Example diagrams

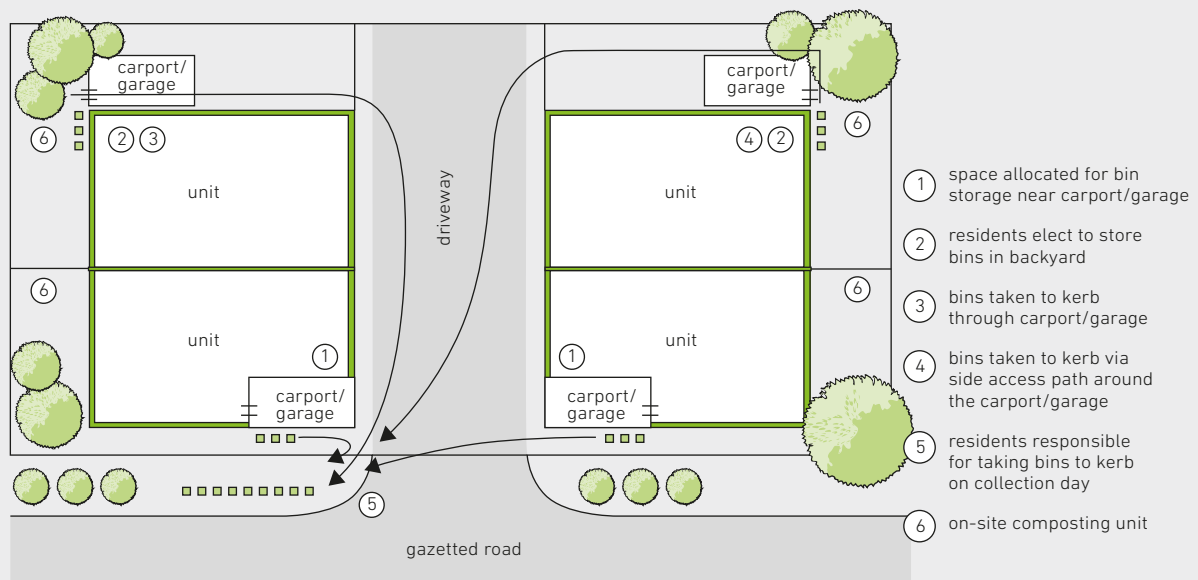
The following figures provide examples of the possible location of bin storage areas for two or more residential dwellings on a lot. These examples are a guide only, many other arrangements could be suitable and in accordance with better practice principles.

Remember to consult with council engineers, planners and waste managers regarding development requirements specific to the local area.

## Example of Better Practice

This example demonstrates different bin storage locations that are possible for two or more dwellings on a lot, where bins are stored within each individual property. Bins are collected from the kerbside, with residents moving bins to and from the collection point on the collection day. Each dwelling also has an on-site composting unit for food and garden organics.

**FIGURE 2**  
**BINS STORED WITHIN EACH INDIVIDUAL GARDEN WITH KERBSIDE COLLECTION**



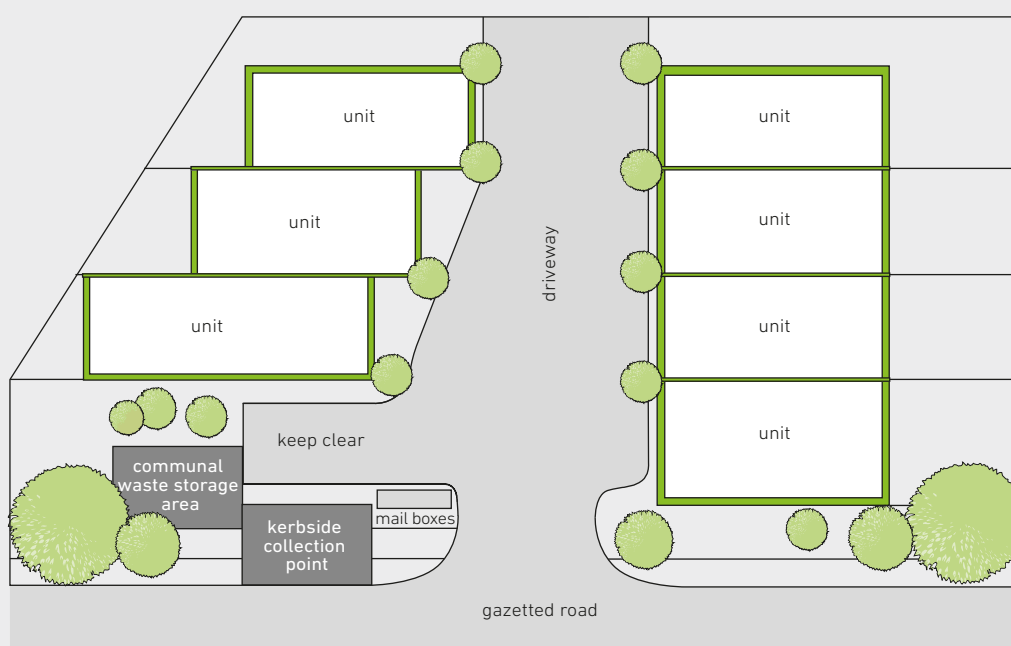


## Example of Alternative Option 1

This example demonstrates the location of a communal storage area servicing a residential complex. Residents take garbage, and recycling and food and garden waste to the communal storage areas, which is conveniently located at the front of the property near the entrance to the development.

The building manager or residents will transfer bins from the communal storage area to and from the kerbside collection point on collection day.

**FIGURE 3**  
**COMMUNAL STORAGE AREA FOR MGBS WITH KERBSIDE COLLECTION**





## Alternative Example

This example demonstrates the possible location of a communal storage area servicing a residential complex that enables the on-site collection of bulk bins. Residents take garbage, recyclables and food waste to the communal storage area, which is conveniently located at the front of the property near the entrance to the development.

The building manager or residents will transfer bins from the kerbside collection point on collection day, or there may be an arrangement in place for on-site servicing. The bulk bins used for garbage collection are collected on-site, with there being sufficient space for the collection vehicle to safely access the collection area, and then to reverse within the property so the vehicle can leave in a forward direction.

**FIGURE 4**  
**COMMUNAL STORAGE AREA FOR BULK BINS AND MGBS WITH ON-SITE COLLECTION**







## Low-rise development: up to 4 residential storeys

### DEVELOPMENT TYPE:

This category includes walk-ups, small blocks of generally 4–12 units, with a number of separate dwellings on each storey. They are called walk-ups because they are not required to have a lift, and access to the upper levels is by stairs.



### ESSENTIAL DEVELOPMENT REQUIREMENTS

- › Storage space allocated inside each dwelling for a minimum of two days' garbage and recycling
- › Space within each dwelling for organics collection/storage (e.g. kitchen caddy)
- › Access path with sufficient clearance and of a suitable grade to wheel garbage and recycling bins from each residence (or communal bin area) within the property boundary to the collection point
- › Distance from communal storage area to collection point should not exceed 40 metres
- › The number of MGBs provided must store one weeks worth of waste generated to allow weekly collection by council
- › Temporary storage on-site for bulky waste within each dwelling, garden or communal storage area
- › Signage in communal storage areas to ensure easy separation of recyclables and organics.

## Better practice description

The better practice waste management design option for this development type is provided below. These requirements are in addition to those included in Section B for all developments.

WASTE STREAM	DESCRIPTION
<b>GARBAGE</b> 	<ul style="list-style-type: none"> <li>› Storage of either 80L, 120L, 240L or 360L MGBs for garbage in a communal storage area. Size of bin to be determined by council</li> <li>› On-site collection of MGBs by council</li> </ul>
<b>COMMINGLED RECYCLABLES</b> 	<ul style="list-style-type: none"> <li>› Storage of 240L MGBs for recycling in a communal storage area</li> <li>› On-site collection of MGBs by council</li> </ul>
<b>ORGANICS</b> 	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>› Communal storage area maintained by caretaker which includes shared 240L MGBs for separated organics (garden or FOGO)</li> <li>› On-site collection of MGBs by council</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>› Communal organics processing equipment/area (composting) maintained by the caretaker with 240L MGBs</li> </ul>
<b>HARD WASTE</b> 	<ul style="list-style-type: none"> <li>› Communal storage area for bulky waste</li> <li>› Placement of a communal on-site charity bin (1m<sup>2</sup> per 50 apartments), managed by council or a private contractor</li> <li>› Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development provision for the storage/collection of e-waste should be considered</li> </ul>
<b>STORAGE &amp; COLLECTION</b> 	<ul style="list-style-type: none"> <li>› Bins are stored in a communal storage area for residents to dispose of their waste</li> <li>› A caretaker may be required to transfer bins to and from a collection point</li> </ul>

## Alternative options

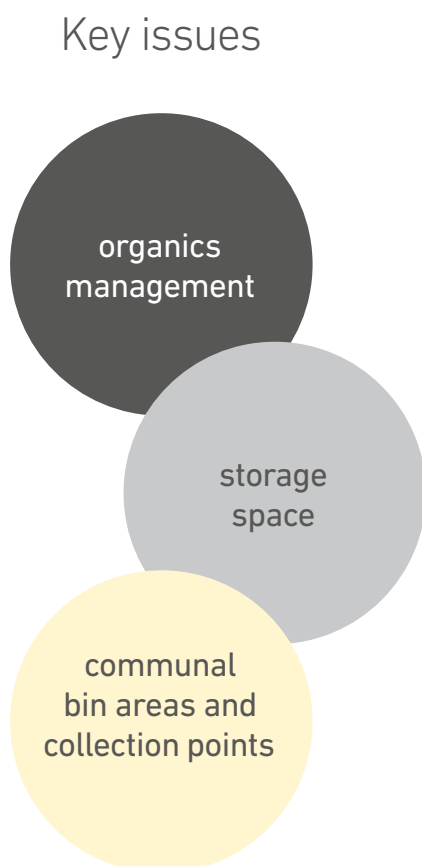
Where the better practice waste management option described is not able to be fully implemented due to council service restrictions or other site considerations, three alternative options have been provided, which are considered the minimum requirements.

**Note: These systems are provided as examples only and are not intended to constrain good, workable alternatives.**

WASTE STREAM	DESCRIPTION
<b>ALTERNATIVE OPTION 1 Use of bulk (660L or 1,100L) bins for garbage and recycling</b>	
	The use of bulk bins may be considered in consultation with council to address compatibility with council collection vehicles and space restrictions for storage of MGBs
Garbage	Shared 660L or 1,100L MGBs stored in a communal storage area
Commingled Recyclables	Shared 660L or 1,100L MGBs stored in a communal storage area
Organics	Where council offers an organics collection service: <ul style="list-style-type: none"> <li>Communal storage area maintained by caretaker which includes shared 240L MGBs for separated organics (garden or FOGO)</li> </ul> On-site collection of MGBs by council <ul style="list-style-type: none"> <li>Where council does not offer organics collection service: Communal organics processing equipment/area (e.g composting) maintained by the caretaker</li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>Placement of a communal on-site charity bin (1m<sup>2</sup> per 50 apartments), managed by council or a private contractor</li> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development provision for the storage/collection of e-waste should be considered</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Bins are stored in a communal storage area for residents to dispose of their waste</li> <li>A caretaker may be required to transfer bins to and from the collection point (on-site or at the kerbside)</li> <li>Garbage, recycling and organics (if required) MGBs are collected weekly by council</li> </ul>
<b>ALTERNATIVE OPTION 2 Shared MGBs with alternative organics management</b>	
Garbage	<ul style="list-style-type: none"> <li>Storage of 240L MGBs for garbage in a communal storage area</li> <li>On-site collection of MGBs by council</li> </ul>
Commingled Recyclables	<ul style="list-style-type: none"> <li>Storage of 240L MGBs for recycling in a communal storage area</li> <li>On-site collection of MGBs by council</li> </ul>
Organics	<ul style="list-style-type: none"> <li>For alternative organics management options, refer to Appendix 4 Organics Recovery Strategy and Appendix 3 Waste Management Trigger Tool</li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>Placement of a communal on-site charity bin (1m<sup>2</sup> per 50 apartments), managed by council or a private contractor</li> <li>Access to e-waste disposal facilities including council collections and drop-off centres. If these services are not provided in the vicinity of the development, provision for the storage/collection of e-waste should be considered</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Bins are stored in a communal storage area for residents to dispose of their waste</li> <li>A caretaker may be required to transfer bins to and from the collection point (on-site or at the kerbside)</li> <li>Garbage, recycling and organics (if required) MGBs are collected weekly by council</li> </ul>
<b>ALTERNATIVE OPTION 3 Communal waste and recycling drop-off areas (Waste or Eco-Point)</b>	
Design Option	<ul style="list-style-type: none"> <li>Three main waste streams: garbage, recycling and organics as waste or eco-points located in a clearly visible communal area (bins may be underground). Residents take their garbage, recyclables and organics from their apartment to the waste or eco-point</li> <li>Benefits may include: reduced contamination, increased recycling rates, better data recording ability, reduced collection frequencies and encourages participation (with other waste streams to be managed in accordance with the better practice description)</li> </ul>

## Issues for consideration

The issues discussed in this chapter need to be considered in addition to those applying to all developments as outlined in Section B. Key issues are storage and space considerations particularly for communal bin areas and collection points.



## Storage and space location

### Communal bin areas

Waste bins may be stored in either one or more communal areas, including:

- › external enclosures, such as a bin bay
- › enclosures located at ground floor parking level, within the building undercroft
- › rooms located within the main building or basement.

Low-rise developments (up to four storeys) may be spread across a large area, encompassing several different blocks within a single development. Therefore, consider incorporating more than one communal storage area within the development.



#### Further Information

Refer to [Appendix 1](#) for Waste Generation Rates for bin storage and size requirements

### Garbage and recyclables collection point

If low-rise developments are spread across a large area and incorporate more than one communal storage area, it may be appropriate to have more than one waste collection point for servicing the development (subject to street frontage and access).

For MGB-based waste collection systems, the waste collection point is typically from the kerb. The collection point for bulk bins should meet the essential requirements for all multi-unit developments specified in Section B.

### Example diagrams

The following diagrams provide examples of the location of bin storage areas for low-rise developments. They are a guide only; other arrangements could be suitable and in accordance with better practice principles. Remember to consult with council engineers, planners and waste managers regarding development requirements specific to a local area.



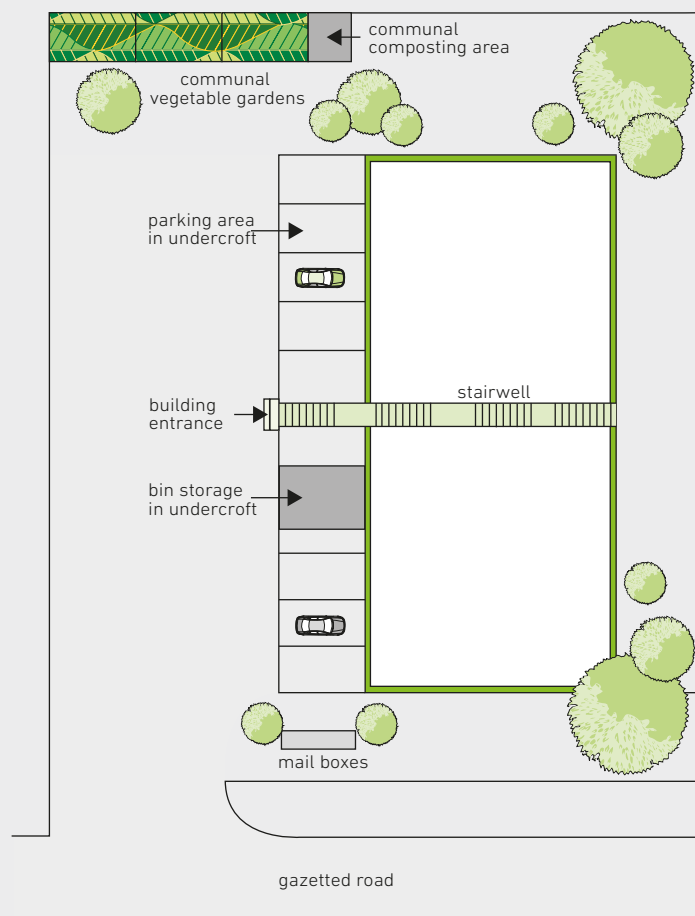


## Example of Alternative Option 1

This example has a communal storage area at ground level, adjacent to resident parking. The storage area is easily accessible to residents using the main building entrance. In this example, a building manager may transfer bins to and from the kerbside for collection or an arrangement may be in place for on-site collection.

A communal composting area and garden is also allocated to manage food and garden waste.

**FIGURE 5**  
**MGBS USED FOR GARBAGE AND RECYCLABLES, WITH COMMUNAL COMPOSTING AREA**





## Example of Better Practice

In this example, multiple communal storage areas are used to service the overall development, with one communal storage area for each block of units. Dual street frontage enables bulk bins and MGBs to be used for collection, with bins spread between at least two collection points. It is possible to have on-site servicing of bins, as the collection vehicle could enter and leave the development in a forward direction, using the dual access points.

**FIGURE 6**  
**BULK BINS USED FOR GARBAGE AND MGBS FOR RECYCLABLES AND ORGANICS**







## Medium to high-rise development: ≥4 residential storeys

### DEVELOPMENT TYPE:

These developments are medium to large blocks of units that are over four storeys high, with one or more dwellings on each storey.

Blocks of units with four or more storeys must have lift access to the upper levels.

Where these developments have only one unit per floor, options for low-rise apartments may also be relevant.



### ESSENTIAL DEVELOPMENT REQUIREMENTS

- › Storage space allocated inside each dwelling for a minimum of two days' garbage and recycling
- › Space within each dwelling for organics collection/storage (e.g. kitchen caddy)
- › Access path with sufficient clearance and of a suitable grade to wheel garbage and recycling bins from each residence (or communal bin area) within the property boundary to the collection point
- › Distance from communal storage area to collection point should not exceed 40 metres
- › The volume of waste storage containers (MGBS or containers) provided must store one weeks worth of waste generated to allow weekly collection by council
- › Temporary storage on-site for bulky waste within a communal storage area
- › Signage in communal storage areas to ensure easy separation of recyclables and organics.

## Better practice description

The better practice waste management design option for this development type is provided below. These requirements are in addition to those included in Section B for all multi-unit developments.

WASTE STREAM	DESCRIPTION
<b>GARBAGE</b> 	<ul style="list-style-type: none"> <li>› Dual chute system with openings on each floor for collection of garbage to a central storage area on-site, whereby the chute empties into a MGB (240L, 660L or 1,100L)</li> <li>› Use of compactor if required to manage collection frequency and storage requirements</li> </ul>
<b>COMMINGLED RECYCLABLES</b> 	<ul style="list-style-type: none"> <li>› Dual chute system with openings on each floor for collection of recyclables to a central storage area on-site, whereby the chute empties into a MGB (240L, 660L or 1,100L)</li> <li>› Use of compactor if required to manage collection frequency and storage area size</li> </ul>
<b>ORGANICS</b> 	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>› Communal storage area maintained by caretaker which includes shared 240L MGBs for separated organics (garden or FOGO)</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>› Communal organics processing equipment/area (composting) maintained by the caretaker</li> </ul>
<b>HARD WASTE</b> 	<ul style="list-style-type: none"> <li>› Communal storage area for bulky waste.</li> <li>› A communal on-site charity bin managed by council or a private contractor (1m<sup>2</sup> per 50 apartments)</li> <li>› E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>› Move in/move out waste catered for</li> </ul>
<b>STORAGE &amp; COLLECTION</b> 	<ul style="list-style-type: none"> <li>› Chutes terminate in a waste room not accessible to the residents</li> <li>› MGBs for organics stored in a communal storage area for residents to dispose of their source separated organics</li> <li>› A caretaker would be required to maintain waste rooms and rotate MGBs on the chute system</li> <li>› Garbage, recycling and organics MGBs would be collected weekly by council from a dedicated on-site collection area</li> </ul>



## Alternative options

Where the better practice option is not able to be fully implemented due to council service restrictions or other site considerations, four alternative options have been provided which are considered the minimum requirements.

**Note 1:** These systems are provided as examples only and are not intended to constrain good, workable alternatives.

**Note 2:** Some councils provide bulk bins for recyclables, such as paper and cardboard; other councils use 240L MGBs for either source-separated or commingled recyclables. In each case, council's waste management section will advise what the allocation of garbage and recycling bins will be according to available MGB or bulk skip sizes.

WASTE STREAM	DESCRIPTION
<b>ALTERNATIVE OPTION 1</b>	<b>3 Chute System*</b>
Garbage	<ul style="list-style-type: none"> <li>Chute system with openings on each floor for collection of garbage and recyclables to a central storage area on-site, whereby the chute empties into a MGB (240L, 660L or 1,100L)</li> </ul>
Commingled Recyclables	
Organics	<ul style="list-style-type: none"> <li>Chute system with openings on each floor for collection of food organics to a central storage area on-site, whereby the chute empties into a 240L MGB</li> <li>Compostable bin liners may be used to reduce contamination and so that the organic material does not block chute, or create offensive odours</li> <li>Where council offers an organics collection service: <ul style="list-style-type: none"> <li>Chutes and waste storage area (not accessible to residents) maintained by caretaker which includes 240L MGBs for separated organics (garden or FOGO)</li> </ul> </li> <li>Where council does not offer organics collection service: <ul style="list-style-type: none"> <li>Communal organics processing equipment/area (composting) maintained by the caretaker</li> </ul> </li> </ul>
Hard Waste	<p>An area accessible for residents for disposal of bulky items, problem waste and e-waste must be provided separate to the waste chute room</p> <ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>A communal on-site charity bin managed by council or a private contractor (1m<sup>2</sup> per 50 apartments)</li> <li>E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>Move in/move out waste catered for</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Chutes terminate in a waste room not accessible to the residents</li> <li>A caretaker would be required to maintain waste rooms and rotate MGBs on the chute system</li> <li>MGBs would be collected by council from a designated on-site collection area</li> </ul>
<b>ALTERNATIVE OPTION 2</b>	<b>Automated waste collection system*</b>
Garbage	<ul style="list-style-type: none"> <li>Chute system with openings on each floor for collection of garbage, recyclables and food organics. Waste is then transported via vacuum suction through a pipe to a centrally located waste transfer station. Each waste stream is collected into a separate compaction container.</li> </ul>
Commingled Recyclables	
Organics	
Hard Waste	<ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>A communal on-site charity bin managed by council or a private contractor (1m<sup>2</sup> per 50 apartments)</li> <li>E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>Move in/move out waste catered for</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Waste is transported via vacuum to a central waste transfer station into designated compaction containers before being collected by a hook lift truck. Based on the capacity of the containers versus the volumes generated, collection frequency can be reduced or increased as required.</li> </ul>

WASTE STREAM	DESCRIPTION
<b>ALTERNATIVE OPTION 3</b>	<b>Dual chute system with alternative organics management</b>
Garbage	<ul style="list-style-type: none"> <li>Chute system with openings on each floor for collection of garbage and recyclables to a central storage area on-site, whereby the chute empties into a MGB (240L, 660L or 1,100L)</li> </ul>
Commingled Recyclables	
Organics	<ul style="list-style-type: none"> <li>For alternative organics options, refer to Appendix 4 Organics Recovery Strategy and Appendix 3 Waste Management Trigger Tool</li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>A communal on-site charity bin managed by council or a private waste contractor (1m<sup>2</sup> per 50 apartments)</li> <li>E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>Move in/move out waste catered for</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Chutes terminate in a waste room not accessible to the residents</li> <li>MGBs for organics stored in a communal storage area for residents to dispose of their source separated organics</li> <li>A caretaker would be required to maintain waste rooms and rotate MGBs on the chute system</li> <li>MGBs would be collected by council from a designated on site collection area</li> </ul>
<b>ALTERNATIVE OPTION 4</b>	<b>Single Chute with Interim waste storage room for recyclables on each level</b> This option may only be implemented for developments with less than 10 storeys and less than 20 dwellings
Garbage	<ul style="list-style-type: none"> <li>Single chute system with openings on each floor for collection of garbage to a central storage area on-site, whereby the chute empties into an MGB (240L, 660L or 1,100L)</li> </ul>
Commingled Recyclables	<ul style="list-style-type: none"> <li>Interim waste storage area provided on each residential level adjacent to garbage chute for residents to place recyclables into 240L MGBs</li> <li>A caretaker collects and transports the recyclables to the main waste room each day for storage prior to weekly council collection</li> </ul>
Organics	<p>Where council offers an organics collection service:</p> <ul style="list-style-type: none"> <li>Interim waste storage area provided on each residential level adjacent to garbage chute for residents to place organics into 240L MGBs</li> <li>A caretaker collects and transports the organics to the main waste room each day for storage prior to weekly council collection</li> </ul> <p>Where council does not offer organics collection service:</p> <ul style="list-style-type: none"> <li>Communal organics processing equipment/area (composting) maintained by the caretaker with 240L MGBs</li> </ul>
Hard Waste	<ul style="list-style-type: none"> <li>Communal storage area for bulky waste</li> <li>A communal on-site charity bin managed by council or a private waste contractor (1m<sup>2</sup> per 50 apartments)</li> <li>E-waste collection bin – size and collection frequency to be determined with council or waste contractor</li> <li>Move in/move out waste catered for</li> </ul>
Storage and Collection	<ul style="list-style-type: none"> <li>Chutes terminate in a waste room not accessible to the residents</li> <li>A caretaker would be required to maintain waste rooms and rotate MGBs on the chute system</li> <li>MGBs would be collected by council from a designated kerbside or on site collection area</li> </ul>

\* An in-sink food waste disposal unit may be used for food waste, which drains to a centrally located collection tank. Material would then be pumped out for collection and processing off-site.

## Issues for consideration

Designing a waste management system, particularly for medium to high-rise buildings needs to be done with care. Due to the large amount of material generated, poor design decisions can have serious repercussions for the management of the building.

The issues discussed in this chapter need to be considered in addition to those applying to all developments as outlined in Section B.

