

WASTE AVOIDANCE AND RESOURCE RECOVERY REGULATIONS 2008

(Regulation 18D)

NOTICE OF INFORMATION REQUIRED FOR AN ANNUAL RETURN OF LIABLE RECYCLERS

PERSON WHO DESCRIBES INFORMATION REQUIRED FOR AN ANNUAL RETURN

I, Mike Rowe, in my capacity as the chief executive officer of the department principally assisting the Minister for Environment in the administration of the *Waste Avoidance and Resource Recovery Act 2007*¹ (CEO) hereby describes in this notice the information relating to reportable waste² or recycling of reportable waste that is required to be provided in an annual return and the procedures to be followed to record and calculate or estimate that information pursuant to regulations 18C and 18D(1) of the *Waste Avoidance and Resource Recovery Regulations 2008*.

PERSON REQUIRED TO PROVIDE AND USE INFORMATION IN THIS NOTICE

In this notice, a person is a *liable person* as described under regulations 18B(1) and 18B(3) of the *Waste Avoidance and Resource Recovery Regulations 2008* if they are an occupier of a premises, whether or not that person holds a licence in respect of the premises in respect of that premises -

- a) if reportable waste is treated, processed or sorted at the premises for the purposes of reprocessing, recycling or energy recovery; and
- b) if, as a result of that treatment, processing or sorting, at least 1,000 tonnes of reprocessed recycled or recovered material is produced in a financial year at the premises that –
 - i) needs no further processing and is ready for use as a production input or final products; or
 - ii) is to be exported from Western Australia.

For the purpose of this notice, these persons will be hereafter referred to as “liable recyclers”.

A liable recycler is subject to Part 3A of the *Waste Avoidance and Resource Recovery Regulations 2008* pursuant to regulation 18B(1). Under regulation 18C of Part 3A, a liable recycler is required to make and lodge an annual return relating to reportable waste or the recycling of reportable waste containing information as required by this notice under regulation 18D.

PREMISES OR LICENSED LANDFILL

The liable recycler must inform the CEO in a form approved in writing by the CEO³ of the premises or the licensed landfill in respect of which the person is a liable person pursuant to regulation 18B(5)(b) of the *Waste Avoidance and Resource Recovery Regulations 2008*.

¹ The “department principally assisting the Minister for Environment in the administration of the *Waste Avoidance and Resource Recovery Act 2007*” is currently the Department of Water and Environmental Regulation.

² Regulation 18A of the *Waste Avoidance and Resource Recovery Regulations 2008* defines **reportable waste** to mean waste that is solid matter.

³ The term “approved” is defined in regulation 3 of the *Waste Avoidance and Resource Recovery Regulations 2008* to mean approved by the CEO in writing. The Department of Water and Environmental Regulation is developing an approved form (an online reporting system) for reporting which it will release by 30 June 2020.

INFORMATION REQUIRED FOR THE ANNUAL RETURN – REGULATIONS 18C AND 18D

For the purposes of making an annual return under regulation 18C of the *Waste Avoidance and Resource Recovery Regulations 2008*, the liable recycler must include the following information in that annual return, and record that information pursuant to regulations 18D(1)(b)(i) and 18D(5).

1. All liable recyclers must record and report the following data against the approved waste material categories:
 - total weight of waste received in tonnes;
 - total weight of waste recycled or recovered in tonnes or cubic metres;
 - total weight of processing losses in tonnes, cubic metres, or percentage of total weight recycled; and
 - estimated weight of stockpiled waste, reported separately for both processed waste and unprocessed waste in tonnes.
2. All liable recyclers must record and report the following details against the approved waste material categories:
 - sector source of waste (municipal, commercial and industrial, construction and demolition)
 - geographic source of waste (Perth metropolitan region, Peel region, other regions, or imported); and
 - destination of processed waste or recycled product (used on-site, final product, further processing in Western Australia, further processing interstate, export overseas).
3. Liable recyclers must calculate or estimate the information by virtue of regulation 18D(1)(b)(ii) of the *Waste Avoidance and Resource Recovery Regulations 2008* required in item 1 and 2 using the *Approved procedure for estimation/calculation of annual return information methods by recycling and reprocessing facilities required under the Waste Avoidance and Resource Recovery Regulations 2008* at Attachment 1 of this notice, which forms part of this notice.
4. Liable recyclers must make and submit their return in the approved⁴ form.
5. Liable recyclers must, by virtue of regulation 18D(1)(b)(i) of the *Waste Avoidance and Resource Recovery Regulations 2008*, keep any records relevant to the calculation, estimation or verification of the information reported in its annual return in a legible written form, or so as to be readily convertible into such a form, for a period of not less than 5 years from the day on which the record was made.

