WASTE MANAGEMENT STRATEGIC PLAN

2010 - 2015

City of Ipswich

FORWARD

The purpose of this Waste Management Strategic Plan is to provide a framework to ensure waste is managed in a sustainable manner within Ipswich. With the population within Ipswich expected to double in the next twenty years a strategic plan is required for the management of waste which shifts the perception of waste from an unwanted commodity to one of a valuable resource. It is not sustainable for future waste generation to simply increase in line with population growth.

To this end the following Vision has been set for this Waste Management Strategic Plan:

> By 2020 all residents and businesses within Ipswich will make optimum use of our natural resources by minimising the generation of waste and treating any waste produced as a resource rather than a problem.

The key strategies to achieve the vision focus on waste minimisation (waste avoidance, recovery and re-use), resource recovery technologies and solutions.

In 2020 Ipswich will prosper from having waste services and waste management solutions that reflect best value, meet the needs of the community, retain & enhance the environment, enjoy community support and understanding, and support the economy.

The Ipswich community will have a crucial role in assisting to achieve this vision by individually minimising waste generation and making full use of available resource recovery services. There are many avenues for the community to reduce the amount of waste they send to landfill each week from the effective use of their fortnightly kerbside recycling, reducing the purchase of food that gets wasted to home composting and donating good quality goods to charities. The community can also play an advocacy role through their purchasing decisions to encourage manufacturers and suppliers to consider the environmental impacts of their goods and services and reduce unnecessary non recoverable packaging. Consumers need to demand less waste from their purchases throughout the whole lifecycle of their purchase from packaging through to final disposal or resource recovery.

Table of Contents

APPENDICES

List of Figures and Tables

1 INTRODUCTION

This plan has been developed to set a strategic vision for waste management for the five year period 2010 - 2015 and provides a framework for Ipswich City Council to achieve this vision.

The plan identifies key strategic outcomes required to achieve the strategic vision and will be reviewed in three years and then subsequently on a five yearly basis. This timeframe complements the Corporate Planning process. Ipswich City Council's Corporate Plan sets the direction for the five-year period 2007-2012 and is the guiding plan for all Council's activities over that period and beyond. This Waste Management Strategic plan considers the themes and intended outcomes of the Corporate Plan as they relate to waste management issues. The plan specifically aligns with the following Corporate Plan Infrastructure and Services Strategic Priority Strategies:

- IS 6.1 - Residents, visitors, commerce and industry have access to options for managing discarded resources and the beneficial disposal of waste; and
- IS 6.2 - Identify and implement local and regional initiatives to capitalise on the environmental and economic potential of the region's waste.

An action plan has been developed that identifies specific initiatives and provides defined targets, timeframes and performance indicators to achieve the vision and monitor performance with a view to benchmarking and continuous improvement. Performance on action plan targets will be reported to Council on an annual basis.

This Plan was developed by the Ipswich City Council utilizing the principles of the waste management hierarchy to enhance and protect the environmental values in our community, including:

- The life, health and wellbeing of the community;
- The diversity of ecological processes and associated ecosystems; and
- Land use capability, having regard to economic considerations.

Council has undertaken research with major stakeholders to gather a thorough understanding of the issues and future trends of waste generated in the local government area. This gives a better opportunity to evaluate the current management systems and practices, review the options, and plan the strategies to meet the future demands.

2 LEGISLATIVE FRAMEWORK

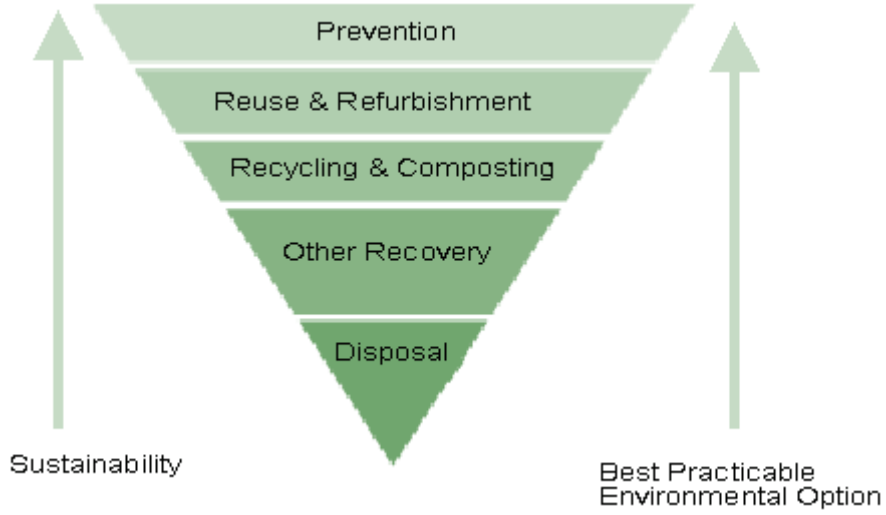
Under the provisions of the Environmental Protection (Waste Management) Policy 2000, Queensland local governments must prepare and adopt a waste management strategic plan. This legislation specifies that in preparing its plan, a local government must have regard to:

(a) current and predicted information about the following matters relating to its area:
    (i) population profiles;
    (ii) residential, industrial and commercial development;
    (iii) waste generation types and amounts; and
(b) the service, markets and facilities relevant to dealing with different types and amounts of waste; and
(c) the waste management hierarchy and principles.

A public consultation process is required to occur prior to finalising and adopting the plan. The plan must be reviewed at least every 5 years.

The State Government is in the process of reviewing its current waste strategy and has released a discussion paper for public comment on this review. Although the new strategy is still in its development stage it does set the framework for the future strategy and indicates that the following principles will underpin a new Queensland waste strategy:

- The waste management hierarchy which encourages the adoption of options for managing waste and specifies the following order of preference for dealing with our wastes:



- Product stewardship whereby:
    i. the producer of a product should plan its design and production to minimise the environmental harm that may be caused by waste generated from the production, proper use or disposal of the product; and
    ii. the importer of a product should take all reasonable steps to minimse the environmental harm that may be caused by waste generated from the importation, proper use or disposal of the product.
- User pays with costs associated with managing and disposing of the waste to be paid by those that generate the waste; and

- The proximity principle which involves finding local markets and solutions for recovered resources to overcome the environmental impacts of transporting commodities for long distances to markets and reprocessors.

The message from the Minister for Sustainability, Climate Change and Innovation at the beginning of this discussion paper indicates that in order to ensure Queensland's sustainable future we need to:

- Minimise the creation of waste;
- Encourage reuse, recycling and recovery of resources;
- Mitigate climate change effects from waste; and
- Make optimum use of our resources.

The Minister also indicates that a more integrated approach is necessary to create strong links between waste avoidance and resource conservation, energy and water efficiency, climate change and planning policies. To secure long-term sustainability we need to shift our thinking towards treating waste as a resource rather than as a problem.

The discussion paper also emphasises that waste management is an important issue because:

- Disposing of waste to landfill depletes resources;
- Landfills have environmental, social and economic costs;
- How waste is managed effects climate change; and
- The way we consume resources needs to be sustainable.

3 ABOUT IPSWICH

3.1 General information

Ipswich is located in South East Queensland (SEQ), adjoining the Brisbane, Lockyer and Fassifern Valleys, and is centrally positioned as a part of the national road network – 40 minutes from Brisbane, an hour from the Gold Coast and 45 minutes from domestic and international air and sea ports. Covering an area of some 1,090 square kilometres, Ipswich has a current population of 157,700 people.

As Queensland's oldest provincial city, Ipswich has a rich history. It is renowned for its architectural, natural and cultural heritage. Ipswich proudly preserves and still operates from many of its historical buildings and homes, with more than 6,000 heritage-listed sites. Ipswich also has a range of charming townships within the western and rural areas of the City, each with its own legitimate claims of historical significance.

Ipswich offers all the modern facilities and attractions of a progressive city. Attractions include the Ipswich Art Gallery, the Workshops Rail Museum, steam trains, wineries, cafes, restaurants, cinemas, shopping centres and more than 500 parks. Ipswich hosts regular national and local festivals and events such as the Ipswich Cup (the City's annual major horse race), Winternationals Drag Races, Queensland 400 V8 Supercars, Ipswich Festival and the Ipswich Show.

The City is well serviced by City Train's Ipswich line which provides a regular and efficient link with Brisbane City and surrounding regions. Translink bus services also operate in the Ipswich Region.

3.2 Community Profile

At the time of the 2001 Census, there were 18,361 overseas born people living in the City of Ipswich representing 14.84% of the total Ipswich City population. This has increased by 5.65% in the ten years to 2001, although the overall proportion has decreased from 15.64% in 1991.

The top five countries of birth for the overseas born population of Ipswich City in 2001 were the United Kingdom (36.12% of the overseas born population), New Zealand (19.40%), Vietnam (4.44%), the Netherlands (3.88%) and Germany (3.35%). Ipswich residents were drawn from 127 different countries of birth in 2001.

7,292 people in Ipswich City were speaking a language other than English at home in 2001, representing 5.89% of the Ipswich City population. The top five languages spoken at home other than English were Samoan (20.44% languages other than English), Vietnamese (16.03%), Spanish (9.13%), Netherlandic (5.49%) and German (4.84%). Of Ipswich City residents who spoke a language other than English at home, most were proficient in English. Generally, at least seven in ten speakers of another language at home reported speaking English very well or well. A total of 74 different languages were spoken in the Ipswich community in 2001.

With only 16.14% of overseas born people in Ipswich City aged under 25 years, the age structure of the overseas born population is significantly older than for Australian born people (42.96%) in Ipswich City. Almost half (47.77%) of the overseas born population in Ipswich City were aged over 45 years, compared to just over a quarter (27.63%) for Australian born people.

