

Commercial and Industrial Food Organics Project

Barwon South West Waste and Resource
Recovery Group



Document verification

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Executive summary

In order to identify the key opportunities and actions for improving diversion of Commercial and Industrial (C&I) food organics waste from landfill in the G21 region, the Barwon South West Waste and Resource Recovery Group (BSWWRRG) engaged Rawtec to gather data of food organics waste or organics waste associated with food preparation or processing from businesses. The project aimed to identify the generators of C&I food organic waste in the G21 region, the type and volumes of food organics produced, the current destination/processing locations and the current capacity of organics processors and their ability to scale-up their operations. This project did not include collecting data regarding residential sources of food and garden organics, other garden waste or timber product waste generation in the region.

Data gathering

Data was gathered through surveys from three main business categories:

- food manufacturers and processors
- hospitality, food retail and other businesses
- organics processors.

In total, 37 surveys were returned which represented 79 data points for waste generation. 10 surveys were from food manufacturers and processors, 21 were from hospitality, food retail and other businesses, and six from organics processors. In addition, a range of data from other sources was collected to enable modelling of data gaps from the returned surveys, or businesses that weren't included in the surveys. This included modelling for an estimated additional number of cafes/restaurants, pubs, bakeries, takeaway, schools, aged care facilities, offices supermarkets and manufacturers/processors in the region. Please note that accuracy of data from the survey responses varied considerably (from estimations by facilities managers to invoices from contractors) and the modelling was conservative in nature to avoid overestimating volumes.

Key results

Based on the survey results and the modelling of the included business/industry types, there is approximately 27,450 tonnes of food organics across the G21 region. Of the total estimated volume generated:

- Approximately 21,510 tonnes may currently be going to landfill and provides significant opportunity to capture for beneficial reuse, such as commercial composting.
- Approximately 2,720 tonnes are being diverted from landfill through donations. Most of this is to local farms, with a small proportion managed onsite or donated to charities.
- The remaining 3,220 tonnes is managed by commercial processors.
- The largest concentrations of food organics waste are in the Greater Geelong region and parts of the Surf Coast region.

There is an additional volume of organic materials of paunch and manure generated from meat processing and manure and mortalities generated from poultry farming in the region. Based on survey results and modelling it is estimated that there may be approximately 90,000 tonnes of this material in the G21 region. It is likely that most of this material is currently managed via onsite composting or donated to local farms for soil improvement activities.

The G21 region has multiple organics processors that service the area. They are located within or just outside the region and have a range of processing capabilities. Based on the six responses from the survey, there is approximately 15,000 tonnes of organics from the G21 region currently being commercially composted. Approximately 4,500 tonnes are food, with the remainder paunch, mortalities, manure and other materials. It is estimated that the current capacity of composting/organics processing facilities that can accept food organics in the region, is approximately 100,000 tonnes per annum.

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Glossary

ANZSIC	Australian and New Zealand Standard Industrial Classification
CoGG	City of Greater Geelong
Commercial and Industrial (C&I)	Businesses that provide a service to customers (e.g. cafes, restaurants, offices) or manufacture goods (abattoirs, meal preparation).
Cull produce	Non-marketable fruits, vegetables and animal products discarded due to quality issues or defective products.
FOGO	Food and garden organics
Food/organics waste	Any edible foods and beverages (or parts of) discarded during the distribution, retail, preparation and service of food products. This includes meals or remaining food items after customer consumption (e.g. left on plates).
Food organics recycling service	Generally, a waste collection service where you are provided with a separate bin(s) to disposed of food waste that are collected for recycling at an organics processing facility (e.g. into compost).
Loose food/organics waste	Any edible foods and beverages (or parts of) with no packaging discarded during the distribution, retail, preparation and service of food products.
Manure materials	Aggregated solid excrement waste from animals generated during industrial agriculture processes (e.g. chicken farm manure). Does not include manure generated in paddocks or fields.
Over production	Discarded foods or organic products resulting from operational factors - excess ordering, cancelled orders, or market failures.
Packaged food waste/organics	Any edible foods and beverages (or parts of) in packaging discarded during the distribution, retail, preparation and service of food products.
Paunch/ mortalities	Whole or parts of a deceased animals bred for food productions that are discarded during meat rendering processes that are inedible and/or non-marketable.
Preparation waste	Edible foods and beverages (or parts of) discarded from food production or meal preparation.
Plate waste	Edible foods and beverages (or parts of) discarded after customer consumption.
Processing by-product	Discarded foods or organics (including edible and inedible parts) produced during processing of consumables (e.g. grains into flour). This includes planned/inevitable losses (e.g. husks, peelings, animal skins and bones).
Spoilage	Includes edible foods and beverages that have become inedible. This can be due to inadequate temperature control in transport and storage or has gone well past its use-by date (not best before).

1. Project background

Food organic waste is a valuable resource. If excess food organics are captured before they become waste, it is preferable that it be donated to local charities and distributed to those in need or donated to local farms for animal feed. Following this it can be diverted to commercial operations and turned into a beneficial product, like compost, to improve soil health. Targeting food organic waste and removing it from the general waste stream that is destined for landfill can provide significant environmental benefits and economic savings for residents, businesses and government.

Good quality data for municipal food waste already exists due to kerbside audits performed by Councils. However, data for Commercial and Industrial (C&I) businesses is somewhat limited and no comprehensive research has been undertaken. In order to identify key opportunities and actions for C&I food organics waste, the Barwon South West Waste and Resource Recovery Group (BSWWRRG) engaged Rawtec to collect data on the source, volumes and types of C&I food waste in the G21 region.

Project objectives

This phase of the project (Phase 1) aims to:

- Identify the generators of C&I food organic waste in the G21 region
- The type and volumes of waste produced by these generators
- The current destination/processing locations of these organics. This was separated into three categories:
 - Landfill
 - Donated to charities or local farms)
 - Commercially processed (e.g. composted)
- Organics processors current capacity and ability to scale-up their operations.

Phase 2 of the project will look to identify and encourage solutions for the food organic waste identified in phase one.

Organisations and region background

Geelong Region Alliance (G21) is the formal alliance of government, business and community organisations working together to improve the lives of people within the region across five member municipalities - Colac Otway, Golden Plains, Greater Geelong, Queenscliff and Surf Coast (Figure 1).

The BSWWRRG is a Statutory Authority that provides a link in the region between state and local governments, industry and the community for recycling and waste management. The Group is responsible for facilitating an integrated approach to regional waste planning and supporting the delivery of waste management and resource recovery services. This project also received a funding contribution from Cleantech Innovations Geelong (CIG).

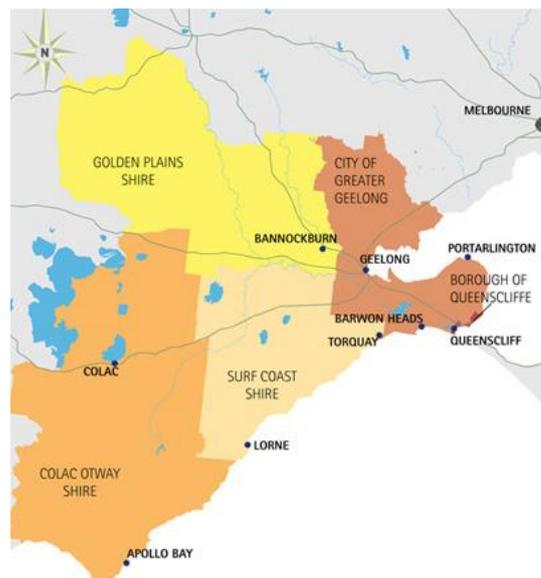


Figure 1: Map of the G21 region

(Source: PRP Geelong)

2. Methodology

There is minimal food and organics waste data from commercial and industrial sources. As such, this project aims to fill in this data gap where possible. This includes information directly from C&I businesses, other studies into C&I food and organic waste and other relevant information from the region.

Business categories

The data collection was narrowed to keep the project manageable. Three main business categories were developed:

- Food manufacturers and processors
 - Fresh food (fruits and vegetables), meat, processed food etc.
 - Beverage manufacturing (Breweries and wineries)
 - Poultry farming (eggs and meat)
 - Industrial bakery and other processed food production etc.
- Hospitality, food retail and other businesses
 - Cafes, restaurants, hotels, bakeries etc.
 - Supermarkets, green grocers etc.
 - Hospitals, universities, schools and other institutions/organisations
 - Offices and other businesses
- Organics processors
 - Including all types of processing (e.g. open windrow, in-vessel, anaerobic digestion)

Food organics categories

Categories to ensure consistent classifications and understanding of food organic waste were also developed (Table 1). Definitions of these categories are in the Glossary.

