

Waikato Regional Waste Infrastructure Stocktake and Strategic Assessment

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1 Introduction

Environment Waikato engaged Sinclair Knight Merz Limited (SKM) to undertake a stocktake of waste and recovered materials flows and facilities in the Waikato region. The stocktake updates and builds on information collected by Responsible Resource Recovery Limited (RRRL) in 2005 that was largely focussed on local authority activities in waste management and resource recovery in the region. In addition to the stocktake of the existing situation, Environment Waikato requested an assessment of strategic, or long term and collaborative, opportunities.

The objective of the project is to provide a comprehensive picture of waste management in the region with a view to identifying key gaps and opportunities for improvements both now and as contracts expire, infrastructure requires renewal and new technology becomes available. The focus is on active participation of all key stakeholders including local authorities, waste and recycling companies and the broader business community. Key questions include:

- How much waste is going to landfill from the Waikato region?
- How much waste is being diverted and what are the diversion routes currently available?
- What waste streams could be relatively easily diverted and what role could local authorities either individually or collectively play to help this happen?
- Should local authorities in the Waikato region coordinate or combine to procure waste management services?
- Are there opportunities for local authorities to work with the waste sector and other businesses in the region to improve service availability and outcomes?
- Are there opportunities to better align individual waste management plans and the Waikato Regional Waste Strategy?
- Are there opportunities to better integrate the waste management planning framework with broader policy and law¹ at a regional and national level?

It is important to note that with decreasing active involvement of local authorities in providing waste management services, the importance of the policy framework increases. In the context of this report, a key question is how local authorities can work together and with industry to improve waste minimisation. For local authorities this is may involve providing or contracting services as well as developing and implementing policy. In many cases in the Waikato region local authorities are running or contracting out the running of refuse transfer stations, landfills and recycling services (collection and drop-off).

2 Methodology

The collection of comprehensive data on waste and recycling is an inherently challenging task. This is related to the wide range of organisations involved, commercial sensitivity of much of the data, issues with the definition of waste (when considering what recovered or diverted materials should be included in the analysis) and the ease of movement of waste across local and regional boundaries.

The intent of this project has been to assess reasonably readily available information in order to determine the movement of waste and recovered materials into, around and out of the Waikato region. The focus has been on waste disposed of to landfill/cleanfill, recycling commodities (glass bottles/jars, metal cans, paper/cardboard and plastics code 1 & 2), scrap metal and organic waste composted or processed for other beneficial use such as biofuel. Other collection and processing of by-products has

¹ For example the Local Government Act 2002 including LTCCP, Waste Minimisation (Solids) Bill, government policy on waste and sustainability and the NZ Waste Strategy.

been identified but not necessarily quantified. Examples include the use of wood waste for biofuel within a single operation and the production of ethanol from whey. Organic waste processed via home composting and waste disposed of to on-farm sites has not been quantified.

Information regarding waste flows and quantities has been aggregated at a regional level and was collected from a wide range of sources including:

- existing reports on waste management in the Waikato region;
- searching web databases such as Yellow Pages, UBD and Finda for listings for waste and recycling companies;
- reviewing overview information on industry and services in the Waikato region – Innovation Waikato, Lake Taupo Development Company, Local Authority websites; and
- telephone calls and/or site visits with local authorities, key waste sector organisations and a selection of major businesses operating in the Waikato region (Fonterra, Wallace Corp, AffCo, Inghams, Degussa Corp, Te Kuiti Meats, Omya, McDonalds Lime, Tenon, the Laminex Group, and Carter Holt Harvey).

It is important to note that while some data is accurate, other parts of the dataset are by necessity based on estimates. Good data was collected regarding:

- the quantity of waste disposed of to municipal waste landfill (via weighbridge records);
- the quantity of commodities recycled (via trading/weighbridge records);
- The composition of waste disposed of to municipal waste landfills; and
- The quantity of organic waste composted at commercial operations.

Quantities for the following waste streams were estimated based on the information sources above:

- the quantity of wood waste utilised for boiler fuel (based on published data from EECA and discussions with boiler fuel suppliers and operators);
- the quantity of commercially sourced scrap metal recycled (based on estimates from the Scrap Metal Recycling Association of NZ);
- the quantity of waste disposed of to cleanfills (based on consent quantity and composition limits); and
- the composition of waste disposed of to cleanfills (based on consent quantity and composition limits).

3 Disposal and recovery estimates

3.1 Waste disposal and recovery infrastructure

The tables on the following pages outline services and facilities for waste disposal, recovery and recycling in the Waikato region. Identification of services, and more importantly material flows, enables data collection to be focussed on key aggregators of materials and avoids the potential for double counting of materials as they move through collection, transport, processing to final disposal or recovery.

Section 4 Current recycling and recovery infrastructure for the Waikato provides more detail on recycling and resource recovery infrastructure in the Waikato region.

3.2 Disposal facilities and processing and recovery facilities in the Waikato

Table 1 presents a summary of services and facilities for the management, recycling, recovery and processing of waste materials in and for the Waikato region.

Table 1: Disposal, processing and recovery facilities in the Waikato region – landfills and transfer stations

	General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Franklin district																
Drop off																
Waiuku Transfer Station (EnviroWaste)	✓	✓	✓	✓	✓	✓		✓	✓							
EnviroFert		✓														✓
Processing																
EnviroFert	Greenwaste composting															
Graeme Lowe Corporation	Rendering															
Disposal																
Ridge Rd Quarries	Cleanfill, quarry overburden															
EnviroFert	Cleanfill, landbanking plasterboard (storing for future processing)															
Hamilton city																
Drop off																
Hamilton Refuse Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓	✓	
EnviroWaste Hamilton Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓					✓	
Hamilton Organic Recycling Centre		✓														
Resene ColourShop, Hamilton	Paintwise collection point – unwanted paint and paint containers															

	General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Processing																
Hamilton Organic Recycling Centre	Green waste composting															
CHH FullCircle	Commodities sort-line															
TimPack	Refurbish old pallets															
	GreenLea Meats Ltd, Paunch grass disposal/land application															
Disposal																
D&T McDonald	Cleanfill															
Hauraki district																
Drop off																
Paeroa Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓		
Waihi transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓			✓	✓		
Processing																
HG Leach Ltd - VCU	Green waste and putrescibles composting															
Disposal																
Tirohia Landfill	Municipal solid waste															
Matamata-Piako district																
Drop off																
Waihou Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Matamata Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Morrinsville Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓	✓	✓		
Processing																
Daltons	Bark and putrescible waste composting															

		General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
HG Leach/Matamata-Piako District Council	VCU at Matamata Transfer Station, green and putrescible waste composting																
Disposal																	
Turley Motors	Cleanfill, construction waste																
Otorohanga district																	
Drop off																	
Otorohanga Recycling Centre			✓	✓	✓		✓		✓								
Kawhia Recycling Centre				✓	✓		✓		✓								
Mobile rural recycling depot				✓	✓		✓		✓								
Rotorua district																	
Drop off																	
Mamaku Transfer Station		✓		✓	✓	✓	✓		✓								
Reporoa Transfer Station		✓		✓	✓	✓	✓		✓								
Tarawera Transfer Station		✓		✓	✓	✓	✓		✓								
Okere Transfer Station		✓		✓	✓	✓	✓		✓								
Disposal																	
Rotorua Landfill (in Bay of Plenty region)	Municipal solid waste																
South Waikato district																	
Drop off																	
Waotu School Recycling Depot				✓	✓		✓		✓								
Atiamuri Recycling Depot				✓	✓		✓		✓								
Arapuni Recycling Depot				✓	✓		✓		✓								
Putururu Landfill/Transfer Station		✓	✓	✓	✓	✓	✓		✓	✓	✓						✓

	General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Tokoroa Landfill	✓	✓	✓	✓	✓	✓		✓	✓	✓	✓					✓
WastePro Recycling Depot (Kinlieth)			✓	✓		✓		✓								
Processing																
CHH Kinlieth	Recycled paper/fibre for paper manufacture															
Fonterra Tirau	Converting whey to ethanol, anaerobic digestion of high strength organic wastes															
WastePro Recycling Depot (Kinlieth)	Recycling commodities sort line															
Disposal																
Tokoroa Landfill	Municipal solid waste															
B&S Excavating	Cleanfill															
CHH Kinlieth – various disposal sites	Pulp and paper processing wastes, wood waste boiler ash															
Taupo district																
Drop off																
Broadlands Rd Landfill and Recycling Centre	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
Turangi Refuse Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
Mangakino Refuse Transfer Station	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓		✓		✓		
Kinloch Refuse Transfer Station	✓	✓	✓	✓		✓		✓								
Whareroa Refuse Transfer Station	✓	✓	✓	✓		✓		✓								
Kuratau/Omori Refuse Transfer Station	✓	✓	✓	✓		✓		✓								
Disposal																
Broadlands Rd Landfill	Municipal solid waste															
Bleakley Landfill	Wood processing waste															

	General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Thames-Coromandel district																
Drop off																
Coromandel Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Matarangi Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Pauanui Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Tairua Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Thames Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Whitianga Transfer Station	✓	✓	✓	✓	✓	✓		✓				✓		✓		
Seagull Centre Trust (Thames Transfer Station)									✓	✓	✓					
Processing																
Streetsmart	Basic recycling commodity sort-line/consolidation															
Waikato district																
Drop off																
Ngauruawahia Recycling Centre			✓	✓		✓		✓								
Te Uku Recycling Centre			✓	✓		✓		✓								
Te Mata Recycling Centre			✓	✓		✓		✓								
Huntly Transfer Station	✓	✓	✓	✓	✓	✓		✓	✓	✓						
Te Kauwhata Transfer Station	✓		✓	✓	✓	✓		✓								
Xtreme Waste, Raglan	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓	✓
Resene ColourShop	Paintwise collection point – unwanted paint and paint containers															
Processing																
Huntly Transfer Station (Recover NZ)	Sort line planned recycling commodities.															

	General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Disposal																
Hampton Downs Landfill	Municipal solid waste															
Huntly Ash Ponds	Coal ash slurry ponds/disposal															
Rotowaro Mine	Coal ash slurry for mine rehabilitation															
Te Kowhai Sands	Cleanfill															
IH Wedding and Sons	Cleanfill															
John Campbell	Cleanfill															
Waipa district																
Drop off																
Cambridge Transfer Station	✓	✓	✓	✓	✓	✓		✓								
Te Awamutu Transfer Station	✓	✓	✓	✓		✓	✓	✓							✓	✓
Processing																
Streetsmart	Basic recycling commodity sort-line/consolidation															
Waitomo district																
Drop off																
Rangitoto Quarry Landfill	✓		✓	✓		✓		✓	✓			✓	✓			
Disposal																
Rangitoto Quarry Landfill	Municipal solid waste															

		General refuse/industrial refuse	Green waste	Aluminium & steel cans	Paper and card	Scrap steel	Plastics 1 & 2	Timber/firewood	Glass	Whiteware	Car bodies	Furniture	Waste oil	Tyres	Household hazardous	Construction & demolition	Cleanfill
Liquid and hazardous waste collection and processing																	
	Collection services																
	Transpacific Industries (Allens United, Nuplex)	Waste oil, medical waste															
	Tallowman	Grease traps															
	Pete's Takeways	Septic tank and other sludge															
Out of Waikato region																	
	Processing																
	Streetsmart (Auckland)	Sorting of recycling commodities															
	Perry Environmental (Tauranga)	Vermicomposting putrescible waste															
	Paper Reclaim (Auckland)	Sorting of recycling commodities															

3.3 Waste and recovered materials movements

The figures below present an overview of waste and recovered materials movements within and out of the Waikato region. Figure 1: General waste and recycling commodity flows notes movements for waste destined for landfill and recycling commodity flows while Figure 2: Organic waste flows notes the movement of organic waste diverted from landfill.

Figures on following pages:

Figure 1: General waste and recycling commodity flows

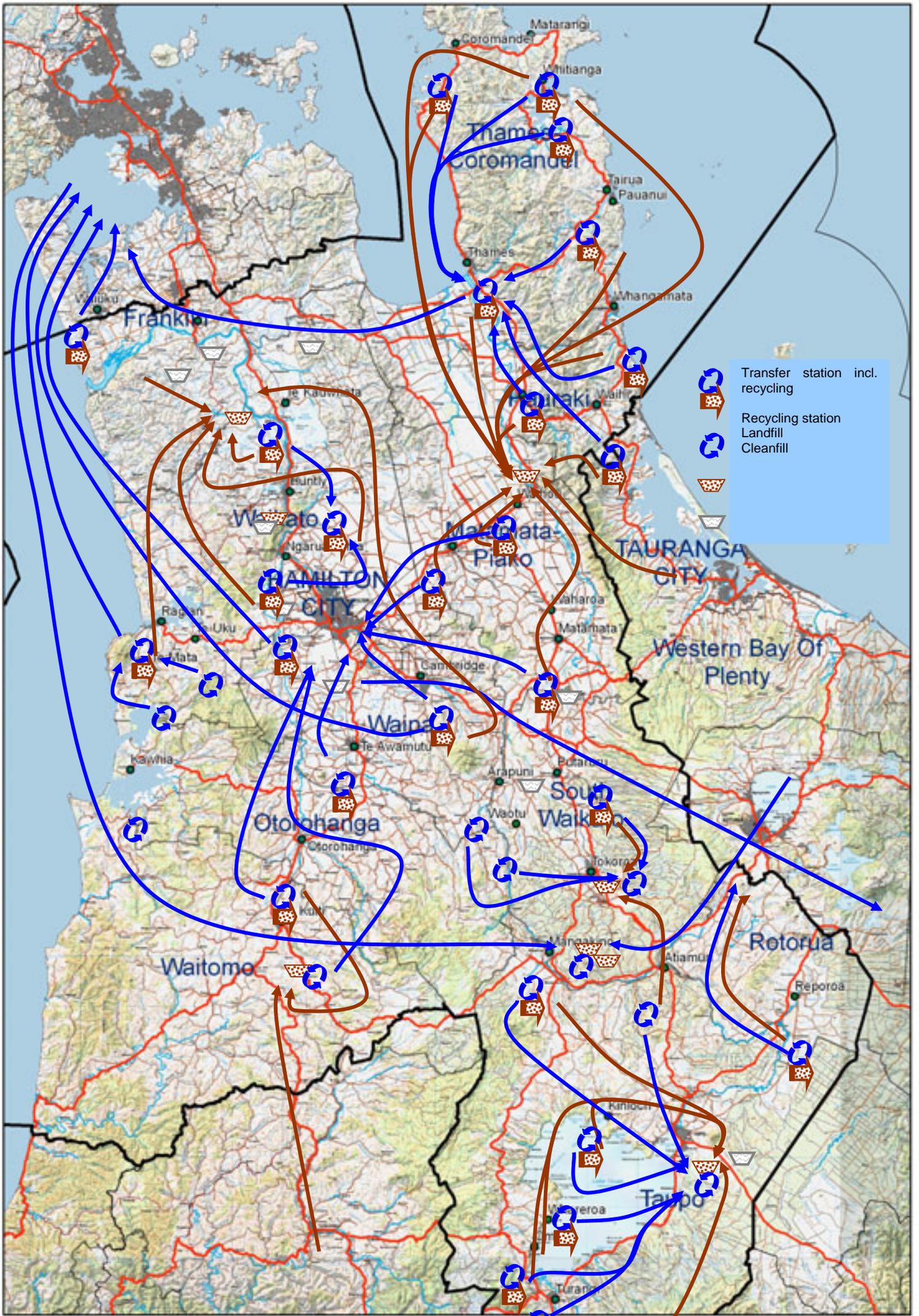
Figure 2: Organic waste flows

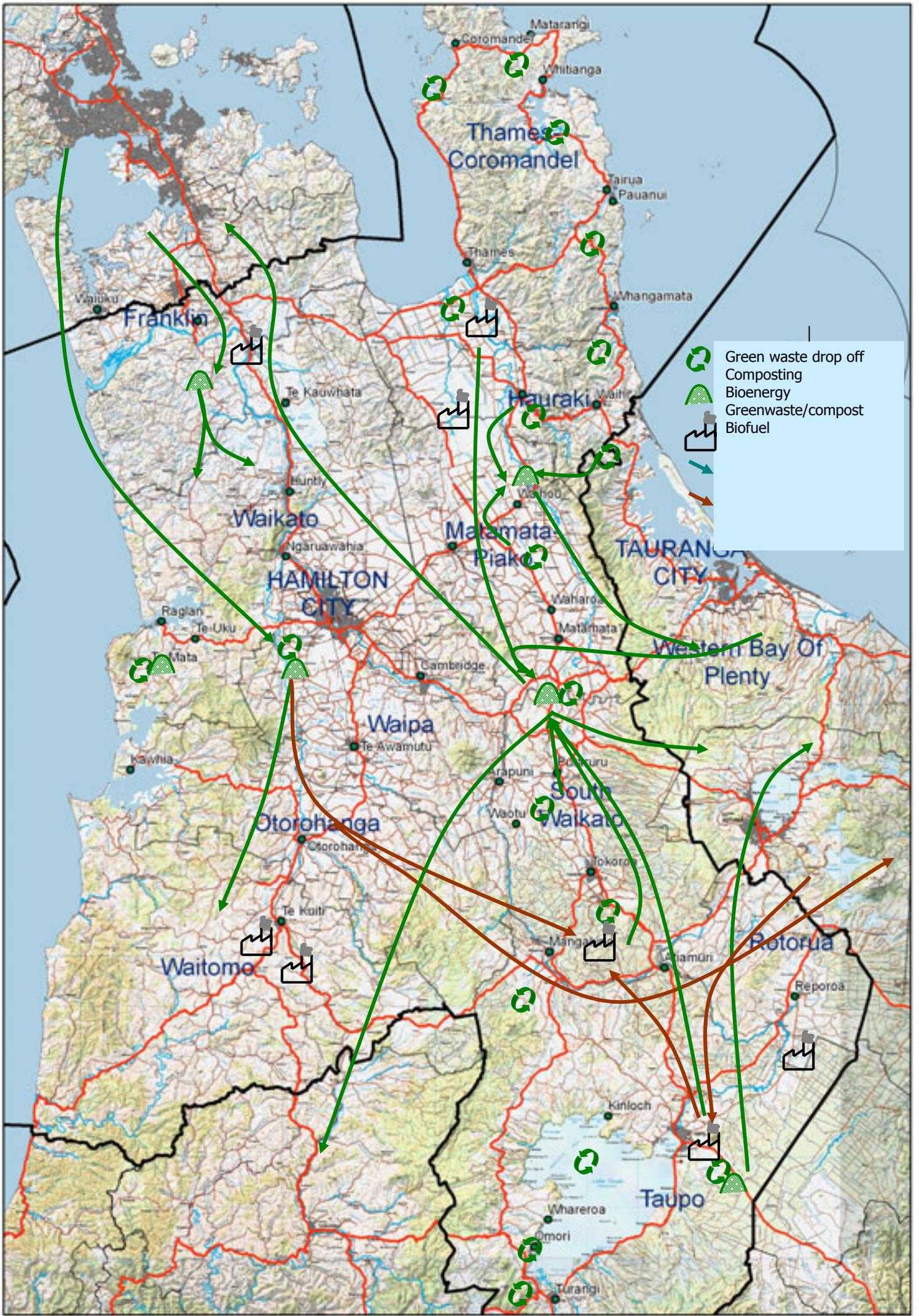
General waste and recycling flows

- Recycling commodities from Thames-Coromandel and Waipa are consolidated and sent to Auckland for detailed sorting (StreetSmart Ltd);
- Recycling commodities in Rotorua are sorted in Rotorua or sent to AllBrite Industries facility in Tauranga for sorting;
- Recycling commodities from Raglan are consolidated and sent to Auckland;
- Recycling commodities from the Waikato district except for Raglan are consolidated and sorted at Huntly Transfer Station (Recover NZ);
- Recycling commodities from the remainder of the region are sorted in Hamilton (CHH FullCircle);
- Waste from Gisborne, parts of the Bay of Plenty, Thames-Coromandel, Hauraki, Matamata-Piako is disposed of at Tirohia Landfill, Paeroa;
- Waste from Franklin, Waikato, Waipa and Hamilton is disposed of at Hampton Downs landfill;
- Waste from Ruapehu district, Otorohanga and Waitomo is disposed of at Rangitoto Quarry Landfill in Te Kuiti;
- Waste from Taupo district is disposed of at Broadlands Rd Landfill in Taupo;
- Waste from the South Waikato is disposed of at Tokoroa Landfill;
- Waste from Rotorua district is disposed of at the Rotorua Landfill;
- Paper from throughout New Zealand is used at CHH Kinlieth; and
- Some paper from the region is used for manufacturing egg cartons in the Hawkes Bay.

Organic waste flows

- Greenwaste compost from Vertical Composting Units in Waitakere are transported to Hamilton for maturing and sale;
- Greenwaste from Auckland is processed into compost at Tuakau (EnviroFert);
- Bark waste from the Waikato and Bay of Plenty is processed into compost in Matamata (Daltons);
- Greenwaste from Hauraki, Matamata-Piako and the Bay of Plenty is composted with poultry waste in Paeroa (HG Leach);
- Greenwaste from Hamilton is composted at the Hamilton Organic Recycling Centre;
- Greenwaste from Taupo is composted at the Taupo Organic Recycling Centre;
- Compost from the Waikato is sold in the region and throughout the North Island for landscaping, horticulture and restoration/sediment control;
- Wood waste from the Waikato is used as boiler fuel in the Waikato and Bay of Plenty; and
- Wood waste is imported into the Waikato for use as boiler fuel.





3.4 Waste disposed to landfill and cleanfill?

3.4.1 General comments

There are five municipal solid waste landfills (for general waste) in the Waikato region, five disposal sites associated with industrial operations and at least 13 consented cleanfills of significant size.

The published cost of disposal for municipal solid waste ranges from \$40 per tonne to \$120 per tonne; this will vary for large quantities of waste and/or long term contractual arrangements and does not include the cost of transport to the disposal location (transfer station or landfill). Disposal costs and definitions for 'cleanfill' also vary around the region.

There are several disposal sites in northern Waikato consented to receive a range of materials wider than the generally accepted definition of cleanfill² including green waste, timber (including treated), plastics and steel. These sites are actively used by waste transporters in the Waikato and for waste from the Auckland region. Material disposed of at these sites is included in the estimates for cleanfills included in Table 3:

Total waste disposed of to landfill and cleanfill from the Waikato region.

Waste from the Gisborne district is currently transported to the region for disposal at the Tirohia Landfill while the Gisborne District Council develops a landfill within the Gisborne district. This landfill is unlikely to be operational prior to 2010. A bylaw prohibits the disposal of 'out of district' waste at the Broadlands Rd Landfill (Taupo) precluding it's use as a regional facility.

Landfill disposal charges are general calculated taking into account design, consenting, development operational and aftercare (up to 35 years) costs. This takes account of social, environmental and cultural costs in the sense that they are covered through the consent process and monitoring requirements. Many social, cultural and environmental impacts cannot be costed and are therefore excluded from any disposal charging. Environment Waikato has commissioned some research in quantifying these broader impacts³.

3.4.2 Estimates of waste quantities disposed to landfill

Table 2 and Table 3 present estimates of quantities of waste generated in the Waikato that is disposed of to landfill. The 2006 estimate is based on data provided by, and discussions with, local authorities, waste collection and disposal companies and a selection of major waste generators around the Waikato region. The 2004 and 2005 estimates are based on work done by Responsible Resource Recovery Ltd (RRRL) for a subset of Waikato territorial authorities⁴ and per capita extrapolation.

Table 2: Municipal waste disposed of to landfill from the Waikato region

² In the Waikato Regional Plan cleanfill is defined as material that when discharged to the environment will have no adverse effect on people or the environment. This includes natural materials such as clay, soil and rock and other inert materials such as concrete and brick, or mixtures of any of the above.

Cleanfill excludes for example:

- a) material that has combustible, putrescible or degradable components,
- b) materials likely to create leachate by means of biological or chemical breakdown
- c) any products or materials derived from hazardous waste treatment, hazardous waste stabilisation or hazardous waste disposal practices,
- d) materials such as medical and veterinary waste, asbestos or radioactive substances that may present a risk to human health,
- e) soils or other materials contaminated with hazardous substances or pathogens
- f) hazardous substances.

³ For example refer to Assessment of Waste Disposal vs. Resource Recovery, EW Tech Report 2005/35

⁴ Hamilton City, Hauraki District, Matamata-Piako District, South Waikato district and Taupo District

	2004	2005	2006
Municipal Waste (T/yr)	221,000	218,000	222,000
Per capita (T/cap.yr)	0.579	0.567	0.572

Notes:

- In this context, municipal waste excludes cleanfill and waste disposed of to dedicated industrial waste landfills. Table 3: Total waste disposed of to landfill and cleanfill from the Waikato region includes waste not controlled by local authorities.
- 2004 – 2005 figures are based on estimates from RRRL for a sub-set of Waikato territorial authorities and per capita extrapolation
- Population from Statistic NZ 2006 Census Usually Resident Population Count for 2001 and 2006, intervening figures estimated using straight-line interpolation.

Table 3: Total waste disposed of to landfill and cleanfill from the Waikato region

	2005 (T/yr)	2006 (T/yr)
Municipal waste (from Table 2)	218,000	222,000
Waste to unconsented and consented cleanfills ⁵		212,000 0.546 T/capita.yr
Waste disposed of to dedicated industrial waste landfills		155,000
TOTAL		589,000

It is worth noting that there is a degree of commercial sensitivity around quantities of waste disposed of to landfill (and cleanfill), particularly where a small number of operators are active in a given area. In this context waste disposal data can provide valuable commercial data on the size of the market and market share of the operators in the area. For this reason information in this document is reported at a regional rather than district level. The waste collection and disposal market is governed by landfill location and transport distance/cost rather than local authority boundaries. This means that reporting on territorial local authority basis would not reflect the reality of the market and in fact may misrepresent quantities of waste materials generated or managed in a particular district.

The figures in Table 3 are based on discussion with:

- Environment Waikato – cleanfill consent details;
- H.G. Leach (Owners and operators of Tirohia Landfill);
- South Waikato District Council;
- Taupo District Council;
- EnviroWaste Services Ltd;
- Waitomo District Council;
- Carter Holt Harvey Kinlieth;
- Ken Bleakley; and
- Genesis Energy.

3.4.3 Waste composition

The table below present estimates of waste composition in 2006 based on surveys in the Waikato region (labelled as Waikato surveys) and throughout New Zealand (MfE national estimate). The figures are based on municipal waste only i.e. they exclude materials disposed of to cleanfill and materials disposed of to industrial fills.

⁵ Waste to cleanfill is a combination of soil and rock (consistent with EBoP cleanfill definition) and construction waste materials where allowed by consent. This figure is an estimate only and for major sites includes around 30% construction waste comprising approximately 50,000 tonnes per year construction waste.

Table 4: Estimate of the composition of municipal waste

Category	Waikato surveys (%)	National composition estimate (%)
Putrescible waste	25.9%	24.7%
Paper waste	10.6%	15.3%
C&D waste (timber, rubble)	27.5%	25.1%
Metal	7.8%	6.3%
Plastics	8.7%	9.2%
Textiles	3.4%	3.8%
Glass	3.1%	2.5%
Other	13.0%	13.1%
TOTAL	100.0%	100.0%

Note: Putrescible waste includes garden waste and kitchen scraps.

3.5 Waste diverted from landfill and cleanfill disposal

There are some difficulties in identifying materials that have been diverted from landfill beyond 'traditional' recycling streams such as commodities (paper, plastics, glass, metal cans) and green waste due to challenges in delineating the boundary between wastes and by-products. In the course of collecting information a range of organisations processing by-products to create valuable products in the Waikato have been identified. Examples include:

- TimPack (Hamilton) – manufacturing and refurbishing timber pallets;
- Fonterra (Tirau and Reporoa) – converting whey (by product of casein manufacturing) into ethanol for human consumption, biofuel and other applications; and
- Graeme Lowe Corporation (Tuakau) – rendering various meat processing wastes into meat and bone meal (pork and poultry feed), blood meal and inedible tallow (soap manufacture, animal feed).
- The Laminex Group – converting sawdust, shavings and plywood trim to particleboard and hardboard.

There are also a range of reduction and reuse initiatives in place within the region including an active market for wood waste as fuel, application of high strength organic wastes to land and the crushing of concrete for road and construction fill (Materials Processing, Hamilton, D&T McDonald, Waikato Concrete Crushing).

Local authorities have funded the provision of waste minimisation advice to businesses through the Waikato Waste Advisory Service. Options for providing this type of advice in the future are currently being considered.

In addition to a qualitative assessment of the movement of materials destined for landfill disposal into, around and out of the Waikato region, estimates of the quantity of materials in the council controlled recycling streams have been made and are summarised in Table 5 below.

