Waste Industry Workforce Development Plan 2010

Workforce Planning Training needs for the Waste Industry in WA

Contract # 11712

EUPA Training Council for the Waste Authority under the Strategic Waste Initiative Scheme
5/26/2010
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Members of the Waste Industry Working Group established by EUPA to provide guidance to the project:

Kevin Poynton                Chairman                Waste Management Association of Australia
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Consultants:

John King Consultants        Overview of the industry
Helen McCarter               Industry consultation, conduct of survey and research into Training demand and supply issues
Chamber of Commerce & Industry Advice into survey design and structure of the survey instrument


**FORWARD**

This Workforce Development Plan for the waste industry in Western Australia proposes labour and skilling initiatives to assist the industry develop and meet the many challenges it currently faces in attracting and retaining a competent and capable workforce.

The plan proposes a number of strategies that the EUPA Training Council together with industry stakeholders would implement to ensure the industry can attract and retain a skilled workforce in a period where labour and skills shortages are predicted due to sustained economic growth.

The industry like many others is likely to again feel the pressures caused by the loss of labour to the resources sector as many of the waste industry job roles are common to that sector. This competition for skilled labour also comes at a time when the State Waste Strategy is to be implemented and the industry is restructuring, adopting new technologies, and designing new systems of work that will require a much more highly skilled workforce than currently exists.

While the industry seeks to employ tertiary qualified individuals in its supervisory and professional occupations very little, if any, emphasis is given to the formal skilling of the remainder of the workforce.

It is in the provision of skilling/training opportunities for these occupations that there is an apparent lack of engagement in the national training arrangements for the acquisition of recognised “waste management” qualifications. In addition to which, the industry’s lack of awareness and utilisation of government funding initiatives for the provision of training is restricting workforce development opportunities.

The industry of today is very different to that of ten years ago and the industry ten years from now will be very different again. Industry commentators have identified job roles for which no training or qualifications are currently available. This plan proposes workforce development initiatives and the establishment of training arrangements to meet the challenges of today while aiming to prepare the industry for the future.
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1. INTRODUCTION

The Waste Authority awarded EUPA Training Council Inc. a Strategic Waste Initiative Scheme grant to undertake a Workforce Planning and Training Needs survey of the waste industry. The project was to have a workforce planning focus to effectively align the future needs of the waste industry with those of its workforce and identify the means by which the training system can provide skills development opportunities.

Since the commencement of the project in 2009 the Department of Education and Training was restructured to become the Department of Training and Workforce Development. The initial focus of this project was to provide input into what was the State Training Plan however; with the establishment of the new Department the outcomes of this project will now inform the State Workforce Development Plan 2010.

The project was conducted in two parts.

1. An environmental scan to gain a strategic understanding of the waste industry in Western Australia.

2. A survey of the industry to gain direct feedback on the issues confronting the Industry in ensuring it has access to sufficiently skilled labour and training opportunities.

Methodology

In the conduct of the project EUPA undertook to complete the following:

Conduct a series of Focus Groups with representatives of the waste industry to verify and update the outcomes of the Waste Management Industry Training Needs Survey (September 2006) as well as identify the occupational groupings of those employed in this sector.

Prepare and implement a telephone survey of approximately 150 Local Government and private enterprise organisations involved in waste management to determine:

- the number of employees in each of the occupational groupings
- the demand for access to training opportunities for each of these groupings

Map the needs of each of the occupational groups to currently available nationally recognised qualification / skills sets / units of competence.

Research the capacity of the currently registered training providers to deliver the identified training needs.

Identify Federal and State funding opportunities available to industry for the delivery of training.

Produce a Workforce Development Plan for the waste industry to inform the State Training Plan 2010.*

*With the establishment of the Department of Training and Workforce Development in October 2009, the State Training Plan is to be replaced by the State Workforce Development Plan
2. **ENVIRONMENTAL SCAN OF THE WASTE INDUSTRY**

The Electrical, Utilities and Public Administration Training Council Inc (EUPA) in preparing this workforce development plan for the waste industry in Western Australia retained John King Consultants to prepare an industry overview to place a strategic context around the factors likely to impact on the labour and skilling needs of the industry.

The overview provides brief comment on the following as they relate to the industry:

- Industry overview
- Trend analysis,
- Regulatory requirements,
- Impact of government policy/decisions,
- Technology developments,
- Economic drivers,
- Size of the industry – Contribution to the State Economy,
- Social impact.
- Demographic and Qualification profile of the workforce,

In addition, EUPA consulted widely and undertook an industry survey to identify labour and skilling issues, barriers to employment and training as well as potential opportunities that exist in the industry to ensure it has access to a skilled workforce. The findings of the industry survey were used to formulate workforce development strategies. (The full Survey Report is provided at Attachment 1)

2.1 **Industry Overview**

The waste industry in Western Australia can be divided into three major segments, being the municipal solid waste (MSW) sector, commercial and industrial (C&I) waste sector and the construction and demolition (C&D) waste sector, and each of these sectors is supported by ancillary services.

**Municipal Solid Waste Sector (MSW)**

The MSW sector is largely the domain of Local Government. MSW comprises the various forms of waste that originates from residential and some commercial and institutional sources. Waste originating from non-residential sources within this category is generally collected as part of the domestic collection rounds. This waste is characterised as being mainly putrescible waste, but also includes bulk waste (white goods, old furniture, electronic goods), household hazardous waste (oils, chemicals, batteries) and recyclable material (Cardno, 2008). The generation of this type of waste is closely related to population, with approximately 690 kg of waste generated per person in Western Australia (DEC, 2006/07).

**Commercial and Industrial Waste Sector**

C&I waste is solid waste originating from commercial and industrial facilities, including offices, retail outlets, restaurants, factories and institutions. This waste is characterised as being quite varied in its composition.
It can comprise highly organic waste from food processing and restaurants, metals from factories and other industrial premises, and paper products and dry recyclable waste from offices (Cardno, 2008).

The material can be collected as clean waste of a particular type (such as all metals or all papers), but mostly it is collected as a highly heterogeneous waste coming from a range of different premises which results in a high proportion of this waste category being recycled. Collected mixed C&I waste requires specially designed materials recovery facilities (known as Dirty MRFs due to the ‘dirty’ nature of the waste treated) to separate into clean fractions that can be recycled. No such facilities currently exist in Perth. As a result, this mixed waste is disposed at landfills.

Generation of C&I waste is related to the general level of activity within the economy as measured by Gross Domestic Product (GDP).

**Construction and Demolition Waste**

C&D waste is solid waste that is generated from the construction, demolition and maintenance activities associated with buildings and civil infrastructure works. Material comprising C&D waste is typically sand, aggregates, plasterboard, asphalt, bricks, timber, concrete, tiles, roofing material, electrical wiring, and their associated packaging (Cardno, 2008). The amount of C&D waste generated is related to the level of building and construction activity in the economy.