CURRENT REPORTING AND LIABILITY

The liable recycler must make an annual return in the approved⁵ form and lodge it with the CEO on or before 1 October each year. The annual return must contain the information required under this notice for the most recently completed financial year relating to reportable waste⁶ or recycling of reportable waste.

⁴ The term “approved” is defined in regulation 3 of the *Waste Avoidance and Resource Recovery Regulations 2008* to mean approved by the CEO in writing. The Department of Water and Environmental Regulation is developing an approved form (an online reporting system) for reporting which it will release by 30 June 2020.

⁵ See footnote 4 above.

⁶ Regulation 18A of the *Waste Avoidance and Resource Recovery Regulations 2008* defines **reportable waste** to mean waste that is solid matter.

This CEO Notice replaces all previous CEO Notices issued to liable recyclers under regulation 18D(1) of the *Waste Avoidance and Resource Recovery Regulations 2008*.

There are a number of offences provided for under regulation 18E of the *Waste Avoidance and Resource Recovery Regulations 2008* for breaches by a liable recycler under regulations 18B, 18C and 18D, carrying a fine of \$10,000.

Mike Rowe
Chief Executive Officer
Department of Water and Environmental Regulation

19 May 2020

Attachment 1

Approved procedure for estimation/calculation of annual return information methods by recycling and reprocessing facilities required under the *Waste Avoidance and Resource Recovery Regulations 2008*

Approved procedure of the CEO of the department principally assisting the Minister for Environment in the administration of the *Waste Avoidance and Resource Recovery Act 2007* as required under regulation 18D of the *Waste Avoidance and Resource Recovery Regulations 2008*

June 2019

Contents

1	Objective	2
2	Background	2
3	CEO approved methods.....	2
4	Reportable waste material categories	2
5	Hierarchy of approved methods	3
5.1	1 st approved method – Estimation by weight	4
5.2	2 nd approved method – Volume estimation	5
6	Estimating the weight of stockpiles.....	5
6.1	1 st approved method – Estimation by weight	5
6.2	2 nd approved method – Estimation by mass balance	5
6.3	3 rd approved method - Volumetric survey	5
6.4	4 th approved method - Estimation by physical measurement	6
7	Estimating bulk density of material categories	6
8	Source of waste	6
9	Destination/fate of waste	7
10	Additional guidance for charitable recyclers.....	7
11	Default values.....	7
12	Alternative methods	7
13	Glossary.....	9

1 Objective

To establish the procedure of the chief executive officer of the department principally assisting the Minister for Environment in the administration of the *Waste Avoidance and Resource Recovery Act 2007*⁷ (CEO) for estimating and calculating information to be reported in an annual return under regulations 18C and 18D(1) of the *Waste Avoidance and Resource Recovery Regulations 2008* (WARR Regulations).

This document is intended for liable persons, as defined by regulation 18B(3) of the WARR Regulations, who are the occupiers of premises, whether or not the person holds a licence in respect of the premises —

- a) if reportable waste is treated, processed or sorted at the premises for the purposes of reprocessing, recycling or energy recovery; and
- b) if, as a result of that treatment, processing or sorting, at least 1,000 tonnes of reprocessed, recycled or recovered material is produced in a financial year at the premises that —
 - i. needs no further processing and is ready for use as a production input or a final product; or
 - ii. is to be exported from the State.

For the purpose of this document, these persons will be hereafter referred to as liable recyclers.

2 Background

The WARR Regulations require liable persons to make and lodge annual returns with the CEO on or before 1 October in each year. The annual returns must contain information for the most recently completed financial year relating to reportable waste⁸ or the recycling of reportable waste, as required by the notice under regulation 18D(1) (Notice).

The WARR Regulations require annual returns to be prepared using procedures for the purposes of calculation or estimation methods described and approved by the CEO in the Notice.

3 CEO approved methods

This document provides the procedure to be followed by liable recyclers for the purposes of the calculation or estimation methods that liable recyclers are required to use to prepare their annual returns under regulation 18C of the WARR Regulations.

This document forms a part of the Notice approved by the CEO.