## Storage space and location

### Communal bin areas

It is essential to provide sufficient space to store all garbage, recyclables and organics likely to be generated in the period between collection days, and the equipment used to manage and store them. There may be more than one communal storage point.

### Bulky items storage

Allow space, adjacent to the waste storage area for residents to temporarily store unwanted bulky items, while awaiting disposal. This is important to stop residents illegally dumping this material on the footpath, which is likely to detract from the quality and appearance of the development.

The space allocated to store bulky items should consider the intended frequency of collection. Bulky items may be collected by council or contractors. Alternatively, tenants or building managers may make arrangements to take excess bulky items to a waste management centre.



#### Better Practice

If council provides a bulky items collection, it is important to check the details of the service, as the frequency and the types and sizes of materials collected may differ between local government areas. If on-site collection is not available, a caretaker should be employed to move bulky items from the interim storage area to the kerbside (or designated collection point).

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#### Further Information

Refer to [Appendix 5 & 6](#) for better practice guidance on e-waste and hard waste.

## Supporting infrastructure

Medium to high-rise residential developments typically incorporate supporting waste infrastructure including bin lifters, compactors and balers. Refer to Appendix 9 for information on this type of equipment and their potential application in MUDs.

## Access

If vandalism or waste dumping is likely to be a problem, consider having a secure, central area which is lockable to store bulky items.

## Ongoing management

All waste management systems in medium to high-rise developments require some degree of ongoing management. Employment of a caretaker is vital to the success of waste management systems, in particular for MUDs four storeys and above, with more than one apartment per floor. Caretakers are needed to manage the regular removal of materials from the interim storage areas and their transfer to the communal storage area(s); transfer receptacles to the collection point; keep waste storage areas clean and free of dumped waste; ensure new residents are aware of the waste management arrangements; and liaise with the waste collection contractor.

The costs of a caretaker or manager should be factored into the ongoing management of the development.

Conditions of consent can require that a development comply with the submitted and approved waste management plan for the development. If a caretaker is required, this should be detailed in the waste management plan; employment of a caretaker will then form part of the conditions of consent, which must be adhered to.

## Example diagrams

The following figures provide examples of the location of bin storage areas for possible developments four storeys and above. These examples are a guide only, many other arrangements could be suitable and in accordance with better practice principles. Remember to consult with council engineers, planners and waste managers regarding development requirements specific to a local area.





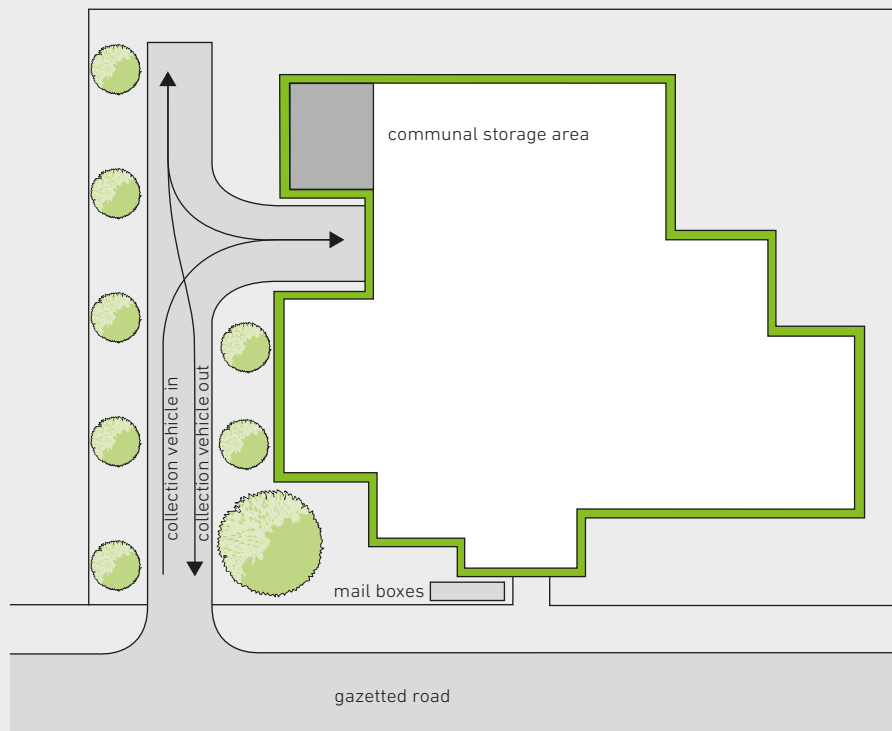
## Example of Better Practice

This example demonstrates locating a communal storage area for medium to high-rise development greater than four storeys at the rear of the development, but adjacent to the carpark entrance so it is conveniently accessible and visible to carpark users. On-site collection of bins is possible since there is sufficient turning space in the driveway design for a waste collection vehicle to make a three-point turn.

The collection vehicle enters the property in a forward direction, into the start of the carpark entrance driveway, reverses to the area adjacent to the bin storage area where collection would take place, and leaves the property in a forward direction.

Alternatively, depending on the number and size of bins used in this development and the distance between the storage area and kerbside, it may be possible to arrange for kerbside collection of bins. In this case, a caretaker would manage the movement of bins to and from the collection point and storage area.

FIGURE 7  
EXAMPLE OF OPTION 1 OR 2 WITH DESIGNATED ON-SITE COLLECTION AREAS





## Further Example

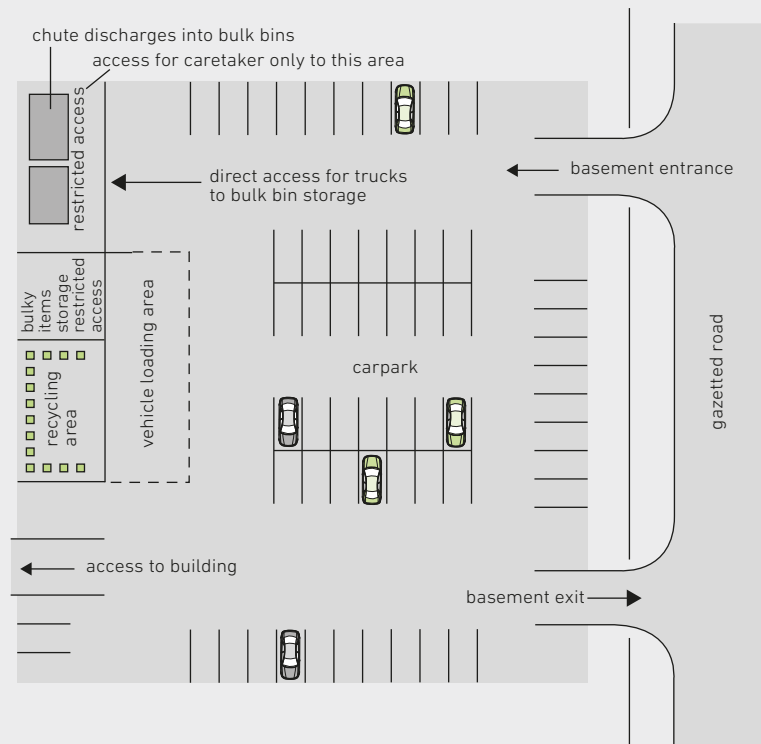
This example demonstrates on-site collection of bulk garbage bins and MGB recycling bins from the basement of a medium to high-rise development greater than 4 storeys. There is no access to the bulk bin storage area for residents; however, they can access the recycling and bulky waste storage areas.

Direct access is provided for the garbage collection vehicle to drive forward up to the bulk bin storage area and use an overhead lift and empty the garbage. The garbage collection vehicle then proceeds to drive through the carpark and leaves the basement, always moving in a forward direction.

The recycling collection vehicle enters the basement and proceeds to directly in front of the recycling storage area. Sufficient space is provided to make the collection without obstructing traffic flow through the carpark. This example assumes recycling and organic bins are wheeled from the storage area to a rear-loading collection vehicle. The vehicle then leaves the basement carpark in a forward direction. Similarly, bulky waste is moved from the bulky waste storage area to the waiting bulky waste collection vehicle at the time of collection.

**Note:** In this example, additional MGBs for garbage are available to residents in the recycling area to prevent contamination of recyclables and organics.

**FIGURE 8**  
**ACCESS AND COLLECTIONS AREAS – USE CHUTE FOR GARBAGE AND MGBS FOR RECYCLABLES AND ORGANICS**





## Alternate Example

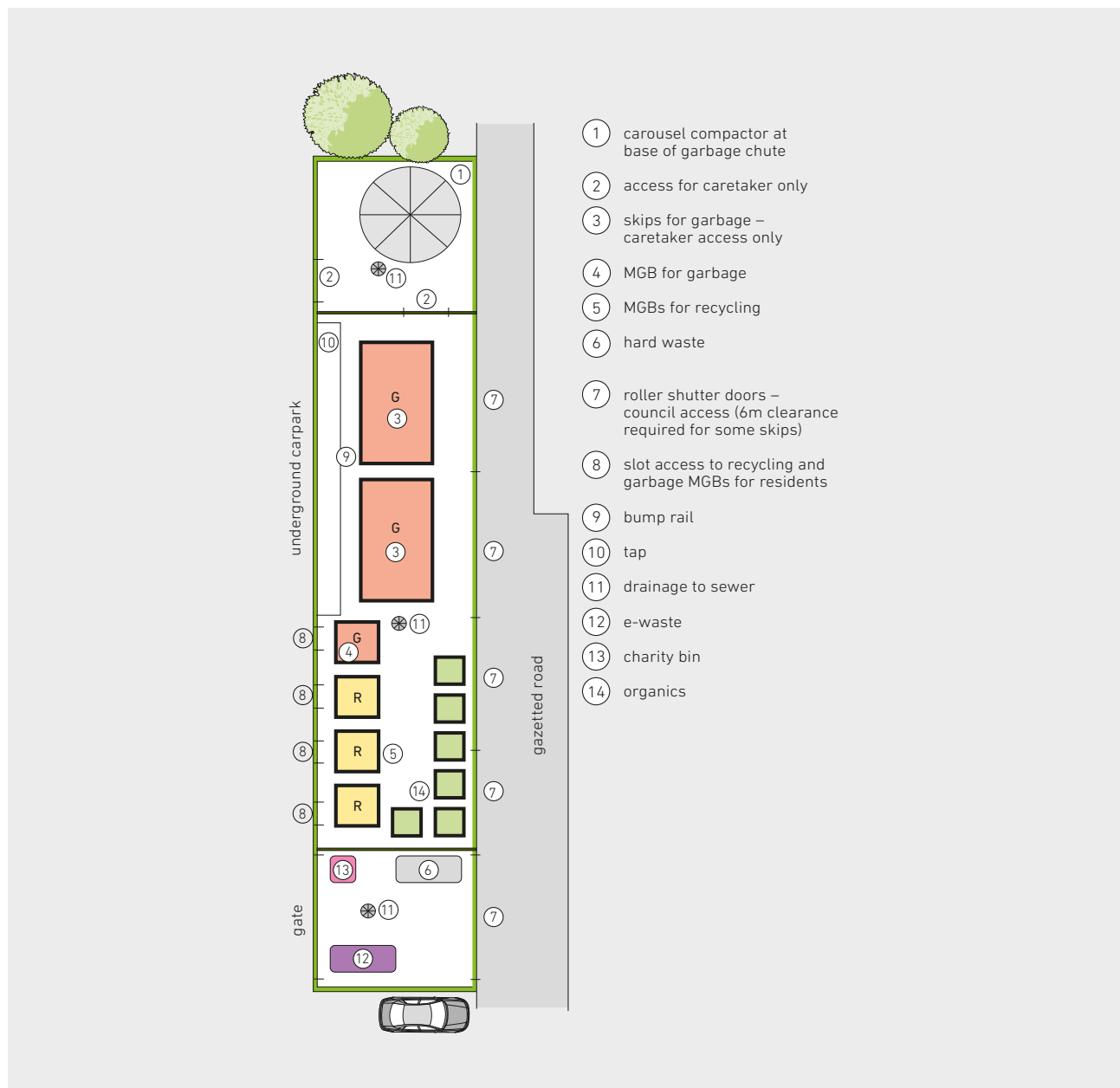
This example demonstrates a possible layout for a secure garbage area for a high-rise development. This type of arrangement may typically be located in a basement or underground carpark.

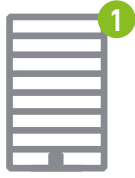
In this example, access for residents to garbage and recycling facilities is limited to the interim storage area and chute inlet hopper on each floor. Access to rooms where the chute empties and extra bins are stored is restricted to the caretaker. This is for safety reasons and to discourage dumping.

In this example, the recycling bins are kept in a locked room or cage and access to the recycling bins for residents is by a bin chute in the wall of the room or cage. This prevents theft and vandalism of the bins, and also prevents residents placing full bags of waste and other large items in the recycling bins (as they cannot fit through the bin chute).

Additional storage for bulky waste items and an area to wash down bins are incorporated into the facilities.

**FIGURE 9**  
**SECURE WASTE STORAGE AREA FOR HIGH-RISE DEVELOPMENT**





## Example of Alternative Option 1

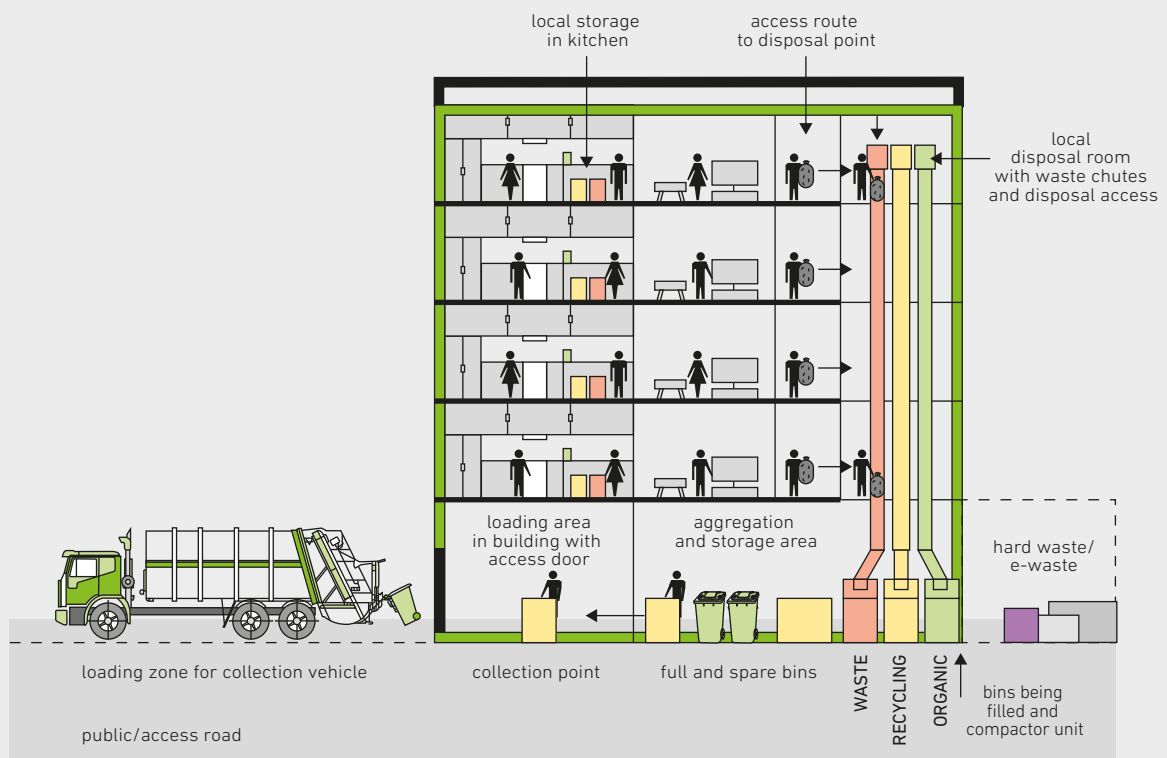
This system includes:

- › local storage
- › local disposal rooms on each level for waste, recycling and organics
- › with disposal through waste chutes.

The example shows the following:

- › A waste storage room with compactors and bulk bins for aggregation
- › pull-in pull-out collection service by waste contractor
- › on-site collection vehicle access and loading areas
- › separate hard waste collection storage area.

FIGURE 10  
THREE CHUTE SYSTEM





## Mixed-use development (all scales)

### DEVELOPMENT TYPE:

Mixed-use developments incorporate residential dwellings and commercial establishments within the same development, and range from, shop-top housing to commercial and retail developments with residential above in low-rise or larger medium to high-rise developments.



### ESSENTIAL DEVELOPMENT REQUIREMENTS

- › Complete separation of the residential and commercial waste facilities. Residential and commercial tenants should be actively discouraged from using each other's waste facilities.



### Further Information

For guidance regarding recycling and waste management of commercial properties refer to the following Sustainability Victoria documents:

- › *Smarter Resources Smarter Business – Recycling Right a Guide for Business*, 2014.
- › *Smarter Resource Smarter Business – Best Practice Waste and Recycling Contracts for Business*, 2014.
- › *Guide to Best Practice Waste and Recycling Contracts for the C&I Sector*, 2013.

## Better practice description

Better practice waste management should be achieved by applying the general principles as outlined in Section B to commercial developments, and assessed against the relevant design options for different MUDs, listed in Section C.

In addition to those requirements included in Section B and Section C, the following better practice waste management design option for this development type is provided below.

WASTE STREAM	DESCRIPTION
<b>GARBAGE</b> 	<ul style="list-style-type: none"> <li>› Separate waste storage and collection area for commercial waste</li> </ul>
<b>COMMINGLED RECYCLABLES</b> 	<ul style="list-style-type: none"> <li>› Separate waste storage and collection area for commercial waste</li> <li>› Bulk bins for cardboard collection. Consider the use of a baler.</li> </ul>
<b>ORGANICS</b> 	<ul style="list-style-type: none"> <li>› Organics processing equipment for commercial food organics waste</li> <li>› Community gardens for collection and processing of residential food and gardens organics</li> <li>› Storage of liquid waste in a bunded storage area (e.g. oil from a restaurant)</li> </ul>
<b>HARD WASTE</b> 	<ul style="list-style-type: none"> <li>› A communal on-site charity bin managed by council or a private contractor (1m<sup>2</sup> per 50 apartments)</li> <li>› E-waste collection bin(s) – size and collection frequency to be determined with council or waste contractor</li> <li>› Move in/move out waste catered for</li> </ul>
<b>STORAGE &amp; COLLECTION</b> 	<ul style="list-style-type: none"> <li>› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies</li> </ul>

## Issues for consideration

Additional considerations for mixed use developments and the commercial component of the development are described in the following sections. These issues need to be considered in addition to those applying to all developments at all scales as outlined in Sections B and C. Key considerations relate to design, storage, access and on-going management.

### Storage areas

#### For residents

Access for residents to waste facilities should be limited to residential services only. There should be no resident access to commercial waste bins and storage areas.



#### Better Practice

If vandalism or waste dumping is likely to be a problem, consider having a secure, centralised lockup area for bulky items.

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#### For commercial

Access for commercial operators should be limited to commercial waste bins and storage areas only. There should be no access to residential waste bins and storage areas.

Commercial premises, such as cafes and restaurants, may generate large amounts of food organics or high volumes of cardboard and paper (e.g. offices and retail stores).

Storage of paper and cardboard is to be in a dry, vermin-proof area. Paper and cardboard is not to be stored for more than two weeks to prevent breeding of vermin in the stored material.

Rooms or areas designated for printing or photocopying are to provide space for interim storage of waste paper (in MGBs up to 240 litres) and used toner and/or printer cartridges for recycling.

Kitchens, office tearooms and service and food preparation areas are to be designed with sufficient, dedicated space to collect and recycle food waste.

### Provision of services

Councils may not be required to provide waste services to commercial businesses, so they may elect to service only the residential component of mixed-use developments. In this situation, a private waste contractor needs to remove the commercial waste, or a private waste contractor may be engaged to remove both the residential and commercial garbage and recycling.

If a private contractor is used to provide the garbage and recycling services, residents may still be required to pay a service availability charge to council as stipulated under section 146 of the Local Government Act 1993, as well as the contractor's fee.

### Waste types and handling methods

Waste materials from residential and commercial properties differ in quantity and composition. In general, commercial properties generate higher yields of waste than residential properties.

In determining waste handling and storage requirements, consider:

- › the likely types of commercial activities that may occur in the development, and the types and volumes of waste they may generate (refer to Appendix 2)
- › the number of residential dwellings and the quantity of residential waste generation (refer to Appendix 1 for typical residential waste generation rates)
- › the waste infrastructure needed to separately manage commercial and residential wastes; for example, commercial units may generate a large volume of cardboard that cannot be accommodated in MGB-based collection systems
- › the need for service lifts (or a goods lift) to transfer waste from the various building floors to the waste storage area(s)
- › the opportunities for organic waste collection and treatment, both on and off-site, particularly for restaurant and café commercial uses
- › are separate collection points provided for commercial and residential waste
- › do the commercial waste storage trail paths avoid residential corridors and thoroughfares

## Commercial waste

### Inside each commercial unit

Each commercial unit should have a clearly defined storage space large enough to store at least two days' worth of garbage, recyclables and other wastes generated.

### Communal storage areas and waste generation rates

It is often difficult to predict commercial waste services and infrastructure requirements during the development design stage when the ultimate commercial tenancy of the building is unknown. A further difficulty with sizing communal storage areas is the intended frequency of servicing, which may be daily or less frequent.

An indication of the likely commercial tenancy in a mixed-use development can be obtained by referring to relevant planning controls for the proposed development area, relevant planning and building permits, and by considering the available floor space of each commercial unit and similar developments elsewhere.

Space must be allocated for:

- Separate storage of liquid wastes (e.g. oils from restaurants and other food premises). Liquid waste storage areas must be bunded and drained to a grease trap, in accordance with the requirements of the EPA Victoria
- Refrigerated garbage rooms, where large quantities of perishable wastes and infrequent collections are proposed
- Clinical or hazardous waste should be placed in specialised containment bins and collected by specialised services.

Appendix 2 provides typical wastes generated from different commercial operations. Where possible, provide space for waste storage areas for commercial units as follows to increase the flexibility and long-term efficiency of servicing:

- If less than five commercial units are proposed
  - estimate waste generation based on worst-case (highest) likely waste generation, i.e. assume 660L garbage and 240L recycling generated for each 100m<sup>2</sup> of floor area per day
- If more than five commercial units are proposed
  - estimate waste generation based on the average waste generation rates for various commercial developments. (To determine an average waste generation rate consider the floor space available for each commercial property)
  - consider a range of both high and low to medium waste generators, such as restaurants, retail (food), retail (non-food), office and service-based industries (such as hairdressers), which would fit in the available floor space (refer to Appendix 2 for a range of commercial waste generation rates)

See estimate of waste generated from a mixed use development shown in Table 4.

The organics component of the waste stream from each commercial generator should be estimated and the appropriate collection infrastructure provided. This may be done by swapping one or more garbage MGBs for organics MGBs, depending on the nature of the use.



#### Further Information

See Appendix 2  
for commercial waste generation rates

**TABLE 4**  
**COMMERCIAL GARBAGE\* GENERATION EXAMPLE**  
**FOR A MIXED USE DEVELOPMENT (PER DAY)**

Land Use	Square Metres (m <sup>2</sup> )	Waste Generation Rate	Waste Generated (l)
Retail/Shops (non-food)	500	50L/100m <sup>2</sup> /day	250
Restaurant	500	660L/100m <sup>2</sup> /day	3,300
Supermarket	500	660L/100m <sup>2</sup> /day	3,300
<b>TOTAL</b>			<b>6,850</b>

\*includes organics component

**TABLE 5**  
**COMMERCIAL RECYCLING GENERATION EXAMPLE**  
**FOR MIXED USE DEVELOPMENT (PER DAY)**

Land Use	Square Metres (m <sup>2</sup> )	Recycling Generation Rate	Recycling Generated (l)
Retail/Shops (non-food)	500	50L/100m <sup>2</sup> /day	250
Restaurant	500	200L/100m <sup>2</sup> /day	1,000
Supermarket	500	240L/100m <sup>2</sup> /day	1,200
<b>TOTAL</b>			<b>2450</b>

## Supporting infrastructure

Similar to medium to high-rise residential developments, mixed-use developments typically incorporate a variety of supporting waste management infrastructure. Further information is provided in Appendix 9.

### Trolleys/Forklift

A trolley or forklift may be necessary for transport of waste collection bins from commercial premises to the storage room. In this case, there must be sufficient space to manoeuvre the trolley and/or forklift.

### Service lifts

If a development incorporates interim storage areas on each level for residents, or when there are commercial units on more than one storey, a service lift should be provided to enable the transfer of materials.

## Ongoing management

Most waste management systems in mixed-use developments will require a dedicated caretaker to:

- ensure both residents and commercial tenants are educated and informed about the waste management services provided
- maintain the separate residential and commercial waste services, including transferring garbage and recycling receptacles to the collection point
- keep waste storage areas clean and free of dumped waste
- liaise with the waste collection contractor(s).

The cost of the caretaker should be factored into the ongoing management of the development.

Conditions of consent can require that a development comply with a submitted and approved waste management plan. If a caretaker is required, this should be detailed in the waste management plan. Employment of a caretaker will then form part of the conditions of consent, which must be adhered to.

## Example diagram

The following figure provides an example of the location of bin storage areas for possible mixed-use developments. This example is a guide only, many other arrangements could be suitable and in accordance with better practice principles. Remember to consult with council engineers, planners and waste managers regarding development requirements specific to a local area.





## Example of Better Practice

This example demonstrates separate waste storage areas for residential and commercial waste in a mixed-use development. Resident access to the communal waste storage area is via a passageway adjacent to the residential lift well. Access to the waste room is limited to residents and caretakers only. Only commercial tenants and caretakers can use the commercial waste storage area, as access is via a service area at the rear of the commercial units.

Caretakers have additional access to each of the waste rooms directly from the parking area. This is normally kept locked and opened only as required, such as to allow regular cleaning and maintenance of the storage areas.