**Support and Ancillary Activities**

Within each of the waste sectors, there are activities undertaken that involve waste collection, which is essentially transport logistics, the processing and treatment of waste, normally undertaken within a processing facility (enclosed factory or yard) and the disposal of waste at landfills. There is also a range of support and ancillary activities associated with the waste management industry, including approvals and regulatory activities, as well as the planning, procurement, construction and implementation of waste management initiatives.

**Waste Quantities**

The changes in the waste management industry relate to the growth in the quantities of waste generated and the methods used for the collection, treatment and disposal of the waste.

A study undertaken for the Waste Authority in 2008 (Cardno 2008) identified current and projected future quantities of waste generated in Western Australia. The following information has been derived from the report on that study.

**Municipal Solid Waste Quantities**

The amount of MSW generated in 2006/07 was 1.4 million tonnes (Waste Authority 2010).

As noted above, the quantity of MSW generated is related to population. Figure 1 shows the current amount of MSW generated in the Perth metropolitan region. The quantity of MSW generated in the Perth metropolitan region comprises approximately 68% of the waste in Western Australia, from approximately 74% of the population. The rate of growth shown reflects that of the whole State.
Prior to 2004/05, details of the quantities of MSW recycled were not recorded, so the total quantity of MSW generated is not known accurately. As seen below, the total quantity of MSW generated will grow progressively, approximately in line with population from the 2006/07 quantity of 1.4 million tonnes.

Figure 1: Projections of MSW Waste Quantities in the Perth Metropolitan Region
(Reference: Cardno, 2008)

Commercial and Industrial Waste

Approximately 1.8 million tonnes of C&I waste was generated in 2006/07 in Western Australia. Prior to 2004/05 the quantities of C&I waste that was recycled were not recorded. Data on the total C&I waste are available from 2004/05 and has been projected from then based on changes in GDP. Figure 2 shows projections of C&I waste in the Perth Metropolitan region, which comprises the vast majority of the C&I waste in the State. It therefore reflects the growth trend for the total State C&I waste for the coming years.

Figure 2: Projections of C&I Waste Quantities in the Perth Metropolitan Region
(Reference: Cardno, 2008)
Construction and Demolition Waste

Approximately 2.7 million tonnes of C&D waste was generated in 2006/07. Future growth in this quantity is seen to be related to the anticipated level of construction activity. Figure 3 shows projections of C&D waste in the Perth Metropolitan region, which comprises the vast majority of the C&D waste in the State. It therefore reflects the growth trend for the total State C&D waste for the coming years.

![Figure 3: C&D Waste Quantities in the Perth Metropolitan Region](Reference: Cardno, 2008)

Waste Collection

MSW is collected by or on behalf of local governments from households and some commercial and institutional properties. The majority of this waste is collected using 240 litre mobile garbage bins (MGBs). Most domestic properties have a weekly collection service for general mixed MSW which are collected by side loading, driver only refuse compactor trucks. The majority of households also have a fortnightly recycling collection service, using 240 litre or 120 litre MGBs. Many properties have a periodic bulk verge collection service for larger items such as white goods, old furniture and garden waste.

Multi unit residential properties and commercial and industrial properties usually have skip bins, serviced by larger front loading trucks with driver only or driver and assistant. The frequency of the services depend on the amount of waste to be collected, but are mostly no less frequent than weekly.

C&D waste is mostly generated as part of building or maintenance works. As a consequence much of this waste is transported to a disposal or processing facility by those undertaking the works. A large portion is also collected from building sites using skip bins, operated by private contractor. Most local governments only collect C&D waste that they generate from their own works, and not from private building activities.
Many local governments undertake their waste collection services using their own workforce and equipment. Many others have contracted out the services to private contractors, or, on occasions to other local governments. C&I and C&D waste is mostly collected by private contractors or is transported by the waste generator.

Workforce Development Issue:

*Increases in waste quantities will lead to growth in employment especially in the areas of waste collection and transport.*

Waste Treatment and Disposal

Increasing portions of each of the waste streams are recycled or processed to transform them into usable products, and so are not disposed to landfill. The proportion of the waste that is diverted from landfill varies between the waste categories. This is illustrated in Table 1 which shows the total waste generated and its destination for the Perth Metropolitan Region for 2003/04 to 2006/07.

<table>
<thead>
<tr>
<th>Waste Stream</th>
<th>2004/05</th>
<th>2005/06</th>
<th>2006/07</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Landfill</td>
<td>Recycled</td>
<td>Landfill</td>
</tr>
<tr>
<td>MSW</td>
<td>720,220</td>
<td>343,150</td>
<td>698,240</td>
</tr>
<tr>
<td>C&amp;I</td>
<td>539,270</td>
<td>800,000</td>
<td>668,430</td>
</tr>
<tr>
<td>C&amp;D</td>
<td>1,586,600</td>
<td>300,000</td>
<td>1,709,690</td>
</tr>
<tr>
<td>Total</td>
<td>2,846,090</td>
<td>1,443,150</td>
<td>3,076,360</td>
</tr>
</tbody>
</table>

Note: Recycling totals are for Western Australia, however >95% can be considered from the Perth Region

Table 1: Perth Metropolitan Region - Summary of total generation of waste (by waste stream) and destination (landfill or recycled) between 2004/05 and 2006/07 in tonnes (Reference: Cardno, 2008)

Figures 1 – 3 show the proportion of the three waste categories that are projected to be recycled. These figures illustrate the anticipated increases in the amounts of waste that will no longer be put into landfill, but will be processed in some other way. They also show the continuing importance of landfill facilities to the management of waste in Western Australia.

In recent decades, local governments have introduced recycling collection service or drop off facilities to recycle paper products and packaging materials. They have also separated out green waste and some white goods from their bulk verge collection services. This has caused an increase in the amount of waste that is diverted from going to landfill.

More recently, significant progress has also been made, and more is planned, for the diversion of MSW from landfill through the processing of this waste in resource recovery facilities. They are large facilities that process the waste into usable products such as compost, energy and recycled packaging material. All of the five metropolitan regional councils in the Perth region either have or are planning to establish a resource recovery facility to process at least part of their MSW.

The effects of these initiatives are shown in Table 2 that shows the quantities of domestic waste and recycling that has been reported by local governments in Western Australia for 2006/07.
### Table 2: Tonnages of Domestic Waste and Recycling by Waste Stream Reported by Local Governments 2006/07 (Reference: DEC 2006-07)

As noted above the major increase in MSW diverted from landfill is anticipated to come from the establishment of resource recovery facilities using alternative waste treatment technologies, initially in the metropolitan region and then in the major non metropolitan population centres. Resource recovery is more than just green waste and recyclables. It might include activity such as:

- **Recyclables** – typically bottles, cans, paper, and cardboard that is re constituted back to its base material and then often blended with virgin materials and made back into the same or similar product.

- **Re-processables** – materials that can be converted into virgin material for use in construction, agriculture, or manufacturing; e.g. concrete rubble being turned into aggregate for making new concrete.

- **Re-directables** – material that simply requires separation prior to being reusable; e.g. soil and clean fill.

- **Re-Usables** – materials that can be salvaged and with very little processing (cleaned, minor repairs) can be sold to be re-used for their original or similar use; e.g. timber can be diverted to chipping as a re-processed material, or re-sold and used for a different building purpose.

