Design Guide for Residential Recycling

15 May 2013
Contents

1 Introduction ............................................................................................................................... 3
   1.1 Purpose of Guidelines ........................................................................................................ 3
   1.2 How to Use this Guide ........................................................................................................ 4
2 Strategic Context .................................................................................................................... 6
   2.1 State Government ................................................................................................................ 6
   2.2 City of Adelaide .................................................................................................................. 6
   2.3 Relevant Legislation ............................................................................................................ 7
3 Operational Environment ....................................................................................................... 8
   3.1 Residential Waste Service Providers ............................................................................... 8
   3.2 Operational Constraints .................................................................................................... 8
4 Waste Management System Selection .................................................................................... 9
   4.1 Guide to System Selection .................................................................................................. 9
   4.2 Waste System Type and Development Characteristics ..................................................... 10
5 Design Guidelines – All Development ................................................................................... 15
   5.1 Objective 1 - Environmental Sustainability ................................................................... 15
   5.2 Objective 2 - Effective Waste Resource Management ....................................................... 16
   5.3 Objective 3 - Clean and Healthy Living Environments ..................................................... 20
6 System Specific Design Guidelines ....................................................................................... 23
   6.1 Type A – Low Density Systems ....................................................................................... 23
   6.2 Type B and C – Medium and High Density Systems .......................................................... 24
   6.3 Type C – High Density (High Rise) .................................................................................. 25
Appendix 1: Glossary of Terms ................................................................................................. 26
Appendix 2: Waste Resource Generation Rates ........................................................................ 28
Appendix 3: Type A - Low Density Checklist .......................................................................... 30
Appendix 4: Type B and C - Waste Management Plan .............................................................. 31
Appendix 5: References ............................................................................................................ 32
1 Introduction

1.1 Purpose of Guidelines

This guide provides residents, developers and industry professionals, engaged in the design, construction or operation of new residential developments, with information about waste management systems that will support achievement of the following objectives and design outcomes:

Objective 1 - Environmental Sustainability
Design Outcomes - Strategic
(a) Maximise resource recovery and minimise waste going to landfill
(b) Meet occupant service requirements and statutory obligations of predicted waste generation

Objective 2 - Effective Waste Resource Management
Design Outcomes - Operational
(a) Functional for residents and building managers (including universal access)
(b) Minimise trip generation and pedestrian travel distances
(c) System capacity affords flexibility (change of land use, population and/or generation rates)
(d) Provide storage areas convenient to primary pedestrian movements
(e) Provide collection zones that enable safe and convenient removal from site and the locality.

Objective 3 - Clean and Healthy Living Environments
Design Outcomes – City Living
(a) Mitigate negative impacts on amenity (visual, noise, odour, litter and illegal dumping potential)
(b) Hygienic and safe

Achievement of these objectives and design outcomes will ensure new residential and mixed use developments positively contribute to achievement of resource recovery targets, support effective waste management and enhance the quality of life for the City community.

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1.2 How to Use this Guide

This Guide outlines a step-by-step approach to inform waste system selection and design.

Step 1 – Preliminary Design Proposal
Step 2 – Select Waste Management System (Guide to System Selection - Chapter 4)
Step 3 – Review Design Guidelines (Chapter 5, Chapter 6 and Appendix 2)
Step 4 – Design the Waste Management System
Step 5 – Prepare Supporting Documentation (Appendix 3 and Appendix 4)
Step 6 – Development Plan Consent Application

Using basic information about proposed residential densities, Step 2 broadly aligns proposed developments with waste systems that may be compatible with likely waste generation rates and system constraints. Step 3 provides guidelines which, when applied, contribute to achievement of the targeted design outcomes and objectives. Step 5 provides guidance on the level of documentation which would be appropriate to support applications for Development Plan consent.

Figure 1.1 – Guideline Flowchart summarises the above process and recommended system documentation to support applications for Development Plan Consent.
Figure 1.1 – Guideline Flowchart.

**STEP 1**

Preliminary Design Proposal for Proposed Development

**STEP 2**

Select Waste Management System (based on residential density)
- **Type A**
  - Low Density System (less than 35 dwellings/ha)
- **Type B**
  - Medium Density System (35-75 dwellings/ha)
- **Type C**
  - High Density System (more than 75 dwellings/ha)

**STEP 3**

Apply Design Guidelines to Proposal
- **Type A**
  - Design Guidelines for All Development
  - Type A Guidelines
  - Appendix 2 - Waste Resource Generation Rates
- **Type B**
  - Design Guidelines for All Development
  - Type B Guidelines
  - Appendix 2 - Waste Resource Generation Rates
- **Type C**
  - Design Guidelines for All Development
  - Type C Guidelines
  - Appendix 2 - Waste Resource Generation Rates

**STEP 4**

Confirm Waste Management System and Amend Preliminary Design Proposal Accordingly

**STEP 5**

Prepare Supporting Documentation
- **Type A**
  - Low Density Checklist (Appendix 3)
- **Type B**
  - Waste Management Plan (Appendix 4)
- **Type C**
  - Waste Management Plan (Appendix 4)

**STEP 6**

Incorporate into Development Plan Consent Application for Proposed Development

Guideline Reference
- Chapter 4
- Chapter 5
- Chapter 6
- Appendix 2
- Appendix 3 and 4
2 Strategic Context

2.1 State Government

2.1.1 The 30-Year Plan for Greater Adelaide

Through the 30-Year Plan for Greater Adelaide, the South Australian Government is planning an urban form for Greater Adelaide that focuses new housing and jobs along existing transport corridors. The Plan recognises the importance of the City of Adelaide in implementing this new form and has a target for the City of 15,040 new dwellings by 2040, housing an additional population of 27,300 (DPLG, 2010).

Increasing the number of people living in the City will have benefits for all of metropolitan Adelaide by relieving pressure on the urban fringe, increasing the number of people living in vibrant mixed use settings close to facilities, and increasing the use of sustainable commuting options including cycling and walking.

Specific policies in the Plan for the City of Adelaide suggest that this additional demand for dwellings could be met by a mix of medium to high density housing.

2.1.2 South Australia’s Waste Strategy 2011-2015

Waste management initiatives of Council support achievement of material recovery and recycling targets in South Australia’s Waste Strategy 2011-2015 (Zero Waste SA, 2011). These targets aim to increase recycling rates for municipal kerbside solid waste (MSW) to 70% by 2015.

