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Zero Waste SA and Integrated Design Commission

Report for State Waste Management Guidance for
Medium Density, High Density and
Multi-Unit Developments in
Metropolitan Adelaide

A New Approach for Municipal
Waste - Delivering the
Strategy

June 2012



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Executive Summary

Framework

Within South Australia, a series of strategic documents have provided direction, priorities and targets for the future development of the state and the metropolitan area of Adelaide. Those that have particularly influenced issues relating to future forms of residential dwellings and associated waste management have included:

- ▶ The South Australia Strategic Plan (SASP) first published by the South Australian Government in 2004, and updated in 2011;
- ▶ The 30 Year Plan for Greater Adelaide (*Department for Planning and Local Government, 2010*); and
- ▶ South Australia's Waste Strategy 2011-2015 (*Zero Waste SA, 2011*).

Amongst a range of issues addressed is the predicted increase of South Australia's population to 2 million by 2027.

South Australia Strategic Plan key targets are:

- ▶ Reduce waste to landfill by 35% by 2020.
- ▶ Increase South Australia's population to 2 million by 2027.

The Waste Management Strategy 2011-2015 key target is:

- ▶ Diversion from landfill of 70% of municipal solid waste arising in the metropolitan area by 2015.

It is envisaged that the population increase will see a shift from low-density, suburban growth towards medium to high density occupancy. This is likely to result in a significant increase in the number of medium and high density and multi-unit developments in focused areas and locations. This is a form of residential development currently relatively uncommon in metropolitan Adelaide, and which may present challenges in relation to waste management both on-site and in service methods.

Operations

Medium and high density and multi-unit developments present a range of challenges in respect of provision of waste management facilities. Space is usually at a premium and expensive. Developers may see waste storage and collection areas as wasted money. The provision of facilities to encourage recycling may be seen as a further financial imposition, particularly if safety concerns are also to be addressed. This can also translate to additional costs and risks at the operational stages for services providers.

Waste collection for most residential properties within metropolitan Adelaide currently follows the standard provision of a weekly three-bin (household waste, recyclables, green waste) service model. This model is not always ideal for MUDs with problems often relating to lack of space for recycling facilities leading to visual, pedestrian and vehicular disamenity in the kerbside presentation of bins for servicing.



Challenges to implementation

To meet State Government waste management targets, suitable facilities within MUD developments will be required, and suitable contractual arrangements between waste contractors and those responsible for providing waste collection services, will need to be set in place to match the pace of growth.

The absence of a market motivation is compounded by the lack of a legislative or regulatory framework to oblige stakeholders to take steps to move towards desired behaviours. Developers cannot be compelled at the planning stage to provide facilities to manage waste in their proposed developments, and councils have no universal requirement to provide a recycle collection service. Current legislation provides little clarity on where obligations may reasonably be expected to exist or be enforced. Consequently, waste is often neglected in design and planning discussions.

Recommendations and the way forward

With the current situation, it is difficult to see how the state's targets for waste diversion will be achieved in higher density dwellings. A fresh approach, involving all stakeholders, including those with legislative authority, is required to develop a clear path towards meeting both South Australia's development needs and its waste management aims. A key aspect of this will be strengthening Council responsibility for waste management and supported by guidance and best practice manuals for multi-unit developments.



1. Introduction

To assist all parties involved in the provision of medium and high density and multi-unit developments (MUDs) with delivering a consistent and optimised approach to waste management within those developments, and to ensure early adoption of these principles within the process, Zero Waste SA and the Integrated Design Commission are promoting the production of state-wide guidance and looking for options for a suitable framework delivery.

This guidance will support the intention to optimise waste diversion from landfill from medium and high density and multi-use developments, through the provision of accessible user-friendly recycling schemes as an integral part of development planning, allied to safe and convenient waste disposal and collection

This project sits within a broader strategy and policy context that establishes the principal drivers for this issue.

While there are many related targets in the SASP, there are two key targets which are most likely to drive the change that will lead to the need for Waste Management Guidelines for multi-unit development. Those are:

- ▶ **Reduce waste to landfill by 35% by 2020.**
- ▶ **Increase South Australia's population to 2 million by 2027.**

The Waste Management Strategy identifies in more detail how the reduction in waste to landfill is most likely to be achieved and likewise the 30 Year Plan for Greater Adelaide presents a blueprint for how population growth will be accommodated. A key target is:

- ▶ **Diversion from landfill of 70% of municipal solid waste arising in the metropolitan area by 2015.**

South Australia's Strategic Plan (SASP) was first released in 2004. It is a high level strategic document, produced by the State Government that sets targets which shape Government priorities. This document was updated and released toward the end of 2011. The aim of the SASP is to focus and drive change within State Government and in collaboration with other stakeholders.

1.1 This report

New approaches are needed in South Australia to manage waste and facilitate collection for multi-unit developments, as current operating practices are unlikely to be appropriate for higher occupant density developments. This report identifies the routes available for strengthening legislation and policy and operational influences, the challenges that are involved with this, and suggests actions available to achieve this.



2. Framework

2.1 Introduction

Within South Australia, a series of strategic documents have provided direction, priorities and targets for the future development of the state and the metropolitan area of Adelaide. Those documents that have particularly influenced issues relating to future forms of residential dwellings and associated waste management have included:

- ▶ The South Australia Strategic Plan (SASP) first published by the South Australian Government in 2004, and updated in 2011.
- ▶ The 30 Year Plan for Greater Adelaide (*Department for Planning and Local Government, 2010*).
- ▶ South Australia's Waste Strategy 2011-2015 (*Zero Waste SA, 2011*).

Amongst a range of issues addressed is the predicted increase of South Australia's population to 2 million by 2027.

It is envisaged that the population increase will see a shift from low-density, suburban growth towards medium- to high-density occupancy. This is likely to result in a significant increase in the number of medium- and high-density and multi-unit developments in focused areas and locations. This is a form of residential development currently relatively uncommon in metropolitan Adelaide, and which is seen as possibly presenting challenges in relation to waste management.

There are several key framework influences for waste collection in MUDs. These range from the regulatory and policy drivers to the industry associations and accreditations. A summary of these is provided below.



Summary of Key Framework Influences

- ▶ Federal and State legislation and policy.
- ▶ The South Australian planning and development assessment system.
- ▶ The development sector: Influences including increasing cost of land and construction costs; sustainability ratings standards.
- ▶ Industry Associations and Institutions involved in the development, design and operation of MUDs.
- ▶ South Australia's Strategic Plan (2011 Department of Premier and Cabinet) and the Environment Protection (Waste to Resources) Policy 2010 supporting the plan. Key targets:
 - Reduce waste to landfill by 35% by 2020.**
 - Increase South Australia's population to 2 million by 2027.**
- ▶ South Australia's waste strategy 2011-2015 key objectives and targets:
 - To maximise the useful life of materials through reuse and recycling.**
 - To avoid and reduce waste.**
 - Diversion from landfill of 70% municipal solid waste arising in the metropolitan area by 2015.**

2.1.1 Confirm Waste Management Aspirations

Published policy has set out the future vision for waste disposal through the Waste Strategy, SASP and Adelaide's 30 year plan. The deliverability of these aspirations needs to be confirmed in order to inform any future direction of waste management in MUDs. Projections in the 30 year plan forecast the population to increase by 560,000 over the 30 year period which will need an increase of 258,000 dwellings.

Recyclable materials such as paper and cardboard, and food and drink containers (steel, aluminium, plastics) are collected from residential dwellings for recycling in colour-coded bins. Despite the existence of an Australian Standard for waste bin colours¹, colours can vary between different councils. The most common system in metropolitan Adelaide uses fully-comingled recycling bins, where all recyclable materials are placed in a single bin. This requires only one collection vehicle and one trip past each residence. Recyclables are collected using similar types of bins and trucks used for garbage collection and are then sent to materials recovery facility (MRF) for sorting and processing. Appendix C lists waste and recycling centres and the commodities handled. Specifically for MUDs the multi-bin option per dwelling has not performed as well as in single dwellings and has other associated problems, namely in-building space and available presentation areas.

The value of waste streams needs to be considered as well. Co-mingled collections can balance out the fluctuations in price of different commodities (One World Environmental Solutions (2009)). High quality

¹ AS4123.7-2006 Mobile waste containers - Part 7: colours, markings and designation requirements



(low contamination) single commodity streams may have greater fluctuation risks, but for MUDs may be more valuable in the long run than regularly contaminated comingled streams.

There are different issues connected with existing and as yet un-built future MUDs, and therefore different approaches are needed for each. The relative rarity of higher density developments in Adelaide, and the current design of many of those that are in place, will make it difficult to incorporate adequate and usable recycling facilities within existing developments. Therefore, at this stage, the key focus should be on setting up the framework to get the best out of future developments, with efforts made to optimise the process in existing developments and opportunities investigated on a case-by-case basis as refurbishment takes place.

Action 1:

Confirm the waste expectation from future MUDs and identify resource-efficient collection strategies from those MUDs.

Reason:

To provide hard data to government, allowing it to give evidence-based leadership to achieve stated policy objectives, whilst limiting the externalisation of the overall costs of developers' lowest cost options for the design and construction stage.

2.1.2 Local Government Service Requirements

Statutory Services

Where obligation and responsibility lies in relation to enforcement of design and operational requirements for the management of waste from residential properties is currently untested. Far from being a driver for action, the current legislative position may be a constraint on the development of clear guidance.

Local Government is a key player in the waste management and recycling system. Most of the burden of managing recycling and waste management falls to councils. There is the expectation on Local Government to deliver on the State's Strategic Plan and the Waste Strategy target of 70% reduction in waste going to landfill. The Local Government Association is one of the principal leaders in maintaining momentum in this issue.

For the most part, councils decide what services they will provide locally, however, there are some statutory services which councils are required to provide by legislation (www.lga.sa.gov.au Introduction to Local Government Workbook October 2010). These include:

- ▶ Planning and development services, including building assessment;
- ▶ Some environmental health services, such as monitoring cooling towers for Legionnaire's Disease;
- ▶ Fire prevention (some building inspection, and some bushfire prevention planning functions are a duty, others are discretionary);
- ▶ Dog and cat management; and
- ▶ Some administrative requirements, such as preparing strategic plans for the area, maintaining an office, employing a Chief Executive Officer and supporting the elected Council.

These services are required under the *Local Government Act 1999*.

The *Local Government Act 1999* requires that a Council is 'responsive to the needs, interests and aspirations of individuals and groups within its community...' and that it must '...seek to ensure that



Council resources are used fairly... ‘ (Section 8, (b) and (h)). A number of other services therefore are usually provided by local authorities. The specification of these is defined by each authority independently. Waste-related services commonly undertaken or funded by councils in South Australia include:

- ▶ Rubbish collection and disposal; and
- ▶ Recycling.

Action 2:

Amend existing legislation to establish residential waste and recycling collection as a statutory service under the *Local Government Act 1999*. This will provide councils with the power to ensure waste collection (directly or through contractors) is undertaken for all dwellings including medium- and high-density and MUDs.

Reason:

This will provide councils with a clear responsibility for ensuring the collection of all residential waste and remove some of the current uncertainty about who is ultimately responsible.

This would clarify the situation and provide consistency of service across the State.

Standard and non-standard services

The Standard Council Service in Adelaide and its environs is:

- ▶ Three-bin waste and recycling service.
- ▶ Collection vehicle will pick up bins containing waste and recycling from public road verge.
- ▶

To facilitate this there should be:

- ▶ Space on the property to store three wheelie bins during the week;
- ▶ Street access available for the council’s waste collection vehicle;
- ▶ Verge at the front, side or rear of the allotment can accommodate two bins for collection each week; and
- ▶ Collection from a public road.

Other services are defined as “non-standard” or “alternative”. Councils are not required to agree to new non-standard or alternative design options proposed by applicants during development assessment, and will only do so at their discretion. In most cases, if a non-standard or alternative design is proposed, the local council will not agree to collect waste from the dwelling. In the absence of a council-provided service, alternative waste services are provided to a development privately, at the landlord’s expense. On these occasions, the council can have little control on the operational details of collections. If the number of MUDs in Adelaide grows, this uncontrolled element could account for a significant proportion of municipal waste in some council districts. Presently, non-standard and alternative services vary in terms of bin size, number, and location of presentation area; they may include collections from private



roads or from within property boundaries. On the description of a standard waste service it is likely that some MUD developments will fall within the current definition of non-standard or alternative service.

The 'standard' model for waste collection is recommended to be extended from the current three bin method to provide several options suitable for multi-unit developments, which developers would be required to consider. There is no reason why any new-build residential property should not be able to incorporate 'standard' waste collection facilities under an extended definition. Alternative services should only be permissible for a heritage building conversion, or if the location is especially unusual and it would be unreasonable to require a standard service.

Action 3:

Develop state-wide 'standard' residential waste collection methods that extend the existing three bin system to provide additional 'standard' options for multi-unit developments.

A 'standard' waste collection method should be mandatory for all proposed residential developments (including mixed use living developments), except in clearly defined circumstances.

Reason:

This would clarify waste collection arrangements; create consistency for developers and a clear understanding for the end user (residents and building management companies) as to the service they should receive. This will provide consistency of service across the State.

Finances and Rates

The *Local Government Act 1993* allows for the 'making and levying of annual charges for domestic waste management services'. This clause allows Local Government to fund waste collection services.

It is understood that currently rates can be applied differently by location, but it is not clear whether differentiation can apply for different dwelling types. Local councils should have the ability to increase or decrease waste charges for MUDs, to provide a standard service for an equitable rate. It is recommended that the ability to do this be investigated and if it is not currently possible, that consideration be given to amending the Act or supporting regulations in order to allow it.

In order to support any rate differentiation, a financial study into the cost of providing a service to MUDs may need to be undertaken. This should include identifying any new infrastructure or contract arrangements. Initially the costs to provide a service to MUDs may be high for some councils due to those dwelling types and waste collection options being uncommon in their area. As a result, the need for subsidies or incentives should also be considered.

Action 4:

Review the existing regulatory framework to facilitate appropriate differentiated waste collection charges for MUDs.

Establish the cost for waste and recycling collection services from MUDs for budgetary purposes, and identify if this can be wholly met by rates, or if subsidies or incentives will be needed initially.

Identify from where subsidies could be provided, or what other incentives are available.

Reason:

This would provide local councils with the financial resources to provide a suitable waste service to MUDs.



2.2 Legislation and Development Assessment

Key State policies have been summarised into a series of high-level aims for waste management, through the SASP and the Waste Policy documents. High-level aims need to be translated into specific planning and design policy and objectives which can be applied at different scales of residential MUD development, ranging from low level to high-rise dwellings.