- **Upcyclables** – are materials that are processed as is into new totally different products for specific markets, at a reduced cost and with reduced energy consumption, e.g. collecting plastic juice drink blister packs that are then welded together and made into carry bags.

### Workforce Development Issues:

The establishment of resource recovery facilities will require employees with new and different skills from those of the current workforce.

International experience (Canada) has demonstrated the shift from landfill to resource recovery has led to significant increases in employment over previous landfill operational levels.
Future Trends

The above analysis indicates that waste generation in Western Australia is likely to increase in the future as a result of increases in population and economic growth. There is also anticipated to be an increase in the proportion of waste that is processed or treated to recover and recycled usable material in the waste, rather than simply burying the waste in landfill facilities. There is likely to be a significant increase in the amount of recycled and processed waste across the three waste categories.

This will result in an increase in the number of waste recycling and processing facilities, some of which will incorporate waste treatment technologies currently not used in Perth. Landfill facilities will continue to be required to play an important part in the industry for waste that is not recycled or processed.

Workforce Development Issue:

Labour demands will increase and that the workforce is likely to require skilling in areas not yet evident as new technologies are adopted by the industry

Regulatory Requirements

The Waste Management Industry in Western Australia is regulated through a number of pieces of legislation and regulations. These include the following:


  The Act enabled the establishment of an independent statutory Waste Authority responsible for waste strategic policy and planning. The Waste Authority has produced a Draft Waste Strategy for the State. Extensive community consultation and workshops have been completed and the feedback is currently being collated by the Waste Authority. It is anticipated that the final version of the Strategy will be adopted during 2010.

- **Environment Protection Act**

  Most waste management facilities are prescribed premises under the Environmental Protection Act due to the nature of the material handled. This means that they need to be assessed for their environmental impacts under Part IV of the Act. They also need Works Approvals for construction and Operating Licences under Part V of the Act.

  These approvals have the potential to significantly influence how the facilities are developed and operated.

- **Occupational Safety and Health Act 1984 (WA) and the Occupational Safety and Health Regulations 1996 (WA)**

  The waste management industry involves a number of occupations that are relatively hazardous, given the collection processes and the nature of the material handled. In the past, prior to the introduction of automated side loading collection trucks, waste collection was undertaken by staff who collected the bins, brought them to the truck and emptied them into the rear loading compactor. This task was particularly dangerous due to the risk for strains in moving the bins and the risk of traffic collisions.
Risks also occur around landfill sites and waste transfer stations due to the delivery of waste by members of the public and external waste delivery contractors.

The introduction of recycling and resource recovery has introduced additional potential safety and health risks into the industry. These relate to the separation and treatment processes adopted for some of the waste and are a consequence of the nature of the waste material.

The Waste Management Association of Australia (WA Branch) has prepared a *Guideline for Managing Workplace Health and Safety in the Waste Management and Recycling Industries in WA* to assist in managing these occupational risks.

- **Carbon Pollution Reduction Scheme**

  The industry is also likely to be impacted by any carbon trading legislation that might be adopted by the federal Parliament, such as the currently drafted Carbon Pollution Reduction Scheme. The cost of landfilling of waste would increase, making recycling and resource recovery more attractive.

**Workforce Development Issue:**

*There will continue to be a need to ensure the workforce is trained in matters related to governing legislation*

**Impact of Government Policies/Decisions**

As noted in the above, the waste management industry is regulated in terms of its methods and facilities of operations. This primarily stems from the nature of the waste material dealt with by the industry. The material has the potential to be a hazard to human health and to the environment. Some of the waste management activities also present potential occupational health and safety hazards. In particular, the collection of waste, which often happens on roadways and trafficked areas, and the manual separation of waste, which often forms part of waste processing systems, can present health and safety risks. These areas are being increasingly regulated to help control the risks.

The manner in which waste is collected is affected by the degree of separation required of waste into different sub streams. Most households and many businesses have two types of rubbish bin – one for recycling and one for general waste. Some local governments provide their residents with a third bin for green waste. Therefore collection of waste is influenced by the need to separate waste for recycling and processing.

The current costs of waste management services are such that it is cheaper to collect waste in one bin and dispose of it to landfill. Additional costs are incurred to recycle waste. The public has shown a willingness to pay more for their waste management services if they get a more sustainable type of service (ie recycling). Increasingly, though, governments are regulating to increase the level of recycling and processing.

The type of waste management services that operate in a particular precinct, is largely driven by the government policies that are in operation. These policies are normally influenced by the conditions and constraints that exist in the area.
For example, in Japan, where there is very limited land available for landfill facilities, there are policies that encourage the incineration of waste that would otherwise go to landfill. As a consequence, there are 1300 waste incinerators in Japan. The industrial base of the Japanese economy, with few nature resources to support those industries, means that recycling and reprocessing of waste is undertaken to a high degree. The policies encouraging the conversion of the waste to energy is influenced by the lack of domestic energy supplies in Japan.

A similar story exists in Europe, where the European Union has extensive waste management policies which address the circumstances in Europe.

The development of waste management policies in Western Australia is at an early stage and the first State Waste Strategy is currently being developed, and is in a draft form. (May 2010)

The stated aim of the State Waste Strategy is to “move Western Australia to best practice in Waste Management by 2020 and to drive a decade of significant improvement in the management of waste.” (Waste Authority, 2010). The Waste Strategy has specific strategies in the areas of Waste Avoidance, Resource Recovery, Waste Disposal and Data, Monitoring, Reporting and Review.

If finally adopted, the Waste Strategy has the potential to significantly impact on the waste management industry, primarily by promoting the recycling and processing of an increasing amount of waste from the three waste streams.

However it is worth noting that while the Draft State Waste Strategy 2010 makes mention of community education it does not place specific emphasis on development of the workforce or make mention of the skilling requirements of those employed in the industry.

**Workforce Development Issue:**

**Efforts are required to influence the State Waste Strategy to ensure it provides direction on the need for stakeholders to have a skilled workforce capable of implementing the Strategy.**

**Technology Developments**

**Waste Collection**

Most waste is collected using waste bins or skips (depending upon the quantity of waste being collected from one location) and transported to the disposal or treatment facility using specially design refuse trucks.

Most MSW is collected using 240 litre MGBs, and are collected using side loading compaction trucks, operated by a driver only. This occurs where the bins can be placed near to the side of the road and can be accessed by the collection trucks mechanical lifting device that is operated by the truck driver. Where this is not possible due to traffic congestion, lack of roadside space or the number of bins at a location (e.g. multi unit development), an assistant accompanies the driver to position the bins for emptying, or to empty them into the rear of a rear loading truck.
C&I waste is mostly collected using skip bins of varying sizes or 240 litre MGBs depending upon the quantity of waste generated at the location. If skips are used, then front loading trucks are used for collection of the waste. MGBs are serviced in a similar manner to MSW.

C&D waste is often collected from construction and demolition sites using tip trucks that have been loaded by front end loaders or bobcat loaders. Skips are also used, together with front loading collection trucks, particularly from building sites.