Table 5: Municipal waste quantities diverted from landfill disposal

	2004	2005	2006
T/yr	49,000	45,000	56,000
T/capita.yr	0.130	0.118	0.144
% (diverted/ diverted+landfill)	22.4%	20.8%	20.2%

Notes:

- The quantities presented above are materials collected on behalf of local authorities only including commodities (paper/card, plastic, glass, and cans), concrete, timber and organic waste.
- 2003 – 2005 figures are based on estimates from RRRL for a sub-set of Waikato territorial authorities and extrapolation based on population growth.
- The percent diversion for 2006 is calculated using the municipal waste portion excluding materials not handled by local authority controlled infrastructure i.e. it is comparable to the earlier figures.

Table 6 shows the total amount of materials diverted in 2006, including municipal and non-municipal waste streams such as mill wastes. Quantities moved through business to business transactions (e.g. commercial recycling collections) may be commercially sensitive and therefore commodity data has been presented at a regional level to avoid issues with publishing this information. Sources of information have included:

- Commercial recycling companies;
- Local authorities; and
- A selection of major waste generators in the Waikato region.

Table 6: Total quantities of diverted materials in 2006

	2006
Commodities (T/yr) (1 & 2 plastics, glass, Al and steel cans, paper, card)	36,000
Boiler fuel (T/yr) (Log ends, slivers and bark)	381,000
Compost (T/yr) (Green waste, biosolids, bark)	74,000
Other Crushed concrete (Hamilton, Taupo – for sale as aggregate, T/yr)	30,000
Land application (T/yr)	509,000
Commercial scrap metal (ferrous and non ferrous) (T/yr)	47,000
Other (T/yr)	37,000
TOTAL (T/yr)	1,114,000 (65.4% of total waste stream)

Note

- Percent diversion calculated using total disposal figure of 588,000 (industrial, cleanfill, municipal waste) from Table 3.
- The figure for municipal waste diverted in Table 5 comprises a portion of the total commodities, boiler fuel, compost, timber and crushed concrete noted above.

Waste composition (Solid Waste Analysis Protocol) surveys undertaken in the Waikato indicate that a significant portion of the waste stream (over 35%), was putrescible (garden and kitchen waste) and over 10% was paper. Note that these figures are for the landfilled waste stream only i.e. they do not include materials recovered for soil conditioners, energy recovery or recycling.

3.6 Diversion performance against targets

The table below presents an overview of diversion performance against the quantitative targets in the Waikato Regional Waste Strategy. These targets are consistent with those in the NZ Waste Strategy.

Table 7: Performance against waste strategy targets

Issue	Targets	Performance in 2006	
		Municipal	Total
Organic waste	Garden waste: 60% by 2005, 95% by 2010	47%	60%
	Commercial organic waste 95% by 2010		
	Diversion of all organic waste from Waikato	32%	81%
Construction waste	Construction waste 50% by 2008	-	22%

Notes:

- Municipal figures are based on diversion controlled by local authorities and the estimated quantity of green, organic or construction waste disposed of to municipal waste landfills from the Waikato region from Table 6.
- There is no significant diversion of construction waste in the municipal waste stream.
- Commercial scrap metal from construction activities has not been separately identified and is excluded from the construction waste diversion figures.

3.7 Summary of disposal and recovery data

Table 8 provides a summary of the disposal and recovery data presented in the preceding sections. The diversion figures are dominated by waste from the wood processing industry used as boiler fuel and the land application of high strength organic wastes from dairy and meat processing.

Table 8: Summary of disposal and recovery data

	2006
Municipal waste (T/yr)	222,000 0.572 T/capita.yr
Cleanfill (estimate only) (T/yr)	212,000 0.546 T/capita.yr
Waste disposed of to dedicated industrial waste landfills (T/yr)	155,000
TOTAL DISPOSAL (T/yr)	588,000
Local authority controlled diversion	
Municipal waste diverted T/yr (commodities, boiler fuel, timber, concrete from local authority waste management services)	56,000
All diversion	
Commodities (1 & 2 plastic, glass, cans, paper/card)	35,000
Boiler fuel (log ends, slivers, bark and waste paper))	381,000
Compost (green waste, biosolids, bark)	74,000
Other	
Crushed concrete	30,000
Land application	509,000
Commercial scrap metal (ferrous and non ferrous)	47,000
Other	37,000
TOTAL DIVERSION (T/yr)	1,114,000
% diversion	65.4%

4 Current recycling and recovery infrastructure for the Waikato

An important aspect of considering waste management activity in the Waikato region is identifying what processing of materials is currently undertaken in the region. It is also important to consider options available for the processing of materials out of the region. This section outlines recycling and resource recovery infrastructure and services available to the Waikato region. Section 6 outlines where opportunities may lie for development of processing capability to serve the region or a broader catchment.

The following sections outline key information relating to the management of recovered materials from the Waikato region. Each subsection concludes with an assessment of current capacity and capability. In this context capacity refers to how much material can be handled/processed i.e. the physical capacity of collection, sorting or reprocessing operations serving the Waikato region. Capability refers to the level of expertise and technology available for collection, sorting or processing of materials. For example there is good capability in the organic waste processing area – most organic wastes can be processed with existing technology and expertise. The capacity for processing organic wastes is adequate but would need to expand to process all organic waste in form the region.

4.1 Summary of current recovery

In brief recovered or divertible materials from the Waikato region are handled as follows.

- **Glass** is either stockpiled or transported to Auckland for recycling.
- **Plastics** (Code 1 and 2) are sorted and baled for movement out of the region, either for further sorting and processing within New Zealand or export. There is an emerging trend in New Zealand towards collecting plastics resin codes 3-7 with collected material exported, this is starting to occur in the Waikato region.
- **Paper** is sorted and baled for use in New Zealand (including at the Kinlieth Mill) or exported.
- **Cardboard** is sorted and baled for recycling in New Zealand (CHH Kinlieth, CHH Penrose) or export.
- **Aluminium and steel cans** are baled and moved out of the region for recycling. Steel can be recycled in New Zealand (processed into reinforcing steel), Aluminium is exported for processing.
- **Scrap steel** and non ferrous metals are moved out of the region for recycling in New Zealand or trading internationally. Steel and non ferrous metal prices are currently strong.
- **Green waste** is composted or shredded and sold as mulch.
- **Food processing waste** is landfilled or treated and recovered to varying degrees (meat processing waste , dairy processing wastes) using vermiculture, composting, rendering, anaerobic digestion and land application.
- **Biosolids** are landfilled or used to produce soil replacement products.
- **Industrial sludges** that are unsuitable for composting or similar processing are disposed of in dedicated or municipal waste landfill.
- **Concrete** is disposed of at cleanfill sites around the region and in some cases crushed for use as base-course or sub-base.
- **Wood processing waste** is in many cases used as boiler fuel at processing sites with materials actively traded within the region and throughout the central North Island. Wet wood or processing waste is landfilled. The Laminex Group manufacture composite wood panel products using sawdust, shavings and plywood trimmings.

- **Other industrial wastes** are landfilled in many cases although baghouse fines and ash are in some cases recovered for sale or re-use.

4.2 Commodities

4.2.1 Sorting and consolidation

Collection and processing of the recycling commodities (plastics code 1 & 2, paper, card, glass and cans) is well established in the Waikato region. Households throughout the region have access to recycling services at drop off locations or through rates funded kerbside recycling collections. Businesses have access to recycling through commercial collections (generally paper and cardboard only) or drop-off centres at transfer stations throughout the region.

CHH FullCircle operates a sorting facility in Hamilton. Streetsmart consolidates materials in Thames and Cambridge for transport to their sorting/baling operation in South Auckland. Auckland City Council and Manukau City Council have recently let a contract for the design, build and operation of a large, modern materials recovery facility in Onehunga to Visy Recycling New Zealand Limited. The facility will be sized for the predicted quantity of material from Auckland and Manukau with provision for expansion.

Other, smaller scale, processing/baling sites in the region include the South Waikato Achievement Centre (Tokoroa), Xtreme Waste in Raglan and council run operations in smaller centres throughout the region. All of these sites are limited in their ability to sort and bale materials to an export standard and therefore send consolidated materials to CHH FullCircle in Hamilton or sorting operations in Auckland.

With the current high world prices for scrap steel and non ferrous metals there is a thriving market for steel and aluminium cans across the Waikato region. Materials are generally sent to Auckland for processing / further trading or exported.

There may be a role for the region's economic development agencies in developing additional sorting, recovery and/or processing capability around materials where there is no existing market. This could include plastics that cannot currently be re-processed in New Zealand, sorting or processing technology to recover valuable metals or processing of waste paper and cardboard that is unsuitable for conventional recycling due to contamination.

Capacity⁶: Limited, there is room for a modern materials sorting facility serving the Waikato

Capability: Good

4.2.2 Utilisation of recycling commodities

A large proportion of materials collected leave the Waikato following sorting and baling for use in other parts of New Zealand or are exported for recycling. The Carter Holt Harvey Kinlieth Mill uses a large amount of recovered fibre from within the Waikato and throughout New Zealand.

While there are markets for most types of materials currently collected by councils and through commercial collections there are still significant quantities of plastics and metals disposed of to landfill from the region. The waste composition data available doesn't provide sufficient detail to identify the types of plastics disposed to landfill, however It is likely they are a mix of recoverable (1 and 2) and other materials.

There are several plastics products manufacturers looking at establishing processing capability for plastic currently not re-processed in NZ with Hamilton being considered

⁶ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

as a location. Access to well defined and consolidated quantities of recovered materials (from major manufacturing sites in the region) makes the Waikato attractive. Waikato territorial authorities may be able to take advantage of this situation or increase the quantity of material by working together or with major business in the region.

Capacity⁷: Adequate - Relies on a mix of in and out of region processing for plastics and metals, no local processing options for Type 3-7 plastics. Good for paper

Capability: Good except for types 3-7 plastics

4.3 Processing of organic waste materials

Composting operations serving the Waikato region are noted below. Compost is marketed for use in the region (domestic gardens, horticulture, commercial landscaping) and transported to other parts of New Zealand.

- Perry Environmental (Hamilton, Taupo);
- Daltons (Matamata) – taking bark waste from the Port of Tauranga and other sources;
- HG Leach (Paeroa) – taking green waste from Matamata-Piako District Council and various putrescible wastes; and
- EnviroFert (Tuakau) – taking green waste predominantly from the Auckland region.

There are significant quantities of waste materials generated in the wood processing sector in the Waikato region. Much of this is used – for boiler fuel, raw materials (MDF, particle board) and compost/soil conditioner. There are also significant quantities of waste from this sector currently landfilled or stockpiled. Examples of energy recovery from wood processing waste in the Waikato region are noted below. Wood chip is also exported out of the region for wood products manufacturing, the market for a specific waste/product stream is dependant on factors such as transport distance and chip quality.

- Materials Processing (Hamilton) - chipping greenwaste, waste paper and waste timber for the Kinlieth and Tasman mills;
- WastePro (Kinlieth) – chipping log ends for biofuel;
- CHH Kinlieth/Genesis (Kinlieth) – wood waste/gas fired co-generation plant, drawing on a range of sources of wood waste for fuel;
- Donnelly Sawmillers – wood waste fired boiler;
- Tanner Sawmills – wood waste fired boiler;
- The Laminex Group (Taupo); and
- Thames Timber.

There are a range of examples of alternatives to composting or energy recovery implemented in the Waikato region. These include:

- Taupo District Council - green waste mulch for sale, biosolids (limed and mixed with soil);
- Thames-Coromandel District Council - green waste mulch for sale, exploring options for biosolids;
- The Laminex Group – manufacturing composite wood panel products using sawdust, shavings and plywood trim;

⁷ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

- Wallace Corp (Waitoa) and Lowe Corporation (Tuakau) – rendering of animal carcasses; and
- Land application of various high strength organic wastes from food processing (DAF⁸ sludge, paunch wastes⁹ ...).

Capacity¹⁰: Adequate for green waste and boiler fuel, good for other organic wastes

Capability: Good, existing expertise can be applied to other organic wastes

4.4 Management of special wastes

There are a number of waste streams that present challenges beyond those for general municipal waste, these are often referred to as special wastes. Some special wastes are a national issue and are dealt with at this level, others are specific to the Waikato or are amenable to local or regional solutions. The following sections note relevant 'special wastes', waste that have the potential to be addressed at a local or regional level. Waste electronic equipment (or e-waste) has the potential to be addressed at a regional level. Special wastes where local authority participation in national initiatives is important include:

- Tyres; and
- Liquid and hazardous wastes.
- Used oil
- Unwanted paint
- Agricultural plastics
- construction and Demolition waste

4.4.1 Waste electronic equipment (e-waste)

E-waste is generally described as 'anything with a plug or a cord' but the focus is generally on electronic waste such as mobile phones, batteries and computers. Both Vodafone and Telecom accept old or unwanted mobile phones. Where possible these are reused in New Zealand with the balance exported for disassembly and recycling (Telecom in Malaysia, Vodafone in Singapore).

Car batteries can be recycled with batteries from Australia and New Zealand in Petone (Wellington), several scrap metal dealers in the Waikato will purchase lead acid batteries. Rechargeable batteries for mobile phones, power tools and computers can be re-processed. As noted above mobile phone providers will take phone batteries for re-processing. ReCell (Tauranga) can refurbish rechargeable batteries. Normal household batteries can be disposed of with general rubbish.

The Ministry for the Environment has worked with computer retailers on examining e-waste issues and pilot collection schemes. The recent Dell E-day in Wellington was a successful example of an e-waste collection. The model adopted was similar in concept to that for the HazMobile household hazardous waste collections involving a single drop-off point available for a specified period of time.

There is no general e-waste collection or management service available in the Waikato region.

⁸ DAF (Dissolved Air Flotation) – a wastewater treatment technique

⁹ Paunch waste – stomach contents from abattoirs/freezing works, predominantly undigested grass

¹⁰ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

Capacity¹¹: Limited (good for phones, batteries)

Capability: Limited in Waikato for general e-waste

4.4.2 Tyres

Several local authorities noted waste tyres as a problematic waste stream. The Motor Trade Association operates Tyretrack, a system for locating tyre transporters and recording the movement of tyres around New Zealand. Tyres are generally disposed of to landfill although alternative uses have been implemented or are being actively considered around New Zealand including:

- landfill drainage/leachate collection systems, for example at the Tirohia and Rotorua Landfills;
- holding down silage pit covers; and
- Energy recovery (boiler fuel).