Introduction of the 3 bin system has delivered substantial progress towards Council’s target of diverting 50% of kerbside waste from landfill by 2015. Recycling rates have increased from less than 25% in 2007/08, to 36% in 2011/12 (42% including commercial cardboard).

2.2 City of Adelaide

2.2.1 Creating our Future, the City of Adelaide’s Strategic Plan 2012-16

The Strategic Plan 2012-16 outlines the Adelaide City Council’s vision for the City of Adelaide and the projects and services it will deliver between 2012 and 2016. It provides for the implementation of the urban design, built environs’ changes and population growth projected in the 30-Year Plan for Adelaide.

Outcome 6: Environmentally Sustainable City is one of the six desired Outcomes for the City. Strategies include actions to reduce the City’s carbon emissions, water use and waste through projects with businesses, residents and organisations. Key projects and services include waste and recycling service improvements for kerbside collection, public places, events and high density developments.

2.2.2 Environmental Sustainability Strategy 2009-2012

The Environmental Sustainability Strategy 2009-2012, seeks the outcome of achieving a ‘zero waste City’. In particular, the Environmental Sustainability Strategy 2009-2012 seeks a:

“A City where waste resource recovery is maximised from residential and higher density developments, hospitality and retail uses and the public realm”

2.2.3 Waste Management Action Plan 2011-2015

The Waste Management Action Plan 2011-2015, sets the following targets for Council’s kerbside waste collection service:

- Recycle 50% of kerbside waste by 2015, on the way to 60% by 2020.
- Increase participation in kerbside green organics service to 25% by 2015.
2.2.4 Smart Move – City of Adelaide’s Transport and Movement Strategy 2012-2022

The Smart Move strategy is a ten year plan that looks at future needs to make our streets safer and more connected, so our City is easier for people to access and use, creating great streets and places for people. It seeks to achieve eight Smart Move outcomes, particularly Outcome 5 which includes the following relevant strategies:

- 5.1 Ensure space is available for servicing the City i.e. for pickups, deliveries and waste collection
- 5.2 Strengthen partnerships between Council, those servicing the City, and service providers
  - 5.2.2 Work with local precinct and resident groups to develop management plans for servicing key locations
- 5.3 Minimise the impact of City services on other City users
  - 5.3.1 Provide efficient waste pick up points at all redesign opportunities
  - 5.3.3 Introduce methods for minimising the unsightly effects of waste storage
  - 5.3.7 Develop behaviour change programs to improve waste disposal practices by residents and businesses

2.3 Relevant Legislation

The following legislation is considered most relevant to the design and operation of waste and resource recovery systems for residential developments in the City of Adelaide.

- Local Government Act 1999
- Public and Environmental Health Act 1987
  - Public and Environmental Health (General) Regulations 2006
- Environment Protection Act 1993
  - Environmental Protection (Waste to Resources) Policy 2010
- Development Act 1993
  - Adelaide (City) Development Plan
  - Building Code of Australia
- Disability Discrimination Act 1992
- Adelaide City Council By-Law No 5 – Waste Management

System designers should refer to the Environment Protection (Waste to Resources) Policy 2010 for direction on resource recovery obligations and prohibited landfill waste.
3 Operational Environment

3.1 Residential Waste Service Providers

In the City of Adelaide waste management services are provided by Council and private contractors.

The Council provides the majority of waste collection services for residential housing through a standard kerbside service which is delivered by the Council’s waste contractor. Private contractors typically provide waste collection services to higher density and more complex residential developments for which Council’s standard kerbside service is not suitable.

The waste collection services offered by Council or private contractors often utilise different type of bins, equipment and vehicles. Whilst this provides for a diversity of service offerings, there are generic constraints that apply to waste resource collection from residential developments irrespective of what type of service is selected.

3.2 Operational Constraints

Many constraints are not dictated by the waste collection service but by the type and design of the residential development itself and the public roads and public realm areas around the development that are required for access or use in providing the waste collection service. Common service constraints are summarised below.

- Development density – Higher density developments generally mean less space on properties for storage of waste resource bins and less street frontage per dwelling for bin collection.
- Mixed use development – Residential developments with retail outlets or commercial offices may restrict street frontage for bin collection and require separate waste systems and services for these other uses.
- Street design and operation – Adjacent roads or streets to the development must be wide enough and designed to allow for access and safely carry waste collection vehicles to street frontages or a property where bins are being collected, which may also require traffic and parking controls.
- Public realm collection – Where Council permits waste bin collection from street verges or other public areas, these need to be designed so they don’t interfere with pedestrian traffic or other shared uses and won’t cause damage to adjacent private property, e.g. parked cars, fences, etc. or other public infrastructure, e.g. street furniture, power services, trees, etc.
- On-property collection – Requires properly sized access areas, adequate vertical clearances and pavement design to safely carry waste collection vehicles and allow them to turn and manoeuvre so they can enter and exit the property and load bins.
- Public amenity – Delivery of collection services may require controls on hours of service to avoid adverse impacts on public access to streets or properties or urban noise levels that inconvenience residents and the public.
4 Waste Management System Selection

Operation of a waste management system should be a simple and convenient task from the event of waste being generated to the removal of recovered resources and residual waste from the site. To achieve this, systems should cater for the separation of resources and waste within the dwelling and support the movement, consolidation and storage of these materials as they advance to the point of collection.

Effective waste management systems will be responsive to the following determining factors:

1. The projected volume of waste;
2. The likely composition of the waste stream i.e. paper, food, plastic etc;
3. Targeted resource recovery rate for each waste resource stream;
4. Availability of storage, presentation and collection spaces;
5. Availability of supporting infrastructure and collection service providers;
6. Statutory obligations and Standards; and
7. User preference and behaviour.

Highly effective systems will have a clear chain of custody and responsibility for moving waste within a site that is supported with knowledge and infrastructure that:

1. Enhances the ability of residents and tenants to pass recovered resources and residual waste from private property to public or common areas.
2. Assists building managers to consolidate recovered materials in larger storage bins and present them correctly for collection.
3. Enables collection service providers to safely and effectively remove each waste resource stream.

Through integrated design, effective systems should incorporate the following design elements:

1. System with supporting infrastructure
2. Transfer pathways
3. Storage areas
4. Collection Zones

4.1 Guide to System Selection

Using the residential density of a development, this Section provides a quick reference guide to align developments with systems that could meet the operational requirements of projected waste volumes.