Separation of C&I waste and C&D waste at their source, is necessary for these wastes to be recycled. There is limited capacity in Western Australia to separate these wastes once they have been mixed.

**Waste Processing**

Processing of MSW occurs in material recovery facilities, which separate comingled domestic recycling material into its component fractions, in preparation for sale to market, and in resource recovery facilities, which separate and process the waste to recover usable materials such as composted organic waste and energy.

Only biological technologies are currently being used for resource recovery facilities in Western Australia. These produce recycled packaging and compost. Thermal processes, which also produce energy, are used in other parts of the world, and are currently being considered for use in Western Australia.

Recycling of C&I waste generally only occurs when the waste has been separated into clean fractions, such as metals or paper/cardboard, at source. This separated material is then delivered directly to the market.

Very little recycled material from MSW and C&I waste, other than organic waste, is reused in Western Australia, with most transported interstate or overseas to be used. Recycled organic waste from both of these waste streams is normally utilised close to the site of processing.

C&D waste is processed at recycling facilities that focus on recovering metals for sale, timbers for shredding and concrete, sand and bricks for screening and/or crushing for resale to the local construction industry.

**Waste Disposal**

Waste that is not recycled or recovered for other uses is disposed to landfill facilities. MSW and C&I waste is mostly disposed at suitably designed landfills, capable of containing leachates that are generated, and capturing landfill gas. Leachate and landfill gas are both produced as the organic waste in the landfill breaks down. The gas is either flared or used as a fuel to generate electricity.

C&D waste is mostly disposed at inert landfills, which are often disused quarries.

**Workforce Development Issue:**

The adoption of new technologies in waste collection, processing and disposal will impact on labour demand and skilling needs of the workforce.
Economic Drivers

The economic drivers for the waste industry, as demonstrated above will be growth in the:

- State’s population (MSW),
- general economic activity in the State (C&I waste), and
- building and construction industry (C&D waste).

In addition to these, the move to increased recycling and processing waste is being driven by emerging government policies, as expressed through the State Waster Strategy (currently in draft form). Community support for recycling and an increasing awareness about the link between waste management and the environment have helped drive the move in this direction to date, and the adoption of the new policies that are emerging.

Size of the Industry – contribution to the State Economy

The size of the waste management industry and its contribution to the WA state economy has been estimated as $620,000,000 annually as is shown in Table 3.

<table>
<thead>
<tr>
<th>Annual Turnover</th>
<th>MSW</th>
<th>C&amp;D Waste</th>
<th>C&amp;I Waste</th>
<th>Total</th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>$145,000,000</td>
<td>$70,000,000</td>
<td>$325,000,000</td>
<td>$540,000,000</td>
</tr>
<tr>
<td>Non Metro</td>
<td>$45,000,000</td>
<td>**</td>
<td>$35,000,000</td>
<td>$80,000,000</td>
</tr>
<tr>
<td>Total</td>
<td>$190,000,000</td>
<td>$70,000,000</td>
<td>$360,000,000</td>
<td>$620,000,000</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Employees</th>
<th></th>
<th></th>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Metro</td>
<td>650</td>
<td>100</td>
<td>190</td>
<td>940</td>
</tr>
<tr>
<td>Non Metro</td>
<td>130 **</td>
<td>20</td>
<td>150</td>
<td></td>
</tr>
<tr>
<td>Total</td>
<td>780</td>
<td>100</td>
<td>210</td>
<td>1090</td>
</tr>
</tbody>
</table>

** Part of MSW service

Table 3 Estimated Waste Industry Annual Turnover and number of employees

Please see Appendix 1: Waste Industry Annual Value and Direct Employment Estimates for an overview of how these estimates were derived.

Social Impact

Waste management is a service generally provided by Local Government that impacts on most people in the community. Almost all households and businesses have some interaction with waste management on at least a weekly basis. There is also a relatively high community awareness of the importance of, and potential environmental impacts of waste management services. Waste is seen as a negative consequence of our society’s consumerism. It also is a “touch point” between the community and general environmental awareness, or concerns about specific environmental issues.
This is illustrated by the very high level of community support for the domestic waste recycling service. Recycling provides all members of the population with the opportunity to be actively involved in an “environmental” issue.

There is increasing support within the community for broader waste minimisation and processing initiatives, building on the support for domestic recycling. This is helping to drive the increase in these areas as reported above.

Traditionally, waste management was seen as a public health issue and legislative requirements reflected this, when it was controlled through the Health Act. It then became recognised as an environmental issue, and was controlled through the number of pieces of legislation, including the Environment Protection Act. The recent adoption of the WARR Act reflects an even broader view of waste, with it seen as part of the “consumption” processes in our society. Waste management initiatives are increasing seen as issues involving behavioural change within the community and within industry. This is illustrated by strategies such as increased separation of waste in households (more bins per household), and extended producer responsibility which involves a requirement for the producer of goods to recycle at least part of the goods that they produce.

**Demographics and Qualification profile of the Workforce**


The Employment Outlook noted above indicates that the utilities industries of Electricity, Gas, Water and Waste Services is the smallest employing industry in Australia (of a total of 19 industries), It indicates that the utilities industries employed 126 700 people (or 1.2 per cent of the total national workforce) as at February 2010.

This outlook recognises eight subsectors in which the waste industry is noted as follows:

- Waste Collection Services - the second largest employing sector nationally (16 900 or 17.7 per cent)
- Waste Treatment, Disposal and Remediation - the fourth largest employing sector nationally (12,900 or 10.2 per cent)

Estimates of employment in the waste industry in WA are in the order of 1,100 (Appendix 1 – John King) however these estimates do not include all those employed by the private sector.

In taking the national figures quoted by DEEWR (based on ABS data) it is an accepted norm to assume WA employment figures are approximately 10% of national total. This indicates that there would be approximately 3000 individuals across the State employed in the Waste sector in some way.

DEEWR prepares annual updates of employment projections for industries for the next five years. It predicts that in the years to 2014-15 employment in the utilities sectors including Waste Services is expected to increase to an average rate of 2.4% per annum. Waste treatment disposal remediation is projected to have the strongest employment growth of each of the utilities sectors where it is predicted that it will be up by 3.2% per annum.
**Workforce Ageing**

The Utilities sectors including the Waste Services Industry have an older than average workforce relative to all other industries DEEWR indicates that 44% of all workers in this sector were over 45 years of age in 2009.

**Employment by Gender**

The Waste Services Industry predominantly employs male full time workers (73.8% of all those employed nationally). Female employment, both full and part time is well below the average for all industries.

**Educational Profile**

DEEWR indicates that the Utilities industry employees generally have a high education profile. This due in part to the high number of professional, administration and trade occupations employed by the other utilities sectors of Electricity, Gas and Water.

However it is also recognised that the utilities sector generally plays a significant role in providing employment opportunities for low skilled workers. This particularly the case in the waste sector and it is worth noting that the highest occupational employment category for all the utilities sectors combined is “Truck Driver”.

