

Composition of Solid Waste at Southern Landfill

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1 Introduction

Territorial authorities have statutory responsibility for promoting effective and efficient waste management and waste reduction practices within their district. This responsibility is specified in section 42 of the Waste Minimisation Act 2008. In line with their responsibilities under this legislation, the eight councils in the Wellington region jointly produced and individually adopted the *Wellington Region Waste Management and Minimisation Plan (2017-2023)*.

In support of the regional plan, the individual councils developed local action plans. Wellington City Council's action plan includes an action to:

Collect and manage data in accordance with the National Waste Data Framework, as well as conducting SWAP surveys and other measures to improve data availability and management.

In partial fulfilment of this action, in 2018 Wellington City Council (Council) commissioned Waste Not Consulting Ltd to conduct two SWAP¹ surveys. The survey project, the results of which are presented in this report, comprised:

- A six-day visual survey to determine the composition of residual waste being disposed of at the Council-owned Southern Landfill and transfer station. The survey provided data compatible with the National Waste Data Framework.
- A seven-day sort-and-weigh audit of kerbside waste that gathered composition data on Council's yellow bag collection and private waste operators' wheelie bin collections from residential properties.

The majority of waste generated in Wellington City is disposed of at Southern Landfill. However, a proportion of Council's kerbside waste collections and an unknown quantity of commercially-collected waste are disposed of at other landfills in the region, particularly Spicer landfill in Porirua City and Silverstream landfill in Hutt City.

Due to this cross-boundary movement of waste, the results of the SWAP surveys presented in this report do not provide all of the data required to accurately measure the targets in the WMMP or the Waste Indicators in the National Waste Data Framework. If achieved, objectives in the WMMP to align data collection and reporting systems throughout the Wellington region could provide the necessary data.

The 2018 SWAP visual survey of the composition of residual waste at Southern Landfill used the same methodology as used for a 2009 visual survey at the facility conducted by Waste Not Consulting. The results of the two surveys are compared in this report.

¹ A 'SWAP' survey is a waste composition analysis undertaken according to the Ministry for the Environment's Solid Waste Analysis Protocol 2002.

1.1 Waste services in Wellington City

There is a range of waste collection and disposal services available to residents and commercial organisations in Wellington City.

Southern Landfill, the only Class 1 landfill in the City, is owned by Wellington City Council, and is situated in Landfill Road, Owhiro Bay. The facility includes a transfer station for use by the general public. The landfill tip face is used primarily by commercial waste operators.

The Wellington region is served by other Class 1 landfills in Hutt City and Porirua City. Some cross-boundary movement of waste is known to occur. There are also several Class 2 landfills² in the region that accept construction and demolition waste, including two in Wellington City.

1.1.1 Waste services for the residential sector

Through its contracted service provider, EnviroWaste Services Ltd, Wellington City Council offers a weekly kerbside rubbish bag collection to residents. Council's kerbside waste collection is based on a user-pays bag system, with rubbish bags being sold for a recommended retail price of \$2.50 each.

Information provided by Council indicates that the Council kerbside rubbish bag collection from most of the City is disposed of at Southern Landfill. Collections from the western suburbs are disposed of at Spicer Landfill, in Porirua City.

Council also provides a weekly kerbside collection of recyclable materials from residential properties. Residents are provided with 45-litre crates for glass bottles and jars. Either wheelie bins or transparent green bags may be used for mixed recycling including paper/cardboard and recyclable containers (aluminium and steel cans, and specified plastic containers). Glass and container collections take place in alternating weeks. Council guidelines on recyclable materials are presented in Appendix 1.

Several private waste operators also offer user-pays kerbside waste collections to residential properties, using wheelie bins as the waste receptacle. These operators include Waste Management NZ Ltd, EnviroWaste Services Ltd, WheeliBin Company, JJ Richards Ltd, Woods Waste Ltd, Deluxe Bins, Gordies Bins, and Daily Waste Ltd.

Multi-unit dwellings, including apartment buildings, may make their own arrangements for waste removal. Such services typically use either wheelie bins or front-loader skips.

For the occasional disposal of large quantities of residential waste, several waste operators offer gantry skip services. These operators include Abbott Bin Hire, Bin Hire (UH) Ltd, Bin Waste Ltd, Daily Waste Ltd, EnviroWaste Services Ltd, Northland Waste Ltd, Waste Management NZ Ltd, and Woods Waste Ltd. Different sizes of bins are available, with specific bins being available for dense materials such as hard fill and soil.

² A 'Class 2 - Landfill' is defined in the WasteMINZ *Technical Guidelines for Disposal to Land* (2018) as "a site that accepts non-putrescible wastes including C&D wastes, inert industrial wastes, managed fill material, controlled fill and clean fill material as defined in these Guidelines"

Residential greenwaste collections are also offered by private operators. Collected greenwaste is transported to the compost processing facility at Southern Landfill.

Wellington residents have access to the transfer station and recycling centre at Southern Landfill for the disposal of greenwaste, recyclable materials, and residual refuse.

1.1.2 Waste services for the commercial sector

Businesses may use the Council's weekly prepaid rubbish bag collection service. For businesses in the central business district, there is a nightly collection of Council rubbish bags. Council provides a weekly recycling collection from the central business district, using plastic bags. The Council-operated Kai to Compost service collects food waste from medium to large food waste producers.

The major waste operators in the City offer waste collection services to most commercial waste generators. Depending on the volume of waste generated, wheelie bins, gantry bins, portable compactors, or hook bins are available.

Recycling collection services for businesses for cardboard, paper, and other recyclable materials are available from several operators.

1.1.3 Special wastes

Special wastes generated by Wellington City Council and disposed of at Southern Landfill include sewage sludge and millscreenings from the Council's two wastewater treatment plants, road sweepings, and cesspit cleanings. Special waste generated by private industry and disposed of at Southern Landfill is limited to asbestos from demolition projects, and minor amounts of abattoir waste.

Contaminated soil is also disposed of at Southern Landfill. A high proportion of contaminated soil is used for site engineering purposes that are separate to the active landfill operations. The waste levy is not paid on this material. As a non-levied material, contaminated soil is not quantified or included in the reporting of the SWAP survey.

1.2 Southern Landfill

Southern Landfill is situated in Landfill Road, Owhiro Bay, approximately seven kilometres south of the central business district. The landfill is owned by Wellington City Council. The Southern Landfill site was purchased by Council in 1975 and has been used continuously since 1976 for refuse disposal.

Overall responsibility for the site, including the resource recovery operations, is held by Council's Waste Operations team. Site operations, including the transfer station and tip face, are contracted to Leach & Co. Ltd.

The waste disposal facility currently comprises a second-hand goods shop (Second Treasures) and a recycling drop-off point, a permanent transfer station (which is open to the public and accepts small vehicle loads of waste), and the active tip face, which only accepts large commercial vehicle loads. The site includes a Council-owned and operated

sludge dewatering plant, which processes sewage sludge from the Moa Point and Karori wastewater treatment plants.

There is also a Council-owned composting operation within the complex. The plant composts greenwaste collected separately at the transfer pit, greenwaste delivered by commercial collectors, and commercial food waste collected by private contractors. As a diverted material, the waste levy is not paid on greenwaste that is composted and this greenwaste has not been quantified in the reporting of the SWAP survey.

The weighbridge is situated on the entrance road to the complex, after the recycling drop-off point and before the entrance to the transfer station and landfill. All vehicles are weighed entering and exiting the disposal areas and charged for the amount of waste discharged on a per tonne basis. Individual weighbridge records for commercial vehicles include either vehicle registration numbers or fleet numbers. Registration numbers are not recorded for small vehicle loads. Disposal charges at the Southern Landfill complex are shown below.

Product name	Price (incl GST) per tonne/item	Minimum price (where applicable)
Commercial charges		
Commercial Green	58.10	29.00
Commercial General Waste	126.00	63.00
Domestic charges		
Domestic Car General Waste	158.00	10.00
Domestic Clean fill (Less than 1 tonne)	15.00	15.00
Domestic General Trailer	158.00	10.00
Domestic Green Car	58.10	5.00
Domestic Green Trailer	58.10	5.00
Domestic Green Ute / Van	58.10	5.00
Domestic Ute / Van	158.00	10.00
Lost Docket - Car	25.00	-
Lost Docket - Trailer	40.00	-
Lost Docket - Ute/Van	30.00	-
All other waste charges		
Car Bodies	40.00	-
Stripped Car Bodies (Per Item)	20.00	-
Fridge / Freezer (Per Item)	25.00	-
Special Waste - Domestic All	148.60	74.30
Special Waste Type A - Asbestos	148.60	74.30
Special Waste Type B - Abattoir	148.60	74.30
Special Waste Type C - Fish	148.60	74.30
Special Waste Type D - Other	148.60	74.30
Tyres - Car Tyres	337.60	33.80
Tyres - Earth Moving Machines	426.70	42.70
Tyres - Mixed Loads	426.70	42.70
Tyres - Truck / Tractors	426.70	42.70
Tyres - Car per item	4.00	-
Tyres - Truck per item	10.00	-

1.2.1 Transfer station and pit operation

The transfer station at Southern Landfill complex is operated by Leach & Co Ltd. The transfer station is open to the public seven days a week. The main feature of the transfer station is the transfer pit, into which waste is discharged. The pit is split into two sections, with greenwaste being discharged at one end and general waste at the other. When a sufficient quantity of either material has accumulated, a loader is used to push the stockpile through the chute in the centre of the back wall of the pit into a hook truck, which is used for moving various materials around the complex.

Opposite the transfer pit vehicle turning area are separate drop-off areas for scrap metal, appliances, paint, oil, and hazardous chemicals.

Second Treasures staff work in the transfer station area recovering resources from vehicles as they are being unloaded. Recovered reusable items are taken to the second-hand shop for sale.

1.2.2 Landfill activity

Within the landfill footprint there are several distinct areas where waste is discharged:

- Contaminated soil, asbestos, and asbestos-contaminated soil are stored in an engineered dry cell in Stage 2 of the landfill
- Civic cesspit cleanings and other liquid wastes are disposed of on an inclined tipping area on the waste mass. Liquid waste is collected at the bottom of the slope and channelled into the trade waste system. The remaining solids are landfilled.
- Material suitable for cover material is stockpiled on the active tip face.
- All other waste is disposed of at the active tip face, where it is compacted and covered daily.

General waste and some special wastes are discharged onto the metallised tipping area at the tip face and a loader is used to push the waste onto the tip face, where it is spread and compacted by a compactor.

Cover material is excavated from within the complex and transported to the tip face each day. The cover material is stockpiled throughout the day and then spread and compacted over the exposed waste at the end of each day.

Council has recently completed an alternative daily cover (ADC) trial. The ADC material is a proprietary product that is applied as wet slurry via a hydro seed gun. This method is in its final stages of approval and has been estimated to save approximately 16% of available airspace once incorporated into daily operations.

1.3 Structure of report

The methodologies for the sort-and-weigh audit of kerbside waste and visual survey are presented in section 2. The results of the kerbside waste audit are presented in section 3. The results of the visual survey of residual waste composition at the transfer pit are in section 4 and at the tip face in section 5. Section 6 provides data on all levied waste disposed of at Southern Landfill. Section 7 provides further analysis and discussion of the results.

The structure of this report, and waste flows into Southern Landfill, are shown in Figure 1.1.

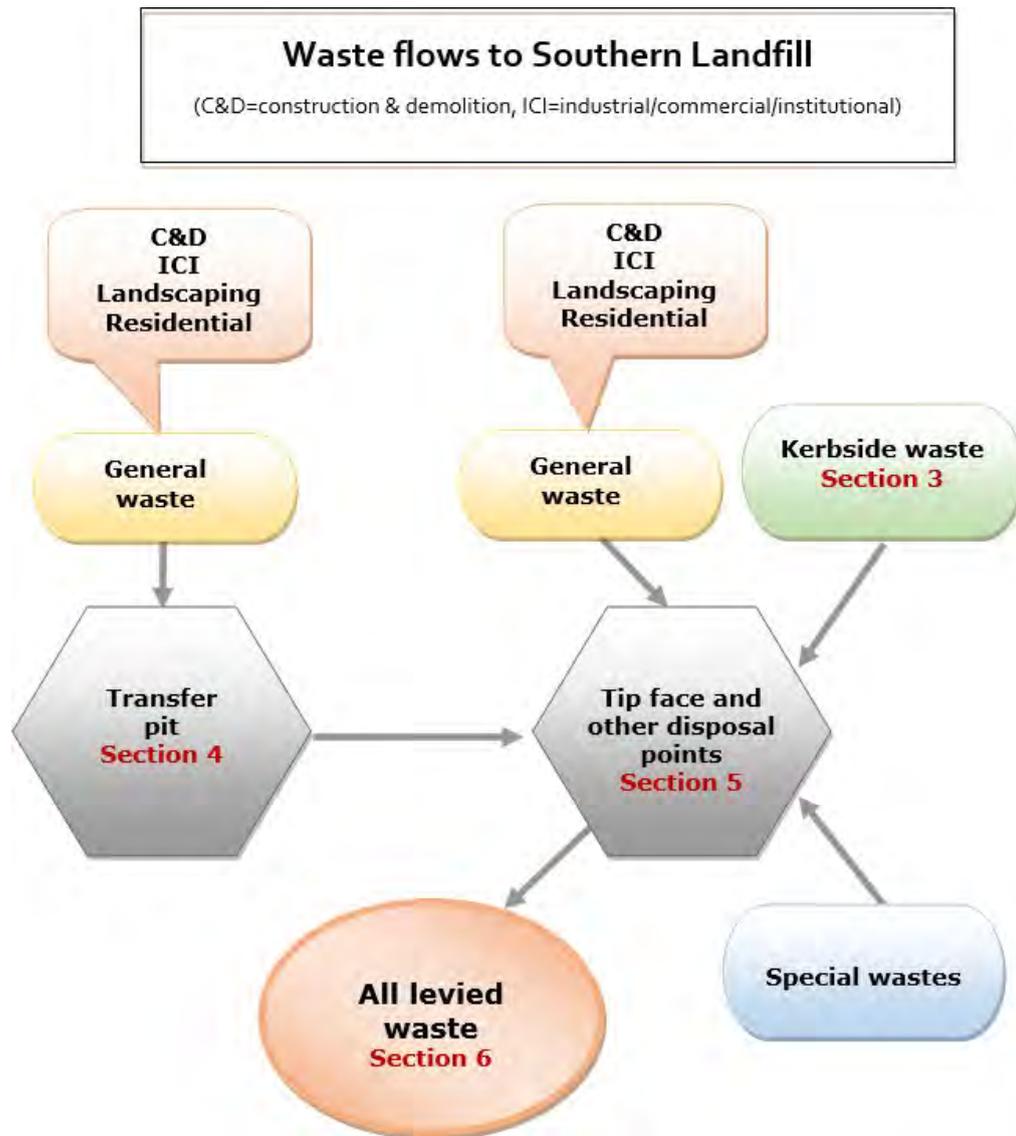


Figure 1.1 - Waste flows at Southern Landfill

2 Methodologies

2.1 Overview

The quantity and composition of waste disposed of at Southern Landfill was determined by combining data from several separate sources:

- A six-day visual survey of residual waste (i.e. waste that is not recovered and is sent for landfill disposal) disposed of at the Southern Landfill tip face and transfer pit
- A seven-day sort-and-weigh audit of the composition of kerbside waste from residential properties, including Council rubbish bags and two sizes of private waste operators' wheelie bins
- Weighbridge records from Southern Landfill.

The methodologies are outlined in detail in the sections that follow.

2.2 Kerbside waste audit

The kerbside waste audit methodology used by Waste Not Consulting was based on Procedure One of the Ministry for the Environment's Solid Waste Analysis Protocol (SWAP).

2.2.1 Sampling strategy

Over seven weekdays, from Wednesday 21 November to Thursday 29 November 2018, a total of 365 Council rubbish bags, the contents of 74 x 120/140-litre wheelie bins, and the contents of 52 x 240-litre wheelie bins were collected from the kerbside from throughout Wellington City. A small number of 80-litre wheelie bins (less than 10%) were included in the sample of 120/140-litre wheelie bins.

All kerbside waste wheelie bin collections in Wellington City are operated by private waste operators. Prior to the collection of the waste audit sample, permission was sought from two of the private waste operators for their wheelie bins to be included in the sample. Permission was given, on the condition that residents using private wheelie bins be given the option of opting out of having their waste included in the sample.

To do this, several weeks before the audit started Council delivered notices to pre-selected streets, advising residents of the upcoming waste audit and providing contact details for opting out. The sample of both Council rubbish bags and privately collected wheelie bins was taken only from those addresses that had been notified of the audit and had not opted out. Only waste from residential properties was included in the samples.

The streets from which the kerbside waste audit sample was collected are shown in Table 2.1 on the next page.

Table 2.1 - Waste audit sample collection streets

Street	Suburb	Street	Suburb
Ruskin Road	Newlands	Buxton Ave	Karori
Newlands Road	Newlands	Chamberlain Road	Karori
Horokiwi Road West	Newlands	Nottingham Street	Karori
Alwyn Place	Newlands	Standen Street	Karori
Kanpur Road	Broadmeadows	Owen Street	Newtown
Hindipur Terrace	Broadmeadows	Coromandel Street	Newtown
Jaunpur Crescent	Broadmeadows	Riddiford Street	Newtown
Rajkot Terrace	Broadmeadows	Constable Street	Newtown
Northland Road	Northland	Rintoul Street	Berhampore
Pembroke Road	Wilton	Herald Street	Berhampore
Euston Road	Wilton	Russell Terrace	Berhampore
Cecil Road	Wadestown	Darlington Road	Miramar
Fernhill Terrace	Wadestown	Para Street	Miramar
Beauchamp Street	Karori	Tannadyce Street	Strathmore Park
Paddington Grove	Karori	Townsend Road	Miramar

The composition and quantity of kerbside waste from residential properties varies according to a number of factors, including the demographics of the residents, the nature of the housing stock, and the range of disposal and recycling services available. To obtain a representative sample of the kerbside waste collections, the streets that were chosen by Council for inclusion in the sample were chosen from a wide geographic area and included a range of housing types.

A single rubbish bag was taken from each dwelling selected for the bag sample. Only dwellings to which a distinct quantity of rubbish bags could be attributed were chosen for the rubbish bag sample. Rubbish bags were not taken, for example, from beside shared driveways as they may have represented the waste output of several households.

When a rubbish bag was taken from a dwelling, the total number of bags set out by that dwelling was recorded. This allowed the calculation of the average number of bags set out per household, which, when combined with an average bag weight, provided data on the average weight of waste set out per household.

It should be noted that the average weight of waste per household set out does not necessarily equate to an average weekly household waste generation, as not all households set out waste each week.

The sample included the contents of 126 wheelie bins from two of the four waste collectors operating in Wellington City. The contents of the wheelie bins were emptied into large plastic bags for the sampling and the empty bins left on the kerbside. All kerbside waste was transported to Southern Landfill for sorting.

2.2.2 Audit execution

At Southern Landfill, the sample of kerbside rubbish bags was sorted in sampling units of five bags. The 120/140-litre wheelie bins samples were sorted in units of five wheelie bins. The sample of 240-litre wheelie bins was sorted in units of two wheelie bins.

Each of the bags in the sample units was weighed in, one bag at a time, and then opened. The contents of all the bags in the sample unit were spread on a sorting table, and the individual items sorted into the appropriate categories. When all of the items in the sample unit were sorted, the individual classifications were weighed out and the material disposed of.

The waste was sorted into the 24 secondary categories described in Appendix 2. These categories are based on the 12 primary categories recommended by the SWAP. The secondary classifications were chosen to identify the different types of recyclable materials present in the waste.

2.2.3 Staff training and OSH issues

The waste was sorted by a team of four, comprising three contract workers and a Waste Not sub-contractor or staff member. Prior to the start of the audit, all team members received the requisite training on the requirements of the audit process and on occupational health and safety procedures. As sensitive documents are occasionally present in residential waste, the importance of confidentiality was emphasised to all team members.



