



WRIGHT CORPORATE STRATEGY PTY LTD

Focused Innovation

**ASSESSMENT OF POTENTIAL
FOR
IMPROVING COLLECTION SYSTEMS
FOR THE
COMMERCIAL & INDUSTRIAL SECTOR**

Report to Zero Waste SA

June 2008

Final Report



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**REPORT TO
ZERO WASTE SA
FINAL REPORT**

**Prepared by
Wright Corporate Strategy
June 2008**



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Revision History

REVISION	DATE	DETAILS
Draft 1	2 June 08	Preliminary draft released to ZWSA for review and comment.
Draft 2	10 June 08	Second draft released with Executive Summary to ZWSA for review and comment.
Draft 3	20 June 08	Final draft released to ZWSA for review and comment.
Final Report	26 June 08	Final report released to client.



EXECUTIVE SUMMARY

This report presents the findings from an analysis of the commercial and industrial waste market in greater metropolitan Adelaide. The analysis was commissioned by Zero Waste SA (ZWSA). The analysis was undertaken with the aim of identifying potential for increasing the amount of resource recovery from the commercial and industrial waste market through front lift collection vehicles in particular. Specifically organics, paper/cardboard and comingled plastics were to be targeted for further recovery.

The analysis firstly considered the extent of front lift collection services within the commercial and industrial waste market and then examined the potential for greater recovery. The analysis concluded with a summary of possible options for intervention in the market that ZWSA might consider to increase the extent of resource recovery.

A further outcome from the analysis has been development of a geographic information system (GIS) based database presenting a geographical assessment of the sources of generation of the target materials across the Adelaide region. This database has significant application potential for Zero Waste SA when considering market intervention options from the perspectives of the various stakeholders in the market.

The Commercial and Industrial Waste Market

The commercial and industrial (C&I) waste market in greater metropolitan Adelaide covers wastes generated from businesses and organisations involved in general commercial (office, retail, services, government administration) and industrial (manufacturing) pursuits. The sector specifically excludes building and construction activities and waste management associated with the domestic/residential sector.

The total amount of waste generated, recovered and disposed to landfill in the C&I market in Adelaide, is presented at Table ES 1, with a breakdown by key resources.

Table ES 1 C&I Wastes – Generation, Recovered, Disposal in SA (tpa)

	GENERATED	RECOVERED	DISPOSED
Food, vegetation	98,000	6,000	92,000
Wood, timber	235,000	210,000	25,000
Cardboard, paper	167,000	125,000	42,000
Mixed plastics	35,000	10,000	25,000
Mixed metals	187,000	183,000	4,000
All other materials	400,000	338,000	62,000
TOTALS	1,122,000	872,000	250,000



Three types of collection vehicle and waste loading system are predominantly used in the C&I waste market – front lift, rear load and roll-on-roll-off (RORO). The front lift segment is the main focus for this assignment.

The Front Lift Market Segment

Front lift collection vehicles are one of three main collection methods commonly used in the C&I waste market for the uplift and removal of wastes and recovered resources from the premises of commercial and industrial waste generators. Front lift collection is most usually adopted at premises of small to medium-sized businesses where waste volumes and vehicular access conditions make this service option practical and financially viable.

The front lift segment of the market has the following relevant statistics:

- up to 12 organisations provide front lift collection services;
- front lift collection represents 64% of the total C&I waste market, or around 160,000 tonnes per annum;
- three service providers command an 85% share of the front lift market;
- the next four service providers cover 11% of the market;
- between 45 and 50 front lift vehicles are used for waste collection, and a further 8 to 10 are used for collecting source separated recoverables – notable paper and cardboard;
- some 7,000 front lift bins are deployed across the market for waste collections, and a further 2,500 are deployed for source separated recoverables.

While the front lift waste collection segment comprises 64% of waste disposal from the C&I market, the amounts of the target materials in the front lift stream destined for disposal are estimated to be marginally different as shown at Table ES 2, along with similar estimates for the rear load and roll-on-roll-off market segments.

Table ES 2 Target Materials in the Front Lift Waste Disposal Segment (tpa)

	ORGANICS	PAPER & CARDBOARD	COMINGLED PLASTICS
Tonnes in total C&I Waste Stream	92,000	42,000	25,000
Tonnes in Front Lift Waste Segment	60,000	27,000	15,000
Tonnes in Rear Load Segment	7,000	2,000	1,000
Tonnes in RORO Segment	25,000	13,000	9,000

Recovery Potential of the Target Materials

The C&I waste generating market was analysed in some detail using multiple levels of analysis and multiple data sources, including macro economic data, industry-specific data on waste generation and disposal, waste disposal audit data, and



estimates on resource recovery made for ZWSA. In addition, geographical assessments were made on waste generation using industry sector analysis, employment data and databases containing information for over 23,000 properties in metropolitan Adelaide.

Both analyses relied on estimates of the generation rates of the target materials across the various industry sectors that comprise the C&I market. At Table ES 3, the estimates of target materials collected by front lift vehicles is presented for the industry sectors.

Table ES 3 Target Materials in Front Lift Collections by Industry Sector

Industry Sector	Front Lift Segment (tpa)		
	Organics	Paper Cardboard	Comingled Recyclables
Food Products Manufacture	13,000	2,000	1,000
Wine & Beverages Manufacture	6,000	2,000	1,000
Textiles, Clothing, Footware Manufacture	0	1,000	0
Wood, Paper, Printing & Publishing	2,000	2,000	1,000
Petroleum & Chemicals Manufacture	0	0	0
Non-Metallic Mineral Products Manufacture	0	1,000	1,000
Metals and Metallic Products Manufacture	0	1,000	1,000
Machanical Equipment Manufacture	1,000	2,000	2,000
Other Manufactured Goods	2,000	1,000	1,000
Electricity, Gas Supply	0	1,000	0
Wholesale Trade	2,000	0	0
Retail Trade	15,000	5,000	3,000
Accmmmodation, Cafes, Restaurants	12,000	1,000	4,000
Transport & Storage	0	1,000	0
Communication Services	0	0	0
Financial, Insurance Services	0	0	0
Property Services	1,000	2,000	0
Professional, Administrative, Defence Services	1,000	2,000	0
Education	2,000	1,000	0
Health & Community Services	2,000	1,000	0
Recreational Services	0	0	0
Personal & Other Services	1,000	1,000	0
Total Industry	60,000	27,000	15,000

Analysis of the data permitted two estimates to be generated for the level of potential market as a whole (macro estimate) and the second based on property-by-property analysis (property based). These two estimates of potential recovery are presented at Table ES 4.



Table ES 4 Estimates of Potential Recovery of Target Materials from the Front Lift Segment (tpa)

	ORGANICS	PAPER & CARDBOARD	COMINGLED PLASTICS
Tonnes in total C&I Waste Stream	92,000	42,000	25,000
Tonnes in Front Lift Waste Stream	60,000	27,000	15,000
Potential Recovery (macro estimate)	22,000	8,000	3,000
Potential Recovery (property-based)	28,000	18,000	11,000*

***Note:** This estimate is for commingled recyclables and includes estimated recovery of paper with commingled plastics from properties generating less than 2 tonnes per annum of waste paper.

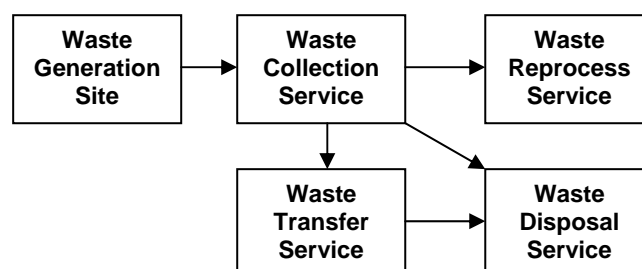
Of these two estimates, the property-based estimate is considered to be more indicative of recovery potential, while the macro estimate would represent a reasonable and conservative lower estimate of recovery potential.

Intervention Options to Increase Recovery

Intervention in the market to improve recovery of the target resources is considered to be warranted where market failures lead to a sub-optimal outcome. From the perspective of ZWSA, a sub-optimal outcome and market failure can be assumed to occur when an individual opts to discard unwanted materials to the disposal stream rather than opting to have the material recovered and disposed towards a waste recovery operation.

To document market failures and intervention options, the C&I waste market was reviewed from the perspective of the material flow value chain as depicted at Figure ES 1.

Figure ES 1 Material Flow Value Chain



Multiple failure points and failure mechanisms were identified in the analysis, and the failures were grouped into the broad classes presented at Table ES 5.



Table ES 5 A Summary of Market Failure Classes

CLASS OF FAILURE	DESCRIPTIVE FEATURES
✓ Knowledge and awareness.	A lack of information at the time and place decisions are made limit the choices available leading to discard for disposal rather than discard for recovery.
✓ Capacity, suitability and availability of facilities and resources.	A lack of adequate space or capacity limits the level of service that can be offered, restricting discard options away from resource recovery.
✓ Service arrangements between parties.	Service contracts and agreements between parties fail to specify performance requirements or indicator benchmarks on resource recovery, leaving no incentive on the service provider to manage resource recovery as a part of the cleaning waste disposal service delivery.
✓ Innovation in technologies, systems and processes.	Innovation in the waste management industry is at relatively low levels in terms of systems, processes, technologies and market intelligence, leading to a prevalence of disposal over recovery.
✓ Market pricing and signals.	Where there are insufficient pricing signals in the market at key decision-making points it is unrealistic to expect change in behaviour from discard for disposal to discard for recovery; equally where forward pricing signals are absent, there is little incentive for forward investment.

Some options for intervention were then developed, based on review of the market failures and the location of those failures in the material flow value chain. At Table ES 6 a list of some suggested intervention options is presented.

Table ES 6 Intervention Options for Consideration

INTERVENTION TYPE	POSSIBLE INTERVENTIONS
Financial	<ul style="list-style-type: none"> ✓ Waste disposal levy. ✓ Rebates for recovered resources. ✓ Forward signalling levy increases.
Regulation	<ul style="list-style-type: none"> ✓ Licensed collection zones. ✓ Pay by weight. ✓ Landfill bans for nominated materials. ✓ No direct despatch to landfill. ✓ Disposal quotas.
Service Agreements	<ul style="list-style-type: none"> ✓ Recovery incentives in cleaning contracts. ✓ Flexible collection contracts.
Government Leadership	<ul style="list-style-type: none"> ✓ Bundling government agency collections.



INTERVENTION TYPE	POSSIBLE INTERVENTIONS
Mentoring and Support	✓ Expand REAP (Resource Efficiency Assistance Package) with additional in-house support.
Market Intelligence	✓ Thematic maps for targeted wastes. ✓ Resource recovery market data.
Information	✓ Advisory material on resource recovery.
Partnerships	✓ Partner with WMAA covering waste service collectors and processors. ✓ Partner with FMA covering cleaners and building managers. ✓ Partner with Local Government for extension of kerbside collections to SMEs.
Innovation	✓ Alternative business model. ✓ Alternative containerisation schemes. ✓ Innovative systems for managing wastes.

Discussion on some of the intervention options are presented in the report including examples and issues that need to be considered.

Using the GIS Database

The GIS database is a powerful resource for many of the stakeholders in the market including ZWSA, Local Government, collection contractors, resource reprocessors and vendors of specialised equipment that might be used in on-site storage of source separated materials. At Table ES 7 some examples of the types of inquiry that can be made by interested parties and the outcome sought.

Table ES 7 Examples of Database Inquiry

STAKEHOLDER	INQUIRY	OBJECT SOUGHT
Vendors of specialised equipment	Number of premises producing a targeted material within a given quantity range within a given geographical area	Selling equipment and collecting recovered resources for re-sale
Collection service providers	Number of premises producing a targeted material within a given quantity range within a set distance either side of a current collection route	Targeted in-fill selling of services along an existing or emerging collection route
Reprocessors of materials	LGAs where significant amounts of targeted materials are found in the waste stream	Targeted education and awareness programs
Local government	Retail premises within the LGA where small amounts of organic waste are disposed to landfill	Targeted marketing to small businesses within the LGA where kerbside collections of source separated organics might be provided



Moving Forward

A suggested sequence of steps for moving forward is presented along the following lines:

- ✓ assemble a comprehensive list of multiple intervention options and divide them into three basic categories –
 - those that can be implemented within existing delegations and approvals,
 - those requiring new delegations and Board approvals,
 - those that require political decision-making and approval;
- ✓ analyse all intervention options and assess the likely cost and return that each might be capable of delivering, in the process assigning a likelihood rating for actually delivering;
- ✓ develop a program of interventions with a mix of objectives –
 - quick runs,
 - good wins that make for good announcements,
 - delivering sustainable change,
 - logical linkages along the value chain,
 - can be completed within a term of Government.



1. INTRODUCTION

Commercial and Industrial (C&I) waste presents as a tantalising opportunity for recycling and resource recovery:

- the wastes are often created at source points where discrete interception appears more than feasible,
- significant amounts of dry recyclable materials (paper and cardboard) are seen right across the waste stream,
- from some sources, bulk quantities of essentially clean biodegradable organic and cellulose-based materials are discarded with little mixing with other wastes,
- the discarded materials pass through a number of transfer/handling situations where some interception and recovery might be achieved, before disposal to landfill,
- the people handling the discarded materials are the same people who, at home, have broadly demonstrated great willingness and enthusiasm for recycling and source separation of their household wastes.

Yet, in most jurisdictions, high levels of resource recovery and recycling remain beyond the grasp of policy makers, and significant amounts of potentially recoverable resources are discarded to landfill every day.

Some of the key reasons underlying the success of municipal resource recovery efforts represent major shortcomings thus far in the attempts at resource recovery from the C&I waste stream, these include –

- knowledge of the market,
- understanding of the arisings and composition of the waste stream, and
- comprehending at the policy level, mechanisms to intervene in the markets effectively.