4 Reportable waste material categories

Liable recyclers must categorise and report waste information reported using the approved reportable waste material categories provided in Appendix A.

⁷ The “department principally assisting the Minister for Environment in the administration of the *Waste Avoidance and Resource Recovery Act 2007*” is currently the Department of Water and Environmental Regulation.

⁸ Regulation 18A of the *Waste Avoidance and Resource Recovery Regulations 2008* defines **reportable waste** to mean waste that is solid matter.

Liabile recyclers must seek the Department of Water and Environmental Regulation (DWER) approval to prepare their returns using more detailed categories, consistent with their own activities and record-keeping. Where alternative categories are proposed, liable recyclers must demonstrate how these align to the categories in Appendix A.

An annual waste composition study will be required where the recycling premises only receives and records reportable waste in categories that do not align with the material categories in Appendix A. The study is to be conducted over a period of at least five days.

5 Hierarchy of approved methods

This clause provides a hierarchy of approved methods that liable recyclers must use to prepare their annual returns as part of the required procedure under regulation 18D(b)(ii) of the WARR Regulations.

Methods used by liable recyclers that are also landfills subject to the waste levy, must be consistent with the requirements under the *Waste Avoidance and Resource Recovery Levy Regulations 2008*. The hierarchy below applies to reportable waste not subject to the waste levy.

Liabile recyclers must choose the method to be used based on the best-available information. That is, the liable recycler must use the “highest” preferred method for which the data is available.

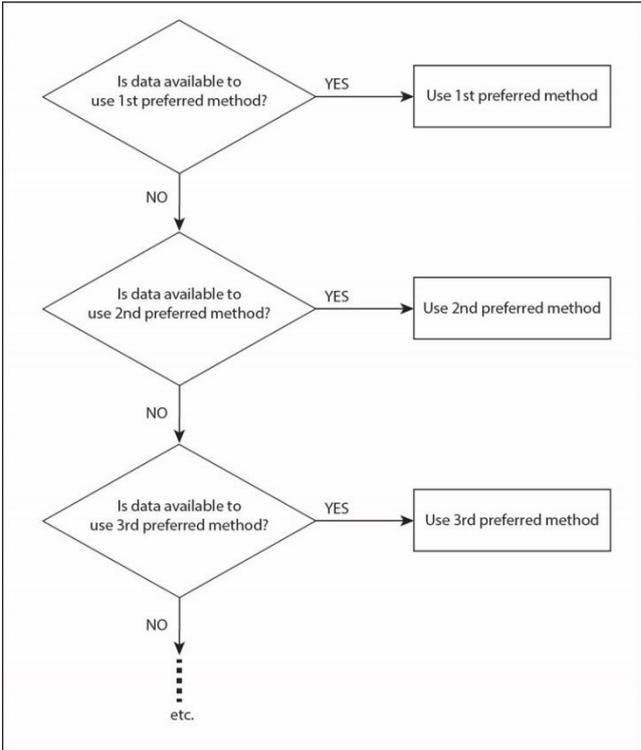


Figure 1: Hierarchy of methodologies

5.1 1st approved method – Estimation by weight

The most preferred method for estimating the amount of reportable waste received at and leaving the facility is for the reportable waste to be weighed at the point of entry or departure at the facility. Where a calibrated weighbridge, load cell or scales is installed at the facility, all compacted waste loads and all waste loads of more than one cubic metre in volume received at and leaving the facility will be weighed.

Volume estimation (see clause 5.2) may be used for small loads under one cubic metre in size (i.e. loads transported in cars and utes).

Equation 1: Estimating total annual weight of reportable waste by weighing each load

$$Annual\ waste = \sum (weight\ of\ all\ vehicle\ loads)$$

Table 1: Data to be collected for estimation by weight

Data required to be collected	Data sources
Total weight of each load	Weighbridge records
Material type of each load	Weighbridge records

Load cells and scales do not need to be verified for trade, as defined by *National Measurement Act 1960*, for measurement for reporting under regulation 18C of the WARR Regulations. However, where the weight is used as a basis for charging or paying customers (including the waste levy), measuring equipment must still be verified under the *National Measurement Act 1960*.

5.2 2nd approved method – Volume estimation

Where weighing reportable waste is not possible, for example for facilities without a weighbridge or where a weighbridge is inoperable, the volume-estimation method must be used. The volume assessment method requires that each waste load entering and leaving the facility is assessed for material type and volume. Approved default values for vehicle volumes and bulk densities for DWER approved material categories are in Appendix B.