Photo 2.1 - Sorting kerbside waste and one day's sample of waste after sorting

2.3 Visual survey

The six-day visual survey of residual waste at the Southern Landfill transfer pit and tip face took place from 21-27 November 2018. The survey included both weekdays and a weekend day to capture weekly variations in the waste stream.

Visual surveying provides information on vehicle loads of waste entering a disposal facility in terms of the type of vehicle transporting the waste, the composition of the waste load, and the activity source of the load (for example, landscaping, residential, and construction and demolition).

The composition of waste is based on the 12 primary categories (e.g. Paper, Plastics, etc.) recommended by the SWAP. Further secondary categories were chosen after consultation with Council. A description of the categories is provided in Appendix 2.

The activity sources of waste are those recommended by the National Waste Data Framework.

2.3.1 Analysing waste streams

For the purpose of analysing waste streams, Waste Not differentiates between kerbside waste collections, special waste, and general waste. Different methods are used for determining the composition of each waste stream.

Kerbside waste collections, in this context, are taken to include collections of rubbish bags and wheelie bins from both residential and commercial/industrial properties. The composition of kerbside collections is most accurately determined by sort-and-weigh auditing, rather than by visual surveying techniques.

Special wastes disposed of at Southern Landfill include asbestos, biosolids, abattoir waste, and wastewater treatment plant screenings.

General waste is considered to be all wastes other than kerbside waste collections and special wastes. Visual surveying is used primarily for determining the composition of the general waste stream.

If waste from other transfer stations is disposed of at a facility, this may be quantified separately, depending on the quantity of waste involved.

2.3.2 Visual assessment of waste composition

While each vehicle was being unloaded into the transfer pit or at the tip face, the surveyor assessed the relative weight of each constituent present in the load on the basis of volume and density. Absolute weights of individual materials were not estimated; rather, the proportion of weight represented by each material was estimated. These data were recorded as a proportion, by weight, for each constituent present in the load.

For vehicle loads in which it was difficult to distinguish the individual constituents, a generic composition, based on previous surveys of that type of vehicle load, was used as a template for the composition then adjusted according to the materials that were visible.

Data was not recorded on vehicles disposing of any materials other than residual waste at either disposal point.

2.3.3 Activity sources

Waste Not has developed its own categories of activity source that are aimed at providing the information that is most useful to councils for monitoring waste streams and effectively targeting waste minimisation initiatives. These activity sources are now recommended by the National Waste Data Framework. The activity sources that were used for classifying waste loads at the Southern Landfill transfer pit and tip face were:

1. **Construction and demolition (C&D)** - waste materials from the construction or demolition of a building
2. **Industrial/commercial/institutional (ICI)** - waste from industrial, commercial, and institutional sources
3. **Kerbside waste collection** - waste collected from residential and commercial premises by private and council kerbside waste collections
4. **Landscaping and earthworks** - waste from landscaping activity, garden maintenance, and site works, both domestic and commercial
5. **Residential** - all waste originating from residential premises other than that covered by one of the other, more specific classifications (includes drop-offs of bagged domestic waste)
6. **Special wastes** - a subjective classification that includes any substantial waste stream (such as biosolids, infrastructural cleanfill, or industrial wastes) that either requires special handling or significantly affects the overall composition of the waste stream and is markedly different from waste streams at other disposal facilities.
7. **Transfer station** - waste entering a facility from another transfer station.

The activity source of each load was assessed and recorded by the surveyor at the same time as the composition was being assessed and recorded. If a load contained materials from more than one activity source, a judgement was made as to which activity source predominated in the load.

2.3.4 Identification of vehicle types

As loads carried by different vehicle types are not affected in similar ways by waste reduction initiatives, vehicles carrying waste were classified according to the system shown in Table 2.2. Photos and more detailed explanations of the truck types are provided in Appendix 3.

Table 2.2 - Vehicle classification system

Vehicle type	Uses
Car-sized loads	Small loads, generally from a single source, can be of either commercial or residential origin. Includes vehicles other than cars carrying very small loads, such as a van carrying a few rubbish bags.
Trailer-sized loads – including vans, small trucks, and utes	Small-medium sized loads, usually from a single source, either commercial or residential, some may be from multiple sources (i.e. a garden contractor)
Kerbside collection compactors	Large load usually from multiple regular sources, either residential or commercial or both combined
Front-loader trucks	Large loads, usually from numerous commercial sources that are regular users
Gantry trucks	Medium-large loads, usually from a single source, may be one-off disposal for residential or commercial waste, or regularly used by a commercial waste generator
Hook truck	Large loads, usually from a single source, may be one-off loads or regularly used by a large-scale waste generator.
Other trucks – including tip, box, and flat-deck	Medium to large loads, usually commercial, may be one off -loads or regular waste generators

3 Kerbside waste

3.1 Council rubbishbags

3.1.1 Primary composition of Council rubbish bags

The audit of Council rubbish bags included 365 bags weighing a total of 2,437 kg. The primary composition of Council kerbside rubbish bags is presented in Table 3.1 below and Figure 3.1 on the following page. The secondary composition, which includes all 24 secondary categories, is presented in Appendix 4.

During the sample collection, when a rubbish bag was taken from a dwelling, the total number of bags set out by that dwelling was recorded. This data was used to calculate the average number of bags per household set out, which was 1.30 bags. This data is analysed further in section 3.1.3. The 'mean weight per household set out' shown in the table has been calculated by combining the average bag weight with the average number of bags set out per household.

The average set out weight of kerbside waste is related to the frequency with which households set waste out for collection. As not all households set out kerbside waste for collection every week, the average household set out weight cannot be regarded as equivalent to an average weekly household waste generation.

Table 3.1 - Primary composition of Council rubbish bags - November 2018

Council rubbish bags November 2018 (margins of error for 95% confidence level)	Proportion of total	Mean wt. per rubbish bag	Mean wt. per household set out (1.3 bags)
Paper	7.9% (±1.0%)	0.53 kg (±0.07 kg)	0.69 kg (±0.09 kg)
Plastics	12.1% (±0.9%)	0.81 kg (±0.06 kg)	1.06 kg (±0.08 kg)
Organics	55.3% (±5.1%)	3.69 kg (±0.34 kg)	4.82 kg (±0.44 kg)
Ferrous metals	1.3% (±0.3%)	0.09 kg (±0.02 kg)	0.11 kg (±0.02 kg)
Non-ferrous metals	1.1% (±0.2%)	0.08 kg (±0.01 kg)	0.10 kg (±0.02 kg)
Glass	2.2% (±0.7%)	0.14 kg (±0.05 kg)	0.19 kg (±0.06 kg)
Textiles	3.5% (±0.9%)	0.24 kg (±0.06 kg)	0.31 kg (±0.08 kg)
Sanitary paper	13.1% (±2.5%)	0.88 kg (±0.17 kg)	1.14 kg (±0.22 kg)
Rubble	0.8% (±0.3%)	0.05 kg (±0.02 kg)	0.07 kg (±0.03 kg)
Timber	0.6% (±0.5%)	0.04 kg (±0.03 kg)	0.05 kg (±0.04 kg)
Rubber	0.3% (±0.1%)	0.02 kg (±0.01 kg)	0.02 kg (±0.01 kg)
Potentially hazardous	1.7% (±0.6%)	0.11 kg (±0.04 kg)	0.15 kg (±0.05 kg)
TOTAL	100.0%	6.68 kg (±0.39 kg)	8.71 kg (±0.51 kg)

Organic material, primarily kitchen/food waste, was the largest single component of the kerbside rubbish bags, comprising 55.3% of the total weight. Sanitary paper (which includes

nappies, paper towels, and tissues), was the second largest component, at 13.1%, and Plastics, 12.1% was the third largest component.

The average Council rubbish bag weighed 6.68 kg (± 0.39 kg at the 95% confidence level). The average household set out 1.30 bags, resulting in the average household set out weight being 8.71 kg (± 0.51 kg at the 95% confidence level). This average household set out weight is only applicable to those properties that set out rubbish bags, and does not include properties that did not set out any kerbside waste.

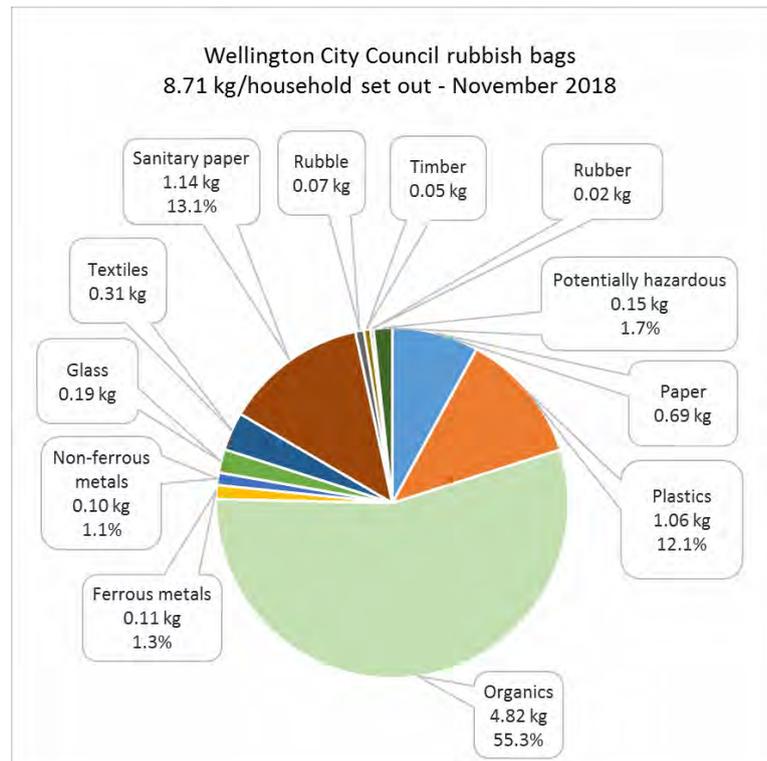


Figure 3.1 - Primary composition of Council rubbish bags - November 2018

3.1.2 Distribution of Council rubbish bags weights

The average domestic kerbside rubbish bag weighed 6.68 kg (± 0.39 kg at the 95% confidence level). The distribution of the bag weights is shown in Figure 3.2 below.

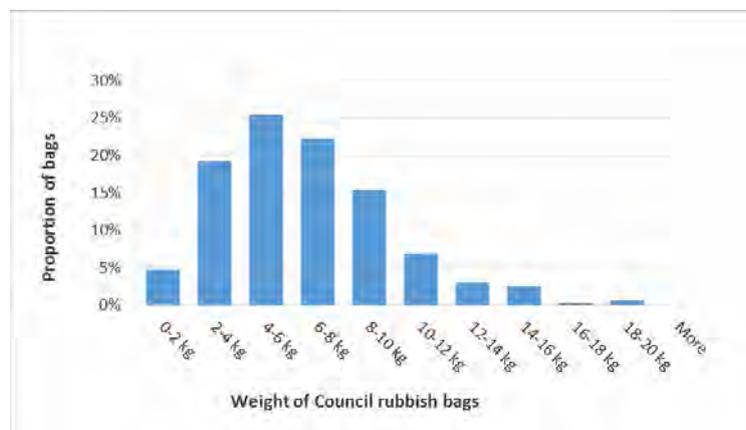


Figure 3.2 – Distribution of kerbside rubbish bag weights - November 2018

Sixty-seven percent of all bags weighed between 2 and 8 kg. Thirteen percent of bags weighed over 10 kg. The heaviest bag weighed 20.00 kg, the lightest, 0.72 kg.

3.1.3 Distribution of Council rubbish bags set outs

Data on the number of Council rubbish bags set out by each household was recorded while the sample was being collected. The average household bag set out was 1.30 rubbish bags. Figure 3.3 below shows the distribution of the bag set outs.

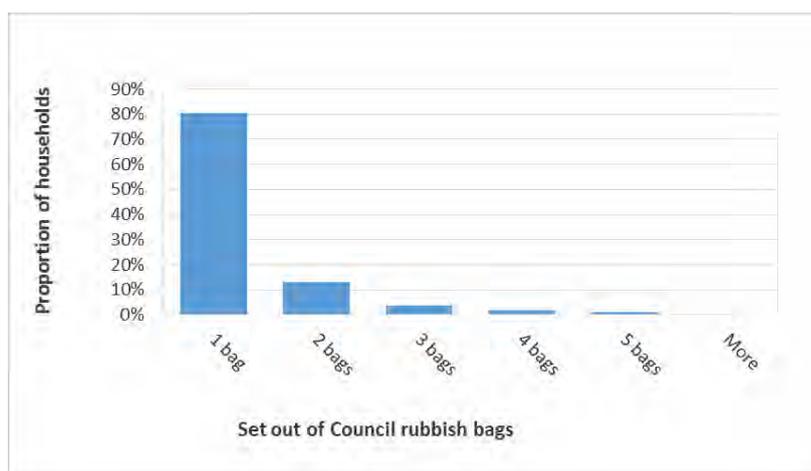


Figure 3.3 – Distribution of kerbside rubbish bag set out - November 2018

Eighty percent of all households using kerbside rubbish bags set out a single rubbish bag. Thirteen percent of households set out two bags. Seven percent of households set out more than two bags. No houses included in the sample set out more than five bags.

3.1.4 Diversion potential of Council rubbish bags

Common means used for the diversion of domestic waste materials from landfill disposal are by providing systems for the collection or diversion of recyclable and compostable materials. Wellington City Council provides a kerbside recycling service for residents and recyclable materials can also be dropped off at Southern Landfill. Materials accepted by Council's kerbside recycling collection are described in Appendix 1.

For the diversion of organic materials, both kitchen waste and greenwaste can be composted at home by residents and greenwaste can be disposed of at Southern Landfill. Private greenwaste collections are also available.

Table 3.2 on the next page shows the proportions of kerbside rubbish bags that could have been diverted using these methods. The table also shows the weight of materials per average household set out and per rubbish bag that could have been diverted. The data on the individual materials has been taken from Appendix 4.

Table 3.2 – Diversion potential of kerbside rubbish bags - November 2018

Kerbside rubbish bags - Diversion potential - November 2018	% of total	Kg per rubbish bag	Kg per household set out (1.3 bags)
Kerbside recyclable materials			
Paper - Recyclable	6.7%	0.45 kg	0.58 kg
Plastics - #1-2 containers	0.8%	0.06 kg	0.07 kg
Plastics - #3-7 containers	0.9%	0.06 kg	0.08 kg
Ferrous metals - Steel cans	0.6%	0.04 kg	0.05 kg
Non-ferrous metals - Aluminium cans	0.4%	0.03 kg	0.04 kg
Glass - Bottles/jars	1.5%	0.10 kg	0.13 kg
Subtotal	11.0%	0.74 kg	0.96 kg
Compostable materials			
Organics - Kitchen/food waste	45.2%	3.02 kg	3.94 kg
Organics - Greenwaste	5.4%	0.36 kg	0.47 kg
Subtotal	50.6%	3.38 kg	4.41 kg
TOTAL – Potentially divertable	61.6%	4.11 kg	5.37 kg

Approximately 11.0% of the materials in Council rubbish bags could have been recycled through Council's kerbside recycling collection or at Southern Landfill. Paper comprised 61% of the recyclable materials.

A further 50.6% of the rubbish bags could have been composted. Eighty-nine percent of the compostable materials was kitchen waste.

In total, 61.6% of the kerbside rubbish bags could have been diverted from landfill disposal by either recycling or composting. This equates to 5.37 kg per average household set out.

Other materials, such as clothing, soft plastics, and other metals, are also recoverable, but have not been included in this analysis.

3.2 120/140-litre wheelie bins

3.2.1 Primary composition of 120/140-litre wheelie bins

The audit of privately collected 120/140-litre wheelie bins included the contents of 74 bins weighing a total of 1,031 kg.

The primary composition of 120/140-litre wheelie bins collected privately in Wellington is presented in Table 3.3 below and Figure 3.4 on the following page. The secondary composition of 120/140-litre wheelie bins is presented in Appendix 5. As not all households set out a wheelie bin for collection every week, the mean bin weight cannot be regarded as equivalent to an average weekly household waste generation.

Table 3.3 - Primary composition of 120/140-litre wheelie bins - November 2018

120/140-litre wheelie bins November 2018 (margins of error for 95% confidence level)	Proportion of total		Mean wt. per wheelie bin	
Paper	8.0%	(±2.2%)	1.12 kg	(±0.31 kg)
Plastics	8.8%	(±1.4%)	1.22 kg	(±0.20 kg)
Organics	57.3%	(±11.2%)	7.98 kg	(±1.56 kg)
Ferrous metals	1.1%	(±0.3%)	0.15 kg	(±0.05 kg)
Non-ferrous metals	1.4%	(±1.2%)	0.20 kg	(±0.17 kg)
Glass	2.2%	(±1.2%)	0.31 kg	(±0.17 kg)
Textiles	5.3%	(±2.8%)	0.73 kg	(±0.39 kg)
Sanitary paper	9.2%	(±3.7%)	1.29 kg	(±0.51 kg)
Rubble	2.2%	(±2.4%)	0.30 kg	(±0.34 kg)
Timber	2.1%	(±2.2%)	0.29 kg	(±0.31 kg)
Rubber	0.2%	(±0.1%)	0.03 kg	(±0.01 kg)
Potentially hazardous	2.2%	(±1.4%)	0.31 kg	(±0.20 kg)
TOTAL	100.0%		13.94 kg	(±1.47 kg)

The average contents of 120/140-litre wheelie bins weighed 13.94 kg (±1.47 kg at the 95% confidence level). Organic material was the largest primary component of the 120/140-litre wheelie bins, comprising 57.3% of the total weight, or 7.98 kg per bin. In terms of the secondary categories of Organics (not shown in the table), food waste comprised 32.5% of the total weight and green waste 22.4%. Sanitary paper was the second largest primary category, 9.2%, and Plastics, 8.8%, was the third largest.

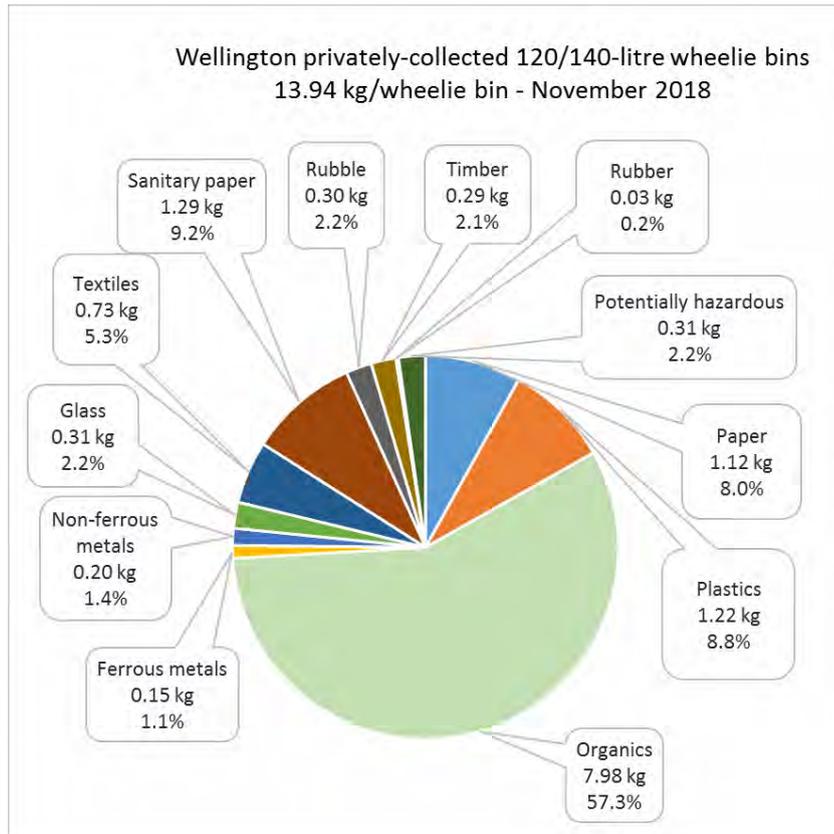


Figure 3.4 - Composition of 120/140-litre wheelie bins - November 2018

3.2.2 Distribution of 120/140-litre wheelie bins weights

The average contents of 120/140-litre wheelie bins weighed 13.94 kg (± 1.47 kg at the 95% confidence interval). The heaviest bin weighed 36.12 kg and the lightest 1.36 kg. The distribution of the bin weights is shown in Figure 3.5 below.