There is ground-level access from both the residential and commercial waste storage areas so the caretaker can easily wheel bins to and from the kerbside for collection.

**FIGURE 11**  
**SEPARATE COMMERCIAL AND RESIDENTIAL WASTE STORAGE AREAS**

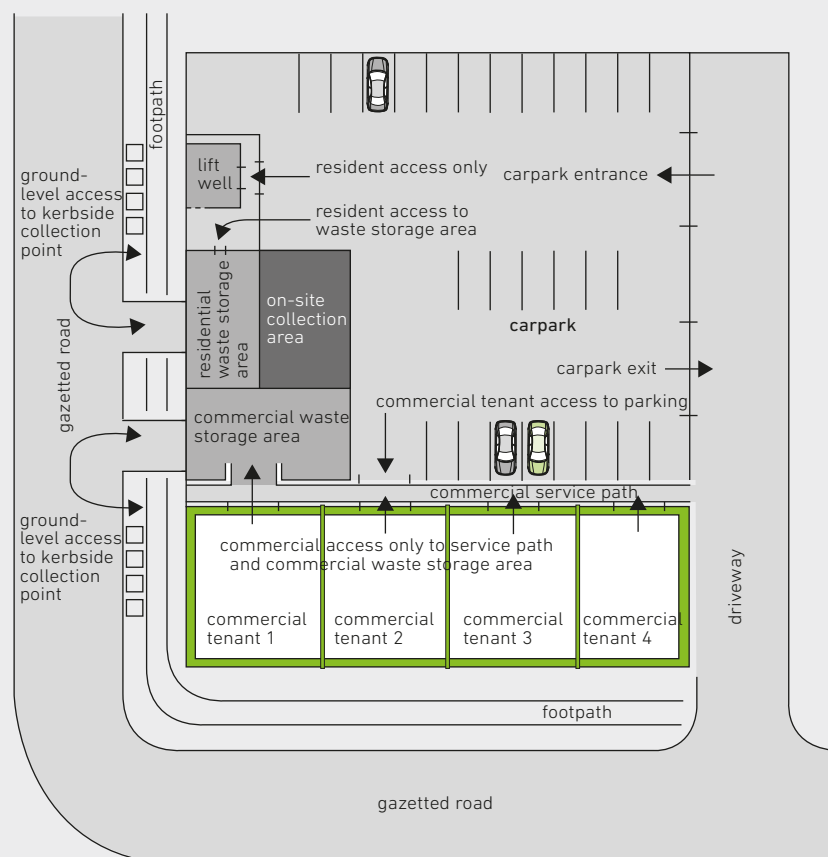




Photo: Peter Clarke – Courtesy of Breathe Architecture



## Precinct scale developments

### DEVELOPMENT TYPE:

These are generally mixed-use developments incorporating residential and commercial uses across a number of buildings.

They can also include urban renewal areas that are well-planned and offer the potential for shared services and precinct-wide alternative waste and recycling management solutions.

Precinct scale developments may be predominately residential, comprising either low-rise development with some mixed use, or may be medium to high-rise precincts combining several buildings and mixed uses. They present opportunities to integrate innovative waste management into the precinct design at an early stage. Depending on the scale of the development, volumes of waste and materials may be greater than typical MUDs, which presents both challenges and opportunities. Precincts should be designed to meet the better practice design options provided earlier in Section C of this report, applicable to each building size.

Above and beyond these requirements, automated collection systems can be utilised to transfer waste to a common collection point. There may also be opportunities to establish WtE facilities within the precinct. These have the potential for environmental benefits through reduced collection frequencies, minimising garbage truck movements within local streets and potential for reduced energy consumption with the creation of energy for on-site use, or putting energy back into the grid.

These technologies are aspirational, and planning waste management for precinct scale developments should also consider the design options described in Section C that correspond to the MUD type.

## Better practice description

The following innovative or aspirational waste management design options may be considered for precinct developments.

WASTE STREAM	DESCRIPTION
<b>GARBAGE</b> 	› Waste to energy (Note: WtE technologies may be feasible with a minimum requirement of 10–50,000 tonnes of waste p.a. approximately)
<b>COMMINGLED RECYCLABLES</b> 	› Chute system with openings on each floor for collection of recyclables to a central storage area on-site, whereby the chute empties into a MGB (660L or 1,100L)
<b>ORGANICS</b> 	› Commercial scale organics processing technologies such as composting and AD. › Community gardens for collection and processing of residential food and gardens organics.
<b>HARD WASTE</b> 	› Establishment of a drop-off reuse/repair community centre › Move in/move out waste catered for
<b>STORAGE &amp; COLLECTION</b> 	› Consideration of automated waste collection systems (e.g. vacuum waste) or other innovative collection technologies



### Better Practice

For larger scale developments such as Precinct Scale Developments, bin location maps should be prepared and available for residents and collection contractors.

## Options

Where the better practice description is not able to be fully implemented due to council service restrictions or other site considerations, two alternative options have been provided, which are considered the minimum requirements.

**Note:** These systems are provided as examples only and are not intended to constrain good, workable alternatives.

Waste and Recycling Management Better Practice	
OPTION	METHOD
<i>(See design options that correspond with the type of development being proposed in the precinct as per Section C for assessment and design options)</i>	
<b>ALTERNATIVE OPTION 1</b>	<b>Automated waste collection system</b>
	<ul style="list-style-type: none"> <li>› Collection of materials via an automated waste collection system (vacuumed waste) to a common storage area and then processed either on or off-site</li> <li>› On-site options include composting (for source separated organics) or WtE (refer to Alternative Option 2)</li> <li>› A communal on site charity bin (for reuse) managed by council or non-for profit organisation</li> <li>› Hard waste storage areas provided at communal locations (to be managed by building/site manager)</li> <li>› Move in/move out waste catered for</li> </ul>
<b>ALTERNATIVE OPTION 2</b>	<b>WtE</b>
	<ul style="list-style-type: none"> <li>› Collection of materials via truck or AWCS for delivery to a central waste storage area on the precinct</li> <li>› On site commercial scale organics processing technologies such as Composting or WtE (Anaerobic Digestion)</li> <li>› On site WtE for residual waste (e.g. Gasification or Pyrolysis)</li> <li>› A communal on site charity bin (for reuse) managed by council or non-for profit organisation</li> <li>› Hard waste storage areas provided at communal locations (to be managed by building/site manager)</li> <li>› Move in/move out waste catered for</li> </ul>



## Key issues for consideration specific to precinct scale developments

The issues discussed in this chapter need to be considered in addition to those applying to all developments as outlined in Section B, and Section C Design Options for different MUDs.

- › Waste processing facilities such as WtE will likely require a works approval from the EPA in Victoria, and therefore these proposals should be discussed with the EPA early in the planning stage.
- › These facilities can create amenity impacts and may require buffer zones from other sensitive uses.
- › Such facilities may also require specific expertise for ongoing operation, maintenance and upkeep.
- › Due to the potentially high volumes of waste and recyclables, central collection points should be located away from residential and other sensitive uses in order to reduce potential amenity impacts.
- › Initial investment costs may be greater than standard better practice systems; however, this may be offset through improved collection efficiencies, reducing traffic congestion, utilising waste for energy within the development, and/or putting energy back into the grid.

### Residential precincts

Each resident in the precinct, regardless of the type of unit, should have equal and efficient access to garbage, recycling and organics services. There may also be opportunities for additional open space and recreation areas. In this case, on site composting and communal gardens may be established.

### Access

Ideally the access will be designed so that vehicles can enter and leave in a forward direction. Given a singular collection area may be utilised for larger scale precincts, consideration should be given to ensure relevant routes do not create adverse impacts for residential areas.

Refer to Appendix 11 Vehicle access/Turning circles for further information on vehicle access requirements.



### OPERATIONAL ISSUES SPECIFIC TO PRECINCT SCALE DEVELOPMENTS

Problems in precinct scale developments typically occur when:

- › Waste systems have not been designed to accommodate the required waste storage and handling capacity of the development
- › There are problems with access for tenants and collection vehicles to the various parts of the development
- › There is no separation of residential and commercial wastes.
- › Collection areas have not been designed appropriately and therefore create impacts for residential areas
- › E-Waste and hard waste storage areas are not easily accessible for all residents.

### Example diagrams

The following figures provide examples of the location of bin storage areas for precinct developments. These examples are provided as a guide only, other arrangements could be suitable and in accordance with better practice principles. Remember to consult with council engineers, planners and waste managers regarding development requirements specific to a local area.



## Example of possible collection options

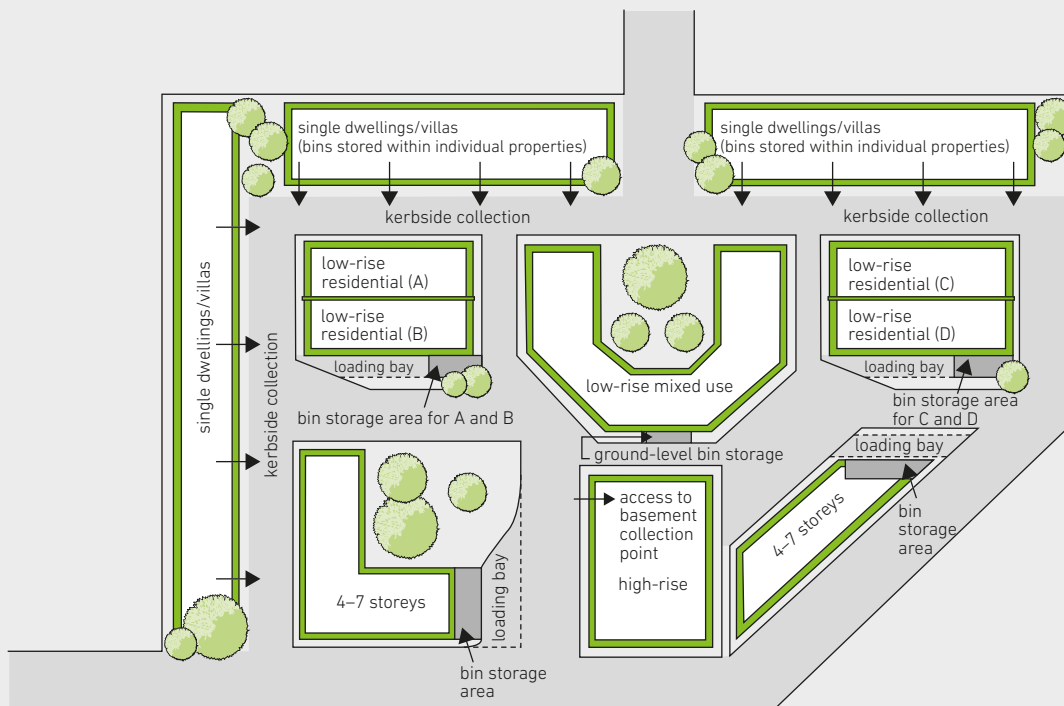
This example demonstrates on-site collection of bins from a precinct scale development that has very limited access and no direct street frontage. The precinct development consists of several different residential developments and a mixed-use development.

Bins from the single dwellings and other units are located on the northern and western sides of the development and are collected from the kerbside of internal roads. Communal bin storage areas are incorporated into each low-rise, mid to

high-rise development, with communal storage areas located adjacent to a dedicated waste loading/unloading bay. This enables collection contractors to safely pull up to the property and wheel bins in and out of the adjacent storage area to the waiting vehicle, removing the need for bins to be placed on the kerbside, which is difficult for this number of units.

Waste from the high-rise development in this example is collected on site from the basement storage area.

**FIGURE 12**  
**EXAMPLE OF POSSIBLE COLLECTION OPTIONS WITHIN A PRECINCT DEVELOPMENT**





## Example of possible collection options

This example demonstrates collection of bins from a precinct scale development that has limited internal access but some street frontage. The development consists of several different residential, mixed-use and commercial developments.

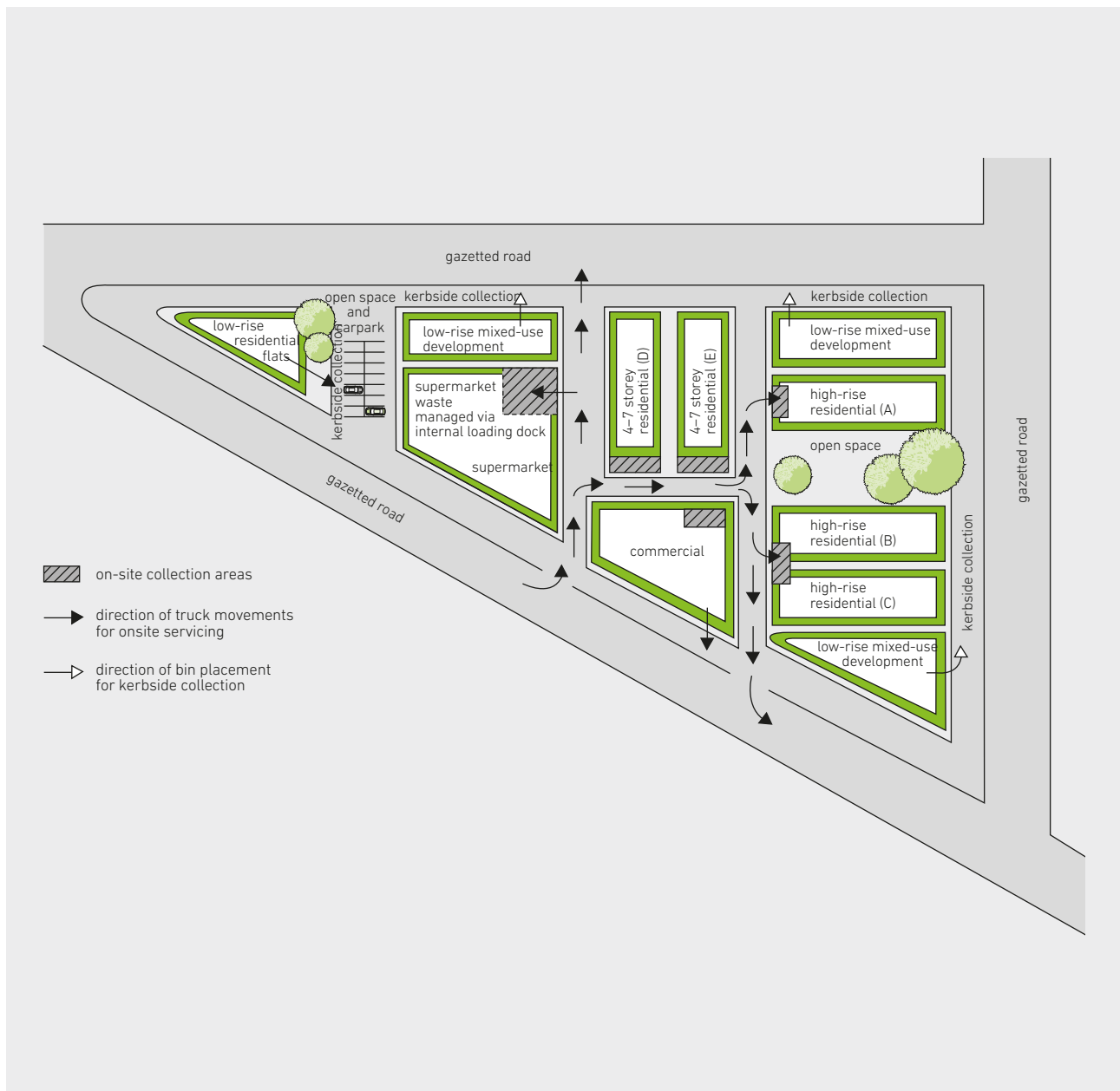
Collection requirements are met through a mixture of on-site servicing and kerbside collection of bins. The mixture of on-site and off-site collection minimises the movement of collection vehicles within the narrow streets of the development.



### Better Practice

Some councils may not collect from private or narrow roads. Check with your local council to determine appropriate collection.

FIGURE 13  
EXAMPLE OF POSSIBLE COLLECTION OPTIONS WITHIN A PRECINCT SCALE DEVELOPMENT

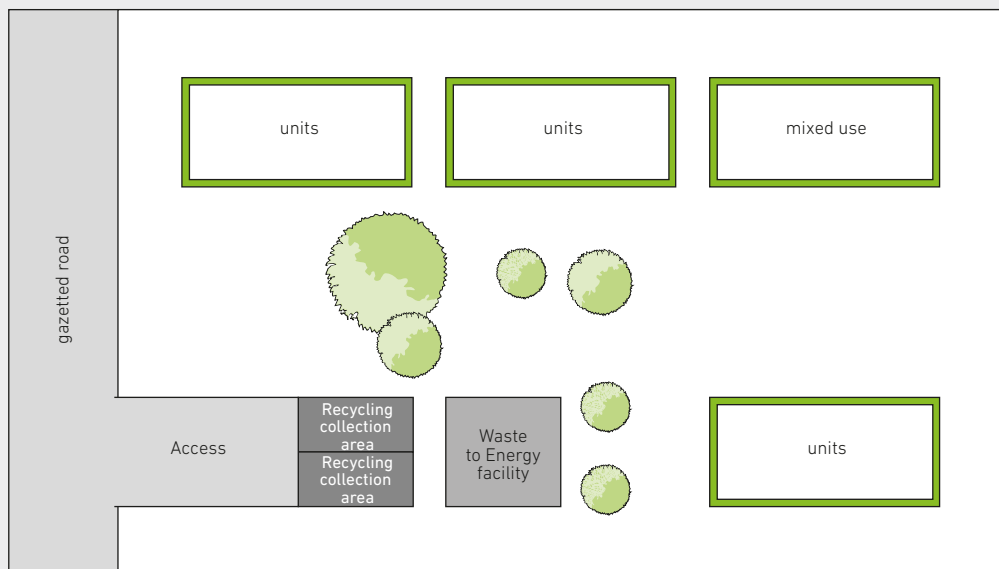




## Example of innovative waste management

This example demonstrates a precinct scale development that has incorporated a WtE facility to process residual waste, and collections areas for recyclables.

FIGURE 14  
EXAMPLE OF INNOVATIVE/ASPIRATIONAL WASTE MANAGEMENT FOR A PRECINCT SCALE DEVELOPMENT







D

## Appendices





# Appendices

Appendix 1  
Residential waste generation rates

Appendix 2  
Commercial waste generation rates

Appendix 3  
Waste management trigger tool

Appendix 4  
Organics recovery strategy

Appendix 5  
E-waste management

Appendix 6  
Hard waste management

Appendix 7  
Australian Standards

Appendix 8  
Waste generation and storage  
layout examples

Appendix 9  
Waste management equipment

Appendix 10  
Collection vehicles

Appendix 11  
Vehicle access/Turning circles

Appendix 12  
Standard signage

Appendix 13  
Waste management plan checklist

Appendix 14  
Waste management plan template

Glossary

## Appendix 1: Residential waste generation rates



### Garbage and commingled recycling

Waste generation rates in Table 6 are recommended for estimating the number of garbage and recycling bins required for a MUD.

Note: A separate paper and cardboard collection service is generally not available in Victoria, and as such, these items are placed in the yellow recycling bin. However, other councils or private waste contractors might offer that service.

Alternative waste and recycling generation rates may be considered; however in this scenario evidence supporting this position must be provided to council.

### Garden Organics

Green waste collections are not often required for MUDs. If a development includes areas of green space the potential generation of garden organics should be considered. The method for collection and processing would need to be determined in consultation with council.

### Food Organics

Developers should provide for food organics within relevant storage areas. For off-site disposal of source separated food organics by council, generation rates and bin specifications for organics should be discussed with council. As general guidance, Sustainability Victoria conducted the *Victorian Statewide Garbage Bin Audit – Food Waste 2016*, to analyse the type of items in a garbage bin, including food waste. The audit found that approximately 35 per cent of the garbage bin is made of food waste.

The number of food organic MGBs required to service a MUD is subject to many factors, including the 'take up' of the caddie and drop off system. To promote participation of organics recovery, building managers will need to provide ongoing education to residents. In the provision of garbage MGBs, adequate space for substitution of garbage bins with 120L or 240L MGBs for organics should be provided.

TABLE 6  
WEEKLY RESIDENTIAL WASTE GENERATION RATES

DWELLING SIZE	GARBAGE	RECYCLING
Individual Dwelling	120L	120L or 240L
3 Bedroom Apartment or Greater	120L	120L
2 Bedroom Apartment	100L	100L
1 Bedroom or Studio Apartment	80L	80L

Source: City of Melbourne 2017 – Guidelines for Preparing a Waste Management Plan 2017

## Appendix 2: Commercial waste generation rates



### Garbage and commingled recycling

The waste and recycling generation rates in this section are provided as a guide. Rates may differ depending on the nature of the use. In this scenario, further evidence should be provided to the relevant authority to justify separate rates. It is also recommended that proponents contact their local council to determine if any local waste generation wastes are available. Industry information should be referred to for further details on waste generation rates

where available and for specific developments not covered in this section. Some industries may generate significant volumes of a recyclable material, for example cardboard.

In these instances consideration should be given to the provision of separate compaction and storage infrastructure such as balers. Recycling generation rates provided below are inclusive of these source separated recyclable items.

**TABLE 7 COMMERCIAL WASTE AND RECYCLING GENERATION RATES**

Type of Premises	Garbage Generation	Recycling Generation
<b>FOOD PREMISES</b>		
Restaurants	660L/100m <sup>2</sup> floor area/day	200L/100m <sup>2</sup> floor area/day
Supermarkets	660L/100m <sup>2</sup> floor area/day	240L/100m <sup>2</sup> floor area/day
Convenience Store	300L/100m <sup>2</sup> floor area/day	150L/100m <sup>2</sup> floor area/day
Café	300L/100m <sup>2</sup> floor area/day	200L/100m <sup>2</sup> floor area/day
Takeaway/Café (pre-packaged food only)	150L/100m <sup>2</sup> floor area/day	150L/100m <sup>2</sup> floor area/day
<b>COMMERCIAL (NON-FOOD)</b>		
Education/Training (teaching space)	5L/100m <sup>2</sup> floor area/day or 1.5L/student/week	5L/100m <sup>2</sup> floor area/day or 0.5L/student/week
Offices	10L/100m <sup>2</sup> floor area/day	10L/100m <sup>2</sup> floor area/day
Licensed club	50L/100m <sup>2</sup> floor area/day	50L/100m <sup>2</sup> floor area/day
Shops (non-food)	50L/100m <sup>2</sup> floor area/day	50L/100m <sup>2</sup> floor area/day
Showrooms	40L/100m <sup>2</sup> floor area/day	10L/100m <sup>2</sup> floor area/day
Warehouse (office)	10L/100m <sup>2</sup> floor area/day	10L/100m <sup>2</sup> floor area/day
<b>OTHER ACCOMMODATION</b>		
Student housing/backpacker	40L/occupant/week	40L/occupant/week
Boarding house/guesthouse	60L/occupant/week	60L/occupant/week
Hotel/Motel	5L/bed/day	5L/bed/day
Serviced Apartment	35L/apartment/week	35L/apartment/week

## Appendix 2: Commercial waste generation rates Continued



TABLE 8  
SPECIALISED WASTE GENERATION RATES

Type of Premises	Garbage Generation	Recycling Generation
<b>FOOD PREMISES</b>		
Butcher	80L/100m <sup>2</sup> floor area/day	50L/100m <sup>2</sup> floor area/day
Delicatessen	80L/100m <sup>2</sup> floor area/day	50L/100m <sup>2</sup> floor area/day
Fish shop	80L/100m <sup>2</sup> floor area/day	50L/100m <sup>2</sup> floor area/day
Greengrocer	240L/100m <sup>2</sup> floor area/day	120L/100m <sup>2</sup> floor area/day
<b>COMMERCIAL (NON-FOOD)</b>		
Childcare	350L/100m <sup>2</sup> floor area/week	350L/100m <sup>2</sup> floor area/week
Gym	10L/100m <sup>2</sup> floor area/day	10L/100m <sup>2</sup> floor area/day
Hairdresser	60L/100m <sup>2</sup> floor area/day	60L/100m <sup>2</sup> floor area/day
<b>OTHER ACCOMMODATION</b>		
Retirement Village	60L/apartment/week	60L/apartment/week
Independent Living	80L/apartment/week	80L/apartment/week
<b>OTHER</b>		
Religious/social	50L/100m <sup>2</sup> floor area/day	10L/100m <sup>2</sup> floor area/day

Source: City of Melbourne – Waste Generation Rates

Note: The waste generation rates should be used as a guide only.

Note: Commercial uses should allow for storage of at least two days waste and recycling generation.

## Appendix 2: Commercial waste generation rates Continued



### Organics

Garbage rates provided for commercial uses include the organics component. Studies may be used in estimating the volume of organics generation from each industry type to allow appropriate selection of storage, collection and processing infrastructure:

Sustainable Resource Use Pty Ltd, *Waste flows in the Victorian commercial and industrial sector*, Sustainability Victoria, 2013

**TABLE 9**  
**ORGANIC WASTE GENERATION RATES PER FULL TIME EQUIVALENT**

Facility Type	Organic Waste		
	Yearly Rate (kg/FTE)	Yearly Rate (L/FTE)	Weekly Rate (L/FTE)
<b>METRO*</b>			
Bakery	1,478kg	3,473L	67L
Bar/Pub	1,851kg	2,859L	55L
Café/Rest	2,220kg	3,788L	73L
Takeaway	2,235kg	4,418L	85L
<b>NON-METRO</b>			
Bakery	1,851kg	4,551L	88L
Bar/Pub	838kg	1,382L	27L
Café/Rest	890kg	1,550L	30L
Takeaway	595kg	1,177L	23L

\*Metro areas as defined by the Australian Bureau of Statistics (ABS) classification for metropolitan Melbourne  
Source: *Commercial & Industrial Compositional Waste Audits Victoria*, Sustainability Victoria, 2018



## Appendix 3: Waste management trigger tool



This table provides a list of typical thresholds/triggers, which can be used to identify the type of waste management system and infrastructure required for a development.