Councils should have a statutory responsibility to plan for waste management in their areas, primarily through the development assessment and building assessment process which should be supported through the local development plans. A minimum requirement for waste and recycling provision should become part of this. All new residential developments should accommodate a 'standard' method (alternative methods should only be in exceptional circumstances).

There are a number of legal principles that apply to the development assessment process. In general terms, the Development Assessment Panel (DAP) or Planning Officers are charged with the responsibility for assessing development applications (this includes land division proposals). The assessment of applications needs to be against the Development Plan. The policy contained in Development Plans provides the guidance for these decisions. These are public documents so that applicants and the community can access this policy and understand the range and nature of issues and considerations covered. There are legal rules and restrictions on what matters a DAP can take into account and how it can apply policy. In general terms, the matters that a DAP can decide on need to fall within the definition of 'development' (as defined within the *Development Act 1993* Part 1 (4)).

The ***Development Act 1993*** is not designed to control management issues, matters that change over time and processes. In the context of individual development applications, a wide range of policies as outlined in the Development Plan are considered by the DAP. These all have equal weight and the application is assessed on balance against all policy considerations. It is possible that there is a gap in planning assessment knowledge around waste disposal and recycling that is translating into less than optimal assessment decisions. There are a number of areas in the current planning system which could be strengthened in order to proactively improve waste management outcomes for future MUD developments:

- ▶ Legislation to require a minimum standard of waste and recycling facilities to be provided in new builds or building refits. This could be through the *Development Act* or its supporting legislative measures;
- ▶ During the assessment process, a statutory consultee (e.g. a Design Panel) or a suitably qualified and experienced planning officer should have the responsibility to assess the waste management plan and proposed facilities. Meeting the minimum standards should be a condition of gaining planning permission;
- ▶ Provision of a Waste Management Plan for all MUDs should be mandatory. This should include the design parameters and operational phase of a development;
- ▶ Publication of guidelines to assist assessing officers understand the information required;
- ▶ Guidelines should be supported by a non-statutory best practice manual;
- ▶ Introduction of policy into the South Australian Planning Policy Library; and
- ▶ Training for key planning staff.



Action 5:

Establish a legislative requirement that sets minimum waste and recycling measures that must be included in residential designs. This should be undertaken under the *Development Act 1993* (Section 33 *Matters against which development must be assessed*), or its supporting regulatory instruments.

This should also identify the office or review panel which will be consulted specifically on this issue as part of the assessment process.

Reason:

The above will establish a specified baseline level for all developers, define who can undertake the review of waste issues within the planning application, and create a clear standard for that review.

Status of the Guidelines

Guidelines should be established to assist the development assessment process. The aim of these guidelines should be to set out the key planning principles which should guide the preparation and assessment of planning applications for residential development in urban areas.

Ideally, assessment guidance in the 'Guidelines' that are relevant under the *Development Act* should be converted to 'policy' and included in development plans. However, the guide may also assist in clarifying what councils are specifically seeking (from an ongoing management perspective) for the purposes of finalising the title issue procedures.

Structure of the Guidelines

The guidelines should not be over-prescriptive but, taking account of current and planned practice, set out an evaluation framework for deciding on the most appropriate waste system for the planned development, and place emphasis on creating high quality facilities through paying close attention to design.

The guidelines should:

- ▶ Specify the 'standard' waste collection services that will be provided by the local council for MUDs;
- ▶ Show how design criteria will be applied by the Planning Officers during the assessment process;
- ▶ State the specific parameters which must be met (for example; safe access, provision of facilities for at least one recycle stream and residual waste, separate recycling facilities on each floor if building is above five floors); and
- ▶ Identify the key components to be included in a waste management plan.

The emphasis should be on identifying minimum standards which optimise outcomes without being too prescriptive or stifling innovation.



Action 6:

Produce waste and recycling guidance principles.

Development Assessment Panels and Planning Officers should be required to have due regard to the guidelines in carrying out their functions under the *Development Act* and the *Local Government Act*.

Reason:

This would clarify waste collection arrangements; create consistency for developers and a clear understanding for the end user (residents and building management companies) as to the service they should receive. This will provide consistency of service across the State.

Best Practice Design Manual

The guidelines will develop the context for development assessments. This should be supported by a more detailed non-statutory design manual. The benefit of the manual being non-statutory will include ease of updating, and allow a focus on waste-management outcomes rather than specific techniques or equipment. The design manual should highlight best practice, and be read in tandem with the guidelines illustrating how policy principles can be translated into practice by developers and their design teams and by local authority planners. The design manual will cite examples of good practice from across the spectrum of development locations, and provide targeted advice for the waste management parameters specifically required by MUDs. The design manual should show how design principles can be applied in the design and layout of new residential MUD developments, at a variety of scales of development and in various settings. In particular, the design manual should set out a series of criteria which should be used at pre-application meetings, and in the assessment of planning applications and appeals.

Figure 1 (below) illustrates an example from the City of Charles Sturt Residential Waste and Recycling Guidelines for New Developments.



Figure 1 City of Charles Sturt Checklists

Appendix E: Waste Management Plan Contents

The following is the expected format and content that must be included in a Waste Management Plan for a Service Type C residential waste system.

Section	Expected content
1. Development details	Location; name of developer; description of development including and occupancy data
2. Type of Waste System	Council Service or Alternative Waste Service; Individual bin sets or Bins; Waste Service Provider; Location of Bin Storage Area and Collection points for selection and design of waste system
3. Waste System Sizing	Number & type of waste and recycling bins per dwelling and for development for system sizing, including per dwelling generation rates, peaking factors assumed; Calculation worksheet for waste generation estimation
4. Bin storage location	Description of design methodology, addressing key issues of: sizing; access; bin removal for collection; bin labelling and signage; and no amenity. Calculation worksheet for number of bins and sizing of area
5. Presentation & collection points	Summary of design methodology, addressing key issues of: sizing; presentation frequency and timing; collection vehicle access; and public safety. A service provider appended including correspondence confirming suitable collection arrangements
6. Specialised Facilities & Equipment	Where specialised facilities and equipment, such as waste chutes, collection equipment, etc., are proposed, provide brief description of design and rationale for why and how they were selected and sized, and how they integrate into and function as part of the residential waste system.
7. Management	Description of waste system management responsibilities and operations development complete, including details of any property management
8. Resident communication	Methods to educate residents about waste and recycling systems and Append copies of proposed tenancy agreements or residents' manuals of the waste system.

Estimation of service costs for residents, and how the proposed waste and recycling system minimise costs for residents for the waste collection service, should be considered in the preparation of the Waste Management Plan not part of the development assessment undertaken by Council.

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@wma.org.au

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Waste System Design Checklist

Service Type B – Non standard Council service

Applicant/Proponent:		
Contact details:		
Proponent's representative:		
Contact details:	Phone:	Email: Mobile:
Development ID: (for Council use only)		
Location/Address:		
Item	Check	Brief Comments (if and where applicable)
1. Street access for Council waste and recycling vehicles confirmed?	<input type="checkbox"/> Yes <input type="checkbox"/> No	Note: existing public roads can be assumed suitable unless Council has advised otherwise.
2. Bin storage area (on property): <ul style="list-style-type: none"> Screened from public view? 2m wide x 1m deep per allotment? Located away from windows and doorways? On a flat paved or sealed surface? Easy for residents to access? Has a flat, 0.9m wide pathway to the presentation zone, with no steps (min. 1.2m path for bulk bins)? 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
3. Bin presentation area (on verge): <ul style="list-style-type: none"> On a public road? Located at front, side or rear of each allotment? 1.6m wide x 1m deep per allotment (or as required for shared bins, including bulk bins)? On a flat, stable surface? At least 1m from shared or communal driveways? Located outside the canopy of street trees (i.e. not under trees)? Unlikely to be blocked by parked cars? Allows 1.2m wide pedestrian thoroughfare? 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	
4. Documentation included with development application: <ul style="list-style-type: none"> Scale plans show bin storage area design details (on property)? Scale plans show bin presentation area design details (on verge)? 	<input type="checkbox"/> Yes <input type="checkbox"/> No <input type="checkbox"/> Yes <input type="checkbox"/> No	

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The manual should cover issues such as providing adequate provision for the storage and collection of waste materials, with appropriate reference to the projected level of waste generation, collection frequencies, and types and quantities of receptacles required. Illustrations such as that in Figure 2 should be provided. If insufficient provision is made, problems of dumping, odour and vermin are likely. Developers should therefore ascertain the relevant local council requirements for waste management storage and collection at the pre-planning stage. This is covered in greater details in Chapter 3 *Operations*.

Figure 2 Illustration of Bin Zones – City of Charles Sturt Residential Waste and Recycling Guidelines

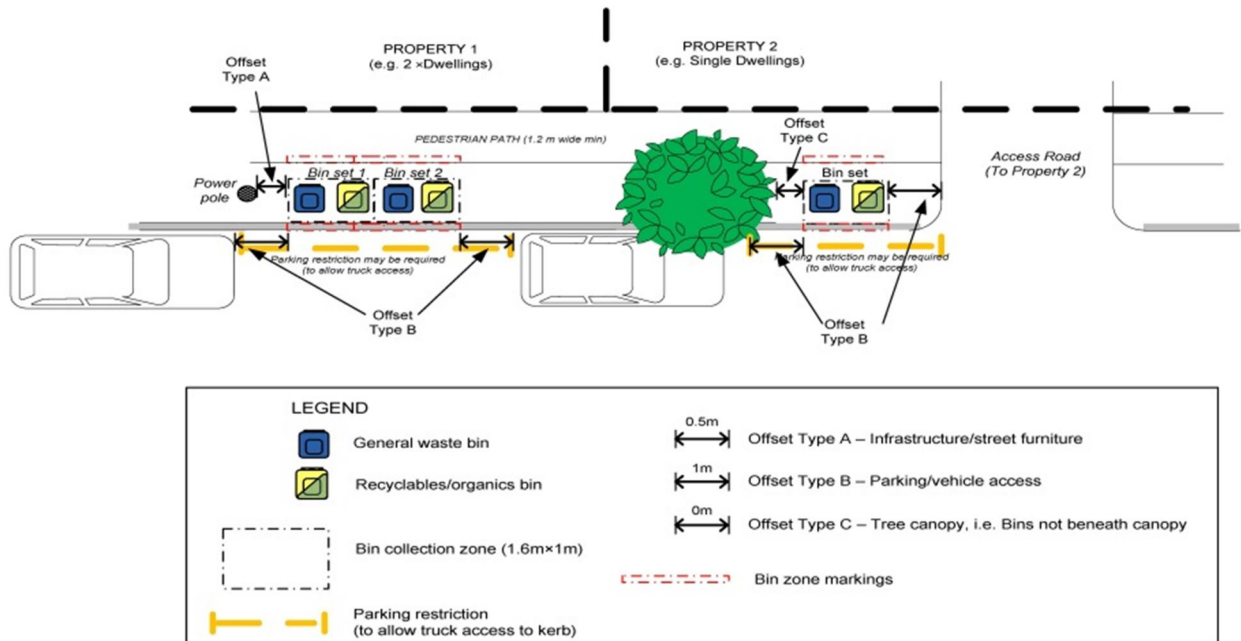


Figure 3.2: Illustration of typical arrangement of bin zones on road verges suitable for a Standard Council (3 bin) service. This diagram illustrates the range of issues that should be considered when laying out allotments and streetscapes in new developments. Note: in some circumstances (such as in rear laneways) residents may need to present bins across their own driveways (but not across shared driveways or those used by other residents).

Standard Council Service (3 bin system)
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It should be intended that both the guidelines and the best practice design manual will be of assistance to developers and their design teams in preparing residential schemes.

In many cases the design and development process relates to commercial interest at the initial sale rather than the long-term performance of the building. Design quality then becomes essential to protect the quality of life of apartment residents and the longer-term sustainability of these developments. Good designers should always find innovative and cost-effective ways to incorporate appropriate standards.

Some councils have already developed a waste management manual for MUDs. The City of Charles Sturt has developed a manual specifically for new developments. Examples of the contents of a Waste Management Plan and a checklist to assist developers in identifying their obligations are below.

The twin track approach of developing the legislative and regulating framework, alongside the production of a manual, has been implemented. This has been achieved in New South Wales through its SEPP 65 – Design Quality of Residential Flat Development legislation. This legislation was supported with guidance for MUD design, which included waste management.

Case study 1 describes the model established by SEPP 65, and could provide a South Australian template for mandating improved design quality. This guidance provides a balance to the pressures of building at higher densities in order to ensure functionality and amenity in new homes. It has the potential to become a facilitator for change through the application of its principles. While improvements can be made to this model, it has shown that design quality and improved amenity can be achieved through planning legislation. This case study demonstrates the importance of political commitment and the need to legislate to effect real change.

Case Study 1 - New South Wales Residential Flat Design Code

In New South Wales SEPP 65 – Design Quality of Residential Flat Development was legislated as planning law in July 2002. This established consistent objectives and processes within the planning system and enshrined the role of registered architects in designing this building type. It also established design review panels to monitor and advise on multi-unit residential development, and defined principles for design quality which included waste management.

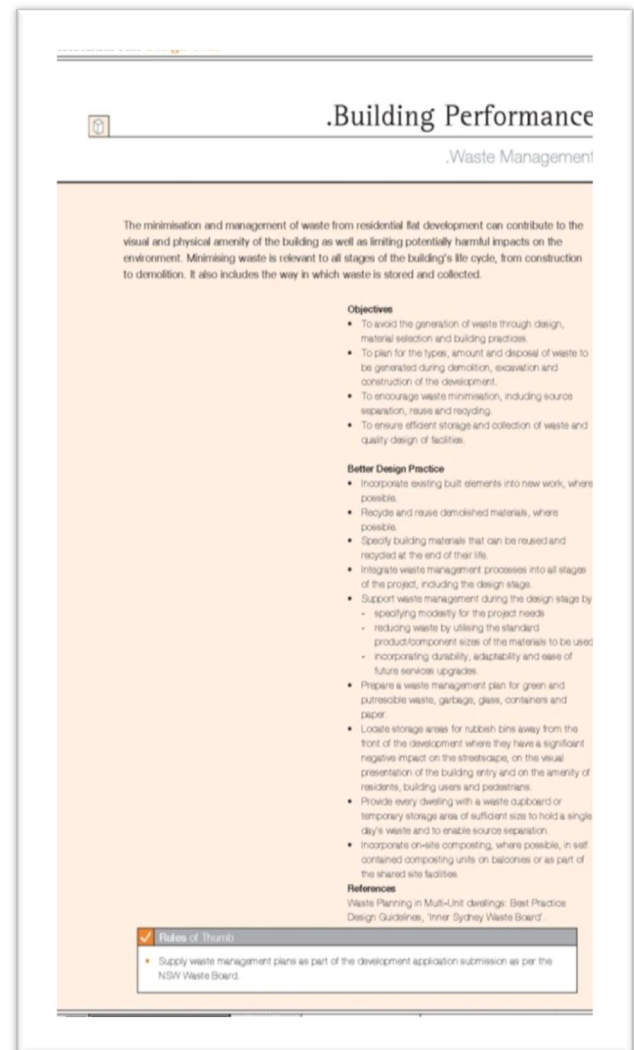
The aims of the legislation was to better satisfy increasing demand and the changing social and demographic profile of the community, to maximize amenity, to promote safety and security for the benefit of its occupants and the wider community, and to minimize the consumption of energy from non-renewable resources.