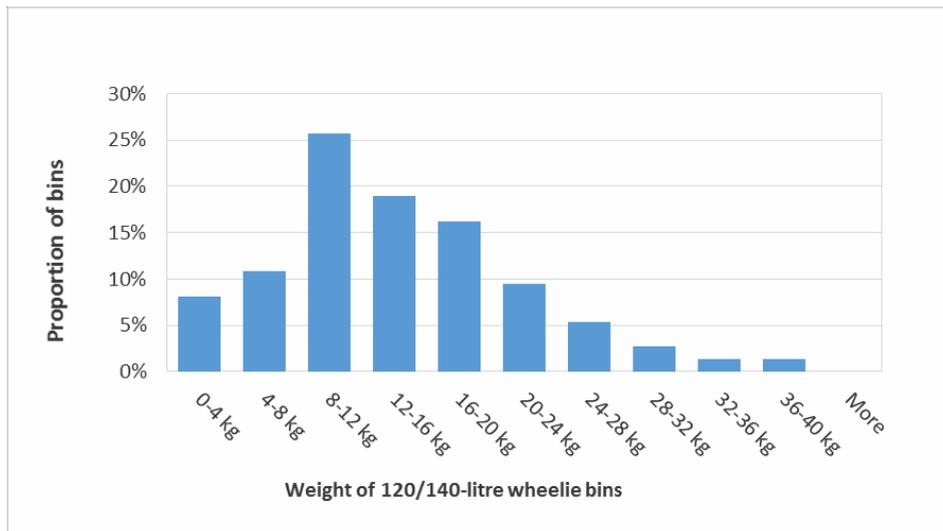


Figure 3.5 - Distribution of 120/140-litre wheelie bin weights - November 2018

Forty-five percent of 120/140-litre wheelie bins weighed under 12 kg, another 45% weighed between 12 kg and 24 kg, and 11% weighed over 24 kg. .

3.2.3 Diversion potential of 120/140-litre wheelie bins

Common means used for the diversion of domestic waste materials from landfill disposal are by providing systems for the collection or diversion of recyclable and compostable materials. Wellington City Council provides a kerbside recycling service for residents and recyclable materials can also be dropped off at Southern Landfill. Materials accepted by Council's kerbside recycling collection are described in Appendix 1.

For the diversion of organic materials, both kitchen waste and greenwaste can be composted at home by residents and greenwaste can be disposed of at Southern Landfill. Private greenwaste collections are also available.

Table 3.4 below shows the proportion of 120/140-litre wheelie bins that could have been diverted using these methods. The table also shows the weight of materials per average bin that could have been diverted. The data on the individual materials has been taken from Appendix 5.

Table 3.4 - Diversion potential of 120/140-litre wheelie bins - November 2018

120/140-litre wheelie bins - Diversion potential - November 2018	% of total	Kg per wheelie bin
Kerbside recyclable materials		
Paper - Recyclable	6.9%	0.97 kg
Plastics - #1-2 containers	0.6%	0.08 kg
Plastics - #3-7 containers	0.6%	0.08 kg
Ferrous metals - Steel cans	0.5%	0.07 kg
Non-ferrous metals - Aluminium cans	0.2%	0.03 kg
Glass - Bottles/jars	1.6%	0.23 kg
Subtotal	10.5%	1.46 kg
Compostable materials		
Organics - Kitchen/food waste	32.5%	4.53 kg
Organics - Greenwaste	22.4%	3.12 kg
Subtotal	54.9%	7.65 kg
TOTAL – Potentially divertable	65.3%	9.11 kg

Approximately 10.5% of the contents of 120/140-litre wheelie bins could have been recycled through Council's kerbside recycling collection or at a recycling centre. Paper comprised 66% of the recyclable materials.

A further 54.9% of the contents of the bins could have been composted. In total, 65.3% of the contents of 120/140-litre wheelie bins could have been diverted from landfill disposal by either recycling or composting. This equates to 9.11 kg per average 120/140-litre wheelie bin. Other materials, such as clothing and other metals, are also recoverable, but have not been included in these calculations.

3.3 240-litre wheeliebins

3.3.1 Primary composition of 240-litre wheelie bins

The audit of privately collected 240-litre wheelie bins included the contents of 52 bins weighing a total of 1,156 kg.

The primary composition of privately collected 240-litre wheelie bins in Wellington is presented in Table 3.5 below and Figure 3.6 on the following page. The secondary composition of 240-litre wheelie bins is presented in Appendix 6.

As not all households set out a wheelie bin for collection every week, the mean bin weight cannot be regarded as equivalent to an average weekly household waste generation.

Table 3.5 - Primary composition of 240-litre wheelie bins - November 2018

240-litre wheelie bins November 2018 (margins of error for 95% confidence level)	Proportion of total		Mean wt. per wheelie bin	
Paper	9.1%	(±2.4%)	2.01 kg	(±0.54 kg)
Plastics	8.5%	(±1.3%)	1.88 kg	(±0.30 kg)
Organics	60.1%	(±12.4%)	13.37 kg	(±2.75 kg)
Ferrous metals	3.2%	(±2.5%)	0.71 kg	(±0.56 kg)
Non-ferrous metals	1.4%	(±1.1%)	0.32 kg	(±0.24 kg)
Glass	4.8%	(±2.6%)	1.06 kg	(±0.58 kg)
Textiles	2.3%	(±1.6%)	0.51 kg	(±0.35 kg)
Sanitary paper	5.8%	(±2.9%)	1.29 kg	(±0.65 kg)
Rubble	2.3%	(±3.2%)	0.52 kg	(±0.70 kg)
Timber	1.1%	(±0.9%)	0.24 kg	(±0.21 kg)
Rubber	0.5%	(±0.4%)	0.12 kg	(±0.08 kg)
Potentially hazardous	0.9%	(±0.4%)	0.20 kg	(±0.10 kg)
TOTAL	100.0%		22.22 kg	(±2.77 kg)

The contents of the average 240-litre wheelie bin weighed 22.22 kg (±2.77 kg at the 95% confidence level). Organic material was the largest primary component of the 240-litre wheelie bins, comprising 60.1% of the total, or 13.37 kg per bin. In terms of the secondary categories of Organics (not shown in the table), food waste comprised 24.6% of the total weight and green waste 34.0%. Paper was the second largest component, 9.1%, and Plastics, 8.5%, was the third largest component.

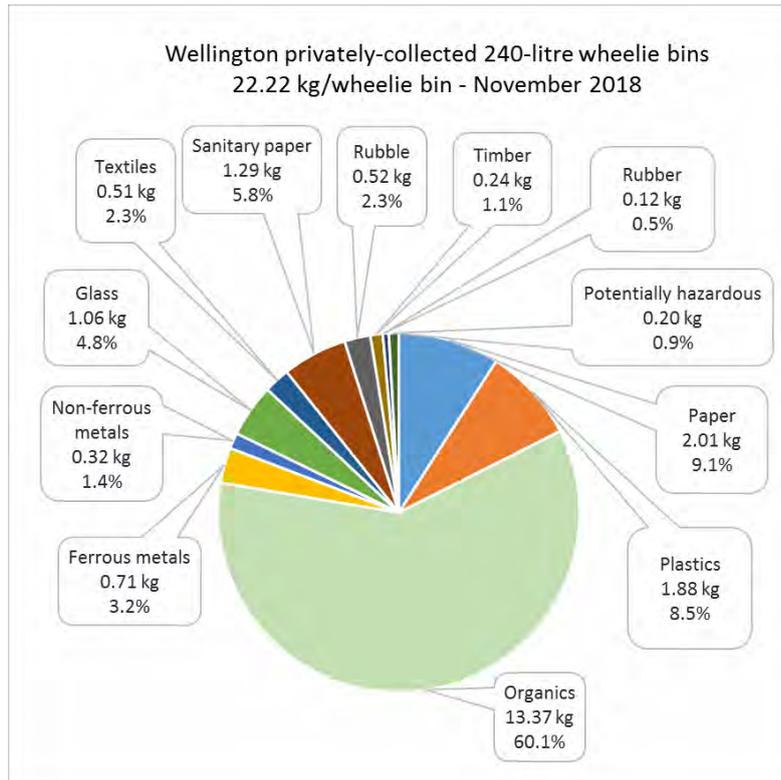


Figure 3.6 - Primary composition of 240-litre wheelie bins - November 2018

3.3.2 Distribution of 240-litre wheelie bins weights

The contents of an average 240-litre wheelie bin weighed 22.22 kg (± 2.77 kg at the 95% confidence level). The distribution of the bin weights is shown in Figure 3.7 below.

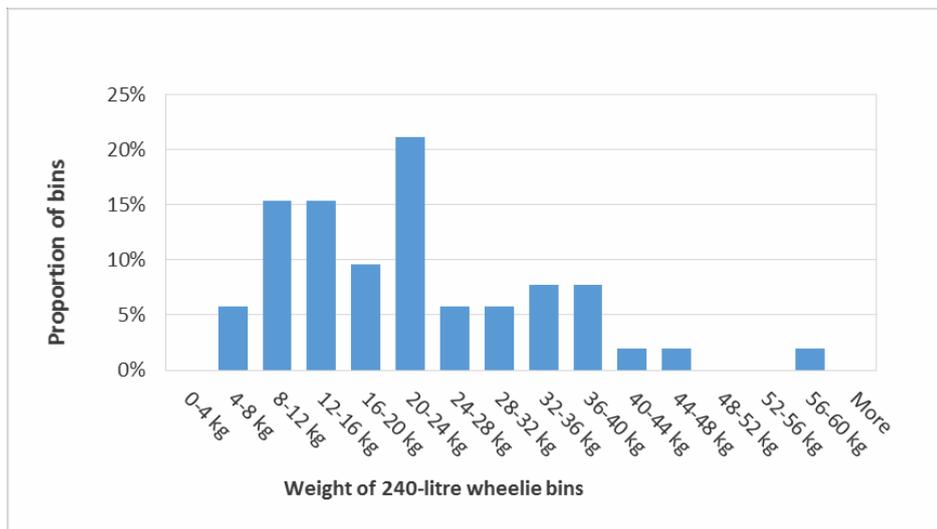


Figure 3.7 - Distribution of 240-litre wheelie bin weights - November 2018

Forty-six percent of 240-litre wheelie bins weighed under 20 kg. A further 48% weighed between 20 kg and 40 kg. Six percent weighed over 40 kg. The heaviest contents of a 240-litre wheelie bin in the sample weighed 57.84 kg and the lightest 4.14 kg.

3.3.3 Diversion potential of 240-litre wheelie bins

Common means used for the diversion of domestic waste materials from landfill disposal are by providing systems for the collection or diversion of recyclable and compostable materials. Wellington City Council provides a kerbside recycling service for residents and recyclable materials can also be dropped off at Southern Landfill. Materials accepted by Council's kerbside recycling collection are described in Appendix 1.

For the diversion of organic materials, both kitchen waste and greenwaste can be composted at home by residents and greenwaste can be disposed of at Southern Landfill. Private greenwaste collections are also available.

Table 3.6 below shows the proportion of 240-litre wheelie bins that could have been diverted using these methods. The table also shows the weight of materials per bin that could have been diverted. The data on the individual materials has been taken from Appendix 6.

Table 3.6 – Diversion potential of 240-litre wheelie bins - November 2018

240-litre wheelie bins - Diversion potential - November 2018	% of total	Kg per wheelie bin
Kerbside recyclable materials		
Paper - Recyclable	7.9%	1.75 kg
Plastics - #1-2 containers	1.3%	0.29 kg
Plastics - #3-7 containers	0.7%	0.16 kg
Ferrous metals - Steel cans	0.7%	0.15 kg
Non-ferrous metals - Aluminium cans	0.4%	0.09 kg
Glass - Bottles/jars	4.3%	0.95 kg
Subtotal	15.2%	3.38 kg
Compostable materials		
Organics - Kitchen/food waste	24.6%	5.46 kg
Organics - Greenwaste	34.0%	7.55 kg
Subtotal	58.5%	13.01 kg
TOTAL – Potentially divertable	73.7%	16.39 kg

Approximately 15.2% of the materials in 240-litre wheelie bins (or 3.38 kg per bin) could have been recycled through Council's kerbside recycling collection or at Southern Landfill recycling centre. Paper comprised over half (52%) of the recyclable materials.

A further 58.5% of the contents of the bins could have been composted. In total, 73.7% of the 240-litre wheelie bins could have been diverted from landfill disposal by either recycling or composting. This equates to 16.39 kg per average 240-litre wheelie bin.

Other materials, such as clothing and other metals, are also recoverable, but have not been included in these calculations.

3.4 Combined kerbsidewaste

In this section, the composition data from the kerbside waste audits described in sections 3.1, 3.2, and 3.3 is used to estimate the composition of the combined kerbside waste stream disposed of at Southern Landfill. For these calculations, it is assumed that all kerbside waste has the same composition as that which originates from Wellington City.

To aggregate the compositions of kerbside rubbish bags and the two sizes of wheelie bins, it is necessary to calculate the percentage of all kerbside waste that is disposed of in each of the three receptacles. The proportion of kerbside waste disposed of in Council rubbish bags was calculated in the July 2016 Joint Waste Assessment prepared for the Wellington Region Councils by Eunomia Research & Consulting and Waste Not Consulting.

For the waste assessment, the disposal rate of kerbside waste for all of Wellington region was calculated to be 206 kg per capita per annum in 2014/15. This estimate was based on two SWAP surveys of disposal facilities in the region that, when combined, represented less than half of all waste from the region disposed of at Class 1 landfills.

For the waste assessment, Wellington City Council rubbish bags' share of the kerbside waste market was calculated using Council data on the number of rubbish bags sold per annum and an assumed average bag weight of 6.25 kg per bag. Based on these assumptions, Council rubbish bags were calculated to have a 24% share of the kerbside waste market, by weight. As the 2018 kerbside waste audit has provided an actual average weight per bag (6.68 kg), the waste assessment calculations have been revised, giving Council rubbish bags a 26% market share, by weight.³

Data on the relative usage of the different sizes of wheelie bins was recorded during the collection of the kerbside waste sample. Data was gathered on 240 wheelie bins across the city, which showed 38% of bins were 240 litres and 62% were 120, 140, or 80 litres. While this is a relatively small sample size, it provides a sufficiently accurate relationship for calculating the composition of the combined waste stream. To calculate a market share, by weight, for the different sizes of wheelie bins, the market share, by usage, was applied to the average weight per bin. The results of the estimates of market share, by weight, for the different waste receptacles are shown in Table 3.7.

Table 3.7 - Market share - by weight of kerbside waste - November 2018

Kerbside waste receptacle	Market share, by weight
Council rubbish bags	26.0%
120/140-litre wheelie bins	37.5%
240-litre wheelie bins	36.5%
TOTAL	100.0%

³ Market share by the percentage of households using a service is an alternative measure of service uptake and value. While the SWAP indicated an average of 1.3 bags per household set out, no data is available on household participation frequency. Based on staff observations, Council officers are aware some households do not present a yellow bag every week, thus in the absence of data, an estimated average 1 bag per household participation rate continues to be the assumption. Based on this assumption, Council's yellow bag market share is 40.6% of the city's households.

It is estimated that Council rubbish bags represent 26% of the kerbside waste market, by weight, 120/140-litre wheelie bins - 37.5%, and 240-litre wheelie bins - 36.5%.

3.4.1 Primary composition of combined kerbside waste

The primary composition of the combined kerbside waste stream disposed of at Southern Landfill is presented in Table 3.8 below and Figure 3.8 on the next page. The secondary composition is presented in Appendix 7.

In Table 3.8, the estimated composition of the combined waste stream has been converted to an average weekly tonnage using the tonnage figure for kerbside waste in Table 6.1. It is likely that 5-10% of kerbside waste originates from commercial, rather than residential, premises, but this has not been taken into account in the calculations as there is no data available.

Table 3.8 - Primary composition of combined kerbside waste - November 2018

Combined kerbside waste (rubbish bags and wheelie bins) disposed of at Southern Landfill - November 2018	Proportion of total	Tonnes per week
Paper	8.4%	49 T/week
Plastics	9.5%	56 T/week
Organics	57.8%	338 T/week
Ferrous metals	1.9%	11 T/week
Non-ferrous metals	1.4%	8 T/week
Glass	3.1%	18 T/week
Textiles	3.7%	22 T/week
Sanitary paper	9.0%	53 T/week
Rubble	1.9%	11 T/week
Timber	1.3%	8 T/week
Rubber	0.3%	2 T/week
Potentially hazardous	1.6%	9 T/week
TOTAL	100.0%	585 T/week

Organic material was the largest primary component of the combined kerbside waste stream, comprising 57.8% of the total weight. In terms of the secondary categories of Organics (not shown in the table), food waste comprised 32.9% of the total weight and green waste 22.2%. Plastics, 9.5%, was the second largest primary component and, Sanitary paper, 9.0%, which includes nappies, tissues, and paper towels, was the third largest primary component.

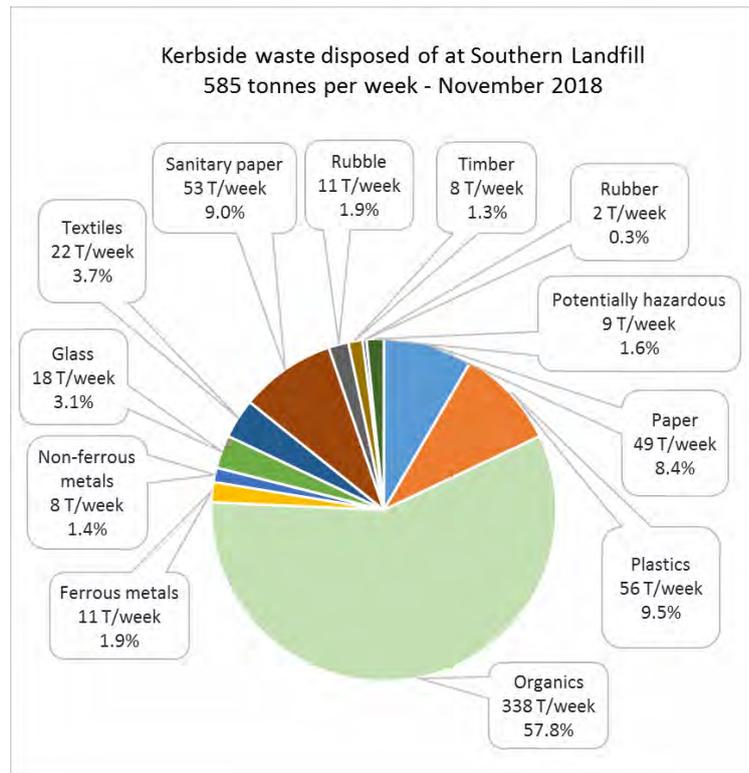


Figure 3.8 - Primary composition of combined kerbside waste - November 2018

3.4.2 Diversion potential of combined kerbside waste

Common means used for the diversion of domestic waste materials from landfill disposal are by providing systems for the collection or diversion of recyclable and compostable materials. Wellington City Council provides a kerbside recycling service for residents and recyclable materials can also be dropped off at Southern Landfill. Materials accepted by Council's kerbside recycling collection are described in Appendix 1.

For the diversion of organic materials, both kitchen waste and greenwaste can be composted at home by residents and greenwaste can be disposed of at Southern Landfill. Private greenwaste collections are also available.

Table 3.9 on the next page shows the proportion of the combined kerbside waste stream that could have been diverted using these methods. The table also shows the tonnes per week of each material that could have been diverted. The data on the individual materials has been taken from Appendix 7.