Zero Waste SA (ZWSA) has signalled that it is prepared to reach out for the potential opportunities at recycling and resource recovery from the C&I waste stream, in its pursuit of continuous improvement in resource recovery across the South Australian economy. In the Request for Tender for this assignment, ZWSA initiated steps to address the first two shortcomings – knowledge of the market and understanding of the arisings – which once understood, can provide a sound basis for developing strategies and policies for market intervention.

Wright Corporate Strategy was commissioned by ZWSA to investigate opportunities for the recovery of greater amounts of materials from the C&I waste stream with a specific focus on:

- organics, paper/cardboard and comingled recyclables,
- within the Adelaide metropolitan C&I waste market,
- being served by front lift collection vehicles.

This report presents the findings from the assignment.



2. METHODOLOGY ADOPTED

2.1 Overview

The assignment was established by ZWSA as a two-part project, involving collecting data on the market, and analysing opportunities for resource recovery, with particular reference to organics, paper and cardboard, and comingled plastics.

Part 1 involves creation of a database of relevant statistics on the C&I market in Adelaide. The aim of Part 1 is to establish the position of the front lift market relative to the total C&I market on a volume and weight basis.

Part 2 involves analysis of the Part 1 data, plus other data sources on waste composition and business type. The aim of Part 2 is to develop a spatial picture of the materials being discarded from the C&I sector through the front lift market and an understanding of the potential for practical and feasible resource recovery initiatives if greater levels of source separation were implemented at business premises.

Execution of the assignment involved developing and appreciation of the front lift sector of the C&I market in Adelaide accompanied by investigations aimed at building a picture of the potential for securing additional targeted materials to recovery in lieu of disposal. Data acquisition and analysis for both Parts 1 and 2 ran contemporaneously and overlapped to a considerable degree.

For ZWSA, one objective sought from the information developed on this assignment is to identify market intervention strategies that might be implemented to stimulate greater recovery of the targeted materials. The identified strategy options might then be considered by ZWSA for incorporation into the 2008-09 plan of programs. This report includes comment and options for possible interventions.

Due to the overlap of Parts 1 and 2, and the inclusion of intervention options, the methodology adopted followed a four-part analysis approach, which collectively address all of the issues ZWSA sought to address on this assignment. Those four parts and the methodologies adopted in each are briefly described below.

2.2 The C&I Waste Market

The C&I market was analysed from the perspective of the amounts of C&I waste generated, recovered and disposed to landfill. Resource recovery and disposal data was obtained from earlier reports commissioned by ZWSA along with other data sources, both in-house and in the public domain. This data established the base picture for the C&I waste sector, within which analyses of both the service providers and the waste generators were conducted.

2.3 The C&I Front Lift Collection Sector

The C&I collection sector was reviewed through telephone and face to face interviews and discussions with a majority of operators in the market. Over sixty organisations were contacted in the initial telephone survey of the industry – the vast majority not being directly involved in the front lift sector.



The waste collection market is highly competitive and it was not uncommon for operators to be overly cautious in divulging information relating to their share of the market. Notwithstanding this caution, it was possible to get both high-level industry-wide estimates for the sector, and indicative data on sector shares by the main operators along with estimates for the amount of plant and equipment deployed across the market.

2.4 Targeting Waste Sources

Economic data (input-output tables) was analysed to provide industry-sector specific indications on waste generation rates. This macro data on the total market was used to provide an overall cap or upper limit on the subsequent estimates that were made within the market. Material and sector specific data was then used to allocate estimates of wastes across each of the material streams of interest and the relevant industry sectors. From this data specific industry sectors and potential recovery rates can be assessed.

To develop the spatial pictures of waste distribution around the Adelaide region databases containing property location and industry type were integrated with the waste disposal data. This resulted in establishment of a spatially oriented database on waste disposal and composition characteristics that could be interrogated from a range of perspectives.

2.5 Intervening in the Market

During the assignment views were formed by the authors on some of the issues that contribute to the loss of resources through land-based disposal. At the request of ZWSA, these views were formalised and an analysis undertaken on market failures, leading to suggestions on some possible options for addressing those issues.

2.6 Report Structure

This report presents information and discussion on the potential for improving recycling collection systems for the C&I sector via the following report sections:

- Section 3** - assessment of the total C&I waste market.
- Section 4** - analysis of the front lift collection market.
- Section 5** - analysis of the industry sectors producing C&I wastes.
- Section 6** - analysis of market failures and intervention options.
- Section 7** - outlines of options for moving forward.



3. THE C&I WASTE MARKET

3.1 The Overall Market

The commercial and industrial waste market is complex and involves both *formal* and *informal* waste management activities.

Formal waste management activities are those conducted by the traditional waste management sector including waste collection contractors and the major reprocessors of waste paper and other dry recyclables. Typical examples of organisations in this sector are Transpacific Industries, Visy, SITA, Amcor, Veolia etc.

The *informal* waste management activities are those conducted outside of the formal sector. Many of the participants do not regard themselves as being part of the “waste management industry”. These activities typically involve direct recovery of resources from generators without the intervention of the formal waste management sector. Examples of organisations in this sector are Sims, Smorgon/Onesteel, motor vehicle wreckers, processors of fly ash, etc.

A significant proportion of the recovered resources that are managed through *informal* waste management activities do not regularly get reported as waste arisings. However, in recent reporting of recovered resources, some of these resources are included in inventories.

It is well recognised that a similar situation exists in the construction and demolition sector where large amounts of building demolition materials are recycled directly from sites and immediately sent for re-use without appearing in either the waste generation or resource recovery inventories.

Notwithstanding this mix of formal and informal waste management activities, Table 1 presents a compilation of the annual tonnes of C&I waste in South Australia for the materials of specific interest in this assignment drawing on various data sources ^{1,2,3}.

Table 1 C&I Wastes – Generation, Recovered, Disposal in SA⁴ (tpa)

	GENERATED	RECOVERED	DISPOSED
Food, vegetation	98,000	6,000	92,000
Wood, timber	235,000	210,000	25,000
Cardboard, paper	167,000	125,000	42,000
Mixed plastics	35,000	10,000	25,000
Mixed metals	187,000	183,000	4,000
All other materials	400,000	338,000	62,000
TOTALS	1,122,000	872,000	250,000

¹ *Recycling Activity in South Australia 2005-06*, ZWSA

² *Disposal Based Survey October-November 2007*, ZWSA

³ *Industry & Market Report, Australian Waste Industry 2007*, WCS Market Intelligence

⁴ All tonnage data in this report is rounded to nearest 1,000 tonnes



From this data, the materials of interest to this assignment represent:

- 26% of total C&I waste generated,
- 17% of total C&I materials recovered, and
- 64% of total materials disposed to landfill.

In addition, from the data at Table 1, it would appear that:

- less than 10% of the food and related organic wastes are captured,
- less than 30% of the mixed plastic wastes are captured, and
- resource recovery of wood, paper and metals are reasonably effective.

This data clearly supports the selection of the targeted materials – organics, paper and comingled plastics – for special efforts at resource recovery across wide sectors of the business community. A view that is also supported by anecdotal information within the industry on the materials commonly observed in waste streams.

In the case of wood products, the data appears to indicate reasonably high levels of resource recovery when looked at from an overall industry perspective. However, from the disposal audits wood materials would appear to be suited to very targeted efforts at further resource recovery given the common observation of instances where timber comprised large proportions of individual loads. This view is also supported by information gleaned from the industry surveys and discussions.

3.2 Market Context and Trends

The market dynamics and forces at play within the Australian waste management sector are complex and changing. Some of the dynamics are a result of external regulatory changes in response to community and environmental demands, while others are internal to the industry and its structure. Irrespective of the source of the pressures for change, understanding market behaviours is becoming more difficult to predict and accordingly more challenging to influence.

The waste management industry is undergoing a phase of significant growth. In the six years between 2001 and 2007, the value of business managed by the Australian solid waste industry grew at an average rate of 14% per annum, with even more spectacular growth rates in processing and resource recovery (+45% p.a.) and landfill disposal (+23% p.a.). In the next ten years the growth is expected to moderate to an average of +3% per annum, but processing and resource recovery is expected to continue strong growth at a sustained 10% p.a. through to 2015⁵, ⁶.

At the same time the industry is undergoing significant consolidation and shift in ownership base. The market data indicates that the share controlled by the top five companies grew from 42% in 2001 to 54% in 2007, while the top ten companies grew their share from 56% to 66% over the same time. And the Australian based ownership of the main companies is shifting as well, with the top 5 growing to 33% Australian based ownership in 2007 from 21% in 2001.

⁵ *Industry & Market Report, Australian Waste Industry 2001*, WCS Market Intelligence

⁶ *Industry & Market Report, Australian Waste Industry 2007*, WCS Market Intelligence



Within the market there are also significant shifts underway in respect of both the regulatory regime in most jurisdictions and market forces at play – all of which have an impact on market pricing and market behaviour.

On the regulatory side, there is a two-fold move in most jurisdictions – a quest for greater levels of resource recovery and associated reduction in the amount of waste disposed to landfill, accompanied by higher standards for the management of landfills. These objectives are generally pursued through the imposition of environmental management legislation and disposal levies, both of which drive up the cost of waste disposal, at the same time making resource recovery a more financially attractive option to land-based disposal. In some jurisdictions there is also a slowing down on the approval of new landfill capacity, leading to higher value being attributed to remaining landfill space, and greater financial incentive for resource recovery.

As costs, and associated prices, increase for both disposal and recovery, so both elements of the business become more attractive for the service providers, leading to a growing trend for the major participants in the market to seek commercial interests in both disposal and beneficial resource recovery.

Within the markets themselves, increasing fuel prices and the certain introduction of an emissions trading scheme are adding to the upward pressures on costs, and also changing the value of the resources that can be recovered from the waste stream. As the cost of transport changes through fuel price increases and the inclusion of carbon accounting, so will the challenges to the collection service providers to seek optimum transport solutions for collected materials – long distance hauling of unconsolidated and unsorted wastes by road will become less attractive to the option of inner city drop-off at a transfer or resource recovery facility.

At the same time the increase in fuel price is changing the markets for the materials that can be recovered from the waste stream. For kerbside collected recyclables, Councils in Sydney and Melbourne are now being paid by processors for receipt of their recyclables; and in the commercial market, prices for resources are increasing strongly.

The demand for recovered resources has stimulated both domestic and export prices for the traditional materials recovered from the commercial and industrial waste stream – paper, cardboard, plastics and metals. This has led to the number of industry participants looking for opportunities to export recovered resources directly, effectively by-passing the traditional markets for recovered materials. Accordingly, the domestic companies seeking access to these resources are prepared to drive harder to secure and hold market share.

In such a dynamic market, intervention to achieve higher levels of resource recovery over disposal, will be supported by the pricing and material demand movements, but challenged by the industry restructuring that is underway. Understanding these market dynamics will be essential for ZWSA if interventions are to leverage off the opportunities and build on the partnering opportunities.



4. THE C&I FRONT LIFT COLLECTION SEGMENT

4.1 C&I Collection Service Options

To service the disposal need of C&I customers, service providers can call on three common collection systems – roll-on-roll-off, front lift and rear load. The type of collection system used is selected primarily according to the amount of waste to be removed from customers' premises, but also guided by site access and yard space constraints.

Roll-on-roll-off (RORO) collection involves relatively large bins, typically in excess of 6 cubic metres in capacity, that are dragged onto the chassis of the collection vehicle for transport. These collection vehicles pick up one bin at a time for disposal, so the business case for this system requires customers with large waste service demands and large bins, to make the service cost effective.

Front lift collection typically involves bins in the size range 0.6 to 3.0 cubic metres in capacity, with bins towards the larger end of that scale the most predominant. The bins may be fitted with wheels for manoeuvring the bin between convenient locations for storage and unloading; alternatively they may sit directly on the ground where access is appropriate. The bins are emptied into the truck body by lifting the bin at the front of the truck, up and over the driver's cabin, and tipping the contents into a lidded opening on top of the truck body and towards the front of the body.

Front lift collection trucks typically have carrying capacity for 8 to 10 tonnes of material. Depending on the nature of the material being loaded into the truck, a front lift truck might service 60 to 80 bins in each cycle before travelling to unload.

Rear load collection typically involves smaller bins in the size range 240 litres to 600 litres, with the majority in the 240 litre MGB class. This service is used for customers with relatively small waste generation rates, where the service fees are unlikely to offset the investment tied up in a front lift bin, or for customers where access is severely constrained and front lift is not an option.

4.2 The Front Lift Market Size

The choice on the use of front lift collection, as opposed to roll-on-roll-off or rear load collection, is made by the collection service provider based on a range of criteria, including:

- access to the location selected for placement of the collection bins at the generators' site,
- overhead clearances for lifting and tipping bins into the front lift vehicle,
- the quantity of waste to be collected,
- the likely frequency of collection,
- the type of waste involved, and
- the location of the collection site relative to other sites already served by the provider with front lift bins.



Front lift collection services are supplied to business and organisations across all industry sectors and a wide spectrum of business size. Subject to the various access considerations listed above, a potential customer for front lift service is assumed to be of sufficient size if a minimum monthly service frequency can be maintained. This might be equivalent to perhaps 5 to 6 tonnes of collected waste per annum. A waste generation rate of this order might be expected from industrial, manufacturing and retail businesses that employ around 4 or 5 full time equivalent people.

While the 5 to 6 tonne estimate might constitute a threshold for the lower end of suitable customer size, the upper end might be in the order of 150 tonnes per annum for each bin supplied to a customer, with some customers requiring multiple bins and multiple services per week to adequately service their needs.

Therefore, while the majority of front lift customers will be in the small to medium size category, there will be some major waste generators that are serviced through front lift collection.

On this basis, the number of waste generating customers receiving front lift collection services will be substantial.