This was followed in September 2002 by the Residential Flat Design Code (RFDC), a design manual which is a resource to enable councils, planners, developers and architects to improve residential flat design which has been adopted as minimum standards for acceptable development. The specification for waste management is shown opposite.

Lessons Learnt

This program has had a few challenges:

- ▶ The review panels have not been universally adopted. In some areas assessment has been left to council staff, who are not always sufficiently trained in the application of the
- ▶ The balance between prescriptive and performance standards is always difficult, with the desire to prevent the worst potentially blocking the best.
- ▶ There have been occasional rejections of creative design solutions through the poor application of the RFDC. This is a problem with the uncritical application of any legislation, and can be helped in this instance by the greater use of the review panels, whose membership brings expertise and greater understanding to the assessment of individual design solutions.
- ▶ Where panels have been used they are often applied to developments beyond the mandate of SEPP 65, as they are recognized as making a positive contribution to improving design quality.
- ▶ The Urban Taskforce (a developer lobby group) has argued that SEPP 65 adds to the cost of development on sites with low margins by demanding amenity considerations that are unaffordable.



The main planning tool available to councils in NSW to influence the design of new MUD developments, to take into account appropriate waste management systems, is the Development Control Plan (DCP).



DCPs set out the requirements developers must address in the design of waste facilities in order to gain development approval. To aid local government in this area in 2008, the then NSW Department of Environment and Climate Change (DECC) released the “Waste Not” DCP, a model DCP for councils to use. This guide can be accessed at <http://www.environment.nsw.gov.au/warr/WasteNotDCP.htm>. The NSW Office of Environment and Heritage also provided training to assist councils and certified professional in understanding and implementing the DCP.

The “Waste Not” DCP is enforced through the development assessment and approval process of the NSW *Environmental Planning and Assessment Act 1979*. Subsequent non-compliance with approvals is pursued under this Act, by way of the issue of relevant orders requiring compliance and subsequent legal action for non-compliance. The council or an accredited certifier (as defined under the Act) is responsible for enforcing the observance of the provisions of the DCP.

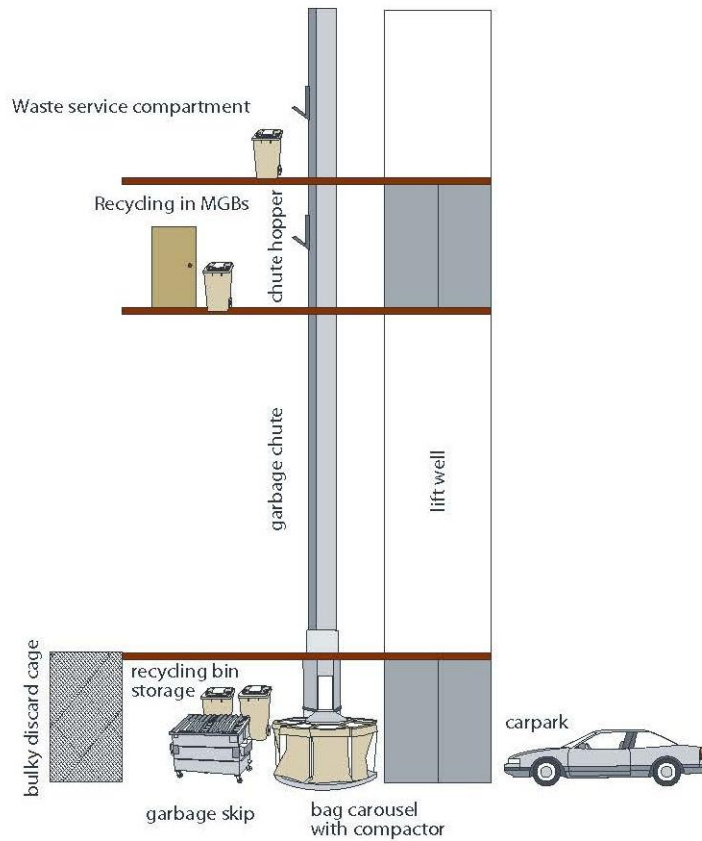
Resource NSW produced a manual *Better Practice Guide for Waste Management in Multi-Unit Dwellings*. In 2010 Sustainability Victoria issued a rebadged version for local use. Individual councils such as the City of Sydney, which features a large number of MUDs, have also prepared their own manuals. These manuals provide assistance to developers and other stakeholders as to how waste management facilities could be arranged in high-rise buildings. A suggested design is shown in Figure 3.



Figure 3 Disposal layout - Illustration from DECC NSW (2008) Better Practice Guide for Waste Management in Multi-Unit Dwellings.

High-Rise Residential Blocks More Than Seven Storeys

Better Practice Guide for Waste Management in Multi-Unit Dwellings





Action 7:

Prepare a best practice design manual to support planning assessment guidance.

Reason:

This would provide options and ways of meeting the minimum standard required by all developers. This will provide easy to use check list and specifications for the detail to provide in a waste management plan. This will remove any confusion as to the minimum mandatory measures that must be met.

Health and safety risks of equipment and storage arrangements can be also be designed out at this point and amenity of the building environment can be improved through establishing minimum standards.

2.3 Building Codes

There is currently a lack of guidance that addresses waste management for multi-unit developments in the Building Assessment process. The Building Code of Australia, with SA Minister's Variations, is now the regulatory document for dwelling construction in South Australia. The National Construction Code (incorporating the Building Code of Australia series), is primarily concerned about safety and amenity, and there are no provisions for waste collection. Consequently, the building regulations in effect in South Australia do not cover the topic of waste management, possibly because waste is not considered an essential service within the context of the Building code. This weakens the enforcement of design requirements. It should be noted, however, Australian Capital Territory has produced a Development Control Code to manage, *inter alia*, waste issues as highlighted below in Case Study 2.



Case Study 2 - ACT Development Control Code for Best Practice Waste Management

The ACT Development Control Code contains the following points within its performance requirements:

Provision must be made within buildings for the collection and temporary holding of solid waste. The design must accommodate screening, volume of waste, disposal, logistics and access (ACT AP2.2)

Garbage facilities must be designed and constructed in accordance with the Development Control Code for Best Practice Waste Management in the ACT. (Waste management - ACT A2.102)

Issues

The Development Control Code for Best Practice Waste Management in the ACT directs professionals such as engineers, architects, planners and developers on how to ensure their applications comply with the best practice waste management requirements applicable for the demolition, refurbishment, construction and operational phases of projects. The *Building Act 2004*, and regulations under that Act, requires a Waste Management Plan to be incorporated into the approval process for building work. A building cannot get approval unless it has met the requirements of the development control codes.

Lessons Learnt

The intent of the code is to offer a performance-based approach to meeting waste management

requirements by using performance criteria and measurable standards. Compliance with the performance criteria will be the primary consideration when assessing applications for Building Approval.

In assessing applications, details provided in the Waste Management Plan and on the plan drawings, will be checked for compliance with the performance criteria for the proposed use (e.g. multi-unit housing as shown below) and against the general aims and objectives of the code.

In the absence of developed amendments to the Code, Councils in South Australia could be encouraged to develop similarly effective Development Control Plans. The ACT has set a precedent, in terms of what is possible, and its experience could be built upon to achieve the same effect as producing amendments to the South Australian Code.

Primary concerns of the National Construction Code include safety and amenity. These are both issues linked with waste management in residential dwellings. Poor design, or late changes in designs can

5.4 RESIDENTIAL – Multi-unit Developments and Cluster Developments with more than 10 units

INTENT

To implement best practice solid waste management (source separation, reuse and recycling) and ensure quality and effective design of storage facilities addressing waste generation volumes, frequency of collection, public amenity, and safe and convenient collection.

PERFORMANCE CRITERIA

The intent may be achieved where:

- sufficient space is provided within each unit for temporary storage of recyclables and garbage;
- best practice communal facilities taking into account future needs;
- ensure safe and convenient use of the storage area;
- best practice collection is followed – See Section 8 of the code.
 - trucks should move in and out in a forward motion.
 - siting of the waste storage area where ever possible should suit mechanical pick up of waste hoppers by front-end loading trucks.
 - hopper servicing should occur with the truck contained within the leased boundaries of the block.
 - sections of the internal road that need to be used by the collection truck should be of industrial type pavement.
- adequate space has been provided for individual composting or communal composting where layout allows for it.
- there are washdown provisions – assessment based on the type of waste handled.

ACCEPTABLE SOLUTIONS

- use of separate storage containers for garbage and recyclables.
- storage areas should meet requirements of Sections 7.3 and 8.4 of the code and design and siting of facilities should comply with Sections 6, 7 and 8 of the code.
- user convenience – maximum carting distance should be 75m. For aged persons or persons with a disability this distance should be limited to 50m (see Diagram E). Bin carting grade should not exceed 10%. Every enclosure or room should be provided with a 'user' access.
 - the gates or the roller shutters should be kept closed except when the hoppers need to be accessed by the truck.
 - co-location of the waste storage containers and recyclable containers is preferred.
- reversing of trucks onto a public road will be considered, only if the applicant can demonstrate that reversing is essential and approval is given by the Manager, Traffic Infrastructure Policy addressing traffic and public safety issues.
 - hopper service area should be of industrial strength pavement to take up front-end loading and be clear of structures for a height of 6.1m.
 - location of hopper service area should allow truck to be parked safely within the premises whilst servicing.
 - industrial strength pavement should be provided on the section of the internal road used by the collection trucks (See Diagram F).
 - basement for storage/collection of waste/recyclables. Proposal should comply with Section 8.7.
- communal composting area should be suitably located. See Fact Sheet 3 on composting.

NOTE. If a private waste operator is used, the lessee should confirm this in writing. A letter from a waste operator confirming the viability of collection should also be submitted to ACT Waste.
- washdown provisions – see Section 7.7.



result in an inferior arrangement which does not work as well as it could and has inherent difficulties for waste collectors or residents and reduced amenity within the dwelling and neighbourhood. Health and safety requirements should ensure that public safety, access and amenity associated with storing and removing of wastes are satisfactorily addressed. This should include safe and easy access for collection trucks and that equipment is suitably designed to allow safe operation by residents and collection companies.

Action 8:

Investigate the development of a route to amend the South Australia building regulations to include reference to appropriate waste management. This should be supported by a Minister's Specification for Best Practice Waste Management.

Health and Safety aspects of residential waste management operations should be assured through the Building Codes.

As an interim measure, appropriate Development Control Plans should be issued by Adelaide councils to have the same effect.

Reason:

This would provide a minimum standard required by all developers and require its consideration during building consent assessment at the detailed design phase of a new development.

The above will provide the tools to allow the Building Rules Assessment and Planning Officers to effectively influence the design and operation of MUDs.

Health and safety risks of equipment and storage arrangements can be designed out. Amenity of facilities and the surround environments of residential areas can be improved through establishing minimum standards.

2.4 Enforcement

The routes for enforcing the proposals discussed above should also be considered at the time of making any changes to the existing regulatory framework.

Enforcement of design is already an established element of the development assessment process. As with many other aspects of building design, if development assessment or building rules requirements are not met, then planning can be refused. After construction is complete, the requirements of planning and building rules are checked (by the council or private certifier) before issuing of the certificate of occupation, without which the building cannot be used.

The new Adelaide City Design Review Panel will have a formal role in the city planning regime for Adelaide. Where development projects are within the Adelaide City Council area, have a contract value of over \$10 million and are to be assessed by the Development Assessment Commission (DAC), they will be referred to the South Australian Government Architect and Executive Director of the IDC who convenes and chairs the Panel. The Panel process will be governed by Terms of Reference, which will contain key reference documents that describe good design practice to assist the panel members with their review process. The waste management best practice manual could be included in these documents, and therefore could have influence over how waste-management issues relating to developments are reviewed in the city. The Integrated Design Commission is currently working with DPTI to develop these documents. This route of pre-lodgement for significant applications could promote high-quality, innovative design early in the development and make sure that buildings are better connected with their surroundings. It is to be linked to a new streamlined development assessment process.



During the operational phase, it is less clear what the control the council will have. Some of the following may be applicable:

- ▶ It is understood that building management companies or residents can be enforced to have waste removed through the Public Health Act, for the purposes of protecting community health. It is not clear if this could be extended to managing recycling responsibilities as well;
- ▶ There may be council bylaws, with financial penalties, that can be created or extended to enforce the correct use of recycling facilities;
- ▶ Suitable responses to ongoing failures to control contamination of the recyclable waste stream should be investigated.
- ▶ Educational programs for MUD residents could be undertaken in building where it becomes apparent facilities were not being used properly.

Action 9:

Before any changes are made to the regulatory framework, enforcement routes should be thoroughly consulted on and confirmed. Appropriate measures to allow the changes to be enforceable should be included.

Reason:

The enforceability and potential costs of enforcement should be identified before any changes to policy or legislation is made, to check that enforcement is possible and affordable.

2.5 Other Tools

There are a number of industry associations which have influence in the development of new dwelling and associated waste management (see Appendix C for a list). Industry associations can play a key role in facilitating adoption of new ideas and best practice. However, without a clear driver for change, such as government policy, there is likely to be some reluctance to incorporate new ideas.

The National Australian Built Environment Rating System (NABERS) Waste rating allows the applicant to compare the waste generation and recycling performance of its building to other similar buildings. The Leadership in Energy and Environmental Design (LEED) program developed by the US Green Buildings Council also includes a rating system for the operation of high performance green buildings. Further work with the industry associations and institutions could improve existing performance based accreditations through including a larger waste management element, particularly for the operational phase of buildings.

The Green Building Council of Australia (GBCA) released the Green Star - Multi Unit Residential v1 rating tool on 2 July 2009, to promote the design and construction of high-performance green residential developments. This rating system includes provision for providing suitable space and access for waste and recycling within a communal area. There is no specification to provide space within an individual Unit. GBCA is currently developing a building management rating tool, specifically to be used during the operational stage of a building.

The Queensland Government has developed its 'Green Door' program, described in Case Study 3. The objective is to work collaboratively with developers who aim to achieve the highest level of sustainability.