Around 60% of the overseas born population of Ipswich City aged 15 years and over were labour force participants (employed/unemployed), similar to proportions recorded for the Australian born population. The unemployment rate for the overseas born population of Ipswich City in 2001 was 8.92%, slightly higher than the Australian born rate of 8.33%.

Intermediate clerical, sales and service workers was the most common occupation type among the overseas born population of Ipswich City in 2001 comprising of 18.19% of employed persons. This was followed by tradespersons and related workers at 15.78%.

The main industry of employment for the overseas born population of Ipswich City in 2001 was manufacturing, which accounted for almost a quarter (23.53%) of employed people. This was followed by health and community services (13.07%) and retail trade (11.58%).

Just over a quarter (27.87%) of the overseas born population in Ipswich City earned less than $200 per week in 2001, while 5.68% earned more than $1,000.

More than two-thirds (67.49%) of the overseas born population of Ipswich City in 2001 were living in their own home. Of these, 46.15% owned their home outright, while the remainder (53.85%) were paying off a mortgage. Almost a third (29.53%) of the overseas born population in Ipswich City were living in a rental dwelling.

3.3 Economic Profile

The following information is taken from the Ipswich City Council report on Current Economic Profile & Future Economic Projections & Scenarios (August 2008).

- Ipswich is growing and is projected to grow faster than the rest of South East Queensland. Since 2006, population in Ipswich has increased by approximately 14,052 to 157,701 persons, with the economy increasing from $4.2 billion to an estimated $4.9 billion gross value added production, an increase of 17.8% in two years. By 2026, the economy is projected to be $12.7 billion with a population of 354,956. Ipswich local government area is expected to be the states fastest growing local government area over the next 25 years, with an annual average growth rate of approximately 4.6% compared to the Queensland's 1.7% per annum.
- Ipswich has a strong base of economic activity, which will grow and expand. There are a number of established developments in Ipswich that provide a significant contribution to employment and economic activity and are expected to continue to do so into the future. Key centres of existing economic activity include, but are not limited to, the office and commercial space in Ipswich Central (CBD), industrial/ manufacturing areas such as the Carole Park and Wulkuraka Industrial Estates and the Dinmore Abattoir, retail precincts such as Ipswich Central (CBD), Riverlink and Orion Springfield, health and education facilities such as the Ipswich Hospital, the University of Queensland (Ipswich campus) and the Southern Queensland TAFE as well as infrastructure such as the Swanbank Power Station, Amberley Air Force Base and recreational precinct of Willowbank Raceway.
- Ipswich will experience significant population and economic growth as large areas of residential and industrial land are developed and released to market. Significant population, employment and regional economic development within Ipswich local government area is likely to be driven by a number of core developments and changes such as the development of Greater Springfield, the expansion of Amberley Air Force Base, the implementation of the Ipswich State Development Area (Ipswich

CBD), and a range of industrial parks such as Carole Park, Citiswich (formerly Bremer Park), Redbank River Park, Swanbank Enterprise Park and Ebenezer Industrial Park. Other developments are also anticipated such as retail developments, residential developments (e.g., Ripley Valley), as well as the expansion of Ipswich Hospital and the University of Queensland Ipswich campus, with many of these developments largely linked to and driven by population demands or growth in economic activity.

- Ipswich has a strong and growing labour force with a trend of increasing participation rate to 2006. Employed persons in Ipswich increased at a faster rate (increasing by 22.8%) than in Southeast Queensland (19.1%) between 2001 and 2006. Labour force participation was slightly lower in Ipswich Local Government Area (LGA) than in Southeast Queensland (66.7%) in 2006.

  The number of employed persons in Ipswich LGA increased at a faster rate between 2001 and 2006 (22.8% to 62,786 persons) than in Southeast Queensland (19.1%). At the same time, Ipswich's unemployment rate fell 3.3 percentage points to 5.1% in 2006, which was below the decline recorded in Southeast Queensland (-3.7 percentage points to 4.7).

  Ipswich local government area is characterised by a high level of blue collar workers residing in the region, with a considerably higher proportion of workers compared to Southeast Queensland in the occupations of:
  - Tradespersons and related workers (15.9% compared to 12.7%);
  - Labourers and related workers (13.0% compared to 8.6%); and
  - Intermediate production and transport workers (11.9% compared to 7.9%).

- Significant population growth is anticipated to be driven by employment generation as well as the development and release of large residential areas to meet housing demand spill over from Southeast Queensland. Population projections indicate that the Ipswich between 2008 and 2026 is expected to grow by 4.6% per annum to approximately 354,956 people in 2026. This is compared to approximately 1.7% per annum growth for Queensland. Population growth is expected to be driven by significant employment growth in Ipswich local government area over the next 18 years as well as the development of a number of large residential precincts such as the Greater Springfield and Ripley Valley developments.

- Over the next 18 years to 2026 the composition of Ipswich LGA's population is expected to shift towards older age groups. The most pronounced change – in terms of share of total population – is projected to occur in the 0-14, 65-74 and 75-84 age groups. The share of the 0-14 age group is projected to almost halve from 23.8% in 2006 to approximately 12.0% in 2026 while for the 65-74 and 75-84 age groups are projected to almost double in share. These changes have implications in terms of the provision of aged care related services due to the significant growth in the older age groups (65 years and over).

- In the period between 2008 and 2026, the total number of employment in the Ipswich local government area is expected to increase by 153.1% or 79,282 jobs. Between 2008-2026 the sectors exhibiting the most growth (in percentage terms) are projected to be cultural and recreational services (9.5% per annum), wholesale trade (9.4% per annum), accommodation, cafes & restaurants (8.5% per annum), personal & other services (7.1% per annum) and manufacturing (6.0% per annum).

- The major contributors to the significant employment growth in Ipswich are the manufacturing, retail trade, property and business services and health and community services sectors. The strong growth demonstrated by the manufacturing, wholesale, transport & storage sectors relates to the strengths of the Ipswich economy and the abundance of available industrial land in Ipswich compared to SEQ. This growth is further supported by other developments such as the projected growth at Amberley Air Force Base. Strong growth in the retail, accommodation, cafes & restaurants, health & community services and cultural & recreational services sectors is a function of the strong business and population growth in the region.
- The manufacturing sector is anticipated to lead economic growth contributing an additional $2.0 billion in gross value added (GVA) production between 2007-08 and 2025-26. This is expected to be primarily driven by an increase of approximately $2.0 billion in GVA from the manufacturing industry, as Ipswich is projected to attract a large share of high value manufacturing industry development over the projection period in line with industry trends.

  Other key sectors of growth in GVA are projected to include:
  - Wholesale trade ($206.7 million to $1.0 billion);
  - Transport and storage ($373.0 million to $1.0 billion);
  - Retail trade ($619.6 million to $1.4 billion); and
  - Property and business services ($451.9 million to $1.1 billion).
- There are a number of strategic assets that can be leveraged to assist in the development and delivery of opportunities for economic development in the Ipswich and SEQ region. These key characteristics include:
  - Abundance of industrial & residential land;
  - Springfield Parkland and Ipswich CBD;
  - Swanbank Power Station and Swanbank Enterprise Park;
  - Amberley Air Force Base;
  - Proximity to Brisbane & available infrastructure;
  - Existing industry base; and
  - Education assets (University & TAFE).

4 KEY TRENDS AND DRIVERS FOR IPSWICH

A number of external factors and trends in the broader socio-economic environment are likely to have a significant impact on Ipswich City Council and its constituents in the coming years.

4.1 Population Growth

Ipswich is expected to have an annual population growth rate of over 4% over the next twenty years as new families move to the area for employment and a sustainable lifestyle. Within this timeframe most of this growth is expected in the eastern area of the City as the new developments of Springfield (50,000) and Ripley Valley (110,000) are constructed. Projected population figures by the Queensland Department of Infrastructure and Planning are as follows:

Current population	157,701
2026 population	350,333

The ultimate population for the city has been projected to 676,000.

This growth will exert considerable pressure on Council in terms of upgrading existing infrastructure, and providing new infrastructure in areas such as transport, utilities and government services. Governments at all levels are under pressure to fund infrastructure development in a responsible manner, whilst providing ongoing products and services. This will require organisations to explore flexible delivery models such as Public/Private Partnerships, transforming the organisation, as well as exploring opportunities to amalgamate service delivery.

This growth however, will provide Council with opportunities to attract new business and industries to the area, support the enhancement of existing industry such as the development of Amberley as a Super Base and an aeronautical hub, as well as exploit the tourist potential provided by the large population in the surrounding SEQ region.

A growing lack of available land in areas of SEQ (outside Ipswich) for larger scale industry and residential development will also provide opportunities for the Ipswich region.

4.2 Changing Demographics

The demographics of the region is likely to change significantly over the coming years through two unrelated events. The first event is the aging baby boomer generation who will start to reach retirement age in increasing numbers. This ageing population will impact upon the level and type of services to be provided to constituents.

By contrast the provision of affordable housing and an attractive lifestyle combined with good employment opportunities is likely to lead to an influx of younger people and families into the region.

4.3 Technology

Since the 1980s the world has witnessed rapid growth and change in all forms of technology including new computer products and services, growth of the Internet, greater computing power, more mobile computing and the growth of nanotechnology. This has lead to many changes in the way we work and play.

Technology will continue to change and grow at an ever-increasing pace in the coming decades, impacting the way our citizens go about their daily lives, changing the way Council interacts with its citizens, placing greater demands on Council to deliver new and existing services in different ways as well as changing the way Council staff do their jobs.

4.4 Climate Change

There seems to be a growing body of scientific evidence to suggest our world is likely to be subject to climate change in the coming decades. This phenomenon is likely to have an impact on needs such as drought proofing the region, ensuring there is adequate water available for our urban and agricultural areas as well as protecting the citizens and their property against increasingly extreme weather events.