Equation 2: Estimation of weight from volume

$$Annual\ waste = \sum (volume\ of\ waste) \times (density\ of\ waste)$$

Table 2: Data to be collected for volume estimation

Data required	Data sources
Volume of each vehicle / container	Gatehouse records
% capacity of vehicle / container in use	Estimated for each load as it arrives - default is 100%
Material category of each load (e.g. mixed paper, co-mingled recycling)	Determined by gatehouse operator as load arrives

6 Estimating the weight of stockpiles

6.1 1st approved method – Estimation by weight

The first approved method is to weigh material stored in stockpiles. Weighing equipment does not need to be trade certified.

6.2 2nd approved method – Estimation by mass balance

The second most preferred method for calculating the net weight of the stockpiles for the year is using the mass balance approach. That is, determining whether the amount of the stockpiled reportable waste

grew or reduced over the year by comparing it to the amount of stockpiled reportable waste at the start of the year.

Equation 3: Estimating annual weight of stockpiles

$$\text{Weight}_{\text{stockpile}} = \text{Weight}_{\text{original}} + \text{Weight}_{\text{received}} - \text{Weight}_{\text{left site}} - \text{Weight}_{\text{contamination removed}} - \text{Weight}_{\text{material used on-site}}$$

This method is only suitable for non-degradable material, such as concrete, dry recyclables, etc. Volume estimation should be used to determine the amount of material in organic waste stockpiles at the end of the financial year (see clause 6.3).

6.3 3rd approved method - Volumetric survey

If not all reportable waste added to the stockpile or removed and produced from the stockpile has been weighed, a volumetric survey may be used to estimate the amount of waste contained in stockpiles. Volumetric surveys should be used to estimate the amount of organic waste stockpiled on-site at the end of the reporting period. Volumetric surveys are not required to be conducted by a qualified surveyor. For example, surveys may be conducted using a drone or a stockpile measurement App.

Volumetric surveys should be conducted as close to the end of the reporting period as possible. The volume is converted to weight by multiplying the volume by the bulk density of the material.

6.4 4th approved method - Estimation by physical measurement

Where only a small amount of material is stored on-site (<200m³), the stockpile volume may be estimated by measuring the circumference of the base of the stockpile and the height of the stockpile. If the material is stored in baled cubes, the amount of material stockpiled is the area multiplied by the height.

If the stockpiles are conical in shape, the amount of material stockpiles can be estimated as the circumference at the base multiplied by the height, then divided by 6.

7 Estimating bulk density of material categories

Facilities without a weighbridge, or where the weighbridge is inoperable for six months or more in one year, must conduct a bulk density survey at their premises to determine the bulk density of the various reportable waste material category loads received at and leaving the facility. A detailed report of the bulk density survey, including raw data, must be submitted to DWER with the next annual data report following the survey.

Where a weighbridge is inoperable for less than six months in one year, DWER approved default values for waste material bulk densities and vehicle/container volumes may be used. These are provided in Appendix B.

8 Source of waste

The source of each load received at or leaving the facility must be recorded by waste stream:

- municipal solid waste (MSW);
- commercial and industrial waste (C&I) waste; or

- construction and demolition waste (C&D) waste.

and by geographic source

- Perth metropolitan region;
- Peel region; or
- other regions.

Where this data is not recorded, the liable recycler will conduct four surveys over the year, each of one week in length, to determine the proportion of reportable waste received at or leaving the facility by geographic source and by waste stream.

Where possible, the waste stream in which the waste was generated should be recorded, otherwise it is recorded as the waste stream in which the waste was collected.

C&D recycling facilities may assume all waste delivered to their premises for processing is from the C&D waste stream.

9 Destination/fate of waste

Liable recyclers are required to report what happens to the reportable waste received at their facility.

The options for fate of reportable waste are: used on-site, final product, further processing in Western Australia, further processing interstate, export overseas.

The categories for geographical destination are; local, exported interstate or exported overseas.

For the purposes of reporting, it can be assumed that 100% of reportable waste exported for recycling is recycled.

10 Additional guidance for charitable recyclers

The sorting and sale of unwanted items, such as the activities of charity operated “op shops”, are not required to be reported under regulation 18C of the WARR regulations.