It is also worth noting that the survey of the waste industry indicates that very little nationally recognised training is accessed by the industry in WA and that the sector does not have a training culture for plant and process operators based on the attainment of qualifications.

**Workforce Development Issues:**

**Accurate data of employment numbers are difficult to obtain and those that are available are somewhat unreliable.**

**The ageing workforce and potential future retirements will require the industry to consider the means by which it will skill it’s future employees.**

**The gender inequity in employment numbers indicates employment opportunities for women in the industry need to be explored.**

**2.2 Labour and Skill Needs**

The waste industry in Western Australia employs relatively small numbers of people and no data was sourced that could provide an accurate indication of employment by occupational category on a WA state basis.

However as noted previously, the industry is predicted to grow by 2.4% per annum as a result of growth in the following economic drivers:

- State’s population,
- General economic activity in the State; and
- Building and construction industry.

It was determined through the industry research and survey that the predicted future critical job roles for the waste industry include occupations such as:
ANZSCO Unit Group and Occupation

7331 Truck Drivers (Waste Collection Truck Drivers)
7219 Mobile Plant Operators (Landfill)
3992 Operators (Waste Recovery Facilities)
1335 Production Managers (Waste Manager of Waste Recovery Facility)
2343 Environmental Scientist
2335 Mechanical Engineer or Operations Engineer
2332 Construction Engineer
3232 Plant Fitter
3411 Electrician / Instrumentation Fitter

In addition to which, the move to increased recycling and processing of waste is being driven by emerging government policies which is influencing the adoption of new technologies and work systems. New and emerging job roles that are predicted to eventuate as a result of the implementation of government policies and the move towards “zero waste” include:

Waste Collection
- Waste Trackers
- Waste Education Officers
- Waste Auditors
- Roaming Educational Officers
- Recyclers / Sorters
- Customer Service staff

Waste Treatment
- Customer Service staff
- Waste Treatment Plant Operators
- Waste Treatment Plant Mechanics / Fitter
- Waste Treatment Store person
- Transport Drivers
- Environmental Scientists and Engineers specializing in Waste Treatment processes

Respondents to the industry survey (see Attachment 1 - Waste Industry Survey Report) stated that the current waste management related training needs required for depot truck drivers and supervisors is as follows:

- HR Licensing
- Mobile Plant Operations (WorkSafe licensing)
- First Aid
- Defensive Driver Training
- Frontline Management
- Customer Service (Handling Difficult People)

Other urgent training needs identified includes:

- Occupational, Health and Safety
- Research and Development
- Project Management
- Alternative Waste Treatments and
- Welding
2.3 Issues, Barriers and Opportunities

The most significant future pressures impacting on the waste industry in Western Australia were identified as follows:

1) Increasing costs to handle waste
2) Recycling
3) Legislative requirements
4) Attracting and retaining staff (at depot level)

EUPA consulted widely and undertook an industry survey to identify labour and skilling issues, as well barriers to employment and training as well as potential opportunities related to the above. The findings are listed below.

- Government policy and growing community awareness is emphasising the need for a clean, green environment premised on effective waste management practices, however these policies are not being translated into effective workforce development strategies.

- A distinct gulf in employee qualification requirements exists within the sector where there is a strongly held perception across the industry that operators are not required to hold any form of waste management qualifications.

- Industry is expecting to lose “Drivers” and “Mobile Plant Operators” to the resources sector as was the case in the last resources boom. Comments were made that waste collection truck driver jobs were not attractive to younger workers where there was no career path and often these individuals were lured away by an offer of higher wages from the mining companies. No career path with a structure based on the attainment of relevant qualifications exist at the operator / pre-supervisory level.

- The predominantly ageing workforce (outdoor) is not particularly interested in the achievement of waste industry related qualifications

- Industry has identified that recycling, waste treatment and waste reduction will be the major priority areas for skilling in the foreseeable future.

- The skilling needs of the waste sector are changing insomuch as the waste to energy initiatives are now impacting on the industry.

Barriers to Employment and Training

In seeking industry feedback on these impacts respondents to the industry survey identified the following as potential barriers to employment and training:

- There is lack of a training culture or commitment to nationally recognised training within all sectors of the industry.
There is an industry wide lack of awareness of what nationally recognised training opportunities are available and very little nationally recognised vocational education and training (VET) is accessed by the industry.

Many commentators were not aware of the publicly funded training opportunities available to the industry in the form of User Choice funding (Traineeships) or Productivity Places Program funding (PPP).

The cost of training is seen as prohibitive especially so to regionally based organisations and regional organisations have a preference for training to be available locally.

It is expected the Resource projects will again attract workers from the sector to undertake either waste management activities as part of the project or as labour for other roles such as mobile plant operations or truck drivers.

At the depot and operator level, individuals entering the industry are only required to hold a Heavy Rigid truck driver’s licence and any further informal training in waste collection, handling and recycling is provided on-the-job.

Where training is accessed to provide for a licensed operator outcome it is generally sourced from Registered Training Organisations (RTOs) from other industry sectors such as Transport & Logistics or Building and Construction for Plant Operator tickets.

While most of the professional and trade occupations required by the industry are included on the new “Skilled Occupation List” (Department of Immigration and Citizenship May 2010), those occupations predicted to be in demand such as plant operations, drivers and waste processing/recycling are not on the “list”. Therefore skilled migration for these occupations may not be a recruitment option.

**Potential Opportunities**

The soon to be released State Waste Strategy (Draft May 2010) places a strong emphasis on community education yet the draft strategy does not comment on the skills and capabilities of the workforce required to implement the Strategy.

Job roles are changing due to environmental pressures and government policy, with the likelihood that demands for new qualifications and skills sets will evolve for employees in areas such as recycling, landfill and waste to energy initiatives.

As much of the current training delivery in the waste sector is not nationally recognised, the industry is not accessing publicly funded training opportunities through the utilisation of traineeships, apprenticeships or cadetships.

No examples of skills recognition strategies were identified in the conduct of the industry survey. That is, there is no national recognition achieved for any of the informal training undertaken and little opportunity is provided to complete training as part of a workforce development strategy.
RTOs operating in the Waste Sector have not yet developed flexible delivery strategies to service training demand from regional areas, e.g. blended learning, on-the-job existing worker traineeships etc.