Table 1: Categories for food organics waste

Food manufacturers and processors	Hospitality, food retail and other businesses	Organics processors
<ul style="list-style-type: none">• Spoilage• Cull produce• Processing by-product• Over production• Paunch/mortalities• Manure materials• Other	<ul style="list-style-type: none">• General waste• Food/organics waste• Food donated to charities (e.g. Second Bite)• Food organics donated elsewhere (e.g. local farms)	<ul style="list-style-type: none">• Loose food waste/organics• Packaged food waste/organics• Timber• Paunch/mortalities• Manure materials• Other

Data on organic materials that are a by-product of food processing/manufacturing activities (i.e. paunch, mortalities and manure) was also collected during the project. However, these are also not necessarily a common waste stream for most businesses in the region and therefore are excluded from some elements of the analysis (this will be highlighted when it is the case).

Liquid wastes (e.g. milk, beer or wine liquid waste) are excluded from this project. It is likely that there are liquid wastes in the region that could be captured for beneficial reuse (e.g. anaerobic digestion) if it is not already happening, however this is not in the scope of this project. Note also that the project collected information on food organics and did not include any form of garden organics (e.g. grass clippings, tree trimmings) that businesses may also generate during their operations.

2.1. Data collection

Business surveys

A major source of information for this project is directly from businesses, which was collected through a short survey. BSWWRRG provided an initial list of businesses in the region which was further developed in consultation with representatives of the G21 Councils and further desktop research.

In addition to the business list developed, Councils had additional business information that due to privacy constraints they were unable to share directly with Rawtec. However, where appropriate they sent the survey on our behalf to the relevant businesses.

A survey was developed for each business category. This considered the variation in activities, the types of food waste and the available data the businesses may have available. A copy of the surveys is included in the Appendix 1 - Surveys.

The surveys were developed to be easy to respond to and consider the level of familiarity and information that businesses may or may not have with their waste and recycling systems and services. As such, the level of detail and accuracy of the responses vary (from estimations by facilities managers to invoices from contractors). Therefore, we have clarified where possible and made assumptions when interpreting and inputting the data where appropriate.

The data from the surveys was collected under the condition of maintaining confidentiality. As such, the data is aggregated, and individual responses and information is not disclosed.

Table 2 outlines the number of survey responses that were received and the number of data points that they represent.

Table 2: Number of businesses/organisations that returned surveys and the total number of sites the surveys covered

Category	Survey returns	Data points
Food manufacturers and processors	10	11
Hospitality, food retail and other businesses	21	62
Organic processors	6	6
TOTAL	37	79

Business interviews

In addition to the surveys, face to face interviews were scheduled in early April with a range of key businesses to gain further insights and information. These further helped in the estimation and modelling of waste generation in the region and were a valuable source of information.



Other data

A range of other data was collected for this project to assist in the modelling of the results:

- Sustainability Victoria C&I audit data for the Barwon South West region.
- Australian Business Register information and Australian and New Zealand Standard Industrial Classification (ANZSIC) codes.
- City of Greater Geelong major employers list.
- Other data gathered from online sources, including:
 - Aged care facilities in the region
 - School data, including the number of schools and total enrolments
 - Supermarkets in the region.

2.2. Data modelling

As expected, the number of survey results provide only an insight to the G21 region and not the full picture. Using the information from the surveys and other sources allowed modelling to be completed to estimate the amount of food organics in the region. Further explanation of the modelling methodology is outlined below in the key results.



3. Total food organics summary (survey and modelling)

3.1. Total estimated tonnes

The survey and modelling estimates there are approximately 27,450 tonnes of food organics waste in the G21 region. This is based on the survey returns and the data modelling and is summarised in Table 3. Approximately 5,940 tonnes are currently being diverted from landfill through commercial composting or donations (to local farmers or charities).

Table 3: Estimated total amount of tonnes of food organics waste in the G21 region based on the survey data and the data modelling

Category	Food organics to landfill/unknown (tonnes per annum)	Food organics to commercial processors (tonnes per annum)	Food organics donated (tonnes per annum)	Total
Food manufacturers and processors (surveys & modelled)	9,215	2,658	1,839	13,710
Hospitality, food retail and other (surveys & modelled)	12,295	58	1,385	13,740
Total	21,510	2,716	3,224	27,450*
Percentage of total	78%	10%	12%	100%

*Total has been rounded and may not equate

The G21 region also has a significant number of poultry farms. Based on modelling it is estimated there may be 71,200 tonnes of organics produced on these farms. This material is made up of mortalities (managed onsite due to quarantine considerations) and manure materials, which tends to be provided to local farmers. There are also several meat processing facilities in the region that produce paunch and manure. From the survey returns provided there is an additional 18,600 tonnes of this organics material and the majority is provided to local farmers.

Table 4 outlines the estimated breakdown of tonnes of food organics by business category.

Table 4: Estimated breakdown of tonnes per annum per business category (survey and data modelling)

Business category	Estimated tonnes of food organics per annum
Aged care facilities	454
Food hospitality	5,744
Food manufacturers/processors	13,712
Food retailers	4,940
Hospitals	187
Offices	43
Schools	457
Supermarkets	1,914
TOTAL TONNES	27,451*

*Total has been rounded and may not equate



3.2. Total surveyed verses modelled tonnes

Table 5 below provides a breakdown of the total estimated food organics waste tonnes based on the surveyed and the modelled businesses.

Table 5: Comparison of survey data and modelling of the estimated tonnes of food organics based

Category	Surveys (est. tonnes per annum)	Data modelling (est. tonnes per annum)	Total (est. tonnes per annum)
Food manufacturers and processors	7,692	6,020	13,710
Hospitality, food retail and other	2,467	11,270	13,740
Total	10,159	17,290	27,450*

*Total has been rounded and may not equate

3.3. Estimated source of food organics

Figure 2 provides an estimated percentage breakdown of the source of food organics in the G21 region by business category. This is based on all the survey data and the data modelling. This provides an indication of which business types provide good opportunities to work with to capture food organics and divert from landfill to beneficial reuse.

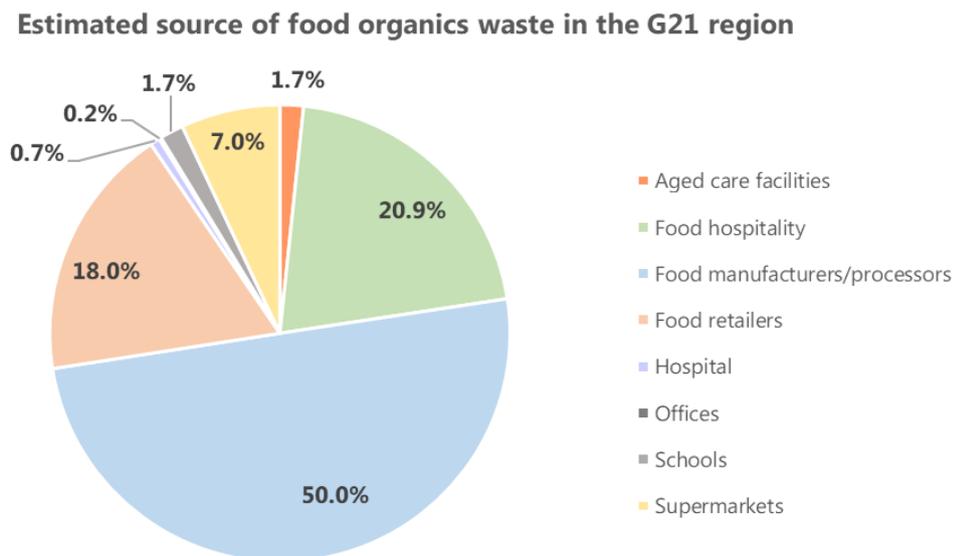


Figure 2: Estimated source of food organics in the G21 region by business category. This is based on the survey and modelling data and excludes paunch, mortalities and manure

Figure 3 provides a heatmap illustrating waste generation hotspots across the region.