Capacity¹²: Adequate for collection, poor for re-processing

Capability: Basic options (chipping/quartering for landfill, silage pits) predominate

4.4.3 Liquid and hazardous wastes

The management of hazardous waste in New Zealand is covered by a range of regulatory tools. These include the Resource Management Act 1991 (RMA), Hazardous Substances and New Organisms Act 1996 (HSNO), the Local Government Act 1974 and 2002 (LGA), the Health Act 1956, various Group Standards under HSNO and Trade Waste By-laws under the LGA.

The Ministry for the Environment has been working with the Liquid and Hazardous Waste Special Interest Group of the New Zealand Water and Wastes Association on the development of a waste tracking system known as WasteTRACK. WasteTRACK is a web-based system run by the waste transporters and linked in many parts of New Zealand with trade waste by-laws. The Ministry is also exploring the development of a Group Standard under hazardous substances legislation to require the use of WasteTRACK for hazardous wastes.

The system is in early stages of implementation, however data to date provides the following information about liquid and hazardous wastes generated and transported in the Waikato region. This data was entered into WasteTRACK by several of the operators in the region. Waipa District Council in particular requires the use of WasteTRACK for liquid waste contractors disposing of materials to their wastewater treatment ponds through their Trade Waste By-law based in the NZ Standard Model.

Table 9: Liquid and hazardous waste transported in the region – WasteTRACK data

Waste type	Quantity recorded
General bulk liquid waste	3,695,000 litres
Septic system waste	12,554,000 litres

Septic tank services in the Waikato are provided by at least 18 providers (according to listings in the Yellow Pages) based around the Waikato¹³. 7 of these providers were registered as users of WasteTRACK in May 2007.

¹¹ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

¹² Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

¹³ Effluent Treatment Solutions (Cambridge), Effluent Services Ltd (Cambridge), Henrys Septic Tank Services (Matamata), Allens United Septic Tank Cleaning Services (Paeroa), Cambridge Septic Tank Services (Cambridge), Raglan Septic Tanks Services (Raglan), Dux Drainage Ltd (Cambridge), South Waikato Waste Disposal (Putururu), Valley Bin Services (Thames), X-S Waste Removal (Ngaruawahia), Allens United Waikato Ltd (Hamilton), Bain Liquid's Disposal (Te Awamutu), Fountain City Plumbing Ltd (Hamilton), Pinewood Waste Services (Putururu),

There are no Waikato based general hazardous waste treatment companies, however Transpacific Technical Services, Medi-Chem Waste Services and Chemwaste Industries service the region from Auckland. Medical and Quarantine waste can be handled by Medi-Chem and Transpacific's MediSmart.

Capacity¹⁴: Adequate
Capability: Treatment for hazardous waste out of region

4.4.4 Used oil

Used oil is collected from commercial premises under the national used oil collection programme operated on behalf of major suppliers throughout New Zealand. Several councils in the region offer used oil collection at transfer stations. McDonalds Lime, part of the Holcim Group, use small quantities of waste oil and are considering a range of alternative fuels on a larger scale for their King Country operations.

Capacity: Adequate
Capability: Good - Majority of waste oil currently transported out of the region

4.4.5 Agricultural plastics

Agricultural plastics (chemical containers, silage wrap) pose disposal and management challenges throughout New Zealand. In response a collection system (AgRecovery) is has been established with an initial focus on agrichemical containers. The scheme has been set up with the participation of chemical manufacturers/suppliers, local authorities and the farming community. The system relies on collection depots being set up at landfills, transfer stations and/or rural supply depots with regular servicing by mobile shredding plant.

AgPac Ltd supply silage wrap and similar products to the agricultural sector throughout New Zealand. Building on a trial undertaken in Taranaki in 2006 AgPac is working with contractors in the Waikato to provide a collection system on a cost recovery basis. Farmers put waste plastics into liners held in a bin, accumulated material is collected by contractors and sent to Auckland for re-processing. The bins cost \$480, liners are \$10 and collection is \$40 per a full liner.

Capacity: Good (increasing)
Capability: Good Materials collected will be processed out of the region

4.4.6 Unwanted paint and paint tins

Waste paint is a small but potentially problematic waste stream in New Zealand with landfill disposal inappropriate due to the need to minimise liquid waste disposal to landfill. Many local authorities around New Zealand accept unwanted paint with various schemes to re-distribute unwanted paint for re-use. Resene Paints have set up a take back scheme (Paintwise) in parts of New Zealand accepting unwanted domestic quantities of Resene paint for free and commercial quantities or non Resene branded paint for a small fee. The Resene ColourShops in Te Rapa and Hamilton are the only collection points for this scheme in the Waikato region.

Xtreme Waste (Raglan) and Seagull Centre Trust (Thames) also accept unwanted paint for redistribution within their communities.

Transpacific Technical Services (Hamilton), Waitomo Liquid Waste Disposal, (Te Kuiti), Town & Country Drainage Ltd (Ngaruawahia), Allens United North Waikato Ltd (Te Kauwhata).

¹⁴ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed

Capacity¹⁵: Limited
 Capability: Good - re-processing out of the region

4.4.7 Construction and demolition waste

Construction and demolition is a significant waste stream (estimate around 120,000 tonnes each year to landfill and cleanfill) in the Waikato region. There is a ready market for untreated timber (boiler fuel, firewood, mulch) and several organisations are producing/using recycled aggregate from waste concrete and asphalt pavement¹⁶. Organisations like Xtreme Waste (Raglan) and Demolition Traders (Hamilton) retail unwanted construction waste – timber and building components.

Capacity: Limited – current processing capacity well committed
 Capability: Good – concrete crushing, untreated timber and scrap metal can all be processed in the Waikato

4.5 Capacity and capability – a summary

Sections 4.2 to 4.4 provide an assessment of capacity and capability. As noted above In this context capacity refers to how much material can be handled/processed i.e. the physical capacity of collection, sorting or reprocessing operations serving the Waikato region. Capability refers to the level of expertise and technology available for collection, sorting or processing of materials. Table 10 provides a summary of capability for key waste streams from the Waikato region.

Table 10: Capacity and capability for key waste streams in the Waikato

Waste stream	Capacity	Capability
Commodities – sorting and consolidation	Limited	Good
Commodities – utilisation	Adequate	Good
Organic waste processing	Adequate	Good
E-waste	Limited	Out of region
Wood-processing wastes	Adequate	Good
Tyres	Adequate	Basic
Liquid and hazardous waste	Adequate	Out of region
Used oil	Adequate	Good
Agricultural plastics	Good	Good
Unwanted paint	Limited	Good
Construction and demolition waste	Limited	Good

4.6 Other diversion and reuse in the Waikato

In addition to the processing of organic wastes there are several examples of by-products from one manufacturing process being used to create products with significant value. Examples include TimPack (refurbishing pallets), Daltons (processing bark into peat replace as well as composting noted above), Fonterra (Reporoa and Tirau - producing several grades of ethanol from whey, lactose derivatives), Graeme Lowe Corporation (meat processing waste into a range of products) and Wallace Corporation (producing a range of products from stock fatalities).

The local authorities in the region also fund the Waste Exchange service where organisations with unwanted materials can make these available at no cost to them or

¹⁵ Capacity – how much material can be handled/processed, Capability – how well is the material handled /processed
¹⁶ Material Processing Ltd (Hamilton), Waikato Concrete Crushing, D&T McDonald, EnviroFert

the receiver of the materials. The funding covers the costs of running a web based database and a coordinator to assist in the 'exchanges'. Over 8,000 m³ of materials were diverted in 2006.

Xtreme Waste (Raglan) and Seagull Centre Trust (Thames) run re-use stores associated with transfer stations. Data provided by Xtreme waste indicate that 4-6% of the municipal waste stream is diverted through the recovery and re-sale of items through their store. In addition to diverting materials from landfill these stores provide income, jobs and cheap goods. Reuse shops are an extension of the second hand trade recovering materials destined for landfill. In Raglan, Kahu's Nest successfully co-exist with a downtown second hand store.

5 The current and future context

There are a range of external factors and initiatives that impact on the management of waste in the Waikato region that are important to consider. These include the Waste Minimisation (Solids) Bill currently with the Local Government and Environment Select Committee, the development of the New Zealand Energy Strategy, the impact of European consumer standards and expectations on the primary produce exported from the region, the influence of the recently promulgated New Zealand Standard for compost, the national construction and demolition waste reduction initiative (REBRI) and the ongoing consolidation of the waste sector in New Zealand. There are also several important decisions on waste management issues to be made in the next 10 years that are of relevance to the region. Each of these is discussed in turn below.

5.1 Current approaches to the way waste is managed in New Zealand

5.1.1 Waste disposal

There is a mix of local authority controlled and private sector landfills around New Zealand. Older sites are generally owned by local authorities while newer sites are a mix of local authority, public-private partnerships and private sector controlled. Examples in New Zealand include:

- Local authority developed and owned landfills e.g. Taupo, Rotorua, Wellington, Hutt/Upper Hutt, Timaru, Dunedin;
- Local Authority – Private sector shared ownership and management of landfills e.g. Whitford (Auckland) and Kate Valley (Canterbury); and/or
- Private sector owned/operated landfills, local authority purchasing airspace with a wide range of contractual arrangements e.g. Tirohia (Paeroa), Hampton Downs (North Waikato), Bonny Glenn (Rangitikei), AB Lime (Southland) and Redvale Landfill (Auckland).

All of these arrangements have advantages and reflect local conditions and, where local authorities are involved, community aspirations. The key to success for any arrangement is a realistic assessment of limitations and putting in place systems or initiatives to address these.

5.1.2 Waste and recycling collection services

In general, households have access to the following services:

- Refuse collection - mobile garbage bin (funded through rates or commercial service) or bag (funded through rates or sale of bags);
- Recycling collection – rates funded crate based kerbside recycling collection with a trend towards mobile bins due to efficiency and health and safety benefits; and
- Drop off facilities for recyclables (free), re-usable items (free) and green waste (charges from \$0 to \$60/tonne).

Emerging trends in local authority provided services include the introduction of mobile bins for recycling, domestic putrescible waste (food/kitchen and green waste) collection, investment in enclosed facilities for centralised composting for putrescible waste and / or biosolids (Wellington City Council, Selwyn District Council, Christchurch City Council, Waitakere City Council and MacKenzie District Council) and collection of the full range of plastics (resin codes 1-7). There are unresolved concerns about the impact on the quality of recovered materials from mobile bins, particularly glass and paper.¹⁷

Businesses in urban centres are able to access commercial collections for refuse and recycling from a range of suppliers with a trend towards integrated services (waste, recycling, hazardous waste, liquid waste). An example is Transpacific Industries Ltd move to offer recycling (Recycle NZ, AllBrite Industries), waste collection (Waste Management NZ Ltd) and liquid/hazardous waste services (Onyx, Nuplex Environmental, Allens United).

5.1.3 Waste industry

As noted above, the waste industry in New Zealand is characterised by several large companies and a large number of small operators. Smaller operators may provide collection services to rural councils and individual clients while the large companies dominate urban council services and provide services to companies operating nationally such as Fonterra, Progressive Enterprises and Foodstuffs.

There is a trend towards companies working in partnership with major waste generators and councils with examples including AllBrite Industries – Gisborne District Council, EnviroWaste Services – Timaru District Council and Fonterra – EnviroWaste Services/Waste Management. There is also a trend to seek economies of scale for both disposal and processing of recyclable materials. The development of the Kate Valley Landfill and the joint venture between Transpacific Industries/Waste Management NZ Ltd and AllBrite Industries Ltd are examples of this.

5.1.4 Waste generators

Major companies are becoming increasingly savvy about recycling commodity markets, technology available for dealing with their various waste streams and the range of contractual arrangements on offer. Many materials that were considered waste are now converted to materials with value, examples from within the Waikato region include various meat processing wastes, animal mortalities and wood processing residues.

Companies are increasingly prepared to spend money to divert waste from landfill disposal but in doing so are looking for a return on a purely financial basis and in some cases through leveraging good environmental practice for market advantage. Initiatives such as EnviroSmart, EnviroMark, Environmental Choice, the Sustainable Business Network and the NZ Business Council for Sustainable Development are tapping into this trend.

5.2 Waste Minimisation (Solids) Bill

The Waste Minimisation (Solids) Bill is a members bill sponsored by Nandor Tanczos (Green Party) and supported in part by the government. The Bill has been referred to the Local Government and Environment Select Committee for consideration and following consultation is to be reported back to parliament in 31 October 2007 (recently extend from June 2007). The Bill includes a wide range of provisions with measures likely to be retained including the imposition of a levy on waste disposed to landfill and the development of a regulatory backstop for product stewardship schemes such as the New Zealand Packaging Accord, TyreTrack and AgRecovery.

¹⁷ Issues of concern include reports of increased glass breakage and contamination of paper by broken/crushed glass.

As recently as late June 2007 the Minister for the Environment has indicated to the Select Committee that he is likely to propose additional initiatives under the auspices of the Bill. Initiatives could include bans on specific materials (green waste, hazardous materials) and introducing container deposit legislation. The Green Party and the government appear to agree that substantial re-drafting of the Bill is required to ensure it achieves the intended outcomes.

With waste issues being at the forefront due to the debate regarding the details of the Bill, a review of the actions proposed in the New Zealand Waste Strategy is possible and probably timely. The tools proposed in the Bill would provide government with regulatory powers to focus on specific waste streams (using product stewardship) while also providing funding for broad initiatives where appropriate.

The government's recent announcements on sustainability have included clear messages around waste management and minimisation. The Prime Minister has been clear on the need for a legislative backstop to support product stewardship schemes and additional funding, through a levy on waste, to increase the scope and effectiveness of local and national waste minimisation initiatives.

The levy and product stewardship aspects of the Bill are likely to become law providing additional funding for waste minimisation activities. Models proposed have included a contestable fund and/or allocation of funds to local authorities. Further development of product stewardship schemes effectively involves investment of resources from product manufacturers/importers and retailers to address specific waste streams. In this context local authorities and other organisations with a clear understanding of investment needs and opportunities will be well placed to work with funding agencies and product stewardship organisations to progress waste minimisation in their area of influence.

Wastes that may be addressed through product stewardship schemes in New Zealand include:

- Tyres;
- Used oil;
- Cars;
- Electronic waste;
- Packaging;
- Farm chemicals; and
- Farm plastics.

Recent policy announcements by parties outside government represent increasing alignment of objectives around waste management and minimisation. This means that there is likely to be ongoing support for national policy supporting waste minimisation and resource efficiency regardless of the government of the day.