Table 3.9 - Diversion potential of combined kerbside waste stream

Diversion potential of combined kerbside waste (rubbish bags and wheelie bins) disposed of at Southern Landfill - November 2018	% of total	Tonnes per week
Kerbside recyclable materials		
Paper - Recyclable	7.2%	42 T/week
Plastics - #1-2 containers	0.9%	5 T/week
Plastics - #3-7 containers	0.7%	4 T/week
Ferrous metals - Steel cans	0.6%	3 T/week
Non-ferrous metals - Aluminium cans	0.3%	2 T/week
Glass - Bottles/jars	2.6%	15 T/week
Subtotal	12.3%	72 T/week
Compostable materials		
Organics - Kitchen/food waste	32.9%	192 T/week
Organics - Greenwaste	22.2%	130 T/week
Subtotal	55.1%	322 T/week
TOTAL - Potentially divertable	67.4%	394 T/week

Approximately 12.3% of the combined kerbside waste stream (or 72 T/week) could have been recycled through Council's kerbside recycling collection or at a drop-off facility. Paper comprised 58% of the recyclable materials.

A further 55.1%, or 322 T/week, could have been composted. Kitchen/food waste comprised 60% of compostable materials. Seasonal variations in waste composition need to be taken into account when assessing the components in organic waste. October to February is typically the high season for greenwaste disposal. At Southern Landfill, greenwaste disposal in the 2018 financial year was highest in November. Based on both seasonal trends observed in Southern Landfill greenwaste drop-off tonnages and seasonal SWAP surveys from other districts, it is likely the quantity of greenwaste in kerbside waste would also be different in other seasons.

In total, 67.4% of kerbside waste (or 394 T/week) could have been diverted from landfill disposal by either recycling or composting.

Other materials, such as clothing and other metals, are also recoverable, but have not been included in these calculations.

4 Transfer pit

Over the course of the six-day visual survey at Southern Landfill, between 21 and 27 November 2018, data was collected on 330 vehicles disposing of waste at the transfer pit. All of the vehicles were disposing of general waste (i.e. waste generated by C&D, ICI, landscaping and earthworks, and residential activity). Data was not collected on vehicles disposing of any material into the greenwaste section of the transfer pit.

There is no direct measurement of waste disposed of into the transfer pit. All residual waste loads entering Southern Landfill are weighed at the weighbridge but the records do not differentiate between loads disposed of at the transfer pit or the tip face. Residual waste from the transfer pit is aggregated and hauled to the tip face in a hook truck, but these loads are not weighed at the weighbridge.

For the analysis in this section, the quantity of waste disposed of at the transfer pit has been calculated using the Customer Name and Product Name fields in the weighbridge records for the period 3-30 November 2018. All loads entered into the weighbridge Customer Name field as being 'Domestic Customers' have been counted as disposing of waste at the transfer pit. A high proportion of these loads weighed less than one tonne.

Uncontaminated greenwaste is disposed of into a separate section of the transfer pit, from where it is diverted to the composting plant. All Product Names relating to domestic greenwaste were excluded from the analysis. It is noted, however, that a minor proportion of loads that were recorded as domestic greenwaste by the weighbridge were subsequently discharged into the residual waste end of the pit and landfilled.

The majority of residual wastes, other than special wastes, are recorded in the weighbridge Product Name field as being 'Commerical General Waste' (sic). All loads entered into this field are account holders.

The initial step in estimating the quantity of Commerical General Waste disposed of at the transfer pit was to filter out all commercial waste vehicles - compactors, front-loaders, gantry trucks, and hook trucks - as these all dispose of waste at the tip face. The second step was to assess the remaining loads that weighed between 1.0 and 1.5 tonnes. Depending on the name of the account holder, these loads were classified as either discharging at the pit or at the tip face. Liquid waste contractors, for example, were assumed to dispose of waste at the liquid waste disposal area while the Salvation Army was assumed to be disposing of waste at the transfer pit.

On the basis of these assumptions, it has been estimated that an average of 209 tonnes per week of residual waste was disposed of at the transfer pit between 3-30 November 2018.

4.1 Transfer pit waste - By activity source

An analysis is given in Table 4.1 on the next page of the activity sources of waste loads that were surveyed at the transfer pit. The analysis includes both the four activity sources of waste that make up the general waste stream (C&D, ICI, landscaping, and residential) that are disposed of at the transfer pit and the other activity sources of waste that are disposed of elsewhere at Southern Landfill, but not at the transfer pit. The final column in the table

shows the average weight per week originating from each type of waste during the period 3-30 November 2018.

Table 4.1 - Transfer pit waste - by activity source - 3-30 November 2018

Transfer pit Activity sources of waste loads - 3-30 November 2018	% of loads surveyed	% of total weight	Average tonnes/week
Construction & demolition	20%	42%	87 T/week
Industrial/commercial/institutional	18%	15%	32 T/week
Landscaping & earthworks	12%	17%	35 T/week
Residential	50%	26%	54 T/week
Subtotal - general waste	100%	100%	209 T/week
Kerbside waste	0%	0%	0 T/week
Special waste	0%	0%	0 T/week
TOTAL	100%	100%	209 T/week

Construction & demolition waste comprised 20% of vehicle loads surveyed. These loads represented 42% of waste, by weight. Industrial/commercial/institutional (ICI) waste comprised 15% of waste, by weight, and landscaping and earthworks, 17%. A number of the landscaping loads had been recorded at the weighbridge as greenwaste, but were disposed of as residual waste. Residential loads comprised 50% of all loads, but only represented 26% of the total weight.

4.2 Transfer pit waste - Primary composition

The primary composition of waste disposed of at the transfer pit is presented in Table 4.2 and Figure 4.1 on the following page. The secondary composition, which includes all 25 categories, is shown in Appendix 8.

Table 4.2 - Transfer pit waste - primary composition - 3-30 November 2018

Transfer pit waste Primary composition - 3-30 November 2018	% of total	Tonnes per week
Paper	5.5%	12 T/week
Plastics	4.1%	9 T/week
Organics	12.8%	27 T/week
Ferrous metals	3.6%	7 T/week
Non-ferrous metals	0.2%	0 T/week
Glass	0.7%	2 T/week
Textiles	11.6%	24 T/week
Sanitary paper	0.6%	1 T/week
Rubble	15.2%	32 T/week
Timber	45.5%	95 T/week
Rubber	0.2%	0 T/week
Potentially hazardous	0.1%	0 T/week
TOTAL	100.0%	209 T/week

Timber was the largest component of the waste disposed of at the transfer pit, comprising 45.5% of the total weight. Timber was disposed of in C&D loads and, as furniture, in residential loads. Rubble was the second largest component of waste, comprising 15.2%, and included C&D waste and soil. Organics was the third largest component of the waste, comprising 12.8% of the total weight.

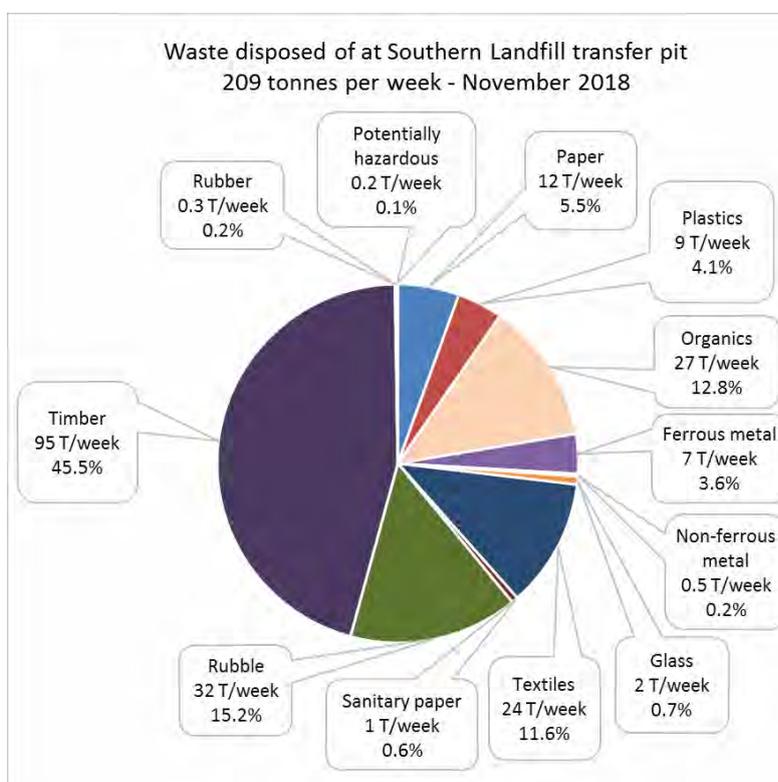


Figure 4.1 - Transfer pit waste - primary composition - 3-30 November 2018

4.2.1 Transfer pit waste - Primary composition by activity source

The primary compositions of the four activity sources that make up the waste stream at the transfer pit are shown in Table 4.3. Secondary compositions are given in Appendix 9, in terms of both percentages and tonnes per week.

Table 4.3 -Transfer pit waste - by activity source - 3-30 November 2018

Transfer pit waste - Primary composition By activity source 3-30 November 2018	C&D	ICI	Landscaping	Residential
Paper	1.8%	18.4%	0.3%	7.2%
Plastics	3.6%	6.8%	0.3%	5.8%
Organics	0.2%	3.7%	56.2%	9.9%
Ferrous metals	1.6%	5.3%	0.9%	7.5%
Non-ferrous metals	0.1%	0.8%	0.0%	0.3%
Glass	0.5%	2.0%	0.0%	0.9%
Textiles	1.0%	33.7%	0.0%	23.0%
Sanitary paper	0.1%	1.2%	0.1%	1.4%
Rubble	21.1%	1.0%	33.8%	1.9%
Timber	70.1%	26.6%	8.4%	41.6%
Rubber	0.0%	0.4%	0.0%	0.4%
Potentially hazardous	0.0%	0.2%	0.0%	0.2%
TOTAL	100.0%	100.0%	100.0%	100.0%
Tonnes per week	87 T/week	32 T/week	35 T/week	54 T/week

C&D waste was composed primarily of Timber (70.1%) and Rubble (21.1%) that, combined, represented 91.2%, by weight, of C&D waste. ICI waste was more heterogeneous, with Textiles, (33.7%), being the largest component. Major generators of textile waste included charity shops, textile recyclers, and commercial carpet installers.

Landscaping waste was 56.2% organic material, primarily greenwaste, and 33.8% Rubble, mainly soil. This data does not include greenwaste disposed of into the separate greenwaste area of the transfer pit. About a quarter of landscaping loads were predominantly compostable greenwaste. The remainder included significant quantities of non-compostable greenwaste, soil, or mixed waste. Residential waste was also heterogeneous, with Timber (41.6%) being the largest component. Timber was present in residential waste as both furniture and C&D waste.

4.2.2 Transfer pit waste - By vehicle type

Table 4.4 on the next page shows the percentage of loads transported by each of the seven vehicle types used in the survey. The table shows the percentage of total weight carried by each vehicle type, and the tonnes per week.

During the survey, only three types of vehicles disposed of waste at the transfer pit - cars, trailers, and other trucks. Other types of vehicles, such as compactors and gantry trucks, disposed of waste at the tip face or the other disposal points.

Table 4.4 - Transfer pit waste - by vehicle type - 3-30 November 2018

Transfer pit waste - By vehicle type 3-30 November 2018	% of loads surveyed	% of weight	Tonnes/week
Car-sized loads	47%	14%	30 T/week
Compactors	0%	0%	0 T/week
Front-loader trucks	0%	0%	0 T/week
Gantry trucks	0%	0%	0 T/week
Hook trucks	0%	0%	0 T/week
Other trucks	2%	4%	8 T/week
Trailer-sized loads	51%	82%	172 T/week
TOTAL	100.0%	100.0%	209 T/week

While 47% of all loads were car-sized, these loads represented only 14% of the total weight of waste. Fifty-one percent of the loads surveyed were trailer-sized loads, and these loads represented 82% of the total weight. A small number of other trucks, mainly tip and box trucks, also disposed of waste at the transfer pit.

4.2.3 Transfer pit waste - Primary composition by vehicle type

The primary compositions of the three vehicle types that disposed of waste at the transfer pit are shown in Table 4.5. Secondary compositions are given in Appendix 10.

Table 4.5 - Transfer pit waste - by vehicle type - 3-30 November 2018

Transfer pit waste By vehicle type 3-30 November 2018	Cars	Other trucks	Trailers
Paper	13.1%	9.8%	4.0%
Plastics	8.8%	28.2%	2.2%
Organics	21.0%	0.5%	11.9%
Ferrous metals	5.0%	13.3%	2.9%
Non-ferrous metals	0.5%	0.0%	0.2%
Glass	1.2%	0.0%	0.7%
Textiles	17.7%	13.6%	10.4%
Sanitary paper	2.2%	0.1%	0.3%
Rubble	5.2%	2.8%	17.4%
Timber	24.6%	31.7%	49.8%
Rubber	0.4%	0.0%	0.1%
Potentially hazardous	0.3%	0.0%	0.1%
TOTAL	100.0%	100.0%	100.0%
Tonnes per week	30 T/week	8 T/week	172 T/week

4.3 Transfer pit waste - Diversion potential

Of the 25 material classifications used in the visual survey, nine are commonly recycled or recovered in New Zealand. A further four materials are compostable. There are currently diversion options available in Wellington region for most of these 13 materials. Based on these 13 materials, Table 4.6 shows the proportion of waste disposed of at the Southern Landfill transfer pit that could potentially be diverted from landfill disposal. The percentages and tonnages have been taken from Appendix 8.

Table 4.6 - Transfer pit waste - diversion potential - 3-30 November 2018

Transfer pit waste Diversion potential 3-30 November 2018	% of total	T/week
Recyclable and recoverable materials		
Paper - Recyclable	1.5%	3 T/week
Paper - Cardboard	3.7%	8 T/week
Plastic - Recyclable	0.1%	0 T/week
Ferrous metals	3.6%	7 T/week
Non-ferrous metals	0.2%	0 T/week
Glass - Recyclable	0.1%	0 T/week
Textiles - Clothing	0.8%	2 T/week
Rubble - Cleanfill	10.3%	22 T/week
Timber - Reusable	2.7%	6 T/week
Subtotal	23.0%	48 T/week
Compostable materials		
Kitchen/food waste	1.9%	4 T/week
Compostable greenwaste	6.5%	14 T/week
Rubble - New plasterboard	2.0%	4 T/week
Timber - Untreated/unpainted	5.0%	10 T/week
Subtotal	15.5%	32 T/week
TOTAL - Potentially divertable	38.5%	81 T/week

Recyclable and recoverable materials comprised 23.0% of waste disposed of at the transfer pit. Compostable materials comprised 15.5 % of waste at the transfer pit. Overall, approximately 38.5% of waste stream could have been diverted from landfill disposal.

The largest single divertable component was cleanfill, which comprised 10.3% of all waste, by weight. Over half of cleanfill, mostly soil, was in landscaping loads.

Compostable greenwaste was the second largest divertable component disposed of into the transfer pit, comprising 6.5% of the total landfilled weight. This does not include greenwaste disposed of into the separate greenwaste disposal area of the pit, which is composted on-site.

5 Waste direct to tip face

In this section, “tip face” is used to describe all waste disposal points at Southern Landfill, other than the transfer pit. During the six-day visual survey at Southern Landfill, data was collected on 164 vehicles disposing of waste at the working tip face. Data was not collected on vehicles disposing of waste at the asbestos or liquid waste disposal sites.

The data from the visual survey at the tip face was used to determine the composition of general waste (i.e. excluding kerbside waste, special waste, and waste from the transfer pit). The composition of kerbside waste was determined with the sort-and-weigh audits described in section 3.

The average weekly tonnage of levied waste disposed of at Southern Landfill was calculated by analysing the Product Names used in the weighbridge records. The records were analysed for the four-week period 3-30 November. In this period, 46 Product Names were used. On the advice of Council, 11 of these were identified as being subject to the waste levy. The levied and non-levied Product Names are provided in Appendix 15.

To calculate the tonnage of levied waste for the four-week period 3-30 November 2018, the tonnages recorded under each of these Product Names was totalled. During the period analysed, an average of 1,745 tonnes per week of levied waste was disposed of at Southern Landfill. An estimated 497 tonnes per week was general waste disposed of directly to the tip face.

5.1 General waste direct to tip face - By activity source

An analysis of the relative numbers and activity sources of general waste loads surveyed at the tip face at Southern Landfill is given in Table 5.1. The analysis includes the four activity sources that make up the general waste stream (C&D, ICI, landscaping, and residential). The analysis *excludes* the activity sources that are not classified as general waste (kerbside waste collections, special wastes, and waste from the transfer pit).

The tonnages for the four activity sources that make up the general waste stream are based on the ratios between the weights for each activity source during the survey period applied to the weekly tonnage of general waste disposed of directly to the tip face.

Table 5.1 - General waste direct to tip face - by activity source - 3-30 November 2018

General waste direct to tip face By activity source Excludes kerbside waste and special waste 3-30 November 2108	% of loads surveyed	% of total weight	Tonnes/week
Construction & demolition	17%	9%	44 T/week
Industrial/commercial/institutional	73%	85%	422 T/week
Landscaping & earthworks	6%	6%	28 T/week
Residential	3%	1%	4 T/week
TOTAL	100%	100%	497 T/week

C&D waste comprised 9%, by weight, of general waste disposed of directly to the tip face. The majority of general waste was from ICI sources, which represented 85% of general waste, by weight. Small amounts of landscaping and residential loads were also disposed of.

5.2 General waste direct to tip face - Primary composition

The primary composition of general waste disposed of directly to the tip face at Southern Landfill is given in Table 5.2 below and Figure 5.1 on the next page. Secondary classifications are presented in Appendix 11.

Table 5.2 - General waste direct to tip face - composition - 3-30 November 2018

General waste direct to tip face Excludes kerbside waste, special waste, and the transfer pit - 3-30 November 2018	% of weight	Tonnes/week
Paper	11.8%	59 T/week
Plastics	16.9%	84 T/week
Organics	16.2%	80 T/week
Ferrous metals	2.9%	14 T/week
Non-ferrous metals	0.9%	5 T/week
Glass	2.8%	14 T/week
Textiles	9.4%	47 T/week
Sanitary paper	6.3%	31 T/week
Rubble	16.6%	83 T/week
Timber	13.1%	65 T/week
Rubber	1.9%	9 T/week
Potentially hazardous	1.2%	6 T/week
TOTAL	100.0%	497 T/week

General waste disposed of directly to the tip face at Southern Landfill was relatively heterogeneous. Plastics was, by a small margin, the largest component of the general waste, 16.9%, reflecting the relatively high proportion of plastic in ICI waste. Paper, Organics, Rubble, and Timber represented between 11.8% and 16.6% of the general waste, by weight.