Human activity has been shown to have a direct impact on the progress of climate change. This recognition has lead to substantial work within all levels of government to implement policies and legislation to mandate a reduction in the generation of greenhouse gases. A range of initiatives are being explored and implemented such as carbon trading schemes, landfill levies, Extended Producer Responsibility and Product Stewardship schemes.

4.5 Global Economic Crisis

There is currently a worldwide economic downturn which is expected to also impact on the Ipswich region. A slight downturn in population growth has been noted throughout Ipswich over the past two years and may to continue to slow. The growth in housing commencements has also slowed. The economic downturn has had a significant impact on recycling and resource recovery operations with markets falling drastically resulting in a significant loss in financial returns for recovered materials. In some cases it is not viable to trade some commodities at the present time.

It is currently not known to what extent the global economic crisis will have on the key trends that were discussed above. As previously discussed the Ipswich economy has some distinguishing factors that may reduce the potential impacts of the economic crisis compared to other local government areas throughout Queensland. Future reviews of this waste management strategic plan will incorporate any impacts that do result from the economic crisis.

4.6 Waste Management Impacts from Key Drivers & Trends

The above key drivers & trends have a direct impact on the type of waste management infrastructure and services that are required for the community. Strategic long term planning for waste management infrastructure and services is required to meet the challenges of population growth, changing demographics and the expected activity in the construction and allied sectors.

With the aging population a per capita decrease in waste generation will occur. In terms of service delivery, an increase in age cared and over 50's residential complexes is expected but a high proportion of the aging population will choose to stay in their homes requiring specialised help along with a possible redesign of the current service delivery (for example smaller bins etc.).

Quality waste education and cleaner production programs will be critical in ensuring that unsustainable waste generation does not increase at the same rate as the residential and business growth within Ipswich.

Sustainable waste management practices will be also critical as our society accepts our contribution to climate change and implements strategies to reduce greenhouse gas emissions. The release of methane gas from landfill decomposition processes will need to be minimised by using waste management options other than landfilling where possible, diverting green and organic wastes from landfill and operating best practice landfilling technologies that capture landfill emissions for use as an alternate energy source.

5 WASTE PROFILE

5.1 Domestic Waste volumes

Ipswich City Council provides residents with a weekly 240 litre mobile garbage bin (MGB) refuse service and a fortnightly 240 litre MGB. This service is provided to approximately 56,966 properties. Council's current policy is that all properties of smaller than 8 Hectares must have a kerbside refuse and recycling collection service. The number of properties within Ipswich that are not provided with a domestic kerbside refuse & recycling service is unknown.

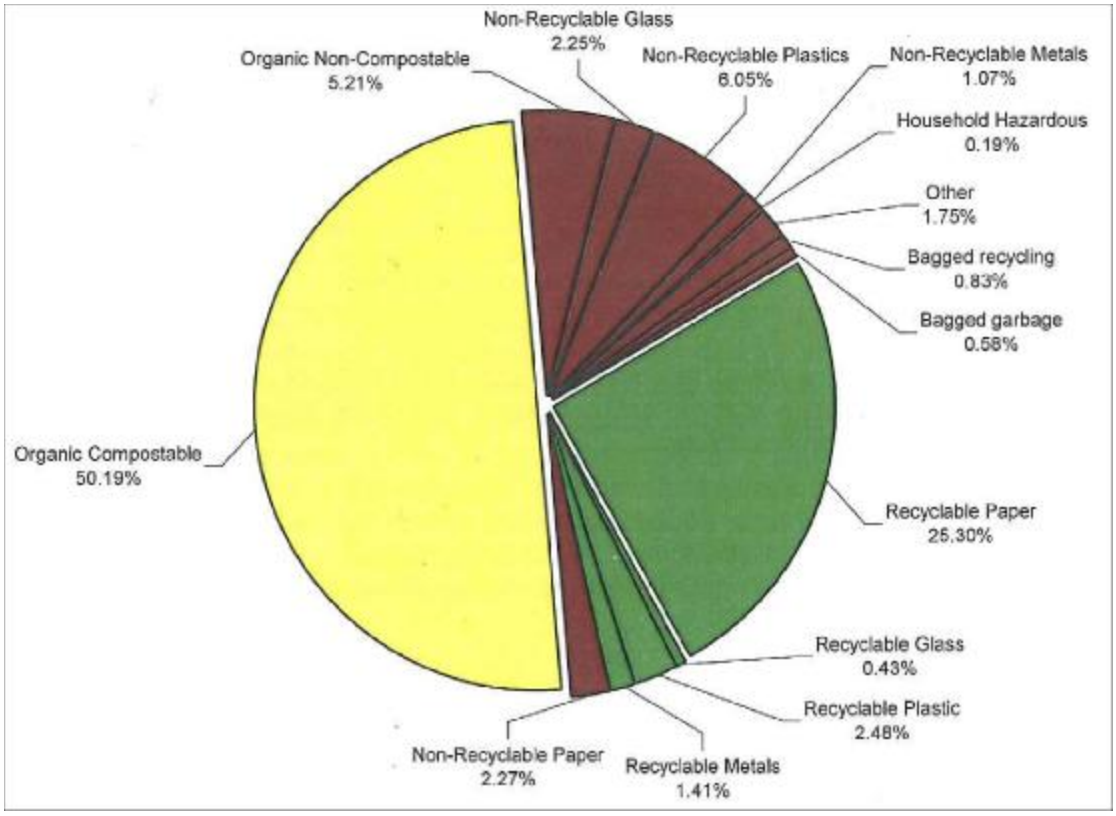
The total volume of domestic and domestic clean-up waste per capita is listed in the Table 1 assuming a total population of 157,701 for Ipswich.

TABLE 1 DOMESTIC & CLEANUP WASTE GENERATION FOR IPSWICH 2007/2008

Waste type	Volume *(tonnes)*	kg per capita	% of total
Domestic – self haul to transfer stations	17,650	111.9	16.7%
Domestic – Collected from households	42,736	271.0	40.5%
Kerbside clean-up	456	2.9	0.4%
Home renovation/cleanup bin services	4,000	25.4	3.8%
Total	64,842	411	61.4%
Recycling – Collection	11,400	72.3	10.8%
Recycling – Drop off	16,816	106.6	15.9%
Greenwaste	12,550	79.6	11.9%
Total Source Separated	40,766	258.5	38.6%

The kerbside domestic waste stream is a major source of recyclable material. The estimated breakdown of waste for Ipswich City Council is shown below.

FIGURE 1 COMPOSITION OF THE TOTAL KERBSIDE DOMESTIC WASTE STREAM



From this data it can be seen that 79.8% of the total domestic waste stream has the potential to be diverted from landfilling by recycling or composting with the main component of this waste being organic compostable material (50.2%).

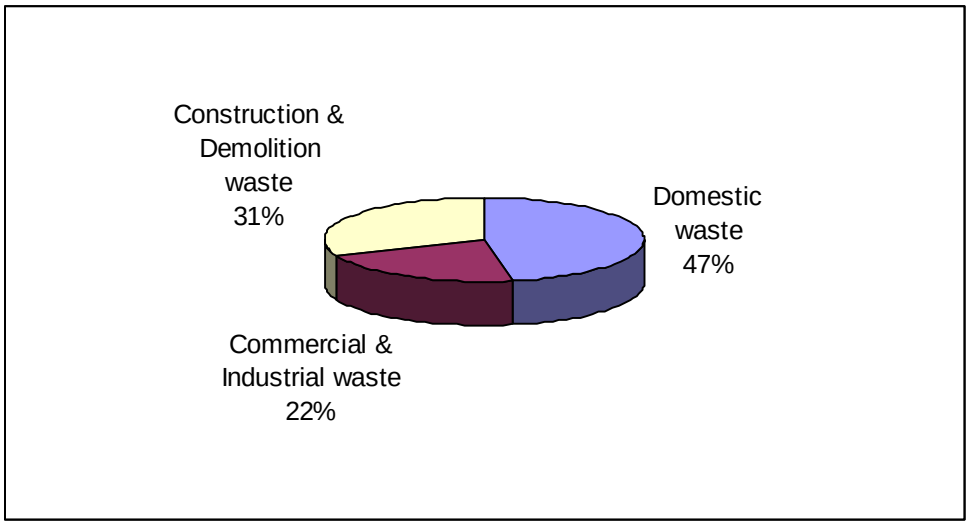
5.2 Non-domestic waste volumes

With many opportunities for waste disposal services in the City, operators other than Council handle some of the commercial, industrial, construction and demolition waste materials generated within the City. There are currently 47 private waste providers that have a waste management approval provided by Council to operate within the City of Ipswich. It is estimated that Council handles about 50% of the commercial/ Industrial (C&I) market, about 20% of the construction and demolition market (C&D) and around 50% home renovation/ cleanup market.

There is limited information available on the specific volumes of waste that the non-domestic waste sector generates within Ipswich as there are no regulatory requirements in place for the whole of the private sector to report on waste generation and disposal. Therefore waste volumes for Ipswich can only be estimated based on State government estimates.

The following outlines the estimated composition of waste that is generated within South East Queensland by source.