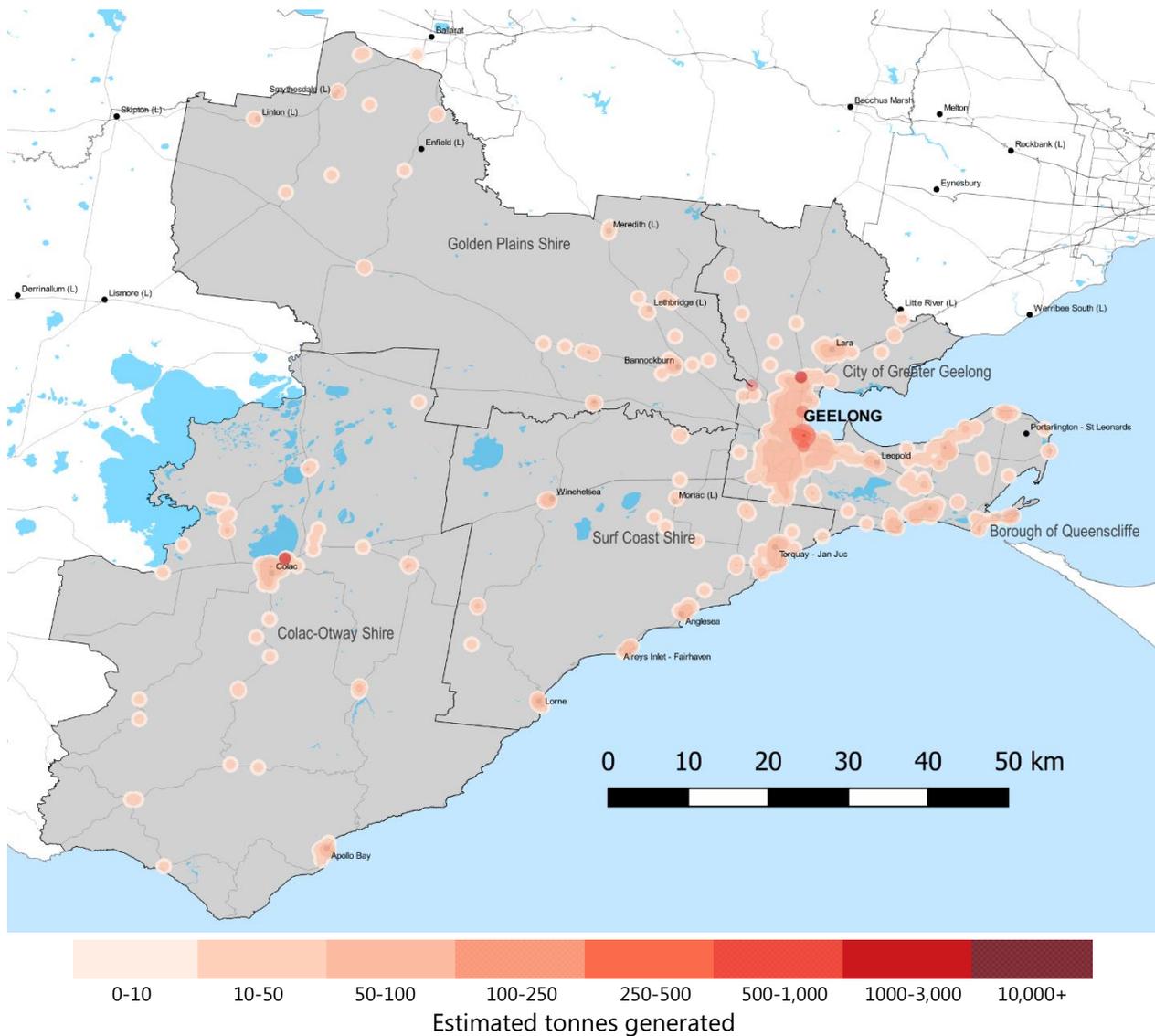


Figure 3: Heatmap illustrating estimated waste generation across the G21 Region¹

¹ Note: Map does not include any surveyed or modelled poultry farms that generate manure/mortalities waste in the region.

4. Survey results

This section outlines the information provided in the survey responses. Where necessary, respondents were followed up to clarify information and some assumptions and corrections were also made when inputting and analysing the data.

4.1. Food manufacturers and processors

Table 6 outlines the breakdown of the survey data points by business category.

Table 6: Breakdown of the survey returns by business categories

Business category	Number of survey data points
Beer manufacturing	1
Bread manufacturing (factory based)	2
Fruit and vegetable processing	1
Meat processing	3
Other	1
Poultry farming	1
Wine and other alcoholic beverage manufacturing	2
TOTAL	11

Table 7 outlines the destination of food organics waste based on the survey responses. Of the 7,700 tonnes, approximately 42 per cent may currently be going to landfill, 35 per cent is commercially composted and approximately 24 per cent is donated.

The survey responses indicated that there is an additional 18,600 to 22,300 tonnes of paunch, mortalities and manure generated in the region. This material is generally either composted onsite or donated to local farms for soil improvement activities. These tonnes have not been included in the table below as it is not considered typical of most businesses and may overstate the opportunities in the region.

Table 7: Destination of food organics waste from food manufacturers and processors based on all survey data points

Category	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)	Totals
Spoilage	-	-	-	-
Cull produce	-	-	312	312
Processing by product	3,190	2,658	1,499	7,347
Over production	-	-	29	29
Other material	5	-	-	5
TOTAL	3,195	2,658	1,839	7,693

Figure 4 below provides a visual outline of where food organic material is disposed. Of the of the food organics donated, 98 per cent is sent to local farms. Only one per cent is donated for food consumption and the remaining one per cent is managed onsite.

Survey results: Current destination of food organics from food manufacturers and processors

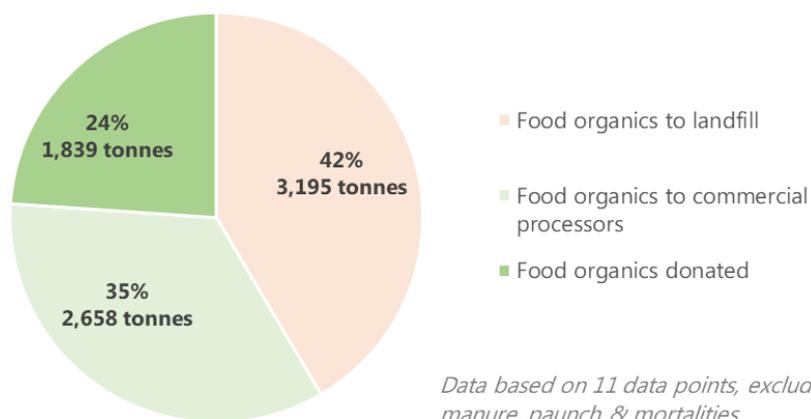


Figure 4: Destination of food organics waste based on survey responses (excludes manure materials)

4.2. Hospitality, food retail and other businesses

Survey responses were received from a variety of hospitality, food retail and other businesses. Table 8 outlines the breakdown of survey data points by business category.

Table 8: Breakdown of the survey data points by business categories

Business category	Number of survey data points
Accommodation and food & beverage	2
Education	3
Cafes and restaurants	11
Hospitals	2
Other businesses	3
Supermarkets	41
TOTAL	62



Table 9 outlines the destination of food organics waste hospitality, food retail and other businesses based on the survey responses.

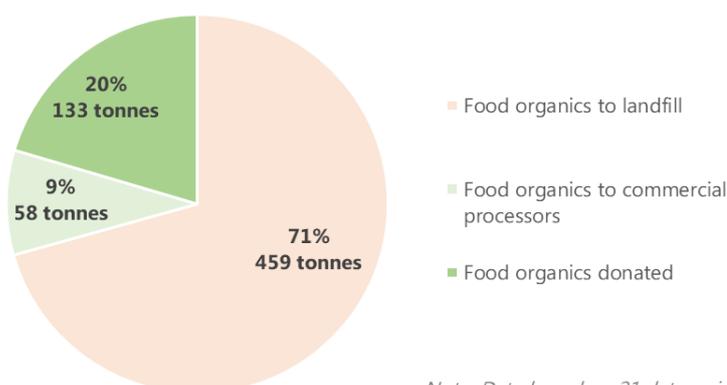
Table 9: Destination of food organics waste from hospitality, food retail and other businesses based on all survey data points

Council	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)	Total (tonnes per annum)
Colac Otway	59	-	13	72
Golden Plains	5	-	31	36
Greater Geelong	915	45	1,250	2,209
Queenscliffe	2	-	2	4
Surf Coast	59	14	72	145
TOTAL	1,040	58	1,368	2,466

Like the food manufacturers and processors, diversion of food organics from landfill appears positive at first glance, with an estimated 1,426 tonnes (58 per cent) is diverted from landfill (either commercially processed or donated). However, if supermarkets are excluded (Figure 5) only 28 per cent of food organic materials avoid landfill (eight per cent commercially processed and 21 per cent donated). Anecdotal feedback from the survey respondents, indicated that there was limited availability of commercial collection services for food organics collection in the region, and this was a major barrier to businesses recycling their food organics waste through a formal service. This is supported by the fact that only an estimated eight per cent of food organics waste from the survey respondents is going to a commercial processor.