However, charitable recyclers may be liable recyclers, as defined by regulation 18B(3) of the WARR regulations and required to report on other aspects of their operations, such as the sorting of waste textiles for export.

11 Default values

Liable recyclers must use facility-specific values where this information is available (see also clause 12). Approved default values for estimating volume for various vehicle types and bulk densities for various reportable waste material categories are provided in Appendix B. These default values can be used where facility-specific data is not available.

12 Alternative methods

Liable recyclers may propose alternative methods for the following if these are more accurate than the methods set out above:

- estimating the amount of reportable waste received, removed and disposed

- estimating the bulk density
- estimating the reportable waste composition
- estimating the source waste stream

Any alternative methods proposed must be accurate, repeatable and consistent.

Liabile recyclers may also propose alternative default values to those listed in Appendix B. Liabile recyclers must submit alternative methods or default values, with relevant substantiating information, to DWER at waste.data@dwer.wa.gov.au for consideration and approval prior to use in the annual return.

13 Glossary

Acronym / symbol	Definition
Σ	Sum of
t	Tonnes
m ³	Cubic metres
C&I	Commercial and Industrial waste - Solid waste generated by the business sector, State and Federal Government entities, schools and tertiary institutions.
DWER	Department of Water and Environmental Regulation
Landfilled waste	All waste buried in landfill. This includes waste material used as daily cover.
MSW	Municipal solid waste - Solid waste generated from domestic (residential) premises and local government activities.
Peel Region	The Peel region is the area defined by the Peel Region Scheme (May 2013).
Perth Metropolitan Region	The Perth region, or Perth Metropolitan Region, is the area defined by the Metropolitan Region Scheme (June 2014).
Recycling	<p>Recycling: A waste fate in which solid wastes are collected, sorted, processed (including through composting), and converted into raw materials to be used in the production of new products. For data reporting purposes, recycling:</p> <ul style="list-style-type: none"> • excludes materials in stockpiles of unprocessed waste materials • includes all materials processed for recycling, whether they are quickly sold or used, or stockpiled for later sale or use • excludes residuals that are sent to landfill or otherwise disposed of.
Reportable waste	Means waste that is solid matter under regulation 18A of the <i>Waste Avoidance and Resource Recovery Regulations 2008</i> .
Resource Recovery	The process of extracting materials or energy from a waste stream through re-use, reprocessing, recycling or recovering energy from waste.
Stockpiling	Temporary storage of waste or waste products for future sale, resource recovery or disposal. Materials are not to be stored on-site for a period of more than 2 years.

Appendices

Appendix A – Approved reportable waste material categories

Table 1: Approved reportable waste material categories

Category (Tier 1)	Sub-category (Tier 2)	Sub-category description
Paper	White office paper	High quality white office paper
	Old Newsprint (ONP)	Newspapers
	Magazines	Magazines and booklets
	Liquid Paperboard (LPB)	Milk and juice cartons made from liquid paperboard
	Paper – mixed	Combination of the above categories
Cardboard	Cardboard / paper packaging	Corrugated and flat cardboard. Excludes non-recyclable waxed and coated cardboard.
Mixed paper/cardboard	Mixed paper/cardboard	Paper and cardboard collected together.
Glass	Glass packaging – mixed	Glass jars and bottles
	Glass – construction	Glass windows and tiles
	Glass - other	Wine glasses, etc.
Plastic *	PET (1)	Polyethylene terephthalate
	HDPE (2)	High Density Polyethylene
	PVC (3)	Poly-vinyl Chloride
	PE-LD/LLD (4)	Low Density Polyethylene
	PP (5)	Polypropylene
	PS (6)	Polystyrene (hard form)
	PS-E (6)	Polystyrene (expanded form / foam)
	ABS/SAN (7)	Acrylonitrile Butadiene Styrene
	PU (7)	Polyurethane
	Nylon (7)	Nylon
	Mixed plastic packaging	Recyclable plastic packaging (PET, HDPE, PVC, etc.)
	Hard plastic (not packaging)	Mixed hard plastics
	Plastics – other or mixed	Mixture of the above and/or unmarked plastics
Metals	Metals - Ferrous Steel – packaging	Cans
	Metals - Ferrous Steel – Steel – non-packaging	Bars, pipes, etc.
	Metals – Non-ferrous - Aluminium – packaging	Cans and foil
	Metals – Non-ferrous - Aluminium – non-packaging	Bars, tubes, etc.
	Metals – Non-ferrous - Other metals	Copper, zinc, etc.
Organics *	Food waste	Kitchen scraps, unsold food products (unpackaged)
	Garden waste	Leaves, branches, grass clippings, foliage, flowers