FIGURE 2 COMPOSITION OF THE TOTAL WASTE STREAM BY SOURCE



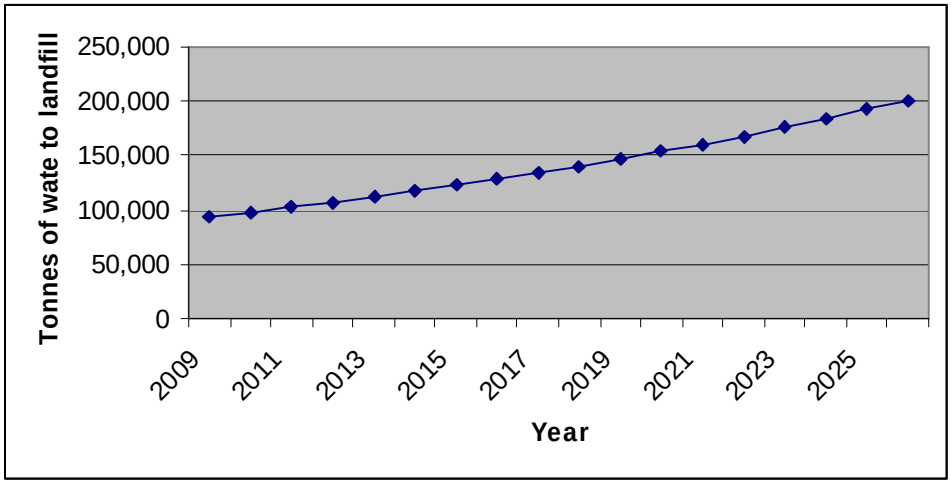
Based on the relative volumes in Figure 2, it is estimated that the following volumes of waste (including recyclables and residual waste) are generated within Ipswich each year:

Waste type	Council service tonnes/year	Private operators tonnes/year	Total tonnes/year
Domestic	103,608	2,000	105,608
Construction & demolition	13,931	55,725	69,656
Commercial & industrial	24,717	24,717	49,434
TOTAL	142,256	82,442	224,698

5.3 Projected Waste Quantities

If waste generation increases in line with population growth it is estimated that by 2026 the volume of waste from Councils waste management activities to landfill will have increased by 215% from current disposal requirements. If this scenario eventuated significant expenditure will be required by Council to provide adequate waste disposal facilities and an increasing volume of valuable resources will be lost by wasteful waste management practices. Therefore it is very important that an emphasis must be placed on resource recovery and resource recovery infrastructure when planning for future waste management needs in Ipswich.

FIGURE 3 WASTE GENERATION PER YEAR WITH PROJECTED POPULATION GROWTH



6 WASTE INFRASTRUCTURE

6.1 Existing Infrastructure

6.1.1 Ipswich Waste Services Operations

Council's Ipswich Waste Services business unit and collection fleet operations are located at the Briggs Road Depot. The depot undertakes day-to-day servicing, washing, fuelling and garaging of the collection fleet. Administration of the business unit and storage of surplus collection containers (RORO bins, skips, frontlift bins, and MGB's, etc) are also accommodated at the site. Staff accommodation is modest with the provision of two demountable buildings and an amenities building.

A recent addition to the facilities at this site in July 2005 is the product destruction operations. Off specification beverages from commercial sources are brought here for the containers to be recycled. The glass, aluminium, plastic and cardboard packaging of these beverages are fully recycled. The liquid contents are either used for dust suppression at the Whitwood Road landfill when required to reduce potable water consumption and transported to a local compost facility for use in their composting operations.

6.1.2 Transfer Stations

The following table shows the public transfer station infrastructure currently in place within Ipswich. All these sites are operated by Ipswich City Council. Currently there are no other service depots, drop-off centres or material recovery facilities within the City of Ipswich.

TABLE 2 TRANSFER STATIONS IN IPSWICH

Name	Address	Operator	Site description	Products disposed to landfill	Products recycled
Riverview Recycling & Refuse Centre	Riverview Rd, Riverview	Council	15,723 tonnes/yr to landfill. Operates seven days/week, eleven hours/day with peak days being Saturday and Sunday.	household clean-up waste, construction & demolition waste, commercial & industrial waste	Green waste, oil, metal, tyres, batteries, white goods, glass, cardboard and plastics.
Rosewood Recycling & Refuse Centre	Oakleigh-Colliery Rd Rosewood	Contractor	1,000 tonnes/yr to landfill. Operates seven days/week, 8 hours/day with peak days being Saturday and Sunday.	household clean-up waste, construction & demolition waste, commercial & industrial waste	Metal recycling, waste oil

Riverview Recycling and Refuse Centre is the major transfer station for the City. The station has a catchment population of 125,000 (over 90% of the city population) within a 12 km radius. The facility was one of the first push pit transfer stations in Queensland and is now 21 years old and experiences operational problems to cater for traffic volumes and current activities. The layout of the centre with the weighbridge and gatehouse at the front right hand corner of the site also make it difficult to further upgrade the centre to enhance waste minimisation opportunities and ensure the safety of users to the site.

Recyclables collected at the kerbside are "bulked up" at this centre to enable more efficient transport and then taken to a materials recovery facility in Brisbane. Waste collected from the kerbside refuse collection service does not require to be "bulked up" due to the proximity of a disposal site and is therefore transported directly to the Council's Whitwood Road landfill.

Rosewood Recycling and Refuse Centre is a minor facility for local resident use. However, the Rosewood site is an important facility in the network since it provides a disposal location for rural residents in the west of the city area that are not provided with a weekly kerbside collection. Its location is convenient and accessible to the majority of rural residents with only those residents in the far southwest of the city area required to travel for more that 15km (or 10 to 15 minutes) to the site.

The size of the site (only 3.128 ha in area) provides limited opportunities for waste separation infrastructure. In the long term the size of the site will dictate the need to seek an alternative site for the provision of waste management infrastructure to western residents as population numbers increase.

6.1.3 Landfill facilities

This table gives an overview of the infrastructure in place to provide for landfill disposal within the Ipswich area. As the table indicates all but one landfill in Ipswich is operated by private operators.

TABLE 3 LANDFILL OPERATORS (2007 DATA)

Operator	Location	Remaining Air Space (million m3)	Waste Types Accepted
IWS (Council)	Whitwood Road	0.19	Putrescible, C & D, C & I
Ti-Tree BioEnergy (managed by Veolia ES)	Ebenezer (T Tree), Willowbank	25	Putrescibles, C & D, C & I, regulated waste
Veolia ES	Wattle Glen, Redbank Plains	0.8	C & D, C & I, limited regulated waste
National Landfill Technologies	New Chum	10	C & D, C & I
Thiess	Swanbank	20	Putrescible, C & D, C & I, regulated waste

The Whitwood Road Landfill receives all of Councils domestic kerbside refuse for disposal. The site is expected to reach its capacity within approximately 1.5 years.

6.1.4 Closed landfills

As a result of its mining history, the City of Ipswich has always had a large number of old mine pits that have traditionally and still are being used for waste disposal purposes. Consequently, there has been a history of these sites accepting a wide variety of waste from throughout South East Queensland for disposal. Management and rehabilitation of closed landfill sites is the responsibility of the property owner. Ipswich City Council is the owner of 20 recognised former landfills and two sanitary depots. A landfill rehabilitation program has been established whereby rehabilitation needs have been prioritised and scheduled based on a risk assessment of the individual sites. Environmental assessments have been carried out on all former landfill sites and rehabilitation works have been completed at three of these sites.

There are also some former landfills under private ownership of which Council has no information in relation to their rehabilitation.

6.2 Other Waste Treatment/Processing Sectors

6.2.1 Materials Recovery Facilities

There are no materials recovery facilities (MRF) for the separation of any type of domestic, C&I or C&D waste within the City with the exception of the product destruction operation at the Briggs Road Depot. Recyclables collected through the domestic kerbside recycling service are transported to Brisbane for processing.

6.2.2 Composting Facilities

There is a growing composting industry operating within the City. Wastes collected and processed include green waste, vegetable and animal wastes, grease trap wastes and bio-solids. Compost products are supplied to local soil manufacturing companies. The volume of organic waste which undergoes some form of composting is estimated to be in excess of 500,000m^3/year. It should be noted that a significant proportion of this waste material is sourced from outside Ipswich City.

6.2.3 Tyre recycling

There are a number of used tyre collection services and one tyre processor within Ipswich.

Tyres or used casings that are collected from retailers, are firstly inspected for their suitability for reuse in the second hand market, if these casings have insufficient tread they are sorted for retreadability and are sold to retreaders. After all usable casings are removed, the tyres are further sorted for secondary recycling or landfill disposal. Approximately 38,000 tyres are collected from within Ipswich each year. A further 2 million are received from sources outside the Ipswich.

Approximately 200,000 tyres are received from throughout SE Queensland at the tyre processor each month. 80,000 -100,000 of these tyres are processed to produce rubber crumb and onsold to manufacturing markets. The remainder is landfilled because there are inadequate markets to make use of all the collected tyre rubber.

6.3 Future Waste Management Site

Council owns a site at Austin Street, Redbank Plains that it purchased in 1986 for the purposes of future landfilling and other waste management activities. The site at Austin

Street covers over 100 hectares and includes a 2 hectare disused open cut mine pit adjacent to Redbank Plains Road and an area of approximately 25 hectares that is currently being mined for ceramic clays and landscape boulders.

With the current upgrade to Redbank Plains Road the site has good access to the Cunningham Highway. The site is within an industrial zone and the majority of its neighbours are landfill (non-putrescible) operators or disused mining lease areas.

The site has been previously used by Council to extract coalstone for use as landfill cover material. This operation was suspended in the late 1990's when operational costs became uneconomic. The site holds a current environmental authority for quarrying activities. One of the conditions of the sites environmental authority is for Council to rehabilitate the pit once quarry activities have ceased. No rehabilitation works have been undertaken to date and no waste management activities are currently occurring at this site.

7 REVIEW OF AVAILABLE WASTE MANAGEMENT TECHNOLOGIES

A review of available waste management technologies has been undertaken (Refer Appendix A). The following summarises the conclusions that were drawn from the review in relation to the relevance of the technologies to the future needs of Ipswich City.