Case Study 3 - Green Door, Queensland

Green Door is a planning process that aims to maximise outcomes through the existing assessment process. This support aims to assist developers create 'well made' applications that can be assessed



through a streamlined integrated development assessment system. A dedicated State Government Case Manager will work with the local government assessment manager, referral agencies and the applicant to identify what information will be needed to enable the appropriate and timely assessment of a development application. All Green Door projects continue to be assessed by a local government assessment manager through the Integrated Development Assessment System.

Green Door is not intended to be an alternative development assessment process, but projects are expected to be exemplary sustainable developments which demonstrate sustainability outcomes that are significantly higher than the current expected requirements. One of the principles is:

Waste and materials- Avoid waste generation or significantly reduce the waste generated on-site and convert unavoidable waste into a valued resource during construction and operation.

Lessons Learnt

The need to have route for the ongoing monitoring and improvement of the Queensland planning framework was identified. This will be supported by the Green Door Advisory Committee reporting on the findings from Green Door projects and make recommendations to the planning Minister.

Where Commonwealth land is being released or sold, there are opportunities to attach encumbrances to the sale to ensure a high quality design, as has been developed with the Bowden Development summarised in case study 5.

Case Study 4 - Bowden Development, Adelaide

The 16-hectare Bowden development is the first in a series of walkable neighbourhoods being developed under the 30-year Plan for Greater Adelaide. It is projected that the former industrial site will eventually be home to some 3,500 residents living in over 2,200 dwellings, within a mixed use neighbourhood to be delivered over a 10-15 year period.

The project will be staged and comprise individual allotments to be sold to builders and developers with the Urban Renewal Authority (URA) being responsible for public realm delivery.

The URA has prepared Urban Design Guidelines for the Bowden Project. Selected purchasers of development lots will be required to submit detailed development proposals to obtain approval against the Urban Design Guidelines from the URA (prior to the purchaser seeking statutory approvals or commencing development). A Design Review Panel has been established to consider detailed development proposals in accordance with the Urban Design Guidelines. The Urban Design Guidelines will also be administered by encumbrances to be lodged on the titles.

One of the aspirations of the project is to:

Reduce waste by 90%. Decrease construction waste by 90% with smart design and future recyclability. Provide ergonomic facilities, education, and incentives to occupants, limiting waste sent to landfill to 5% of State average, with at least 70% being reclaimed and re-used, recycled or composted. Recycling and composting made easy through the provision of on-site segregation and composting facility services.

Developers will need to meet a number of requirements including the need to:

- ▶ Meet the City of Charles Sturt requirements for waste storage and collection (being Council's Residential Waste and Recycling Guidelines).
- ▶ Provide an appropriate waste management plan with building development applications in consultation with Council



The URA also prepared a waste plan for Stage 1 of the Bowden project prior to the lodgement of the land division. This sought to identify how waste recycling could work for the first stage of the project and provide some guidance for Stage 1 developers. In addition, the URA is also considering the preparation of a broader waste management strategy for the Bowden project in order to further consider options for waste and recycling. Potential matters to be considered as part of the waste management strategy include waste recycling storage facilities, composting facilities and options, waste collection options, waste education programs, innovative waste recycling options and addressing waste recycling in tender documentation.

All developments within Bowden must adopt the Green Star rating accreditation tool and will be required to achieve a minimum 5 Star Green Star Design rating to achieve encumbrance compliance.

Lessons Learnt

The URA needed to find a method by which quality design would not be left to chance. This is expected to be achieved through provision of the following two control mechanisms:

- Clear guidelines.
- An enforcement body.

The Design Review Panel was formed to review all design proposals by the developers and builders involved in delivering the various stages of the project, to ensure that all the design principles embedded in the project's Urban Design Guidelines are respected and the Green Star rating is met.

Stage 1 release of allotments is due to happen shortly. This will provide an initial view of how developers plan to meet the waste commitments, which may provide innovative design which can be transposed to other council areas.

There is the risk that well-made procedures established now could become watered down or subject to drift over the 10-15 years of the development period.

5000+ is a design-led project for the redesign, renewal and reactivation of inner Adelaide, funded by the three tiers of Government. The project has been run in five separate themes to focus thinking on; Green, Vibrant, Moving, Liveable and Leading. The distillation of the thinking under each of these themes was then subject to a series of design testing exercises with key ideas and findings. These key findings and propositions are compiled in guiding principles and a place shaping framework document for the funding partners. This project could align with the intentions of the waste management guidelines and best practice manual. It supports the need for best practice sustainability pursuits which minimise waste and better integrate services and facilities in the built form and public realm of the city promoting increased health and wellbeing for residents.



Action 10:

Identify which performance-based rating systems or other tools will be relevant to MUDs and waste management performance. Establish connections and identify where strengthening of rating systems or provision of other information could be made.

Maintain contact with the Bowden Design Review Panel to gain feedback on their process, and issues that are arising as this development progresses.

Reason:

This will provide incentives to developers and architects to meet and exceed best practice and develop schemes which are designed to function appropriately during operation.



3. Operations

3.1 Introduction

Medium and high density and multi-unit developments present a range of challenges for the provision of waste management facilities. Space is usually at a premium and expensive. Developers may see waste storage and collection areas as wasted money. The provision of facilities to encourage recycling may be seen as a further financial imposition, particularly if safety concerns are also to be addressed. This can also translate to additional costs and risks at the operational stages for services providers.

Waste collection for most residential properties within metropolitan Adelaide currently follows the standard provision of a weekly three-bin (household waste, recyclables, green waste) service model. This is currently undertaken using a range of standard equipment by contractors operating within defined service levels, working to long-term contractual arrangements with local councils.

3.2 Operational Mechanisms

3.2.1 Single dwellings

In waste management terms a single dwelling is one that receives a waste service that is clearly and easily attributed to that dwelling, and one set of bins that is stored and secured in it, and not part of a shared system. This includes the conventional idea of a detached, semi-detached, group or row of dwellings, each with their own waste service, and having their own bins, which is the responsibility of, and secured by, the occupier, and not shared or able to be shared with any other dwelling.

3.2.2 Multi-unit developments (MUDs)

Multi-unit developments are residences where there are more than one dwelling on the property and where all dwellings share and have access to a single bin or set of bins. This includes the conventional idea of MUDs, such as residential flat buildings, but it also includes detached, semi-detached, group or row dwellings, developments where no single occupant has responsibility for their own bin and all share common infrastructure, usually located in one designated place. Bins may well be numbered at some MUDs with the intention that only occupants of that numbered unit use that bin, but if all other residents also have access to that bin, the property falls under the definition of a multi-unit dwelling.

High-rise blocks are also a type of MUD that, in many cases, has been fitted with waste chutes. More information about chutes is provided later in this report, but essentially chutes are one or more tubes that extend through each floor from the top of the building into the basement where they empty into either a bin or a compactor. The advantages, disadvantages and issues related to chutes are also covered later in this report.

3.2.3 Residential Complexes

Not all MUDs are simple block of units. Some medium density residential complexes also fall under this definition. These developments consist of a large site on which many residential dwellings are constructed, either at the same time or using a phased approach. Typically, they feature their own internal roads and may also have their own retail outlets. There may be a range of different dwelling types from villas to high-rise blocks.

The waste system is often integrated into the design of the whole site, even if it is a phased development. A single waste system may service the whole site, and a range of different dwelling types, or more than one system, may be developed for different parts of the site. Managers of developments of



this nature often engage their own contractor to provide the waste collection service, even though it may be the local council's responsibility to do so.

3.2.4 Locked Gate Communities

Some residential developments are built inside a secure boundary that prevents any unauthorised visitors. Developments of this nature present special issues for local governments and waste contractors providing waste services. Care must be taken by architects and councils to ensure that not only are waste collection services able to be provided but that there are no reductions in levels of service or environmental standards due to the secure nature of the facility. It may be possible for collection vehicles to enter the site to provide the service or it may be that facility managers undertake an internal collection and bring waste to a central location outside the site for collection by council or a contractor.

3.2.5 Mixed Use Living

Mixed use living developments include a combination of major land-use types such as residential, retail, office and commercial, civic and light industrial. Some developments feature retail outlets and hotel or serviced apartments as part of the same complex.

Waste collection and storage systems should be, and mostly are, separate for the residential and commercial elements in the same development. Residents normally pay a flat rate for their waste service, which, in these situations, may be incorporated into each dwelling's management fees. A similar arrangement often also applies for office accommodation and can also apply to other retail and commercial operations in the same complex. This is often the only solution where there are a large number of occupants, and allowing each to make their own waste collection arrangements is impractical.

However, in smaller developments, retail and commercial occupants may make their own individual waste collection arrangements, in which case it is advisable to keep the commercial and residential systems separate and secure to prevent any cross-use, particularly by commercial operators abusing the residential system to avoid commercial waste disposal costs.

3.3 Building Design

Good urban design is about creating a high quality vision for an area and then deploying the appropriate skills and resources to realise that vision. High standards of design are needed to ensure that new housing developments create MUDs that work well for the end users, as well as meeting aesthetic aspirations. A key design objective should include delivering sustainable waste management principles. The underlying approach should be to build dwellings not only for short-term market demands, but to meet the needs of the occupier and provide long-term flexibility of use. Clearly defined policies and guidance create more certainty for potential developers and their design teams, and also provide a basis for developing a shared, collaborative approach to pre-application consultations with the planning authority. An overall development framework that creates a consistent baseline for all developers is more likely to achieve planning goals.

Provision of clear building design specifications will assist developers and architects in understanding the parameters they must work within, and the facilities they are required to include in the building and any curtilage or building set back arrangements required to provide enough space for bin presentation. This should minimise the inefficiencies of designs being altered at a late stage in project development, which can lead to substandard alternatives being provided at increased cost, as shown in Case Study 5. This can result in future residents and collection companies working within an inefficient, poor quality arrangement and potentially placing a burden of additional waste management costs onto future occupants.

Case Study 5 - Whitmore Square eco-housing development, Adelaide

At the development assessment stage of Whitmore Square, issues with the design of waste management facilities for a 26-dwelling affordable housing initiative were identified.

The original design proposed Adelaide City Council's standard residential waste service collection. Each dwelling was to have one bin each for waste and co-mingled recyclables, a total of 52 in all.

Two main issues prevented the original design being acceptable. These were:

- ▶ The area allocated for bins in the basement area displaced several residential parking spaces.
- ▶ The access ramp to be used by residents taking bins to the street frontage was considered too steep for safe use, and use of the disabled access was not permitted.

In addition a new requirement to provide food waste segregation was requested post-design.

Three options were investigated. These reviewed the use of commercial bins, access for commercial collection vehicles, waste chutes, disabled access, food waste odour, and convenience for residents.

The final design revolved around using smaller commercial bins which could be accommodated at ground level rather than at basement level. Separate food waste storage areas were designed into the building. To accommodate smaller bins, the frequency of collections needed to be increased to several times a week for each service.

The costs for the commercial service and the increased frequency were required to be borne by each resident, at twice the cost of a standard residential service provided by Adelaide City Council. This pushed higher than necessary costs for waste collection onto the end users, rather than developing the best option at the design stage.

Lessons Learnt

Early provision of all building design parameters from the Planning Authority, could have allowed an appropriate and efficient design to have been developed early on in the process, rather than altered later.

Principal design details such as space requirements for collection vehicle access, minimum grades for access ramps etc. should be readily available to designers (e.g. on a council website).



A balance must be struck between the development sector's need to act commercially, and the requirement for the homes it is providing to be fit for purpose. There are a number of bodies that could influence or be influenced through engaging in open debate on the issues. These would include:

- ▶ Industry associations (see Appendix C);



- ▶ Bodies running accreditation services (see Appendix C);
- ▶ Waste collection service providers;
- ▶ Equipment supply companies; and
- ▶ The Building Advisory Committee.

Consultation should be undertaken with architects, developers, end users (building management companies) and relevant institutions to develop pertinent instructions, identify the best route for providing this information and disseminating this. Many of these institutions will be familiar with systems working in other states and the benefits and disadvantages of these. Again, this is the area where the best practice design manual could include the relevant details, case studies and checklists for elements to be considered and included in designs. Contacts within these sectors should be identified and a liaison process initiated on this issue.

Action 11:

Work with Industry stakeholders to identify the route for information dissemination and development of pertinent and usable instructions.

Identify and consult with key contacts within the industry.

Reason:

Developing guidance and best practice manuals with the industry will create ownership from the beginning, resolve some early issues that may arise and build trust for ongoing dialogue.



3.4 Contents of a Best-Practice Design Manual

A MUD best-practice design manual should include options, case studies and innovative designs for waste and recycling infrastructure. Early identification of issues relating, for example, to methods of collection and requirements for outside collection space, could prevent some of the issues identified in the case studies below from arising. For example, identification of the issues highlighted at Wakefield Place (Case Study 6) at an early stage of the design could have provided time to assess the potential problems and identify alternative designs or equipment.

Case Study 6 - Wakefield Place, Adelaide

Wakefield Place in Adelaide is a recently built, high-density, multi-level townhouse development.

Although bins can be stored in residential garages, there is limited presentation space on collection day to accommodate all the bins. This problem would be exacerbated if collections are extended to include food waste. Options identified include staggering collection days for different wastes which could solve the limited presentation space problem, but this would mean more days when unsightly bins are visible and when street parking is taken up by bins. Communal commercial-sized bins could be incorporated into the existing green space areas within the complex. Consultation with residents would be needed to develop this option and additional costs would be picked up by the residents.

Lessons Learnt

Replacing individual bins with commercial bins would require less space presentation space. There is however, likely to be greater contamination of communal recycling waste streams but would allow for the incorporation of food waste bins. This example suggests the best approach is early identification of the most valuable and cost effective recycling streams for a particular MUD followed by effective consultation with stakeholders. Providing bins for every type of waste may not be a practical solution for MUDs.

Potential areas of focus for the design manual are:

- ▶ Waste streams;
- ▶ Handling and collection; and
- ▶ Education.

These areas are discussed in more detail below.

3.4.1 MUD Waste Streams

There are several characteristics of MUD waste generation that distinguish it from single dwellings. These characteristics have been discovered from the results of waste audits (as an example ACT NOWaste, 2003, which shows typical MUD and SD generation characteristics).

- ▶ Occupants of MUDs generate less waste per dwelling than those who live in single dwellings. This is partially due to there being fewer people living in each MUD than in each single dwelling, and partially due to there being less green waste generated in MUDs;
- ▶ There are greater quantities of food disposed of per dwelling in MUDs than in single dwellings. Possibly due to younger occupiers, greater predominance of certain cultural groups, who for cultural reasons produce food in excess of their needs and that home composting is not a viable option for most MUD residents; and
- ▶ There are higher levels of contamination in MUD recycling streams. This issue is linked to the generally lower recycling performance found in MUDs, and is most likely due to the anonymity



provided by many residents sharing common bins. This reduces personal responsibility. The activities of only a small number of people can have a proportionally greater influence on overall performance, that is the actions of one person can contaminate all of a building's recycling.