**TABLE 10**  
**WASTE MANAGEMENT TRIGGER TOOL**

OPTION	TYPICAL THRESHOLD/TRIGGER	KEY REQUIREMENTS
<b>GARBAGE AND RECYCLING</b>		
80L MGB	<ul style="list-style-type: none"> <li>Two or more residential dwellings on a lot</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
120L MGB	<ul style="list-style-type: none"> <li>Two or more residential dwellings on a lot</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
240L MGB	<ul style="list-style-type: none"> <li>Two or more residential dwellings on a lot</li> <li>Low-rise MUD</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
660L MGB	<ul style="list-style-type: none"> <li>Medium to high-rise MUD</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
1,100L MGB	<ul style="list-style-type: none"> <li>Medium to high-rise MUD</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
Compaction container	<ul style="list-style-type: none"> <li>High-rise MUD with high volumes of waste generated to reduce storage requirements and collection frequency</li> </ul>	<ul style="list-style-type: none"> <li>To be determined in consultation with council</li> </ul>
Kerbside council collection	<ul style="list-style-type: none"> <li>Collection frequency is a maximum of once per week</li> <li>Amenity impacts are minimised</li> </ul>	<ul style="list-style-type: none"> <li>MGBs are placed at the kerb for collection and returned to the property after collection</li> <li>To be determined in consultation with local service providers to ensure kerbside collection is feasible</li> </ul>
On-site collection	<ul style="list-style-type: none"> <li>Collection frequency is more than once per week</li> <li>Insufficient kerbside space available, which is accessible to a waste collection vehicle</li> <li>Health and safety impacts or traffic impacts result from kerbside collection.</li> </ul>	<ul style="list-style-type: none"> <li>Agreed in consultation with council</li> </ul>
Vacuum waste collection to an on-site waste collection/transfer terminal	<p>Key factors which typically support the business case for an Alternative Waste Collection System (AWCS) include:</p> <ul style="list-style-type: none"> <li>Greenfield site (or site unconstrained by existing underground utility infrastructure)</li> <li>On-site waste collection required from basement under business as usual truck collection option</li> <li>&gt;1,000 residential dwellings</li> <li>Council/developer support</li> <li>No shallow groundwater table and minimal soil contamination issues</li> </ul>	<ul style="list-style-type: none"> <li>Council able to collect compaction containers or suitable private contractor</li> </ul>


OPTION	TYPICAL THRESHOLD/TRIGGER	KEY REQUIREMENTS
<b>ORGANICS</b>		
FOGO* collection by council	Council operated FOGO collection service	<ul style="list-style-type: none"> <li>› Council collection service</li> <li>› Collection/storage in bins no greater than 240L MGBs due to health and safety concerns with the weight of food organics</li> </ul>
FOGO* collection by private contractor	Where council does not provide a FOGO service	<ul style="list-style-type: none"> <li>› Selection of appropriate contractor for collection and processing of FOGO</li> <li>› Collection/storage in bins no greater than 240L MGBs due to health and safety concerns with the weight of food organics</li> </ul>
Home composting/ worm farming (e.g. in-vessel composting)	Dwellings with access to private garden (approx. >16m <sup>2</sup> ) for both the composting equipment and application of compost product	<ul style="list-style-type: none"> <li>› Access to open space</li> </ul>
Communal composting/ worm farming	Greenspace (>16m <sup>2</sup> ) available within MUD including roof top gardens for both the composting/worm farming equipment and application of the product	<ul style="list-style-type: none"> <li>› Engaged residential community or caretaker</li> <li>› Space provided for worm farming/composting equipment and application of product</li> </ul>
Domestic Bio-digester	Dwellings with access to private garden (approx. >16m <sup>2</sup> ) for both the composting equipment and application of compost product	<ul style="list-style-type: none"> <li>› Access to open space</li> </ul>
Dehydrators	Minimum of 30 kgs of food waste generated per day	<ul style="list-style-type: none"> <li>› Caretaker</li> <li>› Identification of end-user for end-product</li> <li>› Ventilation</li> <li>› Management of wastewater</li> </ul>
In-sink grinder	Check with your local water authority	<ul style="list-style-type: none"> <li>› Dependant on local water authority requirements</li> </ul>
<b>HARD WASTE</b>		
Kerbside storage and collection of hard waste	<ul style="list-style-type: none"> <li>› Two or more residential dwellings on a lot</li> <li>› Low-rise MUD</li> </ul>	<ul style="list-style-type: none"> <li>› Council kerbside hard waste collection service provided to MUDs</li> <li>› Notification of collection days to residents</li> </ul>
On-site storage and collection of hard waste	<ul style="list-style-type: none"> <li>› Medium to high-rise MUD</li> <li>› Area provided for on-site storage to be determined based on number of dwellings, expected residential turnover rate, hard waste collection frequency and arrangements with charity companies for collection of high quality hard waste (for re-use)</li> </ul>	<ul style="list-style-type: none"> <li>› Location of on-site collection area and frequency of collection to be agreed in consultation with council or private contractor</li> </ul>
<b>CHARITY GOODS</b>		
Provision of a charity bin	Allowance of 1m <sup>2</sup> per 50 dwellings	<ul style="list-style-type: none"> <li>› Arrangement with council or private contractor to collect charity donations</li> </ul>
<b>E-WASTE COLLECTION</b>		
E-waste collection bin	Size of storage bin and collection frequency to be determined with council or waste contractor	<ul style="list-style-type: none"> <li>› Arrangement with council or private contractor to collect e-waste</li> </ul>
<b>WASTE TO ENERGY</b>		
Thermal treatment (e.g. direct combustion, gasification, pyrolysis) or anaerobic digestion	<p>Key factors which typically support the business case for WtE include:</p> <ul style="list-style-type: none"> <li>› Minimum of 10,000 tonnes per annum of residual waste for thermal treatment technologies;</li> <li>› Minimum of 10,000 tonnes per annum of organic waste for anaerobic digestion;</li> <li>› On-site or nearby use of energy (in the form of heat) available as opposed to requiring connection to local grid</li> <li>› Land area available greater than 5,000m<sup>2</sup></li> </ul>	<ul style="list-style-type: none"> <li>› Local and state government regulatory approvals</li> </ul>

\* May be separated food organics collection or garden organics collection, or a combined collection of food and garden organics.

## Appendix 4: Organics recovery strategy



TABLE 11  
ORGANICS RECOVERY STRATEGY

ORGANICS RECOVERY STRATEGY	Benefits 
<p><b>OPTION 1 – SMALL SCALE ON-SITE COMPOSTING OF FOOD/GARDEN WASTE</b></p> <p>Part of the communal open space area, or roof garden should be dedicated to composting of food waste, garden waste and growing vegetables.</p> <p>This should be designed into the waste management plan in conjunction with either a dual chute or three chute system.</p> <p>Developments may incorporate a vegetable garden to encourage ownership and community involvement and to make use of composted soil. Further ownership may be encouraged by allocating a planter box per level, or per unit depending on the number of units in the apartment complex.</p> <p>While communal management of composting by residents is an option, it is best assigned to an individual such as a caretaker, building manager, or dedicated resident for on-going management.</p> <p><b>Note: Prior to using compostable bin liners check with service providers to ensure they are accepted. Some processing facilities may not accept them, due the time it takes for the material to break down.</b></p> <p><b>Health Precautions</b></p> <ul style="list-style-type: none"> <li>Composting involves living organisms breaking down organic material. On rare occasions, composting has been associated with illness and allergies in humans. Particular consideration should be given to developments for the elderly or vulnerable persons (individuals who are allergic to fungal spores produced in compost).</li> <li>Appropriate signage must be provided, and instructions and precautions should be considered when handling composting and soil materials.</li> </ul>	<ul style="list-style-type: none"> <li>Encourages recovery of organics</li> <li>Reduces organic material being sent to landfill</li> <li>Reduces GHG emissions</li> <li>Can assist households, local government, and state government achieve waste reduction and recycling targets</li> <li>Encourages participation in organics recovery and growing vegetables</li> <li>It works well without a full-time caretaker, as long as communal areas are maintained.</li> </ul>
<p><b>OPTION 2 – HOME UNIT WORM FARM</b></p> <p>The option for a home unit worm farm is available regardless of the organics management design. This system involves establishing a worm farm composting unit for each dwelling. Worm farms are ideal for units with small backyards. The recovered material (vermi compost) could be used as potting mix. Communal worm farms in MUDs require greater commitment from residents, or caretakers, but can be located in common areas or basement car parks.</p>	<p><b>Challenges</b></p> <ul style="list-style-type: none"> <li>Worm farms may process food at a slower rate.</li> <li>Requires ongoing management and maintenance.</li> <li>Requires ongoing education to ensure correct usage.</li> <li>If not managed appropriately the area may generate odours and create amenity impacts for residents.</li> <li>If not managed appropriately, composting areas may attract vermin.</li> <li>Potential contamination of compost.</li> <li>If there is either an overuse or underuse of the facility, the building manager may need to take appropriate action and adjust the management plan accordingly.</li> <li>Worm farms shouldn't be placed in direct sun for long periods.</li> <li>Compost heaps (open piles of compostable materials) may cause aesthetic issues.</li> <li>Check compliance with relevant strata and council regulations prior to implementing a communal composting or worm farm system.</li> <li>Food organics can be collected from dwellings using caddies and disposed of, either through an organics chute system or placed into bins at a communal location. Should compostable bags be accepted, only use those certified as compostable (AS 4736-2006 and AS 5810-2010). Any other type of bag, whether biodegradable, oxo-degradable or nondegradable, will contaminate the compost product, requiring that it be sent to landfill.</li> <li>Avoid placing composting areas near buildings, in order to reduce termite risk.</li> </ul>

### Ongoing education and management

- › Identified responsibilities for cleaning communal areas and bins, educating residents in the appropriate use of the composting system.
- › The maintenance schedule should be built into the gardening maintenance program.

### Physical infrastructure requirements

- › Internal design of apartments requires specific storage for garbage waste, commingled recyclables and organics.
- › To prevent leachate run-off into stormwater drains and waterways, on-site compost facilities must not be located on steep slopes or near stormwater drains.
- › Composting areas should be sited away from unit entry and window areas to minimise potential amenity impacts.
- › If compost enclosures are used, these can be custom made to suit the particular property and are typically constructed bays with sides and a cover. Planks of wood or chicken wire are suitable materials for construction.
- › Communal composting areas should be screened with structures or vegetation where possible, in order to reduce any visual impacts.
- › Composting systems designed to detract vermin should be used.
- › Communal worm farms may be located in communal areas, including basements and car parks, which provide ease of access for residents.
- › Composting areas should remain unobstructed and not be located near doors or elevators etc. If using MGBs, storage areas need to provide easy access for residents and caretakers.

### Communication and Education

- › MUDs with an intranet or regular newsletters, should inform residents about gardening events. Education sessions could be held in order to inform people about the system and to encourage ownership.
- › Notice boards should provide information about use of waste and recycling services in the building.

### Signage

- › Clear signage should be used to identify appropriate use of the composting and storage facilities in accordance with the relevant Australian Standards. In multi-cultural areas other languages may need to be displayed.

Note: Council may have specific requirements, or guidelines for communal gardens and it is not intended that this guide would override any other existing policies, but rather provide additional guidance where appropriate.

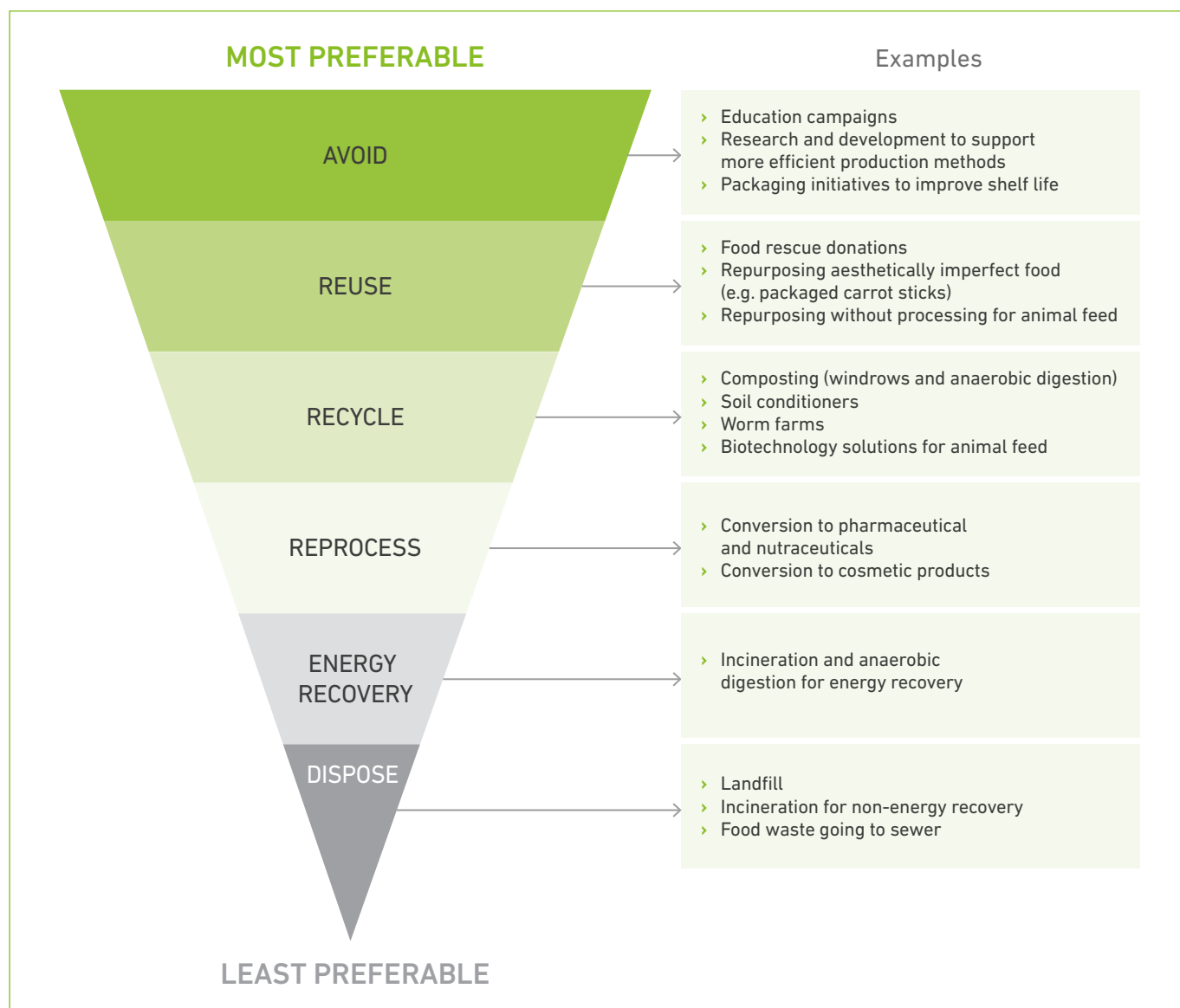
## Organics processing systems

### Waste hierarchy relating to food waste

*The National Food Waste Strategy: Halving Australia's food waste by 2030*, Commonwealth of Australia 2017, provides a food waste hierarchy. The hierarchy recognises the inherent value of food waste and provides guidance on the most resource efficient and environmentally sound approaches to dealing with waste.

Note: Composting is preferred over energy recovery for example. Establishing Food Waste Disposal Unit (FWD), for example should not encourage food to be wasted, and food waste should be managed as best as possible in line with the following figure.

### Food Waste Hierarchy



## Composting

The size and number of compost bins depends on the amount of organic waste generated. It is recommended to have multiple compost bins to ensure an even spread of material and avoid overfeeding fresh material to the compost (which could potentially slow down the composting process).

An equal amount of dry material would need to be added to maintain an optimum nutrient balance, hence additional storage of dry material may be required.

### Compost bin and pile requirements

The area requirement for a typical compost pile is:

- 1000mm x 1000mm.

A variety of compost bins are available from manufacturers or many local councils.

**Note:** There are many compost bin and compost pile arrangements. The above dimensions are indicative only.

600L compost bins may be more appropriate for communal composting arrangements.

### In vessel composting

In vessel composting may be larger in scale than typical composting and may be located underground, subject to achieving airflow in the design. These systems can take food waste; plus paper, cardboard, and in some cases compostable coffee cups and paper plates for example. These systems generally require a greater initial investment in infrastructure and will require specialised maintenance to ensure the system is running appropriately.

## Worm farms

This is a method for recycling primarily food waste into rich, soil conditioner using earthworms to enhance the conversion process. Around 20,000 worms are able to consume a kilogram of organic waste a day, more if the waste is finely pulped. Worm farms are available in various sizes suitable for building scale applications.

Compost worms eat both raw and cooked food, vegetable scraps, including coffee grinds, tea bags and small amounts of cardboard such as egg cartons. The following foods should not be placed in a worm farm, meat, dairy products and bread as these can attract vermin, and small quantities only of onions, citrus peel or tomatoes as these are very acidic.

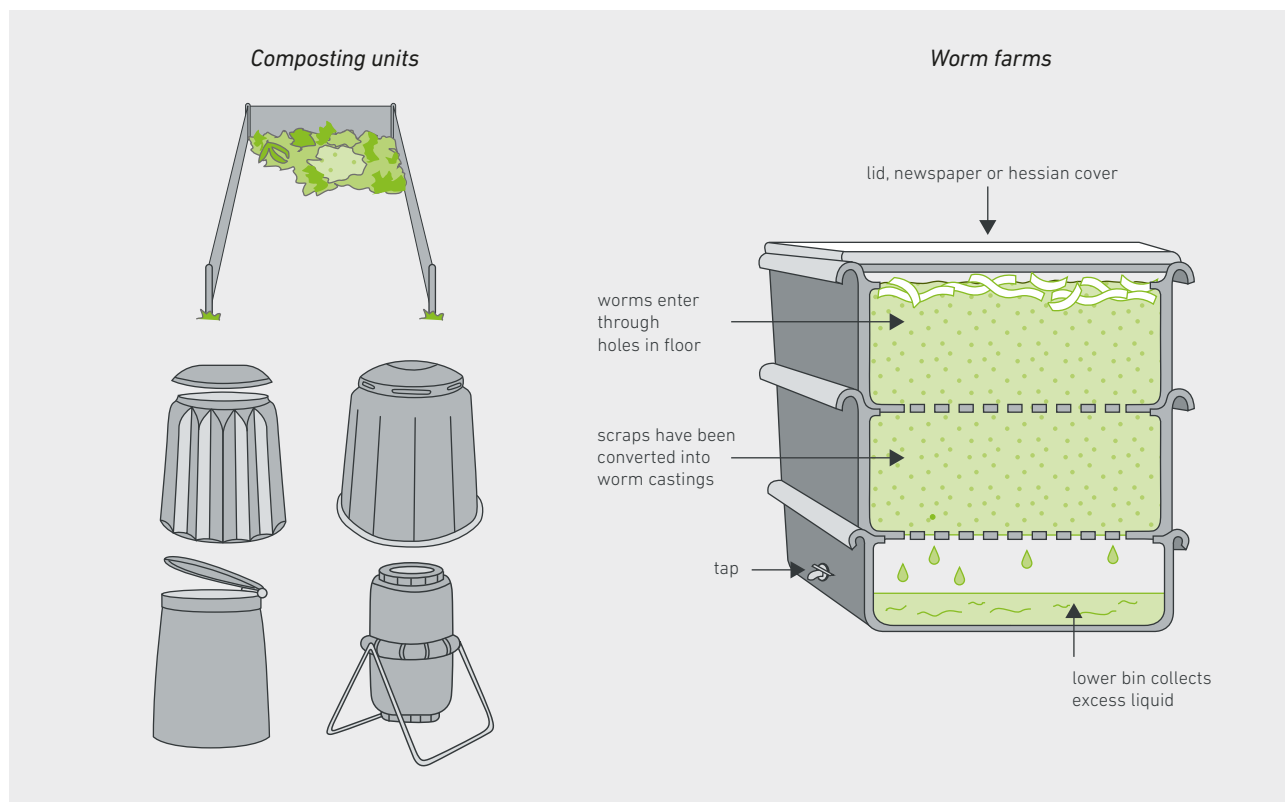
Worm farms can be located in common areas or balconies, provided they do not receive direct sunlight in afternoon hours. Check with your building manager for acceptable locations in your building.

### Worm farm requirements

Space requirements for a typical worm farm for an average household:

- Height: 300mm per level
- Width: 600mm
- Length: 900mm

**Note:** There are many worm farm arrangements. The above dimensions are indicative only.



## Bokashi or Urban Composting Unit

This form of composting is an anaerobic process that relies on inoculated bran to ferment food waste, including meat and dairy. A nutrient rich tea is produced, which can be applied to gardens. A pre-compost material is also produced, which should be buried in a fallow spot in the garden.

## Domestic Bio-digester

A domestic bio-digester is more of a food digester than a composter. It produces compost liquid, which can be used as fertiliser.

Bio-digester units use solar heat to accelerate and enhance the decomposition of food waste by:

- › raising temperatures
- › maintaining aerobic conditions, and
- › encouraging the growth of microorganisms.

## Waste to Energy (Anaerobic Digestion)

Anaerobic Digestion (AD) is a biological process that occurs when organic matter is decomposed by bacteria in the absence of oxygen. Biogas can be captured and converted to energy through this process. This system may be more suited to precinct scale developments and is not preferred due to its position in the food waste hierarchy.

Residues and outputs from waste to energy processes must be characterised and managed in accordance with the Environment Protection (Industrial Waste Resource) Regulations 2009.

Green Cone Bio-digester Banyule City Council





## Organics pre-treatment systems

### Dehydrators

Dehydrators are designed to reduce volume/weight of food waste up to 80–90 per cent in 1–3 days using dehydration/dewatering. Dehydrated food waste should not be referred to as “compost” and is typically referred to as a “sterile biomass”.

The dehydration process applies temperatures upward of 80°C to dry the food waste, removing water and reducing its mass by up to 90 per cent. The dehydrated product is considered sterile, however has not been biologically stabilised. Once the material is added to soil and gains sufficient moisture, it will reactivate microbes and will continue to decompose. It may be possible to be applied to soil in small amounts such as a strong fertiliser, or mixed in small proportions with large amounts of soil (e.g. 1:10 ratio).

**Note:** The output from dehydrators may need further pasteurisation to reduce risk to the environment and human health.

### Benefits of in sink food waste disposal units

- FWD may be of particular benefit in compact urban areas where collection is difficult, and/or collection frequencies need to be reduced, due to congestion or other amenity issues.
- FWD may be beneficial in areas where sewage is sent to a central sewerage treatment plant (STP) designed to produce bioenergy and has the capacity to accept the additional organic load.
- Reduces the amount of organic material going to landfill.
- If managed appropriately FWD can avoid potential odour and vermin issues that might be experienced with collection or composting facilities.

**Note:** Under the Environment Protection (Scheduled Premises) Regulations 2017 there are EPA works approval and licensing requirements above certain thresholds for organics processing and other waste treatment.

### In-sink food waste disposal units

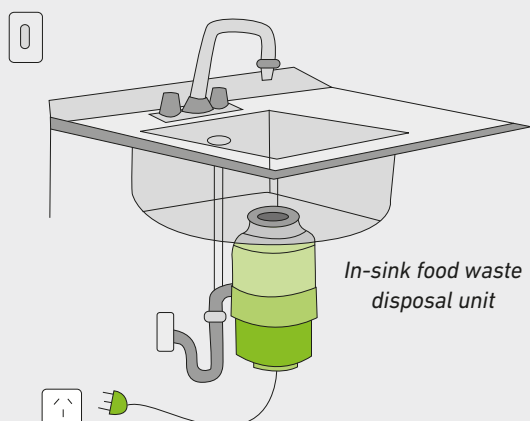
An in-sink food waste disposal unit (FWD) is an electrical and mechanical appliance installed under the kitchen sink, connected to the drain. Food waste is fed into the unit which grinds the waste until it is small enough to flow through the pipes and into the sewage system or septic tank.

Some councils and local water authorities do not support this technology due to the increased load it places on the sewage system and because it could detract from organics recovery objectives.

An in-sink FWD unit may be used, which drains to a centrally located collection tank. Material would then be pumped out for collection and processing off-site.

Before incorporating an in-sink food waste disposer unit:

- liaise with council to investigate whether a garden and/or food organics collection service will be available
- consult with the local water authority and council to determine any specific requirements, and whether a trade waste agreement is required



### ORGANICS MANAGEMENT

It is important to note that ‘one size’ will not fit all; home composting fits some, kerbside collection fits others, while alternative organics management may be appropriate in some cases.

Value-adding food waste through composting with other organic materials, producing bioenergy through anaerobic digestion, and developing innovative solutions to convert food waste to animal food etc is considered better than sending food waste to landfill, or sewer, and should therefore be encouraged where possible.



### Further Information

Regarding WtE and processing organics refer to *Resource Recovery Technology Guide*, Sustainability Victoria, 2018.



## Appendix 5: E-waste management



TABLE 12  
E-WASTE MANAGEMENT

E-WASTE MANAGEMENT
<p><b>Storage collection and transportation</b></p> <p>Temporary storage areas for e-waste should be provided at convenient and centralised locations at MUDs prior to collection. MUDs with 20 or more apartments can arrange a 240L or 660L bin (or similar) to recycle e-waste. The bins should have appropriate stickers that show materials accepted.</p> <p>All e-waste should be stored and transported on an impermeable surface, undercover and protected from the weather to prevent potential run-off of contaminants.</p> <p>Australian Standard AS/NZS 5377:2013 outlines the minimum requirements for the safe and environmentally sound collection, storage, transport and treatment of end-of-life e-waste. These are set to maximise re-use and recycling, reduce or eliminate material going to landfill.</p> <p>There are a number of e-waste collection services available in Victoria that are able to service multi-unit developments. Building managers and residents are encouraged to check with their respective local council to find out more about appropriate services in their area.</p> <p>The Federal Australian Government Department of Environment and Energy provides further information on e-waste recycling programs, which can be viewed here: <a href="http://www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme">www.environment.gov.au/protection/waste-resource-recovery/television-and-computer-recycling-scheme</a>.</p> <p>Where a development has an on-site caretaker or building manager, they should be responsible for advising residents, and facilitating collection. Where there is no on-site caretaker or building manager, collection should be facilitated by the body corporation or residents.</p> <p>Note that some collection services provide their own bins, and will then collect them at a later scheduled time, while some solely provide the collection service. It is important to check with the service provider in this regard.</p> <p>Reuse of e-waste is encouraged; however, if that the item is at the end of its life span, recycling may be more appropriate.</p> <p><b>Data distribution compliance and priority</b></p> <p>It is recommended that prior to disposing of e-waste items that may store data, any personal and other information be removed. It is also encouraged that service providers provide Certificates of Data Destruction (COD) to ensure e-waste recycling has occurred, and to reduce any potential privacy breaches.</p>

### Benefits



- › Increases recovery of valuable materials and metals.
- › Reduces hazardous waste being sent to landfill.
- › Reduce the likelihood of illegal dumping.