Technology	Conclusions	Feasible option for Ipswich
Separation	• Separation practices are essential to reduce the volume of waste that is currently disposed to landfill. • Source separation improves recycling yields and the quality of recovery of material compared to bulk separation processes. • Bulk separation of recyclables from mixed waste is also successfully operating in some facilities within Australia and provides a means of recovering resources. • Bulk separation of residual waste streams is more viable if separation of organic/green waste and recyclable materials has been undertaken at the waste generation source. • The choice between source or bulk separation for specific applications is primarily determined by an economic assessment of the two options.	
Transfer Stations	• Transfer Stations are an essential service for the disposal of excess waste that cannot be disposed in the kerbside service. • They provide the ability to recover resources before disposal of residual waste material to landfill. • They also provide a facility to 'bulk up' domestic recyclables before their transport to a Materials Recovery Facility.	
Reusing	• Large scale reuse of materials is outside the control of local government. • Development of a buy back centre would be within Councils capabilities and could provide a valuable community service for the purchase of low cost second hand goods.	X

Technology Cont.	*Conclusions cont.*	*Feasible option for Ipswich*
Materials Recovery Facilities (MRF)	• MRF's are an essential component of kerbside recycling systems. • The cost of transporting recyclable materials from Ipswich to Brisbane, and future market value of these materials leads to the possibility that developing a MRF in Ipswich may be feasible in the future when market values recover. • MRF's have the potential to provide opportunities for further recovery of domestic waste through pre-sorting of refuse before disposal to landfill.	medium term
C&I and C&D resource recovery	• Resource recovery efforts in this sector could make a large difference to the amount of waste going to landfill as this represents over half the volume of all waste generated. • Successful bulk separation operations are currently being undertaken throughout Australia thereby requiring specifically designed resource recovery infrastructure.	
Biological treatments	• High capital costs of anaerobic treatment processes. • An alternative option is composting which would provide a means of diverting a significant volume of waste from landfill disposal.	X
Mechanical Biological treatments	• Technology is currently not economically viable and not widely available as a mainstream waste management option in Australia.	X
Pyrolysis	• Technology is currently not economically viable and not widely available as a mainstream waste management option in Australia.	X
Gasification	• Technology is currently not economically viable and not widely available as a mainstream waste management option in Australia.	X
Incineration	• High level of community concern over the siting of incineration facilities. • The potential benefits of saving space through the use of incineration technologies are outweighed by the possibility of environmental harm due to the noxious chemicals released during incineration.	
Landfilling	• Least favoured disposal option in the waste management hierarchy. • However, essential component to any waste management system due to the need to dispose of residual wastes that have no other viable disposal option due to cost or available technology.	

8 WASTE MANAGEMENT STRATEGIC PLAN VISION

The following Vision has been identified for this Waste Management Strategic plan:

> By 2020 all residents and businesses within Ipswich will make optimum use of our natural resources by minimising the generation of waste and treating any waste produced as a resource rather than a problem.

The key strategies to achieve the vision focus on waste minimisation (waste avoidance, recovery and re-use), resource recovery technologies and solutions.

In 2020 Ipswich will prosper from having waste services and waste management solutions that reflect best value, meet the needs of the community, retain & enhance the environment, enjoy community support and understanding, and support the economy.

The 2020 vision for waste aligns with the themes and intended outcomes of Ipswich City Council's Corporate Plan.

9 STRATEGIES TO ACHIEVE VISION

During consultation, waste management strategies were identified and prioritised. A SWOT analysis was undertaken to assist with this process (refer Appendix B). All strategies need to conform to the following Ecological Sustainable Framework:

- minimising the amount of waste generated;
- providing a cost-effective level of service to ratepayers;
- reducing the environmental impacts of waste generation and disposal; and
- providing the necessary infrastructure for future economic development in the Ipswich region.

The identified priority strategies are listed below.

Strategy A: Promote Waste Minimisation and Resource Recovery through Community Education

Ipswich City Council provides a community education and awareness program called "What a Waste" which encourages residents and local business to “reduce, reuse, recycle and compost”. Targeted and effective tools for communication and education serve to promote behavioural change. Education plays an important role in gaining community awareness, co-operation and participation in waste minimisation and resource recovery initiatives provided by Council. Therefore it is important for this program to provide effective communication and promotion strategies that suit their target audience.

There has been a recent increase in environmental awareness amongst the general community particularly in relation to climate change. Councils waste education program needs to demonstrate strong links between waste avoidance and resource conservation, energy and water efficiency and climate change to assist the community to understand the impact of their waste management decisions on our future environmental sustainability.

No.	Action	Target date
A1	Review Waste Education Program to assess the performance of the program.	June each year
A2	Collaborate with surrounding local governments and environmental educators when developing waste education activities.	Ongoing
A3	Conduct waste education presentations in Ipswich kindergartens, schools and community groups.	At least 12 visits per month
A4	Facilitate the implementation of new forms of recycling and promote them to the community. e.g. mobile phone recycling.	Ongoing

No.	*Action cont.*	*Target date*
A5	Promote events including National Recycling Week, International Composting Awareness Week and World Environment Day to schools and the local community.	Annual events
A6	Update waste education presentations, promotional material, teaching resources and web content as needed.	Ongoing
A7	Provide waste minimisation education through static displays at special events, libraries and shopping centres.	4 displays per year
A8	Develop and implement waste auditing processes in schools.	June 2012
A9	Facilitate additional projects including council's internal waste minimisation program, public event recycling and the public place recycling program.	Ongoing

Intended Outcomes:

An increased level of awareness of waste as a resource and participation in waste minimisation and recovery behaviours by Ipswich residents.

Performance Indicators:

- Increase yield of domestic recycling service to 4 kg per household per week by July 2015.
- Reduce contamination level of kerbside recycling service to 10% by July 2015.

Strategy B: Provide services and infrastructure that promote waste minimisation and resource recovery

The type of waste collection services and waste management infrastructure that is available for use affects the level of waste minimisation and resource recovery that will be achieved throughout Ipswich. For example, the introduction of the Ipswich fortnightly kerbside recycling service in the early 1990's resulted in a significant reduction of waste disposed to landfill from the domestic waste volumes.

Some local governments in Australia have introduced kerbside domestic green waste or organic services that appear to be working successfully. Studies have shown that an increase in service frequency for kerbside recycling services also achieves higher yields of recyclable materials. Ipswich City Council needs to continually monitor and assess these new service options to determine if they would be viable for the Ipswich community.

As previously outlined in this report, Council's current public recycling and refuse centres provide facilities that divert a large volume of waste from landfilling to recycling markets primarily from the domestic sector. This has been achieved at

centres that have been largely designed for waste disposal rather than resource recovery leading to limited opportunity for further improvements at the sites. With the growing population in Ipswich future waste management infrastructure needs to be investigated for both the domestic and commercial/industrial sectors. Options for additional infrastructure could include facilities for construction and demolition waste recycling, commercial and industrial waste separation and buy back centres for salvaged items that are suitable for resale.

Public place recycling is another service option that can reinforce waste education programs by encouraging recycling throughout the community (including visitors to the area). There are opportunities to introduce co-mingled recycling bins at popular tourist destinations and in public places which attract significant numbers of people (e.g. shopping precincts). There are also opportunities to include recycling at public events (such as carnivals, festivals and sporting functions).

No.	Action	Target date
B1	Kerbside Collection Continue to monitor new domestic service options for their viability for the Ipswich community.	Ongoing
B2	Infrastructure planning Develop a waste management infrastructure to meet the future needs of Ipswich.	Plan in place by December 2015
B3	Public Place Recycling Implement a public place recycling program.	All A grade parks to be provided with a public place recycling service by 2015
B4	Implement a public events recycling program.	Implement program by July 2013

Intended Outcomes:

Increased participation in waste minimisation and resource recovery activities by Ipswich residents, local business and industry.

Performance Indicators:

- Increase yield of domestic recycling services to 4 kg per household per week by July 2015.
- Achieve 20% diversion from landfill for C&I and C&D waste for services provided by Council by 2015.
- Recycle waste volume from public events serviced by Ipswich City Council by 40% by July 2015.

Strategy C:	Act as an advocate for more sustainable waste management legislation, policy and practices

One of the key impediments to effective waste minimisation and resource recovery programs is the lack of regulatory mechanisms at both the State and Federal level that recognise the indirect costs to the community of landfill disposal. In the Queensland waste management environment landfilling is an inexpensive waste disposal option. This makes many resource recovery and waste minimisation options not economically viable when compared to the landfill disposal option. However the cost of landfilling does not take into account the environmental costs to the community in terms of wasted resources and potential negative environmental impacts from landfilling. The current system is effectively providing an inexpensive waste management option to the current generation to the detriment of future generations.

In some states of Australia some attempt to recognise these indirect costs has been undertaken through the application of landfill levies or increased gate prices at the landfill. It appears unlikely at this stage that the Queensland state government will introduce this system. Therefore the current Queensland waste management strategy articulates that the waste hierarchy of management options should be adopted but provides no incentives for the community, business nor industry to implement these measures. The carbon pollution reduction scheme will have some impact on driving up landfill costs. It is currently unknown as to the extent of the impact of this scheme on the waste management industry.

No.	Action	Target date
C1	Lobby State and Federal Governments to establish regulatory mechanisms that promote waste minimisation and resource recovery.	Ongoing
C2	Work with Regional Organisations of Councils to promote cooperative waste planning and implementation activities.	Ongoing
C3	Actively participate in waste management networks and forums to champion waste minimisation and recovery.	Ongoing

Intended Outcomes:

Waste management legislation and policy provides incentives to promote waste minimisation and resource recovery.

Performance Indicators:

A least one member of the Ipswich Waste Services management team to hold an executive position in a regional waste management group.

Strategy D: Reduce the costs and impacts of Council's own waste generation

Ipswich City Council is a large generator of solid waste and to date little work has been undertaken to minimise the generation of this waste throughout Council. There are significant opportunities for Council to reduce its waste generation throughout all of its operations. It is essential for Council to show leadership in waste management in order for its waste minimisation programs to be credible to the community and local business. A Council wide waste minimisation program will provide both cost savings and environmental benefits for Ipswich.