3 ACTION PLAN

The following pages detail proposed strategies and timeline to address the issues related to the workforce development needs of the industry. They are discussed under the following headings:

- Labour market and supply
- Workforce participation
- Planning and coordination
- Attraction and retention
- Training and productivity
3.1 Labour market and supply

Workforce Development drivers related to “Labour Market and Supply” relevant to the waste industry in Western Australia include:

- Industry growth in the Waste sector is greater than all other sectors (DEEWR)
- International experience has demonstrated the shift from landfill to resource recovery has led to significant increases in employment over previous landfill operational levels.
- Population growth leading to increases in waste quantities will lead to growth in employment especially in the areas of waste collection and transport.
- The adoption of new technologies in waste collection, processing and disposal will impact on labour demand and skilling needs of the workforce.
- The establishment of resource recovery facilities will require employees with new and different skills from those of the current workforce.
- Predicted loss of workers to the mining and energy resource projects over the short to medium term. Specifically in occupations the industry currently considers low or semi-skilled, such as:
  - Truck drivers
  - Mobile Plant Operators
  - Process Plant Operators
- While most of the professional and trade occupations required by the industry are included on the new “Skilled Occupation List” those occupations predicted to be in demand such as plant operators, drivers and waste processing/recycling operatives are not on the “list”. Therefore skilled migration for these occupations may not be a recruitment option.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Strategy</th>
<th>Measures of Success</th>
</tr>
</thead>
</table>
| 6-12 months    | Ensure the industry needs for increased numbers of Truck Drivers and Mobile Plant Operators is communicated to those sectors that train for these occupational groups. Work with industry, particularly the WMAA, WALGA and Local Government agencies to formulate retention strategies aimed at offsetting the predicted impact of competition for labour from other industry sectors. (see 3.4) | Communicate the waste industry’s needs to those Training Councils where workforce and skilling needs overlap e.g.:
  - Logistics - (HV licensing) to ensure there is a sufficient supply of licensed drivers.
  - Construction - having responsibility for mobile plant operators.
  - Local government agencies seek advice and assistance from EUPA in the formulation and implementation of labour retention strategies. |
| 1-3 years      | Research the impact adoption of new technologies in waste collection, processing and disposal will have on future labour demand and skilling needs of the workforce. | Future iterations of this Workforce Development Plan include information on the impact of the adoption of new technologies. |
3.1 Continued

<table>
<thead>
<tr>
<th>3-5 years</th>
<th>Influence the State Skills Migration Strategy to ensure emphasis is placed on the professional and trade occupations relevant to the industry.</th>
<th>The State Skills Migration Strategy and occupations in demand lists include those professional and trade occupations requirement by the industry.</th>
</tr>
</thead>
<tbody>
<tr>
<td>3-5 years</td>
<td>Continue to work with industry stakeholders to identify future labour and skilling demands not yet evident as new technologies are adopted.</td>
<td>Future workforce profiles reflect new occupations such as Waste Tracking, Waste Auditing and Roaming Education Officers.</td>
</tr>
</tbody>
</table>

3.2 Workforce participation

Workforce development drivers related to “Workforce Participation” relevant to the waste industry in Western Australia include:

- The ageing workforce and potential future retirements will require the industry to consider the means by which it will replenish its’ workforce (44% of all workers over the age of 45 years).
- The gender inequity in employment numbers indicates employment opportunities for women in the industry need to be explored.
- Employment issues such as pay and conditions especially for those in low or semi-skilled occupations will need to be addressed.
- The lack of a training culture within the industry

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Strategy</th>
<th>Measures of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12 months</td>
<td>Work with the industry associations (WMAA and WALGA) to build awareness of employment opportunities in the industry</td>
<td>Production of a Career Advisory resource suitable for use with school leavers and career changers</td>
</tr>
<tr>
<td>1-3 years</td>
<td>Promote the employment of underrepresented groups to industry</td>
<td>Identification of job roles that could be modified to make employment in the industry more attractive to women</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Initiatives established for the training and employment (traineeships) of underrepresented groups specifically targeting women and indigenous people.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Increase the participation of women in non-traditional job roles such as truck drivers and mobile plant operators</td>
</tr>
<tr>
<td>3-5 years</td>
<td>Work within the industry associations to establish a career structure for “waste employees” based on the acquisition of skills and qualifications.</td>
<td>Increased uptake of nationally recognised training by the industry.</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Job advertisements specify nationally recognised qualifications.</td>
</tr>
</tbody>
</table>
### 3.3 Planning and coordination

Workforce development drivers related to “Planning and Coordination” relevant to the waste industry in Western Australia include:

- Efforts are required to influence the State Waste Strategy to ensure it provides direction on the need for stakeholders to have a skilled workforce capable of implementing the Strategy.
- There will continue to be a need to ensure the workforce is trained in matters related to the implementation of governing legislation.
- Accurate data of employment numbers are difficult to obtain and those that are available are somewhat unreliable.
- Government policy and changes to community attitudes related to collection and processing of waste.
- Adoption of various waste processing technologies i.e. resource recovery and waste to energy initiatives.
- Competition from other industry sectors for labour in trade and professional occupations such as:
  - Electricians, Mechanical Fitters
  - Environmental Scientists
  - Engineers

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Strategy</th>
<th>Measures of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12 months</td>
<td>Influence the State Waste Strategy to ensure it provides direction on the need for stakeholders to have a skilled workforce capable of implementing the Strategy. Increase the Training Council profile in industry beyond that of the WMAA and WALGA, so that relationships are also established with private waste treatment organisations.</td>
<td>Future editions of the State Waste Strategy include reference to skilling needs of the workforce. Training providers ensure the workforce is trained in matters related to governing legislation. The number of waste industry stakeholders that provide input to EUPA is increased.</td>
</tr>
<tr>
<td>1-3 years</td>
<td>Prepare industry for the introduction of emerging occupations of Waste Tracking, Waste Auditing and Roaming Education Officers</td>
<td>Development of an industry occupational profile based on nationally recognised competencies, skills sets and qualifications. The establishment of a skills set and/or qualifications for these emerging job roles for inclusion in the PRM Asset Maintenance national training package.</td>
</tr>
<tr>
<td>3-5 years</td>
<td>Obtain accurate data of employment numbers in the sector specifically related to Western Australia.</td>
<td>Production of a profile of the industry based on reliable data sources.</td>
</tr>
</tbody>
</table>
### 3.4 Attraction and retention

Workforce development drivers related to “Attraction and Retention” relevant to the waste industry in Western Australia include:

- The ageing workforce and potential future occupational requirements will require the industry to consider the means by which it will skill its’ future employees.
- The less than glamorous image of the waste industry as a career choice for school leavers.
- The gender inequity in employment numbers indicates employment opportunities for women in the industry need to be explored.
- Employment issues such as pay and conditions especially for those in low or semi-skilled occupations.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Strategy</th>
<th>Measures of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12 months</td>
<td>Careers and employment opportunities in the waste sector are promoted.</td>
<td>Production of career advisory materials suitable for those seeking employment in the sector.</td>
</tr>
<tr>
<td></td>
<td>Engage employment service providers in the promotion of the industry to potential employees</td>
<td></td>
</tr>
<tr>
<td>1-3 years</td>
<td>Work with “waste enterprises” to develop attraction and retention strategies relevant to their workforce needs, such as:</td>
<td>Examples of possible attraction and retention strategies are developed and promoted to industry.</td>
</tr>
<tr>
<td></td>
<td>- Offering flexible employment arrangements</td>
<td>The number of waste enterprises seeking assistance</td>
</tr>
<tr>
<td></td>
<td>- Creating a family friendly workplace</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Provision of a reward and recognition program</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Permanent employment rather than part-time or contract positions</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Succession planning</td>
<td></td>
</tr>
<tr>
<td></td>
<td>- Phasing employees from work to retirement</td>
<td></td>
</tr>
<tr>
<td>3-5 years</td>
<td>Work with waste enterprises to undertake job / role redesign to make the industry more attractive as an employer</td>
<td>The number of waste enterprises seeking assistance</td>
</tr>
</tbody>
</table>
3.5 Training and productivity

Workforce development drivers related to “Training and Productivity” relevant to the waste industry in Western Australia include:

- There is lack of a training culture or commitment to nationally recognised training within all sectors of the industry.
- There is an industry wide lack of awareness of what nationally recognised training opportunities are available and very little nationally recognised vocational education and training (VET) is accessed by the industry.
- Many commentators were not aware of the publicly funded training opportunities available to the industry in the form of User Choice funding (Traineeships) or Productivity Places Program funding (PPP).
- The cost of training is seen as prohibitive especially to regionally based organisations and regional organisations have a preference for training to be available locally.
- There is only one RTO with scope to deliver nationally recognised Waste Management qualifications in Western Australia.
- There is no uptake of higher level qualifications specifically related to the waste sector as a means of providing first level management qualifications.