5.3 The New Zealand Energy Strategy

Submissions on the draft New Zealand Energy Strategy closed in early 2007¹⁸. Of relevance to waste management in the Waikato region is the emphasis on renewable transport fuels, heat and power. The Waikato region is well placed in this regard with extensive use of wood processing residues for power and heat generation and the processing of whey to ethanol with potential application as a transport biofuel. The region is also rich in geothermal resource and in some cases this will 'compete' with waste to energy, with geothermal likely to be less expensive where users of heat are close to geothermal bores.

¹⁸ In a recent speech on Climate Change Judith Tizard indicated the Energy Strategy would be finalised in September 2007 and the revised National Energy Efficiency and Conservation Strategy in October 2007.

The Genesis Research/Lake Taupo Development Corporation work on short rotation woody crops for bioethanol production is linked to likely future demand for biofuels. This type of biofuels production may be in a position to utilise low value soil conditioners or fertilisers such as biosolids that can be problematic in other markets. As government policy is refined and finalised through 2007 it is possible that there will be further opportunities to recover energy from 'waste' materials building on regional expertise including researchers at Genesis Research, Waikato University and AgResearch. Researchers at Scion Research (Rotorua) are also active in this area.

Emerging opportunities that are worth further consideration include:

- Utilising excess fermentation capacity in or near to the region to manufacture bioethanol from alternative feedstock such as waste fruit and cellulosic wastes (following pre-treatment) such as contaminated paper wastes and wood processing residue¹⁹;
- Using additional waste streams for boiler fuel – waste timber, contaminated paper/cardboard; and
- Adopting waste to energy technology where there is a need for industrial heat or power.

5.4 The Waikato Regional Energy Strategy

Environment Waikato facilitated the establishment of the Waikato Energy Forum in March 2007 - a multi-stakeholder approach to the development and implementation of a Regional Energy Strategy. The non-statutory strategy is designed to align the activities of a range of stakeholder groups, including central and local government, electricity companies, electricity producers, industry users and community groups to address common energy related issues.

The aim of the strategy is two-fold:

- To facilitate access to renewable energy sources within the region by identifying unintended barriers to development, and to find ways of minimizing or removing these barriers to improve community access to sustainable resources; and
- To advocate for energy conservation and efficiency within the community by fostering partnerships at national and local level

The strategy compliments the national strategy and regionalises responses to energy related issues. It will inform decision-makers at the regional and district with respect to RMA policies and plans which will have a flow on effect to the consideration of resource consent applications. It will also foster partnerships within the community for the development of a series of pilot projects that can provide workable models of electricity generation and energy efficiency which are scalable into larger operations.

The strategy includes an analysis of the range of energy sources within the region and includes an assessment of electricity generation and direct use potential of:

- Hydro electricity;
- Geothermal energy;
- Coal;
- Natural gas;
- Wind;
- Marine energy;
- Solar photovoltaics; and a significant section on
- Biomass and biofuels from specific crops and from plant and animal wastes.

¹⁹ Note that pre-treatment of softwoods (such as *pinus radiata*) to yield feedstock suitable for fermentation is problematic – international initiatives have focussed on hardwoods.

5.5 Export market standards and expectations

EurepGAP is a European based private sector body that sets voluntary standards for the certification of agricultural products from around the globe on behalf of European food retailers. EurepGAP standards currently impact predominantly on horticultural produce from New Zealand but standards exist for integrated farm quality assurance and are likely to become increasingly important for all New Zealand agricultural products exporters. EurepGAP also provides insight into European consumer expectations that are less explicitly influencing other exports from New Zealand such as dairy products and meat.

Of interest in the Waikato is the interest in the storage, use and disposal of agricultural chemicals and the wording of relevant standards relating to the use of compost and soil conditioner products (NZS 4454:2005). There are commonly limitations on the use of 'organic fertiliser' products with particular mention of those containing human waste (sewage sludge, wastewater) although the standards are unclear on the status of treated wastes such as biosolids compost.

5.6 Compost NZ/compost standard

The composting industry in New Zealand has recently established an industry body (Compost NZ) under the umbrella of the Waste Management Institute of New Zealand (WasteMINZ). Key activities for Compost NZ include the promotion of the recently completed NZ Standard for Compost (NZ4454:2005) and building technical capacity within the industry. The group has recently received funding from the Ministry for the Environment's Sustainable Management Fund to implement NZ4454:2005. Compost NZ will provide training for compost producers, facilitate research on compost production and use and work with regional councils on Resource Management Act issues.

Perry Environmental Limited (Taupo and Hamilton composting sites), EnviroFert (Tuakau) and Daltons (Matamata) are members of Compost NZ and it is likely that there will be a strong push to promote the NZ Standard for compost to various agricultural users in the region. In this context smaller compost producers may benefit from assistance or advice with respect to meeting the requirements of the standard. Perry already works closely with Ravensdown on marketing their Revital fertiliser/compost product.

5.7 Construction and demolition waste initiative

Local authorities, the construction industry, the waste sector and the Ministry for the Environment have worked together to develop a suite of guidance material that aims to assist in reducing construction and demolition waste. Target audiences for the guidance material include local government planners, engineers, architects, recyclers, building product suppliers, construction and demolition companies, renovators and developers. The guidelines are promoted under the banner of REBRI (Resource Efficiency in Building and Related Industries) with local authorities and the Ministry for the Environment working with selected projects to document their application and build capability with the construction and waste sector to divert construction waste from landfill disposal.

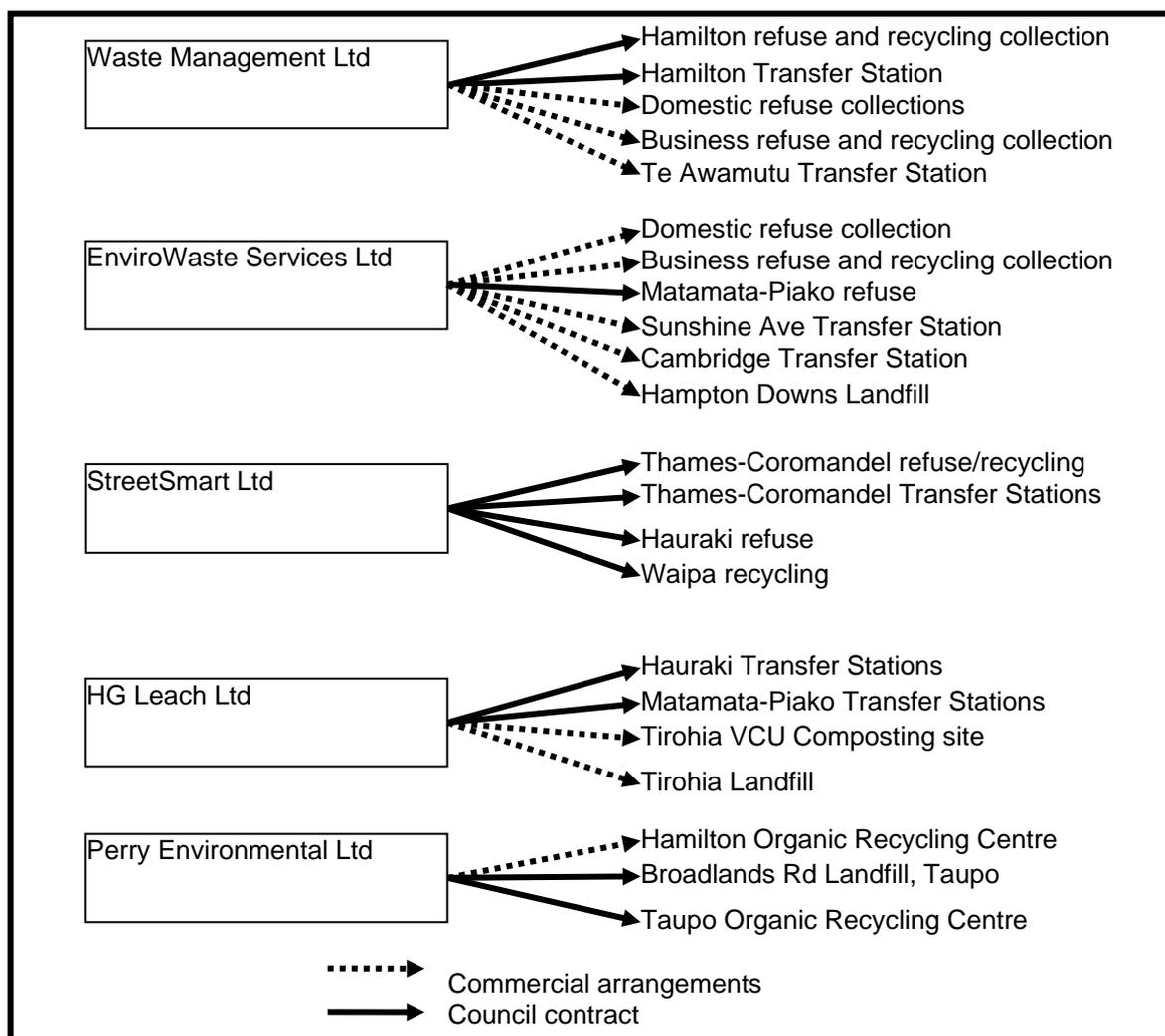
Given the significant quantity of construction and demolition waste material from the Waikato region disposed of to landfill there is an opportunity to build on the trend for local waste operators to separate construction waste materials to avoid the cost of disposal at municipal waste landfills. The wide range of acceptance criteria for cleanfill in the region represents a challenge to increased diversion of construction waste. Increasing costs for disposal of construction waste to cleanfill and the development of cost effective alternatives to disposal will have an impact on management of this waste stream.

5.8 New Zealand waste sector consolidation and investment

Consolidation of the waste sector in New Zealand has already had some impact in the Waikato region with the Transpacific Technical Services becoming the dominant player in the liquid waste management business. Transpacific now controls Waste Management NZ Ltd and AllBrite Industries but has been blocked from acquiring parts of EnviroWaste Services Ltd by the Commerce Commission. It remains to be seen how the new owners of the two major commercial waste management players at a national level (Ironbridge Capital – EnviroWaste Services Ltd and Transpacific Industries Group – Waste Management NZ Ltd) will approach the waste minimisation aspects of the businesses. In recent media statements Ironbridge Capital have highlighted the value of the collaborative and comprehensive waste minimisation and management services offered to local authorities by EnviroWaste Services Ltd.

Recent new entrants to the waste and recycling market in the Northern North Island include Recover NZ and Visy Recycling New Zealand Ltd. Recover NZ are a joint venture between Meta NZ Ltd (TerraNova/Christchurch City Council) and Metrowaste Ltd. Recover NZ have the contract for waste collection, transfer stations and recycling in the Waikato district except for Raglan. Visy Recycling have recently won the contract to design, build and operate an 80,000 tonne per annum materials recovery facility in Onehunga to service Auckland and Manukau City kerbside recycling collections.

Figure 3 Key waste sector participants in the Waikato



In a commercial environment characterised by several large players and a large number of very small operators, local authorities need to consider carefully how to

structure contractual and regulatory arrangements to ensure that all involved have an incentive to reduce waste and appropriately manage residual waste. Contracts need to recognise the realities of disposal and diversion costs (including logistics) and include flexibility to account for changing markets and improving technology. There are also opportunities for local authorities to work with businesses in their area where there is potential for mutual benefit with respect to the range and/or cost of services.

5.9 Hazardous waste management in New Zealand

As noted in Section 4.4.3, the Ministry for the Environment is working with hazardous waste transporters and local government on the implementation of WasteTRACK, a system for the tracking of liquid and hazardous wastes. Local authorities around New Zealand are moving towards requiring the use of WasteTRACK for liquid wastes disposed of in municipal wastewater treatment plants and requiring the use of WasteTRACK for materials entering private treatment plants through consent conditions. The Ministry for the Environment is also developing group standards (under HSNO) for hazardous waste that are likely to require the use of WasteTRACK by transporters and treatment plant operators. Local authorities in the region can assist this industry led initiative by requiring that contractors using disposal facilities (wastewater treatment plants) and providing services use WasteTRACK.

Medical, quarantine and most hazardous wastes from the Waikato region are transported to Auckland for treatment and disposal and as treatment standards improve costs are likely to increase.

5.10 Industry trends in the Waikato region

5.10.1 Changes in the dairy industry

The dairy industry in the Waikato has a long history and continues to be a strong influence on the region. As well as being a key contributor to economic growth the sector has an impact from a waste management perspective on a variety of levels. In this context it is important to understand key trends for the industry. These include:

- Significant land use change in the South Waikato – from forestry to dairy; and
- The emergence of competitors to Fonterra for milk supplies – established player Tatua as well as Open Country Cheese and the developing Dairy Trust.

On farm production is significant from a waste management perspective. Key waste streams including agricultural plastics (wrap and containers) and unwanted chemicals. Increasing interest in life cycle environmental impacts in key export markets mean management of these wastes are likely to come under increasing scrutiny.

Dairy processing sites produce large quantities of high strength organic wastes and smaller volumes of general wastes. As for on-farm waste, companies are looking for cost-effective waste management solutions that support the 'clean green NZ' image in international markets.

5.10.2 The wood waste market in the Waikato

The wood processing sector is also significant for the Waikato region from both an economic and waste management perspective. There are large tracts of land tied up in plantation forestry and many of the major manufacturing sites in the region involve wood processing – Kinlieth (CHH), Taupo (The Laminex Group, Tenon, Lakesawn) and Thames (Thames Timber, CHH).

The use of waste materials for bioenergy and/or bulking agent for compost is well established throughout New Zealand. Challenges in waste management for the wood processing sector in the Waikato region include:

- The decision by The Laminex Group to not re-build the MDF manufacturing line in Taupo – significant quantities of sawdust now available in South Waikato;
- The competing uses for wood waste (bioenergy vs. as a bulking agent for compost/organic waste processing); and
- The comparative benefits of using biomass vs. geothermal for industrial heat and power.
- The competition between forestry and wood processing waste and C&D wood waste for fuel and other uses.
- The trend to convert suitable land to dairying, particularly in the South Waikato. This means that the location of raw material, including harvest waste, is not necessarily close to potential users of that waste predominantly in the South Waikato.

6 Gaps and opportunities

Identification of gaps in the current waste management system in the Waikato region has been done in three ways.

- Looking at the waste composition and quantity data to provide an indication of materials currently landfilled that could be recovered using existing technology – characteristics of interest are likely to include large volumes, easily recoverable, established markets and/or high risk/hazardous materials;
- Comparison of the existing waste management infrastructure serving the region with facilities and developing technology available in other parts of New Zealand and to a lesser degree internationally to provide some insight into potential areas for investment by the public or private sector; and
- Considering the information presented in the Sections 3 - 5 in light of existing and proposed law and policy framework in New Zealand and the Waikato.