Of the total tonnes of food organics donated, approximately 22 per cent (296 tonnes) is recovered and donated to local charities for human consumption. 70 per cent is sent to local farms and the remaining nine per cent is managed by businesses in another way (e.g. through a dehydrator and the output donated to community gardens, mussel shells used for reef restoration).

Survey results: Current destination of food organics from food & beverage, food retail and other businesses (excl. supermarkets)



Note: Data based on 21 data points

Figure 5: Destination of food organics waste based on survey responses (excludes supermarkets)

Figure 6 below outlines the destination of the food organics waste generated by supermarkets that returned surveys. Approximately 68 per cent of food is being donated to charities and/or local farmers. However, an estimated 32 per cent may still be going to landfill. No supermarkets surveyed indicated that they were sending food organics waste to commercial composters.

A significant challenge for supermarkets is packaged food organics. There is de-packaging technology commercially available, however this creates an additional step before food organics can be used in a beneficial way. None of the organics processors who responded indicated they have de-packaging capabilities.

Survey results: Current destination of food organics from supermarkets

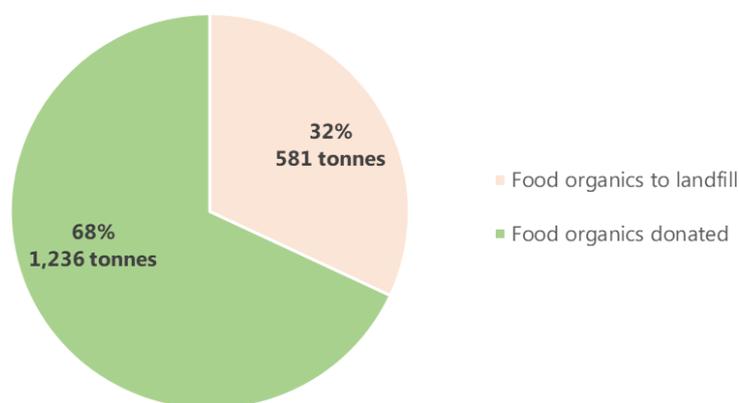


Figure 6: Destination of food organics waste from supermarkets based on survey responses

4.3. Source of food organic waste

Figure 7 outlines an estimation of where food organics waste comes from within hospitality, food retail and other businesses, based on responses from 7 businesses. As shown, almost half of food organics waste was indicated to come from the consumer, with the remainder taking place in the kitchen, either through spoilage or in the food preparation process.

Source of food organic waste from food & beverage, food retail and other businesses

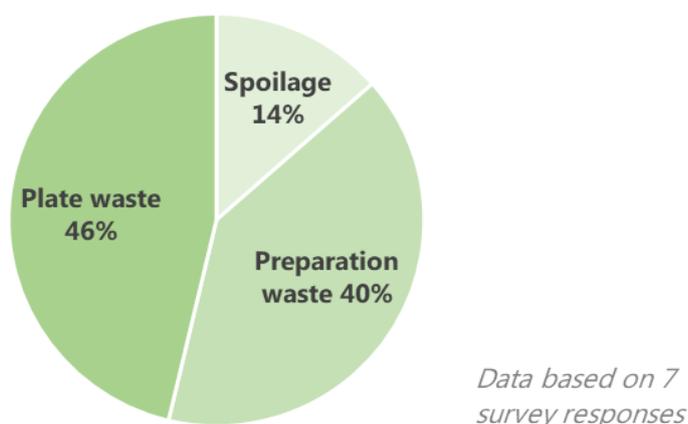


Figure 7: Estimated source of food organics waste from businesses based on seven survey responses



4.4. Additional comments and observations

The surveys also identified that is significant interest in recycling food organics in the region. Nearly all businesses were interested in a food organics collection service that turns food organic waste into a beneficial product (e.g. composting).

Businesses also identified a range of challenges, including:

- The availability and cost of a collection service.
- Ensuring source separation and reducing contamination at back of house systems don't add significant staff time or costs for a business.
- Packaged food organics may make up a large proportion of waste and are a significant barrier for recycling food waste for some businesses.



5. Food organics data modelling

To build on the survey returns and identify further sources of food organics in the G21 region, a range of modelling of the estimated additional volumes of food organics waste in the region was undertaken. This was based on additional information gathered and a range of analysis and assumptions to provide a high-level estimate of food organics waste for some businesses and industries.

The modelling is structured to be conservative in nature; as such the actual volumes of food organics generated may be higher. The modelling also does not specify on the current destination of the food organics waste (i.e. if some businesses are already sending food organics to a commercial processor).

It should also be noted that an unknown quantity of the estimated food organics from manufacturers and retailers may be packaged and not suitable for diverting (through donation to charity or to farmers) or available for commercial processing due to a variety of reasons (e.g. packaged food), without significant processing and decontamination investment (e.g. de-packaging capabilities).

5.1. Food manufacturers and processors

The ANZSIC data provided by Councils indicates there are many food manufacturing and processing businesses in the G21 region. However, there is likely a large variation between businesses and the volumes of food organics waste they may produce. The modelling outlined in Table 10 is based on the responses from businesses to the survey. Note that these are high level estimates and the metrics used are conservative to avoid overestimating the quantities. The number of businesses is the total outlined in the ANZSIC codes (registered for GST) minus the number of businesses that returned a survey.

Table 10: Estimated number of possible food organic generating manufacturing and processing businesses in the G21 region

Category	Approximate number of businesses in G21 region	High level estimate of food organics (tonnes per annum)
Beverage manufacturing (i.e. beer/wine)	43	1,930
Food processing/manufacturing	58	4,090
TOTAL NUMBER OF BUSINESSES	101	6,020

Survey responses were received from two large beverage manufacturers (one beer, one wine) in the region. As these are significantly larger than others in the region their results have been adjusted before being applied to the 43 other businesses in the region. Based on an estimated average of 34.4 tonnes per annum for breweries and 50.5 tonnes per annum for a winery, there is an estimated 1,930 additional tonnes of organics produced in the region in addition to the survey data.

Food processing and manufacturing businesses were modelled using the average of four survey responses. This figure was then divided by 50 per cent, providing an estimate of 70.5 tonnes per annum per business. Based on the 63 businesses in the region, there is an estimated 4,090 additional tonnes of food organics that may be generated in addition to the survey data.



Figure 8 outlines the location of the food organics generated by food manufacturers and processors based on the council.

Location of estimated food organics in the G21 region: Food manufacturers and processors

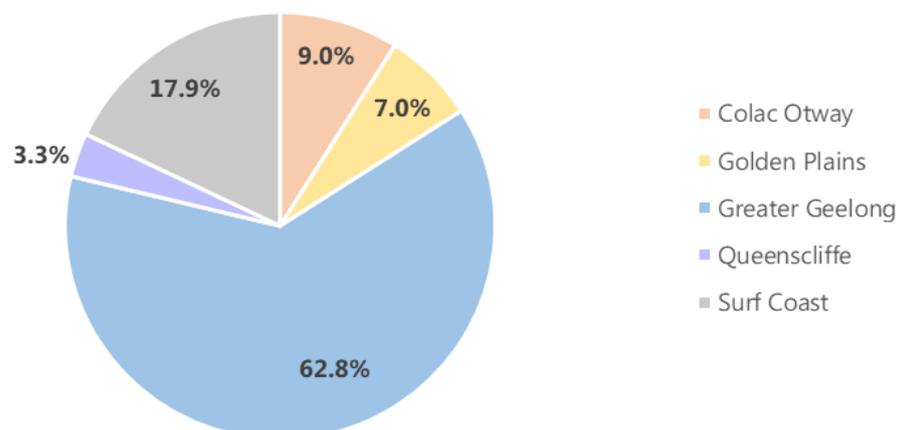


Figure 8: Indicative location and proportion of where food organics is generated by food manufacturers and processors in the G21 region

In addition to the beverage and food processing manufacturing, there are an estimated 43 poultry farms in the region. Based on the response from one farm, the organics materials produced from the farm is mortalities (which are managed on farm due to quarantine considerations) and manure which is often provided to local farms.

As this is a distinct industry and the organic outputs are mostly already accounted for, they have not been included in the above figures. Despite this, modelling was completed to understand the possible volumes in the region. The modelling is based on conservative estimates of 320,000 birds per farm, per cycle with an average of five cycles per year. This means 1.6 million birds per year per farm. The survey return was then used to calculate the average volume of manure and mortalities per bird, and then applied to the estimated number of farms in the region. Based on this it is estimated that per year, a farm may have 56 tonnes of mortalities and 1,600 tonnes of manure. This equals an estimated total of 71,200 tonnes in the region per year.

5.2. Food retailers and other businesses

ANZSIC codes were also used to identify the number of food retailers and other businesses in the region. Food retailers considers businesses such as catering services, dairy produce retailers, fruit and vegetable retailers, meat, poultry and fish retailers, supermarkets and grocery stores and other specialised food retailers.

