Guide To Preferred Service Standards For Kerbside Recycling in Victoria

August 2004

Acknowledgments

EcoRecycle acknowledges the assistance
of the following in preparing this report:

Nolan ITU
Project Advisory Committee
WorkSafe Victoria
Stakeholder written submissions & comments

Copyright

Disclaimer

Information in this document is current as of
August 2004. While all professional care has been
undertaken in preparing the document, EcoRecycle accepts
no liability for loss or damages incurred as a result of reliance
placed upon its content.

Preface

In June 2003 EcoRecycle Victoria commenced a review of the *Guide to Preferred Service Standards for Kerbside Recycling in Victoria*, November 2000. The purpose of the review was to take into account changes and improvements in waste management practices, WorkSafe Victoria's Occupational Health & Safety legislation and the differences between metropolitan and non-metropolitan kerbside services.

Consultants Nolan ITU were appointed to revise the current document with an advisory committee formed to oversee the review representing local government, industry, waste management contractors, EPA Victoria, WorkSafe Victoria, Municipal Association of Victoria (MAV), Victorian Waste Management Association (VWMA) and the Plastic and Chemical Industries Association (PACIA). A discussion paper was released for comment in August 2003 followed by a series of workshops across the state in Ballarat, Shepparton and Melbourne. A draft document was prepared in October 2003, and another round of consultation workshops were held in Ballarat, Melbourne, Shepparton and Gippsland the following month.

The intention was to complete the final document by December 2003 after the final round of workshops, however a number of issues raised concerns among stakeholders of which some are listed below.

- Degree of prescription in the draft document
- Inclusion of Polypropylene (PP) and Polystyrene (PS) in the kerbside stream
- Drop-off services
- Services to small-to-medium enterprises (SME's)

A revised draft document was prepared for further consultation to work through the issues of contention. Further workshops were held in Bendigo and Melbourne in March and April 2004.

This final document represents the input received during this last round of workshops and written submissions received during April 2004. The advisory committee met during June 2004 to consider final comments and submissions received.

Document Review Period

This document will be reviewed in July 2006.

National Packaging Covenant Funding

The existing Preferred Service Standards Guide has in the past been used as the basis for funding requirements under the Best Practice Kerbside Recycling Program, administered by EcoRecycle Victoria and funded under the National Packaging Covenant (NPC) Kerbside Recycling Transitional Arrangements. This revised guide is a stand-alone guide and does not imply that councils conforming to the recommendations in the guide will be eligible for funding under the NPC. Whether or not this guide is used in future years as the basis for funding under the Best Practice Kerbside Recycling Program is a decision that will be determined by the National Packaging Covenant.

Contents

Glossary of Terms

Best Practice	Represents the current 'state of the art' in achieving particular goals. It is dynamic and subject to continual review and improvement.
Combined Contract	Where a council has chosen one contractor that will carry out both the collection and sorting of kerbside recyclables.
Commingled	Mixed recycling, usually comprising paper, cardboard and beverage containers such as glass bottles and jars, PET, HDPE and PVC bottles, liquid paperboard cartons, aluminium, and steel cans.
Contamination	Materials and items within a recycling process that are not readily recycled by that process. (eg: glass breakage)
Crate	A plastic crate used for recycling. It is an open-topped solid plastic crate, of usually 50 to 60 litres in volume.
Diversion Rate	A volume of recyclables as a percentage of the combined recycling and garbage streams.
Dry Recyclables	Material disposed of in recycling MB that includes plastics, bottles, cans, paper, cardboard.
Garbage	Residual waste unsuited to reuse or recycling
Green organics	Refers to grass clippings, tree cuttings, plants and leaves.
Kerbside Recycling	Collection of recyclable materials placed at the kerbside by householders, businesses and commercial site operators.
Liquidpaperboard	Milk and fruit juice, and other liquid product paperboard packaging
Litter	Any material, generally waste, left where it should not be.
Losses	Losses in a recycling system are made up of contamination (see above *'contamination')*
Mobile Bin	Container used for the purposes of placing at kerbside for collection.
Municipal waste	Domestic waste – household solid and inert wastes placed out for kerbside collection
Materials Recovery Facility	Facility that receives, separates and prepares mixed (mostly) recyclable materials into individual products for further processing.
Non-rateable properties	Churches, kindergartens, libraries

Rear load compactors	Collection vehicles where the recyclables are loaded into the rear of the vehicle.
Recyclables	Dry recyclable material collected at kerbside that includes paper, cardboard, bottles, cans, aluminium, plastics, etc.
Reprocessing	When recyclables are sorted, they are sent to a reprocessor for consolidation, processing (e.g. melting, pulping) and sale to end-users.
Residual waste	(See garbage)
Side load compactor vehicles	Collection vehicles where the recyclables are loaded via the top of the vehicle, usually by means of a side loading MB lifter.
Small to Medium Enterprises	Includes such business/organisations as cafés, milk bars, video shops, bookshops etc.
Split contract	Separate contract for collection and separate contract for sorting.
Resource Recovery and Waste Transfer Station	Facility where unwanted materials can be taken for subsequent transport to recycling operations or landfill. Also called Transfer Station.
Waste minimisation	Limitation of waste through products and policies that minimise the amount of waste that must be disposed of.

Abbreviations

HDPE	High Density polyethylene
LDPE	Low Density polyethylene
MB	Mobile Bin
MRF	Materials Recovery Facility
OH&S	Occupational Health and Safety
PET	Polyethylene Terephthalate
PP	Polypropylene
PS	Polystyrene
PVC	Polyvinyl chloride
SME	Small to medium enterprise

Plastic Coding System

	Polyethylene Terephthalate PET
	High Density Polyethylene HDPE
	Unplasticised polyvinyl chloride UPVC or plasticised polyvinyl chloride PPVC
	Low Density Polyethylene LDPE
	Polypropylene PP
	Polystyrene PS or Expandable Polystyrene EPS
	Other

Executive Summary

Background

The Preferred Service Standards Guide has provided direction to local government and the recycling industry in Victoria on the adoption of cost efficient kerbside recycling systems.

This update has followed a review of the current standards. The review has incorporated the recently released WorkSafe Victoria (2003) *Occupational Health and Safety Guidelines for the Collection, Transport, and Unloading of Non-hazardous Waste and Recyclable Materials.* It also considers the implementation needs of the draft *Towards Zero Waste – A Material Efficiency Strategy for Victoria.*

The updated Preferred Service Standards applies to the collection, sorting and transport of dry recyclables generated from both residential and non-residential properties including non rateable properties (such as churches, kindergartens) and small to medium sized enterprises (SMEs).

Occupational Health & Safety

Kerbside collection methods and systems used by councils and contractors for recyclables must comply with the requirements of the Occupational Health and Safety Act 1985 (*OH&S Act)* and associated regulations, and be informed by relevant guidelines including the recommendations of the WorkSafe Victoria (2003) Guidelines. See http://www.workcover.vic.gov.au/vwa/home.nsf/pages/so_wastecollection for more information.

These Guidelines are designed to assist industry to improve occupational health and safety performance in general, and to prevent injuries and fatalities by implementing, wherever practicable:

- a 'no-lift' approach to the handling of containers, bundles/packages;
- a 'no-riding on the outside of vehicles' approach;
- a 'no-work at heights' approach (except in workshops or by fully-equipped service crews, where practicable; and compliance with occupational health and safety legislative requirements.

Councils and contractors should refer to the OH&S Act 1985 and associated regulations, and ensure they are consistent with relevant WorkSafe Victoria OH&S guidelines, legislation and requirements when implementing kerbside systems.

Preferred Service Standards

Kerbside recycling baseline targets

1. An average weekly recycling yield of at least 3.5 kg for households.
2. A collection and sorting cost per tonne per year of less than:-
    - $170 for metropolitan & large provincial centres
    - $200 for small provincial centres & rural townships
3. A collection and sorting cost per household per year of up to:-
    - $45 for metropolitan & large provincial centres

- $50 for small provincial centres & rural townships

Collection and sorting cost includes container purchase, supply and distribution.

Kerbside recycling aspirational targets

1. An average weekly recycling yield of greater than 4.5 kg for households.
2. A collection and sorting cost per tonne per year of less than:-

    - $120 for metropolitan & large provincial centres
    - $150 for small provincial centres & rural townships

Collection and sorting cost includes container purchase, supply and distribution.

Range of materials

1. Primary range of materials:

    - cardboard packaging
    - newspapers
    - printing and writing paper
    - magazines
    - phone books
    - glass packaging
    - rigid and semi-rigid aluminium packaging
    - liquid paperboard
    - rigid plastic packaging including PET, HDPE, PVC, and
    - rigid steel packaging

2. Secondary range of materials:

    - Polypropylene (PP)
    - Polystyrene (PS)
    - Expanded polystyrene
    - Flexible plastics

All new contracts to collect the full range of primary materials, while the collection of the secondary range of materials must be subject to available technology and local markets.

Collection systems

- 240L MB - fully commingled fortnightly collection
- 240L MB – split fortnightly collection
- 120L MB - fully commingled weekly collection

Mobile bin colours

1. Standard mobile bin (MB) lid colours for recycling, garbage and green organics to be adopted statewide to avoid confusion and product contamination. Recommended lid colours are:

- Recyclables - yellow
- Garbage - red
- Organics - bright green

2. A dark green or black standard colour for all MB bodies (NB: The dark green/black colour will allow maximum recycled content into MB manufacture).

Extent of servicing for kerbside and drop-offs

1. Provision of kerbside recycling collections to all residents within metropolitan and major provincial centres.
2. Provision of kerbside recycling collections for smaller provincial centres and rural townships and remote areas, where a minimum of at least 400 MB's per eight-hour day can be collected and the baseline cost target of less than $50/household/yr can be achieved.