Council is also a large purchaser of goods and services The development of a purchasing plan which reflects commitment to recycled materials, re-use of materials in Council activities and investigation of opportunities for waste avoidance is an important means of reducing waste generation and assisting the development of viable markets for products containing recycled materials. Council can also set an example for the private sector to use government standards and specifications for the purchase of recycled and recyclable content products.

No.	Action	Target date
D1	Develop and implement a staged Council wide waste minimisation operations plan .	July 2013
D2	Develop & implement a purchasing plan which reflects commitment to the use of recycled materials, re-use of materials in Council activities and investigation of opportunities for waste avoidance.	July 2015

Intended Outcomes:

- Cost savings achieved through waste minimisation and resource recovery.
- Increase in recycled and recyclable content products purchased by Council.

Performance Indicators:

- 20% reduction in landfill disposal of waste generated through Council operations by July by 2015.
- 15% increase in purchase orders that have recycled or recyclable content in the purchase item by July 2015.

Strategy E: Provide a regulatory framework that promotes waste minimisation and resource recovery

In the planning processes, it is important that developers consider minimisation, recycling and management of waste generated during both the construction and operational stage of the development. Consideration of waste management needs at the planning stage allows for the provision of suitable design and infrastructure that promotes waste minimisation and resource recovery. Council has the ability to specify waste management requirements through its standard planning approval process and request the submission of waste management plans for large developments.

Billing policies have a significant impact on waste generation. The current nominal disposal charges for Ipswich residents at the public transfer stations, for example, make it difficult to encourage residents to minimise waste. Experience by other local governments has found that when user pays systems are implemented, as disposal charges increase, waste disposal volumes decrease. It is also important from an equity perspective that all users of waste disposal facilities are contributing to the cost of providing these services. Currently in Ipswich some rural households have access to the public transfer station system but only minimally contribute to their costs because the household is not provided (nor rated) for a household waste collection service. The household waste collection charges subsidise the cost of the public transfer station system.

Council also has a direct role in waste management of environmentally relevant activities that are devolved to local government under the Environmental Protection Regulation 2008. Waste minimisation and cleaner production processes can be actively encouraged through this Environmental Licensing process.

No.	Action	Target date
	Development Approval	
E1	Review and enhance standard waste management conditions for development approvals.	Review completed and new conditions adopted by July 2013
E2	Require the submission of a waste management plan covering both construction & ongoing operational activities for all large developments proposed in Ipswich in the planning approval process.	Require large developments to submit a waste management plan by July 2015
E3	Assess the feasibility of including a waste management element in developers contributions.	Complete a feasibility assessment on the issue and present the findings to council by July 2013
	User Pays Principle	
E4	Stage increases of disposal fees at the public transfer stations to eliminate subsidising refuse disposal and encourage waste minimisation.	Achieve full operational cost recovery for refuse disposal at the public transfer stations through tipping fees by July 2015
E5	Assess the feasibility of extending the kerbside collection area to all serviceable properties in Ipswich.	Report to Council by March 2012
	Environmental Licensing	
E6	Continue to promote waste minimisation and cleaner production practices through Council's environmental licencing responsibilities.	Ongoing

Intended Outcomes:

- Equitable waste management pricing structure in place.
- Whole of city coverage for collection services.

Performance Indicators:

- All new developments are provided with suitable waste management infrastructure and services.
- No financial subsidies are required to support the operational costs of refuse disposal operations at the transfer stations by 2015.

10 PERFORMANCE REPORTING

The performance of the plan during the previous twelve months will be reported against the identified strategies, targets and performance indicators. At the end of each financial year of operation a report on the performance of this plan will be prepared and submitted to Council.

In accordance with the requirements of the Environmental Protection (Waste Management) Policy 2008, an annual report is also required to be submitted to the Queensland Environmental Protection Agency that includes the following information:

- A review of progress made against all the Action items listed in the Waste Management Strategic Plan;
- Details of recycling programs conducted or managed by Council during the year, including the amounts and types of waste recycled and the names and addresses of the facilities used in the programs;
- Details of landfills operated by Council during the year, including the amounts and types of waste disposed of during the year to the landfills; the name, address, capacity and life expectancy of each landfill that started operation during the year; and the name, address and capacity of each landfill that ceased operation during the year.
- The amounts and types of waste converted to useable energy during the year in any waste to energy plants operated by the local government.

11 ADOPTION OF THE PLAN BY COUNCIL

Ipswich City Council adopted the Ipswich City Council Waste Management Strategic Plan at its meeting held on 24 May 2010 (Refer City Works Committee No. 2010(05) of 17 May 2010 – Council Ordinary meeting of 24 May 2010).

The Ipswich City Council Waste Management Strategic Plan is available on Ipswich City Councils website located at http:\www.ipswich.qld.gov.au

Appendix A

REVIEW OF WASTE MANAGEMENT TECHNOLOGIES

(The following is an edited extract from a Bachelor of Engineering Thesis report undertaken on behalf Ipswich Waste Services by Rebecca Sellars entitled "Infrastructure Master Plan for Ipswich Solid Waste Disposal" dated 23 June 2008.)

1.0 Overview of Waste Management

With the increase of society's concern about the environment and decrease of available space for landfill in a lot of countries, waste management has evolved from uncontrolled dumping or burning of waste into integrated management plans (Pichtel 2005). The integrated waste management plans seek to extract value from materials previously discarded as useless, and reduce the amount of waste going to landfills. These landfills are often engineered to reduce the environmental impact by reducing pollution to groundwater by leachate, as well as gas/dust/noise emissions. Lack of space for landfill and increasing stringent government regulations are helping push this shift towards more sustainable methods of managing waste (Zero Waste SA 2005; Boer et al 2007; Lu et al 2006; Chang et al 2005).

In determining suitable options for an Infrastructure Master Plan for Ipswich's solid waste the issues which must be considered include potential technologies/infrastructure to manage waste, methods of deciding which management systems are best, the current Ipswich Waste Services operations, as well as information about future population and waste generation in Ipswich. The following discussion of existing practices and technologies will explore these issues.

2.0 Waste Management Technologies and Infrastructure

There have been many alternative technologies developed to not only reduce the amount of solid waste going to landfill, but also to reuse/recycle waste or generate energy from it. Waste management includes the collection, transport, treatment and disposal of waste. Some waste reduction technologies include reusing, recycling, biological treatments, gasification, pyrolysis, incineration, landfilling and landfill gas harvesting. Each of these technologies has its own advantages and disadvantages when taking into account economic, environmental and legal considerations.

2.1 Separation

If some types of waste are to be diverted from the waste stream in order to reduce the amount of waste going to landfill and utilise various components in the best possible manner, at some point there needs to be separation or sorting of the waste. The two main ways this can happen is through source separation where the people generating the waste keep the waste separated in various categories so it never becomes commingled, or bulk separation, where the waste once commingled can be separated en masse at material/resource recovery facilities.

There are varying degrees of bulk separation, even for waste which is source separated (Veolias 2006). While it is quite common in Australia to have one bin for commingled recyclables and another for all other waste some places like Sydney have followed the example of European countries and have introduced multiple kerbside recycling bins so that for example, paper/cardboard are already separated from plastic containers before it reaches the material recovery facility.

Early research in America in the 1990's suggested that rather than decreasing the amount of waste recycled, source separation actually improved the amount people recycled at home (Apotheker 1990), and more recently research in Europe and the UK has supported this finding (Dahlen et al 2007; DEFRA 2005). Market research in the UK has also shown that the value of recyclables is reduced by contamination and the earlier the separation of wastes occurs in the waste management system the more valuable the recyclables (DEFRA 2005).

One example of intensive Mechanical Treatment is the Woodlawn Alternative Sorting and Processing (WASP) facility being developed in New South Wales. In addition to the Woodlawn Bioreactor facility which has been operating since 2004, the WASP facility will be able to divert many types of materials from the waste stream by using technologies such as screening, manual separation, magnetic separation, eddy current separation, air classification, wet separation and ballistic separation (Veolias 2006).

Since one of the aims of Council's Waste Management Strategic Plan is to reduce the volume of domestic waste, either more extensive kerbside source separation and/or bulk mechanical separation after collection could be elements of the future infrastructure master plan for Ipswich.

Ipswich residents have been source separating their recyclables from their residual waste since the early 1990's. It seems wise to continue up front source separation practices provided that the quality and yield of the salvaged materials outweighs the costs involved in the separate collection services required for source separated materials and the alternative cost involved in providing bulk separation.

One option that makes bulk separation of residual wastes a more feasible option is to provide a source separation option for the removal of organic and green waste from the general waste stream. The residual waste stream then essentially becomes a dry waste stream that can be easily bulk sorted with some remaining contamination from residents that choose not to source separate their waste.

2.2 Transfer Stations

Transfer stations are commonly used to reduce the cost of transporting waste over large distances (Bovea 2007; Department of Environment and Conservation 2006) but are now becoming a means of reducing the waste going to landfill with more and more transfer stations incorporating resource recovery facilities (Lochhead 2006; De Wit 2006).

Some good examples of transfer stations which are incorporating resource recovery initiatives are Wingfield South Australia (Integrated Waste Services, 2007), Moss Vale South Australia (Lochhead 2006) and Banyule Victoria (Millard 2006). Together these sites have facilities for kerbside recycling material recovery, green/organic waste composting, public disposal of recyclables and waste, Buy Back Centres, as well as processes to manage the waste and make it easier for further transportation such as compaction and bailing (Integrations Waste Services 2007). In these facilities which are processing waste from the government, industry and the public, it is important to ensure that there are separate and safe facilities for the varying types of customers to deposit waste (Integrations Waste Services 2006).