Guidance for building designers on the type of waste that needs to be collected and the appropriate bin capacity per unit will assist in building design. This model may not reflect the same service provided to single dwellings and the provision of guidance as to the most appropriate, valuable or potentially lowest contaminated streams is more likely to deliver an approach that will facilitate occupant engagement and achieve better waste management outcomes.

Communal Bin Areas

Sufficient space needs to be provided in an appropriate location within the building to store all garbage and recycling likely to be generated in the period between collection days. Consideration needs to be given to how the bins are to be emptied and the equipment used to manage and store it, and how much room will be required to manoeuvre the bins to where they will be emptied.

Co-Mingled Recycling

Recyclable materials such as paper and cardboard, and food and drink containers (steel, aluminium, plastics) are collected from residential dwellings for recycling. The most common system uses fully-co-mingled recycling bins, where all recyclable materials are placed in a single bin. This requires only one recycling collection vehicle and one trip past each residence. Recyclables are collected using similar types of bins and trucks used for garbage collection.

Separate Recycling

In some cases it may be more appropriate to provide single stream recycling collections. These may result in less contamination and may be more applicable to the waste produced by residents at a particular MUD.

Case Study 7, the Ebenezer Building, demonstrates how a beneficial recycling system can be established.

Case Study 7 - Ebenezer Building, Adelaide

Ebenezer Building in Adelaide's CBD is a mixed-use, 40-apartment complex spread over seven floors.

Issues

Combined recycling bins collected by the Adelaide City Council had previously been used at this complex, but had been abandoned due to continued contamination with general waste.

Lessons Learnt

Instead of combined recycling bins, receptacles specifically for glass bottles have replaced these via a commercial collection service. This waste stream has received little contamination; this may be due to the receptacles being clearly identified for purpose, reducing any confusion with the general waste bins.

Green Waste

A distinctive characteristic of MUDs is that they do not usually generate much green waste, and councils often do not provide kerbside green waste collections to MUDs. MUDs with lawns and gardens usually engage contractors to maintain them, who remove and dispose of green waste outside of the normal municipal collection system.



Food Waste

In 2009-10 Zero Waste SA piloted a kerbside collection service with 10 South Australian councils. The pilot project combined food waste with green organics. Food waste is expected to be a significant proportion of MUD-generated waste and therefore could be a viable option to collect as a separate waste stream, if there is enough volume.

Food waste however is likely to be difficult to manage in a MUD, particularly in multi-storey dwellings. There are odour issues associated with storing it in both individual units and in the communal waste areas. This makes making it the least attractive waste stream for residents to either manually take to communal bins or deposit in waste chutes. There is also the likely issue of contamination with plastic bags being used to contain the waste during storage. Vermin and fly nuisance may also be a concern to building managers and residents. Education for both building managers and residents and correct use of facilities can prevent these issues, Case Study 8 demonstrates a way to achieve this.

Case Study 8 - Seattle Food & Yard Waste - Apartment and Condo Owners

By law, Seattle apartment and condominium properties of five or more units have to provide a food waste collection cart for residents to use. In addition each unit receives a kitchen table-top food caddy, which is billed to the resident.

Lessons Learnt

In an effort to achieve better food waste recycling rates 'Friends of Recycling and Composting' (FORC), a public-utility run program was established. After signing up with Seattle Public Utilities, a resident from each unit can voluntarily join FORC and become eligible to attend an optional FORC training session. They then qualify for free kitchen table-top food caddy. Only units that participate in a FORC training qualify for the free caddies.

Building managers can sign up as the building's FORC steward. The building will get a one-time \$100 utility bill credit and qualify for FORC training. Building managers can get free educational information and posters to provide to each unit or place in public areas. They can also request a FORC training event to take place at their building.

<http://www.seattle.gov/util/Services/>



The poster features a green background with a white circular icon of a person recycling. To the right is an image of a green food waste cart filled with organic waste. The text is in white and red. At the bottom left is the Seattle Public Utilities logo, and at the bottom right is a red arrow pointing right with the text 'Turn over for more information'.

Five Steps to Success With Your Food and Yard Waste Cart

- 1. Notify and educate tenants.** Display the "Available Now: Food and Yard Waste Collection Service" poster. Distribute a food and yard waste educational flyer to every unit (many languages available). Request a training for residents (interpreters provided on request).
- 2. Locate the cart in a convenient location.** Put it near the main garbage and recycling containers. Make sure the cart is labeled "Food and Yard Waste." Notify residents where it is.
- 3. Check your cart.** No plastic, glass, or metal are allowed in the cart. Make sure the cart liner is replaced and the cart emptied each week by the service provider. If not, call (206) 684-7665.
- 4. Sign up a Friend of Recycling and Composting (FORC) steward.** A FORC checks containers for contamination, provides educational materials to residents, and answers residents' questions about correct disposal of items. By signing up a FORC, your property will receive a one-time \$100 utility bill credit on its utility bill.
- 5. Give units kitchen food scrap collection buckets.** If your FORC attends a 2012 FORC training, your property will receive buckets for all units. Residents find buckets helpful for storage and carrying food scraps to the food waste cart.

Seattle Public Utilities

Turn over for more information

Bulky Items Storage

Consideration should be given to allowing space for residents to temporarily store unwanted bulky items.



Providing storage on-site for the disposal of bulky items is important in guarding against residents illegally dumping this material on the footpath, thus detracting significantly from the quality and appearance of the development.

Commercial Waste in Mixed Living Developments

Inside each commercial unit there should be a clearly defined storage space sized to sufficiently store all the garbage, recyclables and other wastes generated by that unit for at least one day.

Action 12:

Develop clear guidance as to the options available for waste collection for MUDs. These should become the 'standard' collections that local councils will provide to allow economies of scale to be delivered.

Reason:

Provide developers and architects with information which will allow their design to be influenced at the most efficient stage, the start of project design.

3.5 Waste handling and collection

3.5.1 Collection systems

Typical Collection Methods

Collection of waste, whether destined for landfilling, recycling, recovery or some other process, from most premises whether residential, commercial or industrial, involves materials being placed by occupants in containers of different types and sizes and then either the whole container being collected for disposal, or the contents of the containers being emptied into a collection vehicle which transports it to a disposal point.

The collection systems most often used in residential applications are designed to lift wheelie bins from as small as 80 litres up to 360 litres.

Collection Vehicles

When collections are undertaken from MUDs using side-lift vehicles, as used for single dwellings, the bins are usually required to be positioned in rows along kerbs to allow the collection vehicle to get access to them. There are variations to this however, depending on council requirements and terms may be included in some collection contracts. Bins at some MUDs are collected using a vehicle that has a bin lifter at the rear. This allows for two or more bins to be collected at the same time but also requires the operator to leave the cab and move the bins by hand. In some cases, more than one operator may be required. Because operators on foot are available to move the bins, it also means that bins do not necessarily have to be lined up on the kerb. Operators may be able to enter properties to take bins from their storage locations to the collection vehicle.

In some council areas where there are easily identifiable districts of MUDs, separate 'unit runs' operate that use specific vehicles to collect only from MUDs.

Associated Infrastructure

Associated infrastructure within buildings may include bin lifters and service lifts. In this situation, the design of waste storage areas needs to incorporate sufficient space to locate and operate the lifting



devices. These devices should be fitted with safety features to prevent injury to operators, and should be secured to prevent use by unauthorised persons.

3.5.2 Bin Numbers and Sizes

The type of collection service provided, and the types of containers used, depends on the amounts and types of waste generated and the amount of space available to store waste and waste containers. The range of bin sizes and types is large and extends from 50 litre hand bins up to 30 m³ compactors. Large amounts of bulky material, such as cardboard generated at a shopping centre, may be best collected in a compactor, which by compacting it reduces its volume, reduces the amount of space required to store it and reduces the number of times it needs to be collected. At the other end of the scale, small quantities of household waste can be placed in 120 litre 'wheelie' bins.

Because MUD residents generate less waste per dwelling than single dwellings, they do not need the same capacity for garbage and recycling as single dwellings. Some councils recognise this, and provide bins for their MUDs to allow for two, three or four units to share 240 litres of bin capacity. Often, less recycling bin capacity is provided than garbage capacity so it is not unusual to find MUDs with three units sharing 240 litres of garbage capacity (80 litres each) but four units sharing 240 litres of recycling capacity (60 litres each). Even under these systems, it is not unusual to find that not all this capacity is used.

3.5.3 Service points and Unit Storage

At some larger MUD or mixed living complexes, with internal roads, particular service points may be specified. These are places at which the council, or its contractor, agrees to collect bins and may be internal or external to a building. They have been included in the design of the development as a place where the noise of collection and the presence of a vehicle are less likely to disturb or cause inconvenience to residents, or expose pedestrians or other motorists to risk.

There needs to be sufficient space within the kitchen, or other convenient location, in each dwelling unit for interim storage of at least two days' worth of waste and recycling. Space inside dwelling units should allow for separate storage of recyclables from the garbage stream as illustrated in Figure 4. Ideally, sufficient space should also be allocated for the segregation of food organics in a separate waste container.

Storage areas should be located in positions that:

- ▶ Allow easy, convenient and safe access for the users of the facility;
- ▶ Allow easy and safe transfer of bins to the collection point;
- ▶ Allow easy, safe and convenient access for collection service providers;
- ▶ Are well screened, designed to prevent or contain odours and do not reduce amenity; and
- ▶ Are secure against potential vandalism or theft.

Figure 4 Bin Layout Illustration (from DECC NSW (2008) Better Practice Guide for Waste Management in Multi-Unit Dwellings.)

Possible communal area layout



3.5.4 Clearance and Slope Grades

In some complexes or mixed developments, the service point may be below ground or in a car park or loading dock. Planning documents may specify a minimum clearance for these areas to allow waste collection vehicles to enter and service bins. In general, front lift vehicles require the most clearance at about 6.1 m. Side lift vehicles require at least 4 m, with normal rear lift vehicles requiring at least 3.5 m. Some specialised waste collection vehicles can operate where there is less clearance.

The grade of access for vehicles collecting bins and residents moving bins to presentation areas should not be of a grade that is too steep to meet health and safety requirements.

3.5.5 Turning Circles

The design of larger complexes with internal roads also need to take into account the turning circles for waste collection vehicles which can be up to 10 m long. AustRoads has guidelines for turning circle requirements to meet the standards of public roads.

3.5.6 Cleaners and Managers

Some MUD complexes are large enough for facilities managers to engage cleaners or managers for who waste would be one of their responsibilities. Systems administered and monitored by managers or

cleaners are likely to be those that operate best and have the highest levels of performance. Cleaners can ensure bins and bin rooms are kept clean and tidy, and can identify and rectify contamination issues and contact council or contractors if collection services are missed. They can monitor the condition of bins and replace them when damaged or lost.

3.5.7 Other Systems

So far we have assumed that MUD waste is stored on-site in wheelie bins or bulk bins and collected by conventional collection vehicles. But there are other systems for waste handling in MUDs and three more common types are examined here.

Figure 5 Chute Illustration from DECC NSW (2008)
Better Practice Guide for Waste Management in Multi-Unit Dwellings

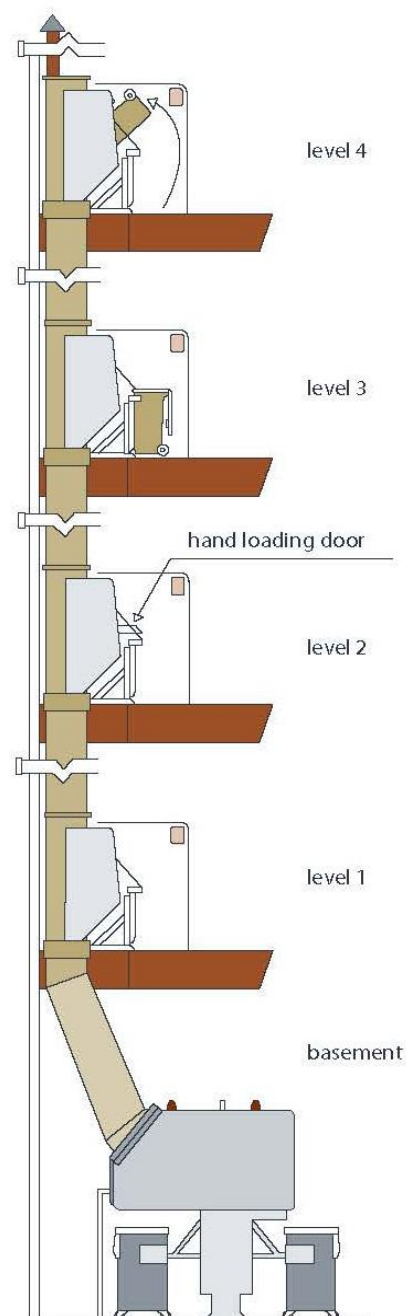
Chutes and Compactors

As described above, waste chute systems consist of a tube that runs vertically through a building to allow waste to be delivered by gravity to a basement area (see Figure 5). In its simplest form this system consists of a single chute for garbage that empties into a bin in a basement waste room. There is one small door on each floor that provides residents with access to the chute to allow them to place their garbage inside.

Recyclables are handled by way of a bin near the chute door on each floor. The recycling bins would have to be serviced by cleaners who would take them to a central storage area or service point.

More sophisticated chute systems consist of more than one tube for different materials that empty into separate bins. Others feature a single chute, but separation of materials in the basement is facilitated by electronic systems activated by residents pressing buttons on the chute doors depending on what material is being disposed of. When residents are disposing of garbage, they press the 'garbage' button and the system closes all the doors on the other floors and operates a flap at the base of the tube that diverts the falling waste into the garbage bin. The same system applies for recyclables.

In addition, chutes can empty into compactors in the basement that push the waste into either wheelie bins, or bulk bins of various sizes or into purpose-built compactor bins. A simple, well-known system is the carousel, which consists of four or more 240 litre wheelie bins arranged on a rotating or sliding platform. One bin is under the compaction unit at all times, and when full, the unit automatically moves





to the next empty bin. Systems like this can increase waste storage capacity and reduce the amount of monitoring and servicing required.

Some authorities do not approve of chutes for recyclables, whether a separate chute or the co-use of a single chute. Bulky items such as cardboard could get caught in the chute and cause a blockage. Even worse flammable items such as cardboard and paper in the basement bin could ignite and fire could migrate up the chute. Many current chute systems are now available with fire mitigation features.