Table 11 outlines the estimated number of businesses and tonnes of food organics generated per annum. The food retailers' figure is based on the average generation of three businesses that returned surveys. This figure was then adjusted by 50 per cent to avoid over estimating. If the average business generates 16 tonnes of food organics per annum, then there may be 4,940 tonnes in the G21 region, in addition to the survey data.

Two responses were received from hospitals in the region. There are an additional three hospitals in Geelong where information on the number of beds was available. Using the response from the surveys, an 0.12 tonnes per bed per year was used to estimated that an additional 60 tonnes may be available in Geelong from the large hospitals, in addition to the survey data.

Table 11: Estimated number of possible food organic generating food retailers and hospitals in the G21 region

Category	Approximate number of businesses in G21 region	High level estimate of food organics (tonners per annum)
Food retailers	309	4,940
Hospitals	3	60
TOTAL NUMBER OF BUSINESSES	312	5,000

Figure 9 outlines the location of the food organics generated by food retailers and hospitals based on the council.

Location of estimated food organics in the G21 region: Food retailers and hospitals

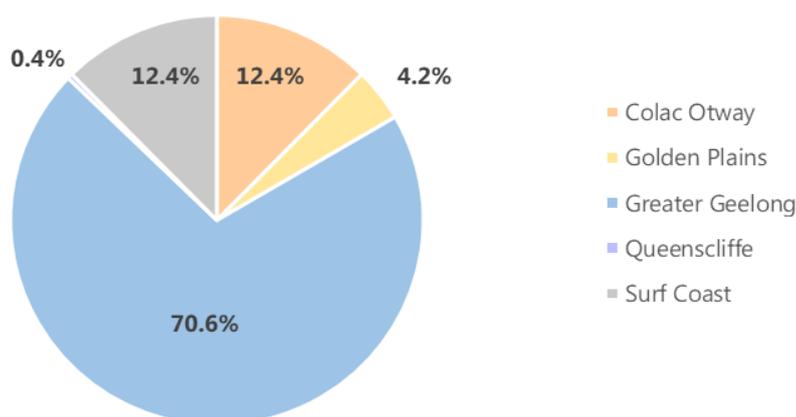


Figure 9: Indicative location and proportion of where food organics is generated by food retailers and hospitals in the G21 region

5.3. Hospitality businesses

There are many hospitality businesses in the G21 region. By using ANZSIC codes, the number of businesses in the region was determined (only businesses registered for GST, gross income of \$75,000 or more, were included). These businesses were then analysed using data from a recent food waste audit completed by Sustainability Victoria (SV). This included data for physical bin audits of 38 businesses in the Geelong and Surf Coast region. From this an average generation of food waste figure (tonnes per annum) was calculated and applied to the numbers and types of businesses in the region.

Table 12 overleaf outlines the estimated number of businesses in G21 region and associated food organics that they generate and may available for commercial processing, in addition to the survey data.

Table 12: Estimated number of hospitality business and tonnes of food organics generated

Category	Est. tonnes per business (per annum)	Est. number of businesses in G21 region	Est. tonnes of food organics generated (per annum)
Café/Restaurant	4.2	577	2,440
Bakery	7.3	75	550
Takeaway	2.3	375	850
Bar/Pub	9.8	141	1,380
TOTAL	-	1,168	5,220

Figure 10 outlines the location of the food organics generated by hospitality businesses based on the council.

Location of estimated food organics in the G21 region: Hospitality businesses

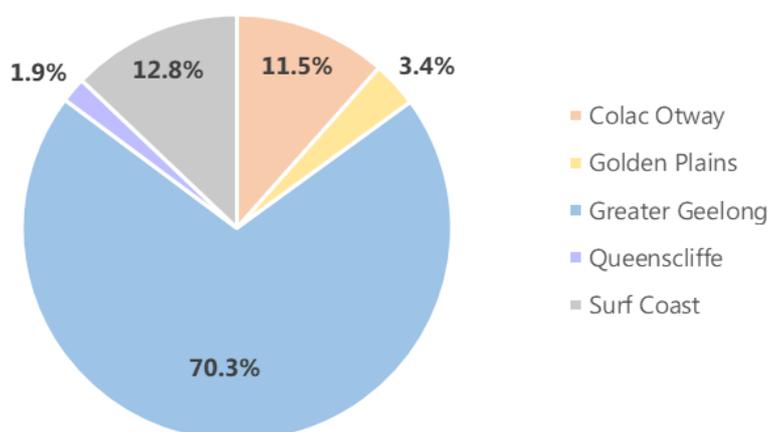


Figure 10: Indicative location and proportion of where food organics is generated by hospitality businesses in the G21 region

5.4. Aged care facilities

Aged care facilities have a significant opportunity to capture and divert food waste from landfill. The recent *Waste and Recycling in Aged Care Facilities Better Practice Guide*² outlines that a typical age care facility generates 2.89 kilograms of waste per bed, per day. A better practice facility in the guide indicates that 11.8 per cent of their waste is recycled through a food organics service. These figures have been applied to the facilities in the G21 region to determine an approximate volume of food organics available.

Table 13 outlines that there are approximately 450 tonnes of food organics generated and available for diversion in the G21 region from aged care facilities, in addition to the survey data. These volumes of food organics may be currently sent to landfill, depending on the facilities' waste management systems.

² Green Industries SA, 2018, *Waste and Recycling in Aged Care Facilities Better Practice Guide*

Table 13: Estimated number of aged care facilities and beds in the G21 region and the volume of food organics that could be recycled via a commercial processor

Council	Est. number of facilities	Est. number of beds	Est. tonnes of food organics generated (per annum)
Colac Otway	4	256	32
Golden Plains	1	120	15
Greater Geelong	32	2,778	346
Queenscliffe	1	90	11
Surf Coast	6	405	50
TOTAL	44	3,649	454

Figure 11 outlines the location of the food organics generated by aged care facilities based on the council.

Location of estimated food organics in the G21 region: Aged Care facilities

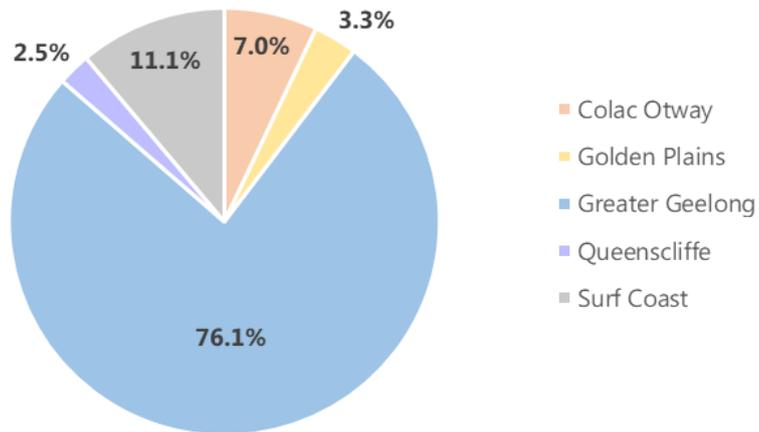


Figure 11: Indicative location and proportion of where food organics is generated by aged care facilities in the G21 region



5.5. Supermarkets

There are an estimated 17 additional supermarkets in the G21 region that did not provide survey returns. From these supermarkets, an estimated 98 tonnes of food organics may be generated per annum (Table 14), in addition to the survey data. These figures are based on an adjustment of the supermarkets that did provide a survey return and their results have been adjusted to consider the supermarkets that did not provide survey returns.

Table 14: Number of supermarkets in the G21 region and the estimated amount of food organics currently donated

Council	Est. number of supermarkets in the G21 region	Est. food organics disposed (tonnes per annum, location unknown)	Est. food organics donated (tonnes per annum)	Total (tonnes per annum)
Colac Otway	2	10	2	11
Golden Plains	1	5	1	6
Greater Geelong	6	29	6	34
Queenscliffe	4	19	4	23
Surf Coast	4	19	4	23
TOTAL	17	82	16	98

Figure 12 outlines the location of the food organics generated by supermarkets based on the council.