4.1.1 Density Guide to Waste System Selection

The 30-Year Plan for Greater Adelaide provides three categories of net residential site density to be used in planning policy to guide individual developments (low, medium and high).

1. Low density = less than 35 dwellings per hectare
2. Medium density = 35-75 dwellings per hectare
3. High density = more than 75 dwellings per hectare

These categories broadly correlate with system design parameters and operational constraints that emerge as waste generation volumes increase and the space available per dwelling for storage, presentation and collection decreases.
To identify applicable guidelines for different residential developments, Table 4.1 below aligns net dwelling densities with potential waste systems.

Table 4.1 – Guide to waste system selection

<table>
<thead>
<tr>
<th>Net Residential Density</th>
<th>Description</th>
<th>Waste System</th>
</tr>
</thead>
<tbody>
<tr>
<td>&lt;35 dwellings per hectare</td>
<td>Low Density</td>
<td>Type A</td>
</tr>
<tr>
<td>35-75 dwellings per hectare</td>
<td>Medium/High Density (Low Rise)</td>
<td>Type B</td>
</tr>
<tr>
<td>&gt;75 dwellings per hectare</td>
<td>High Density (High Rise)</td>
<td>Type C</td>
</tr>
</tbody>
</table>

This categorisation of waste systems is indicative in nature and intended to support preliminary planning for new developments. A Waste Management Plan and performance based assessment should be undertaken to more accurately determine system compatibility.

4.2 Waste System Type and Development Characteristics

The characteristics of these developments and waste systems are further explained below.

4.2.1 Type A – Low Density System

This system is used by Adelaide City Council as its standard waste and recycling service for low density dwellings. This service is typically suitable for development which displays the following characteristics:

1. Net Dwelling Density of up to 35 dwellings per hectare (greater than 300 square metres per dwelling)
2. Building Code of Australia: Typically Class 1 buildings
3. Torrens titled residential development with commercial activities limited to home activities, as defined by Schedule 1 of the Development Regulations 2008.
4. Each dwelling able to present bins for collection in the public realm without significant disruption to parking or pedestrians.
5. Car parking is contained within the site boundary.

Figure 4.1– Low density dwellings in the City of Adelaide set on allotments greater than 300m².
This system typically has the following design features:

1. Provides every dwelling with three bins:
   - General Waste – Residual Waste to Landfill
     - Red Lid - 140 L MGB
     - Weekly collection
   - Co-mingled Recycling
     - Yellow Lid - 240L mobile garbage bin (MGB)
     - Fortnightly
   - Organics (including food organics)
     - Lime Green Lid - 240L MGB
     - Fortnightly

2. The presented bins are picked-up and emptied on the same day by ‘side-loading’ council waste collection vehicles.

3. Bin presentation occurs on a kerbside or in a designated bin collection zone unless otherwise agreed in writing with Council’s contracted service provider.

Figure 4.2 and 4.3 – Low density dwelling in the City of Adelaide and example of 240L bins with colour coded lids – Source: Zero Waste SA

4.2.2 Type B – Medium/High Density (Low Rise) System

This system is compatible with medium and high density residential or mixed use residential development with not more than 5 building levels. This system is typically suitable for development which displays the following characteristics:

1. Net dwelling density of >35 to 75 dwellings per hectare (less than 300 square metres per dwelling.)
2. Building Code of Australia: Typically Class 2 buildings
3. Typically Community Titled developments located within the Mixed Use Zone where higher dwelling densities and building heights greater than 2 storeys are envisaged.
4. Low scale dwellings have very small front setbacks but may also have court yard or roof top gardens.
5. Most have off-street parking, but it is often accessed by a rear laneway or a communal driveway. Visitor parking tends to be on the street.
6. The higher medium density examples rely on balconies or small courtyard gardens for private open space.
7. Shared amenity and landscaping areas to supplement comparatively small private open space.
This system will typically have the following design features:

1. Shared bin system using common bin storage areas
2. Bins – Combination of 240, 660 and/or 1100 litre bins
3. Manual handling systems without significant infrastructure
4. Bin presentation for collection within a designated compound on the development site unless otherwise agreed in writing with Council’s contracted service provider.
5. Bins pulled to the road at the time of collection or to a previously designated collection zone.
6. A more rigorous waste system design process may be required to demonstrate waste resource recovery outcomes. This may involve preparation of a Waste Management Plan. Further guidance on information requirements of Waste Management Plans is provided in Appendix 4.
4.2.3 Type C – High Density (High Rise) System

This system is typically required for developments which display the following density and built form characteristics:

1. Greater than 75 dwellings per hectare and typically 5 or more storeys.
2. Typically located within the Central Business Zone or Mixed Use Zone where maximum building heights are greatest.
3. Building Code of Australia: Typically Class 2 and 3 buildings
4. Community Titled
5. Comparatively small site areas for individual dwellings (under 150 square metres).
6. The location and site area dedicated to car parking is a major contributor for high density developments to be achievable.
7. Private open space is often restricted to roof gardens, balconies or small courtyards.

Figure 4.7 – Aerial photograph – High density (high rise) development - East Terrace, Adelaide

Figures 4.8 and 4.9 – High density (high rise) mixed use development – Wakefield and Grenfell Street, Adelaide.
This system typically has the following design requirements:

1. Highly site-specific design which may include high volume manual and automated handling systems:
   (c) Waste chutes for residents to dispose of waste and recyclables to the waste storage bins;
   (d) Compaction equipment to reduce waste volume and decrease storage area size and/or collection frequency.
   (e) Provision for additional and separate storage areas for storage and collection of hard waste and/or e-waste items.

2. Bin presentation for collection within a designated compound on the development site unless otherwise agreed in writing with Council.

3. Bins are serviced on the development site; pulled to the road at the time of collection; or to a previously designated on-street collection zone.

4. Larger capacity four wheel bins or skips (660L, 1100L, 1.5m³ or 3m³) that may require different types of waste collection equipment, e.g. front-lift trucks, bin lifting equipment and/or trolleys.

5. A more rigorous waste system design process may be required to demonstrate waste resource recovery outcomes. This may involve preparation of a Waste Management Plan. Further guidance on information requirements of Waste Management Plans is provided in Appendix 4.