### Challenges

- › Recycling of e-waste can be expensive due to the complex nature of processes involved.
- › E-waste should be appropriately contained/stored and transported to avoid glass and other potentially hazardous materials contaminating land, or creating injury.

### Ongoing Education and management

- › Building managers should establish partnerships with collection services.
- › Notice boards, intranets and flyers should provide information about use of waste and recycling services in the building.

### Physical infrastructure requirements

- › Designated storage areas should be provided.
- › Storage areas should be developed in accordance with Australian Standard AS/NZS 5377:2013.
- › Storage areas should be centrally located, and close to access areas to facilitate convenient collection.
- › Storage areas should be screened where possible, in order to reduce any visual impacts.



### Further Information

Batteries can be disposed of at your local Aldi, Officeworks, Bunnings or Battery World store, or drop them off at a permanent drop off site. For a list of permanent drop off sites, refer to [www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au).

Printer cartridges can also be recycled through the Cartridges 4 Planet Ark Program, refer to [www.sustainability.vic.gov.au](http://www.sustainability.vic.gov.au).

The following industry funded schemes should also be considered where appropriate:

- › **Mobile Muster** – is a free scheme that facilitates the recycling of mobile phones [www.mobilemuster.com.au](http://www.mobilemuster.com.au)
- › **National Television and Computer Recycling Scheme** (NTCRS) [www.environment.gov.au](http://www.environment.gov.au)
- › **Fluoro Cycle** – is a voluntary stewardship scheme that seeks to increase the recycling rate of waste mercury-containing lamps/lights [www.fluorocycle.org.au](http://www.fluorocycle.org.au)



#### Better Practice

Recycling of e-waste at MUDs will generally occur in one of two ways:

1. Dropping off e-waste at designated drop off sites.
2. Utilise collection services where provided.

**TABLE 13**  
**EXAMPLES OF E-WASTE**

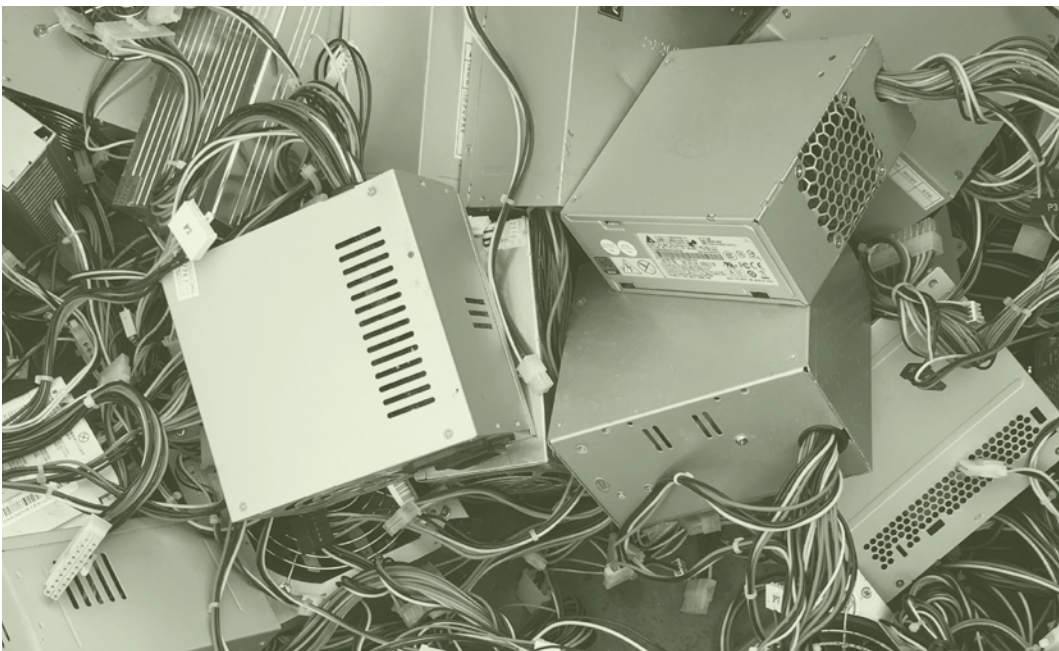
Large Appliances	Professional Tools & Equipment	Small Household Tools & Appliances	Computers TVs IT	Lighting & Mobile Phones	Leisure PV
<ul style="list-style-type: none"> <li>› Refrigerators</li> <li>› Washing machines</li> <li>› Cookers</li> <li>› Microwaves</li> <li>› Electric fans</li> <li>› Air conditioners</li> </ul>	<ul style="list-style-type: none"> <li>› Welding, soldering, milling</li> <li>› Medical devices</li> <li>› Monitoring and control equipment</li> <li>› Automatic dispensers</li> </ul>	<ul style="list-style-type: none"> <li>› Irons</li> <li>› Toasters</li> <li>› Coffee machines</li> <li>› Hair dryers</li> <li>› Electric tools</li> <li>› Sewing machines</li> <li>› Musical instruments</li> <li>› Batteries</li> </ul>	<ul style="list-style-type: none"> <li>› Computers</li> <li>› Monitors</li> <li>› Laptops</li> <li>› Mice, keyboards, routers</li> <li>› Printers</li> <li>› CRT TVs</li> <li>› Flat screen TVs (LCD, LED, plasma)</li> </ul>	<ul style="list-style-type: none"> <li>› Fluorescent lamps</li> <li>› High intensity discharge lamps</li> <li>› Compact fluorescent lamps</li> <li>› LEDs</li> <li>› Mobile phones</li> </ul>	<ul style="list-style-type: none"> <li>› Toys</li> <li>› Game consoles</li> <li>› Cameras</li> <li>› Portable audio and video</li> <li>› Remote controls</li> <li>› Photosensitive semiconductor devices</li> </ul>

Source: Environment Protection Act 1970, Schedule B - *Waste Management Policy (Siting, Design and Management of Landfills)* September 2017

Note: The above list is not exhaustive, but provides a guide to assist in identifying types of e-waste.



Examples of e-waste



## Appendix 6: Hard waste management



**TABLE 14**  
**HARD WASTE MANAGEMENT**

### **HARD WASTE (BULKY ITEMS) MANAGEMENT – OPTION 1:** **Recovery of hard waste through community reuse schemes**

Building managers, residents and councils can facilitate the reuse of hard waste where viable. One way to achieve this is by establishing partnership arrangements with not-for-profit organisations to collect reusable materials.

Collection can be arranged monthly or quarterly depending on the number of units, and residents advised of collection at a predetermined time and location.

Partnerships may be formal arrangements for collecting and distributing items. This may involve providing a directory to residents of not-for-profit organisations that will accept hard waste.

If not-for-profit organisations are unable to collect hard waste on specific development sites, or reuse is not appropriate, building managers will need to arrange for alternative collection and disposal.

Where a development has a building manager, they should be responsible for advising residents and facilitating collection. Otherwise collection should be facilitated by the body corporate or residents.

#### **Benefits**



- › Reduces the total volume of hard waste going to landfill.
- › May avoid costs associated with hard waste disposal.
- › Promoting reuse may reduce likelihood of illegal dumping.

#### **Challenges**

- › Some contractors will not enter private property to collect hard waste.
- › Requires greater participation by residents.
- › Requires coordination between residents, building managers and not-for-profit organisations.
- › Ensure any potential public liability issues associated with providing re-usable items to not-for-profit organisations are considered prior to promoting a particular program.

**Note:** Not-for-profit organisations may service specific areas/suburbs.

#### **Ongoing education and management**

- › In order for community reuse schemes to be effective, partnerships between building managers and not-for-profit organisations will need to be established.
- › Some councils currently promote community reuse schemes through their websites.
- › Not-for-profit organisations provide information on the availability and types of services they offer through their websites.
- › Residents will need to be advised about specific materials that can, and can not be accepted.

#### **Physical infrastructure requirements**

- › A communal on-site charity bin 1m<sup>2</sup> per 50 dwellings (additional to hard waste storage) should be provided.
- › An interim storage area that is easily accessible should be provided for collection.
- › Suitable unobstructed access for the service of hard waste items with a minimum width of 1.8m should be provided.
- › The storage area is to be located in close proximity to the on-site loading bay.
- › The floor must be finished in a non-slip surface.
- › Incorporation of adequate lighting and natural/mechanical ventilation to meet BCA 2016 requirements.

**Note:** Hard waste storage areas may also act as move in/move out waste storage areas.

Reuse should  
be prioritised  
over recycling  
and landfill

## Appendix 6: Hard waste management Continued

### HARD WASTE (BULKY ITEMS) MANAGEMENT – OPTION 2: Provision of centralised storage for hard waste prior to collection

Developments should incorporate centralised storage space for hard waste prior to collection.

Each building (or set of buildings) could be designed with a bulky household waste collection room located adjacent to the loading bay. The room is provided to allow storage of mattresses, furniture and other goods to be collected by council's waste collection service. The size of the household hard waste room depends on the amount of hard waste generated (which could vary significantly) and collection frequency.

Where a development has an on-site caretaker or building manager, they should be responsible for advising residents and facilitating collection. Where there is no on-site caretaker or building manager, collection should be facilitated by the body corporation or residents.

Developers of new MUDs should consult with their respective councils during the early stages of the design phase to ensure that adequate and accessible storage space for hard waste is provided.

### Benefits



- › Improves access for collection of hard waste in MUDS, which has been identified as a major barrier.

### Challenges

- › The associated cost in allocating temporary storage space for hard waste.
- › If vandalism or waste dumping is likely to be a problem, the storage area may need to be secured and lockup area provided.
- › If rooms are mismanaged this may lead to stockpiling, which could attract vermin, mould and create a fire risk.

### Ongoing education and management

- › In order for storage to be effective in managing hard waste, residents must be made aware of the area and it should be conveniently located and centralised. Building managers should be tasked with informing residents of the availability of temporary storage space in MUDs.

### Physical Infrastructure requirements

- › Storage areas should be located near access areas to facilitate collection.
- › Storage of hard waste should be clear of any obstructions, such as doors and corridors which could limit or prohibit access to and from the area.
- › Storage areas will need to meet the BCA.
- › Temporary storage should be provided at ground floor or basement level for ease of access.



### Further Information

#### Hazardous waste

Residents are encouraged to access and use the Sustainability Victoria *Detox your Home* program. It is a safe, free and easy-to-use service to collect and appropriately dispose of common household chemicals such as pesticides, poisons and cleaning products without harming your health or the environment.

Please do not dispose of chemical products by:

- › *Placing them in general or hard waste collections as products may ignite and/or explode*
- › *Pouring them down the drain as it pollutes our waterways, harming animals and vegetation, contaminating our drinking water supply and making beaches and rivers unsafe for swimming.*

Refer to [www.sustainability.vic.gov.au/You-and-your-home/Waste-and-recycling/Detox-your-home](http://www.sustainability.vic.gov.au/You-and-your-home/Waste-and-recycling/Detox-your-home)

## Appendix 7: Australian Standards



The Australian Standards are designed to ensure products, services and systems are safe, reliable and consistent. They are based on sound industrial, scientific and consumer experience and are regularly reviewed to ensure they keep pace with new technologies.

The design of waste management systems need to be compatible with waste management practices and commercial recycling infrastructure in Victoria, and must be compliant with all relevant Australian Standards, as well as the Building Code of Australia. The following table provides a list of the Australian Standards associated with waste management and recycling in MUDs.

AUSTRALIAN STANDARD	AREA OF MANAGEMENT
AS 4123.1	<b>Mobile Waste Containers</b> Part 1: Containers with two wheels and a capacity up to 400L for lifting devices – dimensions and design.
AS 4123.2	<b>Mobile Waste Containers</b> Part 2: Containers with four wheels with a capacity from 500L to 1200L with flat lid(s), for trunnion and/or lifting devices – dimensions and design.
AS 4123.3	<b>Mobile Waste Containers</b> Part 3: Containers with four wheels with a capacity from 770L to 1300L with dome lid(s), for trunnion and/or lifting devices – dimensions and design.
AS 4123.4	<b>Mobile Waste Containers</b> Part 4: Containers with four wheels with a capacity from 750L to 1700L with flat lid(s), for wide trunnion or BG and/or wide comb lifting devices – dimensions and design.
AS 4123.5	<b>Mobile Waste Containers</b> Part 5: Performance requirement and test methods.
AS 4123.6	<b>Mobile Waste Containers</b> Part 6: Health, safety and environment.
AS 4123.7	<b>Mobile Waste Containers</b> Part 7: Colours, markings, and designation requirements.
AS 1668.2	<b>Odour</b> The use of ventilation and air conditioning in buildings Part 2: Mechanical ventilation in buildings.
AS 2890.2	<b>Parking facilities</b> Part 2: Off-Street Commercial Vehicle Facilities.
AS/NZS 5377:2013	<b>E-waste</b> Principles and minimum requirements that aim to minimise the risk of harm to human health and the environment. Collection, storage, transport and treatment of end-of-life electrical and electronic equipment.
AS 4736-2006 AS 5810-2010	<b>Biodegradable plastics</b> Biodegradable/compostable plastics suitable for composting.
AS 4564-2012	<b>Composts</b> Soil conditioners and mulchers.
AS 1319	<b>Safety signs</b> For the occupational environment



## Appendix 8:

# Waste generation & storage layout examples

### Example 1



Examples of how to calculate garbage, recycling and organics bin storage area requirements are provided below. Note: Councils may provide a standard number of bins to the development based on the number of units and the bin sizes

used for local services. Consult with council engineers and waste managers to find out about local services and the likely number of bins to be accommodated in waste storage areas.

## Three storey residential development with 12 × 2 bedroom apartments

Standard council services are 240L bins for garbage, and 240L bins for commingled recyclables. The development is also provided with one 240L bin for garden organics. MGBs are stored in a communal storage.

Garbage is collected weekly. Recyclables and garden organics are collected fortnightly.

### 1. Estimate number of garbage bins required (12 × 2 Bedroom Apartments) in accordance with the Waste Generation Rates in Appendix 1

**Waste generated:**  
12 units x 100L/unit/week = 1,200L/week

**Number of garbage bins required:**  
1,200L/week ÷ 240L/week  
(weekly garbage collection) = 5

### 2. Estimate number of recycling bins required

Note: As there is generally no separate paper collection service in Victoria paper and cardboard should be combined with recyclables.

**Commingled Recyclables generated:**  
12 units x 100L/unit/week = 1,200L/week  
or 2,400L/fortnight (fortnightly recycling collection)

**Number of recycling bins required:**  
2,400L/fortnight ÷ 240L/week = 10

### 3. Estimate number of organics bins required

**Organics bins required: 1**  
(chosen by council in this example)  
On-site individual composting is available in this instance.

### 4. Total number of bins required

Material	Size	Type	Total
Garbage	240L	MGB	5
Commingled recycling	240L	MGB	10
Organics	240L	MGB	1
<b>TOTAL</b>			<b>16*</b>

\*Note: This does not include allowance for contingency/spare bins.

### 5. Hard waste storage

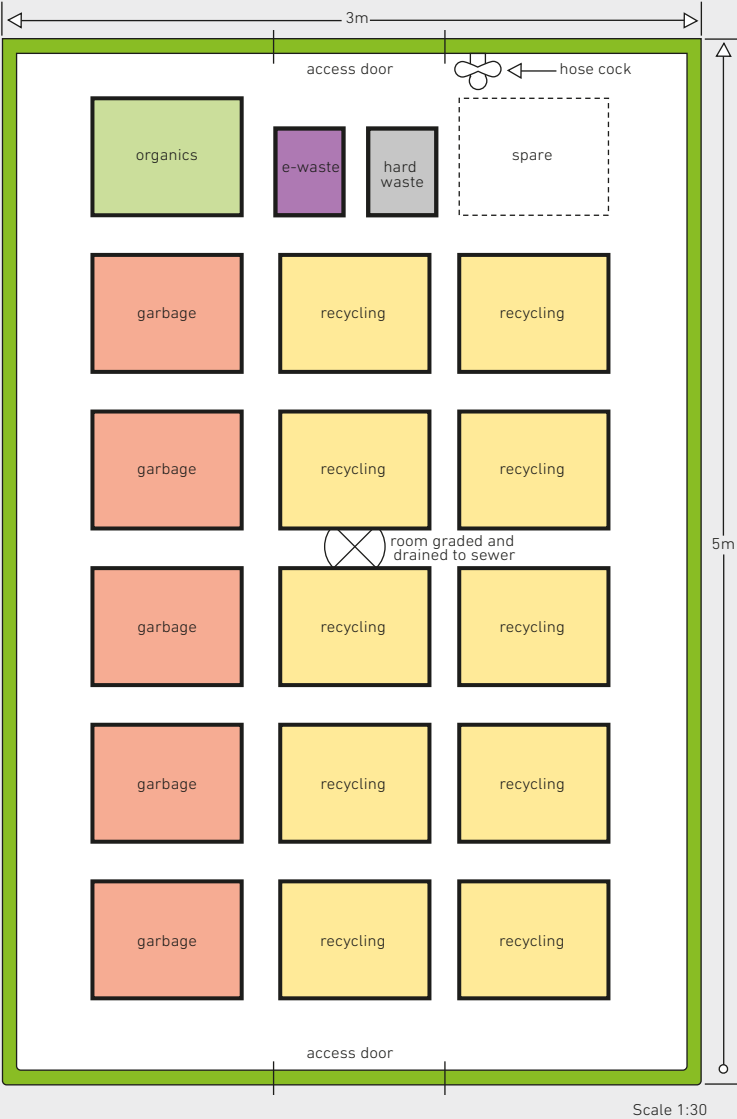
Council provides collection of hard waste from residents once every 6 months. Hard waste would be provided on the kerbside for collection on these days, therefore no storage area provided in this example.

Note: storage areas for hard waste items should be provided in multi-unit dwellings. To calculate the size of the storage area, consider: the number of units in the building; the frequency between collections of hard waste items; and the anticipated turnover of residents.

### 6. Charity and e-waste collection

No charity or e-waste storage/collection has been provided due to the small size of the development. Residents are provided information on the use of council offered drop-off points and collection days.

FIGURE 15  
POSSIBLE COMMUNAL AREA LAYOUT





## Appendix 8: Waste generation & storage layout examples Example 2



### Five storey residential development with 24 × 1 bedroom apartments

#### 1. Estimate number of garbage bins required for 24 × 1 Bed Apartments

**Waste generated:**

24 units x 80L/unit/week = 1,920L/week

**Number of garbage bins required:**

1,920L/week ÷ 240L/week  
(weekly garbage collection) = 8

#### 2. Estimate number of recycling bins required

**Commingled Recyclables generated:**

24 units x 80L/unit/week = 1,920L/week

**Number of recycling bins required:**

1,920L/week ÷ 240L/week  
(weekly recycling collection) = 8

#### 3. Estimate number of organics bins required

**Garden organics bins required:**

None (determined by building management in consultation with council)

**Food organics:**

Space allocated for communal composting to be managed by the building caretaker. Includes a 120L MGB for collection from the communal storage area. Compost product would be available for use by gardener and residents.

#### 4. Total number of bins required

Material	Size	Type	Total
Garbage	240L	MGB	8
Recycling	240L	MGB	8
Organics	120L	MGB	1
<b>TOTAL</b>			<b>17*</b>

\*Note: this does not include allowance for contingency/spare bins

#### 5. Hard waste storage

An allowance of 15m<sup>2</sup> hard waste items' storage was selected for this type of development.

Note: storage areas for hard waste items should be provided in multi-unit dwellings. To calculate the size of the storage area, consider: the number of units in the building; the frequency between collections of hard waste items; and the anticipated turnover of residents. A figure of 15m<sup>2</sup> is provided here as an example only – this area may not be applicable to all developments accommodating 24 units.

#### 6. Charity and e-waste collection

The development is located close to a large shopping centre which has charity bins within the parking lot. Given the residents have access to nearby charity bins no additional bins have been provided in this development.

2m<sup>2</sup> has also been allocated for collection of e-waste in a 660L MGB.

FIGURE 16  
POSSIBLE COMMUNAL AREA LAYOUT



## Appendix 8:

# Waste generation & storage layout examples

### Example 3



Council service: 240L, 660L or 1,100L MGBs for garbage and commingled recyclables. Garbage and recyclables are collected weekly. The council also provides a food and gardens organics service for MUDs. FOGO is collected in 240L MGBs, which are collected weekly.

The development will be designed to include:

- A dual chute system accessible on each residential level

- The chutes discharge into 660L MGBs rotating carousel with compactor for garbage with a compaction ratio of 2:1
- A separate waste room accessible to residents is provided for storage of hard waste, charity bin and e-waste collection bin.

The communal waste areas in the basement have been sized using this information.

## Nine storey residential development with 36 units

(16 x 1 bed apartments and 20 x 2 bed apartments)

### 1. Estimate number of 660L garbage bins required

To save on space and allow easy movability 660L MGBs have been selected by the developer.

#### Waste generated:

16 units x 80L/unit/week = 1,280L/week  
plus 20 units x 100L/unit/week = 2,000L/week

**Total garbage generated per week:** 3,280L/week

#### Number of garbage bins required:

3,280L/week ÷ 660L/week  
(weekly garbage collection) = 5  
(-2 bins for organics) = **3**

### 2. Estimate number of 660L recycling bins required

#### Recycling generated:

16 units x 80L/unit/week = 1,280L/week  
plus 20 units x 100L/unit/week = 2,000L/week

#### Total recycling generated per week:

3,280L/week

#### Number of recycling bins required:

3,280L/week ÷ 660L/week  
(weekly garbage collection) = **5**

### 3. Estimate number of organics bins required

The number of FOGO bins has been calculated based on 35 per cent of the garbage bin contains FOGO<sup>1</sup>.

#### Organics generated:

35% of 3,280L/week = 1,148L/week

#### FOGO bins required:

1,148L/week ÷ 240L/week = **5**

### 4. Total number of bins required

Material	Size	Type	Total
Garbage	660L	MGB	3
Recycling	660L	MGB	5
Organics	240L	MGB	5
<b>TOTAL</b>			<b>13*</b>

\*Note: this does not include allowance for contingency/spare bins

1 Sustainability Victoria, Waste Audit Report

## 5. Hard waste storage

An allowance of 18m<sup>2</sup> hard waste items storage was chosen for this development.

Note: storage areas for hard waste items should be provided in multi-unit dwellings. To calculate the size of the storage area, consider: the number of units in the building; the frequency between collections of hard waste items; and the anticipated turnover of residents.

A figure of 18m<sup>2</sup> is provided here as an example only – this area may not be applicable to all developments accommodating 36 units.

## 6. Charity and e-waste collection

1m<sup>2</sup> is allocated within the waste storage room, accessible to residents for a charity bin. 2m<sup>2</sup> has also been allocated for collection of e-waste in a 660L MGB.

FIGURE 17  
POSSIBLE COMMUNAL AREA LAYOUT



## Appendix 8: Waste generation & storage layout examples

### Example 4



Council service: garbage and commingled recycling is collected in 1,100L MGBs. Garbage and recycling is collected once per week. The development is not provided with a garden or food organics service.

The development will be designed to include:

- A dual chute system accessible on each residential level
- A communal garden roof top
- The chutes discharge into 1,100L MGBs rotating carousel with compactor for garbage with a compaction ratio of 2:1
- A gardening contractor removes any garden prunings from the site that are generated during routine maintenance, or they should be placed in an on-site composting facility if one is available
- A separate waste room accessible to residents is provided for storage of hard waste, charity bin and e-waste collection bin.

The communal waste areas in the basement have been sized using this information.

### Ten storey residential developments with 64 units (14 x 1 bed apartments, 25 x 2 bed apartments, 25 x 3 bed apartments)

#### 1. Estimate number of garbage bins required

##### Waste generated:

14 units x 80L/unit/week = 1,120L/week  
plus 25 units x 100L/unit/week = 2,500L/week  
plus 25 units x 120L/unit/week = 3,000L/week

**Total garbage generated per week: 6,620L/week**

##### Number of garbage bins required:

6,620L/week ÷ 1,100L/week  
(weekly garbage collection) = 6  
(-2 bins for organics) = **4**

#### 2. Estimate number of recycling bins required

##### Recycling generated:

14 units x 80L/unit/week = 1,120L/week  
plus 25 units x 100L/unit/week = 2,500L/week  
plus 25 units x 120L/unit/week = 3,000

**Total recycling generated per week: 6,620L/week**

##### Number of recycling bins required:

6,620L/week ÷ 1,100L/week  
(weekly recycling collection) = **6**

#### 3. Estimate number of organics bins required

The number of FOGO bins has been calculated based on 35 per cent of the garbage bin contains FOGO.

##### Organics generated:

35% of 6,620L/week = 2317L/week

##### FOGO bins required:

2317L/week ÷ 240L/week = **10**

#### 4. Total number of MGBs required

Material	Size	Type	Total
Garbage	1100L	MGB	4
Recycling	1100L	MGB	6
Organics	240L	MGB	10
<b>TOTAL</b>			<b>20*</b>

\*Note: this does not include allowance for contingency/spare bins

## 5. Hard waste storage

24m<sup>2</sup> hard waste items storage has been allowed for this development.