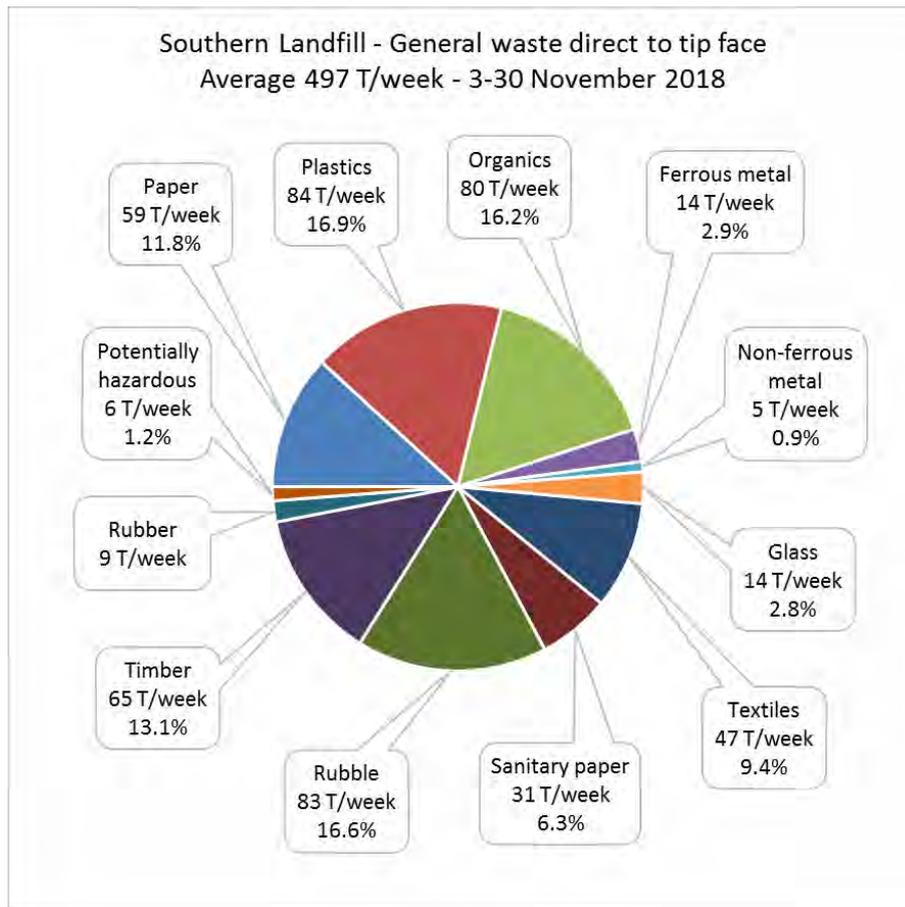


Figure 5.1 - General waste direct to tip face - composition - 3-30 November 2018

5.2.1 General waste direct to tip face - Primary composition by activity source

Table 5.3 on the next page shows the composition of the four activity sources that comprised general waste disposed of directly to the tip face. The analysis *excludes* the activity sources that are not classified as general waste (kerbside waste collections, special wastes, and waste from the transfer pit). The secondary categories are presented in Appendix 12 in terms of both percentage composition and tonnes per week.

Table 5.3 - General waste direct to tip face - by activity source - 3-30 November 2018

General waste direct to tip face - By activity source Excludes kerbside waste, special waste, and transfer pit - 3-30 November 2018	Construction & demolition	Industrial/commercial/institutional	Landscaping & earthworks	Residential
Paper	1.7%	13.6%	1.8%	6.4%
Plastics	2.5%	19.6%	0.1%	7.5%
Organics	0.6%	16.7%	35.1%	0.0%
Ferrous metals	1.0%	3.2%	0.0%	11.5%
Non-ferrous metals	0.0%	1.1%	0.0%	0.0%
Glass	0.2%	3.3%	0.0%	0.0%
Textiles	10.4%	9.8%	0.0%	24.4%
Sanitary paper	0.2%	7.4%	0.0%	0.0%
Rubble	45.2%	10.9%	61.1%	0.0%
Timber	38.0%	10.8%	1.8%	50.3%
Rubber	0.2%	2.2%	0.0%	0.0%
Potentially hazardous	0.1%	1.4%	0.0%	0.0%
TOTAL	100.0%	100.0%	100.0%	100.0%
Tonnes per week	44 T/week	422 T/week	28 T/week	4 T/week

Construction and demolition waste was largely composed of Timber (38.0%) and Rubble (45.2%, which included plasterboard, concrete, bricks, and soil).

Industrial/commercial/institutional waste was more heterogeneous, with Plastics comprising the largest proportion (19.6%) and Organics (16.7%) the second largest component, and Paper (13.6%) the third largest.

5.2.2 All waste direct to tip face - By vehicle type

The visual survey collected data on 164 vehicle loads of waste disposed of at the tip face. The type of vehicle disposing of each load was recorded. Table 5.4 on the next page shows the percentage of loads transported directly to the tip face by each of the seven vehicle types used in the survey. No car-sized or trailer-sized loads were recorded at the tip face.

The table includes all activity sources of waste recorded at the tip face. The table shows the percentage of total weight carried by each vehicle type, and the tonnes per week.

It is noted that the visual survey only took place at the actual working tip face. Vehicles disposing of special waste at other disposal points, such as the asbestos area and the liquid waste disposal area, were not included in the survey. As a result, not all vehicle types are represented accurately in the data. 'Other trucks', in particular, are likely to be under-represented as sucker trucks and tip trucks transport most of the special waste going to the other areas. The tonnage carried by hook trucks is also lower than the actual tonnage as waste from the transfer pit is transported to the tip face by a hook truck but that vehicle is not included in the weighbridge records.

Table 5.4 - All waste direct to tip face - by vehicle type - 3-30 November 2018

Waste direct to tip face - By vehicle type 3-30 November 2018	% of loads surveyed	% of weight	Tonnes/week
Car-sized loads	0%	0%	0 T/week
Compactors	45%	38%	585 T/week
Front-loader trucks	9%	14%	223 T/week
Gantry trucks	15%	4%	66 T/week
Hook trucks	21%	26%	399 T/week
Other trucks	10%	17%	264 T/week
Trailer-sized loads	0%	0%	0 T/week
TOTAL	100.0%	100.0%	1,536 T/week

Forty-five percent of the loads surveyed were compactors, and these loads represented 38% of the total weight. A high proportion of waste carried by compactors was kerbside waste, with a minor amount being litter from Council's streetscape contractor. Hook trucks disposed of 26% of waste at the tip face. Waste from the transfer pit is excluded from this total.

5.2.3 All waste direct to tip face - Primary composition by vehicle type

The primary compositions of the five vehicle types that disposed of waste at the tip face are shown in Table 4.5. Secondary compositions are given in Appendix 13.

Table 5.5 - All waste direct to tip face - by vehicle type - 3-30 November 2018

All waste direct to tip face - by vehicle type 3-30 November 2018	Compactors	Front-loader trucks	Gantry trucks	Hook trucks	Other trucks
Paper	8.4%	16.6%	6.5%	5.3%	4.5%
Plastics	9.5%	24.6%	9.1%	7.9%	7.4%
Organics	57.8%	16.4%	10.7%	9.7%	9.2%
Ferrous metals	1.9%	3.7%	2.7%	1.3%	0.7%
Non-ferrous metals	1.4%	1.2%	0.4%	0.4%	0.5%
Glass	3.1%	3.9%	0.8%	1.2%	1.8%
Textiles	3.7%	8.7%	2.5%	11.1%	8.5%
Sanitary paper	9.0%	8.6%	3.5%	2.8%	2.3%
Rubble	1.9%	3.9%	4.7%	20.7%	50.8%
Timber	1.3%	7.1%	18.3%	10.9%	13.6%
Rubber	0.3%	3.2%	0.4%	0.7%	0.5%
Potentially hazardous	1.6%	2.0%	40.4%	28.0%	0.2%
TOTAL	100.0%	100.0%	100.0%	100.0%	100.0%
Tonnes per week	585 T/week	223 T/week	66 T/week	399 T/week	264 T/week

5.3 General waste direct to tip face - Diversion potential

Of the 25 material classifications used in the visual survey, nine are commonly recycled or recovered in New Zealand. A further four materials are compostable. There are currently diversion options available in Wellington region for most of these 13 materials. Based on these 13 materials, Table 5.6 shows the proportion of general waste disposed of directly to the tip face that could potentially be diverted from landfill disposal. The percentages and tonnages have been taken from Appendix 11.

Table 5.6 - General waste direct to tip face - diversion potential - 3-30 November 2018

General waste direct to tip face - Diversion potential - 3-30 November 2018	% of weight	Tonnes/week
RECYCLABLE AND RECOVERABLE MATERIALS		
Paper - Recyclable	5.0%	25 T/week
Paper - Cardboard	5.7%	28 T/week
Plastic - Recyclable	1.0%	5 T/week
Ferrous metals	2.9%	14 T/week
Non-ferrous metals	0.9%	5 T/week
Glass - Recyclable	1.5%	7 T/week
Textiles - Clothing	2.2%	11 T/week
Rubble - Cleanfill	5.3%	26 T/week
Timber - Reusable	0.7%	4 T/week
Subtotal	25.1%	125 T/week
COMPOSTABLE MATERIALS		
Kitchen waste	9.4%	47 T/week
Compostable greenwaste	4.5%	22 T/week
New plasterboard	1.0%	5 T/week
Untreated/unpainted timber	2.0%	10 T/week
Subtotal	17.0%	84 T/week
TOTAL – Potentially divertable	42.1%	209 T/week

Approximately 25.1% of general waste disposed of directly to the tip face could potentially have been recycled or recovered. Cardboard was the largest single component of this, comprising 5.7% of general waste disposed of directly to the tip face, or 28 tonnes per week.

Approximately 17.0% could have been composted. Kitchen waste was the largest compostable component, comprising 9.4%, or 47 tonnes per week.

In total, 42.1% of general waste disposed of directly to the tip face could have been recycled, recovered, or composted. This is a theoretical maximum, as recovery systems are not capable of diverting 100% of a material from landfill disposal.

6 Levied waste to Southern Landfill

6.1 All levied waste to landfill - By activity source

The activity sources of levied waste disposed of at Southern Landfill are shown in Table 6.1 below. A diagram of waste flows is provided in section 1.3. Table 6.1 shows separate and combined tonnages for waste disposed of at the transfer pit and at the tip face. The combined tonnage (i.e. all levied waste) is shown in Figure 6.1 on the next page.

Only waste upon which the waste levy has been paid is included in the calculations. Cover material, including waste classified at the weighbridge as contaminated soil, and any other materials used for engineering purposes, upon which the waste levy is not paid, have been excluded.

Table 6.1 - All levied waste - by activity source - 3-30 November 2018

All levied waste to landfill - By activity source 3-30 November 2018	To transfer pit	To tip face	All levied waste	% of total
Construction & demolition	87 T/week	44 T/week	131 T/week	7.5%
Industrial/commercial/institutional	32 T/week	422 T/week	454 T/week	26.0%
Landscaping & earthworks	35 T/week	28 T/week	63 T/week	3.6%
Residential	54 T/week	4 T/week	59 T/week	3.4%
Subtotal - general waste	209 T/week	497 T/week	707 T/week	40.5%
Kerbside waste	0 T/week	585 T/week	585 T/week	33.5%
Special waste	0 T/week	454 T/week	454 T/week	26.0%
TOTAL	209 T/week	1,536 T/week	1,745 T/week	100.0%

Kerbside waste comprised 33.5% of levied waste disposed of at Southern Landfill and was the largest activity source. Special wastes comprised 26.0% of levied waste and were the second largest activity source. Tonnages for special wastes were taken directly from the weighbridge records. The six Product Names classed as 'Special wastes' are identified in Appendix 15.

General waste comprised 40.5% of levied waste. ICI was the largest component of general waste, comprising 26.0% of the total weight.

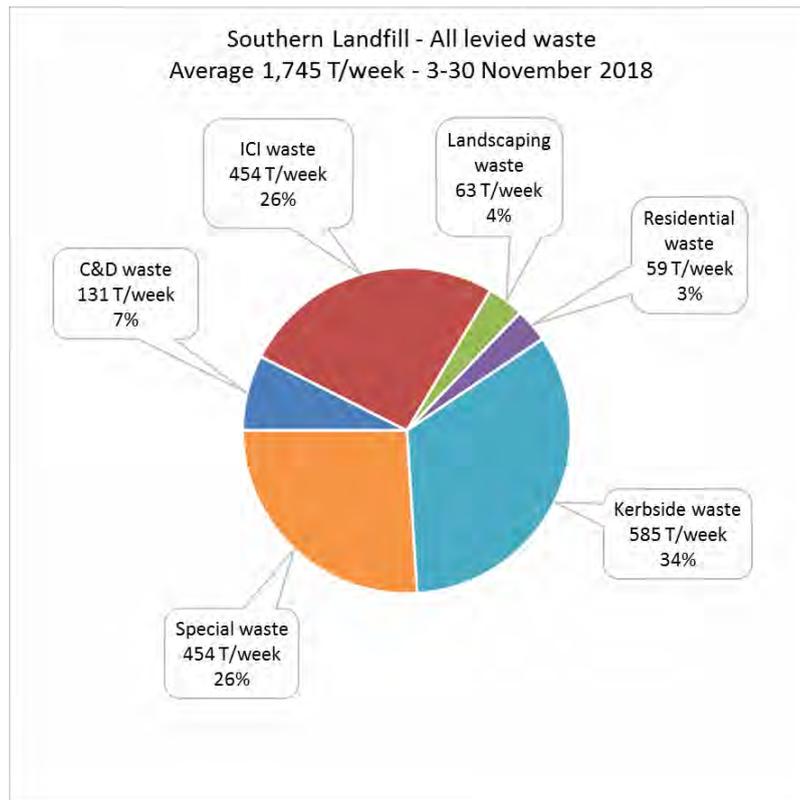


Figure 6.1 - All levied waste - By activity source - 3-30 November 2018

6.2 All levied waste to landfill - Primary composition

The composition of levied waste being disposed of at Southern Landfill was calculated by combining the compositions of the different sources of waste in the proportions shown in Table 6.1. The compositions of the different sources have been determined as follows:

- **Waste to transfer pit** - As determined from survey results and shown in section 4.2.
- **General waste direct to tip face** - As determined from survey results and shown in section 5.2.
- **Kerbside waste collection** - From the sort-and-weigh audits in section 3.4.
- **Special waste** - All special wastes have been categorised as 'Potentially hazardous' materials.

The primary composition of all levied waste disposed of at Southern Landfill for the period 3-30 November 2018 is shown in Table 6.2 and Figure 6.2 on the next page. Secondary composition is given in Appendix 14.

The annual tonnages in the table have been calculated using weighbridge records for the period 30 November 2017 - 1 December 2018. For the calculation, the tonnage of special wastes was separated and the composition of all levied waste from the visual surveys was applied to the remaining tonnage. The reliability of this extrapolation is uncertain, however, as it does not take seasonal variations in waste composition into account. The extrapolated results should be considered to be of an indicative nature only.

Table 6.2 - All levied waste to landfill - primary composition - 3-30 November 2018

All levied waste to Southern Landfill	3-30 November 2018		1/12/2017 - 30/11/2018	
	% of weight	Tonnes/week	% of weight	Tonnes per annum (indicative only)
Paper	6.8%	119 T/week	5.7%	6,118 T/annum
Plastics	8.5%	149 T/week	7.1%	7,611 T/annum
Organics	25.5%	445 T/week	21.2%	22,804 T/annum
Ferrous metals	1.9%	33 T/week	1.6%	1,683 T/annum
Non-ferrous metals	0.7%	13 T/week	0.6%	663 T/annum
Glass	1.9%	34 T/week	1.6%	1,720 T/annum
Textiles	5.3%	93 T/week	4.4%	4,769 T/annum
Sanitary paper	4.9%	85 T/week	4.1%	4,367 T/annum
Rubble	7.2%	125 T/week	6.0%	6,421 T/annum
Timber	9.6%	168 T/week	8.0%	8,608 T/annum
Rubber	0.7%	12 T/week	0.6%	594 T/annum
Potentially hazardous	26.9%	469 T/week	39.1%	42,038 T/annum
TOTAL	100.0%	1,745 T/week	100.0%	107,395 T/annum

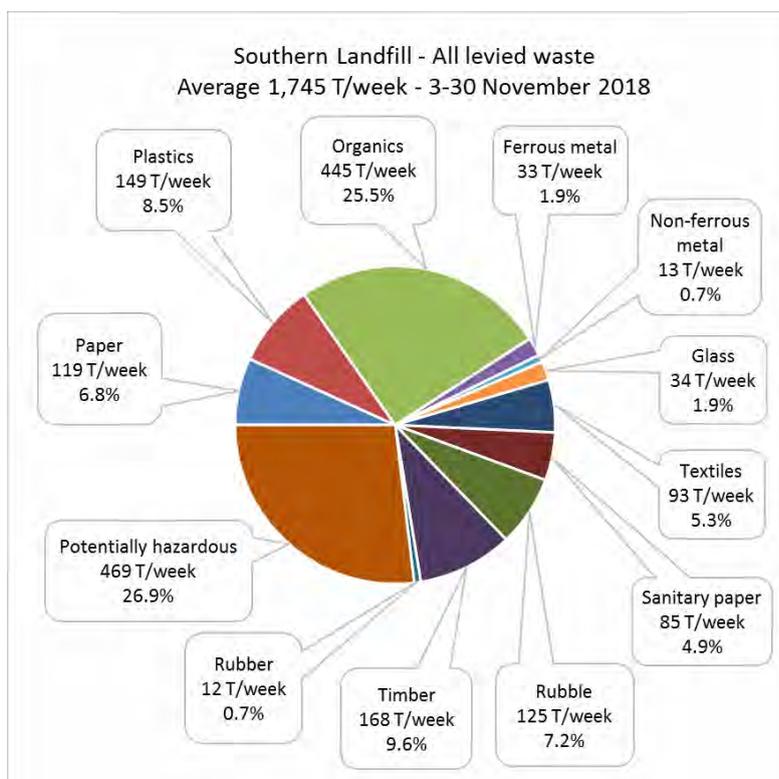


Figure 6.2 - All levied waste to Southern Landfill - 3-30 November 2018

Weighbridge data analysed from the four-week period 3-30 November 2018 indicates that an average of 1,745 tonnes per week of levied waste was disposed of at Southern

Landfill. During this period, Potentially hazardous material was the single largest component of levied waste, comprising 26.9% of the total weight, or 469 tonnes per week. Approximately 97% of potentially hazardous material was special waste, primarily related to wastewater treatment. Organics was the second largest material, comprising 25.5% of all levied waste, by weight, or 445 tonnes per week. Kerbside waste collections contained 76% of all organic material, or 338 tonnes per week.

The weekly average of 1,745 tonnes per week during the survey period was 315 tonnes per week (15%) lower than the annual average of 2,060 tonnes per week from 30 November 2017 - 1 December 2018.

The difference in the average weekly weights between the two periods analysed is the result of difference in the tonnages of special wastes. During the annual period analysed, an average of 791 tonnes per week of special wastes was disposed of at Southern Landfill. During the four-week period analysed for the survey, an average of 454 tonnes per week of special waste was disposed of.

As all special wastes have been classified as Potentially hazardous, the proportion of Potentially hazardous in the indicative annual composition is 46% higher than in the composition of waste during the survey period.

6.3 All levied waste to landfill - Diversion potential

Of the 25 material classifications used in the visual survey, nine are commonly recycled or recovered in New Zealand. A further four materials are compostable. There are currently diversion options available in Wellington region for most of these 13 materials. Based on these 13 materials, Table 6.3 on the next page shows the proportion of waste disposed of at the Southern Landfill transfer pit that could potentially be diverted from landfill disposal. The percentages and tonnages have been taken from Appendix 14.

Table 6.3 - All levied waste to landfill - diversion potential - 3-30 November 2018

All levied waste to Southern Landfill - Diversion potential	3-30 November 2018		1/12/2017 - 30/11/2018	
	% of weight	Tonnes/week	% of weight	Tonnes per annum (indicative only)
RECYCLABLE AND RECOVERABLE MATERIALS				
Paper - Recyclable	3.8%	66 T/week	3.2%	3,384 T/annum
Paper - Cardboard	2.3%	40 T/week	1.9%	2,066 T/annum
Plastic - Recyclable	1.0%	18 T/week	0.9%	928 T/annum
Ferrous metals	1.9%	33 T/week	1.6%	1,683 T/annum
Non-ferrous metals	0.7%	13 T/week	0.6%	663 T/annum
Glass - Recyclable	1.3%	23 T/week	1.1%	1,163 T/annum
Textiles - Clothing	1.3%	23 T/week	1.1%	1,195 T/annum
Rubble - Cleanfill	2.7%	48 T/week	2.3%	2,455 T/annum
Timber - Reusable	0.5%	9 T/week	0.4%	469 T/annum
Subtotal	15.7%	273 T/week	13.0%	14,005 T/annum
COMPOSTABLE MATERIALS				
Kitchen waste	14.0%	243 T/week	11.6%	12,471 T/annum
Compostable greenwaste	8.8%	153 T/week	7.3%	7,833 T/annum
New plasterboard	0.5%	9 T/week	0.4%	468 T/annum
Untreated/unpainted timber	1.2%	20 T/week	1.0%	1,045 T/annum
Subtotal	24.4%	426 T/week	20.3%	21,817 T/annum
TOTAL - Potentially divertable	40.1%	699 T/week	33.4%	35,822 T/annum

During the survey period, approximately 15.7% of all levied waste, 273 tonnes per week, could potentially be recycled or recovered. Recyclable paper was the largest single component of this, comprising 3.8% of all levied waste, or 66 tonnes per week.