With the numerous facilities available in Ipswich for disposal of waste by landfill, a transfer station for the purpose of bulking up domestic waste for efficient transfer is not

necessary. Transfer stations will still be useful as sites for public resource recovery and disposal as well as the bulking up of kerbside recyclables if they continue to be processed by the Visy MRF at Gibson Island Brisbane.

2.3 Material Recovery Facilities (MRF's)

Some waste products such as used paper, plastic and glass can be reprocessed to make materials for new products. Not only does this reduce the amount of waste going to landfill, but using recycled materials to make new products, instead of using virgin materials, can reduce production costs (Visy 2008). One example of this is recycled glass which has a lower melting point than the mixture of raw materials used to make glass in the first place (Pichtel 2005). This means it requires less energy to melt and make into something new. Another example is steel, which when recycled can save 75% of the energy it would take to make the same steel product from virgin materials (WSN Environmental Solutions 2005). By recycling and diverting materials from landfill, money can also be saved in states where government imposes a fee per tonne of material sent to landfill.

The demand for recycled material isn't always high enough to make recycling of some materials economically viable but in Australia and in the world there is quite a range of materials which have been recycled profitably. These include glass bottles/jars, scrap steel, aluminium products, a wide range of plastic bottles, paper/cardboard, green waste/timber, some construction and demolition waste, electronic equipment, old tyres, textiles, ceramics and white goods (Zero Waste SA 2006; Freund 2007).

The combination of the cost of transporting kerbside recyclable materials from Ipswich to Brisbane, and the market value of these materials leads to the possibility that developing a MRF in Ipswich may be feasible. However, due to the global economic crisis, the value of many recyclable materials have recently plummeted which has significantly increased the cost of MRF operations at the present time. Commodity markets are expected to recover over the coming years. Therefore the option to develop a MRF in Ipswich should be revisited when markets improve.

One company which has multiple MRF's and receives recyclable materials from transfer stations and businesses around Australia is Visy. Visy has over 30 recycling facilities spread over five Australian states, and once sorted in the MRF, the recyclable materials can go to other divisions of Visy for processing into new products (Visy 2008).

The materials Visy can currently recycle through kerbside collection are:

- All plastics codes 1-7
- Ice cream and takeaway containers
- Milk bottles
- Juice and cream containers
- Cordial bottles
- Empty steel cans
- Aluminium soft drink cans
- Clean aluminium foil and pie tray
- Empty aerosol cans
- Telephone directories
- Newspapers and magazines
- Cardboard, cereal and food boxes
- Office paper
- Envelopes and office mail
- All empty glass bottles and jars
- Empty milk and juice cartons

2.4 Reusing

A method that can save even more resources and energy from being wasted than recycling is reusing items. In some parts of Europe for example, glass bottles and jars are

refilled and reused rather than being made into new products (Freund 2007). While this may be beyond the ability of local councils to implement, if industries producing glass products can be encouraged to implement reusing of packaging this may prevent materials becoming waste and going to landfill or needing to be recycled.

One method of reusing materials that has been implemented by some local governments is the establishment of Buy Back Centres. An example of a Buy Back Centre in operation is the 'Reviva! Centre' at the Moss Vale Resource Recovery Centre (Lochhead 2006). Materials and items which would often go to landfill but can be reused or repaired are sold at the 'Reviva! Centre'. This benefits both the customer buying the items as they receive the goods at a discounted price and also reduces the amount of waste going to landfill. More locally, the Logan City Council also has the Logan Recycling Market, where items which have earlier been donated or salvaged from the waste stream are sold (Logan City Council 2008). It is understood that the sale of savaged materials tends to cover the operational costs of these Buy Back Centres but a significant capital outlay is required for their initial set up.

While the large scale recycling of items such as glass bottles is more of an issue that could be dealt with by manufacturers rather than Ipswich City Council, the development of a Buy Back centre would be within the Councils capabilities.

2.5 C&I and C&D Resource Recovery

Based on state government estimates, approximately 53% of the waste generated within South East Queensland is commercial & industrial (C&I) or construction and demolition (C&D). As this represents over half of all waste generated resource recovery efforts in this sector could make a large difference to the amount of waste going to landfill.

While there are few transfer stations in the process of developing facilities for C&I and C&D resource recovery (Lochhead 2006; Integrated Waste Services 2006) there are some transfer stations which have resource recovery for these streams already running.

SITA for example has a facility for recovering materials from C&I waste streams in Gosford, NSW (SITA Environmental Services) and Adelaide Resource Recovery sells recycled concrete, recycled bitumen, aggregates and recycled sand products which have been produced from C&D waste received at the Wingfield transfer station (ABCSE 2005). Ipswich Waste services also runs a Product Destruction service which fully recycles the containers and packaging of off specification beverages from commercial sources, and uses the liquids for dust suppression and other activities which do not require potable water.

A company based in the US, Hatch Mott MacDonald, has devised a materials processing facility specifically for construction and demolition waste. It involves a crusher, a magnetic head separator, an eddy current separator, screens, a vacuum picking conveyor and a flotation tank (Corliss & Mullen n.d.). The crushed concrete material is suitable for the construction of landfill or roads to replace aggregate made from virgin materials (Corliss & Mullen n.d; Nunes et al 2007).

Reduction of the volume of C&I and C&D waste is one of the aims of Council's Waste Management Strategic Plan so increased resource recovery in this sector should be considered in future infrastructure.

2.6 Biological Treatments

There are two main categories of biological treatments for waste, one being composting (controlled aerobic, biological conversion of organic wastes into complex, stable material (Pichtel 2005)) and the other being anaerobic digestion. Both methods involve making the conditions in the landfill or compost area favourable for bacteria and micro-organisms to decompose waste at a faster rate than would normally occur.

Laboratory scale tests suggest that aerating the waste minimises the leachate production and can reduce the long-term emissions of methane (Ritzkowski & Stegmann 2007; Bilgili et al. 2007). However, under anaerobic conditions the term of post closure care can be decreased by accelerating the rate of decomposition, and this also yields more methane gas which can be used to produce electricity (Benson et al. 2007).

The capital costs of anaerobic treatment are generally higher as it is necessary to carry out the process in an airtight vessel, and it requires the waste stream to be more homogenous than the aerobic process (Veolias 2006).

Composting appears to be an attractive waste processing option for Ipswich City Council. A recent waste audit has indicated that 50% of the total Ipswich domestic waste stream that is disposed in the weekly kerbside refuse service is organic compostable waste. If this waste was source separated there is the potential to divert 25 000 tonnes of organic waste away from landfill each year.

There is also 300 tonnes of greenwaste collected at Riverview Recycling and Refuse Centre per week that could also be used for composting purposes rather than its current disposal method of incineration and energy generation. While the current disposal method provides some environmental beneficial outcomes with the generation of electricity from the incineration process, composting provides even more environmental benefits through a local solution with the resulting end product having the potential to enhance the local environment if used in Council's operations and local agriculture.

2.7 Mechanical Biological Treatment (MBT)

This treatment for municipal solid waste involves mechanical sorting of commingled waste to extract the organic fraction for biological treatment (such as composting or anaerobic digestion) and landfilling the remaining inert wastes (WSN Environmental Solutions 2005).

Some large projects around Australia are using MBT for municipal solid waste (such as in Stirling WA, Shenton Park WA, Eastern Creek NSW) whereas other places are using this technology for a more specific waste stream such as biosolids (Port Macquarie NSW, Port Stephans) or commercial organics (Kwinana WA, Dandenong VIC) (ABCSE 2005; Zero Waste SA 2005).

While the green waste disposed of at the transfer station is currently taken to Rocky Point Green Energy Facility for incineration, further extraction of green and organic waste from the domestic waste stream could lead to a greater percentage of the waste being composted rather than landfilled. Extraction of green and organic waste could be by means of source separation or (MBT). While biological, or mechanical biological treatment may be incorporated in future infrastructure plans, like gasification and pyrolysis, it would be prudent for Council to allow these alternative technologies to demonstrate their effectiveness over time and become a more mainstream waste management option to reduce costs.

2.8 Pyrolysis

Pyrolysis is a thermal process which can be used to convert waste to energy. The waste is heated in the absence of air and oxygen to around 400°C - 800°C where it begins to degrade and produces char/ash, pyrolysis bio-oil and synthesis gas which is often called syngas (ABCSE 2005; WSN Environmental Solutions 2005). The bio-oil and syngas can then be used as fuels. Different pyrolysis processes have been optimised for various specific waste streams and are currently commercially viable (Stucley 2007; Biopact 2008) and though pyrolysis works best with a relatively homogenous mix of waste with a high carbon content there are some companies which have developed pyrolysis processes for processing municipal solid waste (Juniper Consultancy Services 2003).

Visy, Paperlinx and ESI all have projects operating in Australia which use pyrolysis of either black liquor (derived from recycled paper) or biosolids in order to generate energy and reduce the amount of waste going to landfill (ABCSE 2005).

Until the technology to process mixed municipal solid waste by pyrolysis becomes widely available and economies of scale allow current costs to be more competitive than other waste processing options, pyrolysis is unlikely to be a useful element in the management of Ipswich's waste in the short to medium term.

2.9 Gasification

Gasification is similar to pyrolysis in that it is a thermal technology that converts carbon-rich waste to energy. However, the gasification process generally occurs at higher temperatures of up to 1300°C and in the presence of a limited amount of air/oxygen (ABCSE 2005). The resulting gas is normally a combination of carbon monoxide, carbon dioxide, hydrogen and methane as well as water and some higher hydrocarbons (ABCSE 2005) but the exact composition depends on factors such as the temperature of gasification, the chemical composition of the waste and the amount of air/oxygen present in the reaction.