The total waste disposal market for the C&I sector in greater metropolitan Adelaide is estimated to be some 250,000 tonnes of waste per annum. Of this, front lift collection vehicles are estimated to collect 64 percent or 160,000 tonnes of waste per annum and deliver that waste for disposal.

4.3 Front Lift Service Providers

It is likely that up to 12 organisations provide front lift collection services in the Adelaide C&I waste market. Within these ranks, three companies – SITA, TPI/Cleanaway and Veolia – share over 85 percent of the total market, or more than 135,000 tonnes of the estimated 160,000 tonnes per annum collected for disposal by front lift vehicles.

A further 11 percent, or 18,000 tonnes per annum is managed by the next four service providers.

The balance of 4 percent or some 7,000 tonnes per annum shared across a further 4 or 5 service providers.

The front lift collection contractors are estimated to collectively employ between 45 and 50 vehicles to service the Adelaide front lift market, using in excess of 7,000 bins distributed across the metropolitan area. A further 8 to 10 front lift vehicles and possibly up to an additional 2,500 bins are estimated to be involved in dedicated collection services for paper/cardboard and comingled recyclables.

The front lift business in Adelaide, as in most other cities, is highly competitive. This is highlighted by the following analysis:

- industry estimates on expected productivity from front lift vehicles would indicate that only 21 front lift collection vehicles would be required in a perfect market; however, the market currently supports 45 to 50 vehicles operating across Adelaide; where as,



- industry estimates for the number of bins theoretically required to service an efficient market very closely match the 7,000 bins estimated to in place for disposal services.

This would indicate that the service providers collectively understand the size of the market to be serviced and have relatively accurately allocated an appropriate number of collection bins across the market. But, the mobility and competitive nature of the front lift market has led to an oversupply of collection vehicles, possibly in the order of 10 to 15 units. This over supply of vehicles could represent excess investment in the market in vehicles in the order of \$3 to \$5 million dollars.

Notwithstanding this apparent oversupply, new entrants are standing in the market to secure a slice of the possible business.

4.4 Pricing in the C&I Market

The C&I market has traditionally been priced on a per cubic metre basis, with customers charged for the size of bin utilised and the frequency of the collection.

For the collection service providers, the business translates into a tonnage-based business immediately the vehicles commence lifting bins onto vehicles, as the following indicates:

- collection contractors pay for waste disposal on a tonnage basis as their vehicle cross weighbridges at transfer stations or landfills;
- roads and traffic authorities closely monitor the axle loadings of waste vehicles to prevent overloading and excess road damage, with substantial penalties for transgressions;
- the lifting capacity of the front lift loading mechanism on the trucks is finite and overweight bins can damage lifting systems;
- customers are charged on a cubic metre and per lift basis, so waste service providers prefer not to collect loads with high bulk density – e.g. loads with excessive amounts of saw dust, glass, food waste or wet materials.

The current pricing system has a long-standing history and there are many arguments presented in support of the system. However, there is a growing awareness within the industry that pay-by-weight will become an industry standard in due course.

4.5 Front Lift Collection Runs

Front lift vehicles are very mobile and travel rapidly between collection points. A collection run for a front lift vehicle comprises a sequence of pick-up stops at customer premises along a contiguous route that is designed to minimise unnecessary travel between up-lift points and final destination or unloading point.

Core customers along the route that can guarantee a collection vehicle a minimum base load underpin runs. Once the core customers are secured, sales efforts are targeted at “in-fill” customers that are located along the route. The essence in



establishing a run is securing the core customers that establish the underlying cash flow to make a run commercially viable.

Establishing a new run can be a costly exercise for a service provider given the time taken to attract both the core customers that underpin the run and the in-fill customers that yield the margin. Establishing new runs that are dedicated to source separated recoverable materials is even more difficult than establishing new waste-only runs.

A major challenge for service providers is protecting their runs – i.e. core customers – from loss to competitors. This concern with run security translates into conservatism on the part of the industry when consideration is given to source separation of recoverable resources and the possible break-down or loss of core customers.

4.6 Working With The Market

Three avenues appear feasible when it comes to working with the C&I waste market to achieve higher levels of recycling of the targeted resources – all of which leverage off the highly competitive nature of the market:

- work with the three major service providers to build inroads with their existing customers for greater levels of resource recovery from the current mixed waste bins being collected;
- work with the smaller new-entrant service providers who are pursuing market differentiation strategies as the key to securing market share, with an emphasis on resource recovery initiatives;
- work with third parties outside the traditional service providers to bring technology and financially attractive resource recovery services directly to waste generators.

4.6.1 Working with the Major Waste Collection Contractors – three service providers command over 85% of the front lift market, and while change in the C&I sector is generally slow, these three organisations will be essential partners for the following reasons:

- collectively these companies already deal with the vast majority of C&I waste generators, so if a collaborative and partnering relationship can be established, then rapid access to major waste generators should be achievable;
- these companies already provide a high-level of collection services into the C&I resource recovery market, and thus they will be eager for market intelligence information that builds further resource recovery runs and facilitates in-fill selling of services;
- to a significant extent, the infrastructure for dedicated recycling collections already exists within these three organisations, therefore plant and equipment should not be a limiting issue for rolling out further recycling runs;
- the sales teams employed by these three service providers represent a leverage opportunity for getting resource recovery educative material into the market and encouraging greater levels of recycling – provided those sales teams are appropriately briefed, incentivised and supported.



4.6.2 Working with the Smaller-New Entrant Service Provider – at least two relatively new C&I collection service providers are making attempts to enter the front lift market in Adelaide, and both are seeking to differentiate their service offering from that traditionally offered by the three majors. In addition, a number of the more long-standing service providers might be incentivised to look at alternative service offerings from that which they currently supply.

In general, these organisations suffer from a lack of resources because their current market share is not sufficient to cover the overheads associated with large sales teams or an oversupply of plant and equipment.

However, these organisations are generally very keen to build market share and are likely to respond rapidly and efficiently if the right packages of incentives can be brought to the table to help facilitate growth of their businesses.

One example of the potential in this area is demonstrated by the collaboration between a reprocessor and one of the smaller contractors. In this instance, the reprocessor deploys sales resources to secure recycling collections from generators, and then contracts the service provider to manage the customer and deliver recycled product to the reprocessor.

4.6.3 Working with Third Parties – here there is an opportunity to by-pass the traditional waste sector participants entirely and work with semi-independent groups that have an interest in securing access to resources or promoting technologies that can facilitate greater resource recovery.

For a number of major waste generators, this is already the norm where, for example streamered plastics or streamered metals are source separated and despatched directly from site to reprocessors or export markets – independently of the waste management sector.

For the smaller waste generators the key to engaging them in this approach will be to have on-site source separation and smart containerisation, so that space in conserved and finished-baled commodities can be uplifted and sent directly to the reprocessors or exported. For mixed plastics and paper and cardboard recovery there is considerable potential in this area.

Local Government could also be included in this third party category, and could become an avenue for increased collections directly from the business community. Kerbside collection services are regularly extended by Councils from domestic residents to small businesses where 240 litre MGB services can accommodate the waste management needs of those businesses. Extending Council collections intercepts resources before they are entrained in the regular C&I stream and presents an opportunity to secure source separation of targeted wastes from small businesses.



5. TARGETING RESOURCE RECOVERY

5.1 Introduction

The key to targeting further resource recovery of the specific materials sought lies in developing an understanding of the following attributes of the waste generating businesses:

- the waste disposal rates for specific industry sectors,
- the composition of the waste disposed in those sectors,
- the potential for greater recovery, and
- the geographical disposition of the businesses within the industry sectors.

To develop an appreciation of these various attributes data from multiple sources was obtained and analysed. To test the sensibility of the analyses and estimates periodic checks and comparisons were made at various stages against “reasonably known facts” – such as the amount of C&I waste disposed, the amount of material recycled from the C&I sector. These “reasonably known facts” formed data boundaries that contained the analyses within which estimates were analysed and assessed.

5.2 Waste Disposal & Composition – Disposal Audits

Disposal audit data collected for ZWSA in 2007⁷ included a code for industry sector of origin and an estimate of the proportions that various materials constituted in the overall waste stream. Using the macro estimate for total waste disposal in the C&I sector of 250,000 tonnes per annum, the disposal audit data was used to allocate waste compositions across a number of industry sectors.

At Table 2, the waste disposal data for a number of materials, including the materials of specific interest, are summarised according to the reported industry source for the wastes.

5.2 Waste Disposal – Economic Data

A second analysis pathway for determining the amounts of waste disposed by various industry sectors used economic data. All governments produce economic data on industry activities, including a set of statistics called Input Output Tables. These tables compile the amount of money each industry sector spends on the various activities that comprise the turnover for the industry.

The Australian Bureau of Statistics (ABS) produce Input Output Tables for the nation as a whole, while state government departments generally produce similar data for business activities within their own states.

⁷ *Disposal Based Survey October-November 2007, ZWSA*



Table 2 C&I Waste Disposal by Industry Sector¹ (tpa)

	RETAIL	MANUFACTURING	MIXED SMEs²	HOSPITALITY	OTHER	TOTAL
Food	25,000	24,000	19,000	14,000	10,000	92,000
Wood	3,000	14,000	3,000		5,000	25,000
Card./Paper	10,000	14,000	9,000		9,000	42,000
Plastics	5,000	5,000	5,000	5,000	5,000	25,000
Metals		1,000			3,000	4,000
	43,000	58,000	36,000	19,000	32,000	188,000³

Notes: 1. Industry sector information was obtained from the text of the audit report, not from an analysis of the detail of individual audits.
2. The industry class Mixed SMEs was used in the audits for small business sources where the nature of the business was not known.
3. On the basis of this analysis, a further 62,000 tonnes per annum of other materials are discarded at landfill from all industry sectors.

Provided this data is sufficiently detailed, it is possible to obtain an approximate estimate of the amount of money each industry sector spends on waste management services and from this, an estimate of the tonnage of waste disposed for each industry sector.

At the national level, ABS data permitted estimates to be developed for the proportion of turnover spent on waste management by over 100 industry sectors. At the South Australian level, Department of Trade and Economic Development data provided relevant turnover information for some 40 industry sectors.

Combining these two sources allowed calculations to be made of the amount spent by various South Australian industry sectors on waste management and thus an estimate of the tonnage disposed by industry sector.

As mentioned earlier, sensibility boundary data was periodically used to constrain the estimates – in this instance the total amount of C&I waste disposed in Adelaide. On this basis, the economic data provided a reasonable basis for allocating tonnages of waste disposed across industry sectors in direct proportion to the level of sector economic activity in retaining waste management services.

At Table 3, estimates of the amount of waste disposed to landfill by industry sectors deemed to be included in the commercial and industrial (C&I) industry bracket, within the greater metropolitan region of Adelaide, are presented in both annual tonnes and annual cubic metres. The estimates for cubic metres of waste were developed from assumed composition data, and specifically developed to support discussions with the waste management sector, where volumetric measure is particularly current at the premises of waste generators.



Table 3 C&I Waste Disposal Estimates by Industry Sector

Industry Sector	Estimate of C&I Waste Generated (tonnes p.a.)	Nominal Equivalent Cubic Metres p.a.
Food Products Manufacture	36,000	220,000
Wine & Beverages Manufacture	20,000	150,000
Textiles, Clothing, Footware Manufacture	5,000	50,000
Wood, Paper, Printing & Publishing	12,000	100,000
Petroleum & Chemicals Manufacture	5,000	60,000
Non-Metallic Mineral Products Manufacture	12,000	140,000
Metals and Metallic Products Manufacture	7,000	80,000
Machanical Equipment Manufacture	25,000	290,000
Other Manufactured Goods	7,000	50,000
Electricity, Gas Supply	5,000	50,000
Wholesale Trade	4,000	20,000
Retail Trade	35,000	240,000
Accmmodation, Cafes, Restaurants	25,000	160,000
Transport & Storage	4,000	40,000
Communication Services	2,000	20,000
Financial, Insurance Services	1,000	20,000
Property Services	11,000	110,000
Professional, Administrative, Defence Services	9,000	90,000
Education	8,000	60,000
Health & Community Services	8,000	60,000
Recreational Services	2,000	20,000
Personal & Other Services	7,000	70,000
Total Industry	250,000	2,100,000

At Table 4, the estimates from Table 3 are compared with the estimates from Table 2 to provide an order of magnitude check on the two approaches to estimating waste disposal rates by industry sector. This comparison provides a reasonable level of confidence in the detailed allocations of waste to the industry sectors based on economic data.

Table 4 Comparing Disposal & Economic Data Estimates (tpa)

INDUSTRY SECTORS	DISPOSAL AUDITS	ECONOMIC DATA
Manufacturing & Mixed SMEs	94,000	129,000
Retail	43,000	39,000
Hospitality	19,000	25,000
Other	94,000	57,000
Total	250,000	250,000

During the course of industry consultations, the data at Table 3 was presented to a number of people directly involved with the C&I waste sector and their views sought on the order of accuracy of the estimates. Two of the five companies consulted provided semi-critical appraisal involving checks with known services to industry



sectors, and concurred that, in the main, the allocation of waste disposal quantities across the industry sectors was reasonable. The remaining three companies gave verbal acknowledgements that the estimates appeared reasonable.

5.3 Target Materials in the Front Lift Segment

To develop an estimate of the targeted resources appearing in the front lift segment, the front lift segment share of total C&I market must be established. Following this, it is necessary to make an assessment of the content or composition of the waste stream discarded for disposal from each industry sector. Armed with the data from combining these two analyses, it is possible to highlight target industry sectors where reasonable yields of resources might be found that are currently despatched to landfill via front lift collection.

As indicated in Section 4 above, the front lift segment of the market is estimated at 64% of the total C&I market, or around 160,000 tonnes per annum. The distribution of the waste in the front lift segment across the industry sectors was assessed by informed estimates. At Table 5, the market proportions for front lift collection services are presented against each industry sector.