Figure 4.10 – Example of 660L mobile garbage bin specification – Mastec
5 Design Guidelines – All Development

5.1 Objective 1 - Environmental Sustainability

Achievement of the following Strategic Design Outcomes will support achievement of Objective 1:

5.1.1 Design Outcomes - Strategic

To be compatible with the long term sustainability of the environment development should:

(a) Maximise resource recovery and minimise waste going to landfill; and

(b) Meet occupant service requirements and statutory obligations of predicted waste streams.

The following guidelines will support achievement of these design outcomes.

5.1.2 Guidelines - System Performance

5.1.2.1 Development should be provided with regular collection services for the following waste streams:

(a) Waste to landfill;

(b) Co-mingled recycling for reuse; and

(c) Organics for composting (including food organics).

5.1.2.2 Provision should be made for the storage and periodic collection of hard waste, e-waste and prohibited landfill (hazardous) waste.

5.1.2.3 Systems should support occupants to achieve the following target rates of resource diversion from landfill;

(a) Low density – 70%

(b) Medium and high density (low rise) – greater than 55%

(c) High density (high rise) – greater than 55%

Figure 5.1 – High density (high rise) mixed use development - Hindmarsh Square, Adelaide
5.2 Objective 2 - Effective Waste Resource Management

Achievement of the following Operational Design Outcomes will support achievement of Objective 2:

5.2.1 Design Outcomes – Operational

Effective waste resource management systems should:

(a) Be functional for residents and building managers (including universal access);
(b) Minimise trip generation and pedestrian travel distances;
(c) Ensure system capacity affords flexibility (change of land use, population and/or generation rates);
(d) Provide storage areas convenient to primary pedestrian movements; and
(e) Provide collection zones that enable safe and convenient removal from site and the locality.

The following guidelines will support achievement of these design outcomes.

5.2.2 Guidelines - Systems with Supporting Infrastructure

The design of waste systems should be compatible with residential waste management practices and commercial recycling infrastructure in South Australia. To achieve this, systems should incorporate the following system features:

5.2.2.1 Systems should support source separation of recyclable materials typically found in the waste stream of residential and where applicable mixed use developments.

5.2.2.2 Systems and supporting infrastructure should:

(a) Be designed to safely, efficiently and conveniently store and handle projected waste generation rates of future building occupants;
(b) Be positioned so that access points or openings are conveniently located in entry halls, lift foyers, or a separate room;
(c) Be designed for ease-of-cleaning and minimal maintenance; and
(d) Minimise potential for blockages and noise disturbances to residents during use.

5.2.2.3 The sizing and selection of bins should use estimates for waste and recycling volumes that are based on peak weekly values:

(a) Using average per capita waste and recycling generation rates (expressed in Appendix 2);
(b) Taking into account design or expected occupancy per dwelling; and
(c) Incorporating an additional 25% buffer to allow for seasonal peaks throughout the year, or by providing additional scheduled or ‘at-call’ services in peak periods.

Waste and recycling generation rates for various residential and commercial land uses are listed in Appendix 2 – Waste Resource Generation Rates.

Prior agreement of the nominated service provider should be secured before additional or ‘at call’ services in peak periods are incorporated into the waste system design.
5.2.2.4 The following colour designations should be used for all supporting infrastructure including bin lids, chute openings and labelling;
(a) Red – Waste to Landfill
(b) Yellow – Recycling for Reuse
(c) Lime Green – Organics for Composting (including food organics)

5.2.2.5 All dwellings should make adequate provision for a kitchen (waste and recycling) bin station that provides the following storage capacities:
(a) General waste bin – at least 20L
(b) Co-mingled recycling bin - at least 30L
(c) Food organics – at least 10L

Figure 5.2 (a) and (b) - Elements of a kitchen waste bin station

(a) Under-counter waste bin  (b) Organics basket with compostable liner and recycling crate

5.2.2.6 A resident handbook should be prepared that outlines the roles and responsibilities of individuals, households, the property manager, and collection contractors to effectively and safely manage the waste and resource recovery system.

5.2.2.7 By-laws filed for community/strata title developments should set out management responsibilities for the waste and recycling system on a property.

5.2.2.8 The ongoing management of the waste and recycling services should be detailed as part of the initial system design.

5.2.3 Guidelines - Transfer Pathways
Development should facilitate the linear movement of separated materials from private areas into and through common property areas as they advance to the final point of collection.

5.2.3.1 Provision should be made for safe and convenient bin transfer to the collection zone/s. This may require provision of vertical lifting equipment, a power trolley or other transport equipment.

5.2.3.2 To minimise risks to persons and property, bin storage areas should be located at ground level.

5.2.3.3 Transfer routes from the designated ground floor access point of a dwelling to the common bin storage area should ensure dignified access and use of the bin storage area for people with a disability and elderly/frail aged.
5.2.3.4 Common bin storage areas should be located in a position that is convenient for both users and waste collection staff, and:

(a) Avoid travel distances of greater than 50m from front door of dwelling to bin storage area (excluding access lift travel distance, but not more than 10 metres from the access lift to the bin storage area);

(b) Minimise carting of bins to the collection point;

(c) Ensure that bins are equitably located and accessible to all residents; and

(d) Transfer routes should be appropriately paved and graded for water run-off to avoid water pooling from rain or irrigation.

5.2.3.5 Transfer routes from the bin storage area to the collection point should be free of obstructions and designed to allow residents, including the aged or persons with limited mobility impairment, to easily and safely cart the bins and should:

(a) Be at least 1.25m wide;

(b) Have a grade no more than 1:10 and with no steps; and

(c) Not pass through the interior living areas of a dwelling.

5.2.4 Guidelines - Storage Areas

Effective waste systems should be provided to ensure that storage areas are appropriately sized, designed and located to support the consolidation of waste resources from dwellings or tenancies into larger storage bins prior to presentation for collection.

5.2.4.1 Storage areas and access to bins should be convenient for all persons (i.e consideration should be given to lifting lids, door opening mechanisms to enable access/egress for people using a wheelchair, and/or provision of low drop off points).

5.2.4.2 Storage and handling infrastructure should be designed to facilitate safe operation and storage of accumulated waste and resources for scheduled periodic collections.

5.2.4.3 Waste and recycling storage containers should be stored in accordance with Council’s Waste and Resource Recovery By-law 5 – Waste Management (i.e. within the property boundary unless formally approved by Council.)

5.2.4.4 Sufficient space should be provided for equipment to handle or manage all waste and recycling likely to be generated on the premises between collections.