The Condé Nast Building in New York was designed to include a number of recycling chutes to serve the entire building. Being the first project of its size to undertake these features in construction, the building has received an award from the American Institute of Architects.

In New York City, the buttons are labelled for trash, paper, plastics, glass and metals. The tenant has to separate items before putting them in the chute.

Vacuum Systems

Some MUD complexes, particularly in Europe, have vacuum systems installed. These consist of underground pipes that transport waste from the disposal point to a remote collection area. The only visible element is a pillar or bollard-shaped 'bin' into which residents place their waste. The waste accumulates in the 'bin' until a sensor alerts the central computerised control which then opens the 'bin' to the action of the vacuum which draws the waste along connected underground pipes to a compactor located at a central collection facility. In some places, pipes can run for several kilometres.

Similar to the chute system, several disposal 'bins' may be provided at each location for different materials but each material travels along a single pipe to the central facility where it is directed into the appropriate bin or compactor. When the bins and compactors are full they are collected from this remote location. The system avoids the need for vehicles to travel across the surface of MUD complexes and is particularly useful in areas of high-density dwellings and where surface travel is not possible at certain times of year, due, for example to snow.

Vacuum systems can also be connected to vertical chutes allowing waste to be delivered directly from a resident's floor to a remote collection point without the need for collection vehicles to operate in residential areas. The main disadvantage to vacuum systems is the cost. Even when installed at the time of construction, they can be expensive, but they are particularly expensive if retro-fitted. However, they can reduce the amount of usable living space or car parking space lost to waste facility areas.

Case Study 9, describes the proposed Mayfield development, which includes a vacuum system.

Case Study 9 - Mayfield Development, Adelaide

The Mayfield Development proposal is for a mixed living development containing 427 units and is planned over 3 phases with an aim for phase 1 to be complete by late 2012. Block heights range from four to 14 floors with ground floors containing retail or light commercial premises.

Prior to lodging the planning application, the developer has worked with the Integrated Design Commission, Development Assessment Commission, and Adelaide City Council. Both the IDC and ACC asked for a waste management plan as part of the development assessment.

A specialised company (EnVac) has designed the waste management system. EnVac has designed similar systems globally; the following illustrations and photos are from *EnVac's Guide to Hammarby Sjostad* (www.envac.net), Stockholm.



The proposed Mayfield waste system will be a vacuum system, with each building having two chutes providing for co-mingled recycling and waste. Waste dropped through the chute will be transported by the vacuum system into large trailer bins in the basement via underground pipes. These bins will lock directly on to the collection truck as a trailer to be towed away,



Advantages:

- ▶ External bins in the park will use the same system
- ▶ Removes the need for separate wheelie bins and emptying of bins on site
- ▶ The collection trucks are a standard model already used in SA although not for collecting residential waste.
- ▶ Collection can be made via external roads into the basements.
- ▶ There will be no wheelie bins presented on the roads
- ▶ Space saving

Disadvantages:

- ▶ No allowance for easy future changes i.e. if food waste collection becomes mandatory
- ▶ Currently the local council cannot operate this system; therefore residents will have to pay additional fees to a private collection company
- ▶ It is not clear how commercial waste will be dealt with, which may require collection of other waste streams.



In-Ground

In-ground systems consist of large capacity containers positioned almost wholly underground with just a small 'bin' visible above ground. The large capacity of the underground containers means that they can store large quantities of waste before being serviced. In addition, servicing does not require particularly sophisticated vehicles, but simply a hydraulic crane to lift the bin, which can either be replaced with any empty bin from a flat top truck, or emptied into an open bin on a truck.

3.5.8 Health and Safety

The design of waste handling systems and storage areas must take into account the health and safety of residents, visitors, cleaners and waste collectors. In particular safe and easy access must be possible from residences to the storage area. Safe and easy access must also be possible from the storage area to the street, to allow cleaners, residents or waste collectors to bring bins to the street for servicing and to get bins to collection vehicles. There must be no steps, kerbs, steep grades or slopes.

Prevention of vermin and smells is particularly important in MUDs where systems may be more complex and as dwellings are often close together, and a single nuisance incident can affect a number of people quickly.

Action 13:

The design manual should include or identify the minimum waste facilities required for new MUDs.

Known health and safety risks should be formally assessed and addressed (e.g. Minimise operatives working in roads and preclude the need for reversing collection vehicles, where possible).

Appendices could cover specific details from each council regarding the waste vehicles currently operated, key contacts etc.

Reason

Ensure a safe approach to waste handling, provide consistency and ensure there is the capacity for different councils to provide specific details relevant to their districts, where necessary.

3.6 Education and Communication

Education and message communication to MUD residents, building and property management, and cleaning companies is a sophisticated process. We have already seen that MUDs tend to have poor recycling performance and that this may be due to the anonymity provided by shared waste storage facilities.

There is no single solution to effectively educating MUD residents to perform better. Combinations of strategies are most likely to work. The requirements to successfully use the system should be clearly communicated by signs in the waste storage areas. These should use words, colours and symbols. Colours should be those specified in the Australian Standard (AS4123.7-2006 mobile waste containers - Part 7: colours, markings and designation requirements). Symbols should be those adopted by the NSW and Victorian Governments, making them a *de facto* national standard. Signs should be provided in community languages where a significant proportion of occupants speak those languages. Consideration



should also be given to cultural sensitivities. Some cultures resist touching bins with their hands and are unlikely to lift bin lids without some other mechanism.

Recycling champions should be identified, educated and developed within communities. These are residents who take it upon themselves to monitor and correct the use of the waste systems.

The Northcott case study (Case Study 10) shows how a successful consultation process can be a benefit to the residents and maximise the waste management opportunities. Further details are provided in Appendix A

Case Study 10 - Northcott MUD, New South Wales

Case Study - NSW Government, Office of Environment and Heritage Nov 2011.

The City of Sydney partnered with Housing NSW to introduce recycling into an existing high-rise complex in Surry Hills for social housing residents. The objectives of the scheme were to:

- ▶ To improve resource recovery across the City of Sydney local government area;
- ▶ To introduce recycling services to the Northcott complex in Surry Hills NSW which previously only had garbage collections and
- ▶ To engage the community in resource recovery.

Initial collaboration between Housing NSW and the City of Sydney began almost 18 months before the introduction of recycling services to Northcott. Dialogue between the two organisations was essential to design infrastructure that was appropriate for the space and location. It was also important to consider other stakeholders at Northcott to ensure the program was integrated into the local community.

Surry Hills Public Tenants Association was critical in integrating Northcott recycling into the local community. Other stakeholders, such as on-site cleaning staff, were also essential in the renegotiation of contracts to ensure ongoing servicing of the new infrastructure once it had been installed. When developing the Northcott recycling initiative, three major components were considered:

- ▶ Development and design of infrastructure to accommodate recycling;
- ▶ Education and resources for Northcott residents; and
- ▶ Processes for managing waste and resources.

Waste service providers were asked to monitor contamination rates and identify other issues. Initial problems were identified such as over stocking of bins and site access but were able to be resolved through ongoing communications between stakeholders. Overall feedback was that the system is working effectively with consistent volumes of collected recyclables.

Lessons Learnt

Identify stakeholders and establish partnerships at the design phase rather than arranging a project and then informing stakeholders after. The early partnership between the City and Housing NSW was critical to the success of the program.

- ▶ Involving and engaging local residents and existing community groups was an important aspect of the initiative to ensure that the recycling services were suitable for the target audience.





- ▶ Continual liaison between project stakeholders was pivotal to the project's success and enabled appropriate educational resources to be designed and delivered.
- ▶ Ensure that recycling rooms have universal locks.
- ▶ Monitor resource recovery following implementation. This can lead to targeted education if necessary.
- ▶ Allow for growth in the recycling service such as room for additional recycling bins as use of the recycling bays increase. This will reduce clutter and allow for a flexible recycling system.
- ▶ Provide visually appealing, clear bin bay signage that can be understood by all community members. Images and translations of key words are helpful.
- ▶ Colour coded bin slots (or bin lids) to Australian Standards (AS4123) and signage can assist in reducing confusion.
- ▶ Celebrate all successes to reinforce participant efforts, even the small wins.

Action 14:

The design manual should identify educational processes or activities to be included in the design of the development that could be included in the operational part of a waste management plan. This could include specifying information packs that will be available to residents or signage, for which a consistent approach should be taken (e.g. colour coding according to the Australian Standard).

Reason:

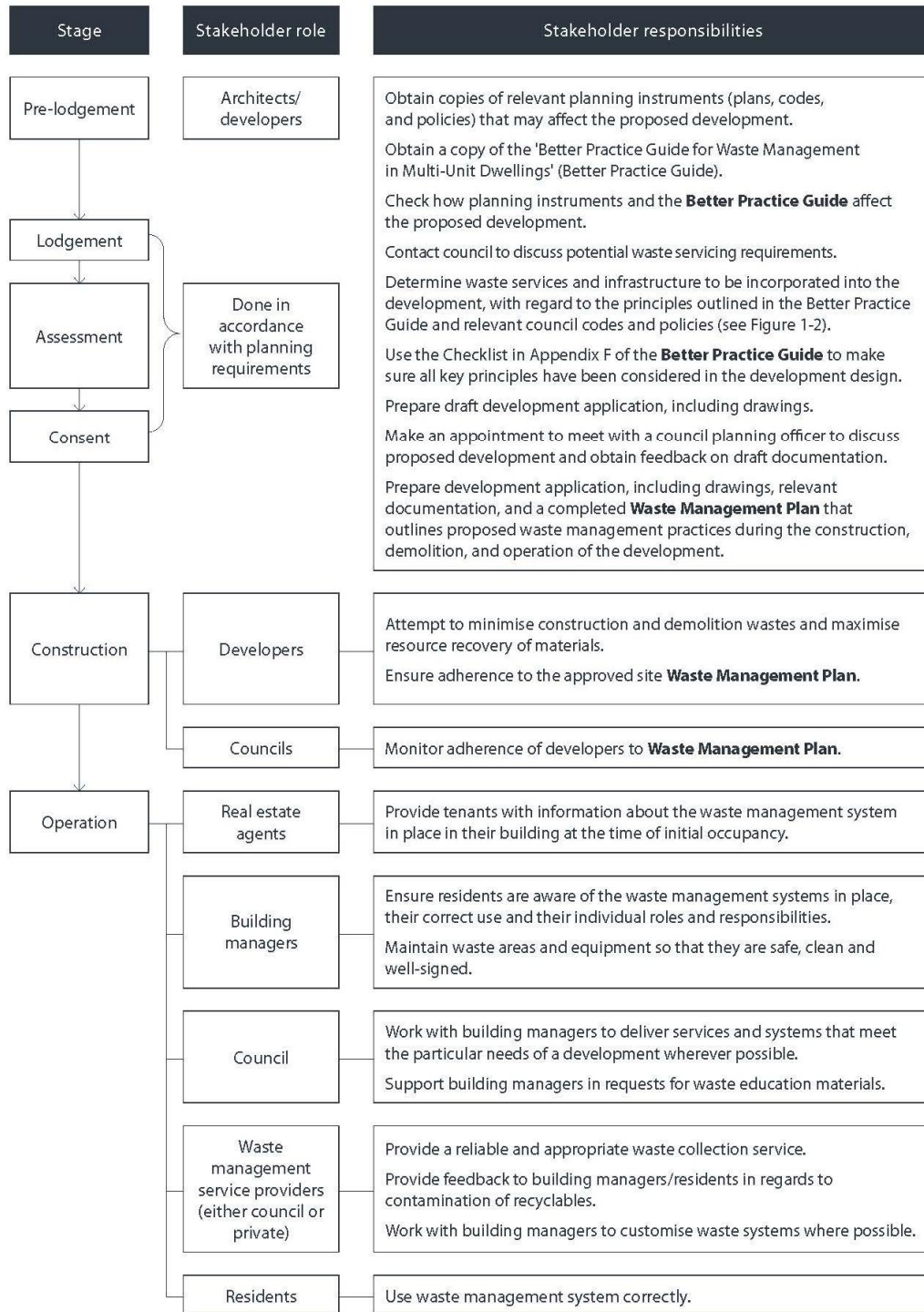
Identifying educational and communications paths with the end user at the design stage will not only deliver the ability to gain the best result from the end user, but will also force the designer to consider the usability of the waste service during the design stage promoting adoption of more practical and user-friendly systems.

3.7 Stakeholders

Figure 6 from the NSW *Better Practice Guide* below illustrates the point of influence different stakeholders have in development of new MUDs and the waste management process. This demonstrates how and when stakeholders may best apply a best-practice manual during the design of a new development.



Figure 6 Illustration from DECC NSW (2008) Better Practice Guide for Waste Management in Multi-Unit Dwellings.





Existing Guidance

There is already a selection of guidance and manuals providing details on the range of topics listed above for MUDs. Consultation with the councils and other key stakeholders who have been using this type of material is a worthwhile exercise. This will provide South Australia with the benefit of existing experience while it develops its own guidelines. The best of this information should be used in an initial draft to be discussed with South Australian local authority and industry stakeholders.

Some existing guidance, codes and manuals are listed below:

- ▶ Department of Environment and Climate Change NSW (2008) *Better Practice Guide for Waste Management in Multi-Unit Dwellings*;
- ▶ City of Charles Sturt (2010) *Residential Waste and Recycling Guidelines for New Developments*;
- ▶ Australian Capital Territory (1999) *Development Control Code for Best Practice Waste Management in the ACT*;
- ▶ Land Management Corporation (2011) *Bowden Urban Development Guidelines*;
- ▶ Department for Infrastructure, Environment and Natural Resources – NSW Planning Department (2002) *Residential Flat Design Code*;
- ▶ Council of the City of Sydney (2005) *Policy for Waste Minimisation in New Developments*;
- ▶ Resource Smart, Sustainability Victoria, Victorian Government (2010) *Guide to Best Practice for Waste Management in Multi-unit Developments*;
- ▶ Hyder (2012) *ACT government assessment of options for the provision of waste infrastructure and procurement services - Study of recycling in high-density dwellings*;

Action 15:

Review details of existing guides. Consult with councils using these guides. Produce or gain permission to use existing guides where applicable.

Reason:

Build upon existing good practice. Knowledge can be gained about what has and hasn't worked (For example; where guidance was difficult for developers to understand, or where actual recycling results haven't met expectations, even when guidance has been followed.)



3.8 Working with Existing MUDs

Developing programs within existing MUD communities or buildings will be a more time consuming process when weighed against the amount of influence that can result. However, there is still value in initiating consultation with some residential communities, building management and corporate bodies, waste collection contractors.

If there are funding opportunities available to facilitate improvements in buildings, this may act as an incentive to building management and corporate bodies. .