Table 5 C&I Waste Market - Front Lift Share (tpa)

Industry Sector	Front Lift Market (tpa)	Front Lift Market (CuMpa)
Food Products Manufacture	18,000	110,000
Wine & Beverages Manufacture	14,000	105,000
Textiles, Clothing, Footware Manufacture	4,000	35,000
Wood, Paper, Printing & Publishing	6,000	50,000
Petroleum & Chemicals Manufacture	3,000	30,000
Non-Metallic Mineral Products Manufacture	6,000	70,000
Metals and Metallic Products Manufacture	4,000	40,000
Machanical Equipment Manufacture	13,000	145,000
Other Manufactured Goods	5,000	35,000
Electricity, Gas Supply	4,000	35,000
Wholesale Trade	3,000	14,000
Retail Trade	25,000	168,000
Accmmmodation, Cafes, Restaurants	18,000	112,000
Transport & Storage	3,000	28,000
Communication Services	1,000	9,000
Financial, Insurance Services	1,000	10,000
Property Services	8,000	83,000
Professional, Administrative, Defence Services	7,000	68,000
Education	4,000	27,000
Health & Community Services	6,000	45,000
Recreational Services	2,000	15,000
Personal & Other Services	5,000	53,000
Total Industry	160,000	1,287,000



To analyse the likely composition of the waste stream, and thus establish possible recovery targets, multiple data and information sources have been used, including:

- the ZWSA disposal audits,
- the ZWSA recycling activity report,
- the estimates of waste generation based on macro economic data, and
- the estimates of waste disposal composition for industry sectors generated by metrics from various sources.

Analysis of the total C&I disposal market, and then the front lift segment, gives estimates for indicative tonnages of the targeted resources that are entrained in the wastes currently disposed at landfill. In this analysis, the waste composition for the total C&I waste stream in respect of the target materials was taken directly from the disposal audit data – this established the “bottom line” total amounts of the target materials for the C&I sector.

Within the industry sectors, composition for the target materials for both hospitality and retail industry sectors were taken from an amalgamation of the disposal audits and estimates of disposal composition using specific sector metrics. For all other industry sectors, informed estimates of composition were made until the “bottom line” position established above was achieved. The results, rounded to the nearest 1,000 tonnes per annum are presented at Table 6.

Table 6 Target Materials in Front Lift Disposals (tpa)

Industry Sector	Front Lift Segment (tpa)		
	Organics	Paper Cardboard	Comingled Recyclables
Food Products Manufacture	13,000	2,000	1,000
Wine & Beverages Manufacture	6,000	2,000	1,000
Textiles, Clothing, Footware Manufacture	0	1,000	0
Wood, Paper, Printing & Publishing	2,000	2,000	1,000
Petroleum & Chemicals Manufacture	0	0	0
Non-Metallic Mineral Products Manufacture	0	1,000	1,000
Metals and Metallic Products Manufacture	0	1,000	1,000
Machanical Equipment Manufacture	1,000	2,000	2,000
Other Manufactured Goods	2,000	1,000	1,000
Electricity, Gas Supply	0	1,000	0
Wholesale Trade	2,000	0	0
Retail Trade	15,000	5,000	3,000
Accmmmodation, Cafes, Restaurants	12,000	1,000	4,000
Transport & Storage	0	1,000	0
Communication Services	0	0	0
Financial, Insurance Services	0	0	0
Property Services	1,000	2,000	0
Professional, Administrative, Defence Services	1,000	2,000	0
Education	2,000	1,000	0
Health & Community Services	2,000	1,000	0
Recreational Services	0	0	0
Personal & Other Services	1,000	1,000	0
Total Industry	60,000	27,000	15,000



At Table 7 the data from these two analyses is summarised.

Table 7 Resources Available for Recovery in the Front Lift Segment (tpa)

	ORGANICS	PAPER & CARDBOARD	COMINGLED PLASTICS
Tonnes in total C&I Waste Stream	92,000	42,000	25,000
Tonnes in Front Lift Waste Segment	60,000	27,000	15,000

The likely recoverability of these target materials will depend to a considerable degree on the extent of concentration of material arising at specific generating sites – i.e. how much of each material is generated at particular sites. For example, when targeting paper and cardboard, industry sources indicate that any property generating more than 1.5 tonnes of paper/cardboard per annum would be of interest as a target for a dedicated paper/cardboard collection.

Therefore to make an assessment of likely potential for recovery it is necessary to drill down further into the waste generating market in an attempt to uncover where significant quantities of the target materials can be found. Such an analysis requires geographical or spatial data.

5.4 The Geographical Distribution of Waste

The waste and resource recovery collection businesses are very focused on the geographical distribution of wastes destined for disposal across a market because the service providers seek to maximise the efficiency of the logistics of the front lift collection vehicles and unloading at discharge points. This is the underlying principle to the creation of collection runs. And this principle will become even more essential and focused as fuel prices increase and carbon accounting is introduced into the wider economy.

Therefore, to improve opportunities for additional resource recovery it is helpful to establish the geographical distribution of the potential availability of the target materials.

To analyse the market for distributional characteristics, further ABS data was acquired relating to levels of employment in each of the industry sectors of interest for every local government area (LGA) in Adelaide. This employment data was used as a surrogate indicator of the level of business activity within each LGA, via which the waste disposal quantities for each industry sector might be distributed across metropolitan Adelaide on an LGA by LGA basis.

Indeed, many researchers investigating waste generation rates for business activities use the number of employees as one of the key estimating metrics for waste from some industry sectors.



The underlying assumptions here are that:

- the estimates for allocating the C&I waste quantities against industry sectors across all of Adelaide are reasonable, and
- it is also reasonable to assume that the amount of waste generated within a particular industry sector will be broadly proportional to the number of employees in that sector across all LGAs.

Therefore, for the 21 local government areas comprising the greater Adelaide metropolitan area employment data was applied on an industry sector by sector basis, to distribute front lift waste disposal quantities to each LGA, and accordingly the estimates of the targeted materials within each LGA.

At Table 8, the total amounts of the targeted materials estimated to be arising in each LGA are presented, with minor differences in the totals amounts for all of Adelaide due to rounding.

Table 8 Target Materials Distributed Across LGS in Adelaide (tpa)

Local Government Area	Organics	Paper	Plastics
	(Front Lift Market Segment t.p.a.)		
Adelaide (C)	7,400	3,900	1,900
Adelaide Hills (DC)	1,600	400	200
Barossa (DC)	600	200	100
Burnside (C)	1,600	700	300
Campbelltown (C)	1,000	400	200
Charles Sturt (C)	5,200	2,700	1,600
Gawler (T)	600	300	100
Holdfast Bay (C)	1,700	600	400
Light (RegC)	200	0	0
Marion (C)	2,800	1,300	800
Mitcham (C)	2,100	1,000	500
Norwood Payneham St Peters (C)	2,700	1,100	600
Onkaparinga (C)	6,800	2,300	1,300
Playford (C)	2,200	1,300	900
Port Adelaide Enfield (C)	7,900	3,800	2,100
Prospect (C)	600	300	100
Salisbury (C)	4,900	2,200	1,400
Tea Tree Gully (C)	2,400	1,000	600
Unley (C)	2,000	800	400
Walkerville (M)	200	100	0
West Torrens (C)	5,500	2,700	1,200
Totals	60,000	27,100	14,700



5.5 Thematic Maps on Waste

Having established the spatial distribution of the target materials on and LGA basis, it is helpful to convert this data into a pictorial format that permits a visual appreciation of the distribution. This will allow “hot-spot” LGAs to be identified for particular target materials that might be targeted for special investigation.

To undertake the mapping work, the software package MapInfo® Professional was used and linked with Microsoft Excel spreadsheets containing the data on target materials and LGAs. This permitted thematic maps to be prepared that combine spatial and numerical data on disposal rates for the target materials.

At Figures 1, 2 and 3 thematic maps are presented showing the amounts of the three targeted materials that are destined for disposal in front lift vehicles across the Adelaide local government areas. The maps include a scale and colour shading, based on quantity levels, to highlight LGAs that might be considered attractive targets for immediate attention. It should be noted that the scales and colour coding for each map are different.

Figure 1 Organic Waste for Disposal by LGA

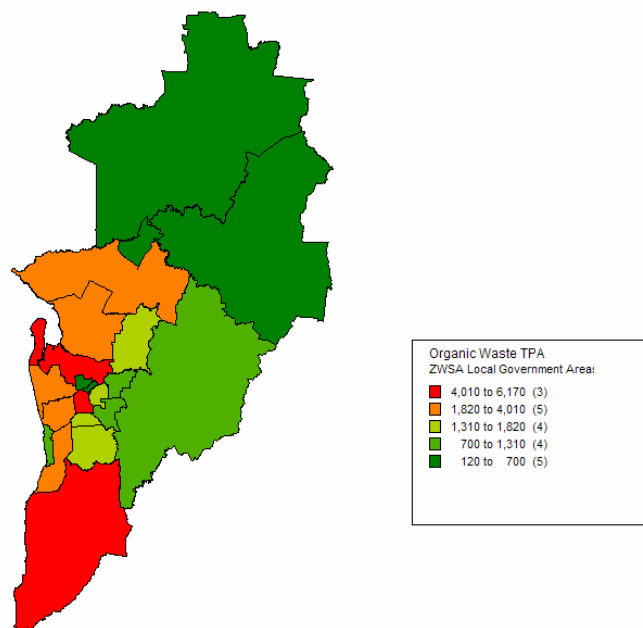




Figure 2 Paper/Cardboard Waste for Disposal by LGA

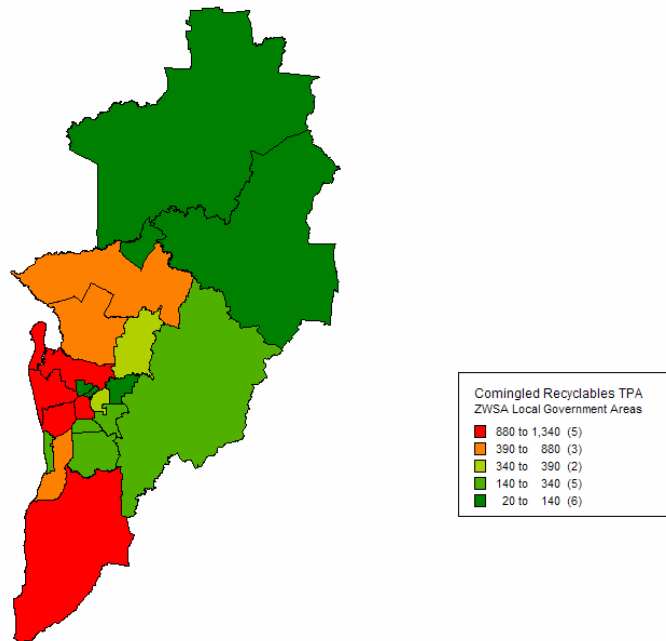
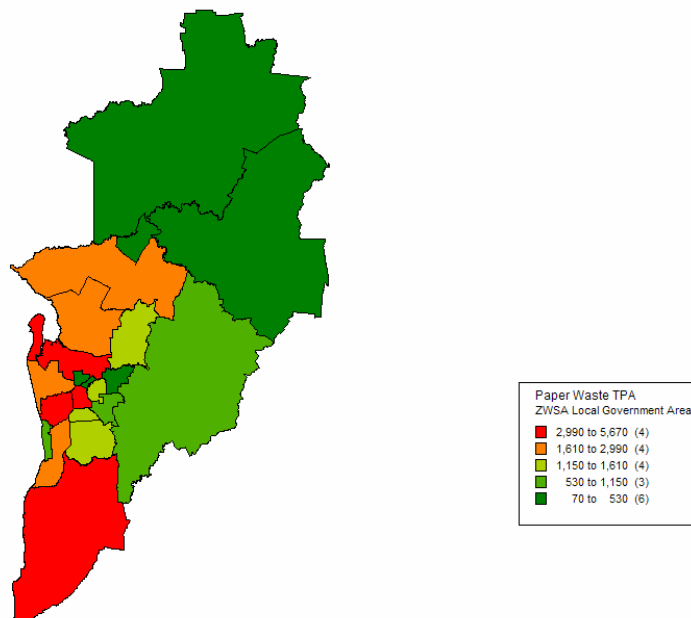


Figure 3 Comingled Plastic Waste for Disposal by LGA





5.6 Estimating Recovery Potential

Two options are available in respect of estimating recovery potential for the target materials:

- broad sectoral estimates, using the individual industry sectors as a guide to general business size and therefore likelihood of concentrations of arisings, and
- estimates based on property data for each of the industry types.

Looking at the industry sectors on a broad basis – it is possible to make estimates on the distribution of SMEs and larger enterprises, and possible recovery rates for the target materials in both SMEs and larger enterprises. Combining these estimates with the tonnes of the target materials for each industry sector provides a macro estimate of possible recovery.

At Table 9, the estimates for possible recovery of the target materials, based on a broad sectoral assessment is presented and compared with the data at Table 7 for the amounts contained in both the whole of the C&I disposal stream and the amounts in the front lift collected disposal stream.

Table 9 Macro Estimate of Potential Recovery of Target Materials from the Front Lift Segment (tpa)

	ORGANICS	PAPER & CARDBOARD	COMINGLED PLASTICS
Tonnes in total C&I Waste Stream	92,000	42,000	25,000
Tonnes in Front Lift Waste Stream	60,000	27,000	15,000
Potential Recovery (macro estimate)	22,000	8,000	3,000

Moving to a property basis of consideration – it would be possible to assess recovery potential somewhat more rigorously than the foregoing, if the level of arising of each target material, were known on a property-by-property basis.