Drop-off service provision for small, rural and provincial sectors

1. Provision of a combined kerbside recycling and drop off service to rural, remote and small provincial centres. (The extent of kerbside recycling services to be based on contract costs of up to $50/household/yr and pick up of at least 400 MB's per 8-hour day.

2. Where the collection of 400 MB's per 8-hour day and the baseline cost target of less than $50/household/yr cannot be achieved, the provision of a network of convenient drop-off centres that are staffed and/or supervised is recommended.

3. Drop off centres may include resource recovery and waste transfer stations, service stations, and schools but only where these sites can be supervised.

4. Provision of two 60L containers for recycling to residents SOLELY serviced by drop-off centres with advice as to where the drop-off centres are located, their opening hours and the materials that can be recycled.

Multi-unit residential developments

Provide all multi-unit residential developments and residential sites with access to waste and recycling services.

Servicing of non-residential sites

1. Councils are encouraged to provide kerbside collection services for the following non-residential sites:

   - non rateable properties including sporting facilities, libraries, kindergartens, schools, churches and scout halls.
   - small to medium size commercial enterprises (SMEs).

2. Provision of the same container and frequency of service for the designated non-residential sites as for residential properties.

Sorting and reprocessing

1. Include penalty payments into recycling collection and sorting contracts where the total losses (including contaminant, glass breakage, other recyclable losses & oil contamination) exceed 10%.

2. Incorporate regular auditing of loads.

Education

1. Provision of feedback to residents by councils on recycling and waste minimisation achievements. (This should include the amount of material recovered, contamination rate of materials collected, waste collection & disposal reductions, and environmental gains including greenhouse gas reduction, improved resource recovery and reduced water usage)

2. Promotion by councils on reduction of domestic waste opportunities through other return systems such as:

    - retail drop off points e.g. shopping bags, corks;
    - transfer stations e.g. oil, branches, timber, metals;
    - reuse opportunities e.g. clothing bins, charities, computers.
    - promotion of other programs and services through EcoRecycle Victoria and local governments (eg Household Chemical Collection Program, oil drop off facilities).

1 Introduction

Kerbside recycling occurs in almost all Victorian council areas. In addition, many councils provide recycling drop-off centres for local residents. The level of domestic recycling activity is higher than in other states, reflecting the Victorian community's high priority for kerbside recycling as an essential service.

Victorian recycling services have developed in a myriad of forms, and recently there has been a concerted focus on ensuring the efficiency of the recycling effort. Since its inception in August 1999, the National Packaging Covenant has provided an opportunity to focus on service standards and on establishing sustainable, cost-effective recycling systems.

Programs such as EcoRecycle's Best Practice Kerbside Recycling Program have facilitated the move away from less desirable recycling practices.

The Preferred Service Standards presented in this Guide:

- Provide a benchmark from which the recycling collection and processing industry can move forward in an efficient and sustainable manner;
- Are relevant to the different geographic and demographic circumstances across the State as they accommodate the needs of urban as well as rural communities;
- Are based upon assessment criteria endorsed by stakeholders;
- Are consistent with the National Packaging Covenant and the consultation Draft Towards Zero Waste – A Materials Efficient Strategy for Victoria; and
- Are consistent with WorkSafe guidelines, legislation and requirements. (http://www.workcover.vic.gov.au)

The Standards have been developed following wide consultation with both industry and local government, and provides an analysis of current and potential practices and systems.

The Preferred Service Standards will be reviewed in July 2006. Refinements are likely to occur as the recycling industry matures and new technologies and markets develop. The Standards are therefore to be viewed as flexible in response to industry developments, innovation and OH&S developments.

The Preferred Service Standards incorporate the key elements of EcoRecycle Victoria's Accreditation Standards and Model Kerbside Recycling Collection and Sorting Contracts.

1.1 Linkage with the National Packaging Covenant

The National Packaging Covenant provides a framework for recycling based on the principle of shared responsibility between industry and all spheres of government to achieve national consistency in the life cycle management of packaging and paper and the implementation of sustainable and efficient kerbside recycling systems. See http://www.deh.gov.au/industry/waste/covenant/ for more information.

Refer to Preface for information about previous funding information linked to the Preferred Service Standards Guide.

1.2 Linkage with the Draft Towards Zero Waste Strategy

The *Towards Zero Waste: A Materials Efficiency Strategy* for Victoria (Consultation Draft) is aimed at:

- Increasing materials efficiency and reducing solid waste generation.
- Increasing the sustainable recovery of materials for recycling and reprocessing.
- Reducing the environmentally damaging impacts of waste.

The draft Strategy aims to increase the recovery rate in all solid waste generated from the current 48% to 75% by 2013, comprising a 45% recovery rate in household waste by July 2008 (current recovery 28%) and a 65% recovery rate in household waste by July 2013.

A comprehensive plan to reduce and recover solid waste, manage residual waste and reduce litter, will form the basis for programs to be implemented over the next 10 years.

Measures will be introduced to progressively divert more materials from the waste stream. Other strategies for waste recovery include market development initiatives for innovative product design and or/recovery, linked to product stewardship agreements.

The achievement of recovery targets established in the draft Strategy will enable the diversion of significant quantities of materials from landfill over the next decade. The Government, through the EPA and EcoRecycle, will assist the waste management industry to target resource recovery, aided by the development of best practice environmental standards.

The draft Strategy identifies priority materials that have been specifically selected due to quantities generated and landfilled and the environmental impact or risk. These include garden organics, food waste and paper/cardboard.

The draft Strategy also proposes the implementation of regional contracts for household recyclables, and expanded recycling services to the commercial and industrial sectors, including small to medium enterprises (SMEs).

The updated Preferred Service Standards have been prepared with the draft Towards Zero Waste Strategy objectives, targets, and initiatives in mind. See http://www.ecorecycle.vic.gov.au/for more information.

1.3 Purpose of this Guide

This Guide presents the revised Preferred Service Standards as well as providing a series of additional actions to support the document. It covers the collection and processing of recyclables from residential and small-to-medium enterprises (SME's). The collection of green organics and hard-waste is not covered in this document.

1.4 What is Best Practice?

Best practice represents the current 'state of the art' and aims to produce outcomes consistent with the community's social, economic and environmental expectations. This Guide incorporates preferred service standards for the kerbside recycling industry with respect to cost efficiency, materials collected, extent of servicing in rural Victoria and OH&S aspects. Continuous improvement is an important part of best practice.

2 Occupational Health and Safety

Kerbside collection methods and systems used by councils and contractors for kerbside recyclables must comply with the requirements of the *OH&S Act 1985* and associated regulations, and be informed by relevant guidelines including the recommendations of the WorkSafe Victoria (2003) *Occupational Health and Safety Guidelines for the Collection, Transport, and Unloading of Non-Hazardous Waste and Recyclable Materials.*

These guidelines were designed to assist the industry to improve occupational health and safety performance in general, and to prevent injuries and fatalities, by implementing, wherever practicable:

- A 'no-lift' approach to the handling of containers, bundles/packages;
- A 'no-riding on the outside of vehicles' approach;
- A 'no-work at heights' approach (except in workshops or by fully-equipped service crews, where practicable; and
- Compliance with occupational health and safety legislative requirements.

These guidelines state that where there are difficulties adopting these approaches, an employer needs to:

- Prepare and implement a Risk Control Plan and be able to demonstrate alternative methods of controlling risks as far as is practicable, and
- Prepare and implement an action plan to achieve these approaches over time and be able to demonstrate the steps or stages and changes being undertaken, according to the documented schedule, towards full implementation.

Practicable means having regard to:

- The severity of the hazard or risk in question;
- The state of knowledge about the hazard or risk and any ways of removing or mitigating that hazard or risk;
- The availability and sustainability of ways to remove or mitigate the hazard or risk; and
- The cost of removing or mitigating that hazard or risk.

Employers need to take into account all practicability factors, not only cost, when evaluating new or upgraded kerbside recycling systems.

Councils and contractors should refer to the OH&S Act 1985 and associated regulations, and ensure they are consistent with relevant WorkSafe Victoria OH&S guidelines, legislation and requirements when implementing kerbside systems.

3 Preferred Service Standards

3.1 Cost Bands and Recycling Yields

In framing the updated Preferred Service Standards for recyclables, it is important that they meet appropriate financial and system yield criteria.

From a financial perspective, costs within each municipality should be comparable to those achieved across the State and in line with the ability of councils to fund recycling from their rate base.

From a yield perspective, recycling collection and sorting should result in a yield that is comparable across the State and represents a major diversion of recyclables from the domestic waste stream (i.e. compatible with the draft *Towards Zero Waste Strategy*).

