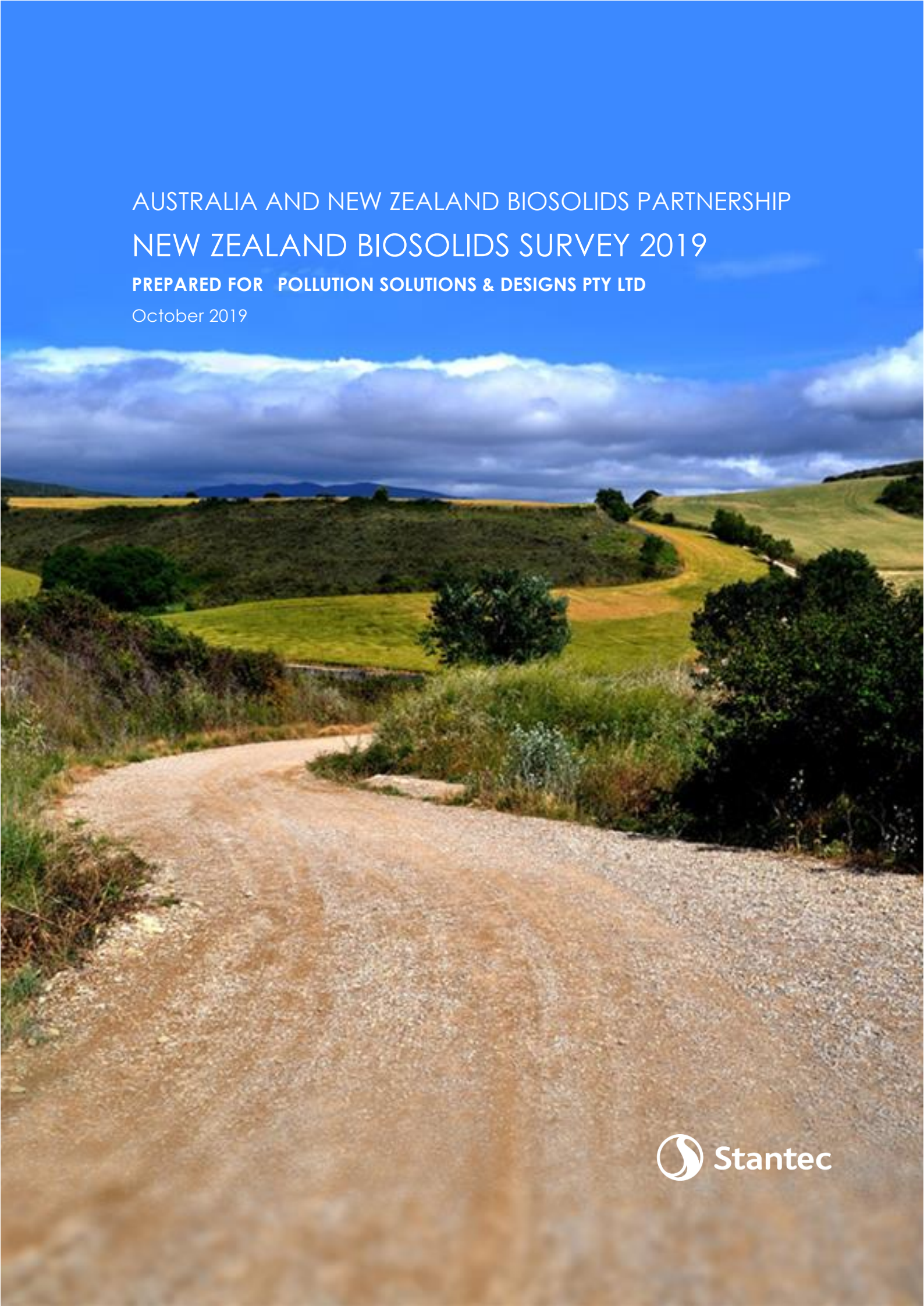
AUSTRALIA AND NEW ZEALAND BIOSOLIDS PARTNERSHIP

NEW ZEALAND BIOSOLIDS SURVEY 2019

PREPARED FOR POLLUTION SOLUTIONS & DESIGNS PTY LTD

October 2019



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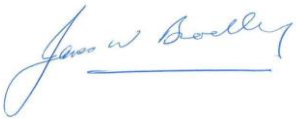
QUALITY STATEMENT