Figure 5.3 - Example of 1100L mobile garbage bin specification from Mastec (Source: Mastec website 9 July 2010)
5.2.4.5 Storage area should be provided on the property in a location that balances the needs of residents with aesthetic and functional requirements of the waste management service provider.

5.2.4.6 The designated bin storage area should be located external to living areas as follows:
(a) assigned to a dwelling/s and located within the property boundaries;
(b) Otherwise, bin-sets should be co-located in designated part(s) of the Common Property.

5.2.4.7 Steps should be taken to ensure waste cannot spread beyond the designated storage areas.

5.2.4.8 Storage area/s should be of sufficient size and dimensions to store, in separate containers, the volume of waste and recycling likely to be generated during the period between collections. For example - Type A System - Minimum size per bin-set = 2m wide × 1m deep – (refer Figure 5.4).

Figure 5.4 (a), (b) and (c) - Examples of potential arrangements and dimensions for bin storage areas.

(a) Single dwelling property – 140L and 240L bins
(b) Two dwellings with common bin storage area
(c) 660L bins for putrescible waste/comingled recycling and 240L for organics.
(d)

5.2.5 Guidelines - Collection Zones

Collection Zones may occur within the site of the development or external to the site from the kerbside or roadway. They are a critical interface between the internal site infrastructure (with procedures maintained by the building or facilities manager), and the collection vehicle infrastructure operated by the collection service provider.
The following design guidelines will facilitate the transfer of waste and resources to the collection service provider:

5.2.5.1 On-street collection zone should, in consultation with Council, balance the needs of collection with the aesthetic and functional requirements of the public realm by:
   (a) Giving consideration to existing and potential traffic controls that could facilitate access;
   (b) Minimising disruptions to local pedestrian and vehicle movements;
   (c) Minimising impact upon noise sensitive adjacent land uses;
   (d) Ensuring carting distance from storage area to collection zone (where a rear-lifting truck would pick-up the bin) does not exceed 15m; and
   (e) Confirming adequate street access for waste collection vehicle.

5.2.5.2 Where the collection zone is on the property, development should:
   (a) Provide access for trucks to enter and exit the property in a forward gear;
   (b) Minimise the need for reversing;
   (c) Minimise interference with pedestrian or vehicular movements;
   (d) Provide a roadway designed for fully loaded weight and turning loads of collection vehicles;
   (e) Provide adequate clearance and lifting heights for bin servicing and manoeuvring; and
   (f) Be positioned and have designated collection times to minimise loss of amenity to residents, neighbours and the public arising from noise or odour associated with bin collection.

For initial guidance, typical vehicle specifications and access requirements for rear-lifting waste collection vehicles are included in *NSW Better Practice Guide for Waste Management in Multi-unit dwellings* (DEC, 2008).

5.3 Objective 3 - Clean and Healthy Living Environments

Achievement of the following City Living Design Outcomes will support achievement of Objective 3:

5.3.1 Design Outcomes – City Living

Development should protect and enhance the quality of life for the City community, by:
   (a) Minimising litter and illegal dumping potential;
   (b) Mitigating negative impacts including visual, noise and odour; and
   (c) Being hygienic and safe.

The following guidelines will support achievement of these design outcomes.

5.3.2 Guidelines - Safety and Amenity

Effective waste management systems should be provided to protect and enhance the quality of life for the City community.

5.3.2.1 Storage areas should consider:
   (a) The prevention and mitigation of fire risks;
   (b) The prevention of waste spreading beyond the defined location causing obstructions, amenity and hygiene impacts;
(c) Minimising the visual impact reducing the negative impact upon aesthetics;
(d) Monitoring to ensure residents are adhering to conditions of storage and that no risk to safety or access are caused by depositing of waste dangerously;
(e) Cleansing of the defined area to minimise odour, pests and nuisances preserve the visual amenity of the area; and
(f) Providing suitably designated areas to store liquid and hazardous waste to prevent spillage.

5.3.2.2 Bin sets which are located indoors, adjacent windows or below balconies, should give careful consideration to;
(e) Ventilation;
(f) Mitigating odour and noise nuisances; and
(g) Visual impacts.

5.3.2.3 Bin storage areas should be designed and located to minimise visual prominence from the public realm and adjoining residential premises.

5.3.2.4 Storage areas should:
(a) Be secured, well illuminated, visually permeable, have passive surveillance and be designed to prevent entrapment of residents;
(b) Minimise potential for odour and noise nuisances and preserve visual amenity for residents, neighbours and the public; and
(c) Utilise washable surfacing and drainage systems that support periodic maintenance cleaning.

5.3.2.5 Periodic risk assessments should be undertaken by the Property Manager to ensure safe storage and handling of waste resources.

5.3.2.6 Storage areas should have regard to the following design matters:
(a) Ongoing compliance with the Building Code of Australia and all relevant Australian Standards;
(b) Safe handling for transporting waste;
(c) The prevention of entrapments areas for residents, staff and visitors;
(d) The prevention and mitigation of fire risks;
(e) Adequate provision for the secure storage and periodic collection of hazardous waste. (batteries, smoke detectors, compact fluorescent light globes etc);
(f) Structural design requirements for floor;
(g) Adequate signage and illumination (also information for visually impaired) to indicate to the user the nature of the waste and recyclable material. Signage to align with the Australian Standards for Mobile waste containers - colours, markings, and designation;
(h) Adequate ventilation;
(i) Suitable flooring and wall finishes to minimise staining and benefit for easier cleaning and maintenance;
(j) Adequate floor grading and drainage (to sewer) to prevent spillages entering stormwater;
(k) Secure gated compounds to prevent interference with bins and equipment;
(l) Access by residents (where required) or building staff for maintenance purposes; and
(m) Where storage areas are on higher levels, a separate service lift should be considered and adequately sized and designed to carry filled bins.

Figure 5.5 Example of Instructional Signage in a Bin Enclosure
6 System Specific Design Guidelines

6.1 Type A – Low Density Systems

The following design guidelines are specific to low density developments using Council’s three bin kerbside collection service.

6.1.1 Guidelines - Collection Zones

6.1.1.1 A bin presentation area should, in consultation with Council, balance the needs of collection with the aesthetics and functional requirements of the public realm.