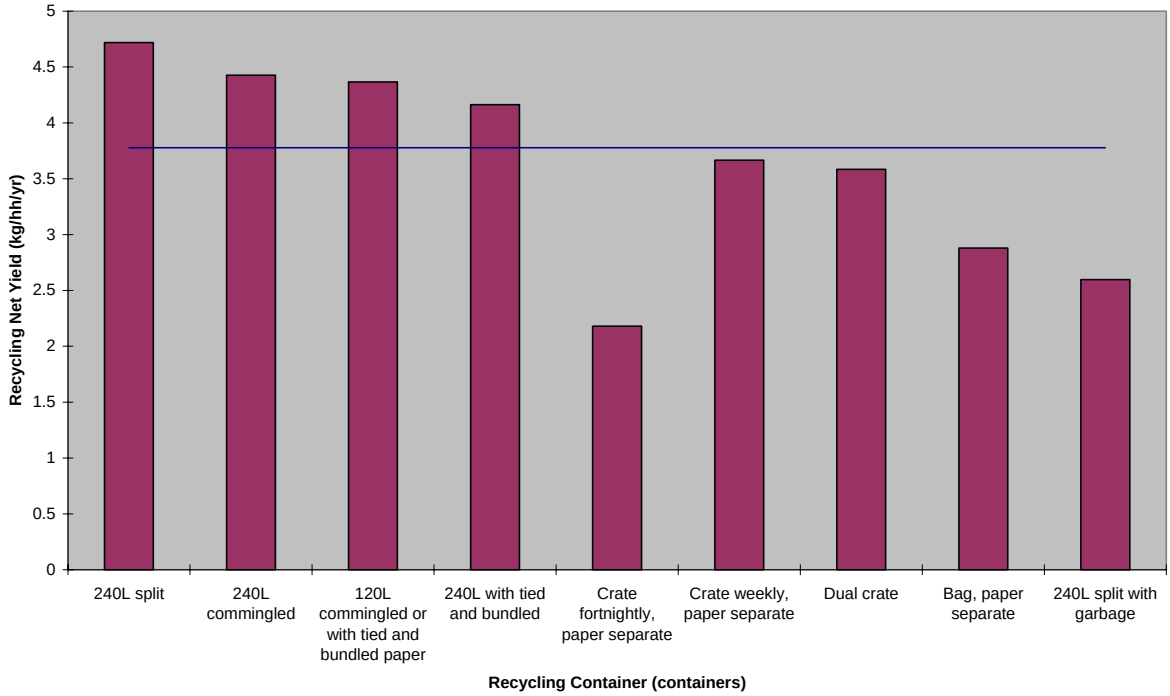
Cost and yield performance targets were established in the former Preferred Service Standards Guide of 2000. They were interpreted by some as peak performance targets or baseline requirements that needed to be met in order to access funds from the Best Practice Kerbside Recycling Program under the National Packaging Covenant.

To avoid this confusion the Preferred Service Standards now include baseline and aspirational targets for kerbside recycling costs and net yields. These are defined as follows:

- Baseline targets - For councils and contractors to identify whether the kerbside recycling collection and sorting contracts are delivering minimum requirements.
- Aspirational (stretch) targets - For councils and contractors to strive, through continuous improvement, to achieve best practice over the life of the kerbside recycling collection and sorting contracts.

The introduction of the Preferred Service Standards will lead to cost and yield performances that exceed the baseline targets. A summary of recycling yields across Victoria for 2001/02 is shown in Figure 3.1.

Figure 3.1: Recycling Net Yield by Container (proportion of households) – 2001/02



Preferred Service Standards - Kerbside Recycling Baseline Targets

1. An average weekly recycling yield of at least 3.5 kg for households.
2. A collection and sorting cost per tonne per year of less than:
   - $170 for metropolitan & large provincial centres
   - $200 for small provincial centres & rural townships
3. A collection and sorting cost per household per year of up to:
   - $45 for metropolitan & large provincial centres
   - $50 for small provincial centres & rural townships

Collection and sorting cost includes container purchase, supply and distribution.

All of the baseline cost targets exclude GST.

The targets are based on the measured performance outcomes across councils in Victoria and interstate which have implemented the Preferred Service Standard collection systems as discussed in Section 3.3. These targets to be met in all areas regardless of household size or income levels, except in areas where occupancy rates are dramatically low due to holiday occupancy.

Preferred Service Standards - Kerbside Recycling Aspirational Targets

1. An average weekly recycling yield of greater than 4.5 kg for households.
2. A collection and sorting cost per tonne per year of less than:

- $120 for metropolitan & large provincial centres
- $150 for small provincial centres & rural townships

Collection and sorting cost includes container purchase, supply and distribution.

The aspirational cost targets excludes GST.

Examples of continuous improvement opportunities may include ongoing consumer education to encourage recycling and reduce contamination, improved sorting and collections systems to reduce recycling losses and glass breakage. These targets are consistent with those outlined in the draft *Towards Zero Waste Strategy* for domestic waste minimisation across Victoria.

Some aspirational targets may not be met in all areas. Municipalities with small household sizes or low household incomes (inner urban) may not meet the per household objective.

EcoRecycle Victoria will assist councils to provide annual updates on yields and costs of systems across the State (through its annual Local Government Data Collection survey), national benchmarks and links to WorkSafe information and updates.

3.2 Range of Materials

Currently almost all Victorian kerbside recycling services collect the following materials:

- Cardboard
- Newspaper
- Magazines
- Printing and writing paper
- Glass bottles
- Aluminium cans
- Clear PET bottles
- Clear HDPE bottles
- Steel

In addition, many also collect PVC rigid packaging, liquid-paper-board (LPB) packaging, aluminium semi-rigid packaging and printing and writing paper. A smaller number of councils also designate the following for collection: HDPE and PET coloured rigid packaging, PP rigid packaging, PS rigid packaging, LDPE film packaging and shopping bags. The percentages, by weight, for all materials collected are shown in Table 3.1.

Table 3.1: Percentage of Collected Material by Weight – 2001/2002

Material	%
Office and mixed paper (incl. News)	41.77%
Cardboard	16.33%
Glass	28.86%
Steel	3.34%

PET	3.43%
HDPE	3.23%
Aluminium	1.41%
Other	1.60%
Source: EcoRecycle, (2003)	

The price paid by reprocessors for materials such as newspaper, cardboard, glass and steel has a significant impact on overall recycling costs. The price paid for other materials, although just as significant, has less of an impact on the collection and sorting cost, as the percentage of overall tonnes collected is small. The marginal cost of adding products to the range of recyclables is low. The saving from removing materials from the mix is also very low.

The inclusion of materials/products in kerbside collection is to be based on all of the following:

- Significant volumes in the domestic waste stream;
- Compatibility with recycling collection systems;
- Adequate reprocessing opportunities and sustainable market outlets; and
- Environmental benefit to be derived from diversion and recycling.
- Satisfactory health and safety systems

There is currently a broad range of market outlets for all clean rigid plastics. There are 40-50 Australian plastics reprocessors. Most of these are able to receive post-consumer plastics. The majority of PET and HDPE material collected in Victoria is reprocessed in Australia.

In addition to the local plastics recycling industry, there is a demand for material across Asia for all polymers and over 40 000 tonnes annually is exported from Australia for reprocessing. This is an important outlet for coloured PET and HDPE and for PVC, PP and PS material. Most of these plastics are collected from households in relatively low volumes and there is a market for this material to be baled and sold as mixed plastics, though recent indicators suggest that the mixed plastic market into Asia is slowing markedly.

Preferred Service Standards - Range of Materials

1. Primary range of materials:
   - cardboard packaging
   - newspapers
   - printing and writing paper
   - magazines
   - phone books
   - glass packaging
   - rigid and semi-rigid aluminium packaging
   - liquid paperboard
   - rigid plastic packaging including PET, HDPE, PVC
   - rigid steel packaging

2. Secondary range of materials:
    - Polypropylene
    - Polystyrene
    - Expanded Polystyrene
    - Flexible plastics

All new contracts to collect the full range of primary materials, while the collection of the secondary range of materials must be subject to available technology and local markets.

For existing contracts, it may be possible to negotiate the expansion of the current designated materials to the Preferred Service Standard list of materials without a significant financial impact. Some sorting facilities already receive and recover some non-designated materials. Others deal with them as a disposal costs.

Expanded polystyrene (EPS) and flexible plastics are not included in the Preferred Service Standard list of primary materials collected.

As new contracts come up for renewal, councils are encouraged to collect the full range of materials through the kerbside collection system (as above).

However, it is acknowledged that not all materials have the appropriate markets available to be collected, reprocessed and sold into viable products. PACIA, EcoRecycle Victoria and the packaging industry are working in partnership to develop new markets for these materials that will enable them to be collected at kerbside.

EcoRecycle Victoria, PACIA, raw material suppliers and other supply chain partners will work co-operatively with the sorting industry to facilitate kerbside recycling of all rigid plastics containers (including PP and PS) by:

- Ensuring local reprocessing outlets are developed for the reprocessing of PP and PS;
- Providing information on reprocessing outlets for all collected plastics; and
- Providing advice on any changes in collection and sorting costs and market prices for PS and PP.
- Developing new and expanded reprocessed plastic applications.
- Demonstrating the financial and technical feasibility of recycling these materials.

The inclusion of these materials into the primary range of materials will be considered during the review period in July 2006.

As kerbside systems focus more on food and general lines packaging in addition to beverage packaging, the issue of product residue becomes significant. The environmental benefit of recycling will be reduced if large volumes of hot water are consumed in preparing recyclables.

Councils and contractors should encourage residents to:-

- Present recyclables free from residues by rinsing the container and re-using the water.
- Take lids and closures off containers and place both container and lid in the recycling container separately.

3.3 Collection systems

Mobile Bins

Since the introduction of the Preferred Service Standards in 2000, there has been a strong shift towards recycling systems utilising mobile bins (MB) for all recyclables. This has been in the form of either a 240L split or fully commingled MB, collected fortnightly. The MB is the preferred system type that councils and contractors should be looking to implement to meet OH&S guidelines.

Preferred Service Standards – Collection Systems

The preferred system for collection of kerbside recycling is:

- 240L MB - fully commingled fortnightly collection
- 240L MB – split fortnightly collection
- 120L MB - fully commingled weekly collection

Any collection system involving manual handling should only be considered after it is deemed not practicable to implement a fully mechanised lifting system as defined in the *OH&S Act 1985* and associated regulations.

In inner metropolitan areas with narrow streets, street parking and on-site storage issues, it may be difficult to provide a fortnightly 240 L MB collection service. In these situations a 120L MB collected weekly may be appropriate. If this is not possible, councils should refer to the OH&S guidelines to ensure they comply with relevant legislation and undertake risk assessments to determine the safest collection system.