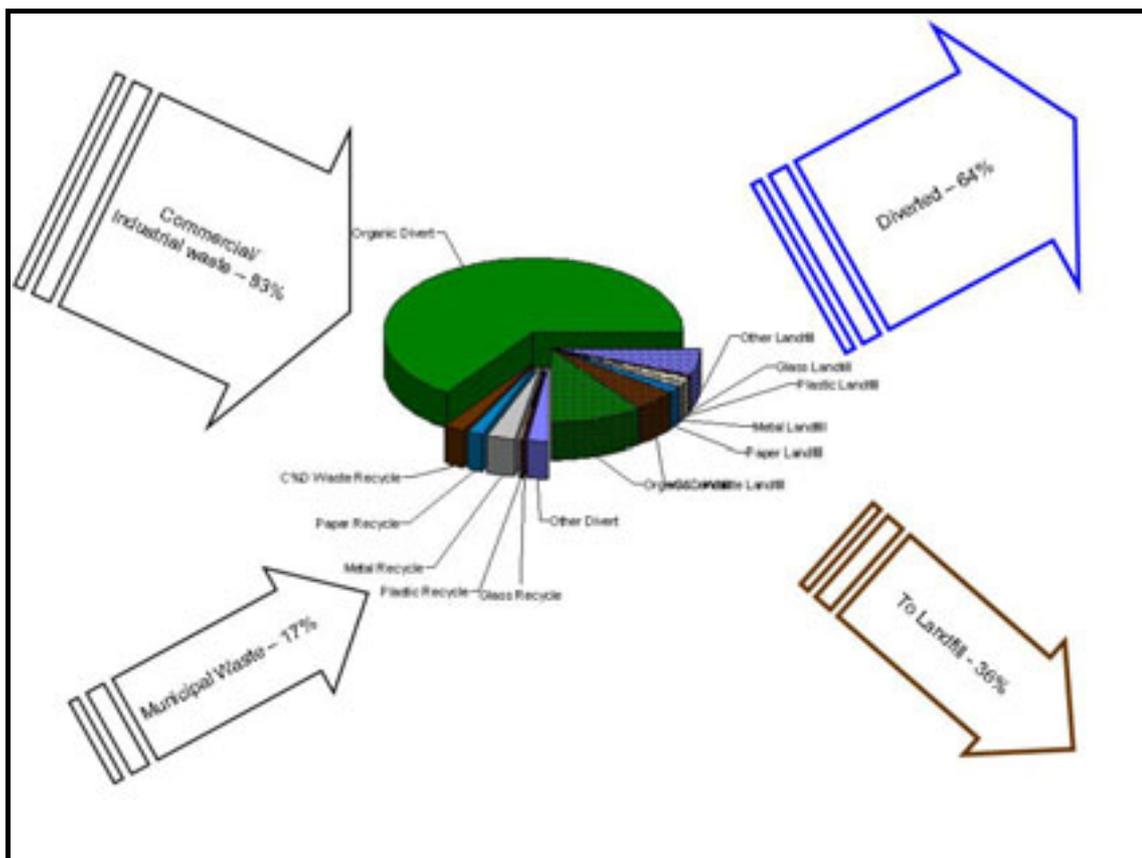
Section 6.1 briefly recaps the waste situation in the Waikato, Sections 6.1 and 6.3 outline some of the opportunities while Section 6.4 discusses how these opportunities could be realised.

6.1 Waste in the Waikato region – the big picture

As shown in Figure 4 over 80% of waste in the Waikato region is generated through industrial or commercial activity. Around one third of all waste generated in the region is disposed of to landfill (including cleanfills and industrial / private waste landfills). Major components of the waste stream going to landfill are organic waste (garden waste, food processing waste, wood processing waste – 175,000 tonnes per annum), construction/demolition waste (timber, metal, concrete - 122,000 tonnes per annum) and paper/cardboard (28,500 tonnes per annum).

Around 64% of the total waste stream, over 1,000,000 tonnes per annum, is diverted. Diversion is through local authority collections, commercial recycling collections, through commercial transactions involving wastes such as wood waste (boiler fuel), bark (composting, boiler fuel), scrap metal and food processing waste and land application of high strength organic wastes.

Figure 4: Summary of Waste disposal and Diversion in the Waikato



Major service providers operating in the Waikato region include Waste Management NZ Ltd, EnviroWaste Services Ltd, Materials Processing Ltd, Perry Environmental Limited, StreetSmart Ltd and Recover NZ. Key council contracts are held by Waste Management (Hamilton), Materials Processing (Rotorua), EnviroWaste (Matamata-Piako), StreetSmart (Hauraki, Thames-Coromandel, Waipa), HG Leach (Matamata-Piako, Hauraki), Recover NZ (Waikato) and Perry Environmental (Tauranga).

National, regional and local policy impacts on waste management and minimisation in the Waikato. Introduction of a waste levy and regulatory support for product stewardship schemes in the government supported Waste Minimisation (Solids) Bill is likely to provide additional funding for waste minimisation activities in the region. A reviewed New Zealand Waste Strategy Action Plan will make use of these tools and amend the targets in the NZ Waste Strategy to reflect current data and waste minimisation opportunities.

There have been moves in the Waikato to improve coordination of local government waste policy – reflected in territorial Waste Management Plans, the Regional Policy Statement, Long Term Community and Council Plans and the Regional Waste Strategy. Major waste generators are becoming increasingly aware of the costs and opportunities related to their waste. In this context they are looking for service providers who will work collaboratively with them to reduce overall waste management costs.

The increasing focus on sustainability as an overarching framework for action at a central government level means considering waste as an isolated issue is no longer appropriate. To successfully access government funding and support for waste minimisation activities in the future initiatives will need to consider parallel issues such as energy (efficiency, renewables, security), economic development, climate change and the framework for water management.

6.2 Recoverable materials in the Waikato

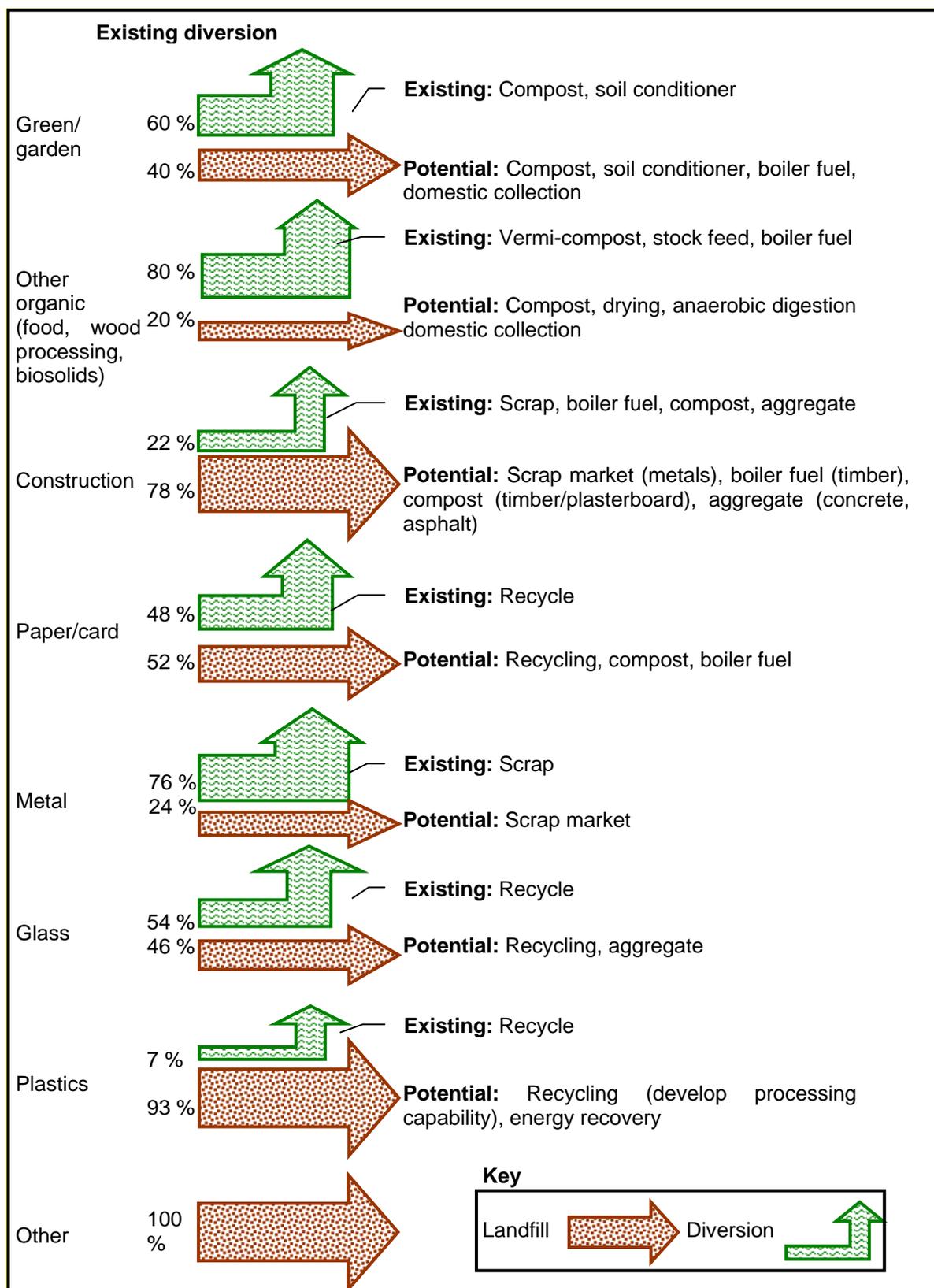
6.2.1 Overview of recoverable materials

Significant and potentially recoverable waste streams from the Waikato region that are currently landfilled or stockpiled include biosolids, paper/card, putrescible wastes (green waste, food waste and primary processing wastes), wood processing wastes (slivers, recovered fibre, treatment sludge) and construction and demolition wastes (timber, concrete, plasterboard). Figure 5: Existing and potential diversion opportunities provides an overview of existing diversion and opportunities, these are discussed further below.

Many of these materials could technically be used as soil conditioners, with or without further processing such as composting. Energy recovery may be an option where energy content, contaminant levels and potential users of heat and/or power can be managed. In some cases there are several options and there is a need at an organisational and regional level to consider what combination of solutions provides the optimum benefit. Various wood processing waste streams are a good example of this scenario where boiler fuel and bulking agent (for composting putrescible wastes) are competing uses for what has the potential to become a scarce resource.

The key question for each waste stream is whether alternatives to landfill have not been adopted due to technical barriers or whether there are other issues of relevance. This is discussed below for several key waste streams.

Figure 5: Existing and potential diversion opportunities for the Waikato region



Note: the two areas for each waste stream add up to 100% for that waste stream i.e. they show current diversion vs. landfill.

6.2.2 Green/garden waste

While a significant amount of green waste is diverted in the Waikato region the data assembled for this report suggests there are still opportunities for further diversion. For the material still being disposed of to landfill barriers to increased diversion may include

lack of widespread collection services. For diverted materials there is a range of processing/use options available.

Where there are commercial green waste processing operations there are often collection services offered to private and commercial customers. In some parts of New Zealand and internationally green waste collections are offered by local authorities, this could be an option considered by local authorities in the Waikato region either individually or on a collective basis. Mobile garbage bin (MGB) collections have been reported to increase the proportion of garden waste collected from households, this is likely to be off-set where green waste services are offered in tandem with refuse collection.

Green wastes and similar materials such as waste bark from the wood processing industry are becoming an important material in the context of both composting and bioenergy. The trend to compost putrescible wastes means there is a need for bulking agent such as green waste or bark. Increased use of wood waste as boiler fuel means the bark and woody green waste have some value in this context as well. Organisations producing or collecting significant quantities of these wastes streams make decisions on their long term management based on cost and logistics considerations. For materials currently diverted there is potential for consideration of the 'best' beneficial use at a regional level.

Opportunities – garden waste collection service, wood green waste for bioenergy.

6.2.3 Other organic waste

The issues for other organic waste materials are similar to those for green waste. There are several options for processing and beneficial use but decisions are made at a company or council level without reference to the potential for synergies at district or regional level.

Food and other highly putrescible wastes – Options for processing putrescible wastes include processing as soil conditioner (including composting, anaerobic digestion and vermi-composting) or energy recovery (depending on energy content). Key issues to be considered include ways to separate material (council provided collection, encouraging commercial collections, regulatory options), markets for compost and energy, the regulatory framework for composting and energy recovery facilities and the impact on landfill gas collection schemes. Food and other processing sites produce large amounts of highly putrescible wastes, often with well understood characteristics. Many of these waste streams are diverted from landfill now with ongoing exploration of a range of alternative uses.

Some options for processing highly putrescible wastes, for example anaerobic digestion, produce a significant product stream that requires management or disposal. Thus a management option for a particular waste stream may employ several process technologies and even a range of product - end use combinations. There is potential for local authorities to work with one or more of the large producers of high strength organic wastes to develop one or more processing – end use options for the Waikato.

Opportunities – undertaking an options study, collaboration between local authorities and private sector waste generators.

Wood processing waste – wood processing waste materials landfilled or stockpiled are generally unsuitable for boiler fuel due to moisture and/or ash content. Alternatives currently being explored in New Zealand include land application (in some cases following processing such as composting) and use as feedstock for bioethanol or bio-composite production (currently at early stages of investigation). Key issues include the regulatory framework for land application, markets for compost/soil amendments and research/product development support for innovative processing.

Construction and demolition waste timber is in many respects similar to parts of the wood processing waste stream. Potential options for utilising untreated waste timber are similar including energy recovery, chipping for mulch or use as bulking agent in compost. There is potential for local authorities to work with the wood processing sector, researchers, the construction sector and other stakeholders to explore options for beneficially re-using this material, options may include:

- Additional compost and soil conditioner manufacture;
- Additional energy recovery; and
- Utilising waste material as feed stock for chemical or other product manufacturing.

Challenges in this context include creating markets for soil conditioner product, product/process development timelines and comparative energy costs (including capital requirements).

Opportunities – undertaking an options study, consider ‘best use’ for each waste stream.