Note: to calculate the size of the storage area, consider the number of units, the frequency between collections of hard waste items and the anticipated turnover of residents. A figure of 24 m<sup>2</sup> is provided here as an example only – this area may not be applicable to all developments accommodating 64 units.

## 6. Charity and e-waste collection

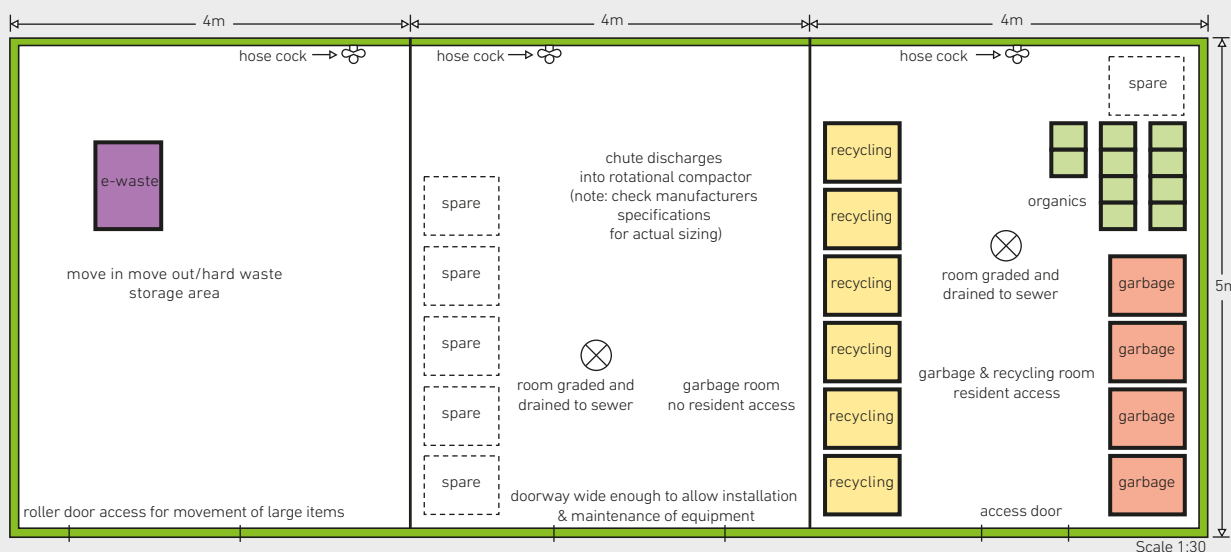
1m<sup>2</sup> is allocated within the waste storage room, accessible to residents for a charity bin. 2m<sup>2</sup> has also been allocated for collection of e-waste in a 660L MGB.

## Possible communal area layout

In this example, resident access is not permitted to the room housing the garbage chute and rotational compactor. Additional garbage MGBs are therefore provided next to the recycling MGBs to avoid contamination of recyclables.

Spare garbage MGBs are located adjacent to the rotational compactor so the caretaker can replace the full garbage bins (under the compactor unit) as required.

FIGURE 18  
POSSIBLE COMMUNAL AREA LAYOUT



## Appendix 9: Waste management equipment



### Mobile garbage bins (MGBs)

MGBs with capacities up to 1700L should comply with the Australian Standard for mobile waste containers AS 4123. This standard specifies standard sizes and sets out the colour designations for bodies and lids of mobile waste containers that relate to the type of materials they will be used for.

Indicative sizes only for common MGB sizes are shown below. Note that not all MGB sizes are shown; the dimensions are

only a guide and differ slightly according to manufacturer, whether bins have flat or dome lids and are used with different lifting devices (refer to AS 4123 for further detail).

Clearance space of 0.6m should be provided between MGBs to ensure user and servicing access. Clearance is measured at lids to account for sloped sides.

**TABLE 15**  
**MOBILE CONTAINERS WITH A CAPACITY FROM 80L TO 360L WITH TWO WHEELS**

Bin Type	80L MGB	120L MGB	140L MGB	240L MGB	360L MGB
Height (mm)	870	940	1065	1080	1100
Depth	530	560	540	735	885
Width	450	485	500	580	600

**TABLE 16**  
**MOBILE CONTAINERS WITH A CAPACITY FROM 500L TO 1700L WITH FOUR WHEELS**

Bin Type	660L Bulk Bin	660L MGB	770L MGB	1100L MGB/ Bulk Bin	1300L MGB	1700L MGB
Height (mm)	1235	1250	1425	1470	1480	1470
Depth	765	850	1100	1245	1250	1250
Width	1360	1370	1370	1370	1770	1770

Note: Crate dimensions may vary between different bin manufactures

**TABLE 17**  
**BULK BINS GREATER THAN 1700L CAPACITY**

Bin Type	2.0m <sup>3</sup> Skip	3.0m <sup>3</sup> Skip	4.5m <sup>3</sup> Skip
Height (mm)	865	1225	1570
Depth	1400	1505	1605
Width	1830	1805	1805

Note: The bulk bin dimensions are a guide only and may differ slightly according to manufacturer. Not all available bulk bin sizes are shown.



*Dome or flat lid containers*

## Chutes

Chute systems are suitable for both garbage and recycling disposal in MUDs. Various configurations can be adopted for chute systems. For example, single or dual chutes can be used to convey garbage and recycling waste to a communal room where the waste can be compacted prior to collection for transport. Another possible configuration is a multiple chute system, whereby two or three vertical chutes convey material directly into a receptacle or waste compactor. Concerns regarding the breakage or damage of some recyclables (e.g. glass) as a result of the drop should be taken into consideration (consult chute manufacturers).

The following should be taken into consideration when implementing a chute system:

- Reduce noise and fire risks associated with their use.
- Chutes, service openings and inlet hoppers must be constructed of metal or other smooth-faced, durable, fire-resistant and impervious material of a non-corrosive nature, capable of being easily cleaned.
- Provide a service room (or compartment) on each floor of the development to allow access to the garbage chute.
- Chutes should be cylindrical in section to avoid waste being caught within the chute, and with a diameter of 500mm or greater.
- Chutes must be vertical without bends or "off-sets" and not reduce in diameter over the fall.
- Chutes must be ventilated to ensure that air does not flow from the chute through any service opening.
- A cut-off must be provided at or near the base of the chute to effectively close off the chute while the storage container or compacting device is withdrawn.
- Chute rooms must be provided with an inlet hopper and be in convenient, well-lit and ventilated positions.
- The floor below each charging device and service opening must be finished with a smooth impervious material with a minimum area of not less than one square metre (1m<sup>2</sup>) situated centrally below the inlet hopper.
- Chutes should not open onto any habitable or public space.
- Hopper doors are to have an effective self-sealing system.
- Inlet hoppers must be designed to:
  - effectively close off the service opening in the chute when the device is opened for loading
  - automatically return to the closed position after use
  - permit free flow of waste into the chute
  - not project into the chute
  - permit easy cleaning of the device and connection between the service opening and the chute
  - be not less than one metre (1 m) or more than one and one-half metres (1.5 m) above the floor level.
- A receptacle or waste compactor should be positioned to receive waste from the chutes in such a way to avoid spillage and overflow.
- Chutes should be completely enclosed in a fire-rated shaft constructed of an approved material and fitted with sprinklers in accordance with the Building Code of Australia.
- Refer to the manufacturer(s) instructions for exact specifications.

Example of a bin chute





## Service lifts/storage room

A service lift (or service elevator) may be appropriate in place of a waste chute in smaller scale developments where a caretaker is employed.

A service lift is dedicated to the transport of garbage and recycling containers and other equipment required for the operation of the development.

Interim storage rooms allow residents to store waste and recyclables. Residents place their waste and recyclables in bins provided and these are transported daily by the caretaker to the waste storage room. Each service room needs to be designed with sufficient space for the storage of two days' garbage and recyclables for all residents on that level.

Developers will need to check with council whether this option is acceptable.

**Note:** Chute, service lifts and bin rooms will need to be designed to meet the Building Code of Australia.

Example of a waste storage room



## Underground bins

Underground bins use hidden capacity by installing large collection containers below ground level. The general user only sees a small portion of the container or a small bin above ground.

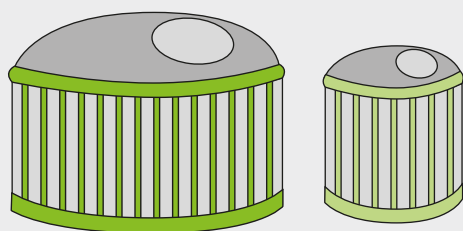
Underground bins are available in sizes up to 5000L. These bins offer the advantage of having a large storage capacity that can effectively manage the waste from many dwellings, with a small, above-ground footprint requirement. Below-ground storage of waste is an advantage, particularly in summer, as the waste is kept cool. The frequency of bin collection may also be reduced significantly, subject to appropriate control of odour and leachate.

Smart sensors can be installed to notify the council or responsible waste contractor when the bin is full, to trigger the dispatch of a collection vehicle. A waste collection vehicle that has been modified with a hook-arm or crane typically collects waste from underground bins. The hook attaches to the bin and draws it from the ground. The bin is held over the hopper of the waste collection vehicle and is emptied by a trapdoor system or by pulling a cord holding the lining at the base of the bin (this differs between bin manufacturers). Due to the servicing method selecting an appropriate location for the bins with access for collection vehicles is therefore very important.

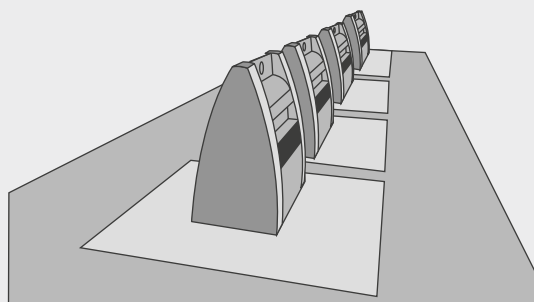
As an alternative to using collection vehicles, waste could be conveyed to a temporary storage area or transfer station via an automated (vacuum) waste system connected to the underground bins. Furthermore, when configured with weight sensors, this could be a step towards a more accurate waste data management system.

Underground bins are well suited to collect garbage. However, depending on the bin capacity, they may not be as suitable for collecting recyclables as the greater the depth of the bin, the greater the risk of glass breakage when recyclables are dropped in. The bulky nature of cardboard and the weight of source-separated paper may also detract from the suitability of underground bins for recycling. Information and further details of materials that can be managed using this type of bin should be sought from manufacturers.

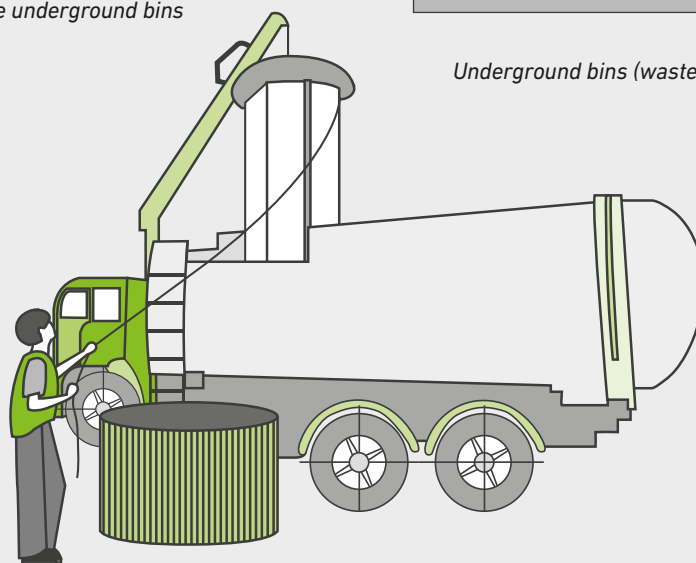
**Note: Both dome and underground bins are collected using a similar overhead crane mechanism. The connection of the bin to a rope may not be required for some automated systems.**



*Dome/round type underground bins*



*Underground bins (waste or eco-point)*



*Collection of underground bins*

## Compactors

Compactors are extremely useful for garbage or cardboard/paper or plastic/aluminium containers. They are less useful for steel containers depending on the specifications of the local council recyclables collection and processing contractor.

### MGB compactors

Compactors are used to compress the waste (or recyclables) into smaller collection containers. The compaction ratio is typically set at around 2:1. Higher ratios are not used as they may result in heavier bins, causing occupational health and safety (OH&S) problems, mechanical damage and may break recyclable materials. They may also cause compacted waste to get jammed in the base of the bins, making it difficult to empty the contents.

Better practice compaction systems compact directly into a 240L, 660L and 1,100L MGB, reducing the requirement to manually load the compacted waste into bins or skips.

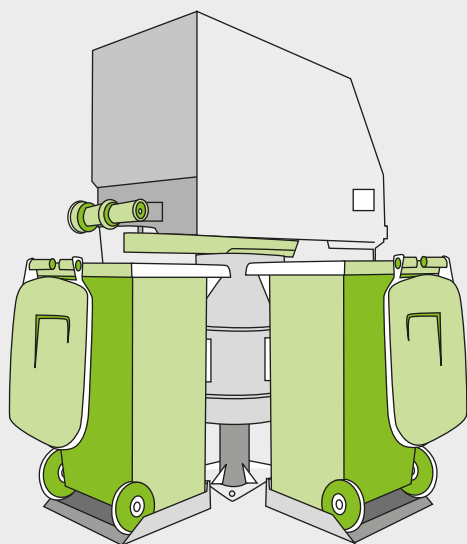
Compactors must be fitted with optical or visual sensors to provide warning to a nominated caretaker that a bin must be replaced. A closed circuit camera may be used, providing it is frequently monitored, such as part of a building security system.

Compactors require regular maintenance. In particular, systems fed from a chute can be prone to blockages or failure of the 'electronic eye', which can result in garbage overflowing or backing up the chute.

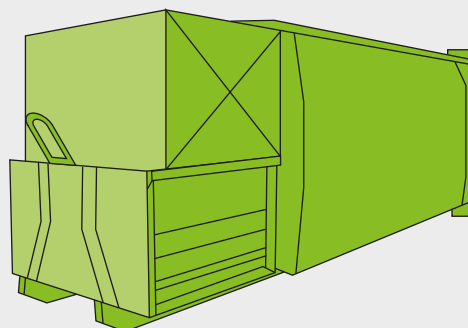
## Hook-lift compactors

Hook-lift compactors should be considered where a large amount of garbage and recyclables are generated and storage space for bins is limited. Made out of heavy duty steel, a compactor is stationary and can only be transported via hook lift trucks and standard sizes range from 5 to 25 cubic metres. Developments with more than 250 apartments or a total stream of 25,000L of garbage and/or 25,000L of recycling should consider the use of a hook-lift compactor. Use of a hook-lift compactor should be determined in consultation with the council. Use of a compactor for recyclables must be decided based on council collection contract requirements.

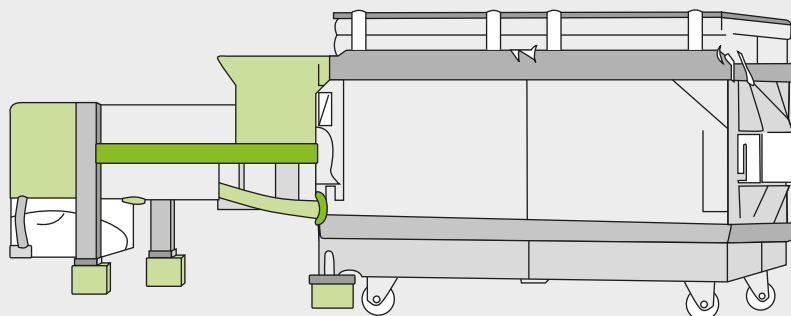
**Note:** Fully transportable compactors may be a better option in order to reduce mess that can be associated with the static compactors.



*Static compactor*



*Hook lift static compactor unit*



*Static compactor*

## Balers

Balers are most commonly used for cardboard. Balers compress and reduce the size of materials into package bales. Bales require mechanical lifting when collected. They are used and advantageous in situations where large amounts of bulky materials are produced, space is limited and the materials can be compressed so as not to occupy valuable bin capacity.

The balers themselves come in a wide variety of sizes and capacities and have a small footprint. Balers can be customised by size and use requirements. Although some balers operate automatically, someone is normally required to load and operate the baler, which is a disadvantage. The bales can also be large, heavy and difficult to move by hand. Sometimes equipment such as a forklift is required to move them.

## Glass bottle crushers

Bottle crushers are designed to break glass into small but recyclable-sized fragments, known as “cullet”. Most crushers are integrated with a small mobile bin (typically 60L) to keep the weight of the cullet within limits for ease of handling. Crushers allow for much larger weights of glass to be stored in smaller volumes, reducing the storage space required for glass recycling by well over 50 per cent.

In addition, crushers minimise noise associated with handling glass recycling by reducing the need to tip bottles from a bar-sized bin to a larger storage bin, and also reducing the noise at collection.

Glass bottle crushers are available in different sizes and configurations to suit venues ranging from small bars to larger clubs.

These crushers should be considered in areas in close proximity to residential dwellings to reduce the loss of amenity from recycling noise levels, and where bottle disposal is high and storage areas are limited.

## Bin lifters

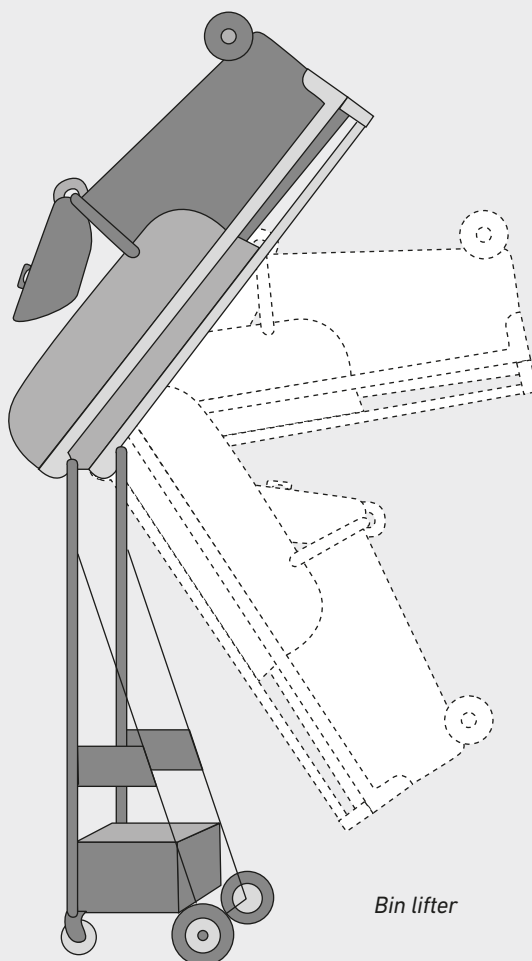
If MGBs containing garbage or recyclables have to be emptied into bulk bins, provide equipment to eliminate the need to manually lift and empty the bin. In this situation, the waste storage area design needs to incorporate sufficient space to locate and operate the lifting device. The lifting device should be fitted with safety features to prevent injury to operators, and should be secured to prevent use by residents.

The cost of buying and maintaining the bin lifter and the employment of a caretaker to operate it should be factored into the ongoing management of the development. In addition, most councils will only provide one set of bins to a development (i.e. MGBs or bulk bins, but not both), so the cost of an additional set of bins should also be factored in.

Bin lifters are available for a variety of tipping applications, including various size bins and containers, and designed to tip into containers of various heights. They can be battery powered or connected to mains power. Some models also come with safety cages.

## Bin tugs

Bin tugs are a potential solution for large MUDs, which require a number of bins to be moved to collection points. Bin tugs vary in size/type and should be selected on a case by case basis. Suitable space should be provided for on-site storage.



# Appendix 10: Collection vehicles



Waste collection vehicles may be side loading, rear-end loading, front-end loading or crane trucks. The size of vehicle varies according to the collection service. Developers should consult the local council and/or relevant contractors regarding the type of vehicle used in the local area.

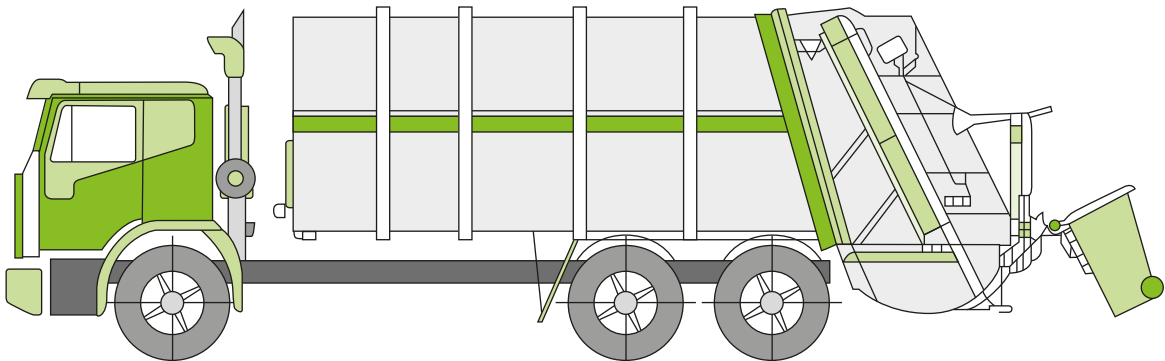
The following characteristics represent the typical collection vehicle; however, these are only for guidance.

It may be possible to engage a collection service provider to use smaller collection vehicles to service developments with narrow roadways and laneways, or for on-site collections. However, as the availability of smaller vehicles to make services varies between councils and private contractors, wherever possible, the development should be designed to accommodate vehicles of a similar size to that reported below.

## Rear loading collection vehicle

This is commonly used for domestic garbage and recycling collections from MUDs. It can be used to collect waste stored in MGBs or bulk bins, particularly where bins are not placed on the kerbside.

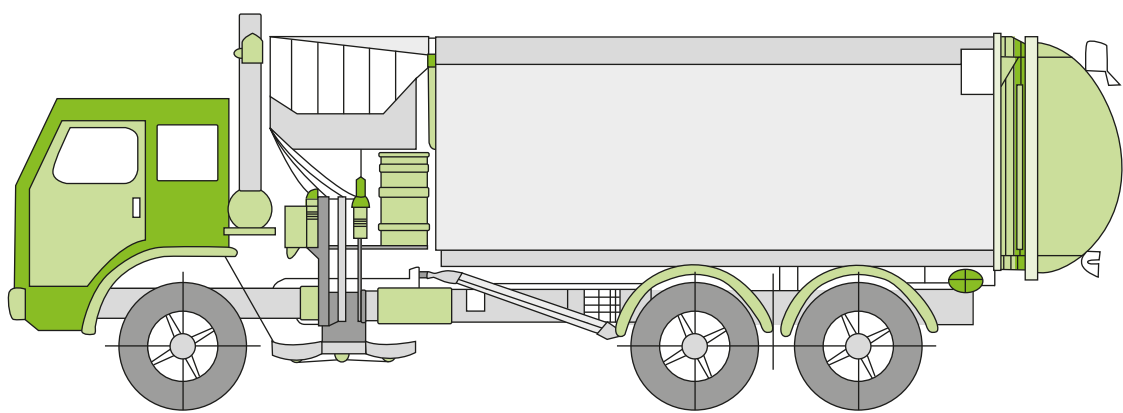
Rear Loading Collection Vehicle	(m)
Length overall	10.24
Width overall	2.50
Clearance height	4.50
Travel height	3.50
Weight (vehicle only) tonnes	(t) 12.40
Weight (payload) tonnes	(t) 9.50
Turning circle	18.00



# Side loading collection vehicle

This is the most commonly used vehicle for domestic garbage and recycling collections. It is only suitable for collecting MGBs up to 360L in size.

Side-Loading Collection Vehicle	(m)
Length overall	9.64
Front overhang	1.51
Wheelbase	5.20
Rear overhang	2.93
Turning circle kerb to kerb	17.86
Turning circle wall to wall	20.56
Front of vehicle to collection arm	3.80
Maximum reach of side arm	3.00
Travel height	3.63
Clearance height	4.50

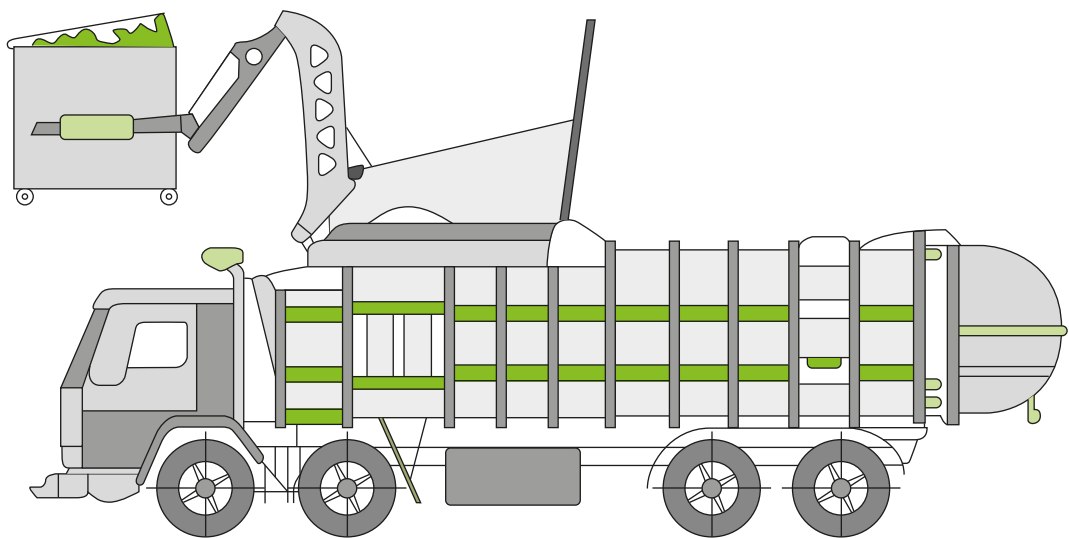




# Front-lift loading collection vehicle

This is mainly used for collecting commercial and industrial waste, and is only suitable for bulk bins with front lift pockets (not MGBs).