Consideration should be given to the following criteria:

- The kerbside area in front of a development should be able to accommodate the bins that are presented and allow the bins to be safely accessed and picked up by the collection vehicle.
- The frontage of a development should meet the following requirements.
  (i) Retain a 1.2m wide pedestrian path in front of property whilst providing a kerbside ‘verge’ area that can accommodate a bin presentation zone for each dwelling = 1.6m wide × 1.0m in depth;
  (ii) Ensure that the above bin presentation zone is satisfactorily offset from trees, street furniture, tree canopies, etc.; and
  (iii) Ensure that on-street parking arrangements do not restrict access of collection vehicle to kerbside on collection days.

An example illustrating these requirements is shown in Figure 6.1.

Figure 6.1 - Example of presentation zone at front of property for collection of 140/240L bins by council side-loading waste collection trucks.
6.2 Type B and C – Medium and High Density Systems

6.2.1 Guidelines - Systems and Supporting Infrastructure

6.2.1.1 When locating storage areas and disposal points, priority should be given to the convenient disposal of recycled materials. This may involve the location of recycling stations and temporary kitchen bin repositories in or adjoining entry foyers or pedestrian entry points to car parks.

6.2.1.2 Where a rear-lifting waste collection vehicle is to be used, the vehicle specifications and access requirements to the bin collection point should be confirmed with Adelaide City Council. For initial guidance, typical vehicle specifications and access requirements for rear-lifting waste collection vehicles are included in *NSW Better Practice Guide for Waste Management in Multi-unit dwellings* (DEC, 2008).

6.2.2 Guidelines - Storage Areas

6.2.2.1 Shared bin storage areas should respond to the different storage and access requirements of:

(a) Larger capacity 4 wheel bins, including positioning, set-back, access, noise suppression and screening;

(b) Static infrastructure such as carousels, compactors and chutes; and

(c) Residential and commercial occupants.

6.2.2.2 Where the bin storage area and collection point are separated by a change in building, floor or ground levels, systems should:

(a) Provide for manual carting or, if required, mechanical assisted carting;

(b) Restrict the size and weight of bins to ensure safe operation and handling;

(c) Ensure the egress route is clearly marked and free of obstructions;

(d) Avoid kerbs or provide ramps of an adequate width, non-slip surface and gradient (≤1:10).

(e) Ensure service-lifts or mechanised lifting platforms are of an adequate size and load capacity.

(f) Where using mechanically assisted carting, the same requirements as for manual carting should apply except that in addition:

   (i) The lifting equipment or trolley to pick-up bins must be appropriately sized and designed to manoeuvre within the access areas available and lift the bins;

   (ii) A secure storage area for lifting equipment or trolley should be provided to prevent theft or damage by third parties.

6.2.3 Guidelines - Safety and Amenity

6.2.3.1 Common bin storage areas should be monitored to ensure residents are adhering to building fire safety requirements.

6.2.3.2 For building fire safety and accessibility reasons, designated storage areas should be kept tidy and must not obstruct passages and fire exits.
6.3 Type C – High Density (High Rise)

6.3.1 Guidelines - Systems and Supporting Infrastructure

6.3.1.1 Development should utilise economies of scale to realise economic benefits for residents, throughout the life of a development, of source separation infrastructure.

6.3.1.2 Development should utilise economies of scale to leverage adoption of mechanical and automated infrastructure solutions, such as chutes, compactors, carousels to:
   
   (a) Minimise system footprint;
   (b) Increase ease of participation and maintenance;
   (c) Improve service frequency;
   (d) Improve aesthetics and amenity; and
   (e) Enhance safety.

6.3.1.3 Mixed use development should respond to the different waste resource generation rates of commercial and residential occupants (Appendix 2).

6.3.1.4 Waste resource recovery systems, including designated storage areas, should afford maximum flexibility to the likely future mix of commercial and residential land uses to support change of land use, future adaptation and reuse of buildings.

6.3.1.5 Direct collection from an on-site bin storage area will require:

   (a) Provision of adequate vertical clearance for a truck to traverse the site to and from the bin storage area;

   (b) Ability for the collection vehicle to adequately manoeuvre into position to lift bins with limited need to reverse or potential risk to damage the building or other property in the basement; and

   (c) Ability for the collection vehicle to exit the basement in a forward gear.

Consideration should be given to the following criteria:

- Minimum vertical clearance - ≥4m at any point where the collection truck will need to traverse site including collection zone, manoeuvring areas and the entry and exit ramps.

- The grades of entry and exit ramps should not exceed capabilities of the waste collection vehicle.

- The floor of the basement must be suitably designed to carry the load of the collection vehicle.
Appendix 1: Glossary of Terms

**Commercial and Industrial Waste (General)** has the same meaning as in the Environment Protection Authority Waste Guidelines;

**Commercial Cardboard** means non-contaminated cardboard generated by commercial premises but excludes Recyclables, contaminants such as wax boxes, milk cartons, boxes soiled by food, paints or oils, plastic or polystyrene;

**Collection Zone** – The location where the physical transfer of waste and resources to the collection vehicles occurs prior to removal from the site and locality. Subject to relevant approvals, it may occur on either private or public land.

**Domestic Waste** means any kind of domestic waste including putrescibles generated from residences, but excludes liquids, metals (other than food containers), building materials, stones, bricks, soil, lead acid batteries, any dangerous or toxic waste, Commercial and industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste;

**Domestic Waste Container** means a container provided or designated by the Council for the reception of Domestic Waste (maximum weight 60kg);

**Footpath Area** means:

1. that part of the Road between the boundary of the Road and the edge of the carriageway of the Road on the same side as that boundary; or
2. a footway, laneway or other place made or constructed for the use of pedestrians and not for the use of Vehicles;

**Green Organics** means any clean organic matter consisting of lawn clippings, plants, vegetables, food scraps, leaves, prunings or other materials for which permission has been given by the Council but excludes any item larger than 15cm in diameter, Domestic Waste, Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste or Radioactive Waste;

**Green Organics Container** means a container provided or designated by the Council for the reception of Green Organics (maximum weight 70kg);

**Hard Waste** means solid waste arising from domestic premises which is not suitable for collection using a kerbside bin system and includes any internal and external household items such as fridges, television sets, mattresses, but excludes any Domestic Waste, Commercial and Industrial Waste (General), Listed Waste, Hazardous Waste, Radioactive Waste or waste that is not deemed suitable for collection by the Council;

**Hazardous Waste** has the same meaning as in the Environment Protection Authority Waste Guidelines;

**Listed Waste** has the same meaning as in the Environment Protection Authority Waste Guidelines;

**Radioactive Waste** has the same meaning as in the Environment Protection Authority Waste Guidelines;

**Recyclables** means newspapers, magazines, clean paper and cardboard, clean plastic containers of a type specified by the Council, clean tins and cans, clean glass and clean milk and juice containers and other materials for which permission has been given by the Council;

**Recyclables Container** means a container provided or designated by the Council for the reception of Recyclables (maximum weight 60kg);

**Road** has the same meaning as in the Local Government Act 1999.
Universal Design – “Universal Design is a framework for the design of places, things, information, communication and policy to be usable by the widest range of people operating in the widest range of situations without special or separate design. Most simply, Universal Design is human-centered design of everything with everyone in mind” (Institute of Human Centered Design, as adopted by the Adelaide City Council “Access & Inclusion Strategy 2012”)
### Appendix 2: Waste Resource Generation Rates

Table A2.1: Generation rates for sizing bins, number of bins and required bin storage areas.