Location of estimated food organics in the G21 region: Supermarkets

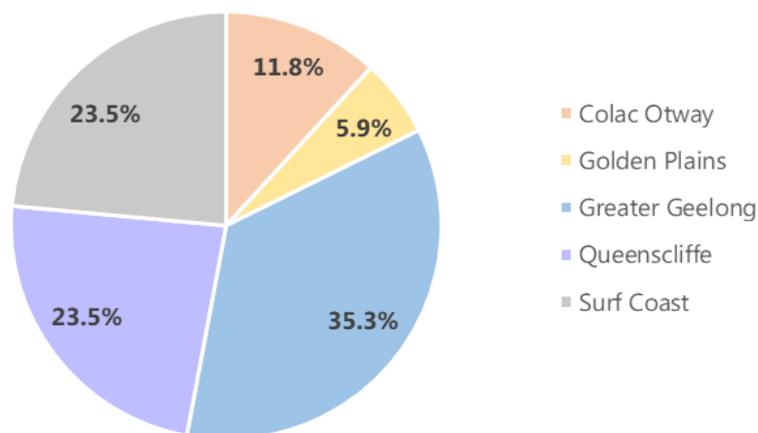


Figure 12: Indicative location and proportion of where food organics is generated by supermarkets in the G21 region

5.6. Schools

Table 15 outlines the estimated generation of food organics waste in schools in the G21 region. It also does not consider boarding facilities at schools that may produce significantly larger volumes of food organics waste. Based on publicly available data, there are an estimated 124 schools in the G21 region, including government and private schools. The data also included the number of enrolments.

The number of staff members is estimated based on the staff to student ratio from modelling of the survey returns and employment data from the CoGG. The food organics kilograms per person, per year figure is based on physical audits conducted by KESAB.³

The figures used for the modelling were:

- Primary schools - 7.1 kg per person, per annum
- Primary/Secondary schools, secondary schools and specialised schools - 8.9 kg per person, per year.

Note that these figures include loose food and food in packaging that would require it to be separated before disposal.

Table 15: Estimated number of schools in the G21 region and the estimated food organics waste generated

Council	Est. number of schools	Est. number of students	Est. number of staff members	Est. food organics waste generated (per annum)
Colac Otway	17	3,212	429	29
Golden Plains	12	1,909	255	15
Greater Geelong	81	41,090	5,494	377
Queenscliffe	3	437	58	3
Surf Coast	11	3,716	497	32
TOTAL	124	50,365	6,734	457

Figure 13 outlines the location of the food organics generated by schools based on the council.

Location of estimated food organics in the G21 region: Schools

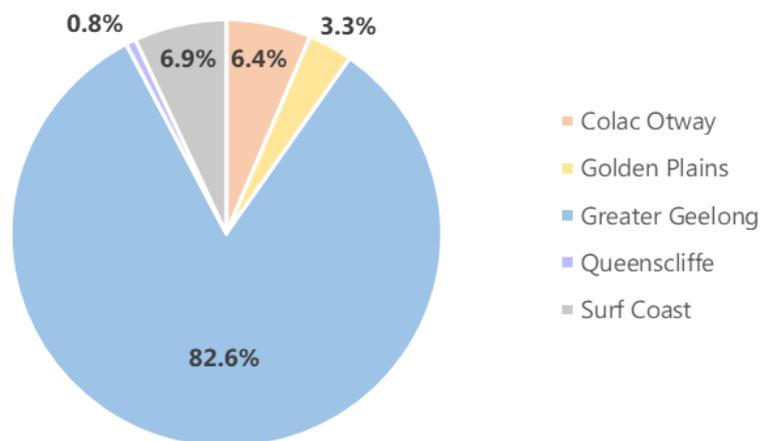


Figure 13: Indicative location and proportion of where food organics is generated by schools in the G21 region

³ KESAB, 2016, *Wipe out waste - Bin Materials Audit Report- Average for Primary sites in SA* and KESAB, 2016, *Wipe out waste - Bin Materials Audit Report- Average for R-12 School sites in SA*

5.7. Offices

The G21 region includes many administration centres, headquarters and offices with a large employee base. Information was provided by the CoGG⁴ on the major employers in the region. Of these, 29 businesses were included in the analysis that cover a range of sectors including professional services, utilities, media, finance and public administration. Nearly all of these are based in the Geelong region. These businesses have an opportunity to separate food waste from general waste to have a positive environmental impact and potentially reduce waste management costs.

Table 16 outlines the estimated volume of food organics available from these offices. Based on the 29 businesses, it is estimated that there may be 43 tonnes of food organics generated per year.

The volume has been modelled based on work completed previously by Rawtec on the average generation of organics per FTE (5.9 kg per annum). The number of employees has also been adjusted (75 per cent of the total number) to consider that all employees may not be office-based. The figures are conservative estimates only as there are a significant number of offices in the region that are not included.

Table 16: Estimated volume of food organics generated by large offices in the G21 region

Council	Number of businesses	Total number of employees	Est. office-based employees	Est. tonnes food organics
Colac Otway	1	266	200	1.2
Golden Plains	1	174	131	0.8
Greater Geelong	25	10,510	7,883	38.7
Queenscliffe	1	167	125	0.7
Surf Coast	1	305	229	1.4
TOTAL	29	11,422	8,567	43*

*Totals have been rounded and may not equate

Figure 14 outlines the location of the food organics generated by offices based on the council.

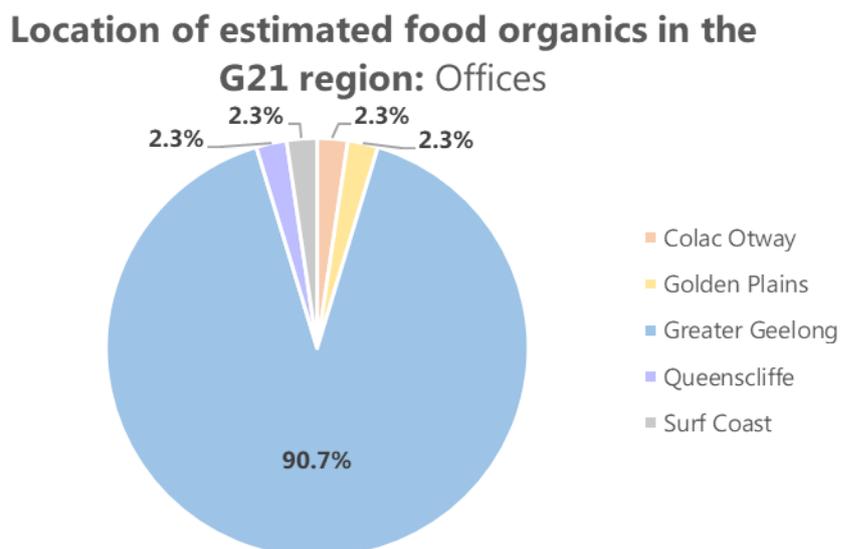


Figure 14: Indicative location and proportion of where food organics is generated by offices in the G21 region

⁴ City of Greater Geelong, 2018, *Select Major Employers - Barwon region 2018*

6. Organics processors

The G21 region has multiple organics processors operating in the region. They have a range of processing capabilities and includes those with facilities in the area and others based just outside the G21 boundary.

Six processors provided a response to the surveys and we met with two of these during a visit to the area. Of those that responded:

- Four are open windrow composters and one in-vessel composter.
- One composter is developing an in-vessel system.
- Only three are currently licensed to take food organics.
- Two others do not currently meet the limit requiring an EPA license.
- One respondent indicated they may apply for an EPA license to receive food.

6.1. Survey responses - current food organics processing

Based on the survey responses from the composters, there is approximately 15,000 tonnes of C&I organics from the G21 region currently being commercially composted (Table 17). Note that this does not match the total tonnes that businesses in the previous sections indicated they were sending to commercial processors. The difference is likely due to businesses that were not capture in the surveys.

Table 17: Estimated food/organics collected by organics processors

Material type	Est. tonnes of organics processed per annum
Loose food	4,740
Packaged food	-
Paunch/mortalities	6,000
Manure materials	3,800
Other material	520
TOTAL TONNES PROCESSED	15,060

6.2. Current and future processing capacity

Based on the survey respondents and information provided by BSWWRRG, it is estimated that organics processors servicing the Barwon South West region are currently processing approximately 91,000 tonnes of organic materials. This includes all types of organic materials (e.g. timber, garden organics), not just food related organics. The current total capacity of these processors is estimated at 144,600 tonnes of material per year, indicating that the processors are only receiving 63 per cent of their capacity.

Only six processors can currently take food organics and their current capacity is 99,600 tonnes per year. Based on survey responses, it is estimated that future processing capacity for facilities taking food waste could be 136,400 tonnes per annum.

We also understand that there is a potential waste to energy partnership between four businesses in Colac. The 'Colac WEB' involves three large manufacturers/processors and Barwon Water and may capture 45,000 tonnes of waste (including food and liquid wastes and wood waste).



6.3. Opportunities and challenges

It is important to note that the first preference is to reuse food organics for human consumption where possible. However, the outlook for organics processing and composting is positive. Some wineries and farms in the region are applying compost on their property and experiencing significant positive results. With the large number of wineries and farms in the region there could be a significant demand for compost in the region.