Approximately 24.4% of all levied waste during the survey period could have been composted. Kitchen waste was the largest compostable component, comprising 14.0% of levied waste, or 243 tonnes per week.

In total, 40.1% of levied waste during the survey period could have been recycled, recovered, or composted. This is a theoretical maximum, as recovery systems are not capable of diverting 100% of a material from landfill disposal.

When the composition calculated from the visual survey results is extrapolated to the annual tonnages from the weighbridge records, it is estimated that 33.4% of all levied waste could have been diverted. This is lower than the corresponding figure for the survey period as the higher proportion of special wastes in the annual data are not considered divertable.

7 Discussion and analysis

7.1 Comparison of kerbside waste receptacles

A comparison of the diversion potential of the three types of kerbside waste receptacles included in the sort-and-weigh audits is given, in percentage terms, in Table 7.1 below and in terms of weight per household set out in Table 7.2 on the next page.

Table 7.1 - Comparison of diversion potential of kerbside waste receptacles - as % of total

Comparison of diversion potential of kerbside waste receptacles - % of total - November 2018	Council kerbside rubbish bags	120/140-litre wheelie bins	240-litre wheelie bins
Kerbside recyclable materials			
Paper - Recyclable	6.7%	6.9%	7.9%
Plastics - #1-2 containers	0.8%	0.6%	1.3%
Plastics - #3-7 containers	0.9%	0.6%	0.7%
Ferrous metals - Steel cans	0.6%	0.5%	0.7%
Non-ferrous metals - Aluminium cans	0.4%	0.2%	0.4%
Glass - Bottles/jars	1.5%	1.6%	4.3%
Subtotal	11.0%	10.5%	15.2%
Compostable materials			
Organics - Kitchen/food waste	45.2%	32.5%	24.6%
Organics - Greenwaste	5.4%	22.4%	34.0%
Subtotal	50.6%	54.9%	58.5%
TOTAL – Potentially divertable	61.6%	65.3%	73.7%

While the recycling potentials of rubbish bags and 120/140-litre wheelie bins were similar (11.0% and 10.5%, respectively), the 240-litre wheelie bins contained a higher proportion of recyclable materials (15.2%), largely due to a higher proportion of glass bottles/jars.

The composting potential shows greater differences between the individual materials, in terms of percentage composition. While rubbish bags contained a higher proportion of kitchen/food waste than wheelie bins, the wheelie bins contained substantially greater proportions of greenwaste than the rubbish bags.

Although the overall diversion potentials, in percentage terms, were similar, there are large differences in the weights of each material set out by households. The comparison is given in terms of set out weight per household in Table 7.2 on the next page.

One of the reasons for differences in the quantity of waste disposed of in the different receptacles may be related to household size, with larger households potentially choosing larger waste receptacles. Ubiquitous, non-recyclable materials can be used to compare the

relative number of occupants of households using the different types of kerbside waste receptacles. The relative quantities of kitchen waste and plastic bags & films per household set out are potentially a reasonable proxy for household size.

Based on the secondary composition data in Appendices 3, 4, and 5, the average 240-litre wheelie bins contained 1.4 times as much kitchen waste as the average household set out of rubbish bags and 1.2 times as much kitchen waste as the average 120/140-litre wheelie bins. Similarly, the average 240-litre wheelie bins contained 1.4 times the weight of plastic bags & films as the average household set out of rubbish bags and 1.2 times the weight of plastic bags & films as the average 120/140-litre wheelie bins.

If all other factors are considered to be equal, it would not be unreasonable to assume that households that use 240-litre wheelie bins are larger than households that use the other waste receptacles, but, on average, on the order of less than 50% larger.

Table 7.2 - Comparison of diversion potential of kerbside waste receptacles - weight per household set out

Comparison of diversion potential of kerbside waste receptacles - Kg per household set out - November 2018	Council kerbside rubbish bags	120/140-litre wheelie bins	240-litre wheelie bins
Total weight per household set out	8.71 kg	13.94 kg	22.22 kg
Kerbside recyclable materials			
Paper - Recyclable	0.58 kg	0.97 kg	1.75 kg
Plastics - #1-2 containers	0.07 kg	0.08 kg	0.29 kg
Plastics - #3-7 containers	0.08 kg	0.08 kg	0.16 kg
Ferrous metals - Steel cans	0.05 kg	0.07 kg	0.15 kg
Non-ferrous metals - Aluminium cans	0.04 kg	0.03 kg	0.09 kg
Glass - Bottles/jars	0.13 kg	0.23 kg	0.95 kg
Subtotal	0.96 kg	1.46 kg	3.38 kg
Compostable materials			
Organics - Kitchen/food waste	3.94 kg	4.53 kg	5.46 kg
Organics - Greenwaste	0.47 kg	3.12 kg	7.55 kg
Subtotal	4.41 kg	7.65 kg	13.01 kg
TOTAL – Potentially divertable	5.37 kg	9.11 kg	16.39 kg

As shown in the top row of the table above, households using 240-litre wheelie bins set out 2.6 times as much waste as households that set out rubbish bags. Some of this may be due to differences in household sizes, as larger families may choose to use 240-litre wheelie bins, but some may also be due to differences in waste management behaviour and, potentially, the frequency of set out. Some wheelie bins, for example, are collected on a fortnightly basis. However, not every household sets out rubbish bags on a weekly basis, so the effect of set out frequency cannot be assessed.

Households using 240-litre wheelie bins set out 3.5 times the weight of recyclable materials as households using rubbish bags and 3.0 times the weight of compostable materials. The major differences were the quantities of glass bottles/jars and of greenwaste. Users of 240-litre wheelie bins disposed of 7.0 times the weight of glass bottles/jars and 16.2 times the weight of greenwaste, compared to users of rubbish bags.

Apparent differences in waste management behaviour were less marked between users of 120/140-litre wheelie bins compared to users of rubbish bags. Households using 120/140-litre wheelie bins set out 1.5 times the weight of recyclable materials as households using rubbish bags and 1.7 times the weight of compostable materials. Users of 120/140-litre wheelie bins tended to dispose of considerably more greenwaste to landfill than users of rubbish bags, with 120/140-litre wheelie bins containing 6.7 times as much greenwaste per bin as the average household set out of rubbish bags.

7.2 Comparison with 2009 survey

A visual survey of waste composition at Southern Landfill was undertaken from 23-29 June 2009, using a methodology that was very similar to that used in 2018. The 2009 research did not include a sort-and-weigh audit of kerbside waste. The 2009 data analysis used the results of a 2005 sort-and-weigh audit of kerbside waste to represent the composition of kerbside waste.

7.2.1 Comparison with 2009 survey - By activity source

In Table 7.3 below, the activity sources of all levied waste to landfill from the 2018 survey are compared to the activity sources of the equivalent waste stream measured in 2009. The analysis of 2009 data shown in the table was not presented in the report on the 2009 survey.

Table 7.3 - All waste to landfill - by activity source - 2018 and 2009

All waste to landfill - By activity source - 2009 and 2018	June 2009	November 2018	% change
Construction & demolition	99 T/week	131 T/week	32%
Industrial/commercial/institutional	335 T/week	454 T/week	36%
Landscaping & earthworks	58 T/week	63 T/week	9%
Residential	90 T/week	59 T/week	-35%
Subtotal - general waste	582 T/week	707 T/week	22%
Kerbside waste	461 T/week	585 T/week	+27%
Special waste	423 T/week	454 T/week	+7%
TOTAL	1,466 T/week	1,745 T/week	+19%

The weekly quantity of waste disposed of at Southern Landfill increased from 1,466 T/week in 2009 to 1,745 T/week in 2018, an increase of 19%. In percentage terms, ICI waste showed the greatest increase - 36%. In tonnage terms, kerbside waste showed the greatest change, increasing 124 T/week, a 27% rise.

Changes in the disposal of waste at Southern Landfill are not necessarily related to changes in waste generation in Wellington City. As waste from Wellington City may be disposed of at

any of three different Class 1 landfills in the region or at several Class 2 landfills sites, changes at Southern Landfill may reflect changes in disposal patterns, particularly by the major waste operators.

Seasonal differences between the two surveys should also be taken into account when comparing the results of the survey. The June 2009 survey took place in winter, usually a time of low waste generation, particularly from construction activity.

7.2.2 Comparison with 2009 survey - By primary composition

The primary compositions of all levied waste to landfill from the 2018 SWAP survey and the equivalent waste stream from the 2009 survey are compared in Table 7.4. The table also shows the percentage change in the weekly tonnage of each material over the nine-year period.

Table 7.4 - All waste to landfill - primary composition - 2009 and 2018

All waste to landfill - Primary composition - 2009 and 2018	23-29 June 2009		3-30 November 2018		% change - by weight
	% of weight	Tonnes/ week	% of weight	Tonnes/ week	
Paper	12.2%	179 T/week	6.8%	119 T/week	-33%
Plastics	9.4%	138 T/week	8.5%	149 T/week	8%
Organics	22.8%	334 T/week	25.5%	445 T/week	33%
Ferrous metals	2.0%	30 T/week	1.9%	33 T/week	11%
Non-ferrous metals	0.4%	6 T/week	0.7%	13 T/week	112%
Glass	3.3%	48 T/week	1.9%	34 T/week	-30%
Textiles	3.0%	45 T/week	5.3%	93 T/week	109%
Sanitary paper	4.1%	60 T/week	4.9%	85 T/week	42%
Rubble	6.3%	92 T/week	7.2%	125 T/week	36%
Timber	7.1%	103 T/week	9.6%	168 T/week	63%
Rubber	0.2%	3 T/week	0.7%	12 T/week	255%
Potentially hazardous	29.2%	428 T/week	26.9%	469 T/week	10%
TOTAL	100.0%	1,466 T/week	100.0%	1,745 T/week	19%

The substantial decrease in the weekly tonnage of Paper and the increase in Organics are directly related to the differences in the composition of kerbside waste used for the analysis of the two surveys. The 2009 survey used a 2005 composition with a markedly higher proportion of Paper and a substantially lower proportion of Organics than was found in the 2018 sort-and-weigh audits.

The higher proportion of Rubble and Timber in 2018 is associated with the greater tonnage of C&D waste in 2018 than in 2009.

7.3 Comparison of activity sources with other districts

Using the methodology described in section 2.3.3 for determining the activity sources and composition of waste being disposed of to landfill, Waste Not Consulting has conducted surveys for a large number of territorial authorities. Table 7.5 compares the activity sources of waste disposed of at Southern Landfill with four other districts. The Southern Landfill data in Table 7.5 has been adapted from Table 6.1. Special wastes have been removed from Table 6.1 and the other percentages recalculated. In Table 7.5, special wastes and cleanfill have in all instances been excluded from the analysis to provide a more meaningful comparison.

Table 7.5 - Comparison of activity sources of waste to landfill - % of total

Activity sources of waste to landfill - excludes special wastes	Hamilton City	Taranaki Region	Napier/Hastings	Tauranga	Southern Landfill
Year of audit	2017	2016	2016	2016/17	2018
C&D	22%	15%	7%	23%	10%
ICI	40%	43%	41%	34%	35%
Landscaping	5%	3%	2%	3%	5%
Residential	5%	9%	6%	6%	5%
Subtotal - General waste	72%	70%	57%	66%	55%
Kerbside waste	28%	30%	43%	34%	45%
TOTAL	100%	100%	100%	100%	100%

While the activity sources of waste being disposed of to landfill from each of the five surveys are similar, there are important differences. The proportion of C&D waste was highest in Tauranga and Hamilton. The proportion of C&D waste in Napier/Hastings is significantly lower than the other areas, likely indicating lower levels of construction activity. The proportion of C&D waste at Southern Landfill is also low compared to the other areas, but this may reflect the proximity of Class 2 landfill sites to Southern Landfill.

The proportion of ICI waste disposed of at Southern Landfill was lower than in the other areas and the proportion of kerbside waste higher. These differences likely reflect the nature and extent of commercial and residential activity in the catchment from which waste at Southern Landfill arises.

Appendix 1 - Kerbside recyclable materials

Recyclable materials

Paper and cardboard

- newspapers and magazines
- egg cartons
- office paper and envelopes
- junk mail
- cereal boxes
- toilet paper rolls
- cardboard boxes, including pizza boxes (but remove pizza scraps and cheese residue)
- brown corrugated cardboard

Plastic

- drink bottles (clean)
- food containers (clean)
- cleaning product containers

Tins and cans

- aluminium drinking cans
- food tins
- pet food tins

Glass

- glass bottles and jars (lids removed and clean)

Don't put these in your kerbside recycling

Aerosols

- fly spray
- spray deodorant
- cream cans

General waste

- food and liquid
- cloth or clothing
- bottle and jar lids

Wax-coated, lined cartons or light-proof

- milk and juice cartons

Specific types of plastic and metallic wrap and packaging

- plastic bags
- polystyrene
- bubble wrap
- cling film
- tin foil
- meat trays (polystyrene and plastic)

Green waste

- lawn clippings
- weeds

Specific types of glass

broken glass
ceramics
drinking glasses and cups
glass bricks
light bulbs and fluorescent tubes
medical and lab glass containers
mirrors
Pyrex
TV tubes and computer screens
vases and ornamental glass
window glass

Hazardous items

sharp objects
medical syringes
batteries
paint and oil
all types of gas bottles / cylinders

Appendix 2 - Waste classifications

KERBSIDE WASTE AUDIT CLASSIFICATIONS

Primary category	Secondary category	Definition
Paper	Recyclable paper	Cardboard packaging, newspapers, brochures, office paper, magazines, books, empty clean pizza boxes
	Non-recyclable paper	Waxed, foil-backed, food-contaminated, multi-materials, milk and juice cartons
Plastics	#1-2 plastic containers	Containers with a # 1-2 recycling logo
	#3-7 plastic containers	Containers with a # 3-7 recycling logo
	Plastic meat trays	Rigid plastic meat trays, excluding foam meat trays
	Plastic bags/film	All plastic bags and film
	Other non-recyclable	Non-recyclable plastic packaging, including foam polystyrene meat trays, oil, and chemical containers. All other non-packaging materials made primarily of plastic
Organics	Kitchen waste	All kitchen waste
	Greenwaste	All organic garden waste
	Multimaterial/ other	All other primarily organic items – includes cat tray litter, hair, vacuum cleaner bags
Ferrous metals	Steel cans	All steel cans, excluding aerosol cans
	Multimaterial/ other	All other items made primarily of ferrous metal including aerosols
Non-ferrous metals	Aluminium cans	All aluminium cans, excluding aerosol cans
	Multimaterial/ other	All other items made primarily of non-ferrous metal, including aerosols and aluminium foil
Glass	Glass bottles/jars	All bottles and jars, emptied with the lids and contents removed
	Multimaterial/ other	All other items made primarily of glass, includes light bulbs, drinking glasses, and window glass
Textiles	Clothing & rags	All items primarily made of a fabric, such as clothes, curtains, suitable for rags
	Other textiles	Includes shoes, backpacks, handbags, rugs, not suitable for rags
Sanitary paper		Includes disposable nappies, paper towels, tissues
Rubble, concrete		All concrete, rubble and soil
Timber		All items made primarily of timber
Rubber		All items made primarily of rubber (e.g. kitchen gloves)
Potentially hazardous	Household	Batteries, medicines and cosmetics, cleaning agents, sharp objects
	Other	Potentially hazardous items not associated with domestic activity, such as used oil and garden chemicals.

TRANSFER STATION VEHICLE SURVEY CLASSIFICATIONS

Primary category	Secondary category	Description
Paper	Recyclable	Newspapers, magazines, office paper, etc.
	Cardboard	Kraft cartons
	Paper non-recyclable	Multimaterials, building paper, contaminated paper
Plastics	Recyclable	Containers with recycling logo 1-7
	Plastics non-recyclable	Other types of plastic and primarily plastic multimaterials
Organic	Kitchen/food	Food and food preparation waste
	Compostable greenwaste	Lawn clippings, hedge clippings, leaves, tree trimmings and logs less than 50 cm diameter, and garden weeds
	Non-compostable greenwaste	Flax, cabbage tree, bamboo, branches over 50 cm
	Organic other	Organic matter such as meat processing waste
Ferrous metals	Primarily ferrous	Items made primarily of steel
	Multimaterials	Ferrous items containing a sizable proportion of other materials
Nonferrous metals	Primarily nonferrous	Items made primarily of nonferrous metal
Glass	Recyclable	Bottles and jars
	Other glass	Includes glass pane, CRT TVs, and computer monitors
Textiles	Clothing/textile	Items made primarily of cloth or textiles
	Multimaterial/other	Items containing some textile and other materials, such as carpets, shoes, backpacks, suitcases
Sanitary paper	None	Sanitary materials such as nappies, paper towels, feminine hygiene products
Rubble	Cleanfill	All materials suitable for cleanfill disposal
	New plasterboard	Sizable pieces of new plasterboard
	Other	Other materials such as soil, ceramics, plasterboard
Timber	Reusable	Lengths of timber and pieces of sheet suitable for reuse
	Unpainted & untreated	Unpainted and untreated lengths of timber
	Multimaterial/other	Sawdust, construction and demolition debris, CCA-treated wood, MDF
Rubber	-	All items made primarily of rubber such as tyres, latex foam mattresses
Potentially hazardous	-	Material with potentially toxic or ecotoxic properties or having properties requiring special disposal techniques.

Appendix 3 - Types of waste disposal vehicles

FRONT-LOADER TRUCKS

“Front-loaders” are top-loading compactors that use forks mounted to the front of the vehicle to lift bins over the cab and tip the contents of the bin into the compactor unit at the rear. Front-loaders work primarily in urban areas, regularly servicing medium to large-scale industrial, commercial, and institutional customers. In general, a business using front-loader bins would be serviced at least weekly, but can be serviced several times a day for a business like a large supermarket. Front-loaders vary in size, and may carry loads from 4 to 10 tonnes. A single load may contain waste from ten to fifty customers.



The potential for the recovery of materials from waste transported by front-loaders is limited. The waste load is compacted by the truck, and the loads tend to be large and heterogeneous. This restricts significantly the potential for manually separating recoverable materials when the load is discharged on a tipping floor. There are usually not significant quantities of easily-separable materials other than cardboard packaging in front-loader refuse.

GANTRY TRUCK

“Gantry trucks” are used to transport gantry bins (skip bins) from customers’ premises to a disposal facility. Gantry truck services are used by industrial, commercial, institutional, and residential customers. Some large-scale commercial waste generators use gantry bins as their regular disposal system. Residential customers and business customers both use gantry bins for one-off large-scale refuse removal. Some commercial customers, such as hotels and supermarkets, use portable, stationary refuse compactors that are transported for disposal by gantry trucks. The gantry truck in the photo on the next page is carrying a stationary compactor unit from a supermarket. Gantry bins are often used for special wastes, such as sludges, asbestos, and animal by-products.



Typical gantry truck loads weigh from 0.5-3 tonnes. As most refuse transported in gantry bins is not compacted, there is often opportunity for manually recovering materials from gantry bins when discharged onto a tipping floor. Gantry bins often contain significant quantities of recoverable materials, such as timber and packaging, and these materials as well as reusable items can often be recovered intact from loads.

HOOK TRUCK

Hook trucks (or “huka”trucks) transport bins that can be loaded and unloaded from the rear of the truck for transport and that can be emptied quickly like a tip truck. Hook bins are used by large-scale waste generators, either for regular waste disposal or one-off refuse removal. Hook trucks are often used for transporting 25 or 30-cubic metre bins from transfer stations to landfills or large stationary compactors. Hook bins are also used for large-scale transport of recovered materials, such as cardboard and metal. Hook bins are rarely used for residential waste disposal.



The potential for material recovery from hook bins is similar to that for gantry bins.