Category (Tier 1)	Sub-category (Tier 2)	Sub-category description
	Food and garden organics (FOGO)	Combined food and garden waste collected in kerbside collections (FOGO)
	Organics from mixed municipal waste	Organic outputs from the mechanical biological treatment of mixed putrescible waste
	Forestry waste	Barks and sawdust (from forestry activities)
	Agricultural waste (excluding manure)	Includes animal bedding, animal mortalities, paunch and straw.
	Manures	Raw, untreated animal manure
	Biosolids	Solid organic outputs from processing sewage
	Urban wood, timber, sawdust (also C&D waste)	Wood / timber / sawdust from commercial and industrial activities or construction and demolition activities
	Fats & grease	Waste fats, grease, greasetrap sludge, biodegradable sludges, waste cooking oil, etc.
	Product – Composted Soil Conditioner	Pasteurised material resulting from the controlled microbiological transformation of compostable organic waste under aerobic and thermophilic conditions for not less than six weeks.
	Product – Pasteurised Soil Conditioner	An organic product that has undergone pasteurisation but is relatively immature and lacking in stability
	Product – Composted Mulch	Dry green waste that has been processed by way of chipping, shredding or similar mechanical process, but does not contain putrefying material. Composted mulch has undergone a full composting process.
	Product – Pasteurised Mulch	Mulch that has only undergone a pasteurising process.
	Product – Raw mulch	Dry green waste that has been processed by way of chipping, shredding or similar mechanical process, but does not contain putrefying material. Has not undergoing any further processing.
	Product – Manufactured Soil	Soil that has been specially prepared by blending or additives to achieve set specifications.
	Product – Potting Mixes	Potting mix (or potting soil) is soil that is specially prepared to help plants to grow, especially in containers.
	Product – Playground Surfacing	Recycled organic material that meets the specification in AS/NZS 4422:1996 Playground surfacing - Specifications, requirements and test method.
	Product – biogas	Biogas from processing, used for heat and/or electricity production
	Product – solid biofuel	Processed organic waste sold as solid fuel
	Product – Composted manures	Animal manures that have undergone a full composting process.
	Product – Aged / raw manures	Animal manures that have not undergone a composting or pasteurisation process.
	Other organic materials	Other biodegradable organic waste not already listed (please specify).
Rubber	Tyres	All rubber tyres. Does not include metal rim or hub-caps
	Other rubber, including conveyor belts	All other rubber
C&D waste *	Sand / soil	Clean sand or soil

Category (Tier 1)	Sub-category (Tier 2)	Sub-category description
	Rubble / aggregate <150mm	Stones, etc. also includes clean, processed C&D recycled product less than 150mm in diameter
	Rubble / aggregate > 150mm	Stones, etc. also includes clean, processed C&D recycled product more than 150mm in diameter
	Bricks	Whole or broken bricks
	Concrete	Concrete or cement
	Bitumen	Waste bitumen or asphalt
	Plasterboard	Plasterboard or gypsum
	Masonry material	Mixed concrete, brick, etc.
	Mixed C&D waste *	Mixed construction and demolition waste, sometimes referred to as “inert” waste
	Mixed inert waste *	Type 1 inert waste as defined in Landfill Waste Classification and Waste Definitions 1996 (as amended 2018)
Textiles	Mixed textiles	Cloth, rags, clothes
	Leather	Items mainly leather
	Foam rubber	Includes polyurethane or latex.
	Carpets	Carpets
	Mattresses	Mattresses
Mixed putrescible waste *	Mixed putrescible waste – domestic (household) *	Mixed putrescible waste – domestic (household)
	Mixed putrescible waste – Commercial & Industrial *	Mixed putrescible waste – Commercial & Industrial
		Mixed putrescible waste – Commercial & Industrial – Wet (with food)
		Mixed putrescible waste – Commercial & Industrial – Dry (no food)
Mixed putrescible – other *	Putrescible waste as defined in Landfill Waste Classification and Waste Definitions 1996 (as amended 2018)	
Mixed dry recyclables *	Co-mingled recycling *	Containers, paper and cardboard collected from households and commercial premises.
	Mixed industrial recyclables	Dry recyclable material collected from commercial and industrial premises. Includes mixed cardboard / plastic film collections. Includes mixed timber / steel / cardboard collections.
Bulky Wastes	Electric & electronic goods	Televisions, computers and associated electronics (printers, DVD players, etc.) Electric tools, vacuum cleaners, etc.
	Mattresses	Mixed steel, foam and cloth mattresses
	Whitegoods	Fridges, washing machines, dryers
	Furniture	Mixed material furniture, e.g. lounge chairs
Hazardous	Batteries	Personal and car batteries
	Paint	Recovered paint – may include containers
	Household chemicals	Household chemicals recovered through Household Hazardous Waste collections
	Fluorescent lights	Include CFLs and fluorescent tubes
	Waste Oil	Waste oil collected through waste oil collections and through Household Hazardous Waste Collections, such lubricating oil, mechanical oil.