To further refine the geographical distribution developed above based on LGAs, three property-related databases were acquired; these databases linked:

- individual businesses, with
- industry sector identifiers, plus
- geographical location, and
- the physical space occupied for business activities.

In all, the property databases contained records for over 23,000 businesses in commerce, retail and industry across Adelaide and around 1.4 million square metres of office space used for commercial activities in the Adelaide CBD.

Collective analysis of the property-related databases, with the waste disposal by industry sector within LGAs, allowed estimates on waste destined for disposal to be allocated on a business-by-business basis across the whole of greater metropolitan



Adelaide. The metrics for this distribution were floor space for commercial properties and footprint for retail and industrial properties, within industry sector, within LGA.

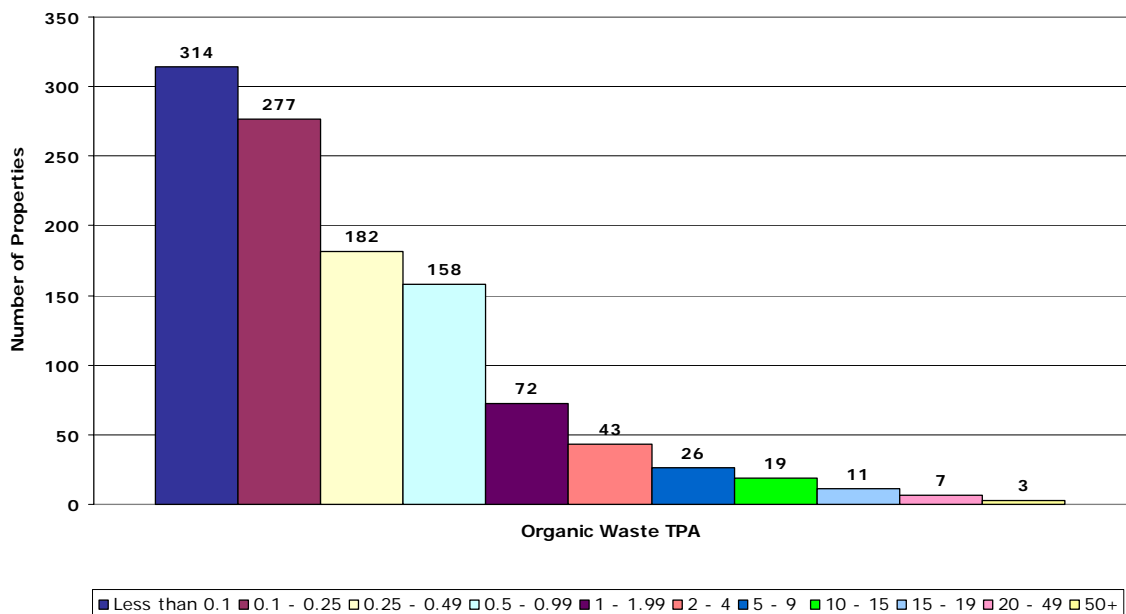
As with the case for employment within industry sector, within LGA, the floor space used for business activities could reasonably be a surrogate for the relative magnitude of business and thus the amount of waste that might be generated. Again, many researchers investigating waste generation rates use floor space as a key metric for developing estimates in some industry sectors. And in this analysis, the data allocated to floor space or footprint is undertaken within LGAs, for which allocations were first made on an employment basis.

In considering the further application of this property-based data, it is critical to recognise that in this analysis no consideration has been given to the suitability of front lift collection vehicles to service individual properties. While the estimate of front lift tonnes collected was made relative to the total C&I market, that front lift tonnage is now applied across the total available property base in the databases, irrespective and without knowledge of any specific constraining conditions at those properties. This will result in an over allocation of waste to the high-rise commercial sector and under allocation of wastes to the industrial and retail sectors, the latter being in all probability the main group of properties that actually receive front lift services.

Notwithstanding this limitation, the property-based allocations provide an improved basis for making an estimate of the possible levels of recovery of the target materials. This arises because a property-based estimate will be based on order of magnitude allocations of waste per property, which in turn is important for assessing whether or not source separation and separate collections are likely to be economically viable for collection contractors on a property-by-property basis.

Using this data it is possible to produce distributional statistics on the number of premises that despatch waste to landfill via front lift collection, for a range of disposal rates per annum. The graph at Figure 4 shows one such typical histogram for Tea Tree Gully LGA for organic materials destined for landfill.

Figure 4 Disposal of Organics from Properties in Tea Tree Gully LGA





Clearly, estimating recovery of target materials with data similar to that presented at Figure 4 is likely to give an improved assessment of potential than the estimate developed earlier on a macro basis.

On a whole of Adelaide basis, Figures 5, 6 and 7 present histograms of the numbers of properties generating various amounts of the three target materials.

Figure 5 Disposal Organics from Properties in Adelaide

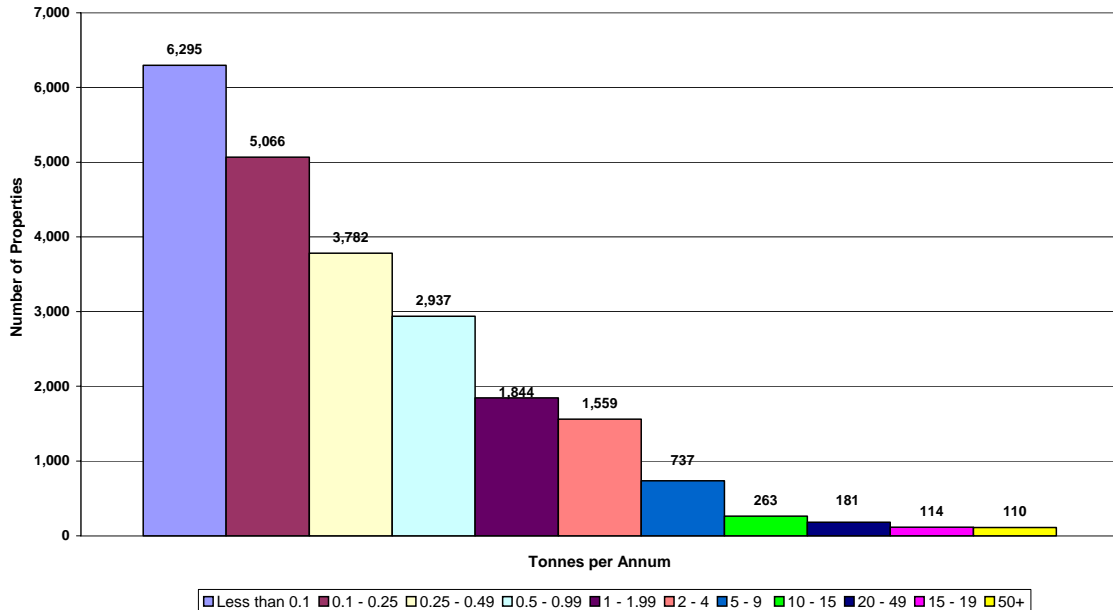


Figure 6 Disposal Paper/Cardboard from Properties in Adelaide

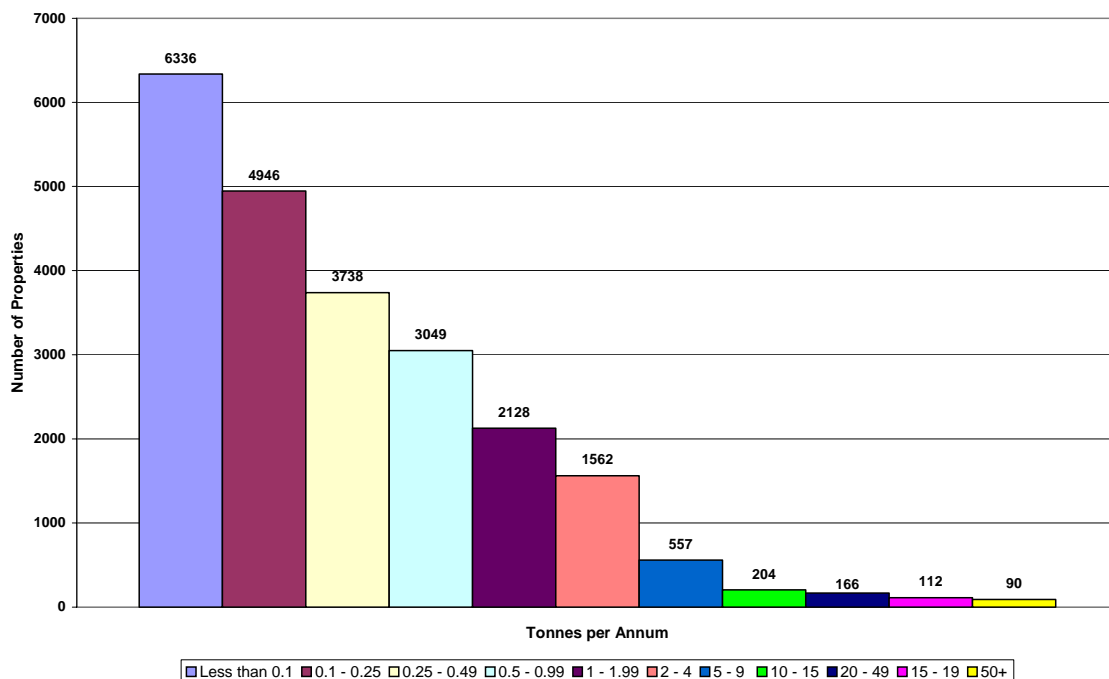
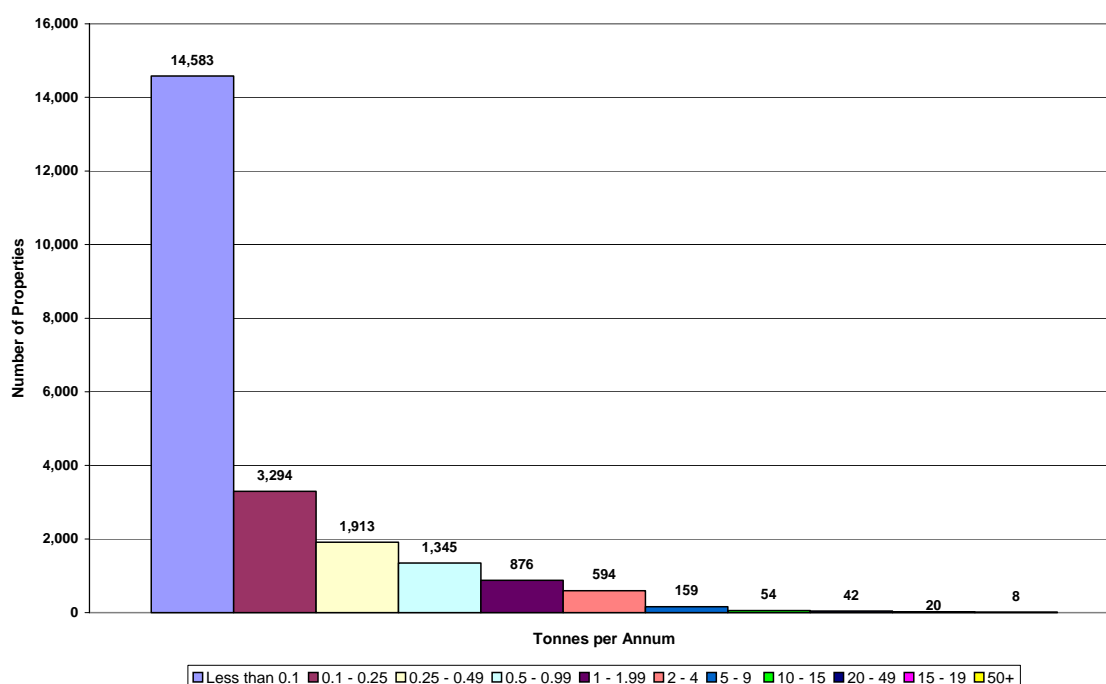




Figure 7 Disposal Comingled Plastics from Properties in Adelaide



This property-based data is then used to estimate potential recovery rates for each material – the results of which are presented at Table 10 and compared with the estimate presented at Table 9 based on a macro assessment.

Table 10 Property-Based Estimate of Potential Recovery of Target Materials from the Front Lift Segment (tpa)

	ORGANICS	PAPER & CARDBOARD	COMINGLED PLASTICS
Tonnes in total C&I Waste Stream	92,000	42,000	25,000
Tonnes in Front Lift Waste Stream	60,000	27,000	15,000
Potential Recovery (property-based)	28,000	18,000	11,000*
Potential Recovery (macro estimate)	22,000	8,000	3,000

***Note:** This estimate is for commingled recyclables and includes estimated recovery of paper with commingled plastics from properties generating less than 2 tonnes per annum of waste paper and unlikely to have separate paper collection.

It is considered that this estimate based on property data is more likely to represent recovery potential than the macro estimate.



5.7 Applying the GIS Database

The GIS database is a powerful resource for many of the stakeholders in the market including ZWSA, Local Government, collection contractors, resource reprocessors and vendors of specialised equipment that might be used in on-site storage of source separated materials.

It is not suggested that the database become a public resource, if for no other reason than copyright and licensing conditions associated with some of the data sources accessed for this assignment. However, the examples set out below have been developed to demonstrate how ZWSA might use the data to better understand market circumstances and opportunities from the multiple perspectives of the different participants and potential partners in the market. Then, armed with improved understanding of market potential, ZWSA might be better positioned to focus intervention options and more accurately determine budget and outcome implications.

Some examples of how the database might be interrogated for the different interests are presented below. In these examples it should be noted that for presentation brevity, the search criteria for each example are restricted to limit the number of results discovered, but at the same time demonstrate the flexibility of the database.

5.7.1 Vendors of Specialised Equipment – these parties might be interested in distributing equipment that can be used by waste generators for temporary storage of source separated target materials and to support collection. The business model for these parties usually involves consideration of both the number of units that might be sold or leased and the amount of product that might be captured.