Front-Lift Loading Collection Vehicle	(m)
Length overall	10.52
Front overhang	1.51
Wheelbase	5.84
Rear overhang	3.17
Turning circle kerb to kerb	22.10
Turning circle wall to wall	23.66
Travel height	3.82
Clearance height for loading	6.10



## Hook-Lift truck

Hook-lift trucks can vary significantly based on the size of the compaction container requiring collection. Provided below is an example of the specifications for a hook-lift truck.

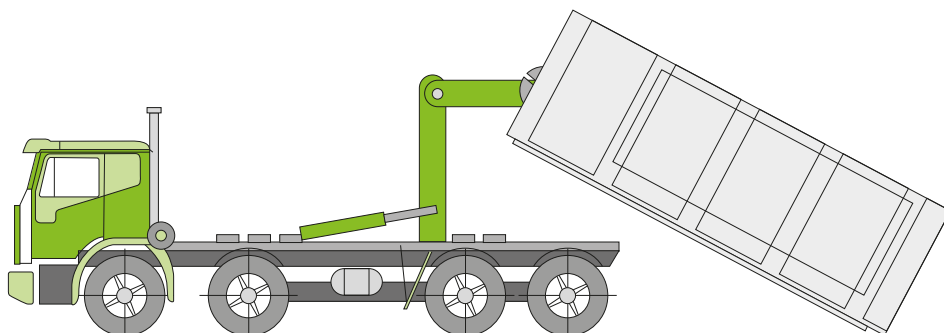
**Note:** The hook lift truck required for collection of fully transportable compactors may differ from the pictures shown.

Hook-Lift Vehicle Specifications	(m)
Length overall	9.20
Width Overall	2.50
Turning circle	25.00
Travel height	4.30
Height in operation	5.60

### Movement Diagram

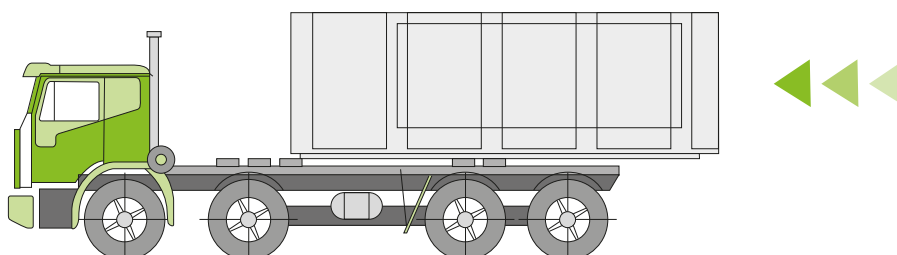
1

Vehicle reverses to collect an uninhibited container and safely pulls container on board.



2

Container is moved to a safe and secure position on the vehicle, and with the container and contents securely in position, this vehicle is ready to leave for emptying.



# Crane trucks

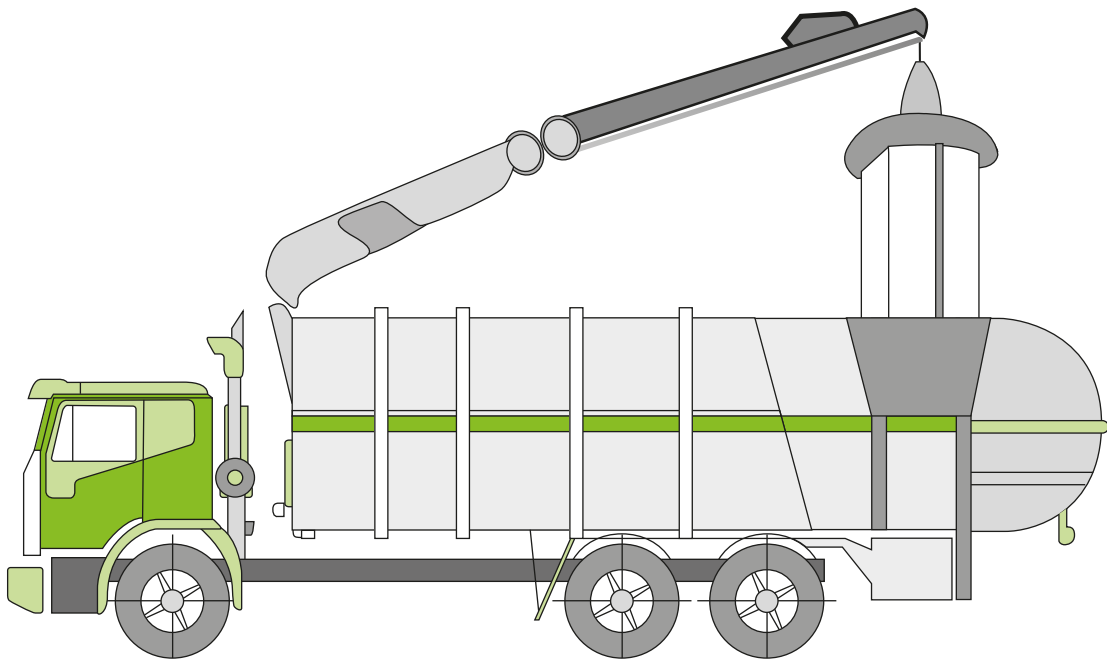
This type of truck is used to collect underground bins.

Crane Truck Collection Vehicle	(m)
Length overall	10.00
Width overall	2.50
Weight (vehicle only) tonnes	(t) 13.00
Weight (payload) tonnes	(t) 9.50
Turning circle	18.00
Travel height	3.80
Clearance height for loading	8.75



**Better Practice**  
Better Practice would allow suitable space on-site for larger vehicles to reduce collection frequencies.

Note: Smaller collection vehicles such as 6.4m in length may be possible, however this is likely to result in more frequent collections, therefore small trucks are not encouraged as better practice.



## Appendix 11: Vehicle access/turning circles



### General

Appropriate heavy vehicle standards should be incorporated into the development design, including those specified in legislation, regulations, guidelines, and codes administered by Austroads, Standards Australia, VicRoads, WorkSafe Victoria and any local traffic requirements.

Designers are encouraged to consult with council and other relevant authorities before the design of roads and access points to determine specific requirements for the proposed development.

### Road and driveway construction and geometry

Roads and driveways must be designed and constructed in accordance with the relevant authority requirements to allow the safe passage of a laden collection vehicle in all seasons.

Factors to consider in design include:

- › gradients for turning heads
- › longitudinal road gradients
- › horizontal alignments
- › vertical curves
- › cross-falls
- › carriageway width
- › verges
- › pavement widths
- › turning areas
- › local area traffic management requirements (for example, speed humps)
- › sight distance requirements
- › clearance heights (for example, a vertical clearance of 6.5m is required to load front-lift vehicles)
- › manoeuvring clearance
- › road strength (industrial-type strength pavement is required, designed for a maximum wheel loading of 7t per axle to accommodate garbage and recycling collection vehicles).

### Collection from basements

Collection vehicles may enter building basements to collect waste, recyclables and/or organics provided the following requirements are met:

- › compliance with Australian Standard AS 2890.2 Parking facilities Part 2: Off-Street Commercial Vehicle Facilities
- › the height to the structural members and upper floor ceiling allows for a typical collection vehicle travel height/operational height consistent with the type of vehicle employed
- › adequate space clear of structural parts or vehicle parking spaces to allow a typical three-point turn of collection vehicles
- › the basement floor is of industrial-type strength pavement and designed for a maximum wheel loading of 7t per axle to accommodate garbage and recycling collection vehicles.

## Vehicle turning circles

Turning circles and clearances to kerbs, existing buildings or other obstructions should be designed to accommodate the largest size collection vehicle that could service the property and must also include allowances for driver steering error (manoeuvring clearance) and overhangs.

As a guide, a turning circle of 25m diameter kerb to kerb (27.8m diameter wall to wall, swept circle) would accommodate most standard waste collection vehicles. A manoeuvring clearance of at least 0.3m (absolute minimum) on both sides of the theoretical swept circle path should be accommodated.

Better practice design calls for a separate entrance and exit to allow the collection vehicle to travel in a forward direction at all times. If collection vehicles need to turn at a cul-de-sac head within a development, the design should incorporate either a bowl, T- or Y-shaped arrangement. Vehicles should only be expected to make a three-point turn to complete a U-turn.

Vehicle turning circles can be reduced by using a mechanical turn table (or similar) equipment. Turn tables proposed for the use of waste collection within developments will need to incorporate a hydraulic override system. This will allow the turn table to be rotated in the event of a systems malfunction alleviating the collection vehicle from becoming lodged during collection manoeuvres. However, this type of equipment comes at an associated cost and requires regular maintenance to ensure it remains in good operating condition.

## Templates

Turning circle templates and reverse entry templates for medium and heavy rigid vehicles are available from SAI Global ([www.saiglobal.com](http://www.saiglobal.com)) through its website.

- ▶ Turning path templates should be used in the design of access driveways and circulation roadways.
- ▶ Reverse entry templates should be used in the design of service bays and service area aprons if vehicles need to reverse to complete a Y-shaped turn.

These templates can be printed and copied onto a transparent medium or imported into computer drawing packages to check vehicle paths on intersection layout drawings.

These templates are applicable for the following vehicle dimensions:

**TABLE 18**  
**TURNING CIRCLE TEMPLATE VEHICLE DIMENSIONS**

Vehicle Class	Overall Length (m)	Design Width (m)	Design Turning Radius (m)	Swept Circle (m)	Clearance (Travel) Height (m)
Medium rigid vehicle	8.8	2.5	10	21.6	4.5
Heavy rigid vehicle	12.5	2.5	12.5	27.8	4.5

Templates have been sourced from AS 2890.2 Parking Facilities: Off-Street Commercial Vehicle Facilities. Please refer to this standard for the latest vehicle access requirements. This standard is available from SAI Global [www.saiglobal.com](http://www.saiglobal.com).

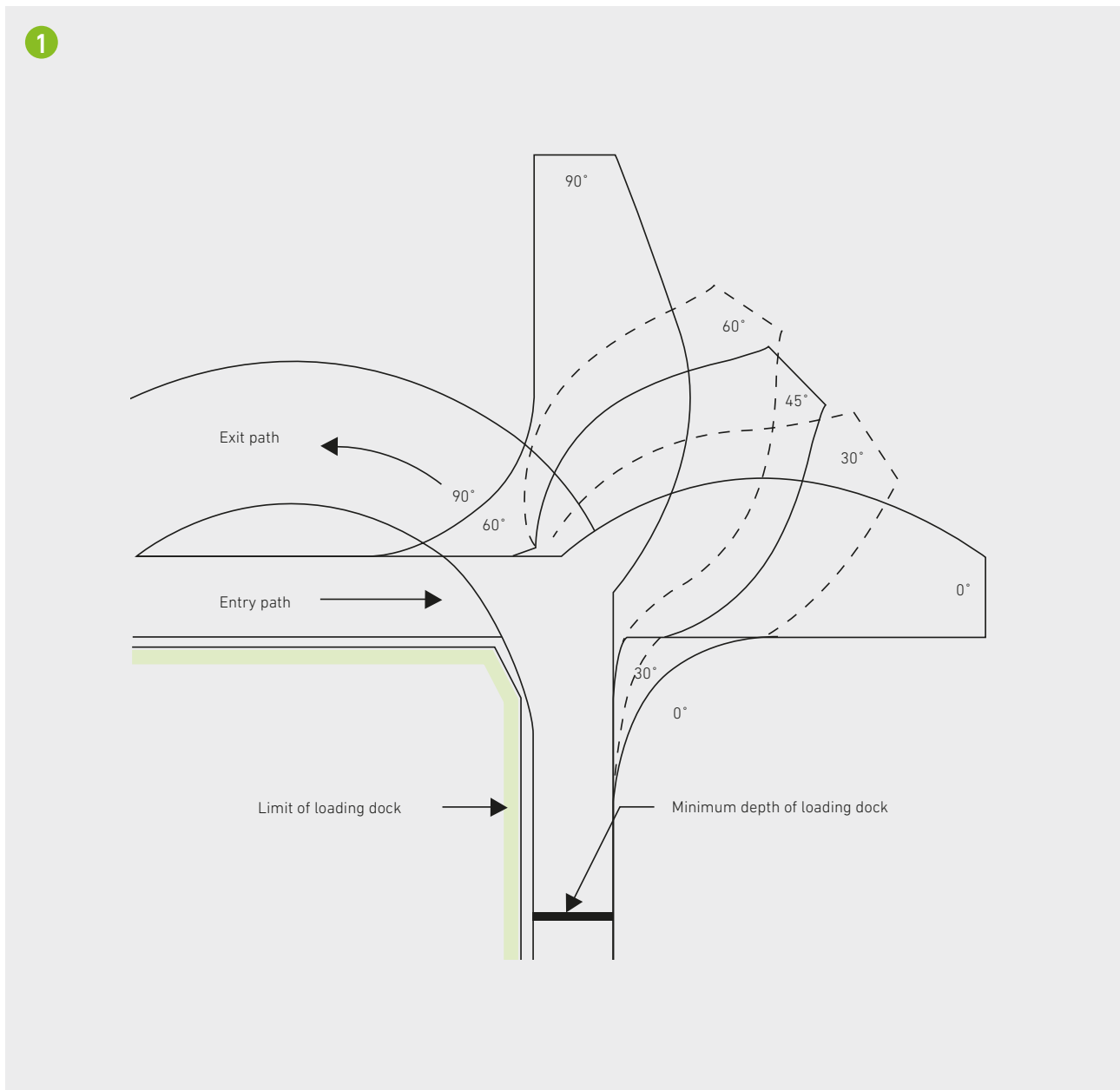
## TEMPLATE 1

### Reverse entry manoeuvre – Medium rigid vehicle

Dimensions in metres.

Note: Manoeuvring clearances are  
required for design purposes.

FIGURE 19  
REVERSE ENTRY MANOEUVRE – MEDIUM RIGID VEHICLE



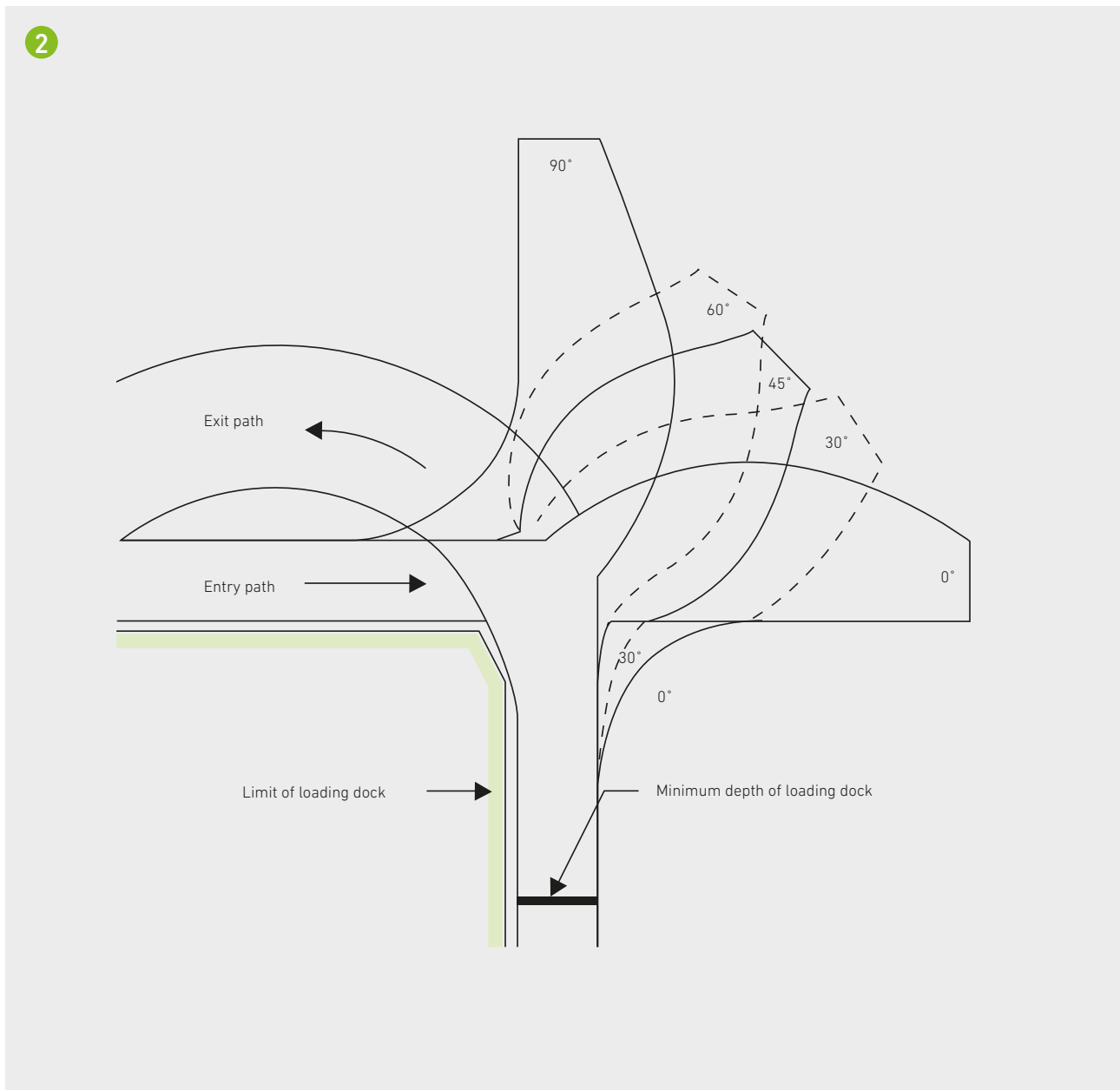
## TEMPLATE 2

### Reverse entry manoeuvre – Heavy rigid vehicle

Dimensions in metres.

Note: Manoeuvring clearances are  
required for design purposes.

FIGURE 20  
REVERSE ENTRY MANOEUVRE – HEAVY RIGID VEHICLE

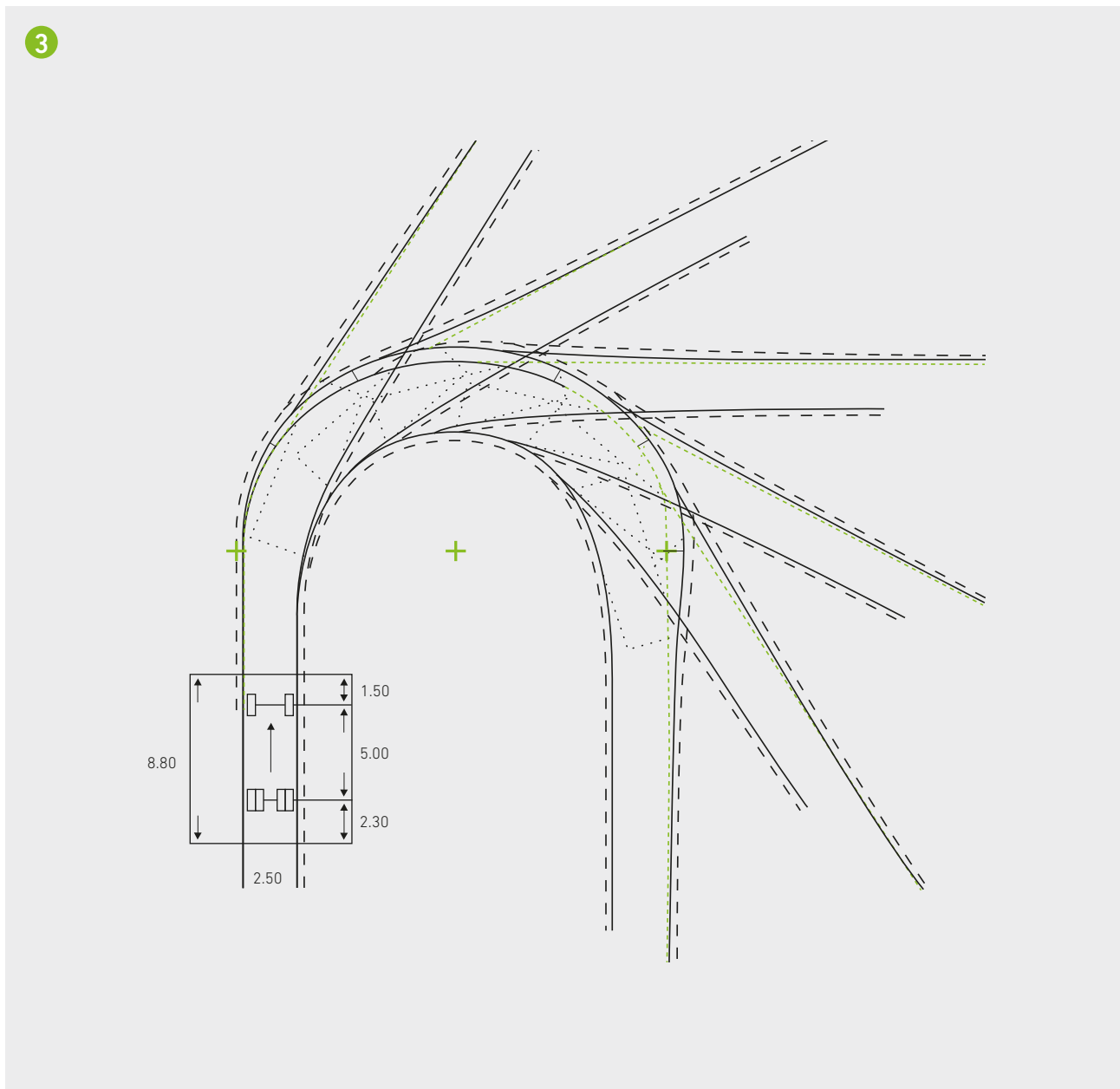


## TEMPLATE 3

### Turning path template – Medium rigid vehicle

Dimensions in metres.  
Minimum radius turn 10m.

FIGURE 21  
TURNING PATH TEMPLATE – MEDIUM RIGID VEHICLE



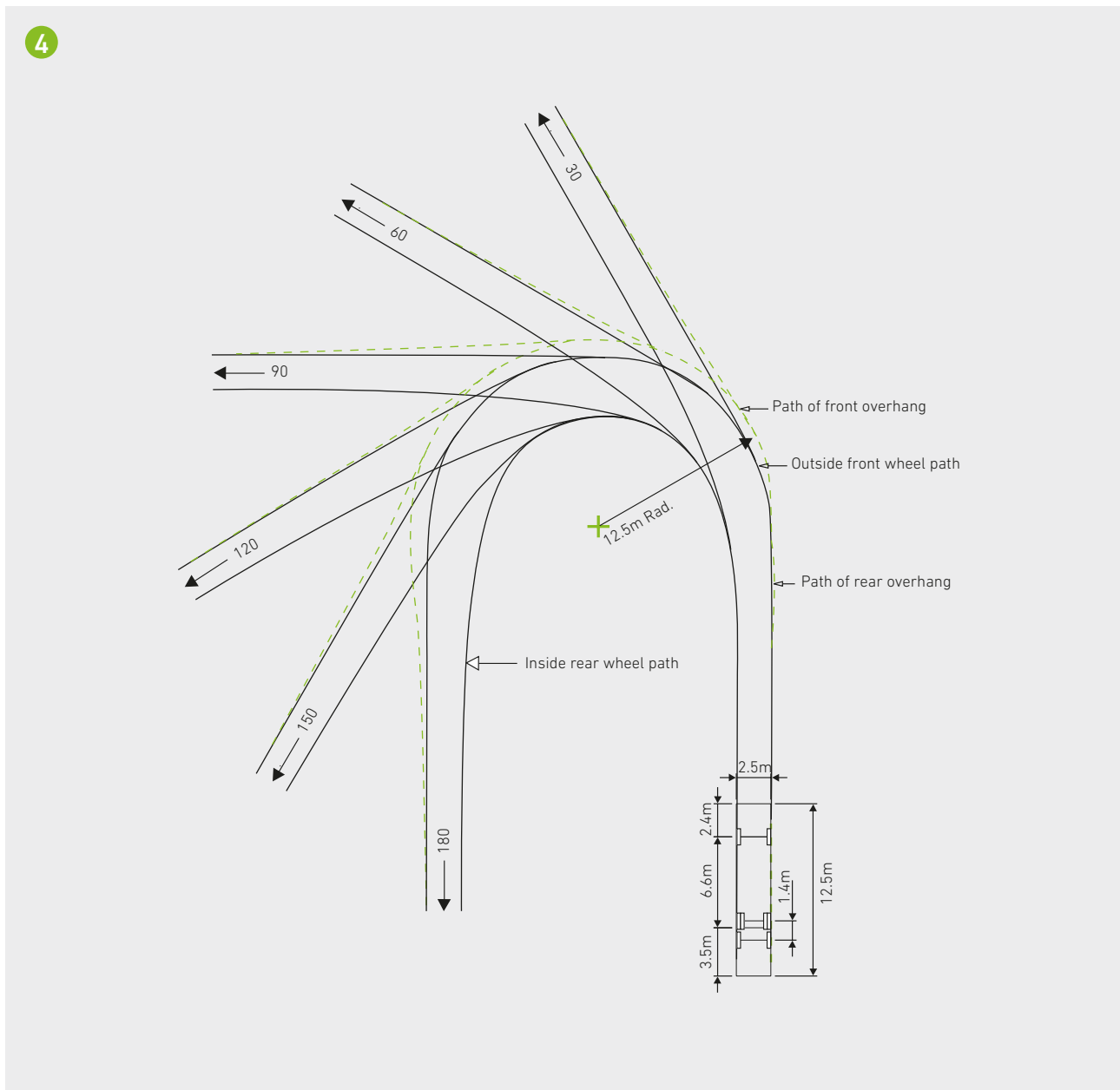


## TEMPLATE 4

### Turning path template – Heavy rigid vehicle

Dimensions in metres.  
Minimum radius turn 10m.

FIGURE 22  
TURNING PATH TEMPLATE – HEAVY RIGID VEHICLE



## Appendix 12: Standard signage



### Waste and recycling signs

See the following examples of waste and recycling signs. For additional signage examples refer to the Sustainability Victoria website.

Note: Signage is provided as a guide only, please check with your local council or service provider for lists of materials that can be recycled.