<table>
<thead>
<tr>
<th>Timeline</th>
<th>Strategy</th>
<th>Measures of Success</th>
</tr>
</thead>
<tbody>
<tr>
<td>6-12 months</td>
<td>Communicate nationally recognized training developments to the existing stakeholders in metropolitan and regional areas of opportunities and developments within the nationally recognised training framework. Build industry awareness of available publicly funded training opportunities. Seek the introduction of an existing worker traineeship for the industry.</td>
<td>The number of waste organisations engaging in national training arrangements is increased. Waste organisations are taking advantage of publicly funded training opportunities. The numbers of those involved in waste management traineeships is increased.</td>
</tr>
<tr>
<td>1-3 years</td>
<td>Increase the number of RTOs operating in the waste sector. Seek to increase the capacity and capability of Registered Training Organisations (RTOs) to be in a better position to service the industry skilling needs in both the metropolitan and regional areas. Ensure qualifications and skill sets are available to train for the new occupations becoming evident, specifically in recycling, waste treatment and waste reduction.</td>
<td>Additional RTOs scoped to deliver waste related nationally recognised training. Funding support is sourced to assist the RTOs produce resources that will allow for regional access to training services. The National ISC as the developer of the training package includes competencies, skill sets and qualifications in future editions of the training package.</td>
</tr>
</tbody>
</table>
3.5 Continued

<table>
<thead>
<tr>
<th>3-5 years</th>
<th>Exploration and implementation of mechanisms for the provision of skills recognition services to encourage the engagement of the existing workforce in nationally recognised training arrangements</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>An employment framework based on the attainment of nationally recognised qualifications is established.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>3-5 years</th>
<th>Establishment of an industry managed induction program for entry to the industry.</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Development of a unit of competence specifically to reflect the unique skills required to operate waste collection trucks beyond that of an HV licensed truck driver.</td>
</tr>
</tbody>
</table>

4 **THE WAY FORWARD**

It is the role of EUPA Training Council to implement this Workforce Development Plan on behalf of the industry in Western Australia.

EUPA has established an Industry Working Group for this industry sector and it is through this group and its relationship with the Waste Management Association that EUPA is becoming more influential in the industry.

It is intended that EUPA will publish the Plan for circulation to all stakeholders.

The Plan will be updated annually and it will become a blueprint for EUPA’s continuing work in this industry sector.
5 BIBLIOGRAPHY AND REFERENCES


10. *Department of Immigration and Citizenship, Skills Occupation List*, May 2010


Appendix 1: Waste Industry Annual Value and Direct Employment Estimates
**Municipal Solid Waste**

The annual economic turnover and direct employment within the MSW sector of the waste management industry in Western Australia have been estimated. These estimates are detailed below and are based on the following estimated rates. The estimated rates have been calculated using a range of data available to the author, and the author’s experience within the industry.

**Estimated Rates:**
- Properties per truck (all Services) = 2,200
- Properties per drivers = 2,080
- Properties per Supervisor = 18,750

**MSW Collection**

<table>
<thead>
<tr>
<th>Metropolitan Councils</th>
</tr>
</thead>
<tbody>
<tr>
<td>Number of Councils</td>
</tr>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Properties</td>
</tr>
<tr>
<td>Drivers</td>
</tr>
<tr>
<td>Supervisors</td>
</tr>
<tr>
<td>Trucks</td>
</tr>
<tr>
<td>Average Cost/HH/Yr</td>
</tr>
<tr>
<td>Annual Cost</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Non Metro LGAs with KS Recycling</th>
</tr>
</thead>
<tbody>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Properties</td>
</tr>
<tr>
<td>Average Cost/HH/Yr</td>
</tr>
<tr>
<td>Annual Cost</td>
</tr>
<tr>
<td>Drivers</td>
</tr>
<tr>
<td>Supervisors</td>
</tr>
<tr>
<td>Trucks</td>
</tr>
<tr>
<td>Non metro LGAs No KS Recycling</td>
</tr>
<tr>
<td>-------------------------------</td>
</tr>
<tr>
<td>Population</td>
</tr>
<tr>
<td>Properties</td>
</tr>
<tr>
<td><strong>Average Cost/HH/Yr</strong></td>
</tr>
<tr>
<td><strong>Annual Costs</strong></td>
</tr>
<tr>
<td>Drivers</td>
</tr>
<tr>
<td>Supervisors</td>
</tr>
<tr>
<td>Trucks</td>
</tr>
</tbody>
</table>

| Total Annual Costs            | $186,173,960 |

<table>
<thead>
<tr>
<th><strong>Total Staff - Collection</strong></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Drivers - Full time Equivalents</td>
<td>409</td>
</tr>
<tr>
<td>Supervisors (FTE)</td>
<td>43</td>
</tr>
</tbody>
</table>
## MSW Facilities

### Facilities

#### 2006/07

<table>
<thead>
<tr>
<th>Metro Class 2&amp;3</th>
<th>Operator</th>
<th>RC</th>
<th>Estimated Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Red Hill EMRC Waste</td>
<td>EMRC</td>
<td>EMRC</td>
<td>40</td>
</tr>
<tr>
<td>Tamala Park MRC Waste</td>
<td>MRC</td>
<td>MRC</td>
<td>48</td>
</tr>
<tr>
<td>Cardup</td>
<td>WALS</td>
<td>RRC</td>
<td>10</td>
</tr>
<tr>
<td>Hopkinson Road</td>
<td>City of Armadale</td>
<td>RRC</td>
<td>8</td>
</tr>
<tr>
<td>Millar Rd City of Rockingham</td>
<td>City of Rockingham</td>
<td>SMRC</td>
<td>10</td>
</tr>
<tr>
<td>Henderson</td>
<td>Henderson</td>
<td>SMRC</td>
<td>8</td>
</tr>
</tbody>
</table>