These parties might therefore be interested in an inquiry of the database that includes number of premises, generating the target material of interest, in a given range of annual amounts, within a geographical zone. Such an enquiry of the database might be as follows:

- the number and location of industrial premises,
- disposing of commingled plastics,
- between 3 and 10 tonnes per annum,
- within a 2 kilometre radius of Port Adelaide.

At Table 11, the results of this enquiry are presented. It should be noted that for this inquiry, the database produced the name and address of the occupant of each site along with the amount of commingled plastics estimated to be discarded – these have not been included in the table presented here.



Table 11 Premises Meeting the Vendor Search Criteria

ANZIC	Description	Tonnes per Annum
2331	Pulp, Paper and Paperboard Mfg	9.97
2140	Oil and Fat Mfg	9.92
2112	Poultry Processing	7.83
5329	Automotive Repair and Services n.e.c.	6.35
2861	Agricultural Machinery Mfg	6.20
2411	Paper Stationery Mfg	6.03
2332	Solid Paperboard Container Mfg	4.69
8440	Other Education	4.53
2323	Wooden Structural Component Mfg	4.53
2122	Ice Cream Mfg	4.43
8639	Health Services n.e.c.	4.19
2329	Wood Product Mfg n.e.c.	3.82
2181	Soft Drink, Cordial and Syrup Mfg	3.59
2949	Manufacturing n.e.c.	3.46
2334	Paper Bag and Sack Mfg	3.43
2640	Non-Metallic Mineral Product Mfg n.e.c.	3.42
8440	Other Education	3.34
2179	Food Mfg n.e.c.	3.14
2635	Concrete Product Mfg n.e.c.	3.10
5252	Antique and Used Good Retailing	3.03
211	Meat and Meat Product Mfg	3.00

5.7.2 Collection Service Provider – a typical inquiry for a collection contractor might be targeted at in-fill selling of collection services around an existing run. It would therefore involve a specific target material, some limits on arisings and geographical bounds related to the existing run. Such an inquiry of the database might be as follows:

- the location of non-commercial premises,
- disposing of paper and cardboard,
- between 1 and 20 tonnes per annum,
- within 1.5 kilometres on either side of Park Terrace,
- in Salisbury.

The results of this inquiry are presented at Table 12. Again, it should be noted that for this inquiry, the database produced the name and address of the occupant of each site along with the amount of paper waste estimated to be discarded, which information has been excluded from this table.



Table 12 Premises Meeting the Collection Service Provider Search Criteria

ANZIC	Description	Tonnes per Annum
5253	Garden Equipment Retailing	16.48
4531	Timber Wholesaling	7.08
4624	Motor Vehicle Dismantling and	6.09
5231	Furniture Retailing	3.56
5234	Domestic Appliance Retailing	2.78
5231	Furniture Retailing	2.34
5233	Domestic Hardware and Hous	1.96
8635	Physiotherapy Services	1.81
5259	Retailing n.e.c.	1.78
5259	Retailing n.e.c.	1.78
4624	Motor Vehicle Dismantling and	1.69
5329	Automotive Repair and Service	1.62
4624	Motor Vehicle Dismantling and	1.57
4624	Motor Vehicle Dismantling and	1.51
5252	Antique and Used Good Retail	1.37
4624	Motor Vehicle Dismantling and	1.34
5234	Domestic Appliance Retailing	1.24
4539	Building Supplies Wholesaling	1.18

5.7.3 Reprocessors of Materials – for this interest group, information on priority regions for information dissemination, or targeted education initiatives on resource recovery may be of interest. On this basis their inquiry might seek to identify relative amounts of target materials on a geographical basis, and could be structured as follows:

- map all LGAs,
- showing total quantities of comingled plastics discarded in the LGA.

The map arising from such an inquiry is similar to those thematic maps presented at Figures 1, 2, and 3 earlier in this section.

5.7.4 Local Government – here an inquiry might be aimed at augmenting existing kerbside collection services, with the intent of providing services to small businesses via 240 litre MGBs – with organics being a prime example. In this instance the inquiry might be constructed as follows:

- the location of retail premises,
- disposing of organic wastes,
- between 5 and 10 tonnes per annum,



– in the Unley LGA.

An abbreviated set of results of this inquiry is presented at Table 13, again with names and addresses of tenants omitted from the table.

Table 13 Premises Meeting the Local Government Organic Search Criteria

ANZSIC	Road	Suburb	Tonnes
51	GLEN OSMOND ROAD	FULLARTON	8.29
57	GLEN OSMOND ROAD	FULLARTON	5.22
57	GOODWOOD ROAD	GOODWOOD	6.15
57	KING WILLIAM ROAD	GOODWOOD	6.87
57	KING WILLIAM ROAD	HYDE PARK	6.87
57	KING WILLIAM ROAD	HYDE PARK	6.87
57	KING WILLIAM ROAD	HYDE PARK	6.52
57	KING WILLIAM ROAD	HYDE PARK	5.97
57	KING WILLIAM ROAD	UNLEY	6.39
26	LYONS STREET	FORESTVILLE	5.15
57	ST ANNES PLACE	PARKSIDE	6.70
57	UNLEY ROAD	HYDE PARK	7.31
57	UNLEY ROAD	PARKSIDE	8.76
57	UNLEY ROAD	PARKSIDE	6.18
57	UNLEY ROAD	PARKSIDE	6.01
57	UNLEY ROAD	PARKSIDE	5.94
57	UNLEY ROAD	UNLEY	9.30
57	UNLEY ROAD	UNLEY	8.17
57	UNLEY ROAD	UNLEY	8.14
51	UNLEY ROAD	UNLEY	7.24
57	UNLEY ROAD	UNLEY	7.04
57	UNLEY ROAD	UNLEY	6.70
57	UNLEY ROAD	UNLEY	5.91
57	UNLEY ROAD	UNLEY	5.84
86	UNLEY ROAD	UNLEY	5.40
57	UNLEY ROAD	UNLEY	5.15

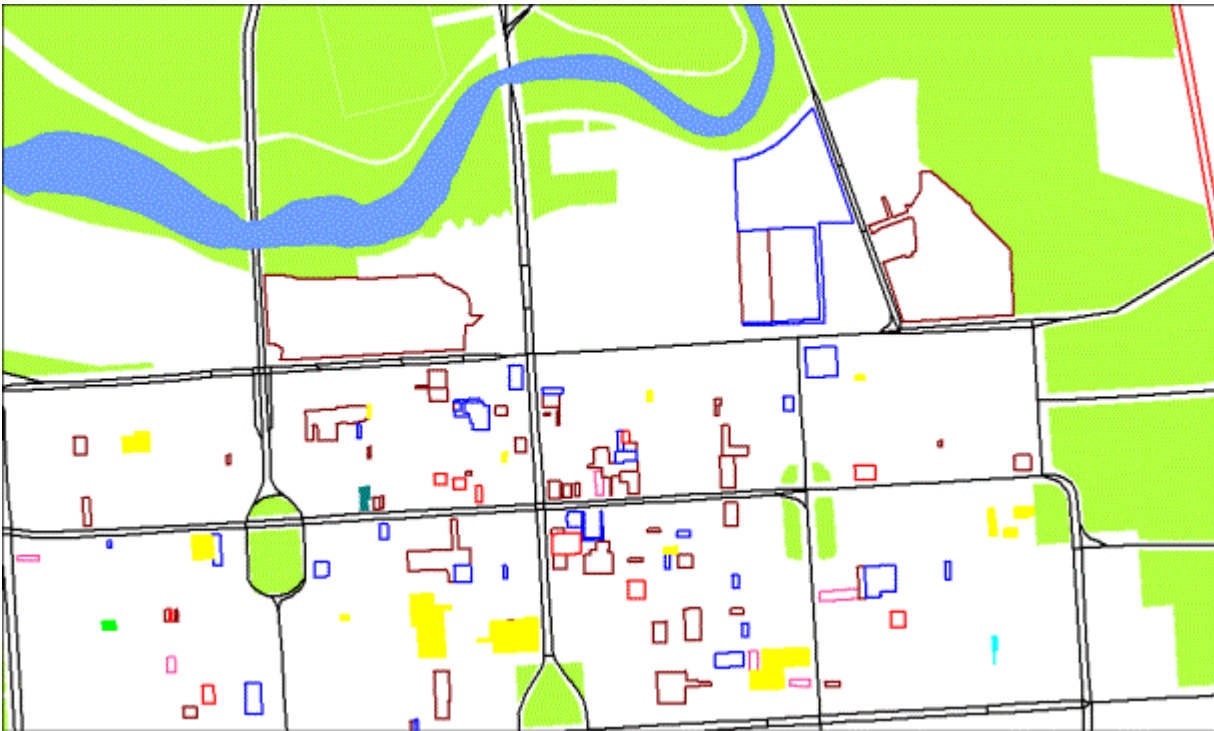
5.7.5 Targeting Individual Business Premises – many of the participants in the market and potential partners with ZWSA are likely to have an interest in resource recovery on a property-by-property basis, and thematic mapping of properties based on the level of wastes being generated would be a significant aid to that task.

At Figure 8, a map of the CBD area of Adelaide is presented showing the outlines of individual properties, colour coded according to the estimated amount of paper and cardboard being generated as part of the total waste stream at each premise. The data is for retail premises only, i.e. it excludes commercial premises and industrial premises, and it is for total waste generated, before dedicated source separated paper recoveries are taken into account.

Inquiries of the database can produce similar graphical presentations for other elements of the waste stream.



Figure 8 Property-Based Map of Adelaide CBD and Waste Paper Generation



In summary, the GIS database is a powerful tool combining waste arising data with geographical information on properties and types of businesses. It equips ZWSA with a tool that permits improved assessment of the market and the potential for further resource recovery, and thus improved targeting of intervention options.

It is important to understand that the database has definite limitations; however, some of these may be ironed out with successive refinement of data with greater accuracy and improved understanding of the property databases and their limitations.

Notwithstanding those limitations, the application of GIS based data management and interrogation systems for waste related investigations by ZWSA can be a very powerful tool and provide ZWSA with a greater level of market knowledge and intelligence upon which to base strategically targeted interventions.



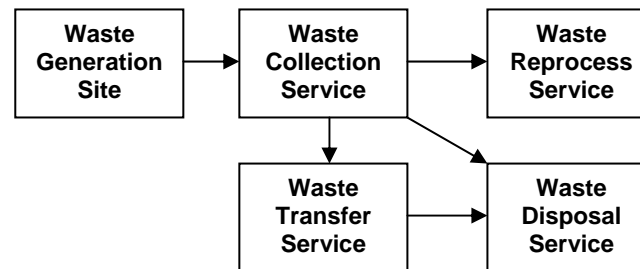
6. INTERVENING IN THE MARKET

6.1 The Decision-Making Value Chain

Intervening in markets is common where governments determine that market failures are producing sub-optimal outcomes. From the perspective of ZWSA, a sub-optimal outcome and market failure can be assumed to occur when an individual opts to discard unwanted materials to the disposal stream rather than opting to have the material recovered and disposed towards a waste recovery operation.

Examining the behaviour of participants as they make decisions on the fate of unwanted materials can highlight areas where the outcomes from decisions constitute market failures that may warrant attention. In this section an examination of the actions of individuals in deciding on the fate of unwanted materials is presented. The sequence of examination follows a notional value chain of the fate of discarded materials, starting with the site where the materials are first identified as being surplus to requirements, and ending with those materials being either disposed in a landfill or delivered to a recovery facility. The value chain has five elements or stages as shown in the Figure 9.

Figure 9 Material Flow Value Chain



6.2 Identifying Failure Points

Within each of the stages along the value chain there are multiple action or decision-making points where the choices of individuals determine the fate of the unwanted materials. At Table 14 a sequential examination of the stages in the value chain is presented, with the



decision points where the fate of materials is determined, the factors that might influence the decision being made, and an assessment of the specific issue at the core of the market failure. As areas of market failure are identified, the type of failure is highlighted in each instance for later summarising.