In municipalities with small provincial centres and a high proportion of rural and remote areas, the kerbside recycling costs will be higher than in metropolitan areas and large provincial centres due to increased travel distances and smaller volumes at sorting facilities.

The type of collection system adopted by council will also depend on the type of housing present in its geographical boundaries. Residential tenements can be made up of detached houses, semi-detached houses, units, flats and apartments. It is acknowledged that not all tenements within a specific shire may be able to have access to the above preferred standard collection systems because of storage space and logistical issues from the collectors point of view. Alternative arrangements such as the sharing of 120L or 240L MB's may be appropriate.

With increased travel distances, the number of households serviced per working day will be reduced and in some areas, the use of vehicles equipped for mechanised lifting of MB's will be expensive. In these instances, the issue of practicability and risk assessments will determine the most practicable system to implement.

When introducing new kerbside recycling systems, councils should look to downsize their current MB for garbage if they have not already done so. When introducing new kerbside recycling systems, most councils have also introduced new garbage bins, changing from 240L MB's to predominantly 120-140L MB's and in some instances, offering smaller 80L MB's to households. Often these changes have been introduced with accompanying differential pricing systems, whereby households opting for smaller garbage bins are charged a lower waste management fee than those opting for larger garbage bins.

Table 3.2 – Correlation between garbage and recyclables collection system[1] and diversion rate, Victoria 2001-2002

	Garbage collection system						
Recyclables collection system	*80L*	*120L*	*140L*	*240L*	*240L split (garbage & recyclables)*	*Bag*	*Average diversion rate*
	Diversion rate (%)						
120L commingled or with tied bundle	33	32	—	—	—	—	*32*
240L split or commingled	—	34	27	26	—	—	*30*
240L & tied bundle	—	28	28	27	—	—	*28*
2 Crate system	46	20	—	22	—	—	*24*
Crate & tied bundle	30	28	24	14	—	—	*23*
[2]Other systems	19	34	6	15	17	19	*18*
Average diversion rate (%)	*35*	*29*	*25*	*18*	*17*	*19*	—

[1]Refers to the predominant bin type used by the local government
[2]Includes bag or split recyclables with garbage collection, or monthly collections.

Table 3.2 indicates that the diversion rate of recyclables increases when a smaller garbage bin is implemented. Smaller garbage bins will encourage residents to utilise their MB for recycling more frequently and decrease their reliance on the garbage bin. The overall cost efficiencies of collection and sorting are partly dependent on the uptake and utilisation of the recycling service.

3.4 Mobile Bin Colours

While there may be reasons for some regional differences in recycling systems, councils should strive for a consistent approach. This will enable residents moving from one area to another to easily understand the recycling system requirements. One aspect of this consistent approach is the colour of recycling collection containers used. To avoid confusion resulting in contamination of recyclables, it is recommended that the following be adopted.

Preferred Service Standards – MB Colours

1. Standard MB lid colours for recycling, garbage, and green organics to be adopted statewide to avoid confusion and minimise product contamination. Recommended lid colours are:
   - Recycling - yellow
   - Garbage - red
   - Organics - bright green
2. A dark green or black standard colour for all MB bodies (NB: the dark green/black colour will allow maximum recycled content into MB manufacture).

Progressively phase out and replace MB lid and body colours if inconsistent with the Preferred Service Standards. Provide adequate resident education that includes MB lid messages.

Councils should recognise the need for MB's to be manufactured using Australian post consumer recycled content. Councils may use 'hot stamping' to designate each MB and for the purpose of education messages, this can also assist the visually impaired.

During the completion of this document, Standards Australia had sought stakeholder comments on appropriate MB colours. The draft recommendation adopted by Standards Australia in April 2004 is the recommendation in this document for both MB body and lid colours. The implementation of MB colours should reflect those of Standards Australia where any inconsistency exists between this document and the final determination of Standards Australia.

3.5 Extent of Servicing for kerbside and drop-offs

The use of pick-up frequency as a determinant in deciding the level of service allows councils the flexibility to collect from a combination of higher population density areas and some surrounding lower density areas.

It is necessary to ensure that the collection vehicles are fully utilised to ensure that the cost efficiencies are achieved. For this reason it is recommended that all collection vehicles be operated over five days a week for a minimum of six hours per day. For smaller rural councils this can be achieved by establishing joint collection contracts with adjacent councils.

In some cases tourism means the seasonal variation in populations is significant (e.g. coastal areas). In these areas the participation and yield of recyclables can vary by over 50% from season to season. It may be appropriate in these areas to have a variation in frequency for different periods of the year, e.g. more frequent summer to Easter periods. As this change in collection frequency may be confusing for some permanent residents, it should be accompanied with sufficient education information to avoid community resentment.

In more remote areas with small townships and large farms, the minimum pick up of 400 MB's per day would not be possible, in which case a drop-off service system could be provided. The use of pick-up frequency as a determinant in deciding the level of service, allows councils the flexibility to collect from a combination of higher population density areas and some surrounding lower density areas.

Preferred Service Standards - Extent of Servicing for Kerbside and Drop-Offs

1. Provision of kerbside recycling collections to all residents within inner, middle, and outer metropolitan cities and major provincial centres.
2. Provision of kerbside recycling collections for smaller provincial centres and rural townships and remote areas, where at least 400 MB's per eight-hour day can be collected and the baseline cost target of less than $50/household/yr can be achieved.

3.6 Drop off Service Provision for Small, Rural and Provincial Sectors

Kerbside services are currently provided to an estimated 1.8 million households across Victoria. There are some households in rural areas or in small or remote townships that are significantly more expensive to service with a kerbside collection. There is a constant pressure on councils to extend kerbside recycling to provide all residents with the same level of service as the larger urban centres.

It is not expected that councils must provide a kerbside recycling service to all residents across the whole shire. Costs will increase significantly if all residents were provided with a kerbside service. The goal is to ensure that all residents are provided with access to a recycling service, regardless of whether it is a kerbside service or a drop-off service. When tendering out contracts for kerbside collection and sorting, councils should seek tender prices that will equate to a cost of no more than $50/hh/yr. This will give a good indication of how many residents can be serviced within the Preferred Service Standards baseline targets, and hence will allow council to make provisions for adequate drop-off facilities to cater for those residents that cannot be serviced by kerbside recycling.

The aim of the recycling service is to ensure recyclable materials are recovered in an environmentally, cost-effective and practical manner. The difference in the level of service across the shire, ie from kerbside services to drop-off facilities, should be explained by councils to residents on the environmental and economic reasons rather than as a reduction in service.

Where drop off facilities are provided, these are to be located at sites where there is some existing staffing (e.g. council resource recovery and waste transfer stations or depots). In selecting sites for small townships, sites should be chosen that will not be susceptible to the dumping of garbage materials either by residents or visitors to the area. Some sites that have worked well include schools and service stations. As residents accessing drop off centres still need to store and transport their recyclables, collection containers can be issued to residents (specifically for the purpose of taking recyclables to a drop-off facility).

Preferred Service Standards – Drop-Off Service Provision for Small, Rural and Provincial Sectors

1. Provision of a combined kerbside recycling and drop off service to rural, remote and small provincial centres. (The extent of kerbside recycling services to be based on contract costs of up to $50/household/yr and pick up of at least 400 MB's per 8hr day)

2. Where the collection of 400 MB's per 8hr day and the baseline cost target of less than $50/household/yr cannot be achieved, provision of a network of convenient drop-off facilities that are staffed and/or supervised is recommended.

3. Drop off centres may include resource recovery and waste transfer stations, service stations, and schools but only where these sites can be supervised.

4. Provision of two 60 L containers for recycling to residents SOLEY serviced by drop off centres with advice as to where the drop off centres are located, their opening hours and the materials that can be recycled.

3.7 Multi-Unit Residential Developments

On some large high-density residential sites, building managers control issues such as waste disposal. On some of these sites, management has sought to exclude its residents from the council waste and recycling services and to make its own garbage disposal arrangements. This has resulted in a significant reduction in recycling collection coverage in inner urban areas. Councils will need to identify appropriate garbage and recycling collection systems for a range of low and high-density multi unit sites where on-site storage is restricted. This could include other system types such as the use of garbage chutes and/or larger volume skips rather than MB's for garbage and recycling.

Preferred Service Standards – Multi-Unit Residential Developments

1. Provide all multi-unit residential developments and residential sites with access to waste and recycling services.

Councils should incorporate planning permit condition(s) for major multi-unit residential developments to include recycling and waste services and refer to the "aspirational target" of 4.5kg yield per week to determine the number of MB's that will be required to provide an adequate recycling system.

EcoRecycle will develop recycling guidelines that include design for multi-unit residential developments during 2004/05.

3.8 Servicing of Non-Residential Sites

Across the state, councils approach the servicing of non-residential properties in many ways. These sites include:

- council properties and libraries
- primary and secondary schools
- sporting facilities
- churches and public halls
- shops and shopping centres
- offices
- factories and industrial sites
- hospitals and tertiary education institutions

For many large sites, the garbage and recycling volumes are significant and are dealt with through commercial collection arrangements. For recycling from these sites, the cost of collection is comparable to garbage collection costs and in some cases (e.g. shopping centres), there is sufficient value in the collected material to fully cover collection costs.

For small to medium sized enterprises (SMEs), the cost of collection is higher in staff and transport costs and this will be reflected in higher charges. In many cases, small sites will have difficulty in arranging a recycling collection on a commercial basis.

In order to meet the disposal needs of small/medium sites and to maximise diversion to recycling, some council have included non-residential sites in their kerbside collection contracts. There are currently no consistent servicing arrangements across Victorian councils for these sites.