Case Study 11 – Manual Recycling, USA

A labour-intensive method has been established in some buildings in the USA, where the building superintendent uses the canister system. Individual bins are placed at the back door of each unit. The maintenance staff transports the garbage and recyclables to the basement. This system has been shown to be very effective and residents have been seen to be more aware of the environment, as seen by the quantity of materials being recycled and associated behaviour such as cleaning containers.

Consultation with any known residents associations in existing MUDs should be undertaken to identify any initial interest in participating in a project. Consultation with waste collection companies who service MUDs should be undertaken to identify if they have observed missed opportunities to develop recycling initiatives.

Previous studies have looked at specific case studies around Adelaide. There may be opportunities to follow up on some of these, for example, Wakefield Place discussed earlier in this report (Case Study 6).

Action 16:

Consult with building management and corporate bodies to identify where there is interest in providing recycling in their properties.

Consult with residents associations in existing MUDs to identify initial interest.

Consult with waste collection companies who currently service MUDs to identify if they have observed missed opportunities to develop recycling initiatives.

Identify potential ongoing projects from previous case study research.

Reason:

A simple consultation process could identify a few easy win projects which could be started swiftly, if funds are available to progress.

Identify interest from existing MUD stakeholders. A few projects may be identified similar to the Northcott project in NSW.



4. Challenges to Implementation

4.1 Legislation and policy

Currently it is unclear where obligation and responsibility lies in relation to the enforcement of design and operational requirements for management of waste from residential properties. Business needs certainty and a framework to make significant investment decisions. The key stakeholders in developing any changes to policy will be the State Government, local councils and the Local Government Association.

For a significant development of the planning framework several important changes are recommended for consideration:

- ▶ Establishing residential waste and recycling management as statutory council service;
- ▶ Strengthening waste management from an on-balance consideration during development assessment to a minimum requirement, including establishing a review panel and trained planning officers specifically to cover waste;
- ▶ Develop guidelines to accompany the development assessment process; and
- ▶ Develop a best practice design manual for waste management in MUDs.

The key challenges to achieving these aims are:

- ▶ Political changes, funding and maintaining commitment at State and council level;
- ▶ Time (required for development of guidance changes to policy and legislation);
- ▶ Lack of baseline data to develop an adequate design manual; and
- ▶ Time required for consultation and working with industry associations.

4.1.1 Political changes and Funding

Funding may be needed to support projects or council start-up collections from MUDs, particularly in the initial years until the volume of this type of accommodation has increased to a level that will make collections more economically viable. Continued political commitment will be needed to facilitate these programs and make funds available. Financial studies should identify future landfill cost savings, to strengthen a case for any proposed subsidies.

4.1.2 Time required for development of guidance, the manual and changes to legislation

A realistic and agreed program will need to be developed to identify key activities, constraints and procedures in order to fulfil actions.

4.1.3 Lack of baseline data

Where there is a lack of baseline data in South Australia, information from other States could be used as a starting point. Where this is not possible, further studies may be required, for example, financial studies, consultation exercises with industry and local councils. These processes will also require funding and will take time to develop.



4.1.4 Working with Industry

Without seeing an obvious incentive to participate, there may be reluctance amongst industry stakeholders to become involved. The different stakeholders in the MUD development and waste management industry may perceive a range of threats and opportunities. Developers may see waste storage and collection areas as lost revenue. The provision of facilities to encourage recycling may be seen as a further financial imposition, particularly if safety concerns are also to be addressed. This can also translate to additional costs and risks at the operational stages for services providers.

Industry is likely to have concerns about:

- ▶ Increased costs to building design and construction;
- ▶ Responsibility for operational management falling on the developer;
- ▶ Occupational health and safety;
- ▶ Safety of residents using bins; and
- ▶ Changes to contracts or contractual arrangements.

Industry associations may be slow to engage with the process unless there is a legislative or policy driver on the horizon.

4.1.5 Education of Residents and Service Providers

Education of, and the delivering of a key message to, MUD residents, building and property management, and cleaning companies is a sophisticated process. We have already seen that MUDs tend to have poor recycling performance and that this may be due to the anonymity provided by shared waste storage facilities.

There is no single solution to effectively educating MUD residents to improve recycling performance. Combinations of strategies are most likely to work. The requirements to successfully use the system should be clearly communicated by signs in the waste storage areas. These should use words, colours and symbols. Colours should be those specified in AS4123.7-2006.

Requirements for use of bins and keeping contamination out of recycling should be enforced by both council officers and facility managers.

4.1.6 Operational Issues

The majority of operational issues should be designed out or accommodated at the project development stage. If waste becomes a statutory service there will be a greater onus on existing council services and contracts to service areas which had previously been serviced by commercial companies.

Where councils have established long-term contracts with collection contractors, there may be difficulties in changing or extending contracts, proposed changes may have to be timed to coincide with new contracts.

To ensure the security of future waste streams the following points should be determined:

- ▶ What are the projected volumes and percentages of recycling from MUDs?
- ▶ How can project volumes be best achieved i.e. via co-mingled recycling or is selective recycling likely to achieve the best results?



5. Recommendations and the Way Forward

There are clear risks to the State's targets for waste diversion being achieved across the strategic planning horizon, particularly in respect of MUDs. A fresh approach, involving all stakeholders, including those with legislative authority, is required to develop a clear path towards meeting both South Australia's development needs and its waste management aims.

To assist with aligning the state's development aims with its waste management targets, Zero Waste SA and the Integrated Design Commission are promoting the preparation of state-wide guidance for waste management in medium- and high-density and multi-unit developments. It is recommended that a more focused approach, presenting detailed proposals for all stakeholders that will maximise the opportunity for the landfill diversion targets to be met is the next step to formulating guidance to meet the waste management targets.

This study has identified many areas of good practice already established and functioning in Australia. If similar practice is established within South Australia, this State could lead the way in waste management.

A number of specific actions that should be followed up have been identified throughout this report. These are all now shown below.

Action 1: Waste Management Aspirations

Confirm the waste expectation from future MUDs and identify resource-efficient collection strategies from those MUDs.

Reason:

To provide hard data to government, allowing it to give evidence-based leadership to achieve stated policy objectives, whilst limiting the externalisation of the overall costs of developers' lowest cost options for the design and construction stage.

Action 2: Statutory Services

Amend existing legislation to establish residential waste and recycling collection as a statutory service under the *Local Government Act 1999*. This will provide councils with the power to ensure waste collection (directly or through contractors) is undertaken for all dwellings including medium- and high-density and MUDs.

Reason:

This will provide councils with a clear responsibility for ensuring the collection of all residential waste and remove some of the current uncertainty about who is ultimately responsible.

This would clarify the situation and provide consistency of service across the State.



Action 3: Standard and non-standard services

Develop state-wide 'standard' residential waste collection methods that extend the existing three bin system to provide additional 'standard' options for multi-unit developments.

A 'standard' waste collection method should be mandatory for all proposed residential developments (including mixed use living developments), except in clearly defined circumstances.

Reason:

This would clarify waste collection arrangements; create consistency for developers and a clear understanding for the end user (residents and building management companies) as to the service they should receive. This will provide consistency of service across the State

Action 4: Finances and Rates

Review the existing regulatory framework to facilitate appropriate differentiated waste collection charges for MUDs.

Establish the cost for waste and recycling collection services from MUDs for budgetary purposes, and identify if this can be wholly met by rates, or if subsidies or incentives will be needed initially.

Identify from where subsidies could be provided, or what other incentives are available.

Reason:

This would provide local councils with financial resources to provide a suitable waste service to MUDs.

Action 5: Legislation and Development Assessment

Establish a legislative requirement that sets minimum waste and recycling measures that must be included in residential designs. This should be undertaken under the *Development Act 1993* (Section 33 *Matters against which development must be assessed*), or its supporting regulatory instruments.

This should also identify the office or review panel which will be consulted specifically on this issue as part of the assessment process.

Reason:

The above will establish a specified baseline level for all developers, define who can undertake the review of waste issues within the planning application, and create a clear standard for that review.

Action 6: Guidelines

Produce waste and recycling guidance principles.

Development Assessment Panels and Planning Officers should be required to have due regard to the guidelines in carrying out their functions under the *Development Act* and the *Local Government Act*.

Reason:

This would clarify waste collection arrangements; create consistency for developers and a clear understanding for the end user (residents and building management companies) as to the service they should receive. This will provide consistency of service across the State.



Action 7: Best Practice Manual

Prepare a best practice design manual to support planning assessment guidance.

Reason:

This would provide options and ways of meeting the minimum standard required by all developers. This will provide easy to use check list and specifications for the detail to provide in a waste management plan. This will remove any confusion as to the minimum mandatory measures that must be met.

Health and safety risks of equipment and storage arrangements can be also be designed out at this point and amenity of the building environment can be improved through establishing minimum standards.

Action 8: Building Rules

Investigate the development of a route to amend the South Australia building regulations to include reference to appropriate waste management. This should be supported by a Minister's Specification for Best Practice Waste Management.

Health and Safety aspects of residential waste management operations should be assured through the Building Codes.

As an interim measure, appropriate Development Control Plans should be issued by Adelaide councils to have the same effect.

Reason:

This would provide a minimum standard required by all developers and require its consideration during building consent assessment at the detailed design phase of a new development.

The above will provide the tools to allow the Building Rules Assessment and Planning Officers to effectively influence the design and operation of MUDs.

Health and safety risks of equipment and storage arrangements can be designed out. Amenity of facilities and the surround environments of residential areas can be improved through establishing minimum standards.

Action 9: Enforcement

Before any changes are made to the regulatory framework, enforcement routes should be thoroughly consulted on and confirmed. Appropriate measures to allow the changes to be enforceable should be included.

Reason:

The enforceability and potential costs of enforcement should be identified before any changes to policy or legislation is made, to check that enforcement is possible and affordable.



Action 10:

Identify which performance-based rating systems or other tools will be relevant to MUDs and waste management performance. Establish connections and identify where strengthening of rating systems or provision of other information could be made.

Maintain contact with the Bowden Design Review Panel to gain feedback on their process, and issues that are arising as this development progresses.

Reason:

This will provide incentives to developers and architects to meet and exceed best practice and develop schemes which are designed to function appropriately during operation.

Action 11: Building Design

Work with Industry stakeholders to identify the route for information dissemination and development of pertinent and usable instructions.

Identify and consult with key contacts within the industry.

Reason:

Developing guidance and best practice manuals with the industry will create ownership from the beginning, resolve early issues that may arise and build trust for ongoing dialogue.

Action 12: MUD Waste Streams

Develop clear guidance as to the options available for waste collection for MUDs. These should become the 'standard' collections that local councils will provide to allow economies of scale to be delivered.

Reason:

Provide developers and architects with information which will allow their design to be influenced at the most efficient stage, the start of project design.

Action 13: Waste Collection Systems

The design manual should include or identify the minimum waste facilities required for new MUDs.

Known health and safety risks should be formally assessed and addressed (e.g. Minimise operatives working in roads and preclude the need for reversing collection vehicles, where possible).

Appendices could cover specific details from each council regarding the waste vehicles currently operated, key contacts etc.

Reason

Ensure a safe approach to waste handling, provide consistency and ensure there is the capacity for different councils to provide specific details relevant to their districts, where necessary.



Action 14: Education

The design manual should identify educational processes or activities to be included in the design of the development that could be included in the operational part of a waste management plan. This could include specifying information packs that will be available to residents or signage, for which a consistent approach should be taken (e.g. colour coding according to the Australian Standard).

Reason:

Identifying educational and communications paths with the end user at the design stage will not only deliver the ability to gain the best result from the end user, but will also force the designer to consider the usability of the waste service during the design stage promoting adoption of more practical and user-friendly systems.

Action 15: Existing guidance

Review details of existing guides. Consult with councils using these guides. Produce or gain permission to use existing guides where applicable.

Reason:

Build upon existing good practice. Knowledge can be gained about what has and hasn't worked (For example; where guidance was difficult for developers to understand, or where actual recycling results haven't met expectations, even when guidance has been followed.)

Action 16: Working with Existing MUDs

Consult with building management and corporate bodies to identify where there is interest in providing recycling in their properties.

Consult with residents associations in existing MUDs to identify initial interest.

Consult with waste collection companies who currently service MUDs to identify if they have observed missed opportunities to develop recycling initiatives.

Identify potential ongoing projects from previous case study research.

Reason:

A simple consultation process could identify a few easy win projects which could be started swiftly, if funds are available to progress.

Identify interest from existing MUD stakeholders. A few projects may be identified similar to the Northcott project in NSW.



6. References

- ACT NOWaste (2003) *Canberra Residential Waste Audit* (APrince Consulting)
- Australian Capital Territory (1999) *Development Control Code for Best Practice Waste Management in the Act*.
- City of Charles Sturt (2010) *Residential Waste and Recycling Guidelines for New Developments*.
- Council of the City of Sydney (2005) *Policy for Waste Minimisation in New Developments*.
- Department for Infrastructure, Environment and Natural Resources – NSW Planning Department (2002) *Residential Flat Design Code*.
- DECC NSW (2008) *Better Practice Guide for Waste Management in Multi-Unit Dwelling*.
- Green Building Council of Australia (2009) *Green Star rating tool for Multi-Unit Residential v1*.
- Government of South Australia, Department of Planning and Local Government (2010) *The 30-Year Plan for the Greater Adelaide*.
- Hyder (2012) *ACT government assessment of options for the provision of waste infrastructure and procurement services - Study of recycling in high-density dwellings*.
- Land Management Corporation (2011) *Bowden Urban Development Guidelines*
- One World Environmental Solutions (2009) *Analysis of Markets for Council- Collected Recyclables, Local Government Association of South Australia*.
- Resource Smart, Sustainability Victoria, Victorian Government (2010) *Guide to Best Practice for Waste Management in Multi-unit Developments*.
- South Australian Local Government Association (2010) *Introduction to Local Government Workbook*.
- South Australian Government (2004, updated in 2011.) *The South Australia Strategic Plan*
- University of Technology Sydney (2005) *NSW Institute for Sustainable Futures - Beyond Recycling, An Integrated Waste Management Framework for Local Government*.
- Zero Waste SA (2011) *South Australia's Waste Strategy 2011-2015*



Appendix A
Detailed Case Studies



ACT Development Control Code for Best Practice Waste Management

The building code for ACT contains the following points within its performance requirements:

Provision must be made within buildings for the collection and temporary holding of solid waste. The design must accommodate screening, volume of waste, disposal, logistics and access (ACT AP2.2)

Garbage facilities must be designed and constructed in accordance with the Development Control Code for Best Practice Waste Management in the ACT. (Waste management - ACT A2.102)

Issues

The Development Control Code for Best Practice Waste Management in the ACT directs professionals such as engineers, architects, planners and developers on how to ensure their applications comply with the best practice waste management requirements applicable for the demolition, refurbishment, construction and operational phases of projects.