Category (Tier 1)	Sub-category (Tier 2)	Sub-category description
	Asbestos	Includes asbestos fencing, pipes, insulation.
	Clinical waste	Includes all medical and veterinary waste
Contaminated soil	Contaminated soil	Soil from a contaminated site, as defined by the <i>Contaminated Sites Act 2003</i> .
Other*	Fly ash	Ash produced by burning of coal or other materials
	Other	Waste not otherwise specified (please specify)

*Only use denoted category for waste received, collected and/or disposed. Denoted category not to be used for recycled products.

Appendix B – Default values

Note: Liable recyclers must use facility-specific values where this information is available. The default values provided can be used where facility-specific data is not available.

Table 1: Default vehicle volumes

Vehicle type	Assumed volume (m³)
Small vehicle (car, ute, van, trailer)	1
Open truck - small, 2 axles	3
Open truck - large 2 axles	6
Open truck - 3 axles	10
Open truck - 4 axles	12
Open truck - 5 axles	18
Open truck - 6 axles	20
Open truck - 8 axles	20
Open truck - 9 axles	32
Open truck - 11 axles	40
Compactor truck - volume unknown	10

Source: DWER (2018) *Approved manner for estimating the volume or weight of waste received at and disposed of to landfills Waste Avoidance and Resource Recovery Levy Regulations 2008*

Table 2: Default bulk densities

Reportable waste material category	Default bulk density (t/m³)
Paper	0.2
Cardboard	0.1
Plastics	0.14
Metals – Ferrous	0.5
Metals – Non-ferrous	0.14
Glass	0.347
Concrete	1.5
Bricks	1.2
Soil, sand, clean fill	1.3
Organics – Garden organics	0.15
Organics – Food organics	0.5
Organics – Timber / wood	0.19
Organics – other organics	0.3
Rubber/tyres	0.3
Textiles	0.15
Hazardous – asbestos	0.31
Hazardous – other	0.2
Mixed co-mingled recyclables (uncompacted)	0.063
Other / mixed - putrescible	0.3

Reportable waste material category	Default bulk density (t/m³)
Other /mixed - inert	1.3
Mixed building waste in skip bins	0.7

Appendix C – Examples of using methods

Example 1 – Estimation of weight from volume

$$\text{Annual waste} = \sum (\text{volume of waste}) \times (\text{density of waste})$$

Table 1: Data recorded on incoming loads and calculations

Incoming Loads	Load volume (m ³)	% fullness	Source waste stream	Geographic source	Material category	Fate	Material bulk density (t/m ³)	Estimated weight (tonnes)
Load 1	15	100%	MSW	Perth Metro	Co-mingled recycling	Overseas	0.063	0.95
Load 2	20	100%	C&I	Perth Metro	Cardboard (compacted)	Interstate	0.13	2.60
Load 3	1	100%	C&I	Perth Metro	Glass	Interstate	0.347	0.35
Load 4	3	80%	C&I	Perth Metro	Cardboard (loose)	Interstate	0.055	0.13
Load 5	15	100%	MSW	Perth Metro	Co-mingled recycling	Overseas	0.063	0.95

Table 2: Summary data reported

Summary total tonnes of waste received by source waste stream, geographic source and fate to be reported

Source waste stream	Geographic source	Material category	Fate	Weight (tonnes)
MSW	Perth Metro	Co-mingled recycling	Overseas	1.9
C&I	Perth Metro	Cardboard	Exported interstate	2.73
C&I	Perth Metro	Glass	Exported interstate	0.35

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