<table>
<thead>
<tr>
<th>LAND USE</th>
<th>WASTE excluding food</th>
<th>CO-MINGLED RECYCLING</th>
<th>GREEN ORGANICS including food</th>
</tr>
</thead>
<tbody>
<tr>
<td>Low Density Dwelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>35 litres/bedroom/week</td>
<td>25 litres/bedroom/week</td>
<td>40 litres/bedroom/week</td>
</tr>
<tr>
<td></td>
<td>Hard and Electronic Waste 0.77 m$^3$/household/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Medium or High Density Dwelling</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Including student accommodation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 litres/bedroom/week</td>
<td>25 litres/bedroom/week</td>
<td>10 litres/bedroom/week</td>
</tr>
<tr>
<td></td>
<td>Hard and Electronic Waste 0.77 m$^3$/household/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Serviced Apartment, Backpacker or Boarding Houses</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>30 litres/bedroom/week</td>
<td>20 litres/bedroom/week</td>
<td>20 litres/bedroom/week</td>
</tr>
<tr>
<td></td>
<td>Hard and Electronic Waste 0.77 m$^3$/household/year</td>
<td></td>
<td></td>
</tr>
<tr>
<td>Hotel or Motel</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Accommodation</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Bar Areas</td>
<td>5 litres/bedroom/day</td>
<td>1 litres/bedroom/day</td>
<td>1 litres/bedroom/day</td>
</tr>
<tr>
<td></td>
<td>5 litres/10 m$^2$ bar area/day</td>
<td>5 litres/10 m$^2$ bar area/day</td>
<td>0.25 litres/10 m$^2$ bar area/day</td>
</tr>
<tr>
<td>Dining Areas</td>
<td>25 litres/10 m$^2$ dining area/day</td>
<td>5 litres/10 m$^2$ dining area/day</td>
<td>40 litres/10 m$^2$ dining area/day</td>
</tr>
<tr>
<td>Combined Bar and Dining Areas</td>
<td>30 litres/10 m$^2$ combined bar and dining area/day</td>
<td>10 litres/10 m$^2$ combined bar and dining area/day</td>
<td>40 litres/10 m$^2$ combined bar and dining area/day</td>
</tr>
<tr>
<td>Licensed Entertainment Premises or Community Club</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>(Litres per trading day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>5 litres/10 m$^2$ bar floor area/day</td>
<td>5 litres/10 m$^2$ bar floor area/day</td>
<td>0.25 litres/10 m$^2$ bar floor area/ day</td>
</tr>
<tr>
<td></td>
<td>30 litres/10 m$^2$ combined bar and dining floor area/day</td>
<td>10 litres/10 m$^2$ combined bar and dining floor area/day</td>
<td>40 litres/10 m$^2$ combined bar and dining floor area/day</td>
</tr>
<tr>
<td>Offices or Consulting Rooms</td>
<td>5 litres/10 m$^2$/week</td>
<td>7.5 litres/10 m$^2$/week</td>
<td>1.25 litres/10 m$^2$/week</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Showrooms</td>
<td>4 litres/10 m$^2$/day</td>
<td>1 litres/10 m$^2$/day</td>
<td>0.25 litres/10 m$^2$/day</td>
</tr>
<tr>
<td>LAND USE</td>
<td>WASTE excluding food</td>
<td>CO-MINGLED RECYCLING</td>
<td>GREEN ORGANICS including food</td>
</tr>
<tr>
<td>----------</td>
<td>----------------------</td>
<td>----------------------</td>
<td>-----------------------------</td>
</tr>
<tr>
<td>Shop (Litres per trading day)</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Food Premises:</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Butcher</td>
<td>3.5 litres/10m²/day</td>
<td>2 litres/10m²/day</td>
<td>3.5 litres/10m²/day</td>
</tr>
<tr>
<td>Delicatessen</td>
<td>3.5 litres/10m²/day</td>
<td>3 litres/10m²/day</td>
<td>2.5 litres/10m²/day</td>
</tr>
<tr>
<td>Seafood Retailer</td>
<td>3.5 litres/10m²/day</td>
<td>2 litres/10m²/day</td>
<td>3.5 litres/10m²/day</td>
</tr>
<tr>
<td>Fruit &amp; Vegetable</td>
<td>10 litres/10m²/day</td>
<td>12 litres/10m²/day</td>
<td>16 litres/10m²/day</td>
</tr>
<tr>
<td>Hairdresser</td>
<td>3.5 litres/10m²/day</td>
<td>3 litres/10m²/day</td>
<td>1 litre/10m²/day</td>
</tr>
<tr>
<td>Café/Restaurants</td>
<td>27 litres/10m²/day</td>
<td>13 litres/10m²/day</td>
<td>40 litres/10m²/day</td>
</tr>
<tr>
<td>Supermarket</td>
<td>18 litres/10m²/day</td>
<td>20 litres/10m²/day</td>
<td>18 litres/10m²/day</td>
</tr>
<tr>
<td>Takeaway</td>
<td>3 litres/10m²/day</td>
<td>3 litres/10m²/day</td>
<td>3.5 litres/10m²/day</td>
</tr>
<tr>
<td>Retail</td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Less than 100m² floor space</td>
<td>5 litres/10m²/day</td>
<td>2.5 litres/10m²/day</td>
<td>0.25 litres/10m²/day</td>
</tr>
<tr>
<td>Greater than 100m² floor space</td>
<td>5 litres/10m²/day</td>
<td>5 litres/10m²/day</td>
<td>0.25 litres/10m²/day</td>
</tr>
</tbody>
</table>

Notes:

1. The rates for low, medium and high density are based on:
   - Bin and hard waste audits undertaken in metropolitan areas; and
   - Assumed best-practice levels of participation and separation in recycling by residents.
   - Diversion rates achieved by City apartment buildings during studies undertaken by Council.
2. All other generation rates are based upon the City of Sydney - *Policy for Waste Minimisation in New Developments* (2005).
3. Best-practice recycling may not occur until several years after a waste collection service commences – this may affect the required mixture of bins and collection frequency per service initially used.