Table 14 Decision-Making and Market Failures in Material Management

STAGES	DECISION POINTS	FACTORS INFLUENCING DECISION-MAKING	AREAS OF MARKET FAILURE
Waste Generation Site	Waste is Created	<ul style="list-style-type: none"> - availability of an immediate reuse opportunity - availability of opportunities for source separation and segregated discards - organisational interest in environmental footprint 	<ul style="list-style-type: none"> - inadequate knowledge of alternatives and opportunities - inadequate facilities for source separation - poor awareness of carbon impacts on costs/price
	A Discard Bin is Selected	<ul style="list-style-type: none"> - space for multiple receptacles - convenient availability of multiple receptacles 	<ul style="list-style-type: none"> - insufficient space in the immediate work environment for multiple receptacles - insufficient facilities or containers in workplace for convenient source separation
	Discards are Aggregated for Collection	<ul style="list-style-type: none"> - availability of multiple transfer containers - contract conditions with cleaners 	<ul style="list-style-type: none"> - cleaning service contracts are not inclusive of resource recovery objectives - inadequate facilities are available for cleaners to keep streams separated during aggregation
	Collection Bins are Set-out for Collection	<ul style="list-style-type: none"> - availability of multiple collection containers - space for multiple collection containers - contract conditions with waste service provider 	<ul style="list-style-type: none"> - inadequate space for waste facilities in buildings - inadequate knowledge of alternative service possibilities - existing service contracts stifle change - low innovation in waste containerisation - low awareness to existing alternative containerisation technologies - insufficient information on waste quantities and costs - poor awareness of business case for source separation - no awareness of carbon impacts on waste costs



STAGES	DECISION POINTS	FACTORS INFLUENCING DECISION-MAKING	AREAS OF MARKET FAILURE
Waste Collection Service	Discards are Collected and Transported off Site	<ul style="list-style-type: none"> - availability of multiple collection runs in the area - positioning of competitors (incl. resource recovery service providers) - market pricing for services - vehicular access to collection containers - convenience/economics of direct disposal - prices for recovered resources vs. disposal cost 	<ul style="list-style-type: none"> - failure to innovate due to commitments to existing collection infrastructure and collection runs - inadequate space or access for collection of containers - insufficient price incentive and opportunity awareness to set up dedicated runs - high levels of market inefficiency and overlap - fear of loss of business – poor understanding of market - price differential for comingled recyclables devalues paper/cardboard content - insufficient knowledge of market opportunities to establish new runs - competitive pricing leaves little room for pricing resource recovery collections - financial benefit in going direct to disposal - insufficient information on forward price signals on which to base business decisions - low levels of flexibility and innovation - poor presentation of financial/business case to customers



STAGES	DECISION POINTS	FACTORS INFLUENCING DECISION-MAKING	AREAS OF MARKET FAILURE
Transfer Station Service	Wastes are Unloaded and Aggregated	<ul style="list-style-type: none"> - availability of separate areas for unloading - availability of sorting systems - level of contamination in waste streams 	- financial benefits in despatch direct to landfill
	Wastes are Sorted and Resources Recovered	<ul style="list-style-type: none"> - availability of markets for recovered resources - cost of separation 	- lack of price incentive to separate recoverables from waste
	Discards are Sent for Disposal	<ul style="list-style-type: none"> - least cost option 	- landfill disposal price is low and attractive
Resource Recovery Service	Receipt and Payment for Waste Destined for Recovery	<ul style="list-style-type: none"> - quality and quantity of recovered resources presented - prevailing competitor prices - prevailing export market potential for collectors to export directly 	- none
Waste Disposal Service	Discards are Disposed to Landfill	<ul style="list-style-type: none"> - maximise cash flow by rapid filling of void 	<ul style="list-style-type: none"> - waste permitted to go directly to disposal - waste levy and commodity prices not sufficient to divert resources



6.3 A Summary of Failure Classes

A range of market failures has been identified in the value chain assessment and highlighted in the previous table. These can be grouped into the five classes or circumstances of failure set out at Table 15.

Table 15 A Summary of Market Failure Classes

CLASS OF FAILURE	DESCRIPTIVE FEATURES
✓ Knowledge and awareness.	A lack of information at the time and place decisions are made limit the choices available leading to discard for disposal rather than discard for recovery.
✓ Capacity, suitability and availability of facilities and resources.	A lack of adequate space or capacity limits the level of service that can be offered, restricting discard options away from resource recovery.
✓ Service arrangements between parties.	Service contracts and agreements between parties fail to specify performance requirements or indicator benchmarks on resource recovery, leaving no incentive on the service provider to manage resource recovery as a part of the cleaning waste disposal service delivery.
✓ Innovation in technologies, systems and processes.	Innovation in the waste management industry is at relatively low levels in terms of systems, processes, technologies and market intelligence, leading to a prevalence of disposal over recovery.
✓ Market pricing and signals.	Where there are insufficient pricing signals in the market at key decision-making points it is unrealistic to expect change in behaviour from discard for disposal to discard for recovery; equally where forward pricing signals are absent, there is little incentive for forward investment.

6.4 Addressing Market Failures

To address the failures, a suite of options is available, with the choice and design of the selected option being tailored to suit the specific failure at the specific point in the value chain. In some instances, interventions might address a number of failure areas, for example,



mandatory introduction of pay by weight invoicing could provide both a financial incentive for behaviour change as well as filling an information gap for the waste generators in respect of knowing just what waste they dispose and what it really costs.

At Table 16, various options for market intervention are presented, grouped by the type of intervention, such as financial, regulatory, information etc., accompanied by comments on the failure typically addressed by the intervention, some key issues with the intervention and examples. Following this tabulation, some of the specific interventions raised in the table are discussed individually in more detail.

Table 16 Market Intervention Options

TYPE OF INTERVENTION	SUITED TO ADDRESS	KEY ATTRIBUTES	EXAMPLES
Financial	Addresses market failures where price signals are not sufficient to stimulate change in behaviour.	Can become a crutch for recipients. Rebates become priced into markets. Can be very targeted. Can have collateral un-intended impacts through market distortions. Essential to look for loopholes.	<ul style="list-style-type: none"> - Disposal levy on waste to landfill. - Incentive rebates for recovered resources. - Forward signalling of price trends. - The SA Government Feed In Tariff for renewable energy could be a model for replication (with some modification) with some resources.
Regulation	Addresses specific market behaviours through licensing, rationing or prohibition that cannot effectively be influenced through coercion alone.	Can require monitoring and policing to be respected and effective. Essential to look for loopholes. Has potential to avoid creation of future impediments.	<ul style="list-style-type: none"> - Exclusive or licensed collection zones. - Introduction of pay by weight. - Imposition of targeted bans at landfills. - Prohibition of direct despatch to landfill. - Rationing disposal quotas. - Regulating future building designs to accommodate waste management.
Service Agreements	Addresses contractual arrangements between parties that do not allow flexibility or facilitate resource recovery.	Has potential to lock in sustained change. Can be developed with industry participation through a best practice approach and encouraging	<ul style="list-style-type: none"> - Cleaning contracts that provide incentive for resource recovery. - Collection contracts that allow flexibility for changes in service arrangements.



TYPE OF INTERVENTION	SUITED TO ADDRESS	KEY ATTRIBUTES	EXAMPLES
Government Leadership	Addresses instances where establishing viable collection runs requires short- to medium-term underwriting.	industry leadership. Uses linked Government waste service contracts to stimulate new markets and collection runs.	- Bundle Government collections as a backbone to establish new collection runs.
Mentoring and Support	Addresses instances where in-house champions to support change are absent.	Involves low-level facilitation and leadership. Capable of establishing sustained change.	- External support personnel work periodically with company staff in building resource recovery ethos and practice.
Market Intelligence	Addresses gaps in market knowledge on opportunities for collection of source separated resources.	A level playing field approach that places market intelligence into the market and allows service providers to action the information according to interest and capacity.	- Disseminate thematic maps of targeted waste arisings. - Disseminate data and information to compliment in-house information of service providers. - Develop and disseminate data on waste that can be used for business decision-making.
Information	Addresses instances where decision-makers do not have sufficient information available to consider competing options.	Can be costly. Difficult to target. Difficult to gauge effectiveness. Harnesses peer pressure.	- Advertising material in mass media. - Distributing brochures and pamphlets. - Third party awards for excellence.
Partnerships	Addresses industry engagement through leadership and peer support/pressure.	Leverages intervention by tapping into wider self-interest of partner groups.	- Partnership with FMA ¹ to work with cleaners and building managers. - Partnership with WMAA ² to work with waste service providers. - Foster direct relationships between processors and waste generators. - Encourage Local Government to extend kerbside collection of recyclables to SMEs.



TYPE OF INTERVENTION	SUITED TO ADDRESS	KEY ATTRIBUTES	EXAMPLES
Innovation	Addresses instances where the status quo represents a barrier to change in behaviour and innovation is lacking.	Often, neither supported nor understood by the waste industry. Getting innovations implemented and demonstrated can involve "picking winners".	<ul style="list-style-type: none">- Use of an alternative business model to stimulate markets.- Demonstration of innovative systems for managing wastes.- Develop and demonstrate alternative containerisation options.- Re-introduce the bag and frame for collection of comingled recyclables.
Notes: 1. FMA – Facilities Management Australia, the association with professional coverage of building managers and many cleaners. 2. WMAA – Waste Management Association of Australia, for collective dealings with waste service providers.			



6.5 Highlighting Specific Intervention Options

In this section, some expanded discussion is presented on a selection of intervention options that could have potential for achieving leverage on ZWSA funds invested, through tapping into market self-interests to get market involvement in the changes sought, and thus greater potential for sustainability in the outcomes.

Many of the other interventions raised at Table 16 also offer good potential for delivering results for ZWSA, and should not be disregarded without further analysis and review.

6.5.1 Alternative Business Model to Fund Initiatives – the traditional approach for funding initiatives where consumers are involved and stand to benefit, is to require the consumer to pay for the changes and allow the consumer to recover the cost from savings generated. Energy is a good example, where the savings from energy efficiency initiatives can be clearly demonstrated to pay for themselves from the consumers perspective, so it will be obvious to every consumer that spending a little money will reap long-term sustained savings.

But this is not the case, and many consumers will not make the initial outlay even though the benefits might be obvious. This is generally because the issue is not of sufficient importance to the consumer and they have other priorities on which they prefer to expend their resources.

The behaviour of consumers in respect of waste management and resource recovery is no different.

A business model used in some overseas jurisdictions for energy efficiency initiatives is for one of the parties in the value chain to fund the initiatives at the consumers' place and to recover the investment from savings generated, before the savings flow on to the consumer. Once the cost has been recouped, the savings commence flowing to the consumer.

Typically, the party funding the initiatives is the one most likely to be positioned to benefit – i.e. it is very much in the interest of that party to have the consumer change their behaviour – and that party should also be positioned to intercept any savings or benefits generated to recoup their costs.

In the C&I waste market, both the collection service provider and the waste reprocessing service provider are positioned to benefit and intercept financial benefits, with the waste processing service provider perhaps having the greatest interest.

To a limited extent this is already happening in the C&I market as demonstrated by the following examples:

- a waste reprocessing operator actively marketing paper and cardboard collection services directly to consumers and then engaging a collection contractor to provide the service; and



- a waste reprocessing operator funding a consumer support and information system in the WA market called Recycle @ Work (www.recycleatwork.com.au) that provides ready access to information on recycling resources.

The waste reprocessing operator stands to benefit by capturing additional streams of resources instead of that material going to export, a competitor or lost entirely by disposal to landfill. Therefore, the waste reprocessing operator should be prepared to invest in initiatives that they believe will enhance their market share.

This approach could be further developed and encouraged by ZWSA in getting waste reprocessing service providers to fund other innovations at the consumers' premises that ZWSA and the reprocessing service operators believe could yield further gains in resource recovery.

For example, a number of innovative small-scale containerisation and compaction systems are available on the market that can accommodate a range of recovered resources, including paper, cardboard, commingled recyclables and organics. Consumers benefit through the reduction in space required for resource recovery facilities and reduced collection frequency, and the reprocessing service provider captures additional resources.

A scheme of arrangement could involve ZWSA partnering with the reprocessing service providers to share the cost of initial demonstration units; with an obligation on the reprocessing service provider that once the benefits have been demonstrated, they fully fund further roll-out of the system to other waste generators.

This approach leverages ZWSA's funds and builds on an approach that the industry has already commenced, but which can benefit from stimulated expansion. By tapping into industry self interest, it has potential to become self sustaining without on-going financial input from ZWSA.

6.5.2 Forward Signalling Increases in the Waste Levy – most businesses make investment decisions on the basis of forward estimates of cash flows. Where forward estimates are not available and cost/revenue changes occur without warning the impact of that cash flow change is generally absorbed without any significant change in the investment strategy of the business.

The Solid Waste Landfill Levy could be used strategically as well as tactically if forward signals are sent into the market. Working on the basis that businesses will be more likely to make forward business investment decisions if they are aware of future cash flow impacts, indicating how the levy will move over the next five years is highly likely to stimulate investment in resource recovery that might not otherwise be seen.

This same theory applies to all elements of the waste value chain:

Waste Generators – confronted with the assured knowledge that costs for waste disposal will increase, generators may be motivated to make the capital investment decision today to install alternative systems, with the certainty that those investments will be recouped as costs escalate.



Waste Collection Service Providers – having foreknowledge of the gap that will grow between disposal costs and recovery rewards, waste collection contractors will be motivated to commence dedicated resource recovery collection runs, that may, in the early stages be unviable financially, but can be forecast to come into profit as the gap increases and in-fill customers can be sourced.

Waste Reprocessing Service Providers – in a similar vein to the situation with collection contractors, the reprocessing operators will be encouraged to invest in a number of initiative areas if they can confidently predict the outcome of investment decisions to their boards.

In each instance, it is not the fact that the levy increases (the tactics of waste levies); rather it is the known dimensions of the increase in years to come that allow investment decisions to be justified – the strategy of waste levies.

If this strategic intent is clearly identified and put to the market, then the impost of the Solid Waste Landfill Levy and its inevitable increase can be more strategically argued in both political decision-making spheres and the wider community. And those arguments will be well supported in the wider community if there is a corresponding commitment from ZWSA to increase investment in resource recovery to support the investments from industry – i.e. continuing transparency in the application of the levy.

Achieving gains in resource recovery through strategic leverage off the levy comes at a relatively small cost to ZWSA.

6.5.3 Partnerships With WMAA and FMA – the service contracts between waste generators and their cleaners and the waste generators and their waste collection contractors can pose significant barriers to improving resource recovery.

The Waste Management Association of Australia and Facilities Management Australia could be recruited by ZWSA to be partners in working with their members on best practice contracts. Both of these organisations are keen to see practice standards improve over time and both can build a level of peer pressure in their respective sectors to coerce members to adopt the new standard contracts.

Development and roll-out of standard service contracts, or model contracts, is now common place in many jurisdictions to encourage best practice and to ensure that particular objectives are achieved.

In each of the instances here, it will be essential to clearly identify the benefits to all stakeholders that are being targeted with the model contracts. It is to be expected that there will be numerous technical and financial issues to be managed in each instance, however, with a true collaborative intent between the parties, common agreements should be achievable. Some of the key issues are highlighted below.

Cleaning Contracts – most cleaning contracts do not address management of recovered resources, and most cleaners are very focused on completing each cleaning assignment and moving on to the next in the shortest possible time.



With the right attitudes on the part of the waste generating workers, appropriate receptacles for intermediate storage, transfer and storage for collection, the tasks of keeping recyclables separate from mixed waste should not involve significant additional time for cleaning contractors.