**Organics**

Place these items here

<small>Fruit &amp; vegetable scraps</small>	<small>Loose leaf tea</small>	<small>Egg shells</small>
<small>leftover food scraps</small>	<small>flowers / plant clippings</small>	<small>Wood stirers / chopsticks</small>
		<b>Did you know?</b>
<small>Coffee grinds</small>	<small>Chicken bones</small>	

**Commingled**

Place these items here

<small>Aluminium cans and packaging</small>	<small>PET bottles</small>	<small>Clean paper towel / paper bag / newspaper</small>
<small>Glass bottles</small>	<small>Milk cartons</small>	<small>Food tins / cans (rinsed)</small>
		<b>Did you know?</b>
<small>Juice cartons</small>	<small>Milk bottles</small>	

**Soft Plastics**

Place these items here

<small>Cling wrap</small>	<small>Green shopping bags</small>	<small>Confectionery packets</small>
<small>Cereal box liners</small>	<small>Plastic shopping bags</small>	<small>Bread bags</small>
		<b>Did you know?</b>
<small>Biscuit packets</small>	<small>Plastic sleeves</small>	

**Landfill**

Place these items here

<small>Tea bags</small>	<small>Coffee cup</small>	<small>Soiled paper / paper towel / tissues</small>
<small>Plastic cutlery</small>	<small>Styrofoam cup</small>	<small>Waxed paper</small>
<small>Chip / foil packaging</small>	<small>Broken glass</small>	<small>Plastic salad containers / Coffee cup lids</small>

Example signage

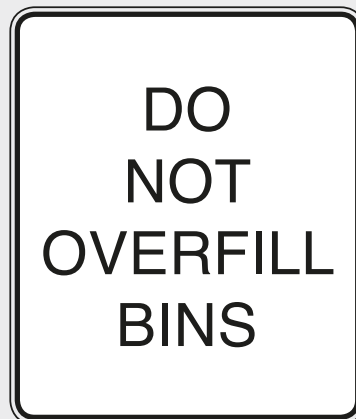


## Safety signs

The design and use of safety signs for waste rooms and enclosures should comply with AS 1319 *Safety signs for the occupational environment*. Safety signs should be used to regulate and control safety related to behaviour, warn of hazards and provide emergency information, including fire protection information.

Australian Standards are available from the SAI Global Limited website [www.saiglobal.com](http://www.saiglobal.com).

### *Examples of Australian Standards*



## Appendix 13: Waste management plan checklist



### Waste management plans

A waste management plan should be completed by an approved independent professional, such as a waste management engineer or waste management planner. It will then be assessed by the responsible authority to ensure it meets any relevant requirement.



#### Better Practice

A detailed waste management plan should be provided where required by the relevant council and/or where an alternative system is required. The level of detail required may differ for small scale developments.

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### Checklist

The following checklist has been developed to ensure the main issues essential for waste management and recycling have been considered.

Contact your council for details on collection services, and whether there are any specific requirements or rules to be met. (For example, some councils have limits on the distance they will enter a building to collect bins).

**Note:** For a downloadable version of the Waste Management Plan Checklist go the Sustainability Victoria website.

# Waste management plan checklist

1/4

KEY ISSUES	Yes	No	N/A
<b>Initial planning</b>			
<ul style="list-style-type: none"> <li>Has council been consulted to find out what planning regulations, codes and policies apply to the development?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Has council been asked about available garbage, recycling and organics services, and future service requirements?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Selected garbage, recycling and organics systems (general)</b>			
<ul style="list-style-type: none"> <li>Does the development incorporate sufficient provisions to meet the garbage, recycling and organics requirements for each tenant (both residential and commercial)?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Are systems easy to use and intuitive?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Are garbage, recycling and organics bins located in close proximity to encourage source separation/reduce contamination?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Will waste bins and containers conform to relevant design standards?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Will waste handling equipment, including chutes, compactors and composting units, conform to the relevant design and safety standards?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Storage space</b>			
<ul style="list-style-type: none"> <li>Is there sufficient space within each unit to accommodate interim storage of at least two days' segregated garbage, recycling and food organics?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is there sufficient space within the property boundary to store, in separate bins or containers, the volume of garbage, recycling and organics likely to be generated at the development during the period between collections?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is hard waste storage space required and has it been allowed for, taking into account potential servicing requirements specific to council?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is a charity bin required?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is e-waste storage space required and has it been considered in accordance with any specific service requirements?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Have storage areas been designed to accommodate easy access for manoeuvring bins and cleaning the storage area(s)?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Have storage areas been designed to allow space for signs and education materials to be displayed?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is there allowance for future service flexibility incorporated in the design?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>In communal storage areas, if applicable, has the design considered the need to separate services (such as meter boards) from waste storage areas? If this is not possible, has additional space been allowed to prevent potential damage to services?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is there room for each unit to have a home worm farm or compost bin?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Where communal open space or gardens are provided, should on-site communal composting be considered?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Is there sufficient green space for application of compost?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Waste management plan checklist

2/4

KEY ISSUES	Yes	No	N/A
<b>Storage location</b>			
› Are storage locations conveniently located for residents?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are storage areas located where there is high pedestrian traffic?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are storage areas out of sight or well screened from the street?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are storage areas located at an appropriate distance from dwellings to reduce potential amenity impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are communal composting areas, if appropriate to the development, located with consideration for the potential amenity and environmental impacts?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Waste collection points</b>			
› Have collection points been identified that are <b>NOT</b> located:			
– near intersections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– near roundabouts, cul de-sacs or slow-points?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– along busy arterial roads?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– in narrow lanes?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– near possible obstructions, including trees, overhanging buildings and overhead powerlines?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– where they pose a traffic hazard?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Is on-site servicing required? If so, has council been asked if it provides this service?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› If there is agreement for on-site collection with the service provider, has an on-site collection point(s) been identified so that:			
– collection vehicles do not interfere with the use of access driveways, loading bays or parking bays during collections?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– the bin position(s) enables collection vehicles safe access to the collection point and has adequate clearance and manoeuvring space?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
– there is clear vision of oncoming traffic as the collection vehicle leaves the property?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are collection point(s) located on a level surface away from gradients and vehicle ramps?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› If mobile garbage bins (MGBs) are to be used and collected from the kerb, is there sufficient space on an adjacent street for them to be lined up neatly in (preferably) a single row?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

# Waste management plan checklist

3/4

KEY ISSUES	Yes	No	N/A
<b>Transfer of bins to the collection point</b>			
› Is the bin transfer route free of steps?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Is the distance the bins need to be wheeled to the collection point reasonable (e.g. not more than 40 metres)?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› If there is a gradient, is it manageable when full bins are being moved manually?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Have bin transport devices been considered to reduce manual handling?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Access for collection vehicles</b>			
› Does the design allow for the waste collection vehicle to move in a forward direction with no (or minimal) need to reverse?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Does the design accommodate access for heavy vehicles to collection points in accordance with relevant Acts, regulations, guidelines, and codes administered by Austroads, Vicroads, WorkSafe Victoria and any local traffic requirements?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Occupational health and safety</b>			
› Has there been a preliminary risk and hazard analysis to identify potential OH&S risks associated with the proposed services and design layout?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Has the design been modified to eliminate or minimise the identified risks?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Noise</b>			
› Has the design considered better practice measures to minimise noise associated with use and servicing of the waste management facilities?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Odour</b>			
› Does the design incorporate ventilation for enclosed storage areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Does ventilation comply with the relevant codes and standards?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are ventilation openings located as near as possible to the ceiling and floor, but away from the windows of dwellings?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are ventilation openings protected against flies and vermin?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Hygiene</b>			
› Have storage areas been designed to prevent the entry of vermin?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
› Are provisions for a tap and hose and correct drainage to sewer incorporated in communal bin storage areas?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Amenity</b>			
› Does the design of waste storage areas blend in with the development?	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>



# Waste management plan checklist

4/4

KEY ISSUES	Yes	No	N/A
<b>Security</b>			
<ul style="list-style-type: none"> <li>As far as possible, does the design allow easy access for residents but not non-residents to waste services?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Are bin areas sufficiently open and well lit to allow use after dark?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Are all internal garbage and recycling rooms and storage areas fitted with fire sprinklers, and rated to fire safety according to the Building Code of Australia?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Signage and education</b>			
<ul style="list-style-type: none"> <li>Does the design specify the need for signs in public areas of the building identifying the location of garbage and recycling bins and storage areas?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Does the design specify the need for signs providing instructions on how to use the garbage, recycling and organics facilities, including identifying what is and isn't recyclable?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Have requirements for safety signs been identified?</li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<b>Ongoing management</b>			
<ul style="list-style-type: none"> <li>Is there a need to employ a building manager/caretaker and/or gardener:                             <ul style="list-style-type: none"> <li>to manage communal composting or worm farms?</li> <li>for transporting bins to the collection point?</li> <li>for operation of chute systems?</li> </ul> </li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>
<ul style="list-style-type: none"> <li>Has an ongoing management plan been developed that identifies responsibilities for:                             <ul style="list-style-type: none"> <li>moving bins to and from the storage point to the collection point (if required) on collection day?</li> <li>washing bins and maintaining storage areas?</li> <li>arranging for the prompt removal of dumped waste?</li> <li>arrangements for consistent signs on all bins and in all communal storage areas?</li> <li>ensuring all residents are informed of the garbage and recycling arrangements?</li> </ul> </li> </ul>	<input type="checkbox"/>	<input type="checkbox"/>	<input type="checkbox"/>

## Appendix 14: Waste management plan template



### Instructions:

Applicants should fill in all fields in the template. If any fields don't apply to the development, an explanation should be provided.

**Note:** For a downloadable version of the Waste Management Plan Template go the Sustainability Victoria website.

Please note that councils may have specific templates relevant to their local area. Please consult with your local council as this template is provided as an example only.

## Waste management plan template

A Development Details	
Applicant	
WMP author (if different from applicant)	
Date of WMP preparation	
Site address	
Site description	
Proposal description e.g. Four double storey dwellings + commercial land use.	
Number of dwellings	<input type="checkbox"/> 3 bedroom or more <input type="checkbox"/> 2 bedroom <input type="checkbox"/> 1 bedroom or studio
Total Number of Dwellings:	<input type="text"/>
Proposal discussed with council prior to lodgement?	Name of Council Officer/s:  Dates of discussions: <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> , <input type="text"/> <input type="text"/> <input type="text"/> <input type="text"/>
Council Permit or Reference No. (if available)	<input type="text"/>

**B 1 – Residential Waste Generation Calculation (per week) — To be calculated using Appendix 1**

Number/Type of Dwellings	Garbage	Commingled Recycling	Paper/Cardboard (if separate to commingled)	Green Waste/ Food waste
	No. of Dwellings x Litres per week (entitlement) = Total Litres of Waste per week			
<input type="text"/> × 3 bedroom or greater	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L
<input type="text"/> × 2 bedroom	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L
<input type="text"/> × 1 bedroom or studio	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L	<input type="text"/> × <input type="text"/> L = <input type="text"/> L
<b>Total Waste Generated</b>	<input type="text"/> L / week	<input type="text"/> L / week	<input type="text"/> L / week	<input type="text"/> L / week

**B 2 – Commercial Waste Generation Calculation (per week) — To be calculated using Appendix 2**

Commercial Land Use	Square Metres/Occupants	Waste and Recycling Generated

Land Use	Total Waste Generated
Residential	
Commercial	
<b>Total</b>	<input type="text"/>

### C Hard Waste Bulky Items Management and Collection — To be developed in accordance with Appendix 6 Hard Waste (Bulky Items) Management

#### DETAILS PROVIDED

On-site storage areas (temporary)	Charity bins required	Other arrangements — To be developed in accordance with Appendix 6 Hard Waste Bulky Items Management Plan

### Green & Food Waste (Organics) Management

#### DETAILS PROVIDED

FOGO Collection system available? (Check with your local council).	On site processing in accordance with Appendix 4 Organics Recovery Strategy	Other arrangements — To be developed in accordance with design options identified in Section B of the guide and Appendix 4 Organics Recovery Strategy

### E-Waste Management — To be developed in accordance with Appendix 5 E-Waste Management

#### DETAILS PROVIDED


## D Collection Frequency, Size And Number Of Bins — To be developed in accordance with Appendix 9 Waste Management Equipment

### D 1 – Waste Collection and Bin Numbers

Total waste generated (L/week)	Number of collections (per week)	Bin size	Number of bins required (calculate and round up) = $\frac{\text{Total waste generated}}{\text{Number of collections}} \div \text{Bin Size}$
<b>Garbage</b>			
e.g. 2,280	1	240L	10
<input type="text"/> L / week	<input type="text"/> per week	<input type="text"/> L	<input type="text"/> bins
<b>Commingled recycling</b>			
e.g. 2,560	1	240L	11
<input type="text"/> L / week	<input type="text"/> per week	<input type="text"/> L	<input type="text"/> bins
Paper/Cardboard — If separate to commingled – Rates to be agreed with council, where a separate paper/cardboard service is available			
<input type="text"/> L / week	<input type="text"/> per week	<input type="text"/> L	<input type="text"/> bins
Green Waste/Food waste — 35% of garbage for residential; for commercial — rates to be determined with council depending on the nature of the use.			
<input type="text"/> L / week	<input type="text"/> per week	<input type="text"/> L	<input type="text"/> bins

### D 2 – Waste Collection Service Provider/s

Select service provider/s and detail whether council's collection service is compatible with collection requirements.	<input type="checkbox"/> Council <input type="checkbox"/> Private <input type="checkbox"/> Combination
Include a justification for private collections.	Is council's collection service compatible with collection requirements? <input type="checkbox"/> Yes <input type="checkbox"/> No
Justification for private collection	

### D 3 – Permitted Collection Times

Permitted collection times to be determined with local service providers	Is the collection service within councils permitted collection times? <input type="checkbox"/> Yes <input type="checkbox"/> No
Include details of collection times	

## E Bin Storage and Waste Disposal Process for Occupiers

### E 1 – Bin storage equipment (inside dwellings)

Describe bin storage equipment and systems for waste and recyclables within each dwelling (e.g. separate waste, recycling and organics storage inside kitchen cupboards).

*Show this information on plans where practicable.*

### E 2 – Bin Storage Areas — Based on calculations from Section C and D

Describe bin storage areas with regards to amenity (screening, odour, noise), cleaning accessibility and bin manoeuvrability. Outline the location of, and access to, bin storage areas. Particularly, outline whether bins are to be stored in individual dwellings or in a communal area, as well as the capacity and size of bin storage areas.

## F Waste Collection Process

### F 1 – Bin Collection Areas

Describe on-site and on-street bin collection area/s. Document potential encumbrances or hazards and show on marked-up drawing/s and provide detail on how these will be mitigated or managed.

*Demonstrate that waste collection areas provide adequate space to accommodate the number of bins proposed by illustrating the areas on marked-up drawing/s [refer to Section I].*

### F 2 – Bin Transfer from Storage Area to Collection Point

Outline whether the transfer of bins from bin storage area/s to waste collection area/s will be the responsibility of an appointed manager or individual occupiers.

*Describe strategy for transfer of bins from bin storage area/s to waste collection area/s, including access routes for bin transfer and gradients of transfer paths and show on marked-up drawing/s.*

## G Site Access Arrangements

### G 1 – Site Access Arrangements

For on-site collections, describe site access arrangements and ensure these are aligned with a traffic impact assessment for the proposed development. The traffic impact assessment should consider the surrounding network of roads, junctions, intersections and other transport related infrastructure where extra traffic (such as waste collection services) could pose a problem.

### G 2 – Contextual Analysis

Demonstrate that the WMP has been developed in response to the existing conditions of the local urban and natural environment. This may include local traffic/infrastructure, road widths, proximity to intersections, bus stops, bike lanes, width of pavement and verge, kerbside landscaping including tree canopies, and kerbside parking areas and any relevant parking restrictions.

## H Waste System Management

Outline whether waste management will be the responsibility of individual occupiers or an appointed building manager or representative of the Owners Corporation.

## I Communications Strategy

Describe the waste management communications strategy. *Specify if using standardised materials such as council templates.*

## J Supporting Information and Drawings

Provide marked-up drawings to scale (1:100 or 1:200 or \_\_\_\_\_) to demonstrate how the waste management requirements for the development have been met. *Attach the following plans to the WMP showing:*

- ☐ Bin storage areas (Section E2)
- ☐ Site access arrangements (Section G1)
- ☐ Contextual analysis (Section G2)
- ☐ Bin collection points and bin transfer routes; including location and transfer routes for hard waste/green waste/charity bins, if applicable (Section F1–2)

#### K Final Comments/Additional Details



## Glossary

Term	Explanation
Amenity	The quality of a local environment in relation to health and pleasantness.
Anaerobic Digestion	Biological breakdown by microorganisms of organic matter, in the absence of oxygen, into biogas (a mixture of carbon dioxide and methane) and digestate (a nutrient-rich residue).
Better Apartment Design Standards	Standards developed by DELWP in order to improve the liveability of apartments in Victoria.
Better practice	Represents current practice and aims to produce outcomes consistent with the community's social, economic and environmental expectations. Continuous improvement is an important component of better practice.
Better practice waste management	Refers to installation and maintenance of services and infrastructure that enable garbage, recyclables, organics and bulk waste handling systems and collection services to achieve the best possible waste minimisation outcomes.
Bio-digester	See <i>Anaerobic Digestion</i> .
Body corporate	See <i>Owners Corporation</i> .
Bulk bin	Refers to a bin for garbage or recyclables with capacity of 1m <sup>3</sup> or more, generally fitted with wheels for manoeuvrability.
Hard waste collection	Services and facilities to manage bulky household items that would not be collected in typical garbage services. See <i>Hard waste</i> .
Collection system	System for the collection of materials from kerbside, including bin type and collection frequency.
Collection point	The point from which garbage and recyclables are collected and transferred from the storage receptacle to the collection vehicle.
Commingled recyclables	Materials combined generally for the purposes of collection, mainly through municipal collection services. Includes plastic bottles, other plastics, paper, glass and metal containers. Commingled recyclable materials require sorting after collection before they can be reprocessed. Can also be called commingled materials.
Composting	The process whereby organic materials are microbiologically transformed under controlled aerobic conditions to create a pasteurised and stabilised organic product for application to land.
Contamination	Contamination refers to garbage in the recycling stream due to the problems it causes in the sorting process at the materials recovery facility. A significant number of recyclers consider bagged materials or containers holding food waste /drink to be a contamination of the recycling stream. Some will recover or reject differing grades of plastic and paper. Plastic bags (or bagged items) are one of the most commonly reported contaminants.
Department of Environment, Land Water and Planning (DELWP)	A Victorian government department providing policy planning, preparation of legislative amendments, leadership coordination and oversight of the environment portfolio.
E-Waste	Electrical or electronic equipment with a power cord or battery (including batteries) at the end of its useful life and covers a range of electronic items including: televisions, computers, mobile phones, kitchen appliances and white goods.
Environment Protection Authority Victoria (EPA)	Established under the auspices of the <i>Environment Protection Act 1970</i> , EPA's role is to be an effective environmental regulator and an influential authority on environmental impacts.
Food organics	Food materials discarded from households or industry, including food processing waste, out-of-date or off-specification food, meat, fruit and vegetable scraps. Excludes liquid wastes.
Food Organics & Garden Organics program (FOGO)	Food organics and garden organics program aimed at increasing the recovery of organics. (For kerbside collection and off-site composting).

Term	Explanation
Garden organics	Organics derived from garden sources e.g. grass clippings, tree prunings. Also known as green organics.
Gasification	Thermal technology that converts material into combustible gases by partial oxidation under the application of heat, leaving an inert residue.
Hard waste	Waste such as old furniture, mattresses, whitegoods, or other household waste that is too large to fit into conventional kerbside waste collection services.
Household waste	Solid waste generated from households.
Indemnity	Indemnity means that a party providing services to a particular property will not be held responsible for any loss or damage to such property as a result of the routine provision of services.
Kerbside waste/collection	Waste collected by local councils from residential properties, including garbage, commingled recyclables and garden organics, but excluding hard waste.
Materials recovery facility (MRF)	A centre for the receipt, sorting and transfer of materials recovered from the waste stream. At a MRF, materials are also sorted by type and treatment, which may include cleaning and compression.
Mobile Garbage Bin (MGB)	Refers to a waste bin with capacity of less than 1 m <sup>3</sup> , fitted with wheels for manoeuvrability.
Municipal solid waste	Solid waste generated from municipal and residential activities, and including waste collected by, or on behalf of, a municipal council. In this document, MSW does not refer to waste delivered to municipal disposal sites by commercial operators or waste from municipal demolition projects.
National Packaging Covenant	A self-regulatory agreement between key stakeholders in the packaging supply chain and all spheres of government.
Organics Stream/Putrescible waste (may include Food Organics and Green/Garden Organics)	All waste (grass, plants, and leaves) for green waste (organic) resource recovery. Food wastes from households or industry including food processing waste, out-of-date or off specification food, meat, fruit and vegetable scraps. Excludes liquid wastes.
Owners corporation	An organisation or group of persons that is identified by a particular name and that acts, or may act, as an entity.
Planning permit	A statement that a particular use or development (subdivision, buildings and works) may proceed on a specified parcel of land.
Planning Policy Framework	The framework comprises general principles for land use and development in Victoria and specific policies dealing with settlement, environment, housing, economic development, infrastructure and particular uses and development. To ensure integrated decision making, planning authorities and responsible authorities must adhere to the general principles and the specific policies contained in the State Planning Policy Framework.
Planning scheme	Sets out policies and controls for the use, development and protection of land for an area. The planning scheme is a legal document.
Pyrolysis	Thermal breakdown of waste in the absence of air, to produce char, pyrolysis oil and syngas e.g. the conversion of wood into charcoal.
Recyclables	While this term strictly applies to all materials that may be recycled, in this document the term is generally used to refer to the recyclable containers and paper/cardboard component of kerbside waste collected separately for recycling (collection, sorting, reprocessing and manufacture into new products). Excludes organics. e.g. it excludes garden organics.

Term	Explanation
<b>Residual waste</b>	<p>Residual material that remains after any source separation or reprocessing activities of recyclable materials or garden organics.</p> <p>Waste that is left over after suitable materials have been recovered for reuse and recycling. This generally means the environmental or economic costs of further separating and cleaning the waste are greater than any potential benefit of doing so.</p>
<b>Risk assessment</b>	A systematic process for assessing and integrating professional judgments about probable adverse conditions and/or events.
<b>Sustainability Victoria (SV)</b>	Statutory authority established in October 2005 under the <i>Sustainability Victoria Act 2005</i> with the key objective of 'facilitating and promoting environmental sustainability in the use of resources'. SV works across the areas of energy, waste and water with communities, industries and government applying the best ideas and encouraging action to enable change in environmental practices.
<b>Undercroft</b>	The area underneath a building, but not underground, with architectural supports like columns, pillars or posts. The area is open and often able to be used for parking.
<b>Waste hierarchy</b>	A concept promoting waste avoidance ahead of recycling and disposal. Recognised as promoting management of waste in the order of preference: avoidance, reduce, reuse, recycle and disposal.
<b>Waste Management Plan</b>	A document that addresses the management of waste and includes details of the type and quantity of materials (garbage and recyclables) that are likely to be generated, how they will be stored and collected; and information about handling procedures. In this guide, a waste management plan refers to either a site plan (to address the demolition/construction stage) or a plan for the building once in operation. Such a plan should be prepared during the design phase of the development to ensure waste and resource recovery is integrated into the design, and required to be approved by the responsible authority as a planning permit condition.
<b>Waste and Resource Recovery Groups (The Group)</b>	Statutory authorities established under the <i>Environment Protection Act 1970</i> responsible for preparing the regional waste and resource recovery implementation plan for their region.
<b>Waste to Energy (WtE)</b>	The terms 'energy recovery from waste', 'waste to energy' or 'energy from waste' can be used interchangeably to describe a number of treatment processes and technologies used to generate a usable form of energy from waste materials. Examples of usable forms of energy include electricity, heat and transport fuels. This may involve such technologies as anaerobic digestion and gasification for example.
<b>Waste minimisation</b>	The concept of, and strategies for, waste generation to be kept to a minimum level in order to reduce the requirement for waste collection, handling and disposal to landfill. Also referred to as waste avoidance.
<b>Waste/Waste Stream</b>	All material placed in the general waste bin or chute system for the purposes of landfill disposal. Also, a classification used to describe waste materials that are either of a particular type (e.g. 'timber waste stream') or produced by a particular source (e.g. 'C&I waste stream').

## Abbreviations

Acronym	Phrase or word
BPEM	Best practice environmental management
C&D	Construction and demolition
C&I	Commercial and industrial
DELWP	Department of Environment, Land, Water and Planning
EFW	Energy from waste
EP Act	<i>Environment Protection Act 1970</i>
EPA	Environment Protection Authority Victoria
FOGO	Food organics and garden organic (related to the combined food and garden kerbside collection system)
GHG	Greenhouse Gases
FTE	Full Time Equivalent
FWD	In-Sink Food Waste Disposal Unit
MGBs	Mobile Garbage Bins
MRF	Materials recovery facilities
MSS	Municipal Strategic Statements
MSW	Municipal solid waste
MUDs	Multi-unit Developments
OH & S	Occupational health & safety
P&E	<i>Planning and Environment Act 1987</i>
PIW	Prescribed industrial waste
QA	Quality Assurance
Regional Group/s	Regional Waste and Resource Recovery Group/s
Regional Plans	Regional Waste and Resource Recovery Implementation Plan
STP	Sewerage Treatment Plant
SV	Sustainability Victoria
SWRRIP	Statewide Waste and Resource Recovery Infrastructure Plan
VLGAS	Victorian local government annual survey
VORRS	Victorian organics resource recovery strategy
VPP	Victoria Planning Provisions
WMP	Waste Management Plan
WtE	Waste to Energy

Units	Abbreviation
kilogram	kg
litre	L
metre	m
square metre	m <sup>2</sup>
cubic metre	m <sup>3</sup>
millimetre	mm
tonne	t





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