Many councils provide a kerbside recycling collection to small non-residential sites on the same basis as households (same container, volume and frequency). In most cases, those sites are charged through their rates with the standard waste charges. In relation to non-rateable properties, such as schools, kindergartens and churches, some councils apply a charge for the service while others do not charge. In other instances, some councils provide the same level of service to these properties as with residential properties, but only charge for the provision of extra services. If recycling services are to be provided to non-rateable properties, appropriate personnel must be responsible to ensure the recycling bin is used correctly, for eg: library – a person or group responsible to ensure everyone knows what can and can't be placed in the recycle bin.

In some council's it is recognised that many non-residential sites require a service level above that for households. It is up to councils to determine how many MB's will be needed to service SME's. Examples of this may be cafes and restaurants generating higher volumes of bottles and cans, or offices and schools generating higher volumes of paper and cardboard. Occasionally, through its kerbside collection contractor, council will increase the allowed capacity or collection frequency for these sites.

Usually the servicing of non-residential sites is outlined clearly in collection contract tender documents. However, this is not always the case and additional sites are often added incrementally during the contract period. In order to maximise waste diversion in the community and recognising the difficulty small and medium site owners may encounter in accessing commercial recycling services, the following guidance should apply.

Preferred Service Standards – Servicing of Non-Residential Sites

1. Councils are encouraged to provide kerbside collection services for the following non-residential sites:

    - non-rateable properties including sporting facilities, libraries, kindergartens, schools, churches, and scout halls.
    - small to medium size commercial enterprises (SMEs).

2. Provision of the same container and frequency of service for the designated non-residential sites as for residential properties.

There may be a need to stage the implementation of kerbside recycling collection from community and commercial sites based upon capacity limitations of local infrastructure.

For larger sites, there is no compelling case for councils to undertake the costly and diverse recycling collection responsibility for these sites. There is however a role for councils in providing information to larger commercial site operators to facilitate their recycling activity. There is also a need for some council control of collection times for both garbage and recycling in areas of mixed residential and commercial activity.

Provincial centres need sufficient volume of recyclables for a sorting facility to be viable. The inclusion of recyclables sourced from SME's can be important in achieving the volumes necessary. Councils should also seek to provide information on available commercial recycling options and costs to the facility managers of large non-residential sites.

3.9 Management of Glass Breakage

With the increased take up of MB-based collection of recyclables, the issue of glass breakage has also grown. Breakage occurs at all points of collection and sorting but is primarily influenced by truck compaction levels. Contractors will continue to strive for maximum collection efficiency including a large number of MB pick-ups per vehicle load. The maximum compaction density will depend on the type of compaction system and container configuration; i.e., fully commingled or split into paper and containers fractions.

As a general guide, commingled collections should not result in compaction rates above 140 kg/m3. The maximum compaction limit allowed should be nominated in the tender documents to ensure that both collection and sorting contractors are clear on requirements.

Contractors will need to assure councils that their proposed collection plan can meet these compaction limits. These can be easily audited on a regular basis.

A method used in some areas to maximise collection efficiency is to consolidate collected material into a bulk-haul container for transit to a sorting facility. The experience of this practice is that the double handling of material in this way leads to extremely high levels of glass breakage and in some cases to an overall reduction in the value of the recyclables to the point that sorting is non-viable. Breakage occurs primarily into the bulk container and at the point of emptying the bulk container.

3.10 Sorting and Reprocessing

The environmental benefit derived from kerbside recycling is linked very closely to maximising the yields of recyclables, collected, sorted and subsequently reprocessed.

For this reason it is vital that the collection, sorting and reprocessing of recyclables should be structured to maximise resident involvement and minimise losses of collected recyclables.

The model collection and sorting contracts produced by EcoRecycle Victoria and used extensively across Victoria have clauses to deal with maximising diversion of recyclables and reducing losses.

Losses are in several forms. There is in some recycling loads, material that is not designated for collection. Due to its nature (oil, paint, food, organics, nappies etc), the material provides a hazard to sorting staff or contamination of the whole load. There is other material that while not hazardous is not designated for collection and must be separated from the recyclables. This may include materials that some residents believe could be recyclable (e.g. flexible plastics packaging, clothing, and timber items). These are also contaminants and while they do not threaten the recovery of the recyclables, can be a significant sorting and disposal cost for sorting facility operators.

Some councils implement various methods to eliminate contamination via households and one of these is the placement of stickers on the MB to notify the householder of the contamination. If the householder continues to incorrectly use the recycle bin some councils personally visit the householder to deal with the situation.

The other component of losses is recyclables that are not recovered in sorting processes. The rate of non-recovery of recyclables is influenced by damage to glass containers during collection and unloading, and by the sorting facility configuration and management. Where the facility is not operating efficiently, significant volume of all recyclables can be lost. Surveying of materials recovery facilities shows that where efforts are made by residents, councils and both collection and sorting contractors, overall losses should be around 8-10% overall. The loss of recyclables within this should generally be less than 3-5% of the total volume handled.

Preferred Service Standards - Sorting and Reprocessing

1. Include penalty payments into recycling collection and sorting contracts where the total losses (including contaminant, glass breakage, other recyclables losses and oil contamination) exceed 10%.
2. Incorporate regular auditing of loads.

A procedure for remedial action should also be a feature of contracts to ensure material losses are addressed by the council and contractors.

3.11 Tendering and Contract Structure

In 2000, EcoRecycle Victoria provided to councils and contractors, model collection and receival (sorting) contracts for recyclables.

Councils across Victoria have used these model contracts with some minor modifications for local needs. The contracting of collection and sorting as distinct services has been beneficial. It allows contractors to be specialist in either collection or sorting facilities and the partnering of contractors to enable co-ordinated tendering of both services. It also provides local councils with maximum competition for both services. There have been positive experiences where councils have awarded separate collection and sorting contracts to different parties and also where the one contractor was awarded both contracts.

There is within the model contracts the ability for contractors to offer a more competitive price for conducting both services.

There is no apparent reason to move away from the current model contract structure. In relation to issues of contamination and load auditing, there needs to be some streamlining of contract clauses to make the audit process more practical and less costly. Collection and sorting contracts should have a duration of 5 - 7 years as this provides a balance between the need for sufficient depreciation time and flexibility to cover trends in waste management.

EcoRecycle Victoria will review and update the current model contracts for collection and sorting to reflect this updated Guide and WorkSafe guidelines.

During tendering processes, councils may wish to approve combined contracts on the basis that split contracts are advertised. It is acknowledged that in some instances combined contracts could be chosen not only based on the financial cost but also on the Best Value Principle Approach.

In tendering processes, councils are encouraged to require contractors to submit tenders that fully comply with the baseline service provision cost and net yield targets. This provides tendering contractors with the opportunity to provide optimal solutions by identifying those areas which can be provided with a financially responsible kerbside recycling system, and those areas which may be best serviced by a network of convenient drop off centres for recycling. This does not preclude councils from also requiring conforming tenders to also provide an option to service all households within the municipality or pre-selected towns and communities.

3.12 Regional Contracts

Almost all recycling contracts across Victoria are on a separate municipal basis. There is sometimes a benefit for smaller municipalities in contracting together with a larger regional council. In relation to sorting contracts, economies of scale are less clear. If the purpose of a regional sorting contract is to facilitate the establishment of a sorting facility, then 50- 75 000 households are likely to be needed.

A more optimal size for a sorting facility is 120,000 to 150,000 households and there is therefore considerable scope for regional sorting contracts to deliver improved economics of scale.

The Environment Protection Act precludes a Regional Waste Management Group (RWMG) from providing a service but does not preclude a RWMG from facilitating the private sector to provide a service on behalf of its member councils, and so achieve an economy of scale.

Regional Waste Management Groups and their member councils should facilitate the pursuit of regional, sub-regional, or intra regional collection and sorting contracts if there are financial and/or social benefits. Regional contracts could also include services of SMEs as an extension to the contract. The cost savings of a regional sorting contract are potentially highest in rural areas. Councils should be aware of the costs and benefits of regional contracts before entering into long term binding agreements.

3.13 Education

Studies undertaken by EcoRecycle Victoria have consistently shown that householders are largely unaware of what happens to their recyclables when they leave the kerbside. In addition, they have stated that they want to receive more feedback on what their recycling efforts achieve. The provision of information on destination of recyclables will not only address any community cynicism about whether collected material gets recycled, it will also help householders to see their efforts achieving environmental outcomes such as resource, energy and water savings.

Diversion of waste from households extends beyond the kerbside collection system. It includes return of material to point of sale, drop off points for a broad range of recyclables at transfer stations and a wide range of reuse opportunities.

Many households are probably unaware of the scope of other recycling and reuse opportunities beyond kerbside.

Preferred Service Standards - Education

1. Provision of feedback to residents by councils on recycling and waste minimisation achievements. (This should include the amount of material recovered, contamination rate of materials collected, waste collection and disposal reductions, environmental gains including greenhouse gas reduction, improved resource recovery, and reduced water usage)

2. Promotion by councils on reduction of domestic waste opportunities through other return systems such as:

    - retail drop off points e.g. shopping bags, corks
    - transfer stations e.g. oil, branches, timber, metals
    - reuse opportunities e.g. clothing bins, charities, computers
    - promotion of other services and program through EcoRecycle and local government (ie: Household Chemical Collection Program)

It is recognised that extensive education programs including full time education staff may be prohibitively expensive for smaller councils. Waste management education is to be encouraged for all municipalities, at a level within the means of each council.

EcoRecycle Victoria will provide councils with data to enable them to convert their recycling achievements for each material into overall environmental outcomes.

4 References

EcoRecycle Victoria (1997), Kerbside Collection: Model Contracts and Financial Cost Model, (includes users manual and modelling software), Melbourne, October 1997.