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## Appendix 3: Type A - Low Density Checklist

<table>
<thead>
<tr>
<th>Item</th>
<th>Check</th>
<th>Comments</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. The development makes provision for each dwelling to have a Council service bin set?</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Green Organics – 240L Mobile Garbage Bin (MGB)</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- General Waste – 140L or 240L MGB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Co-mingled Recycling – 240L MGB</td>
<td></td>
<td></td>
</tr>
<tr>
<td>2. Kitchen waste station contains recommended number and size of bins?</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- General Waste – at least 20L capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Co-mingled Recycling – at least 30L capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Food Organics – at least 10L capacity</td>
<td></td>
<td></td>
</tr>
<tr>
<td>3. Transfer routes support convenient movement of waste from within the dwelling to temporary storage areas and transfer of bins to the on street collection zone.</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Does not require transfer of 240L or 140L MGB through living areas of a dwelling.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Surfacing supports convenient bin movement.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Universal design principles applied</td>
<td></td>
<td></td>
</tr>
<tr>
<td>4. Street access for council service confirmed with Adelaide City Council?</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>5. Bin storage area:</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Designed and positioned to minimise nuisances and maximise amenity.</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Adequately sized &amp; surfacing</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Convenient access for residents</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Universal design principles applied</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Appropriate transfer route to collection zone</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>6. Collection zone:</td>
<td>☐ Yes ☐ No</td>
<td></td>
</tr>
<tr>
<td>- Surfacing and access appropriate</td>
<td></td>
<td></td>
</tr>
<tr>
<td>- Collection zone agreed by Council</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>
Appendix 4: Type B and C - Waste Management Plan

The following guidance is provided on the format and content that should be included in a Waste Management Plan (WMP) for a Type B or C medium or high density system.

<table>
<thead>
<tr>
<th>Section</th>
<th>Expected content</th>
</tr>
</thead>
<tbody>
<tr>
<td>1. Development details</td>
<td>Location; contact details; name of developer; description of development including buildings, commercial premises and land use; dwellings and occupancy data (including number of bedrooms).</td>
</tr>
<tr>
<td>2. Type of Waste System</td>
<td>Waste service provider (Council or Private); individual bin sets or shared/communal bins; location of bin storage area and collection point; and rationale for selection and design of waste system.</td>
</tr>
<tr>
<td>3. Waste System Sizing</td>
<td>Number and type of waste and recycling bins with capacity per dwelling and total for development; Method for system sizing, including per dwelling generation rates, peaking factors and design factors assumed; Calculation worksheet for waste generation estimates appended. For mixed use developments waste generation rates and details of proposed waste services for the commercial premises should be included.</td>
</tr>
<tr>
<td>4. Bin storage location</td>
<td>Description of design methodology, addressing key issues of: sizing, positioning; resident access (including universal design); bin removal for collection; bin labelling and signage; and noise, odour and amenity. Calculation worksheet for number of bins and sizing of storage area.</td>
</tr>
<tr>
<td>5. Transfer Pathways</td>
<td>Description of transfer pathways, addressing key issues of: safe and convenient bin transfer; universal design from access/egress point of a dwelling to the common bin storage locations; minimising risks to persons and property; convenience to both users and waste collection staff.</td>
</tr>
<tr>
<td>6. Presentation &amp; collection points</td>
<td>Summary of design methodology, addressing key issues of: sizing; positioning; universal design; collection frequency and timing; collection vehicle access; and public safety. Details of waste service provider appended including correspondence confirming suitability of proposed collection arrangements.</td>
</tr>
<tr>
<td>7. Specialised Facilities &amp; Equipment</td>
<td>Where specialised facilities and equipment, such as waste chutes, compactors, lifting equipment, etc., are proposed, provide brief description of design and technical rationale for why and how they were selected and sized, and how they are incorporated into and function as part of the residential waste system.</td>
</tr>
<tr>
<td>8. Management</td>
<td>Description of waste system management responsibilities and operations for when development complete, including details of any property management contracts including mixed use sites with commercial premises.</td>
</tr>
<tr>
<td>9. Resident communication</td>
<td>Methods to inform residents about waste and recycling systems and use. Append copies of proposed tenancy agreements or residents’ manuals explaining the use of the waste system.</td>
</tr>
</tbody>
</table>

If you require assistance in the development of a Waste Management Plan, please contact the Waste Management Association of Australia (SA Branch) on phone (61) 2 8746 5000 or email: 

sa@wmaa.asn.au
Appendix 5: References

Australian Building Codes Board (ABCB) (2010); Building Code of Australia (BCA) - 2010; ABCB, Canberra, ACT


Department of Environment and Conservation (DECC), NSW Government (2008); Better Practice Guide for Waste Management in Multi-unit dwellings


SiTA Environmental Solutions (2010); Rear Lift Collection System; http://www.sita.com.au/media/17735/rear%20lift_2pp220307.pdf, Accessed 05/06/10

Standards Australia (SA) (2008); AS 4123.7—2008: Mobile waste containers – Colours, markings and designation requirements


Other References

Commonwealth Environment Protection Agency (1992); National Waste Minimisation and Recycling Strategy, Australia

Council of Australian Governments (1992); National Strategy for Ecologically Sustainable Development


Department of Planning and Local Government (DPLG), South Australian Government (2010); 30-yr plan for Greater Adelaide

Department of Urban Services (1999), ACT Government; Development Control Code for Best Practice Waste Management in the ACT

Environment Heritage & Protection Council (2009); National Waste Policy: Less Waste, More Resources

Resource Smart, Sustainability Victoria, Victorian Government (2009); Draft Best Practice Guide for Waste Management in Multi-unit Developments

South Australian Government (2007); South Australia’s Strategic Plan


Sydney City Council (SCC) (2005); Policy for Waste Minimisation in New Developments