PROJECT MANAGER	PROJECT TECHNICAL LEAD
Isobel Oldfield	Jim Bradley

PREPARED BY		
Isobel Oldfield		24/10/2019
CHECKED BY		
Jim Bradley		24/10/2019
REVIEWED BY		
Rainer Hoffmann		24/10/2019
APPROVED FOR ISSUE BY		
Isobel Oldfield		25/10/2019

CHRISTCHURCH
Hazeldean Business Park, 6 Hazeldean Road, Addington, Christchurch 8024
PO Box 13-052, Armagh, Christchurch 8141
TEL +64 3 366 7449, FAX +64 3 366 7780

REVISION SCHEDULE

Rev No.	Date	Description	Signature or Typed Name (documentation on file)			
			Prepared by	Checked by	Reviewed by	Approved by
0	24/10/19	Final	IO	JB	RH	IO
1	18/03/20	Update	MT/RH	MT		JB

Pollution Solutions & Designs PTY Ltd

New Zealand Biosolids Survey 2019

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1. Introduction

The Australia and New Zealand Biosolids Partnership (ANZBP) commissioned this national survey of biosolids production from municipal wastewater treatment plants (WWTP) in New Zealand to identify the main features of biosolids management. This survey catalogues the following primary parameters:

- Biosolids production
- Biosolids end use
- Biosolids stabilisation grade (based on the Guidelines for the Safe Application of Biosolids to Land in New Zealand, 2003)
- Biosolids primary stabilisation process
- Biosolids dewatering process

The results of this survey are presented on a national basis.

March 2020 update: Pie charts in this report were updated to include the mass basis in addition to the number of WWTP with a technology, process or classification.

2. Method

The approach used to determine the biosolids production in New Zealand was to survey plants serving populations of over 25,000 people or 5,000 m^3/day (5 ML/day). These criteria capture approximately 70% of New Zealand's population. In total information was provided for 32 WWTPs across New Zealand.

All classifications are made on the basis of tonnes (dry and wet) of production.

Levin WWTP and Wanganui WWTP have been identified as meeting the criteria for the study however to date no information has been made available for either of these WWTPs. It is noted that Wanganui WWTP is a newly upgraded treatment plant and therefore there is unlikely to be much historical data available. An attempt to collect the information required will be made again during the 2021 survey.

3. Classifications

To enable relatively simple analysis and presentation of the data each area of information, such as end use, was classified into a number of broad groupings. These groupings are discussed below.

3.1 Production

Production is presented in terms of tonnes of dry biosolids

3.2 End Use

The following classifications were used for end use:

- Agriculture – for biosolids applied to land for its fertiliser value without value added processing
- Landscaping (compost) – for biosolids processed through a composting facility and used for landscaping or other horticultural use
- Forestry – for biosolids applied to plantation forests to aid tree growth
- Landfill – for biosolids disposed to landfill, including monofill
- Ocean Discharge – for WWTP where solids are disposed of to the ocean. These solids are not defined as biosolids and no biosolids mass is associated with these WWTP.
- Stockpile – for biosolids stored, pending future planning, processing or use
- Land rehabilitation – for biosolids used in the rehabilitation of land including mine rehabilitation and landfill capping
- Unspecified

3.3 Stabilisation Grade

Stabilisation grade was classified on the basis of the A, B or C grading. This grading was adopted for this survey in light of the broad variation in nomenclature for stabilisation across Australia and New Zealand. The equivalent gradings are shown in Table 3-1. WWTP that do not produce biosolids (such as those with Ocean Discharge) are not included.

Table 3-1: Stabilisation gradings

Classification	New Zealand
A	A
B	B
C	Unstabilised

The above grading is based on the 2003 document *Safe Application of Biosolids to Land in New Zealand* produced by the New Zealand Water and Waste Association. It is recognised that new interim guidelines have been developed: *Guidelines for the Beneficial Use of Organic Materials on Productive Land* published by Water New Zealand (2017). This guideline has not yet been finalised however and therefore the grading for the 2019 survey remains based upon the 2003 guidelines.