EcoRecycle Victoria (1998a), Preferred service standards for Kerbside Recycling (Draft), prepared by Golder Associates, Melbourne, July 1998

EcoRecycle Victoria (1998b), Accreditation System: Standards of Practice for Kerbside Recycling (Draft for Stakeholder Review), prepared by Cruse and Associates, Melbourne, August 1998.

EcoRecycle Victoria (1998c), Kerbside Recycling in Victoria: Assessments of markets and costs, prepared by Nolan-ITU, Melbourne, October 1998.

EcoRecycle Victoria (2000), Model Kerbside Recycling Contracts, prepared by Nolan-ITU, September 1999.

EcoRecycle Victoria (2002), Municipal Data Collection 2000-2001 Kerbside Waste Management Services, Melbourne, June 2002.

EcoRecycle Victoria (2000), Guide to Recycling Services in Victoria 2000, Melbourne, 2000.

EcoRecycle Victoria (2003), Consultation Draft - Towards Zero Waste – A materials Efficient Strategy, Melbourne, 2003.

EcoRecycle Victoria (2003), Local Government Data Collection 2001-2002 Kerbside Waste Management Services, Melbourne, 2003.

Plastics and Chemicals Industry Association (2002), Plastics Recycling Survey

Resource NSW (2003), Local Government Commercial Recycling Discussion Paper, Sydney, 2003.

State of Victoria (1999), Occupational Health and Safety (Manual Handling) Regulations 1999, S.R. No. 84/1999 pp 1-13.

State of Victoria (1998), Occupational Health and Safety Act 1985 Victoria, Occupational Health and Safety (Manual Handling) Regulations 1988, 2 August 1988.

State of Victoria (1998), Occupational Health and Safety Act 1985, Act No. 10190/1985, Reprint No 5, 17 November 1998.

Worksafe Victoria (2003) Occupational Health and Safety Guidelines for the Collection, Transport, and Unloading of Non-Hazardous Waste and Recyclable Materials, June 2003.

Background Paper A
Kerbside Recycling Profile – 2001/02

EcoRecycle Victoria

Background Paper A - Kerbside Recycling Profile – 2001/02

The following profile is based on data provided by Victorian councils to EcoRecycle Victoria through its Local Government Data Collection Survey for the 2001/02 financial year.

A1 Current services

An estimated 360,934 tonnes of recyclables are recovered from Victorian homes per year. This figure continues to grow and is more than twice the recycling volume of the early 1990s. A kerbside recycling service is provided to almost 1.8 million households, which equates to 92% of Victorian households. The yield of recyclables from kerbside collection per household is, on average, 197 kg per year or 3.78 kg per week.

The current range of recycling systems has evolved from a blend of commercial collections by bottle merchants and paper companies, service group/community organisation drives and the involvement of garbage collectors in recycling.

Expansion of recycling led to the widespread introduction of woven polyethylene bags for collection in the 1980s. During the early 1990s a range of councils introduced crates or MB's for recycling. This was accelerated in the late 1990s with the introduction of funding assistance through the Kerbside Development Program by EcoRecycle Victoria. As a result almost 70 councils now operate a kerbside service with a durable recycling container.

Seventy five of Victoria's 78 councils now have a kerbside service for all or some of their residents. All population centres of significant size have a kerbside collection.

The cost of kerbside recycling varies enormously across the state with councils paying between $7 and $93 per household per year for collection and sorting. The average cost for recycling collection and sorting is $28.50, which falls within the $25 - $35 range established in the *Guide to Preferred Standards for Kerbside Recycling in Victoria,* 2000. There are 29 councils which fall below $25 per household per year, and 19 councils which are above the upper guideline of $35 per household per year.

When measured as a cost per tonne of materials collected, the average is $144.50 per tonne, which is under the maximum $150 per tonne outlined in the *Guide to Preferred Standards for Kerbside Recycling in Victoria*, 2000. There are 40 councils where recycling costs for collection and sorting are above $150 per tonne.

Table A.1 following shows the range of recycling collection containers utilised across the state.

Table A.1: Statewide Recycling Containers - 2001/02

Recycling System	Number Councils
240L split MB fort	6
240L commingled MB fort	13
120L commingled MB separate paper fort	6
240L MB paper separated fort	5
Crate fortnightly, paper separate	6
Crate weekly, paper separate	25
Dual crate weekly	6
Bag, paper separate	6
240L commingled split with garbage weekly	2

No kerbside recycling	3
Total	78

These are presented against the service provision categories with other key system characteristics in Table A.2.

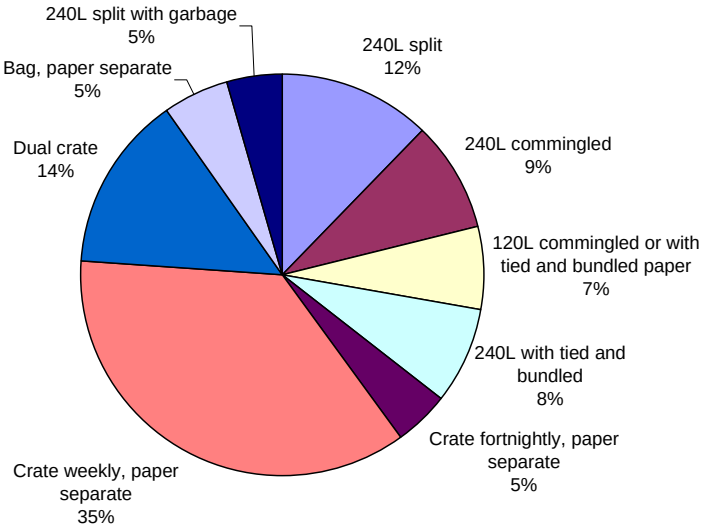
Table A.2: System Characteristics Across Service Provision Categories – 2001/02

	No of Councils	240L split	240L commingled	120L commingled or with tied and bundled paper	240L with tied and bundled	Crate fortnightly, paper separate	Crate weekly, paper separate	Dual crate	Bag, paper separate	240L split with garbage	Net yield (kg/hh/wk)	Cost ($/hh/yr)	Cost ($/t)
Inner Metropolitan	10	0	0	0	0	0	6	4	0	0	3.43	$24.54	$137
Outer Metropolitan	17	5	1	1	2	0	7	1	0	0	4.30	$29.48	$132
Melbourne Fringe	6	1	1	2	0	0	1	0	0	1	3.66	$35.46	$186
Major Provincial	6	0	2	0	1	1	1	0	1	0	3.63	$21.65	$115
Small Provincial	24	0	6	2	2	3	6	1	3	1	2.90	$30.37	$201
Rural Township	12	0	3	1	0	2	4	0	2	0	3.25	$33.54	$199
Total	75	6	13	6	5	6	25	6	6	2	3.78	$28.35	$144

Currently there are 37 councils with a crate based system, compared to 32 councils with MB based systems. Several councils have indicated that their crate based system will be replaced by a MB based system when tendering for a new contract due to a number of factors.

The number of bag based systems has steadily declined since the early 1990s, and this is expected to continue. Almost all councils are upgrading to a durable container when tendering a new contract. Figure A.1 shows the percentage of household currently serviced with each container.

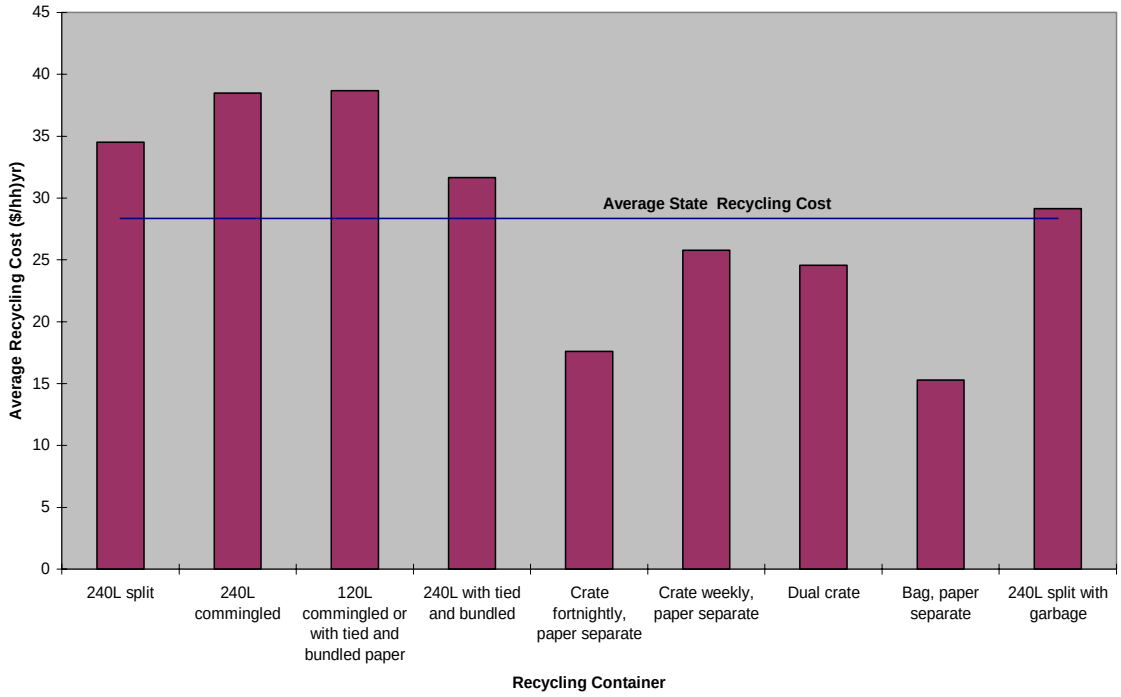
Figure A.1: Recycling Systems by Container (proportion of served households) – 2001/02



The amount of councils with durable container for paper collection has increased from 13 prior to development of the *Guide to Preferred Standards for Kerbside Recycling in Victoria*, 2000, to 25 councils. Of these 25 councils, 19 use either a split MB or commingled MB and 6 councils have a dual crate system.