Biosolids – Most biosolids produced in the Waikato region are currently landfilled. Options that could be considered for diversion of biosolids include land application, composting and drying (for land application, landfill or energy recovery). Key issues requiring consideration include achieving appropriate economies of scale²⁰, the regulatory framework for land application and community (including iwi) perceptions of the approach(es) adopted. Several local authorities are actively exploring opportunities including land application of biosolids cake, composting and drying/energy recovery. There may be opportunities to combine aspects of biosolids processing with solutions for other putrescible waste streams, this is already occurring on a small scale in the Waikato region²¹.

Opportunities – undertaking an options study, consider synergies with other waste streams.

6.2.4 Construction and demolition waste

Data collected for this project indicates that a significant quantity of construction and demolition waste is disposed of to landfill from the Waikato region. Several companies have the capability to process timber (for hog fuel and mulch), plasterboard and concrete. Key issues for construction and demolition waste in the Waikato region include the availability of low cost disposal, logistics for collecting/sorting materials, imperfect information on the quantity of waste disposed of at cleanfill sites and markets for recovered materials.

There are opportunities for local authorities to work with the waste and construction sectors to divert and utilise materials. The focus should be on recycled aggregates, gypsum plasterboard and untreated timber with potential for significant reductions in waste materials disposed of to landfill. Initiatives such as encouraging waste planning at a project level, improving waste management contracts for construction projects, building consent processing/information and construction tendering/contract management may all have a role to play in this context. Local authorities and other large purchasers of construction products and services can also improve the viability of diversion activities through preferential purchasing of recycled content products and making proactive waste management a requirement on projects they are managing.

There are several construction waste landfills in the Waikato region consented to receive a wide range of materials including green waste and waste construction materials including steel, plastics and timber. These sites may have the potential to act

²⁰ Drying and energy recovery require significant capital investment that is unlikely to be viable for small quantities of biosolids.

²¹ DAF sludge from Inghams wastewater treatment process being further processed with Hamilton wastewater treatment plant sewage sludge.

as sorting sites but are unlikely to do so unless cost effective alternatives and/or other incentives are in place. It is reasonable to assume that the private sector will provide sorting/diversion capacity if there are drivers such as limited disposal options or strong markets for materials.

Treated timber is a national issue with no viable alternatives to landfill currently available. Wood processors are introducing reduced toxicity treatments for many applications but there is still a significant amount of treated timber in the waste stream that is not always easy to identify. Where treated timber can be recovered in a usable form it can be made available for re-use, the wood yard at Xtreme Waste in Raglan is an example of this approach. The challenge for this approach is changing work practices on construction sites and identifying appropriate uses for the recovered timber²².

Opportunities – proactive enforcement of cleanfills, market development, ‘green’ contracts.

6.2.5 Waste paper/cardboard

It is likely that a portion of the landfilled paper/cardboard is multi-material and/or contaminated making it unsuitable for recycling. Options for this material may include composting and energy recovery – waste paper is processed for boiler fuel at the Tasman Mill in Kawerau. An option that may become available in the medium term is conversion to ethanol, technology in the early stages of commercialisation internationally. Key issues requiring consideration include ways to encourage further separation at source (to avoid contamination) and the impact of increased diversion on existing recycling, composting and energy markets.

Experience in other parts of New Zealand suggests that there is also a portion of the landfill paper/cardboard that is essentially clean and would be suitable for recycling if it is diverted rather mixed in with general waste. In this context there is potential to work with waste generators – manufacturers, office, retailers to increase diversion of clean materials. Working with business groups and recycling service providers is likely to be the most effective way to increase diversion.

There is no modern materials recovery facility in the Waikato region. This is likely to be limiting the recovery of recycling commodities including paper/cardboard. With the range of service providers operating in the region it is unlikely that any commercial operator will invest in creating such a facility. There may be a role for local authorities and other organisations controlling significant quantities of materials to work together to establish or support the establishment of a facility servicing the region.

Opportunities – increasing diversion of ‘clean’ material, developing alternative options for contaminated material, develop modern materials recovery facility.

6.2.6 Scrap metal

Diversion of metal from landfill disposal is a success story in most parts of New Zealand driven by high world prices and an established network of scrap metal dealers. The amount of material landfilled is still high (around 15,000 tonnes per annum in the Waikato) and represents both a waste of materials and foregone income. There may be potential for increased diversion of materials before they enter the waste stream through providing containers for significant generators of scrap metals.

An alternative or parallel option is to increase recovery of metals as they pass through refuse transfer stations. Recovery is occurring now; opportunities for increasing recovery include adopting improved technology and contractual or financial incentives for diversion. A modern materials recovery facility is likely to improve the recovery of metals from the domestic and commercial recycling stream.

²² Uses may include boxing (for laying concrete), non structural framing and landscaping.

Opportunities – increasing diversion at source, increasing diversion from transfer stations.

6.2.7 Waste glass

The data collected for this project suggest over 50% diversion of waste glass from landfill. Barriers to further diversion are likely to include suitability of waste glass for existing recycling options (Owens Illinois glass furnace, Tasman Insulation) and the current value of recovered glass. Opportunities for increasing diversion are likely to be focussed around the use of glass as a component of roading or general construction aggregate.

Opportunities – Use crushed glass as aggregate, develop modern materials recovery facility.

6.2.8 Waste plastics

Plastics diversion is often a key focus for domestic recycling services and the experience in the Waikato region and other parts of New Zealand is of increasing volumes of plastic collected at the kerbside. Markets for all plastics are expanding internationally although processing options in New Zealand are still predominantly limited to resin codes 1 and 2. Many major generators of waste plastic now understand the management cost and in some cases potential value of their waste materials. This has encouraged innovation amongst waste collectors and processors but has yet to result in much impact at the general commercial and household collection level.

As noted above there is no modern materials recovery facility in the Waikato region. This is likely to be limiting the recovery of recycling commodities including plastics. With the range of service providers operating in the region it is unlikely that any commercial operator will invest in creating such a facility. There may be a role for local authorities and other organisations controlling significant quantities of materials to work together to establish or support the establishment of a facility servicing the region.

Opportunity – Develop a modern materials recovery facility. Facilitate development of processing capability.

6.2.9 Other wastes

E-waste – The management and disposal of unwanted electrical equipment is an emerging issue in New Zealand and internationally. The NZ Ministry for the Environment has worked with the Computer Access Trust of New Zealand (CANZ) and Dell on a pilot 'e-day' to collect unwanted computer equipment in Wellington. Several local authorities, companies and community waste enterprises collect unwanted electronic equipment for refurbishment or disassembly and there are initial discussions around a broader and coordinated approach to managing e-waste. There is potential for local authorities in the Waikato region to work with electronic equipment suppliers to develop and implement local collection and/or reprocessing systems.

Opportunity – develop e-waste collection initiative (local authorities and electronics retailers)

Tyres – The management of tyres in New Zealand is tracked but not managed through TyreTrack. Options for tyre disposal centre on quartering or shredding with a small proportion diverted for beneficial use. There is potential to use tyres as a fuel replacement and as a component in aggregate and both of these options have been trialled in New Zealand. Use of waste tyres in these contexts is likely to follow full uptake of other fuel options (wood waste, waste paper/cardboard) and sources of alternative aggregates (recycle crushed concrete and rubble).

Opportunity – develop markets for waste tyres

Liquid and hazardous waste – The tracking of liquid and hazardous waste using the WasteTRACK system is increasing across New Zealand. Uptake in the Waikato region can be increased through trade waste by-law requirements and generators of liquid and hazardous waste making the use of WasteTRACK a condition of contract.

Opportunity – mandate the use of WasteTRACK through by-laws and/or contracts.

Agricultural plastics – The recently launched AgRecovery programme has yet to impact on agricultural plastics in the region and is likely to take some time to reach its full potential. Local authorities and other organisations in regular contact with the farming community should continue to support this programme including providing information on drop-off locations and encouraging companies to participate in the scheme.

Paint – The Resene PaintWise scheme has government support and some profile nationally. Unfortunately there are only two drop-off locations, both in the Hamilton area, in the Waikato. Local authorities could work with Resene and their contractors to explore opportunities to provide further options for unwanted paint disposal either as part of the Paintwise scheme or in parallel as appropriate. As noted previously in this report there are several transfer stations/re-use shops that accept unwanted paint for redistribution

Opportunity –Resene to extend Paintwise, develop alternative drop-off and redistribution initiatives.

Reusable goods – As noted previously in this report, there are several re-use stores around the Waikato region and data from Raglan suggests they may be diverting up to 6% of the municipal waste stream on a local level. This diversion is comparable to the diversion of recycling commodities. These reuse stores have additional benefits with respect to employment, income to support other waste minimisation activities and providing cheap goods. The Waste Exchange service has also had some success in diverting reusable materials

Opportunity – establish further re-use shops at transfer stations around the region.

6.3 Implementing best practice in the Waikato

6.3.1 Waste minimisation

It is clear from the information presented in Figure 5: Existing and potential diversion opportunities for the Waikato region that there are still significant quantities of recoverable materials from the Waikato region disposed of to landfill. The local authorities in the region have explored a range of ways to encourage businesses to avoid waste where possible with success at an individual business level. The challenge has been in creating change across the business community.

There is increasing attention paid to environmental sustainability as a result of publicity around climate change. Traditional business advocacy organisations such as Chambers of Commerce and Manufacturing Associations are showing an interest in this area. There is potential for organisations that have traditionally been involved in promoting waste minimisation and other sustainable business practice to work together with key business advocacy organisations in the Waikato region to promote practical waste minimisation.

Waste generators working together may be able to achieve economies of scale for specific materials recovery initiatives and also represent an attractive market for existing service providers. Innovation focussed organisations such as Innovation Waikato, AgResearch, Scion Research and the Clean Energy Centre (Taupo) also have a role to play.

6.3.2 Collection and logistics

There is a number of companies providing waste management and recycling services in the Waikato region. Materials are moved around the region for sorting and consolidation and in some cases are subject to further sorting out of the region. Arrangements are on a company or local authority specific basis with synergies only occurring where service providers achieve scale through winning multiple contracts within the region or in neighbouring areas.

The move to mobile bin based domestic recycling and organic waste collection emerging in other parts of New Zealand has yet to impact the region. The trend to increase the range of plastics materials being collected is resulting in changes in some areas. Major waste generators are working with the service providers to increase diversion of specific waste streams from their operations. There is potential for waste generators (including local authorities where they contract for the collection of waste and recyclable materials) to work together to encourage the implementation of best practice collection and logistics in the region. Recyclable materials will only be collected where there are viable processing options as discussed below in Section 6.3.3.

6.3.3 Waste and recovered materials processing

While there are several materials sorting operations in the Waikato region there is no modern material recovery facility. This represents a significant opportunity but one that is unlikely to be taken up by any individual organisation. There is potential for local authorities to work with key waste and recycling companies as well as major generators of commodity recyclables to work towards improving the materials handling capability within the region. Key objectives would be to achieve economies of scale, identifying potential locations and linking the handling of household materials with commercial wastes.

A large percentage of materials landfilled from the Waikato region pass through refuse transfer stations of varying design. Both privately and local authority owned sites are recovering materials prior to dispatch to landfill. There may be opportunities to extend these activities with improved equipment, extending markets for contaminated materials and changing procedures. Examples could include incentives for people dropping off scrap metal and diverting contaminated paper/card for boiler fuel and/or composting.

Many of the waste materials from construction activities are recoverable and with support from local authorities and other procurers of construction services and materials markets will expand. An issue in many parts of New Zealand is the availability of cheap disposal for construction and demolition waste at cleanfill. In the Waikato, as in other areas, cleanfills operate under consents or permitted activity rules, effective enforcement is an important part of ensuring that recoverable materials are not inappropriately disposed.

As noted above, local authorities and others have the ability to increase diversion and expand markets for materials, for example:

- by specifying recycled crushed concrete for backfill or base-course instead of virgin aggregate; or
- specifying compost and mulch (green waste, untreated timber) for landscaping projects.

6.4 Opportunities for minimising waste in the Waikato region

6.4.1 Overview of opportunities

Based on the information presented in Sections 3 to 5 and the discussion in Sections 6.2 and 6.3, there are a range of opportunities to minimise waste from the Waikato region. Key opportunities that become apparent when considering recoverable materials currently landfilled or best practice are outlined in Table 11. These options are discussed in more detail in the following pages.

Table 11: Opportunities for minimising waste in the Waikato region

Waste	Opportunities
Green waste	Undertake a regional organic waste options study Implement green/garden waste collection services
Other organic wastes	Undertake a regional organic waste options study Develop commercial/household organics collection services. Major producers and/or collectors of high strength organic wastes work together on processing – end use options
Construction and demolition waste	Develop markets for recovered materials – concrete, mulch Active enforcement or consents for cleanfills Implement ‘green contracts’ on building projects
Waste paper/cardboard	Develop one or more modern materials recovery facilities to serve the Waikato region Trial waste contaminated waste paper/cardboard as feedstock for composting Trial waste contaminated waste paper/cardboard as boiler fuel
Scrap metal	Develop one or more modern materials recovery facilities to serve the Waikato region
Waste glass	Develop one or more modern materials recovery facilities to serve the Waikato region
Waste plastic	Develop one or more modern materials recovery facilities to serve the Waikato region Major producers and/or collectors of plastic wastes work together on logistics and markets
Other wastes	Continue to support national initiatives
Best practice	Work with business advocacy organisations to promote waste minimisation and coordinated procurement activity. Work towards developing one or more modern materials recovery facility serving the Waikato region. Explore options for integrated or coordinated procurement of services involving local authorities and major waste generators.

Actions taken under one opportunity will often affect another, for example processing increasing amounts of organic waste is unlikely to be as successful without ongoing market development covering compost and bioenergy.

Increasing collaboration between the private sector and local authorities is reflected in all of the opportunities discussed. This reflects a shift from the general business community being passive procurers of waste management services to active participants in the management of their waste. Waste management and recycling

business are at the coal face of waste minimisation and will respond to opportunities provided, facilitated or highlighted by waste generators and local authorities.

6.4.2 Opportunity 1 – Organic waste processing

Given the large quantity of putrescible waste disposed of to landfill and possible processing synergies with biosolids, some wood processing wastes and contaminated paper/cardboard there is potential for one or more combined facilities or systems in the Waikato region. There are a large number of enclosed composting systems available and given the relatively short transport distances in the region a single, centralised facility may be economically viable. Local authorities and large waste generators in other parts of New Zealand have examined possibilities in this area using simple Net Present Value (NPV) analysis. Key issues for putrescible waste processing include determining optimal scale for a processing site, markets for energy and compost/soil amendment products, logistics of waste collection and the regulatory framework for processing sites.