In developing industry model contracts for cleaning it will be essential to look at rewarding the most appropriate behaviour. For example, the quality and quantity of the recovered resources should be rated higher than simply reducing the amount of waste despatched for disposal.

In office buildings the potential value of the recovered paper is likely to be of sufficient interest to waste processors that they might be enlisted in this initiative to contribute to the financial incentive – again, allowing ZWSA to leverage its efforts and investment and build industry participation.

Waste Collection Contracts – anecdotal information indicates that the current form of many waste collection service contracts does not support flexibility on the part of waste generators and, may in fact, mitigate against resource recovery by waste generators.

There may be some valid grounds for some of the conditions contained in waste collection service contracts, such as protecting the financial investment a contractor makes in providing bins to customers. However, some of the reported conditions appear more geared to protecting contractors from clients being poached by competitors.

It is suggested that a facilitated process might be able to address some of these issues, provided the commercial interests of the contractors are appropriately protected. The waste contractors are in general supportive of change and a move towards greater resource recovery, but on their own, they are not positioned or inclined to address such a commercially sensitive issue.

Leadership from WMAA, peer pressure and independent facilitation may be the answers to this thorny issue.

6.5.4 Partnerships with Local Government – domestic kerbside collection services are highly efficient and cost effective, and with many small businesses disseminated across the residential areas of major cities, there is considerable merit in Local Councils extending kerbside collection services to the business sector.

Many Councils include small businesses in their domestic collection runs in Melbourne and Sydney, and to a lesser extent in Adelaide. Extending recyclables and garbage collection services more widely to the small business sector has the potential to increase the momentum for behaviour change in the workplace and increase the pressure on the small businesses to recycle more of their recoverable resources.

For the Councils, the additional cost is recouped through rates and service charges, and for the small businesses, the cost of the service will be less than that supplied by commercial rear load collection contractors.



For ZWSA, this initiative has the potential to leverage off the existing good partnership relationship with Local Government and to achieve a higher diversion rate from these businesses without significant expenditure.

6.5.5 Using Government Leadership to Stimulate Runs – waste collection contractors are generally not the “biggest winner” along the value chain when higher levels of resources are recovered through source separation and dedicated recoveries. However, there is little doubt that, those collection contractors who can successfully develop dedicated collection runs and provide two collection services in place of a single waste contract, will benefit financially.

Notwithstanding this benefit, collection contractors still incur losses during the start up of new collection runs dedicated to source separated recoverables – be they paper, cardboard, comingled recyclables or organics. This is due to the time taken to build up a client list of participants along a suitable run route.

To speed up this process and reduce the financial underwriting that the collection contractors have to wear, tapping into Government sources of supply may provide an answer. The suggested intervention is that ZWSA negotiate with various Government related organisations – schools, departments and agencies, hospitals, TAFE colleges etc. – to facilitate supply of source separated recovered resources that could be contracted out in a job-lot through tender, to form the backbone of new dedicated collection runs.

The collections should be grouped and bundled such that they constitute the initial portion of runs – not the whole run – with the successful tenderers tasked with in-fill selling of services to other waste generators along the route.

This bundling approach could be the building blocks for multiple collections runs across paper and cardboard, comingled recyclables and organics; and with the job-lot tenders, the government organisations and agencies participating in the scheme can be assured of getting highly competitive and attractive prices for the services offered.

ZWSA acts as facilitator and leverages off existing government spending on waste disposal and resource recovery, delivering considerable gains for very modest outlays.

6.5.6 Innovative Containerisation – space constraints are commonly used as the excuse for not engaging in source separation and resource recovery. Be it in the office, at the workbench, difficulties with multiple containers for cleaners, or lack of space for multiple collection bins – this excuse is pervasive across most sectors of industry and commerce.

This is an area where innovation is needed to address the situation in existing premises, and regulation is needed in the yet-to-be constructed buildings of tomorrow.

To set in train a situation where lack of space is no cause for excuse in future buildings and factories, strong regulatory action is needed today to bring about change to the design and planning obligations for new developments. To support these design obligations, consent conditions should also be



imposed requirements for occupants to engage recognised service providers for waste and resource recovery collections.

Similar obligations are required of new developments in areas relating to public health. Is there perhaps a case that the future public health ramifications of GHG emissions from failing to adequately manage waste resources could be a trigger for similar obligations in the waste area?

Returning to the buildings and facilities of today, the space constraints are difficult to address retrospectively other than through smart and space-saving containerisation and capture systems. In this area there is opportunity for ZWSA to examine the market for systems and technologies that might be affordable and practical for small to medium sized enterprises to implement. And where innovation is lacking, to consider options for stimulating alternative approaches.

As mentioned earlier, there are containerisation and compaction systems available on the market today, but relatively poorly utilised because of price thresholds. As suggested, this might be addressed by fostering an alternative business model approach to funding introduction.

However, a great stimulus for innovation is when people see ideas operating in place and believe they can develop an alternative that might be simpler, cheaper or more effective. Thus, as a starting initiative, it may be beneficial for ZWSA to underwrite demonstrations to publicise the problem and show the challenge to prospective inventors.

Once the problem and its dimensions are scoped and then publicised, along with market intelligence data on potential markets and the business case to be met for solutions to be acceptable, it is almost certain that various parties will rise to the challenge – either on their own backing or with third party support.

Space constraints should not be permitted or accepted as a reason for not recovering resources. This has not been permitted in the domestic waste management scene, and should similarly not be tolerated in commerce and industry.

6.5.7 Rebates to Collectors Based on Recoveries – rebates for satisfactory performance of nominated tasks that save third parties money are not uncommon. In the Sydney grease trap waste market, Sydney Water pay a rebate in the order of 8 cents per litre to liquid waste treatment plant operators for each litre of grease trap waste received and treated. For Sydney Water, the rationale is that 8 cents per litre not going into the sewage treatment plants is a lower cost than if the grease trap waste had to be treated by Sydney Water and effluents managed effectively.

Liquid waste treatment plant operators use the rebate as they see fit, with many passing part on to the collection contractors as an incentive to collect and route grease trap waste to their facility. The collection contractors similarly use their share of the rebate to secure collection contracts from facilities with grease traps.



In the grease trap situation, grease traps are mandatory at relevant facilities and it is also an obligation on the owners of those facilities to have the trap serviced on a regular basis by an approved collection contractor. Further, the grease trap waste has little or no intrinsic value in its own right, but the implied value from the Sydney Water rebate is sufficient to stimulate the market.

As with most rebate systems, the rebate is eventually fully priced into the market and difficult to discontinue without potential to disrupt the market. For Sydney Water, if the savings are genuine, then there should be no excuse for the rebates to be withdrawn, and therefore disruptions to the system are unlikely and each party in the value chain shares in the savings.

The concept of a rebate in the solid waste resource recovery market has attraction as a reward for performance – both at the waste generator level and for the collection contractor. And in this situation, there is a case to put that the resource recovery process operator could be the source of the rebate.

In the solid waste sector, dealing with the recovery of paper and cardboard, comingled recyclables and organics, some of the targeted materials do have intrinsic value, given that they can be beneficiated and on-sold into domestic and export markets. And that value is realised by the process plant operator who beneficiates the stream and on-sells the materials for export or local reuse.

In this instance ZWSA is also a beneficiary of the higher levels of resource recovery, on behalf of the community and the Government through reduced waste to landfill. Therefore, there is an argument that could be advanced for a co-contribution rebate system being introduced by ZWSA in collaboration with the resource recovery processors.

Rebates could be paid to collection contractors on the basis of a percentage on the gate fees they exchange with the process operator for the resources they deliver. Using a percentage-based rebate, ensures that both quantity and quality variables are respected and rewarded. Collection contractors can then use the rebates as they see fit – to increase their marketing efforts, to reward their customers or to build greater internal margins. Market forces will eventually dictate how collection contractors manage their rebates.

Again, the rebate will eventually be fully priced into the market, but with the process plant operators deriving benefit from the increased flows of quality materials, and ZWSA continuing to make inroads of waste disposal, there is no real argument for considering withdrawing the rebates once they have been introduced.

6.5.8 Pay by Weight – the technology for pay-by-weight exists, it is fully approved and it is already fitted to many front lift collection vehicles operating in Australia. While the cost of retrofit may be cited as a barrier, the reality is that the market is fast approaching a realisation point when pay-by-weight will be the accepted norm.

Many front lift collection contractors already use weight-based information to monitor the weight of customer bins, to check the cumulative load in their vehicles for axle loadings and as a check on weighbridge receipts as they discharge their loads.



Pay-by-weight in the C&I front lift market has the potential to offer multiple benefits to both the collection contractor and the waste generator; for example:

- *waste generators* will have superior information from that currently received, on which they can monitor their waste performance and environmental footprint, appreciate the real cost of the waste they generate and better comprehend the potential to save cost by recovering resources, and
- *waste service providers* would operate in a market where the real cost of waste removal is the basis for market pricing, making undercutting and competitor encroachment less of an issue than is currently the case where volume and service frequency cloud the real cost per tonne of waste collected.

Mandating the introduction of pay-by-weight would require consultation with both the collection contractors and the waste generators to fully explain the reasons for its introduction and the benefits gained by all parties. The issues raised by both parties need to be heard and comprehended, and then managed in a system that can deliver the benefits sought.

Pay-by-weight is unlikely to be introduced by the waste service providers on their own volition, it will need mandating and facilitation. But as with a number of the interventions suggested, the pay-by-weight system has the potential to leverage ZWSA's efforts without exorbitant expenditure or forward commitment to subsidy.

6.5.9 Licensed Collection Zones – this method is used in some UK counties and local government areas. It has the attraction that it affords ZWSA a high degree of control over the services delivered in nominated areas and it drives up the efficiency with which the front lift collection vehicles are employed.

Consideration of this suggested intervention can be expected to draw serious comment and input from the waste service providers, who will see this as an encroachment on competition and free market practice. These criticisms should be taken on board and arguments advanced on the benefits the system can deliver for all parties, including:

- ensuring competitive prices are provided to customers and service levels are maintained by tendering out licences, with finite terms and with defined contract conditions for termination;
- protecting contractors from customer-poaching within their licensed territories and guaranteeing them access to all wastes and recovered resources from customer premises in their territories;
- delivering contractors a higher degree of market certainty;
- improving the efficiency with which collection vehicles are operated and thus saving on the total investment for collection contractors;
- ensuring that customers get the services they want to suit their needs, by having ZWSA as a party to the head licensing contract and thus involved in setting service standards and service offerings.



6.5.10 Market Intelligence Data – the database established as part of this assignment has significant potential to influence greater recovery of the targeted materials, as demonstrated in the previous section with the examples of interrogation options.



7. NEXT STEPS

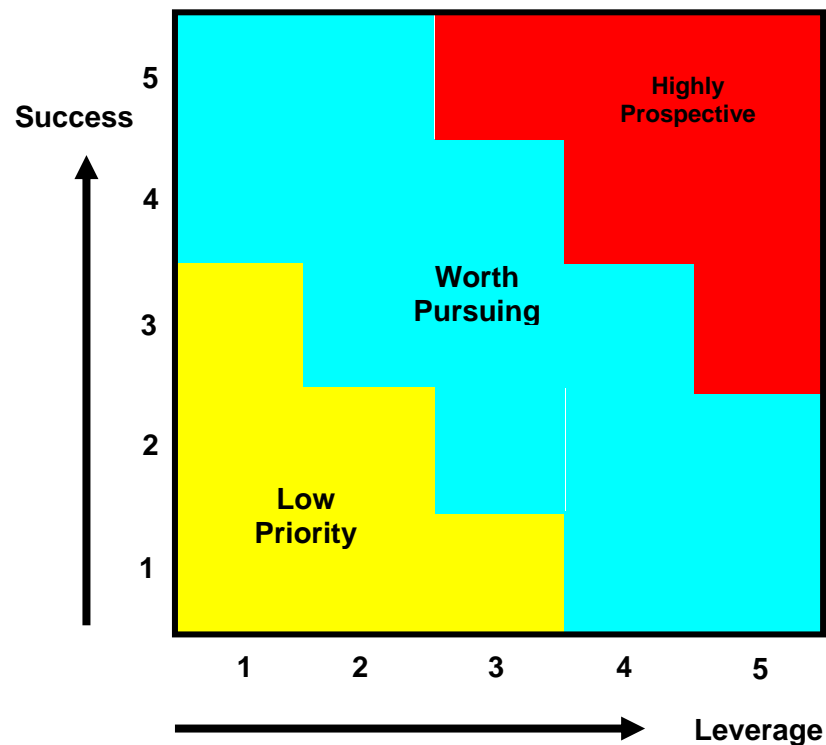
This assignment has analysed the front lift segment of the C&I waste market from the dual perspectives of the services provided and the wastes generated for disposal. Some clear targets have been identified in each area and some mechanisms put forward for addressing those targets.

It is now appropriate to use the information generated from this assignment to develop intervention strategies aimed at securing greater levels of recycling and resource recovery from the C&I market.

A suggested sequence of steps for moving forward might include the following:

- ✓ assemble a comprehensive list of multiple intervention options and divide them into three basic categories –
 - those that can be implemented within existing delegations and approvals,
 - those requiring new delegations and Board approvals,
 - those that require political decision-making and approval;
- ✓ analyse all intervention options and assess the likely leverage in terms of cost and return that each might be capable of delivering, in the process assigning a likelihood rating for actually delivering;
- ✓ arrange the intervention options on a matrix comparing leverage and success potential as shown at Figure 9, to establish priorities for implementation;

Figure 9 A Leverage-Success Matrix for Intervention Options





- ✓ develop a program of interventions with a mix of objectives –
 - quick runs,
 - good wins that make for good announcements,
 - delivering sustainable change,
 - logical linkages along the value chain,
 - can be completed within a term of Government.