The *Building Act 2004*, and regulations under that Act, require a Waste Management Plan to be incorporated into the approval process for building work that involves either demolition of any building, or alteration and refurbishment of a building other than a Class 1, 2 or 10a building (refer to Section 5.1 of the DCC). In addition, The Waste Management Plan included in the code addresses the waste associated in the operational phase of all classes of buildings.

Information to be provided as part of the Waste Management Plan includes:

- ▶ The extent of demolition work to be undertaken;
- ▶ The nature and amount of waste which will be generated by demolition;
- ▶ The location to which each type of waste will be taken by the builder or their agent for reuse, recycling and/or disposal;
- ▶ Containment of waste and recyclables within the property; and
- ▶ Providing safe and easy access for collection trucks.

Lessons to be learnt

The intent of the code is to offer a performance-based approach to meeting waste management requirements by using performance criteria and measurable standards. Compliance with the performance criteria will be the primary consideration when assessing applications. Where measurable standards are included it is possible to vary them, where the applicant can demonstrate that the intent of the standard and the performance criteria are achieved.



In assessing applications, details provided in the Waste Management Plan and on the plan drawings, will be checked for compliance with the performance criteria for the proposed use (e.g. multi-unit housing as shown below) and against the general aims and objectives of the code.

The aims and objectives of the Code are to:

- ▶ Encourage best practice approaches to minimising construction and demolition waste.
- ▶ Encourage building designs and construction techniques that minimise waste generation through cleaner production.
- ▶ Encourage smart planning choices and decisions to maximise reuse and recycling of materials from demolition and construction sites.
- ▶ Identify performance criteria and acceptable solutions to effectively manage household, industrial and commercial generated waste within developments.
- ▶ Ensure that public safety, access and amenity associated with storing and removing of wastes are satisfactorily addressed.

5.4 RESIDENTIAL — Multi-unit Developments and Cluster Developments with more than 10 units

INTENT

To implement best practice solid waste management (source separation, reuse and recycling) and ensure quality and effective design of storage facilities addressing waste generation volumes, frequency of collection, public amenity, and safe and convenient collection.

PERFORMANCE CRITERIA

The intent may be achieved where:

- a) sufficient space is provided within each unit for temporary storage of recyclables and garbage;
- b) best practice communal facilities taking into account future needs;
- c) ensure safe and convenient use of the storage area;
- d) best practice collection is followed — See Section 8 of the code.
 - trucks should move in and out in a forward motion.
 - siting of the waste storage area where ever possible should suit mechanical pick up of waste hoppers by front-end loading trucks.
 - hopper servicing should occur with the truck contained within the leased boundaries of the block.
 - sections of the internal road that need to be used by the collection truck should be of industrial type pavement.
- e) adequate space has been provided for individual composting or communal composting where layout allows for it.
- f) there are washdown provisions — assessment based on the type of waste handled.

ACCEPTABLE SOLUTIONS

- a) use of separate storage containers for garbage and recyclables.
 - b) storage areas should meet requirements of Sections 7.3 and 8.4 of the code and design and siting of facilities should comply with Sections 6, 7 and 8 of the code.
 - c) user convenience — maximum carting distance should be 75m. For aged persons or persons with a disability this distance should be limited to 50m (see Diagram E). Bin carting grade should not exceed 10%. Every enclosure or room should be provided with a 'user' access.
 - the gates or the roller shutters should be kept closed except when the hoppers need to be accessed by the truck.
 - co-location of the waste storage containers and recyclable containers is preferred.
 - d) reversing of trucks onto a public road will be considered, only if the applicant can demonstrate that reversing is essential and approval is given by the Manager, Traffic Infrastructure Policy addressing traffic and public safety issues.
 - hopper service area should be of industrial strength pavement to take up front-end loading and be clear of structures for a height of 6.1m.
 - location of hopper service area should allow truck to be parked safely within the premises whilst servicing.
 - industrial strength pavement should be provided on the section of the internal road used by the collection trucks (See Diagram F).
 - basement for storage/collection of waste/recyclables. Proposal should comply with Section 8.7.
 - e) communal composting area should be suitably located. See Fact Sheet 3 on composting.
- NOTE. If a private waste operator is used, the lessee should confirm this in writing. A letter from a waste operator confirming the viability of collection should also be submitted to ACT Waste.
- f) washdown provisions — see Section 7.7.



New South Wales

The City of Sydney partnered with Housing NSW to introduce recycling into an existing high-rise social housing complex in Surry Hills for social housing residents. The objectives of the scheme were to:

- ▶ To improve resource recovery across the City of Sydney local government area;
- ▶ To introduce recycling services to the Northcott complex in Surry Hills NSW which previously only had garbage collections and
- ▶ To engage the community in resource recovery.

Case study by NSW Government, Office of Environment and Heritage Nov 2011.

Initial collaboration between Housing NSW and the City of Sydney began almost 18 months before the introduction of recycling services to Northcott. Dialogue between the two organisations was essential to design infrastructure that was appropriate for the space and location. It was also important to consider other stakeholders at Northcott to ensure the program was integrated into the local community.

Surry Hills Public Tenants Association (SHPTA) was integral in integrating Northcott recycling into the local community. Other stakeholders, such as on site cleaning staff, were also essential in the renegotiation of contracts to ensure ongoing servicing of the new infrastructure once it had been installed. When developing the Northcott recycling initiative, three major components were considered.

- ▶ Development and design of infrastructure to accommodate recycling;
- ▶ Education and resources for Northcott residents; and
- ▶ Processes for managing waste and resources.

The success of the program was the result of the combination of the three components which delivered a practical solution that also engaged residents. The infrastructure component included the following:

- ▶ Housing NSW lodged a development application with council for the infrastructure upgrade;
- ▶ Two enclosed recycling bays were constructed at the entrance and exit to the complex;
- ▶ Recycling bays were located at the front of the building to encourage integration into residential daily routines;
- ▶ The bays each hold six mixed container recycling bins and six paper and cardboard recycling bins. □ Additional bins are stored on site and can be rotated by cleaning staff as required;
- ▶ Each bay has prominent signage indicating accepted materials. The signage is also in multiple community languages and contains photographs of commonly recycled items;
- ▶ Recycling bins are located in locked bays accessible via slots covered with flexible plastic flaps to discourage the dumping of whole bags of rubbish;
- ▶ A universal lock system was installed for the locked bays and is accessible by relevant stakeholders. The education and resources component included the following;
- ▶ Workshops for residents about recycling held before the facilities were made available for use;
- ▶ Self-nominated champions who were invited to attend a tour of a recycling facility;
- ▶ Inclusion of recycling information in the resident's bimonthly newsletter 'The Tattler';
- ▶ Attendance by City of Sydney Council at local community events. Northcott hosts an annual community event, '3 days at Northcott', which was attended by council;



- ▶ Council provided a free BBQ, reusable recycling bags and recycling brochures to help promote the new Northcott recycling service; and
- ▶ A Chinese bilingual educator was also engaged to speak with the local Chinese community.

Planned Outcomes

Waste service providers were asked to monitor contamination rates and identify other issues. Initial problems were identified such as over stocking of bins and site access but were able to be resolved through ongoing communications between stakeholders. Overall feedback is that the system is working effectively with consistent volumes of collected recyclables.

An average of 144 kg of paper and cardboard and 91 kg of mixed recycling is collected weekly. Contamination is low. This is a great improvement from a base of zero recycling being collected to 235 kg collected weekly. Well-designed signage using colour coding and strong visual messages made it easier for residents with low literacy levels or limited English literacy to participate in recycling. It has enabled the entire Northcott community to participate in recycling.



These results were considered significant because they represented an increase from zero recycling at Northcott. Furthermore, it showcased how an effective, planned and integrated approach can deliver results.

By having self-nominated champions as part of the program it only encouraged those who were interested in recycling to do so, reducing contamination and encouraging community ownership. Community ownership was also encouraged by allowing SHPTA to have key access to the locked recycling bays. This provided the volunteer group with partial responsibility for the recycling and assistance in supporting its management.

Open dialogue between residents, Housing NSW and the City of Sydney was important in ensuring that the system was working efficiently for Northcott residents. Early on, residents identified that the metal flaps covering the recycling slots were a hazard and these were replaced with flexible plastic for easier use.

Unexpected Outcomes

SHPTA took ownership of Northcott recycling and continued to support it by establishing a system to assist elderly and disabled residents in moving their recycling from their apartments to the recycling bays. This system operates from the Northcott Community Centre and increases access to recycling while also generating good will and a sense of community within Northcott. SHPTA's involvement in the establishment of a recycling program at Northcott was vital and, as it is greatly assisting implementation, it is important that SHPTA remains involved and thus ensuring it's continued success.



Lessons Learnt

The partnership between the City and Housing NSW was critical to the success of the program. It allowed for the evolution of the program as issues arose and ensured that the program was integrated to meet the needs of all stakeholders. Involving and engaging local residents and existing community groups was an important aspect of the initiative to ensure that the recycling services were suitable for the target audience. Continual liaison between project stakeholders was pivotal to the project's success and enabled appropriate educational resources to be designed and delivered.

Planning Phase

Identify stakeholders and establish partnerships at the design phase rather than arranging a project and then informing stakeholders after. Avoid technical jargon and make meetings informal and relaxed. Providing food and drink at meetings helps people feel welcome and relaxed. Encourage appropriate levels of ownership of the project which can vary depending on resident skills, capacity, interest and motivation. Support innovation such as SHPTA supporting less mobile residents by carrying their recycling to the recycling bays to increase project participation. Be patient and look for long term solutions. It is important to recognise that building successful partnerships takes time.

Implementation Phase

- ▶ Ensure that recycling rooms have universal locks.
- ▶ Monitor resource recovery following implementation. This can lead to targeted education if necessary.
- ▶ Allow for growth in the recycling service such as room for additional recycling bins as use of the recycling bays increase. This will reduce clutter and allow for a flexible recycling system.

Education and Communications

- ▶ Provide visually appealing, clear bin bay signage that can be understood by all community members. Images and translations of key words are helpful.
- ▶ Colour coded bin slots (or bin lids) to the Australian Standard (AS4123) and signage can assist in reducing confusion.
- ▶ Celebrate all successes to reinforce participant efforts, even the small wins.



Appendix B
Waste and Recycling Centres



Adelaide Metropolitan Depots

Depots and Commodities Handled												
● = Buy ● = Drop off												
Depot	Deposit Containers	Wine Bottles	Newspaper	Cardboard	Car Batteries	Non-Deposit Plastic Bottles	HDPE Milk Non-Deposit	Non Ferrous Metals	Steel	Mixed Clean Plastics	Non Deposit Steel cans	
Metropolitan												
Daws Road Edwardstown	●	●	●	●	●	●	●	●	●	●	●	
Daws Road Oaklands Pk	●	●	●	●	●	●	●	●	●	●	●	
North Plympton	●	●	●	●	●	●	●	●	●	●	●	
Blackwood	●	●		Beer boxes only		●	●					
Brighton	● No glass											
Burton	●	●			●	●	●	●	●	●	●	
Scouts Elizabeth West	●	●	●	●	●	●	●	●	●	●	●	
Glen Osmond	●	●	●	●	●	●	●	●	●	●	●	
Golden Grove	●	●	●	●	●	●	●	●	●	●	●	
Hackham	●	●	●	●	●	●	●	●	●		●	
Holden Hill	●	●	●	●	●	●	●	●	●		●	
Lonsdale	●	●	●	●	●			●	● small quantities		●	
Magill	●	●	●	●	●	●	●	●	●	●	●	
Modbury North	●	●	●	●	●	●	●	●			●	
Marlston	●	●	●	●		●	●	●			●	
Newton	●	●	●	●	●	●	●	●		●	●	
Scouts Greenfields	●	●	●	●	●	●	●	●	●	●	●	
Welland	●	●	●	●	●	●	●	●	●		●	
Scouts Payneham	●	●	●	●	●	●	●	●	●	●	●	
Pooraka	●	●			●	●	●	●	●		●	
Scouts Port Adelaide	●	●	●	●	●	●	●	●	●	●	●	
Prospect	●	●				●	●				●	
Royal Park	●	●			●	●	●					
Reynella	●	●			●	●	●	●			●	
Scouts Salisbury	●	●	●	●	●	●	●	●	●	●	●	
Seaford	●	●	●	●	●	●	●	●	●	●	●	
Sheidow Park	●	●		Beer boxes only		●	●					
Scouts Munno Para	●	●	●	●	●	●	●	●	●	●	●	
Thebarton	●	●				●	●				●	
Welland	●	●	●	●	●	●	●	●	●		●	
Scouts Willaston	●	●	●	●	●	●	●	●	●	●	●	
Wingfield	●	●				●	●				●	
Woodville South	●	●										

Recyclers of South Australia Inc (<http://www.recyclesa.com.au/>)



Appendix C

Industry Associations, Authorities and Accreditation bodies



Industry Associations and Authorities

Table 1 Industry Associations and Authorities and their internet addresses

Organisation	Web Address
Development Assessment Forum	www.daf.gov.au/
Australian Institute of Urban Studies – South Australia Division	www.aiussa.org.au/
Urban Development Institute of Australia – South Australia Division	www.udiasa.com.au/
Property Council of Australia – South Australia Division	www.propertyoz.com.au/SA/Division/Default.aspx
Housing Industry Association	http://hia.com.au/
Master Builders Association South Australia	www.mbasa.com.au/
The Architectural Practice Board of South Australia	www.archboardsa.org.au/
Planning Institute of Australia	www.planning.org.au/
Waste Management Association of Australia (WMAA)	www.wmaa.asn.au/
Australian Chamber of Business and Commerce; Business South Australia	www.acci.asn.au/
Green Building Council of Australia	www.gbca.org.au/
Australian Institute of Architects	www.architecture.com.au/
Standards Australia.	www.standards.org.au/
Australian Building Code	www.abcb.gov.au/
Local Governmental Association	www.lga.sa.gov.au/

Accreditation Bodies

Table 2 Accreditation programs and their internet addresses

Program	Web Address
NABERS	www.nabers.com.au/
Green Star	www.gbca.org.au/green-star/
LEED green building rating system	www.usgbc.org/DisplayPage.aspx?CategoryID=19



GHD

Level 4 211 Victoria Square Adelaide SA 5000
GPO Box 2052 Adelaide SA 5001 Australia
T: 61 8 8111 6600 F: 61 8 8111 6699 E: adlmail@ghd.com

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B	KY	Greg Lutton		Michael Scott		