The survey respondents also outlined some challenges for their operations, they included:

- Encroaching housing and maintaining a social license.
- Approval requirements and process can be a barrier and/or delay in setting up operations.



7. Reference list

City of Greater Geelong, 2018, *Select Major Employers - Barwon region 2018*.

Green Industries SA, 2018, *Waste and Recycling in Aged Care Facilities Better Practice Guide*

KESAB, 2016, *Wipe out waste - Bin Materials Audit Report- Average for Primary sites in SA*

KESAB, 2016, *Wipe out waste - Bin Materials Audit Report- Average for R-12 School sites in SA*

Poultry Hub, 2019, 'Meat Chicken (broiler industry)', <http://www.poultryhub.org/production/industry-structure-and-organisations/chicken-meat/>

Watson, K and Widermann, S.G, 2018, *Review of fresh litter supply, management and spent litter utilisation*, AgriFutures Australia.



8. Appendix 1 - Surveys

Three surveys were developed for the project. Each contained a cover letter (below) and a glossary to ensure that the respondents were familiar with the definitions of each category (not included below).

8.1. Cover letter

Dear

Re: Commercial & Industrial (C&I) Food Waste Survey

The Barwon South West Waste and Resource Recovery Group (BSWWRRG) is currently focusing on identifying opportunities to reduce the thousands of tonnes of food waste that are sent to landfill each year. Disposing of food in landfill costs business and councils millions of dollars and produces methane which is 25 times more potent than CO₂ in terms of global warming.

To enable a market led response to the food waste issue, clear data is required on the source, volumes and types of C&I food waste in the region. In a project co-funded by Cleantech Innovations Geelong, BSWWRRG has engaged specialist waste consultants Rawtec to collect data on the amount of food waste in the G21 region.

The attached survey seeks to understand your current food waste and recycling processes. Individual business data collected in this survey will be aggregated and anonymised and treated as confidential. It will not be shared with other government agencies, companies or third parties.

This survey should only take a short time to complete. Survey returns are due on **Friday 29 March 2019**.

Please return this via email to kristian.legallou@rawtec.com.au.

We are strongly supportive of this project and would encourage you to assist Rawtec with the survey and data collection. Thank you for giving it your attention.

Yours sincerely

Elaine Carbines,

CEO

G21-Geelong Region Alliance



8.2. Food and organic waste survey - Processing/manufacturers

The purpose of this survey is to understand the amount of food/organics waste generated by food/organics manufacturing businesses in the G21 region. Data provided will be aggregated and anonymised and your company/business/facility(ies) will not be individually identifiable. Please complete and return this survey by **29 March 2019** via email to:

- Kristian Le Gallou, Consultant (kristian.legallou@rawtec.com.au) or
- Jarvis Webb, Senior Consultant (jarvis.webb@rawtec.com.au)

If you have multiple facilities in the G21 region, please complete an individual survey for each facility. Please contact us on (08) 8294 5571 if you need assistance answering the survey questions.

1.	Company/business name:	
	Contact name:	
	Phone:	Email:
	Location of your facility: <i>Please complete an individual survey for each of your facilities in the G21 region.</i>	
2.	Please provide a brief overview of business's/facility's activities:	
3.	How many people (FTEs) are directly employed by your company/business/facility?	
4.	a) What are your normal operational days and hours per week?	
	b) Please also include any details of seasonal fluctuations?	
5.	a) Do you currently recycle your food waste? If yes, how?	
	b) If no, would you like a food waste recycling service?	
	c) Are there any barriers/challenges to having a food waste recycling collection service for your business/facility?	
6.	a) What is your current processing/manufacturing capacity (tonnes p.a.)?	
	b) Can you expand your processing capacity, and do you plan to expand?	



7. Please provide information on the types and amounts of organic materials you discard:

Source	Material type(s)	Amount <i>e.g. tonnes, size and number of bins, litres</i>	Timeframe <i>e.g. week, and details on seasonal fluctuations</i>	Who collects your waste? <i>please include destination if known</i>	Est. cost <i>e.g. \$/tonne</i>
Spoilage	<i>e.g. potatoes</i>				
Cull produce					
Processing by-product	<i>e.g. peels</i>				
Over production					
Paunch/ mortalities					
Manure materials					
Other <i>(please list)</i>					

8. What is your method for measuring the data provided?

Weighbridge

Waste contractor invoices/data

If other, please specify:

9. Are you interested in receiving more information and support from the Barwon South West Waste and Resource Recovery Group or your Local Council about waste and recycling?

If yes, please detail what kind of information or support you would like?



8.3. Food/organic waste survey - Food & beverage/retail/commercial

The purpose of this survey is to understand the amount of food/organics waste generated by businesses in the G21 region. Data provided will be aggregated and anonymised and your business will not be individually identifiable. Please complete and this survey by **29 March 2019** via email to:

- Kristian Le Gallou, Consultant (kristian.legallou@rawtec.com.au) or
- Jarvis Webb, Senior Consultant (jarvis.webb@rawtec.com.au)

Please contact us on (08) 8294 5571 if you need assistance answering the survey questions.

1.	Company/business name:
	Contact name:
	Phone: Email:
	Location of your facility: <i>Please complete an individual survey for each of your businesses in the G21 region.</i>
2.	<p>Please provide details of your business and its operations, including:</p> <p>a) Overview of business/facility activities (e.g. supermarket, café, restaurant)?</p> <p>b) Number of people (FTEs) are directly employed by your company/business?</p> <p>c) Any details that summarise the size of your business (e.g. seats in café, hotel beds)?</p> <p>d) What are your normal operational days and hours per week?</p>
3.	<p>Please provide details of your current food waste recycling activities:</p> <p>a) Do you currently recycle your food waste? If yes, how?</p> <p>b) If no, would you like a food waste recycling collection service?</p> <p>c) Are there to be any barriers/challenges to having a food waste recycling collection service for your business(s)?</p>



4. Please provide information (if known) on the types and amounts of waste materials you discard:

Waste materials	Amount <i>(e.g. tonnes, size & no. bins, and details on seasonal fluctuations)</i>	Timeframe <i>(e.g. per week)</i>	Who collects your waste? <i>(e.g. company name)</i>	Estimated cost <i>(e.g. \$ month)</i>
General waste <i>(incl. estimated % food waste in bins if no organics service)</i>				
Food/organics waste				
Food donated <i>(e.g. Oz harvest, pig farm)</i>				
Other <i>(please list)</i>				

5. Please provide information (if known) on the activities where food waste is generated at your business:

Food waste sources	Amount <i>(e.g. %, weight or size & number of bins)</i>	Timeframe <i>(e.g. week, fortnight, year)</i>
Spoilage		
Preparation waste		
Plate waste		
Other <i>(please describe)</i>		

6. Are you interested in receiving more information and support from the Barwon South West Waste and Resource Recovery Group or your Local Council about waste and recycling?

If yes, please detail what kind of information or support you would like?



8.4. Food organics processing survey - Organics processors

The purpose of this survey is to understand the amount of food/organics waste generated by businesses in the G21 region. Data provided will be aggregated and anonymised and your company/business/facility(ies) will not be individually identifiable. Please complete and return this survey by **29 March 2019** via email to:

- Kristian Le Gallou, Consultant (kristian.legallou@rawtec.com.au) or
- Jarvis Webb, Senior Consultant (jarvis.webb@rawtec.com.au)

Please contact us on (08) 8294 5571 if you need assistance answering the survey questions.