The average yield per household of recyclables varies significantly from 0.5 kg per household per week through to 8.1 kg per household per week.

Figure A.2: Recycling Cost by Container (proportion of households) – 2001/02



The average cost per household for collection and sorting is approximately $28 per year. As figure A.2 shows, almost half the system types achieved a cost per household per year lower than the state average. The cost also depends on how far the system extends within each municipality.

Table A.2 and Figure A.3 show the range of yield that is achieved with each recycling container. Whilst the recycling container has an impact on resident participation levels and yield, there are a wide range of other influencing factors such as garbage MB size, household size, household income, education program scope.

The influence of garbage MB size on diversion levels and consequently on yield is significant. The proportion of councils with each garbage MB size is given in Figure A.4. The percentage of 240L garbage MB's has decreased significantly from 38% of total Victorian households to 21%, which have been replaced by 120L garbage MB's. It is likely that the amount of 240L garbage MB's will continue to decrease as councils change to smaller garbage MB's.

Figure A.3: Recycling Net Yield by Container (proportion of households) – 2001/02

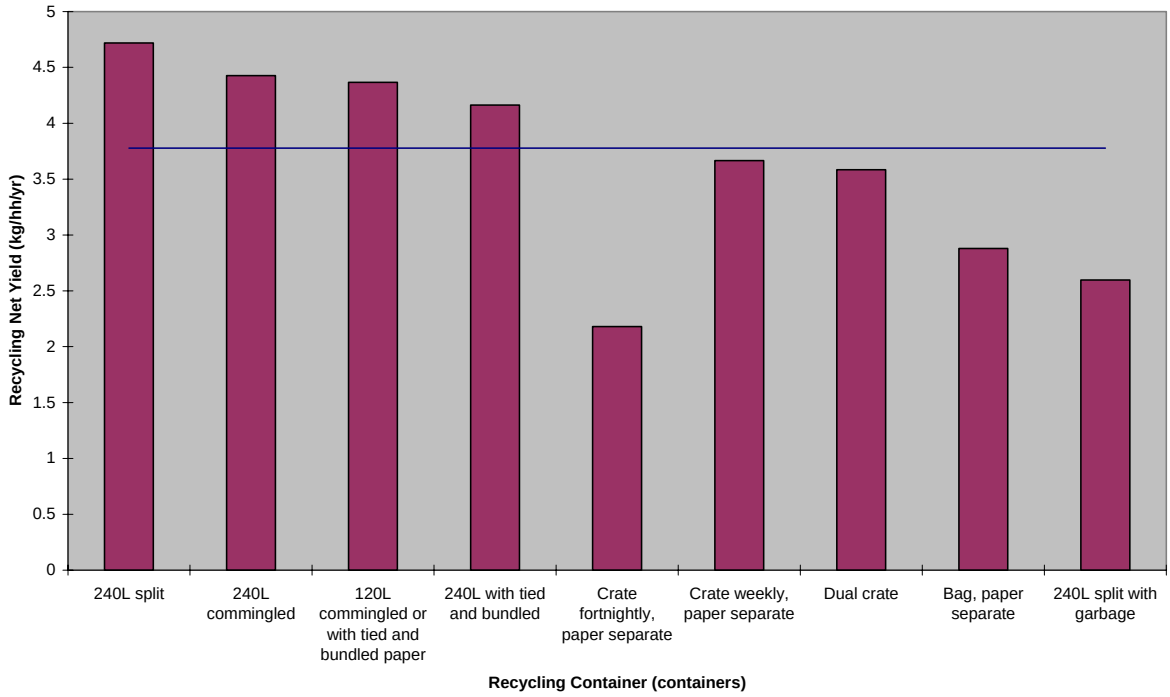
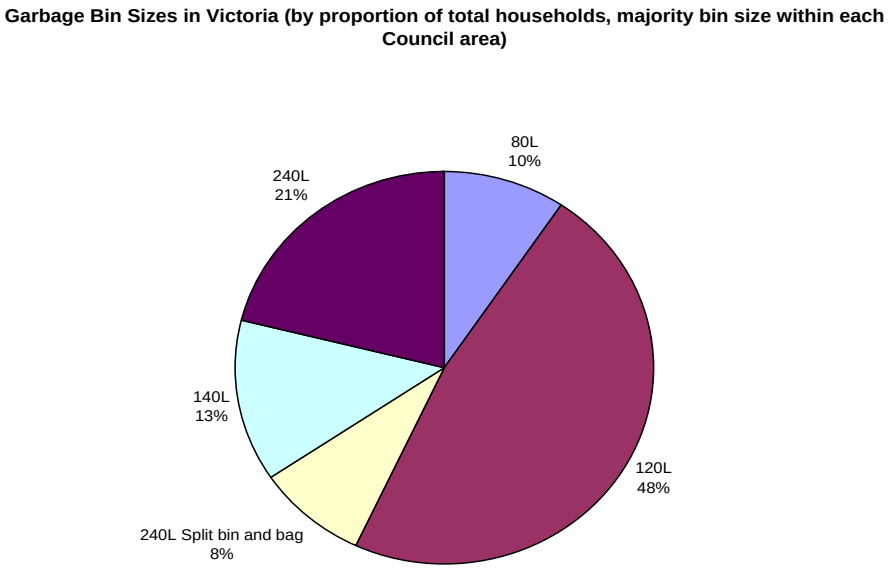


Figure A.4: Garbage MB Sizes in Victoria (by proportion of total households, majority MB size within each council area



A2 Characteristics of Current Systems

A2.1 Range of Materials

The current range of materials collected at kerbside is now relatively consistent across Victoria. Most services collect all of the following:

- cardboard;
- newspaper;
- magazines;
- printing and writing paper;
- glass, bottles & cans;
- aluminium cans;
- steel cans;
- PET bottles;
- clear HDPE bottles; and
- PVC bottles.

Smaller quantities of the following materials are collected:

- coloured HDPE bottles;
- liquid paperboard containers;
- PP bottles;
- phone books;
- aluminium foil; and
- flexible plastics.

At the present time there are sufficient markets available for all significant materials plus aluminium foil and liquid paperboard containers. Some market opportunities exist for other materials.

The average collection and sorting cost per tonne is $144.50. This includes revenue and excludes avoided landfill disposal costs.

Cardboard, newspaper, glass and steel are probably able to be collected for less than this. Some products are worth more per tonne and therefore 'cover' the higher cost component.

The overall yield of recyclables each year is 360,934 tonnes or 3.78 kg per household per week. Paper and cardboard make up almost half of this total. The percentages for all materials are shown in Table A.3. In order to achieve community expectations and maintain reasonable cost per tonne, the range of materials should be as broad as possible. The marginal cost of adding products to the range of recyclables is low. The saving from removing materials from the mix is very low.

The price paid by reprocessors for key materials (newspaper, cardboard, glass and steel) has the main impact on overall recycling costs. The price paid for other materials has less impact on the collection and sorting cost at the percentage of overall collected tonnes is small.

Table A.3: Percentage of collected material (weight)

Material	%
Office and mixed paper	41.77%
Cardboard	16.33%
Glass	28.86%
Steel	3.34%
PET	3.43%
HDPE	3.23%
Aluminium	1.41%
Other	1.60%

The variation in the price received for each material is very large across Victoria. The maximising of market prices for all materials would inject significant revenue into the collection and sorting system.

The overall weight of most products is going down (weight of newsprint, soft drink bottle, steel food can etc). This is expected to continue. The shift in market share for packaging is to lighter weight material. The overall impact of this is that the average cubic metre of recyclables is lighter each year.

As an increased volume of material is being collected from more houses for each tonne due to light weighting, the cost per tonne will continue to rise.

The main cost of adding new materials to the range of recyclables, is either triggering a re-negotiation of contract price or being seen to justify a higher price for a 'comprehensive' service.

There is a benefit in having a similar range of materials in each council area. This will enable statewide promotion of recycling and will result in less confusion amongst residents, particularly those moving from one council area to another.

The long term market availability for LPB, PP, PVC, phonebooks and printing and writing paper will influence their ongoing collection.

Collections with a narrower band of materials have a higher cost per tonne. As the market outlets are readily available, recyclable collection should be reinstated. councils should not promote for inclusion materials that are not subsequently sorted and recycled. This is misleading and leads to damaging cynicism when revealed. If a market outlet is not available, the collection of that material should be suspended until recycling can occur and residents notified accordingly.

Table A.4 shows the number of councils with kerbside collection services that currently collect each material.

Table A.4: Materials Collected by Councils

Material	Number of Councils (out of 75)
Office paper	42
Paper mixed	68
Cardboard	65
Glass bottles	71
PET	70
Al cans	70
HDPE clear	71
HDPE coloured	62
Steel cans	68
Liquid paperboard	50
PVC	45

A2.2 Collection Containers

Audits of kerbside recycling in Victoria and interstate show that established, well promoted recycling services yield over 3 kg of recyclables each week when combined with an 80/120 L garbage MB service. This quantity of recyclables is usually 50% paper and cardboard and 50% bottles, cans and other containers.

In volume terms, this relates to 45 – 60 L of bottles and cans per week. Some households regularly fill a 60 L crate. Very few produce a volume beyond 60 L on a weekly basis and many households are able to present their bottles and cans for recycling on a fortnightly basis. Likewise a fortnightly system offering 120 L capacity per fortnight is considered about the right volume. This could be a 120 L MB or a split 240 L MB. A 240 L MB for all materials on a fortnightly basis is also the appropriate volume.

Paper and cardboard, if pre-sorted correctly, can utilise a volume of 30 – 60 L per week. For this reason, it is considered essential that the volume of recycling containers (both paper/cardboard and bottles and cans) be at least 60 L per week or 120 L per fortnight.