3.4 Stabilisation Process

Classification of the stabilisation process was made on a basis of the primary stabilisation process following the sewage treatment process. The following stabilisation categories were used:

- Anaerobic digestion (including mesophilic digestion)
- Aerobic digestion (Pines WWTP)
- Thermophilic digestion
- Incineration
- Lagoon (used of biosolids storage in liquid form)
- Thermal drying
- Composting (including vermicomposting)
- Long term storage (of dewatered biosolids)
- Lime stabilisation
- Agitated air drying
- None

WWTP that do not produce biosolids (such as those with Ocean Discharge) are not included.

3.5 Dewatering Process

Classification of the dewatering process was made on the basis of the following categories:

- Belt press
- Centrifuge
- Drying beds or lagoon
- None

WWTP that do not produce biosolids (such as those with Ocean Discharge) are not included.

4. Results

4.1 Production

The total biosolids production of New Zealand identified in the survey is approximately 66,000 tonnes per year of dry biosolids, which is an increase on the 64,000 tonnes produced in 2017. This minor increase is due partly to the inclusion of the Queenstown WWTP in this year's survey. Total production remains lower than that recorded in the 2015 survey (77,000 tonnes). The solids content of the dewatered biosolids range from approximately 3% to 96% with an average of 33%. Approximately 350,000 tonnes of the dewatered biosolids is produced per year, which is comparable to the 356,000 tonnes produced in 2017.

4.2 End Use

The end use of biosolids in New Zealand is presented below:

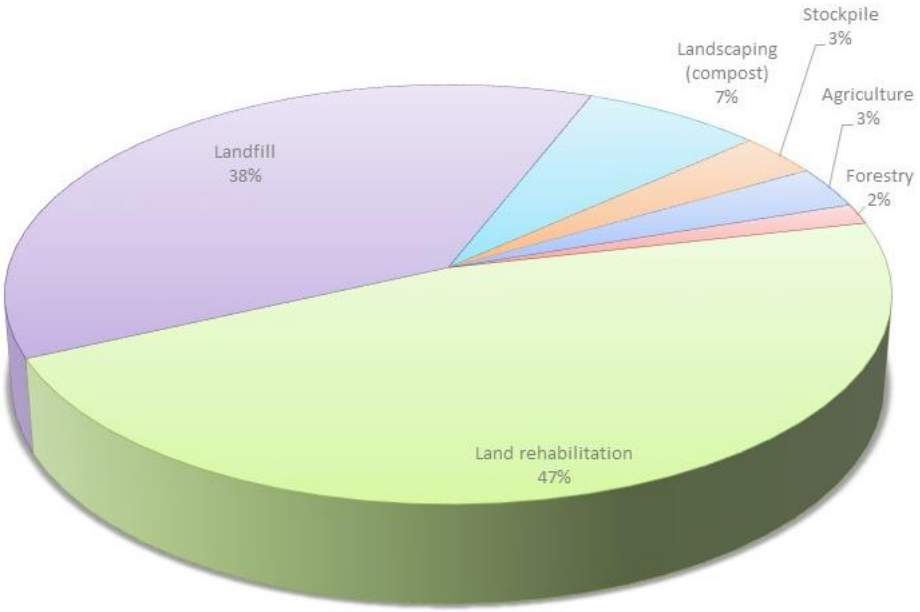

Figure 4-1 Biosolids end use (Mass Basis)