KERBSIDE WASTE COMPACTORS

Side-loading and rear-loading compactors are commonly used for the kerbside collection of residential and small business refuse. They can be designed to service bagged refuse collections, wheelie bin collections, or both. Side-loading compactors can be used for bag collections or fitted with hydraulic arms for emptying wheelie bins without the driver leaving the vehicle. Rear-loading compactors can also be used for bag collections or fitted with hydraulic arms for emptying bins. Non-compacting trucks are also used for kerbside waste collections, but are less common, as the economics of transporting uncompacted waste are less favourable.



As kerbside waste collection vehicles collect small quantities of refuse from a large number of customers and the refuse is heavily compacted, there is little opportunity for manually recovering materials from the refuse.

OTHER TRUCKS

Other truck types commonly used for the transport of waste include tip trucks, box trucks, and flat decks. Tip trucks are most commonly used for the transport of waste from landscaping, earthworks, and construction and demolition activity. Box trucks are rarely used as dedicated waste transport vehicles, but are often used for waste transport by businesses that also use them for goods pick-up and delivery. Flat decks are used for the transport of bulky waste items, or by general carriers for the disposal of stackable items, such as pallets.



Appendix 4 - Council rubbish bags

Wellington City Council - Domestic kerbside rubbish bags 21-29 November 2018 (Margins of error for 95% confidence level)		% of total weight	Mean wt. per rubbish bag	Mean wt. per household set out
Paper	Recyclable	6.7% (±1.0%)	0.45 kg (±0.06 kg)	0.58 kg (±0.08 kg)
	Non-recyclable paper	1.2% (±0.2%)	0.08 kg (±0.01 kg)	0.11 kg (±0.02 kg)
	Subtotal	7.9% (±1.0%)	0.53 kg (±0.07 kg)	0.69 kg (±0.09 kg)
Plastics	# 1-2 containers	0.8% (±0.1%)	0.06 kg (±0.01 kg)	0.07 kg (±0.01 kg)
	# 3-7 containers	0.9% (±0.1%)	0.06 kg (±0.01 kg)	0.08 kg (±0.01 kg)
	Meat trays	0.8% (±0.1%)	0.05 kg (±0.01 kg)	0.07 kg (±0.01 kg)
	Plastic bags & film	7.6% (±0.6%)	0.50 kg (±0.04 kg)	0.66 kg (±0.05 kg)
	Other non-recyclable plastic	2.1% (±0.5%)	0.14 kg (±0.03 kg)	0.18 kg (±0.04 kg)
	Subtotal	12.1% (±0.9%)	0.81 kg (±0.06 kg)	1.06 kg (±0.08 kg)
Organics	Kitchen/food waste	45.2% (±4.0%)	3.02 kg (±0.27 kg)	3.94 kg (±0.35 kg)
	Greenwaste	5.4% (±2.2%)	0.36 kg (±0.15 kg)	0.47 kg (±0.19 kg)
	Other organic	4.7% (±2.4%)	0.31 kg (±0.16 kg)	0.41 kg (±0.21 kg)
	Subtotal	55.3% (±5.1%)	3.69 kg (±0.34 kg)	4.82 kg (±0.44 kg)
Ferrous metals	Steel cans	0.6% (±0.1%)	0.04 kg (±0.01 kg)	0.05 kg (±0.01 kg)
	Other steel	0.7% (±0.2%)	0.05 kg (±0.02 kg)	0.06 kg (±0.02 kg)
	Subtotal	1.3% (±0.3%)	0.09 kg (±0.02 kg)	0.11 kg (±0.02 kg)
Non-ferrous metals	Aluminium cans	0.4% (±0.1%)	0.03 kg (±0.01 kg)	0.04 kg (±0.01 kg)
	Other non-ferrous	0.7% (±0.2%)	0.05 kg (±0.01 kg)	0.06 kg (±0.01 kg)
	Subtotal	1.1% (±0.2%)	0.08 kg (±0.01 kg)	0.10 kg (±0.02 kg)
Glass	Bottles/jars	1.5% (±0.6%)	0.10 kg (±0.04 kg)	0.13 kg (±0.05 kg)
	Non-recyclable glass	0.6% (±0.2%)	0.04 kg (±0.01 kg)	0.05 kg (±0.02 kg)
	Subtotal	2.2% (±0.7%)	0.14 kg (±0.05 kg)	0.19 kg (±0.06 kg)
Textiles	Clothing/textiles	1.5% (±0.6%)	0.10 kg (±0.04 kg)	0.13 kg (±0.05 kg)
	Multimaterial/other	2.1% (±0.6%)	0.14 kg (±0.04 kg)	0.18 kg (±0.05 kg)
	Subtotal	3.5% (±0.9%)	0.24 kg (±0.06 kg)	0.31 kg (±0.08 kg)
Sanitary paper		13.1% (±2.5%)	0.88 kg (±0.17 kg)	1.14 kg (±0.22 kg)
Rubble		0.8% (±0.3%)	0.05 kg (±0.02 kg)	0.07 kg (±0.03 kg)
Timber		0.6% (±0.5%)	0.04 kg (±0.03 kg)	0.05 kg (±0.04 kg)
Rubber		0.3% (±0.1%)	0.02 kg (±0.01 kg)	0.02 kg (±0.01 kg)
Potentially hazardous	Household hazardous	1.6% (±0.5%)	0.11 kg (±0.04 kg)	0.14 kg (±0.05 kg)
	Other hazardous	0.1% (±0.1%)	0.00 kg (±0.01 kg)	0.01 kg (±0.01 kg)
	Subtotal	1.7% (±0.6%)	0.11 kg (±0.04 kg)	0.15 kg (±0.05 kg)
TOTAL		100.0%	6.68 kg (±0.39 kg)	8.71 kg (±0.51 kg)

Appendix 5 - 120/140-litre wheelie bins

Wellington privately collected - - 120/140-litre wheelie bins 21-29 November 2018 (Margins of error for 95% confidence level)		% of total weight	Mean wt. per wheelie bin
Paper	Recyclable	6.9% ($\pm 2.1\%$)	0.97 kg (± 0.29 kg)
	Non-recyclable paper	1.1% ($\pm 0.3\%$)	0.15 kg (± 0.04 kg)
	Subtotal	8.0% ($\pm 2.2\%$)	1.12 kg (± 0.31 kg)
Plastics	# 1-2 containers	0.6% ($\pm 0.2\%$)	0.08 kg (± 0.02 kg)
	# 3-7 containers	0.6% ($\pm 0.2\%$)	0.08 kg (± 0.03 kg)
	Meat trays	0.6% ($\pm 0.2\%$)	0.08 kg (± 0.03 kg)
	Plastic bags & film	5.5% ($\pm 0.8\%$)	0.77 kg (± 0.12 kg)
	Other non-recyclable plastic	1.4% ($\pm 0.7\%$)	0.20 kg (± 0.09 kg)
	Subtotal	8.8% ($\pm 1.4\%$)	1.22 kg (± 0.20 kg)
Organics	Kitchen/food waste	32.5% ($\pm 5.7\%$)	4.53 kg (± 0.79 kg)
	Greenwaste	22.4% ($\pm 10.7\%$)	3.12 kg (± 1.49 kg)
	Other organic	2.4% ($\pm 0.9\%$)	0.34 kg (± 0.13 kg)
	Subtotal	57.3% ($\pm 11.2\%$)	7.98 kg (± 1.56 kg)
Ferrous metals	Steel cans	0.5% ($\pm 0.2\%$)	0.07 kg (± 0.03 kg)
	Other steel	0.6% ($\pm 0.2\%$)	0.08 kg (± 0.03 kg)
	Subtotal	1.1% ($\pm 0.3\%$)	0.15 kg (± 0.05 kg)
Non-ferrous metals	Aluminium cans	0.2% ($\pm 0.1\%$)	0.03 kg (± 0.02 kg)
	Other non-ferrous	1.3% ($\pm 1.2\%$)	0.18 kg (± 0.17 kg)
	Subtotal	1.4% ($\pm 1.2\%$)	0.20 kg (± 0.17 kg)
Glass	Bottles/jars	1.6% ($\pm 1.1\%$)	0.23 kg (± 0.16 kg)
	Non-recyclable glass	0.6% ($\pm 0.5\%$)	0.08 kg (± 0.07 kg)
	Subtotal	2.2% ($\pm 1.2\%$)	0.31 kg (± 0.17 kg)
Textiles	Clothing/textiles	2.4% ($\pm 1.9\%$)	0.33 kg (± 0.27 kg)
	Multimaterial/other	2.9% ($\pm 1.9\%$)	0.40 kg (± 0.27 kg)
	Subtotal	5.3% ($\pm 2.8\%$)	0.73 kg (± 0.39 kg)
Sanitary paper		9.2% ($\pm 3.7\%$)	1.29 kg (± 0.51 kg)
Rubble		2.2% ($\pm 2.4\%$)	0.30 kg (± 0.34 kg)
Timber		2.1% ($\pm 2.2\%$)	0.29 kg (± 0.31 kg)
Rubber		0.2% ($\pm 0.1\%$)	0.03 kg (± 0.01 kg)
Potentially hazardous	Household hazardous	2.2% ($\pm 1.4\%$)	0.31 kg (± 0.20 kg)
	Other hazardous	0.0% -	0.00 kg -
	Subtotal	2.2% ($\pm 1.4\%$)	0.31 kg (± 0.20 kg)
TOTAL		100.0%	13.94 kg (± 1.47 kg)

Appendix 6 - 240-litre wheelie bins

Wellington privately collected - - 240-litre wheelie bins 21-29 November 2018 (Margins of error for 95% confidence level)		% of total weight	Mean wt. per wheelie bin
Paper	Recyclable	7.9% (±2.5%)	1.75 kg (±0.55 kg)
	Non-recyclable paper	1.2% (±0.9%)	0.27 kg (±0.19 kg)
	Subtotal	9.1% (±2.4%)	2.01 kg (±0.54 kg)
Plastics	# 1-2 containers	1.3% (±0.6%)	0.29 kg (±0.13 kg)
	# 3-7 containers	0.7% (±0.2%)	0.16 kg (±0.04 kg)
	Meat trays	0.5% (±0.1%)	0.11 kg (±0.03 kg)
	Plastic bags & film	4.3% (±0.7%)	0.95 kg (±0.15 kg)
	Other non-recyclable plastic	1.7% (±0.8%)	0.37 kg (±0.18 kg)
	Subtotal	8.5% (±1.3%)	1.88 kg (±0.30 kg)
Organics	Kitchen/food waste	24.6% (±5.5%)	5.46 kg (±1.23 kg)
	Greenwaste	34.0% (±13.3%)	7.55 kg (±2.95 kg)
	Other organic	1.6% (±0.8%)	0.36 kg (±0.18 kg)
	Subtotal	60.1% (±12.4%)	13.37 kg (±2.75 kg)
Ferrous metals	Steel cans	0.7% (±0.3%)	0.15 kg (±0.07 kg)
	Other steel	2.5% (±2.6%)	0.56 kg (±0.57 kg)
	Subtotal	3.2% (±2.5%)	0.71 kg (±0.56 kg)
Non-ferrous metals	Aluminium cans	0.4% (±0.3%)	0.09 kg (±0.06 kg)
	Other non-ferrous	1.0% (±1.1%)	0.23 kg (±0.24 kg)
	Subtotal	1.4% (±1.1%)	0.32 kg (±0.24 kg)
Glass	Bottles/jars	4.3% (±2.6%)	0.95 kg (±0.58 kg)
	Non-recyclable glass	0.5% (±0.2%)	0.11 kg (±0.05 kg)
	Subtotal	4.8% (±2.6%)	1.06 kg (±0.58 kg)
Textiles	Clothing/textiles	1.5% (±1.4%)	0.34 kg (±0.32 kg)
	Multimaterial/other	0.8% (±0.3%)	0.17 kg (±0.07 kg)
	Subtotal	2.3% (±1.6%)	0.51 kg (±0.35 kg)
Sanitary paper		5.8% (±2.9%)	1.29 kg (±0.65 kg)
Rubble		2.3% (±3.2%)	0.52 kg (±0.70 kg)
Timber		1.1% (±0.9%)	0.24 kg (±0.21 kg)
Rubber		0.5% (±0.4%)	0.12 kg (±0.08 kg)
Potentially hazardous	Household hazardous	0.9% (±0.4%)	0.20 kg (±0.10 kg)
	Other hazardous	0.0% -	0.00 kg -
	Subtotal	0.9% (±0.4%)	0.20 kg (±0.10 kg)
TOTAL		100.0%	22.22 kg (±2.77 kg)

Appendix 7 - Combined kerbside waste collections

Combined kerbside waste disposed of at Southern Landfill Rubbish bags and wheelie bins combined November 2018		% of total weight	Tonnes per week
Paper	Recyclable	7.2%	42 T/week
	Non-recyclable paper	1.2%	7 T/week
	Subtotal	8.4%	49 T/week
Plastics	# 1-2 containers	0.9%	5 T/week
	# 3-7 containers	0.7%	4 T/week
	Meat trays	0.6%	4 T/week
	Plastic bags & film	5.6%	33 T/week
	Other non-recyclable plastic	1.7%	10 T/week
	Subtotal	9.5%	56 T/week
Organics	Kitchen/food waste	32.9%	192 T/week
	Greenwaste	22.2%	130 T/week
	Other organic	2.7%	16 T/week
	Subtotal	57.8%	338 T/week
Ferrous metals	Steel cans	0.6%	3 T/week
	Other steel	1.3%	8 T/week
	Subtotal	1.9%	11 T/week
Non-ferrous metals	Aluminium cans	0.3%	2 T/week
	Other non-ferrous	1.0%	6 T/week
	Subtotal	1.4%	8 T/week
Glass	Bottles/jars	2.6%	15 T/week
	Non-recyclable glass	0.6%	3 T/week
	Subtotal	3.1%	18 T/week
Textiles	Clothing/textiles	1.8%	11 T/week
	Multimaterial/other	1.9%	11 T/week
	Subtotal	3.7%	22 T/week
Sanitary paper		9.0%	53 T/week
Rubble		1.9%	11 T/week
Timber		1.3%	8 T/week
Rubber		0.3%	2 T/week
Potentially hazardous	Household hazardous	1.6%	9 T/week
	Other hazardous	0.0%	0 T/week
	Subtotal	1.6%	9 T/week
TOTAL		100.0%	585 T/week

Appendix 8 - Transfer pit waste - Composition

Transfer pit- Residual waste 3-30 November 2018		% of total	Tonnes/week
Paper	Recyclable	1.5%	3 T/week
	Cardboard	3.7%	8 T/week
	Non-recyclable	0.3%	1 T/week
	Subtotal	5.5%	12 T/week
Plastics	Recyclable	0.1%	0 T/week
	Non-recyclable	4.0%	8 T/week
	Subtotal	4.1%	9 T/week
Organics	Kitchen/food waste	1.9%	4 T/week
	Comp. greenwaste	6.5%	14 T/week
	Non-comp. greenwaste	4.2%	9 T/week
	Organic other	0.1%	0 T/week
	Subtotal	12.8%	27 T/week
Ferrous metals	Primarily ferrous	1.6%	3 T/week
	Multimaterials	1.9%	4 T/week
	Subtotal	3.6%	7 T/week
Non-ferrous metals		0.2%	0 T/week
Glass	Recyclable	0.1%	0 T/week
	Other glass	0.6%	1 T/week
	Subtotal	0.7%	2 T/week
Textiles	Clothing/textile	0.8%	2 T/week
	Multimaterial/other	10.8%	23 T/week
	Subtotal	11.6%	24 T/week
Sanitary paper		0.6%	1 T/week
Rubble	Cleanfill	10.3%	22 T/week
	New plasterboard	2.0%	4 T/week
	Other	2.9%	6 T/week
	Subtotal	15.2%	32 T/week
Timber	Reusable	2.7%	6 T/week
	Unpainted & untreated	5.0%	10 T/week
	Multimaterial/other	37.8%	79 T/week
	Subtotal	45.5%	95 T/week
Rubber		0.2%	0 T/week
Potentially hazardous		0.1%	0 T/week
TOTAL		100.0%	209 T/week

Appendix 9 - Transfer pit waste - By activity source

Transfer pit- Residual waste by activity source % of total 3-30 November 2018		C&D	ICI	Landscaping	Residential
Paper	Recyclable	0.1%	5.7%	0.1%	2.2%
	Cardboard	1.6%	12.2%	0.2%	4.5%
	Non-recyclable	0.1%	0.5%	0.0%	0.6%
	Subtotal	1.8%	18.4%	0.3%	7.2%
Plastics	Recyclable	0.0%	0.2%	0.0%	0.2%
	Non-recyclable	3.6%	6.6%	0.3%	5.6%
	Subtotal	3.6%	6.8%	0.3%	5.8%
Organics	Kitchen/food waste	0.2%	2.3%	0.3%	5.6%
	Comp. greenwaste	0.0%	1.0%	32.8%	3.2%
	Non-comp. greenwaste	0.0%	0.1%	23.1%	0.9%
	Organic other	0.0%	0.4%	0.0%	0.2%
	Subtotal	0.2%	3.7%	56.2%	9.9%
Ferrous metals	Primarily ferrous	1.5%	2.9%	0.5%	1.8%
	Multimaterials	0.1%	2.3%	0.4%	5.7%
	Subtotal	1.6%	5.3%	0.9%	7.5%
Non-ferrous metals		0.1%	0.8%	0.0%	0.3%
Glass	Recyclable	0.0%	0.4%	0.0%	0.3%
	Other glass	0.4%	1.6%	0.0%	0.7%
	Subtotal	0.5%	2.0%	0.0%	0.9%
Textiles	Clothing/textile	0.1%	1.2%	0.0%	2.2%
	Multimaterial/other	0.9%	32.5%	0.0%	20.8%
	Subtotal	1.0%	33.7%	0.0%	23.0%
Sanitary paper		0.1%	1.2%	0.1%	1.4%
Rubble	Cleanfill	10.7%	0.1%	33.3%	0.7%
	New plasterboard	4.6%	0.0%	0.0%	0.3%
	Other	5.9%	1.0%	0.5%	0.9%
	Subtotal	21.1%	1.0%	33.8%	1.9%
Timber	Reusable	4.8%	4.1%	0.0%	0.3%
	Unpainted & untreated	4.7%	13.2%	0.5%	3.5%
	Multimaterial/other	60.6%	9.3%	7.9%	37.9%
	Subtotal	70.1%	26.6%	8.4%	41.6%
Rubber		0.0%	0.4%	0.0%	0.4%
Potentially hazardous		0.0%	0.2%	0.0%	0.2%
TOTAL		100.0%	100.0%	100.0%	100.0%