**Total** 84

<table>
<thead>
<tr>
<th>Material Recovery Facilities</th>
<th>CR</th>
<th>MRC</th>
<th>SMRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>City of Wanneroo</td>
<td>Wangara</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Baywaste</td>
<td>Bayswater</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>SMRC RRRC</td>
<td>Canning Vale</td>
<td></td>
<td>*</td>
</tr>
<tr>
<td>Perth Engineering</td>
<td>Coogee</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Perth Waste (Bunbury)</td>
<td>Bunbury</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>TPI Cleanaway</td>
<td>Maddington</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Cleanaway/City of Mandurah</td>
<td>Mandurah</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>Visy</td>
<td>Welshpool</td>
<td></td>
<td>10</td>
</tr>
<tr>
<td>AMCOR</td>
<td>Canning Vale</td>
<td></td>
<td>10</td>
</tr>
</tbody>
</table>

**Total** 80

<table>
<thead>
<tr>
<th>Resource Recovery Facilities</th>
<th>CR</th>
<th>RRC</th>
</tr>
</thead>
<tbody>
<tr>
<td>SMRC RRRC</td>
<td>Canning Vale</td>
<td>90</td>
</tr>
<tr>
<td>MRC Neerabup</td>
<td>Neerabup</td>
<td>16</td>
</tr>
<tr>
<td>WMRC Brockway</td>
<td>Brockway</td>
<td>10</td>
</tr>
<tr>
<td>Atlas</td>
<td>Malaga</td>
<td>10</td>
</tr>
</tbody>
</table>

**Total** 126
## Transfer Stations

<table>
<thead>
<tr>
<th>Location</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Balcatta City of Stirling</td>
<td>15</td>
</tr>
<tr>
<td>South Perth</td>
<td>4</td>
</tr>
<tr>
<td>Ranford Road City of Canning</td>
<td>4</td>
</tr>
<tr>
<td>Welshpool Sita</td>
<td>10</td>
</tr>
<tr>
<td><strong>Total</strong></td>
<td><strong>33</strong></td>
</tr>
</tbody>
</table>

| Total MSW related Staff         | 775   |
### Construction and Demolition Waste

<table>
<thead>
<tr>
<th>Class</th>
<th>Annual Tonnes Generated 2006</th>
<th>Disposal and Transport Cost/tonne</th>
<th>Total Annual Cost</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>C&amp;D Waste</strong></td>
<td>2,700,000</td>
<td>$25.00</td>
<td>$67,500,000.00</td>
</tr>
</tbody>
</table>

### Class 1 Landfills

#### 2006/07

<table>
<thead>
<tr>
<th>Class 1 Landfills</th>
<th>RC</th>
<th>EMRC</th>
<th>EMRC Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>Mathieson Road</td>
<td></td>
<td>MRC</td>
<td>8</td>
</tr>
<tr>
<td>Driver Road</td>
<td></td>
<td>MRC</td>
<td>8</td>
</tr>
<tr>
<td>Flynn Drive</td>
<td></td>
<td>MRC</td>
<td>6</td>
</tr>
<tr>
<td>RCG, Quinns Rd</td>
<td></td>
<td>MRC</td>
<td>6</td>
</tr>
<tr>
<td>Atlas - Mirrabooka</td>
<td></td>
<td>MRC</td>
<td>3</td>
</tr>
<tr>
<td>Tims Thickett Mandurah</td>
<td></td>
<td>RRC</td>
<td>3</td>
</tr>
<tr>
<td>Thomas Road (Inert)</td>
<td></td>
<td>SMRC</td>
<td>8</td>
</tr>
<tr>
<td>Abercrombie Rd</td>
<td></td>
<td>SMRC</td>
<td>6</td>
</tr>
<tr>
<td>RCG, Rockingham Rd</td>
<td></td>
<td>SMRC</td>
<td>5</td>
</tr>
<tr>
<td>Moltoni Bibra Lake Landfill</td>
<td></td>
<td>SMRC</td>
<td>3</td>
</tr>
<tr>
<td>Lefroy Road Quarry</td>
<td></td>
<td>SMRC</td>
<td>3</td>
</tr>
<tr>
<td><strong>Total Staff</strong></td>
<td></td>
<td></td>
<td><strong>48</strong></td>
</tr>
</tbody>
</table>
### C&D Waste Recyclers

<table>
<thead>
<tr>
<th>Company</th>
<th>Location</th>
<th>Staff</th>
</tr>
</thead>
<tbody>
<tr>
<td>C&amp;D Recyclers</td>
<td>Hazelmere</td>
<td>6</td>
</tr>
<tr>
<td>Capital Demolition</td>
<td>Bayswater</td>
<td>6</td>
</tr>
<tr>
<td>Instant Waste</td>
<td>Bayswater</td>
<td>6</td>
</tr>
<tr>
<td>EMRC Hazelmere Timber</td>
<td>Hazelmere</td>
<td>6</td>
</tr>
<tr>
<td>Westbins</td>
<td>Malaga</td>
<td>6</td>
</tr>
<tr>
<td>All Earth</td>
<td>Maddinton</td>
<td>6</td>
</tr>
<tr>
<td>Veolia</td>
<td>Jandakot</td>
<td>6</td>
</tr>
<tr>
<td>Waste Stream Management</td>
<td>Welshpool</td>
<td>6</td>
</tr>
<tr>
<td>Total Waste</td>
<td>Welshpool</td>
<td>6</td>
</tr>
</tbody>
</table>

**Total Staff** 54

Note: Assumes collection made by waste generators

### Total C&D related staff

<p>| | |</p>
<table>
<thead>
<tr>
<th></th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Total C&amp;D related staff</td>
<td>102</td>
</tr>
</tbody>
</table>
Commercial and Industrial Waste

<table>
<thead>
<tr>
<th>C&amp;I Waste</th>
<th></th>
</tr>
</thead>
<tbody>
<tr>
<td>Annual Tonnes Generated 2006</td>
<td>1,800,000</td>
</tr>
<tr>
<td>Disposal and Transport Cost/tonne</td>
<td>$200.00</td>
</tr>
<tr>
<td>Total Annual Cost</td>
<td>$360,000,000</td>
</tr>
</tbody>
</table>

Costs

Gate fee (60% of total cost) $120.00

Total cost per tonne $200.00

Recycling

Collection $80.00
Processing $112.50
Total $192.50 Say $200

<table>
<thead>
<tr>
<th>Price per Tonne</th>
<th>Processing cost/t</th>
</tr>
</thead>
<tbody>
<tr>
<td>Steel 35% 200</td>
<td>$70.00</td>
</tr>
<tr>
<td>Cardboard 25% 90</td>
<td>$22.50</td>
</tr>
<tr>
<td>Organics 40% 50</td>
<td>$20.00</td>
</tr>
<tr>
<td>Total</td>
<td>$112.50</td>
</tr>
</tbody>
</table>

(Composition data from Review of Total Recycling Activity in WA, Cardno 2008)

Collection Activities

Staff and Vehicles

Truck and Driver

Average load (tonnes) 11
Average number of loads per day 3
Days per week 5
Annual tonnes per truck and driver 8,580
Total tonnes per annum 1,800,000

Number of trucks and drivers 210

Assumes disposal resources are included in the MSW calculations