1. Company/business name:		
Contact name:		
Phone:		Email:
Location of your facility: <i>Please complete an individual survey for each of your facilities in the G21 region</i>		
2. a) Please provide a summary of your organics processing activities (e.g. open windrow composting):		
b) If you offer (or subcontract) an organic waste collection service, where do you collect from (e.g. areas, types of businesses) and what type of service (e.g. rear-lift, skip/RORO bins)?		
3. How many people (FTEs) are directly employed for processing organics by your company/business?		
4. a) Is your facility EPA licenced to accept food waste?		
b) If not, are you planning to undertake this licence application in the future?		
5. Please provide information on the types and amounts of materials you receive and process:		
Material type	Source <i>(e.g. cafés/restaurants, manufacturers, supermarkets)</i>	Tonnes per annum
Loose food waste/organics		
Packaged food waste/organics		
Timber		
Paunch/mortalities		
Manure materials		
Other (please specify)		
Est. total tonnes per annum		



<p>6. What is method for measuring the data provided?</p> <p><input type="checkbox"/> Weighbridge</p> <p><input type="checkbox"/> Other please specify:</p>
<p>7. What is your current processing capacity (tonnes p.a.) and are you planning any improvements or expansions?</p>
<p>8. What is your publicised gate rate(s) for receiving organics waste from customers at your facility (e.g. \$/tonne)?</p>
<p>9. Are there any barriers to your current/future operations, including the ability to expand activities/processes?</p>



9. Appendix 2 - Data information and assumptions

ANZSIC codes

Below is the ANZSIC code descriptions used to determine the number of food related businesses that may produce food organics as part of their operations

ANZSIC description	
Bakery Product Manufacturing (Non-factory based)	Hospitals (Except Psychiatric Hospitals)
Beer Manufacturing	Ice Cream Manufacturing
Biscuit Manufacturing (Factory based)	Licensed Clubs (Hospitality) Operation
Bread Manufacturing (Factory based)	Meat Processing
Cafes and Restaurants	Meat Retailing (Except Poultry or Canned Meat)
Cake and Pastry Manufacturing (Factory based)	Meat, Poultry and Smallgoods Wholesaling
Catering Services	Other Food Product Manufacturing n.e.c.
Cereal, Pasta and Baking Mix Manufacturing	Other Specialised Food Retailing
Cheese and Other Dairy Product Manufacturing	Poultry Farming (Eggs)
Confectionery Manufacturing	Poultry Farming (Meat)
Dairy Produce Wholesaling	Poultry Processing
Fresh Fish Retailing	Pubs, Taverns and Bars
Fruit and Vegetable Processing	Supermarket and Grocery Stores
Fruit and Vegetable Retailing	Takeaway Food Services
Fruit and Vegetable Wholesaling	Unlicensed Clubs (Hospitality) Operation
Higher Education	Wine and Other Alcoholic Beverage Manufacturing

Material density

Material densities are based on publicly available densities and Rawtec industry experience and knowledge.

Material	kg/m ³
General waste	80
Food waste	200
Bread	90
Yeast	333
High protein solids	333
Chicken litter	200
Dough/Eggs	300
Spent leaf hops	333
Grape Marc	600
Manure	1000
Paunch	400



10. Appendix 3 - Detailed data by Council

10.1. City of Greater Geelong

Survey returns summary

Table 18 provides a summary of the estimated food organics available from businesses in the Greater Geelong region. In addition to the food organics below, there is approximately 1,800 tonnes of paunch that is sent to a commercial processor.

Table 18: Estimated number of tonnes of food organics generated in the council area based on survey data points

Business Type	Number of survey data points	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)
Hospitality, food retail and other businesses	49	915	45	1,250
Food manufacturers and processors	8	3,182	2,658	1,825
TOTAL	57	4,097	2,703	3,075

Modelled data summary

Table 19 provides an overview of the estimated food organics that may be available in the Greater Geelong region based on the modelling. In addition to the modelled tonnes outlined there are approximately 16 poultry farms in the area. Based on modelling there is an estimated volume of 26,500 tonnes per annum of mortalities and manure.

Table 19: Estimated volume of food organic waste in the Greater Geelong region

Category	Est. number of businesses	Est. food organics tonnes (per annum)
Café/Restaurant	401	1,700
Bakery	52	380
Takeaway	293	660
Bar/Pub	95	930
Supermarkets (25% of the general waste stream and donated food)	6	34
Aged care facilities	32	346
Schools	81	377
Offices	25	39
Food manufacturers/processors	21	3,780
Food retailers	217	3,470
Hospital	3	60
ESTIMATED TOTAL	1,226	11,780*

*Total has been rounded and may not equate

10.2. Surf Coast Shire

Survey returns summary

Table 20 provides a summary of the estimated food organics available from businesses in the Surf Coast Shire region.

Table 20: Estimated number of tonnes of food organics generated in the council area based on survey data points

Business Type	Number of survey data points	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)
Hospitality, food retail and other businesses	7	59	14	72
Food manufacturers and processors	-	-	-	-
TOTAL	7	59	14	72

Modelled data summary

Table 21 provides an overview of the estimated food organics that may be available in the Surf Coast Shire based on the modelling. In addition to the modelled tonnes outlined there are approximately 12 poultry farms in the area. Based on modelling there is an estimated volume of approximately 19,870 tonnes per annum of mortalities and manure.

Table 21: Estimated volume of food organic waste in the Surf Coast region

Category	Est. number of businesses	Est. food organics tonnes (per annum)
Café/Restaurant	94	400
Bakery	8	60
Takeaway	36	80
Bar/Pub	13	130
Supermarkets (25% of the general waste stream and donated food)	4	23
Aged care facilities	6	50
Schools	11	32
Offices	1	1.4
Food manufacturers/processors	18	1,080
Food retailers	39	620
ESTIMATED TOTAL	230	2,480*

*Total has been rounded and may not equate



10.3. Colac Otway Shire

Survey returns summary

Table 22 provides a summary of the estimated food organics available from businesses in the Colac Otway Shire region. In addition to the volumes outlined below, there is approximately 11,140 tonnes of paunch, mortalities and manure that was indicated by the survey respondents.

Table 22: Estimated number of tonnes of food organics generated in the council area based on survey data points

Business Type	Number of survey data points	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)
Hospitality, food retail and other businesses	4	59	-	13
Food manufacturers and processors	2	13	-	15
TOTAL	6	72	-	28

Modelled data summary

Table 23 provides an overview of the estimated food organics that may be available in the Colac Otway Shire based on the modelling in the previous section. In addition to the modelled tonnes outlined there are approximately seven poultry farms in the area. Based on modelling there is an estimated volume of 11,590 tonnes per annum of mortalities and manure.

Table 23: Estimated volume of food organic waste in the Colac Otway region

Category	Est. number of businesses	Est. food organics tonnes (per annum)
Café/Restaurant	57	240
Bakery	10	70
Takeaway	30	70
Bar/Pub	22	220
Supermarkets (25% of the general waste stream and donated food)	2	11
Aged care facilities	4	32
Schools	17	29
Offices	1	1.2
Food manufacturers/processors	9	540
Food retailers	39	620
ESTIMATED TOTAL	191	1,830*

*Total has been rounded and may not equate



10.4. Golden Plains Shire Council

Survey returns summary

Table 24 provides a summary of the estimated food organics available from businesses in the Golden Plains Shire Council area. In addition to the volumes outlined below, there is approximately 5,690 tonnes of paunch, mortalities and manure that was indicated by the survey respondents.

Table 24: Estimated number of tonnes of food organics generated in the council area based on survey data points

Business Type	Number of survey data points	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)
Hospitality, food retail and other businesses	1	2	-	31
Food manufacturers and processors	1	-	-	-
TOTAL	2	5	-	31

Modelled data summary

Table 25 provides an overview of the estimated food organics that may be available in the Golden Plains Shire Council based on the modelling in the previous section. In addition to the modelled tonnes outlined there are approximately eight poultry farms in the area. Based on modelling there is an estimated volume of 13,250 tonnes per annum of mortalities and manure.

Table 25: Estimated volume of food organic waste in the Golden Plains region

Category	Est. number of businesses	Est. food organics tonnes (per annum)
Café/Restaurant	13	50
Bakery	3	20
Takeaway	9	20
Bar/Pub	9	90
Supermarkets (25% of the general waste stream and donated food)	1	6
Aged care facilities	1	15
Schools	12	15
Offices	1	0.8
Food manufacturers/processors	8	420
Food retailers	13	210
ESTIMATED TOTAL	70	850*

*Total has been rounded and may not equate



10.5. Borough of Queenscliffe

Survey returns summary

Table 26 provides a summary of the estimated food organics available from businesses in the Borough of Queenscliffe area.

Table 26: Estimated number of tonnes of food organics generated in the council area based on survey data points

Business Type	Number of survey data points	Est. food organics to landfill (tonnes per annum)	Est. food organics to commercial processors (tonnes per annum)	Est. food organics donated (tonnes per annum)
Hospitality, food retail and other businesses	1	2	-	2
Food manufacturers and processors	-	-	-	-
TOTAL	1	2	-	2

Modelled data summary

Table 27 provides an overview of the estimated food organics that may be available in the Borough of Queenscliffe region based on the modelling in the previous section.

Table 27: Estimated volume of food organic waste in the Queenscliffe region

Category	Est. number of businesses	Est. food organics tonnes (per annum)
Café/Restaurant	12	50
Bakery	2	10
Takeaway	7	20
Bar/Pub	2	20
Supermarkets (25% of the general waste stream and donated food)	4	23
Aged care facilities	1	11
Schools	3	3
Offices	1	0.7
Food manufacturers/processors	4	200
Food retailers	1	20
ESTIMATED TOTAL	37	360*

*Total has been rounded and may not equate





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