Two examples of gasification being used to generate energy from waste are the Brightstar project using municipal solid waste which has been decommissioned and the Staplyton Green project using wood waste as fuel (ABCSE 2005).

Like pyrolysis, a separation of the organic fraction of waste from the general domestic waste stream would be necessary before gasification could be considered as a means of disposing of this fraction of the waste. The cost of the system would also need to be greatly reduced to make it a feasible strategy compared with other options.

2.10 Incineration

Incinerating waste has three main benefits, which are:

i. It can reduce the volume of waste between 50% to 90% which greatly reduces the amount of space required for landfill;
ii. The heat energy liberated by burning waste can be harnessed to heat something or generate electricity; and
iii. The high temperatures in the incinerator can sterilise certain wastes by killing microbial and pathogenic organisms (Pichtel 2005).

The disadvantages of incinerating waste are the potential noxious chemical that can be released into the atmosphere as gases or in fly ash. There is generally extreme public opposition to the development of incineration facilities.

It has been noted that while retrieving energy from the waste by incineration before/instead of landfilling is beneficial (Finnveden et al 2007), it is more sustainable to avoid producing the waste, minimise the waste produced or reuse/recycle the materials before resorting to incineration (WMAA 2004; Zero Waste SA 2006; PNEB and Norske-Skog n.d.). While there is space to landfill waste in Australia, the potential benefits of saving space are outweighed by the possibility of environmental harm due to the noxious chemicals released during incineration. Because of this incineration of all the waste generated in Ipswich is unlikely to be feasible.

2.11 Landfilling

Landfilling was one of the earliest methods of waste disposal and in the past waste was directly dumped in an open pit or piled in mounds, but this led to problems with odour, pests and fires (McBean et al. 1995). Burying the waste lessened the effect of these problems and the 'cut and cover' method of covering daily deposits of waste with soil led to what is now know as the sanitary landfill (Datta 1997). From here caps and liners were engineered to prevent leachate and gas emissions, and finally siting criteria to minimise the risks of pollution and disruption to society by taking into account existing environmental conditions and infrastructure were introduced. While the modern engineered sanitary landfill has helped with some of the environmental issues mentioned previously, there is not an endless amount of space to be landfilled, and in the hierarchy of preferred waste management technologies, disposal to landfill is the least preferred method of dealing with waste.

Current legislation in the Environmental Protection Act 1994 and guidelines from the Queensland Environmental Protection Agency give restrictions on the siting of landfills and the standard to which they are designed and built. This includes consideration of liner/capping/gas collection systems, distances from surface and ground water, areas which may be protected for biodiversity, geological features of the area and design for noise and air emission controls.

Two examples of well designed landfills are the Northward Fill Landfill (85km north-west of Adelaide) and the Swanbank Waste Management Facility (Ipswich). The Northward Fill Landfill received the WMAA Silver National Landfill Excellence Award in 2007, and the Swanbank Waste Management Facility was short listed in this competition.

Northward Fill Landfill is an above ground landfill which has a low permeability liner, leachate collection system, landfill gas collection, innovative litter and bird control, surface water management system and a rigorous monitoring program (Transpacific Industries Group 2007). Another distinguishing feature of Northward Fill Landfill is that only wastes subjected to resource recovery measures are accepted for disposal. Northward Fill Landfill provides resource recovery including reuse of foundry sand, turbid water and plasterboard to divert waste from landfill (Transpacific Industries Group 2007). Plasterboard is known to generate poisonous Hydrogen Sulfide (H_2S) gas when degrading in landfills so it is beneficial to the environment to dispose of this material by a method other than landfill (AGO 2002).

The Swanbank Waste Management Facility is another landfill including features such as a composite low permeability liner, leachate collection and recirculation system, landfill gas collection and reuse system, dust nuisance minimisation and litter control (Thiess Services 2007). As the landfill site is a decommissioned open-cut coal mine, the landfilling at Swanbank is also assisting to rehabilitate the area (Thiess Services 2007).

One by-product of the decomposition process that occurs in landfill is landfill gas and there are many projects around Australia using this gas to recover energy. The composition of the gas and the rate at which it is produced are both dependent on many factors including the waste composition, moisture content, oxygen supply and temperature (Luo et al 2004; Ritzkowski & Stegmann 2007). Anaerobic conditions produce methane (CH_4) rich landfill gas while aerobic conditions produce carbon dioxide (CO_2) rich gas (WSN Environmental Solutions 2005; Ritzkowski & Stegmann 2007). Methane (CH4) is a greenhouse gas that remains in the atmosphere for approximately 9-15 years. Methane is over 20 times more effective in trapping heat in the atmosphere than carbon dioxide (CO2) over a 100-year period and is emitted from a variety of natural and human-influenced sources including landfills.

While flaring off this gas is preferable to letting it escape into the atmosphere, it is even better to burn the gas in a manner which yields energy that can be converted to electricity or directly to heat (Zero Waste SA 2005; WMAA 2004). In Queensland alone this is happening in a range of landfill gas recovery projects run by various companies such as LMS, Collex, EDL and Energy Impact (ABCSE 2005).

Landfill gas recovery is seen as an essential component in any modern landfill operation. Therefore any landfill operation that receives Ipswich's residual waste will require landfill gas recovery.

All current waste management technologies presently result in residual waste that will require landfilling. Therefore landfilling is an essential component in the management of Ipswich's waste.

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Appendix B

SWOT ANALYSIS

A SWOT (strengths, weaknesses, opportunities and threats) analysis was undertaken of waste management within Ipswich City in order to better define options for future strategies. The results are summarised below:

TABLE X: SWOT analysis

Strengths	Weaknesses	Strategic initiatives
Number of existing private waste facilities in Ipswich	Limited lifespan of existing Whitwood Road Landfill	Implement operational practices that reduce waste to landfill from Council operations.
Significant financial investment by the waste industry provides long term commitment to the City		Enhance resource recovery infrastructure
		Enhance education & cleaner production programs to reduce the volume of waste requiring landfilling
		Explore options for future waste disposal including options for partnering or shared services arrangements
Range of recycling industries (e.g. tyre / organic waste processors) located in Ipswich	Poor perception of waste facilities	Promote existing resource recovery/recycling industries and services within Ipswich.
		Enhance resource recovery facilities for domestic and non-domestic waste in Ipswich.
		Address issue through waste education.
Availability of land for development of waste facilities (e.g. degraded mining sites)	Location & functionality of Council's (2) existing recycling & refuse centres.	Develop & implement a waste management infrastructure plan that provides for the long term needs of Ipswich.
	Lack of financial incentive for generators to minimise waste	Apply price differential (e.g. free or reduced fee) for the disposal of uncontaminated recyclable material at the public waste disposal facilities to encourage separation from the general waste stream.
		Enhance & promote commercial recycling services for business & industry

Strengths cont.	Weaknesses cont.	Strategic initiatives cont.
Planning for regional development well-advanced	Capital investment in waste management not necessarily community priority	Assess the feasibility of including a waste management element in developers contributions.
Community-based delivery of waste management services		Strengthen regulatory controls for waste management in the development approval process.
	Use of large 240L bins does not promote waste minimisation or diversion	Assess the feasibility of offering different sized bins and applying charges based on bin size.
	Waste infrastructure lacks some recovery facilities / equipment (e.g. dedicated drop-off areas for recyclables)	Enhance resource facilities for domestic waste
	Limited collection or processing of organic resources (e.g. garden waste)	Assess the feasibility of implementing a green/organic waste service.
	Minimal commitment to "closing the loop", e.g. purchase of recycled content materials	Develop & implement a Council purchasing plan to address the issue.
	The use of organic resources generated through Council sites is not being optimised	Implement operational practice that minimise landfilling of organic waste.
Variety of industries in Ipswich region Ipswich plans to be an industrial growth area for SE Queensland	Existing lack of full cost recovery from waste generators Inconsistent regulatory controls	Apply price differential (e.g. free or reduced fee) for the disposal of uncontaminated recyclable material at the public waste disposal facilities to encourage separation from the general waste stream.
		Enhance waste minimisation & cleaner production role through Environmental Protection licensing.
		Assess the feasibility of including a waste management element in developers contributions for waste infrastructure.
		Strengthen regulatory controls for waste management in the development approval process.

Opportunities	Threats	Strategic initiatives
Alternative waste technologies becoming more feasible	Large number of old mine workings can focus attention on landfill as the preferred method of waste disposal because of the low cost of landfilling.	Identify options for alternative resource recovery technologies.
Establishment of waste minimization principles for future regional development		Address issue through waste education
Development of alternatives for inert waste (e.g. recycling of construction & demolition waste) can minimize landfill airspace requirements		Work with local business organizations to identify opportunities for industry collaboration.
Implementation of resource recovery initiatives for organic wastes has potential to divert significant volumes from landfill disposal		Establish a resource recovery centre for C&D waste.
	Inhibition of recovery programs due to restrictions to the movement & management of organic waste & finished product e.g. fire ants	Provide council facilities to divert recovered products to appropriate facilities.
	Inhibition of recovery programs (e.g. compost markets) due to limited markets / distribution networks for recovered resources can	Assess feasibility of implementing a green/organic waste collection system.
Development of long term waste management facilities to service urban development	Use of inappropriate sites (e.g. mine workings with burning coal seams) for waste disposal / landfill could lead to detrimental environmental outcomes	Extend the kerbside collection area to include all serviceable properties in Ipswich.
		Explore options for future waste disposal including options for partnering or shared services arrangements
Waste education can assist achievement of community's environmental goals	Expectations may exceed Councils financial capacity.	Ensure outcomes of Councils waste education program are effectively evaluated to ensure value for money.
Ability to promote Ipswich's environmental commitment to tourists through public place recycling / education programs	Expectations may exceed Councils financial capacity.	Address issue through waste education and the provision of public place recycling.