It is acknowledged that many smaller households will generate less than 60 L per week of bottles and cans (or 120 L per fortnight). To improve efficiency of collection, these households should be encouraged to present their bottles and cans only when 50% to 100% full.

For high rise flats a 30 – 45 L crate per week will be adequate, due to smaller household size, and probably more convenient to handle and store.

In Victoria, almost all sorting of recyclables occurs at a sorting facility. Some sorting of paper grades occurs at kerbside where residents have presented materials in a separate form. In some remote areas the recyclables are sorted on the truck, but this is uncommon.

The cost of recycling collection services is presented in Table A.5.

Table A.5: Recycling Systems and System Costs (by household and weight)

Container	Total Households Served	Total Cost ($M)	Average Household Cost ($/hh/yr)	Average Cost per tonne ($/t)
240L split	221 477	$7.6	$34.52	$140.68
240L commingled	163 750	$6.3	$38.50	$167.24
120L commingled or with tied and bundled paper	122 407	$4.7	$38.66	$170.25
240L with tied and bundled	143 292	$4.5	$31.67	$146.25
Crate fortnightly, paper separate	83 744	$1.5	$17.61	$155.39
Crate weekly, paper separate	660 646	$17.0	$25.79	$135.26
Dual crate	258 313	$6.3	$24.56	$131.78
Bag, paper separate	96 064	$1.5	$15.28	$102.04
240L split with garbage	83 159	$2.4	$29.13	$215.65
Total	1832 852	$52.0	$28.35	$144.32

In most collection services, paper and cardboard has been kept separate from other recyclables.

Fourteen councils have a fully commingled collection system where all paper grades are mixed with other recyclables, including 13 councils with 240L commingled and one 120L commingled collection MB. This makes the sorting process more complex as paper needs to be removed before other recyclables can be sorted effectively. This paper sorting is undertaken using a trommel or series of trommels. The cost per tonne of this process is significant. For this reason systems which keep paper grades separate either through a split MB or a separate paper collection are preferred. The major advantage of commingled systems is the need for only one collection vehicle. In addition, the paper in the MB can have a cushioning effect to reduce glass breakage. Current contract prices indicate that fully commingled systems are amongst the highest cost systems and generally above split MB system costs (Table A.5).

Two councils use split MB's to collect recyclables and garbage at the same time. These systems are plagued by extraordinary levels of cross contamination of the recyclables combined with high glass breakage levels. It is understood that these systems are being phased out by the two operating councils.

Six councils operate a MB split with recyclables and paper collected by the same vehicles. This system still gives a degree of cross contamination and for this reason the material all needs to go to a sorting facility. The degree of mixing is quite low and therefore sorting is less expensive than fully commingled material.

Ten councils offer a MB for recyclables with paper being kept separate. This enables bottles and cans to be sent for sorting and the paper to be collected and sent straight to the reprocessor for recycling. Contamination levels in these systems appear to be the lowest of all MB services.

Thirty one councils provide a single crate, collected either weekly or fortnightly, with collection of paper and cardboard as a tied bundle. Contamination is generally lower in crate based than MB based systems.

Six councils have a dual crate system, providing a durable container for both paper and bottles and cans. Contamination is low in the crate based system, and collection of paper is encouraged by providing an easy collection container.

Crate based systems are generally being replaced by MB based systems, largely due to WorkSafe guidelines which recommend a 'no-lift' approach. Increased litter is also cited as a reason for replacing crate based systems with MB's.

A2.3 Collection Vehicles

The choice of collection vehicle is linked very closely to the collection container. All MB systems are collected using a compaction vehicle usually a side loading compactor. Most crate systems utilise a manual pick up and the vehicle is therefore usually a non compacting cage or clunk type vehicle. Several smaller collection contracts utilise a flat bed truck with a series of 'Cevol' or other MB's.

The design of the cage trucks means that as the truck fills, the height for lifting of crates rises from waist height to above shoulder height. The flatbed trucks with MB's involve a higher lift height throughout. There are several examples in Victoria and interstate where the manually lifted material is tipped at waist height into a MB or trough which is then mechanically elevated. This ensures the collection staff don't lift above waist height.

Some collection vehicles are known to be operating with unroadworthy features or with gross pollution problems. It is important that with vehicles on the road all day, these practices are eliminated.

A2.4 Sorting

There is a wide range of sorting facilities across the state. There are facilities with an annual throughput of just 200 tonnes while others are processing over 20 000 tonnes. The level of automation also varies and is linked closely to the scale of material processed. Despite this there are many facilities at a small to medium scale that operate efficiently without compromising occupational health and safety standards. The efficiency of sorting is heavily linked to the maximum retention of each material in a saleable form. It is in this area that some smaller facilities can compete.

There are isolated instances where sorting of material is taking place during transit. The sorting of material on a moving vehicle is a high accident risk activity and should be eliminated.

Most materials now have specifications produced by reprocessors. Sorting contractors should be aware of all material specifications and sorting facilities should be designed to achieve these specifications.

Most major markets for paper require newsprint (short fibre) to be separate from cardboard (long fibre). For this reason retention of paper in a separate form is preferred and the sorting of paper grades by the householder or at a sorting facility is most preferred. The paper sorted from fully commingled systems has more limited market opportunities and the quality of the paper often does not meet the requirements of large domestic markets.

The collection at kerbside of sorted grades means the material can be delivered directly to high value markets with minimal or no sorting. The subsequent sorting of paper grades is costly but does allow a mechanised collection method.

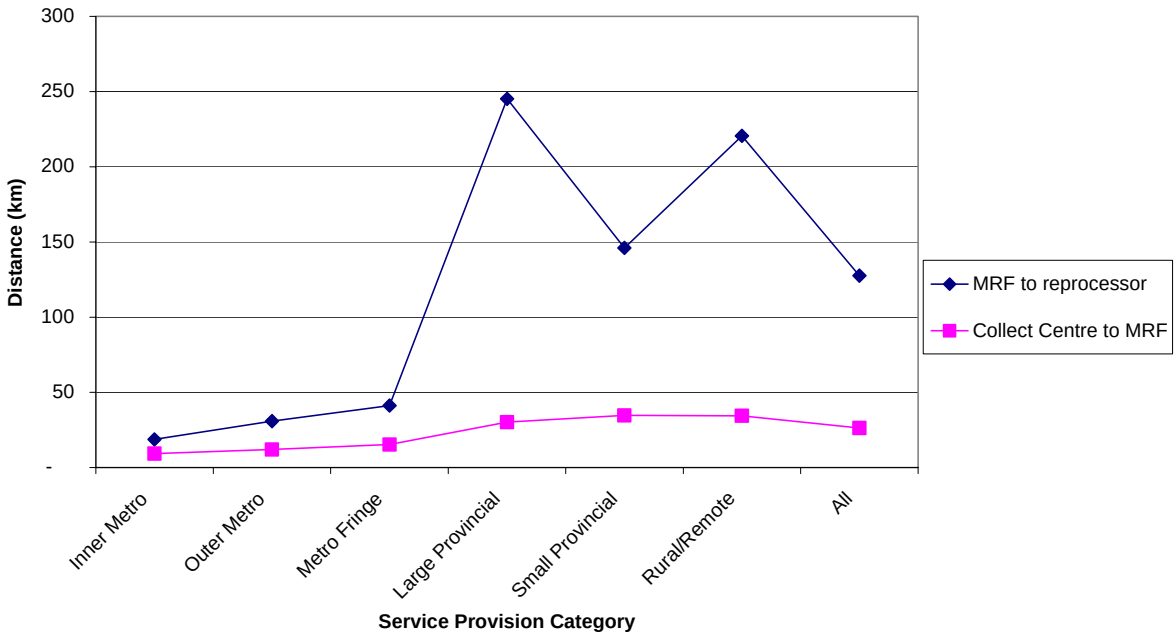
Much of the losses in sorting facilities is broken glass. This could be minimised by lowering the height of discharge of material from trucks, unloading onto a ramp or other surfaces less harsh than concrete, and the use of automated loading of sorting lines to reduce handling impacts.

To achieve compliance with specifications for each material, a positive sort of each is generally necessary. There is also a trend towards pre sorting of glass and plastics with final sorting in a reprocessing facility.

A2.5 Freighting and Markets

The efficient freighting of materials to markets is vital to cost efficiency. The Nolan-ITU lifecycle assessment of kerbside recycling undertaken for EcoRecycle Victoria in 1999 showed that while the environmental benefits of recovery of resources through recycling far outweighed the collection and sorting impacts, the freighting of materials inefficiently or over long distances reduced the environmental benefit significantly. Except in metropolitan areas, it is preferred that paper be freighted either baled or in large 'smart' trucks to ensure the material is handled cost effectively. Similarly, once sorted, glass should be broken prior to being freighted over significant distances. Figure A.4 below shows the transport distances to market across each service provision category.

Figure A.4: Transport Distances for Recyclables



All lightweight materials such as plastics, aluminium, liquid paperboard and steel should be compacted before freighting. Weighing of loads at the sorting facility (in and out) is preferred.

Many collection vehicles are designed for low speed, stop-start operation. These vehicles are not suitable for use in freighting recyclables at highway speeds over long distances. Where material is to be transported a considerable distance for sorting, it is usually more efficient to transfer material with care to bulk load trucks/MB's before freighting.

A number of sorters in remote parts of the state are equipped only with small to medium size vehicles for collection. The transporting of sorted materials to market in these vehicles is not recommended. Sorters should identify more efficient local freighting options including back loading opportunities. Several reprocessors such as BHP, Coca Cola and Fletcher Challenge arrange efficient bulk hauling of material and purchase ex MRF.