Transfer pit- Residual waste by activity source Tonnes per week 3-30 November 2018		C&D	ICI	Landscaping	Residential
Paper	Recyclable	0.1 T/week	1.8 T/week	0.0 T/week	1.2 T/week
	Cardboard	1.4 T/week	3.9 T/week	0.1 T/week	2.4 T/week
	Non-recyclable	0.1 T/week	0.2 T/week	0.0 T/week	0.3 T/week
	Subtotal	1.5 T/week	5.9 T/week	0.1 T/week	3.9 T/week
Plastics	Recyclable	0.0 T/week	0.1 T/week	0.0 T/week	0.1 T/week
	Non-recyclable	3.1 T/week	2.1 T/week	0.1 T/week	3.0 T/week
	Subtotal	3.1 T/week	2.2 T/week	0.1 T/week	3.1 T/week
Organics	Kitchen/food waste	0.2 T/week	0.8 T/week	0.1 T/week	3.0 T/week
	Comp. greenwaste	0.0 T/week	0.3 T/week	11.6 T/week	1.7 T/week
	Non-comp. greenwaste	0.0 T/week	0.0 T/week	8.2 T/week	0.5 T/week
	Organic other	0.0 T/week	0.1 T/week	0.0 T/week	0.1 T/week
	Subtotal	0.2 T/week	1.2 T/week	19.9 T/week	5.4 T/week
Ferrous metals	Primarily ferrous	1.3 T/week	0.9 T/week	0.2 T/week	1.0 T/week
	Multimaterials	0.0 T/week	0.8 T/week	0.1 T/week	3.1 T/week
	Subtotal	1.4 T/week	1.7 T/week	0.3 T/week	4.1 T/week
Non-ferrous metals		0.1 T/week	0.3 T/week	0.0 T/week	0.2 T/week
Glass	Recyclable	0.0 T/week	0.1 T/week	0.0 T/week	0.1 T/week
	Other glass	0.4 T/week	0.5 T/week	0.0 T/week	0.4 T/week
	Subtotal	0.4 T/week	0.6 T/week	0.0 T/week	0.5 T/week
Textiles	Clothing/textile	0.1 T/week	0.4 T/week	0.0 T/week	1.2 T/week
	Multimaterial/other	0.8 T/week	10.5 T/week	0.0 T/week	11.3 T/week
	Subtotal	0.9 T/week	10.9 T/week	0.0 T/week	12.5 T/week
Sanitary paper		0.1 T/week	0.4 T/week	0.0 T/week	0.7 T/week
Rubble	Cleanfill	9.3 T/week	0.0 T/week	11.8 T/week	0.4 T/week
	New plasterboard	4.0 T/week	0.0 T/week	0.0 T/week	0.2 T/week
	Other	5.1 T/week	0.3 T/week	0.2 T/week	0.5 T/week
	Subtotal	18.4 T/week	0.3 T/week	12.0 T/week	1.0 T/week
Timber	Reusable	4.1 T/week	1.3 T/week	0.0 T/week	0.1 T/week
	Unpainted & untreated	4.1 T/week	4.3 T/week	0.2 T/week	1.9 T/week
	Multimaterial/other	52.8 T/week	3.0 T/week	2.8 T/week	20.6 T/week
	Subtotal	61.1 T/week	8.6 T/week	3.0 T/week	22.6 T/week
Rubber		0.0 T/week	0.1 T/week	0.0 T/week	0.2 T/week
Potentially hazardous		0.0 T/week	0.1 T/week	0.0 T/week	0.1 T/week
TOTAL		87.2 T/week	32.3 T/week	35.5 T/week	54.4 T/week

Appendix 10 - Transfer pit waste - By vehicle type

Transfer pit- Residual waste by vehicle type 3-30 November 2018		Cars	Other trucks	Trailer
Paper	Recyclable	4.8%	0.1%	1.0%
	Cardboard	7.6%	9.3%	2.8%
	Non-recyclable	0.7%	0.4%	0.2%
	Subtotal	13.1%	9.8%	4.0%
Plastics	Recyclable	0.3%	0.0%	0.1%
	Non-recyclable	8.4%	28.1%	2.2%
	Subtotal	8.8%	28.2%	2.2%
Organics	Kitchen/food waste	8.1%	0.4%	0.9%
	Comp. greenwaste	7.5%	0.0%	6.7%
	Non-comp. greenwaste	5.0%	0.0%	4.2%
	Organic other	0.3%	0.0%	0.1%
	Subtotal	21.0%	0.5%	11.9%
Ferrous metals	Primarily ferrous	1.8%	11.4%	1.2%
	Multimaterials	3.1%	1.9%	1.7%
	Subtotal	5.0%	13.3%	2.9%
Non-ferrous metals		0.5%	0.0%	0.2%
Glass	Recyclable	0.4%	0.0%	0.1%
	Other glass	0.8%	0.0%	0.6%
	Subtotal	1.2%	0.0%	0.7%
Textiles	Clothing/textile	3.4%	0.0%	0.4%
	Multimaterial/other	14.3%	13.6%	10.1%
	Subtotal	17.7%	13.6%	10.4%
Sanitary paper		2.2%	0.1%	0.3%
Rubble	Cleanfill	2.8%	2.8%	11.9%
	New plasterboard	0.1%	0.0%	2.4%
	Other	2.2%	0.0%	3.1%
	Subtotal	5.2%	2.8%	17.4%
Timber	Reusable	1.9%	0.0%	2.9%
	Unpainted & untreated	0.7%	3.8%	5.8%
	Multimaterial/other	22.0%	27.9%	41.0%
	Subtotal	24.6%	31.7%	49.8%
Rubber		0.4%	0.0%	0.1%
Potentially hazardous		0.3%	0.0%	0.1%
TOTAL		100.0%	100.0%	100.0%

Appendix 11 - General waste to tip face - Composition

General waste direct to tip face Composition - Excludes kerbside waste, special waste, and transfer pit 3-30 November 2018		% of total weight	Tonnes/week
Paper	Recyclable	5.0%	25 T/week
	Cardboard	5.7%	28 T/week
	Non-recyclable	1.1%	6 T/week
	Subtotal	11.8%	59 T/week
Plastics	Recyclable	1.0%	5 T/week
	Non-recyclable	16.0%	79 T/week
	Subtotal	16.9%	84 T/week
Organics	Kitchen waste	9.4%	47 T/week
	Compostable greenwaste	4.5%	22 T/week
	Non-compostable greenwaste	0.4%	2 T/week
	Other organic	1.8%	9 T/week
	Subtotal	16.2%	80 T/week
Ferrous metals	Primarily ferrous	1.2%	6 T/week
	Multi/other	1.6%	8 T/week
	Subtotal	2.9%	14 T/week
Non-ferrous metals		0.9%	5 T/week
Glass	Recyclable	1.5%	7 T/week
	Non-recyclable	1.3%	6 T/week
	Subtotal	2.8%	14 T/week
Textiles	Clothing/textile	2.2%	11 T/week
	Multimaterial/other	7.2%	36 T/week
	Subtotal	9.4%	47 T/week
Sanitary paper		6.3%	31 T/week
Rubble	Cleanfill	5.3%	26 T/week
	New plasterboard	1.0%	5 T/week
	Other	10.3%	51 T/week
	Subtotal	16.6%	83 T/week
Timber	Reusable	0.7%	4 T/week
	Unpainted & untreated	2.0%	10 T/week
	Non-recoverable	10.3%	51 T/week
	Subtotal	13.1%	65 T/week
Rubber		1.9%	9 T/week
Potentially hazardous		1.2%	6 T/week
TOTAL		100.0%	497 T/week

Appendix 12 - General waste direct to tip face - Composition by activity source

General waste direct to tip face Composition -by activity source Excludes kerbside waste, special waste, and transfer pit 3-30 November 2018		Construction & demolition	Industrial/ commercial/ institutional	Landscaping & earthworks	Residential
Paper	Recyclable	0.1%	5.9%	0.0%	3.6%
	Cardboard	1.5%	6.4%	1.8%	2.7%
	Non-recyclable	0.1%	1.3%	0.0%	0.0%
	Subtotal	1.7%	13.6%	1.8%	6.4%
Plastics	Recyclable	0.0%	1.1%	0.0%	0.0%
	Non-recyclable	2.5%	18.5%	0.1%	7.5%
	Subtotal	2.5%	19.6%	0.1%	7.5%
Organics	Kitchen waste	0.1%	11.1%	0.0%	0.0%
	Compostable greenwaste	0.3%	3.0%	35.1%	0.0%
	Non-compostable greenwaste	0.1%	0.4%	0.0%	0.0%
	Other organic	0.0%	2.2%	0.0%	0.0%
	Subtotal	0.6%	16.7%	35.1%	0.0%
Ferrous metals	Primarily ferrous	0.9%	1.3%	0.0%	1.4%
	Multi/other	0.1%	1.8%	0.0%	10.1%
	Subtotal	1.0%	3.2%	0.0%	11.5%
Non-ferrous metals		0.0%	1.1%	0.0%	0.0%
Glass	Recyclable	0.0%	1.7%	0.0%	0.0%
	Non-recyclable	0.2%	1.5%	0.0%	0.0%
	Subtotal	0.2%	3.3%	0.0%	0.0%
Textiles	Clothing/textile	0.0%	2.5%	0.0%	10.1%
	Multimaterial/other	10.4%	7.3%	0.0%	14.3%
	Subtotal	10.4%	9.8%	0.0%	24.4%
Sanitary paper		0.2%	7.4%	0.0%	0.0%
Rubble	Cleanfill	8.1%	1.4%	61.1%	0.0%
	New plasterboard	6.3%	0.5%	0.0%	0.0%
	Other	30.8%	9.0%	0.0%	0.0%
	Subtotal	45.2%	10.9%	61.1%	0.0%
Timber	Reusable	1.9%	0.6%	0.0%	0.0%
	Unpainted & untreated	2.3%	2.1%	0.0%	0.0%
	Non-recoverable	33.7%	8.0%	1.8%	50.3%
	Subtotal	38.0%	10.8%	1.8%	50.3%
Rubber		0.2%	2.2%	0.0%	0.0%
Potentially hazardous		0.1%	1.4%	0.0%	0.0%
TOTAL		100.0%	100.0%	100.0%	100.0%

General waste direct to tip face Composition by activity source Excludes kerbside waste, special waste, and transfer pit 3-30 November 2018		Construction & demolition	Industrial/ commercial/ institutional	Landscaping & earthworks	Residential
Paper	Recyclable	0.1 T/week	24.8 T/week	0.0 T/week	0.2 T/week
	Cardboard	0.7 T/week	27.0 T/week	0.5 T/week	0.1 T/week
	Non-recyclable	0.0 T/week	5.6 T/week	0.0 T/week	0.0 T/week
	Subtotal	0.8 T/week	57.4 T/week	0.5 T/week	0.3 T/week
Plastics	Recyclable	0.0 T/week	4.8 T/week	0.0 T/week	0.0 T/week
	Non-recyclable	1.1 T/week	78.0 T/week	0.0 T/week	0.3 T/week
	Subtotal	1.1 T/week	82.8 T/week	0.0 T/week	0.3 T/week
Organics	Kitchen waste	0.1 T/week	46.9 T/week	0.0 T/week	0.0 T/week
	Compostable greenwaste	0.1 T/week	12.6 T/week	9.7 T/week	0.0 T/week
	Non-compostable greenwaste	0.0 T/week	1.8 T/week	0.0 T/week	0.0 T/week
	Other organic	0.0 T/week	9.1 T/week	0.0 T/week	0.0 T/week
	Subtotal	0.2 T/week	70.4 T/week	9.7 T/week	0.0 T/week
Ferrous metals	Primarily ferrous	0.4 T/week	5.6 T/week	0.0 T/week	0.1 T/week
	Multi/other	0.0 T/week	7.7 T/week	0.0 T/week	0.4 T/week
	Subtotal	0.4 T/week	13.3 T/week	0.0 T/week	0.5 T/week
Non-ferrous metals		0.0 T/week	4.5 T/week	0.0 T/week	0.0 T/week
Glass	Recyclable	0.0 T/week	7.4 T/week	0.0 T/week	0.0 T/week
	Non-recyclable	0.1 T/week	6.3 T/week	0.0 T/week	0.0 T/week
	Subtotal	0.1 T/week	13.7 T/week	0.0 T/week	0.0 T/week
Textiles	Clothing/textile	0.0 T/week	10.5 T/week	0.0 T/week	0.4 T/week
	Multimaterial/other	4.6 T/week	30.9 T/week	0.0 T/week	0.6 T/week
	Subtotal	4.6 T/week	41.3 T/week	0.0 T/week	1.1 T/week
Sanitary paper		0.1 T/week	31.3 T/week	0.0 T/week	0.0 T/week
Rubble	Cleanfill	3.6 T/week	5.9 T/week	16.9 T/week	0.0 T/week
	New plasterboard	2.8 T/week	2.2 T/week	0.0 T/week	0.0 T/week
	Other	13.5 T/week	37.8 T/week	0.0 T/week	0.0 T/week
	Subtotal	19.9 T/week	46.0 T/week	16.9 T/week	0.0 T/week
Timber	Reusable	0.8 T/week	2.7 T/week	0.0 T/week	0.0 T/week
	Unpainted & untreated	1.0 T/week	8.9 T/week	0.0 T/week	0.0 T/week
	Non-recoverable	14.8 T/week	33.9 T/week	0.5 T/week	2.2 T/week
	Subtotal	16.7 T/week	45.5 T/week	0.5 T/week	2.2 T/week
Rubber		0.1 T/week	9.2 T/week	0.0 T/week	0.0 T/week
Potentially hazardous		0.0 T/week	6.0 T/week	0.0 T/week	0.0 T/week
TOTAL		43.9 T/week	421.5 T/week	27.6 T/week	4.4 T/week

Appendix 13 - Waste direct to tip face - Composition by vehicle type

Waste direct to tip face Composition - by vehicle type Excludes transfer pit 3-30 November 2018		Compactors	Front-loader trucks	Gantry trucks	Hook trucks	Other trucks
Paper	Recyclable	6.5%	6.6%	2.9%	2.2%	1.9%
	Cardboard	0.7%	8.6%	3.0%	2.6%	0.8%
	Non-recyclable	1.2%	1.4%	0.5%	0.5%	0.9%
	Subtotal	8.4%	16.6%	6.5%	5.3%	3.6%
Plastics	Recyclable	2.2%	1.2%	0.3%	0.5%	0.6%
	Non-recyclable	7.3%	23.3%	8.8%	7.4%	3.1%
	Subtotal	9.5%	24.6%	9.1%	7.9%	3.7%
Organics	Kitchen waste	32.9%	11.4%	3.3%	5.6%	4.5%
	Compostable greenwaste	20.0%	1.3%	7.0%	3.0%	6.1%
	Non-comp. greenwaste	2.2%	0.5%	0.0%	0.3%	0.1%
	Other organic	2.7%	3.1%	0.3%	0.8%	0.3%
	Subtotal	57.8%	16.4%	10.7%	9.7%	11.0%
Ferrous metals	Primarily ferrous	0.6%	1.2%	1.7%	0.6%	0.3%
	Multi/other	1.3%	2.5%	1.1%	0.7%	0.2%
	Subtotal	1.9%	3.7%	2.7%	1.3%	0.5%
Non-ferrous metals		1.4%	1.2%	0.4%	0.4%	0.4%
Glass	Recyclable	2.6%	1.7%	0.5%	0.7%	1.3%
	Non-recyclable	0.6%	2.2%	0.3%	0.5%	0.1%
	Subtotal	3.1%	3.9%	0.8%	1.2%	1.5%
Textiles	Clothing/textile	1.8%	3.3%	1.0%	0.9%	0.5%
	Multimaterial/other	1.9%	5.4%	1.5%	10.2%	8.0%
	Subtotal	3.7%	8.7%	2.5%	11.1%	8.5%
Sanitary paper		9.0%	8.6%	3.5%	2.8%	2.1%
Rubble	Cleanfill	0.0%	0.3%	0.0%	2.9%	31.6%
	New plasterboard	0.0%	0.0%	2.5%	1.3%	0.3%
	Other	1.9%	3.5%	2.2%	16.5%	21.1%
	Subtotal	1.9%	3.9%	4.7%	20.7%	53.0%
Timber	Reusable	0.0%	0.6%	0.8%	0.5%	0.5%
	Unpainted & untreated	0.0%	1.7%	2.9%	1.0%	1.9%
	Non-recoverable	1.3%	4.8%	14.6%	9.4%	12.9%
	Subtotal	1.3%	7.1%	18.3%	10.9%	15.3%
Rubber		0.3%	3.2%	0.4%	0.7%	0.3%
Potentially hazardous		1.6%	2.0%	40.4%	28.0%	0.2%
TOTAL		100.0%	100.0%	100.0%	100.0%	100.0%

Appendix 14 - All levied waste - Composition

All levied waste to Southern Landfill Composition		3-30 November 2018		1/12/2017 - 30/11/2018	
		% of total weight	Tonnes/week	% of total weight	Tonnes per annum (indicative only)
Paper	Recyclable	3.8%	66 T/week	3.2%	3,384 T/annum
	Cardboard	2.3%	40 T/week	1.9%	2,066 T/annum
	Non-recyclable	0.7%	13 T/week	0.6%	669 T/annum
	Subtotal	6.8%	119 T/week	5.7%	6,118 T/annum
Plastics	Recyclable	1.0%	18 T/week	0.9%	928 T/annum
	Non-recyclable	7.5%	130 T/week	6.2%	6,683 T/annum
	Subtotal	8.5%	149 T/week	7.1%	7,611 T/annum
Organics	Kitchen waste	14.0%	243 T/week	11.6%	12,471 T/annum
	Compostable greenwaste	8.8%	153 T/week	7.3%	7,833 T/annum
	Non-comp. greenwaste	1.3%	24 T/week	1.1%	1,206 T/annum
	Other organic	1.4%	25 T/week	1.2%	1,294 T/annum
	Subtotal	25.5%	445 T/week	21.2%	22,804 T/annum
Ferrous metals	Primarily ferrous	0.7%	13 T/week	0.6%	665 T/annum
	Multi/other	1.1%	20 T/week	0.9%	1,018 T/annum
	Subtotal	1.9%	33 T/week	1.6%	1,683 T/annum
Non-ferrous metals		0.7%	13 T/week	0.6%	663 T/annum
Glass	Recyclable	1.3%	23 T/week	1.1%	1,163 T/annum
	Non-recyclable	0.6%	11 T/week	0.5%	558 T/annum
	Subtotal	1.9%	34 T/week	1.6%	1,720 T/annum
Textiles	Clothing/textile	1.3%	23 T/week	1.1%	1,195 T/annum
	Multimaterial/other	4.0%	70 T/week	3.3%	3,574 T/annum
	Subtotal	5.3%	93 T/week	4.4%	4,769 T/annum
Sanitary paper		4.9%	85 T/week	4.1%	4,367 T/annum
Rubble	Cleanfill	2.7%	48 T/week	2.3%	2,455 T/annum
	New plasterboard	0.5%	9 T/week	0.4%	468 T/annum
	Other	3.9%	68 T/week	3.3%	3,498 T/annum
	Subtotal	7.2%	125 T/week	6.0%	6,421 T/annum
Timber	Reusable	0.5%	9 T/week	0.4%	469 T/annum
	Unpainted & untreated	1.2%	20 T/week	1.0%	1,045 T/annum
	Non-recoverable	7.9%	138 T/week	6.6%	7,094 T/annum
	Subtotal	9.6%	168 T/week	8.0%	8,608 T/annum
Rubber		0.7%	12 T/week	0.6%	594 T/annum
Potentially hazardous		26.9%	469 T/week	39.1%	42,038 T/annum
TOTAL		100.0%	1,745 T/week	100.0%	107,395 T/annum

Appendix 15 - Product names - Levied waste

Product Name		Product Name	
Commercial Green	Not levied	Light Gauge Out	Not levied
Commerical General Waste	Levied	Mixed Organics	Not levied
Compost additives	Not levied	Moa Point Sludge to Tip Face	Levied - Special waste
Compost Sales	Not levied	Outwards Gas Bottles	Not levied
Contaminated Soil	Not levied	Outwards to Recycle Centre	Not levied
Domestic Car + Green Trailer	Not levied	Per Item Product	Not levied
Domestic Car General Waste	Levied	PUBLIC	Not levied
Domestic Cleanfill	Not levied	Recycle Shop to Trsf Station	Levied
Domestic General Trailer	Levied	RetailCompost	Not levied
Domestic Green Car	Not levied	Shop scrap to Trsf Stat	Not levied
Domestic Green Trailer	Not levied	Special Waste - Domestic All	Levied - Special waste
Domestic Green Ute/Van	Not levied	Special Waste - Type D - Other	Levied - Special waste
Domestic Hazardous Waste In	Not levied	Special Waste Type A - Abestos	Levied - Special waste
Domestic Ute / Van	Levied	Stockpile Cover to Tipface	Not levied
Domestic Ute + Green Trailer	Not levied	TradeCompost	Not levied
Domestic Yellow Bags	Levied	Train Scrap- Copper	Not levied
E Waste Product	Not levied	Tyres-Car per item	Not levied
Fridge/Freezer	Not levied	United Water Screenings	Levied - Special waste
Glass	Not levied	Visitor	Not levied
Green Pit to Compost	Not levied	Weekend General Car -Bypass	Not levied
Green to Stock Pile	Not levied	Weekend Green Car - Bypass	Not levied
imported Sand	Not levied	Western Treatment to Tip Face	Levied - Special waste
Kai to Compost (Kitchen Waste)	Not levied	Whiteware Out	Not levied