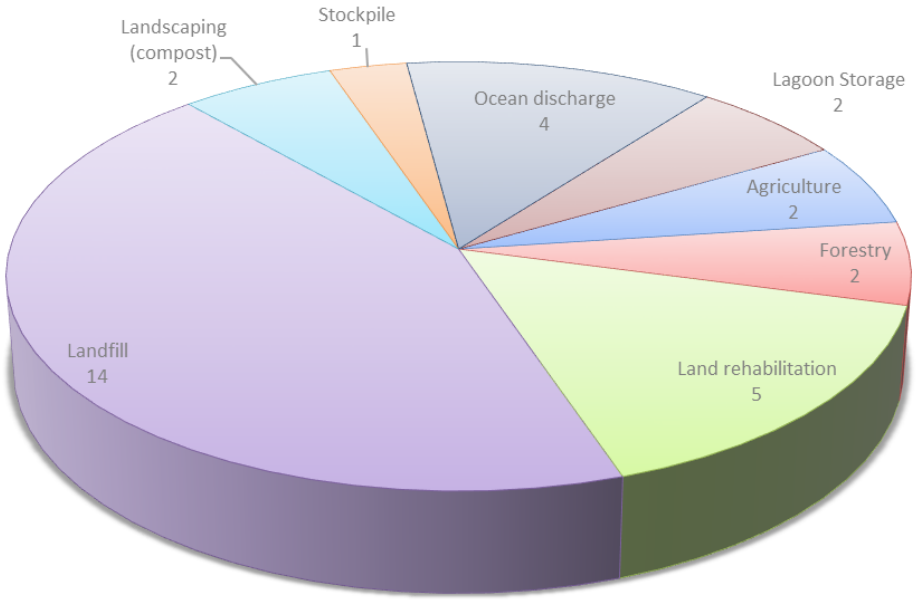

Figure 4-2 Biosolids end use (Number of WWTP Basis)

The total mass percentage of biosolids sent to landfill was 38% in 2019. This has reduced from the 78% of biosolids recorded as going to landfill in 2017. The percentage use for land rehabilitation has increased from 7% in 2017 to 47% in 2019. This is mainly due to the reclassification of the use of biosolids for landfill capping as rehabilitation rather than disposal to landfill. Mangere WWTP (New Zealand's largest WWTP) now has its biosolids classified as land rehabilitation due to the use of the biosolids for the restoration of a quarry on Puketutu Island. The variety of other biosolids end uses has also remained the consistent.

The Hastings, Napier, Gisborne and Greymouth WWTPs uses a lowly loaded biological trickling filter process where the excess cell biomass sludge is not separated but is discharged to the ocean along the treated wastewater flow. In Hastings, Napier, and Gisborne the discharge is through off-shore ocean outfalls and in Greymouth into the Grey River adjacent to the ocean. In all cases the environmental effects assessment and associated resource consents permit this discharge. In this assessment the mass associated with ocean discharge is discounted as it does not fit with the definition of a biosolid used in this context.

4.3 Stabilisation Grade

The stabilisation grade of biosolids in New Zealand is presented below[1]:

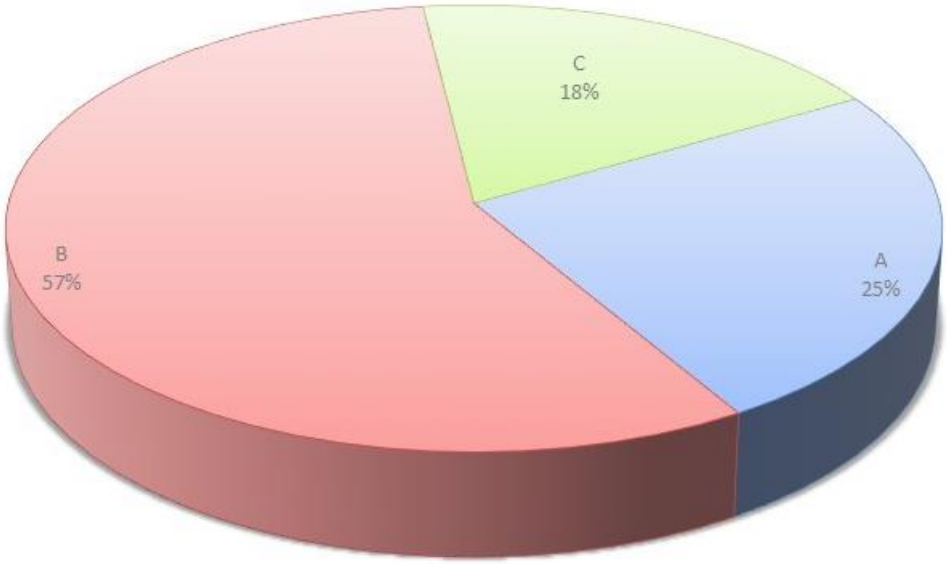

Figure 4-3 Biosolids Stabilisation Grade (Mass Basis)