Commercial green waste collection services are available in urban areas within the region. This demonstrates that where processing capability exists (Hamilton Organics Centre, Taupo Organics Centre) waste generators will use it provided it is cost competitive with landfill disposal. A portion of the commercial putrescible wastes generated in the region are diverted to various forms of 'beneficial reuse'. There is potential to look for both transport and processing synergies in this area. Some private sector waste generators are effectively ranking various beneficial use options and in some cases looking for ways to move to 'higher grade' options.

While in many areas local authorities have led the development of organic waste processing capability, in the Waikato the private sector are already active in this area. Examples include Perry Environmental, HG Leach and Daltons as well as major waste generators such as Fonterra, meat processors and other food processors around the region. Local authorities should look for opportunities to work with the private sector to support the establishment of organic waste processing facilities that are appropriately sited, designed and operated.

Processing options appropriate for the waste streams in the Waikato include composting, anaerobic digestion and vermi-composting. Options for local authority involvement around New Zealand include:

- Direct funding by local authorities – existing examples include MacKenzie District Council establishing and operating a Vertical Composting Unit (VCU) for green and food waste and Dunedin City Council's green waste composting operation at the Green Island Landfill;
- Formal collaboration with the private sector – existing examples include Tauranga City Council providing land for the Perry Environmental Ltd composting operation and Wellington City Council's joint venture with Living Earth to process green waste and biosolids in an enclosed composting plant; and
- Commitment via contracts for processing of local authority controlled materials – an existing example is Gisborne District Council's arrangement with AllBrite Industries Ltd for municipal waste controlled by the council.

It is likely, given the high cost of landfill disposal for waste generators in most parts of the Waikato region, that commercial waste collectors will make use of the additional disposal option in a similar way to existing green waste collection services. A committed quantity of material (with associated income) from local authorities combined with the potential for attracting further quantities through commercial collection and disposal may provide the basis for a commercial viable system regardless of funding model.

Where composting is employed for processing putrescible wastes, bulking agents are required. Examples of bulking agent used in the Waikato region include bark, sawdust and shredded green waste. For the woody green waste hog fuel remains a viable

option provided the material can be cost effectively removed from the waste stream. Options and opportunities for extending this diversion route are discussed below in Section 6.4.4. Given the strong market for biofuel there is likely to ongoing competition for this material and it is possible that green waste will have some value in the same way that bark currently does.

With significant quantity of waste paper and cardboard still disposed of to landfill in the Waikato there is potential to explore the use of this material as bulking agent for compost or boiler fuel. There will be technical issues to be considered including the nature of contamination, logistics of collection and impacts on existing processing equipment.

Making it happen – with the range of waste streams and processing options available as well a large number of waste generators (including local authorities) there would benefit in looking at options at a regional level. In Table 11 this has been referred to as an Organic Waste Options Study. Key objectives would be to involve all major producers of organic waste, identify potential processing options, consider funding models and rank the range of potential solutions.

6.4.3 Opportunity 2 – Establishing a modern materials recovery facility

There is currently no large materials recovery facility in the Waikato region and this is likely to be limiting both the quantity and quality of materials diverted. As noted in Section 4.2.1 there are plans to develop a modern sorting facility in Auckland in the near future. It is possible that this facility will have capacity available for materials collected in the Waikato but transport may become a limiting factor. A centrally located facility could service most if not all of the Waikato and potentially create opportunities for commercial recycling services currently not viable due to the lack of sorting infrastructure.

A large proportion of recyclable materials collected in the Waikato region are from commercial operations with no local authority involvement in the collection or processing. In this context the involvement of both companies providing collection services and companies using those services in developing one or more modern sorting operations is important.

A visual survey of recyclable materials disposed at landfill and transfer stations would provide an indication of the types of materials and level of contamination and therefore potential end uses. Options for increasing diversion may include improved diversion of clean material and utilising contaminated paper/card as boiler fuel – discussed further in Section 6.4.4.

Making it happen – with significance of commercial recyclables the involvement of major waste generators is important. Committing a proportion of the materials collected in the region may attract investment from one of the major players in New Zealand. Alternatively one or more of the local authorities or major waste generators may see value in investing directly in developing modern sorting capability. A first step for all scenarios is to start discussions regarding existing contract timelines, willingness to commit to supplying a [sub-] regional facility and interest from recycling service providers in developing or utilising a modern sorting facility.

6.4.4 Opportunity 3 – Ongoing market development

The diversion of materials from landfill through recycling collection services (local authority or commercially provided), drop-off transfer stations or composting is unlikely to be successful in the long term without sustainable markets for the diverted materials. Contractual arrangements vary with respect to ownership of materials and products, but all involved in the waste management process have an interest in developing and sustaining markets for recovered materials. Market development in this context refers

to both improving the supply of materials and increasing demand for products made using diverted materials.

It is of note that the major waste generators and local authorities are likely to be some of the key purchasers of products and services in the region. In this context procurement policy and practice within these organisations has the ability to support environment and waste management policy by 'closing the loop'.

Waste to energy – As noted previously in this report, there is considerable use of wood processing wastes for heat and power in the wood processing sector in the Waikato region. There is also some limited use of materials from the municipal waste stream (woody garden waste, timber) for heat/power in the wood processing sector. There is potential for increased diversion of materials via this route where energy content and contamination levels make energy recovery appropriate.

Internationally recovery of energy from mixed waste is common and there is a wide range of technology available at development stages ranging from pre-commercial to well established. With some significant users (and clusters of users) of industrial heat in the Waikato region there is potential to avoid the need for costly and inefficient conversion of heat energy to electricity by selecting an appropriate location for any waste to energy plant. Key issues for waste to energy are likely to include financial viability (economies of scale, logistics), technical feasibility, characterisation of the waste stream/feedstock and consenting process including community consultation.

In the short term the key opportunity is likely to continue to be the use of wood processing wastes and waste with similar characteristics (woody green waste, waste timber, and paper/card) in existing waste wood fired boilers. Local authorities in the region should be working with the major wood processing sites and existing fuel suppliers (Materials Processing Ltd, WastePro) in the region to identify fuel specifications, map out investment planned in the short-medium term and opportunities for expanding the diversion of appropriate wastes for fuel.

In the medium to long term there are a wide range of technically feasible options for recovering energy from specific waste streams and mixed municipal waste that could be considered in the context of managing waste from the Waikato region. These include:

- Processing putrescible wastes for ethanol recovery (building on Fonterra Reporoa and Tirau technical know-how and processing capacity);
- Anaerobic digestion of putrescible wastes to produce heat/power (using methane) and dried product that can be used for soil conditioner and/or fuel;
- Recovery of energy from waste plastics – either mixed or polymer specific; and
- Recovery of energy from municipal waste. Technology employed internationally includes incineration, pyrolysis and gasification.

Construction and demolition waste – Given the large quantities of construction waste going to landfill from the Waikato region consideration should be given to working with developers, construction companies and the waste sector to reduce waste from construction activities. This could take the form of targeted assistance (as for the Ministry for the Environment case study initiative), assistance with logistic/sites for sorting and/or marketing of recovered materials. There are also regulatory options (under the RMA and LGA) for limiting the disposal of specific types of waste including waste from construction and demolition activities

Existing local authority influence over the construction and demolition waste stream is limited due to the dominance of cleanfill sites. There may be an argument for regulatory intervention through by laws under the LGA but this is unlikely to be successful unless all stakeholders are given an opportunity to be involved in the process. Increased capacity for composting or waste to energy may result in increased

diversion provided disposal/processing costs are set at an appropriate level and waste generators and transporters are made aware of alternatives to disposal.

Progress in this area relies on active participation of all stakeholders. A logical way forward would be to develop a cross sector initiative addressing the issue from several perspectives. This could build on national level initiatives and link to local authority building procurement and asset management as a tool for influencing the regional construction market.

Making it happen – One aspect of market development is ensuring that local authorities and others committed to waste minimisation are reflecting this commitment in their purchasing decisions. This requires good information for those involved in the procurement process and in some cases support for research and product development utilising recovered materials. Developing an integrated approach to market development involving key organisations purchasing second hand and/or recycled materials and considering interactions between different products and competing objectives (cost, waste minimisation and product performance) would be a useful first step.

6.4.5 Opportunity 4 – Local authority – business collaboration

As noted in several places in this report, local authorities and businesses have an equal role to play in increasing the diversion of materials from landfill disposal in the Waikato region. The opportunities outlined above highlight specific examples of opportunities that are relevant for local authorities and businesses including developing processing capability for organic waste and recycling commodities, expanding markets for recovered materials and coordinating or sharing investment in waste infrastructure.

There are a large number of small businesses in the region and the opportunities discussed above have focused on working with major waste generators in the region. Small businesses make a large contribution to the waste stream collectively but are difficult for service providers or policy makers to work with effectively. There is an emerging trend in New Zealand for traditional business organisations such as Chambers of Commerce and Manufacturers Associations to provide information and services relating to waste and other environmental issues.

Making it happen – Business associations may be interested in promoting waste minimisation to their members through providing information, hosting seminars or assisting in developing pilot studies. There may also be opportunities to offer coordinated services to members in the same way that stationary, travel or other services deals are negotiated by business associations.

6.4.6 Opportunity 5 – A waste infrastructure investment plan

There are clearly some opportunities to increase the diversion of waste from the Waikato region from landfill. The key question is whether these opportunities are technically and financial viable for individual organisations or the region as a whole. Because the commercial waste management and recycling companies control a large portion of the waste stream in the region, any alternatives to landfill will need to be competitive with the cost of landfill disposal (including transport).

Creating capacity in recycling and recovery can present commercial opportunities, for example commercial green waste collection services utilising local authority or private sector composting operations throughout New Zealand. There are also examples where the private sector has responded to local authority request for processing capacity i.e. a commitment to supply materials has resulted in private sector investment in infrastructure to service local authority needs as well as commercial customers. AllBrite Industries' investment in their transfer station in Gisborne and Perry Environmental Ltd's investment in Tauranga are good examples of this approach in action.

An additional issue for consideration is the role that local authorities, individually or collectively, should take in working to realise some of the opportunities for the Waikato region. Businesses involved in this project are open to working with local authorities and may be better placed to access investment funding, materials from beyond the region and expertise. A clear message from several organisations during this study was that local authorities should be setting the direction and framework while allowing business to develop and implement solutions.

Before looking at opportunities to collaborate at a detailed level, a useful first step is to consider planned investment (including the private sector where possible) across the region. Table 12 presents a summary of information on planned investment key milestones or decision points for waste management issues in the Waikato region. This information is drawn from council Long Term Community and Council Plans (LTCCP) for all of the local authorities in the Waikato region and discussions with other key stakeholders. There is potential for local authorities to work with private sector developers where development of infrastructure (processing sites, cleanfill/landfill) or collection services are of regional significance.

Table 12: Investment in waste management – 2006-2016

Year	Investment	Events/decision points
2007	Rotorua Landfill next cell development Gisborne District Council commence development of in-district landfill Taupo contracts for Tender Broadlands Rd Landfill Cell Construction Environment Waikato Regional Growth Strategy Dairy Trust new processing site - Horotiu	Waste Minimisation (Solids) Bill reported back to Parliament National energy policy
2008	Rotorua Landfill next cell development Review of Waipa Waste Management Plan Review of Hauraki Waste Management Plan Tokoroa Landfill - additional liner construction Ngatea Recycling Depot construction Review of Waikato Regional Waste Strategy	
2009	Rotorua Landfill next cell development Whakatane Landfill Closure	Whakatane Landfill Closure
2010	Broadlands Rd cell construction	
2011	Matamata-Piako Disposal contract expires	
2012		
2013		
2014		
2015	Whitianga Transfer Station development	

Note: Information in the table is drawn from LTCCP for all local authorities in the Waikato and discussion with key stakeholders.

Making it happen – Considering planned private sector investment as well as likely changes in waste characteristics and quality alongside local authority plans provides a good basis for identifying synergies and gaps. This project has identified potential for coordinated investment in organic waste and recycling commodities processing. An investment plan will look at funding options and business models for these important investments as well as identifying other investment needs.

7 Conclusion and recommendations

7.1 Conclusion

Because the market for waste management and minimisation services in the Waikato region is effectively unrelated to local authority boundaries, collaboration across these boundaries is required to successfully influence the market. The variation in approaches to waste management planning and service provision has not precluded collaboration to date and should not do so in the future. In a similar vein local authorities do not control the waste stream and therefore need to work with other major waste 'generators' to identify and realise opportunities for increasing waste diversion.

This report sets out the results of discussions with stakeholders throughout the Waikato region and notes relevant experience in New Zealand and internationally. On this basis, key recommendations for action by local authorities in the Waikato region have been set out in Section 6.4.

Several key questions were set out in the introduction of this report. The Sections 3 and 4 provide a discussion on the 'factual' questions. These include how much waste is going to landfill, and what diversion routes are available. Section 5 sets the context for the discussion on current and future opportunities in Section 6.

This report concludes that there are advantages to local authorities in the Waikato region working together and with major waste generators on waste issues. There is willingness on the part of the private sector to work with local authorities to find ways to provide cost effective and innovative solutions to districts and the region as a whole. The participation of individual councils will depend on their current role, ability to finance investment and issues of concern in each area. The likelihood of councils taking different roles as they work together does not preclude improved waste management occurring through increased collaboration.

The discussion in the preceding sections provides an overview of the opportunities as well as some of the challenges in improving waste management in the region. This provides a basis for action once local authorities in the region have agreed to build on their collaborative efforts in this area to date.

7.2 Recommendations

Based on the information set out in the report, discussions with key stakeholders including the waste sector, major waste generators and local authorities and reference common practice in New Zealand and internationally, it is recommended that:

- a) Local authorities and major organic waste generators in the Waikato region undertake a review of options for managing the range of organic waste streams generated in the region. This review should focus on real opportunities for beneficially using organic waste with reference to major organic waste streams, applicable technology and markets for end products.
- b) Local authorities and major waste generators in the Waikato region work together with service providers to establish one or more modern materials recovery facilities to serve the Waikato region.
- c) Local authorities and major waste generators in the Waikato region take an active role in developing markets for recovered materials with an initial focus on construction waste (rubble/concrete), organic waste (compost, energy) and waste paper/cardboard (increased recycling, compost, energy);
- d) Local authorities, waste and recycling service providers work with local business associations to promote waste minimisation and provide practical waste minimisation tools. Practical examples include co-sponsoring events drawing on existing initiatives and involving groups such as the Sustainable Business Network,

EnviroSmart and the NZ Business council for Sustainable Development (NZBCSD).

- e) Local authorities and major waste generators in the Waikato region work develop a waste infrastructure investment plan.