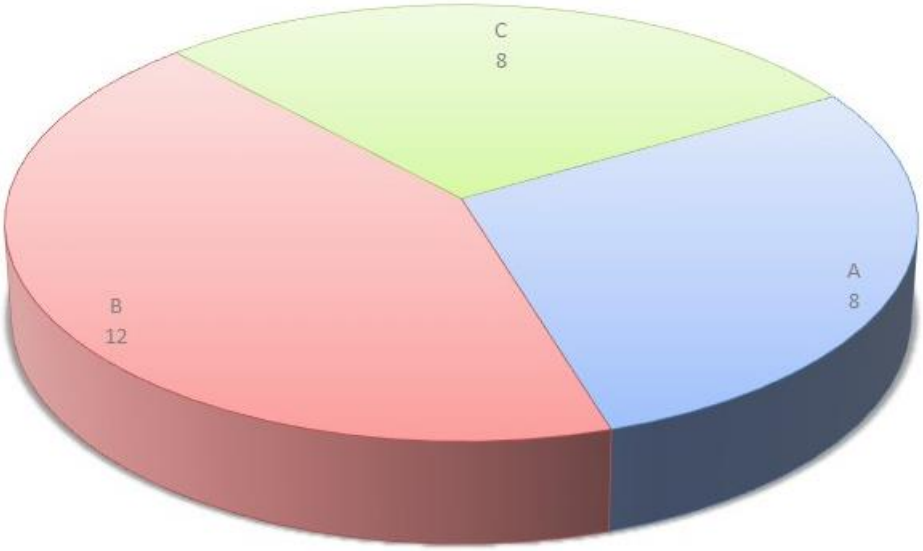

Figure 4-4 Biosolids Stabilisation Grade (Number of WWTP Basis)

The stabilisation grade of biosolids in New Zealand is still predominantly B, although the proportion has reduced from 70% to 57% between 2017 and 2019. This corresponds with a decrease in the number of WWTP with this grade biosolids and an increase in the number of Grade A and Grade C.

[1] Note C grade equates to Unstabilised

4.4 Stabilisation Process

The stabilisation process used for biosolids in New Zealand is presented below:

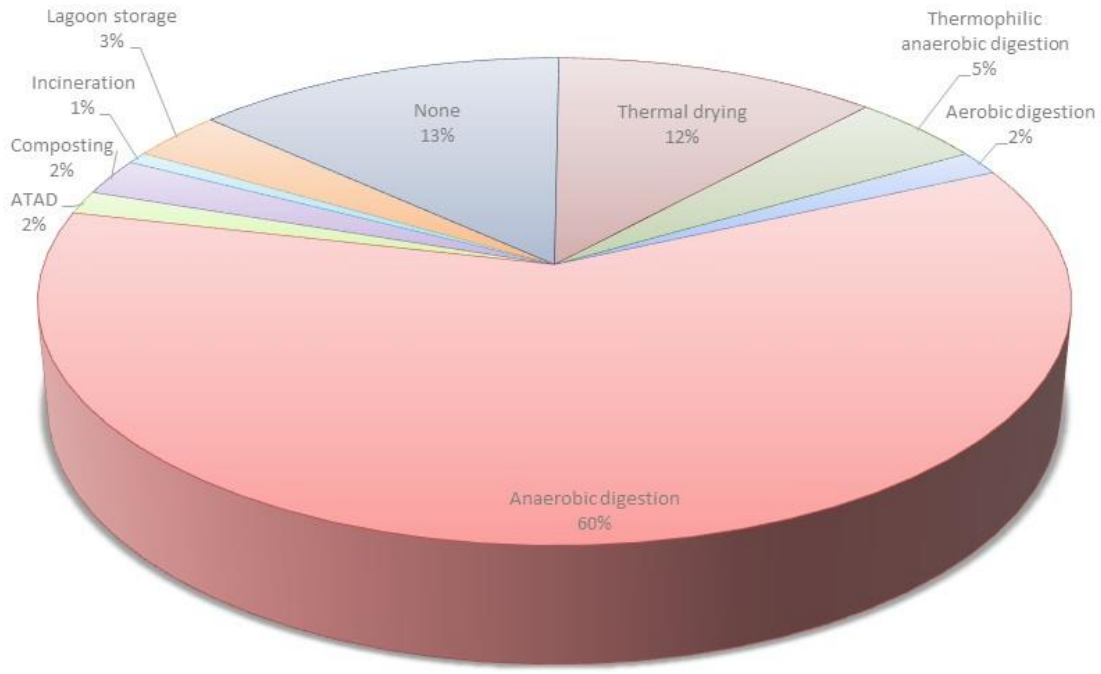

Figure 4-5 Biosolids Stabilisation Processes (Mass Basis)

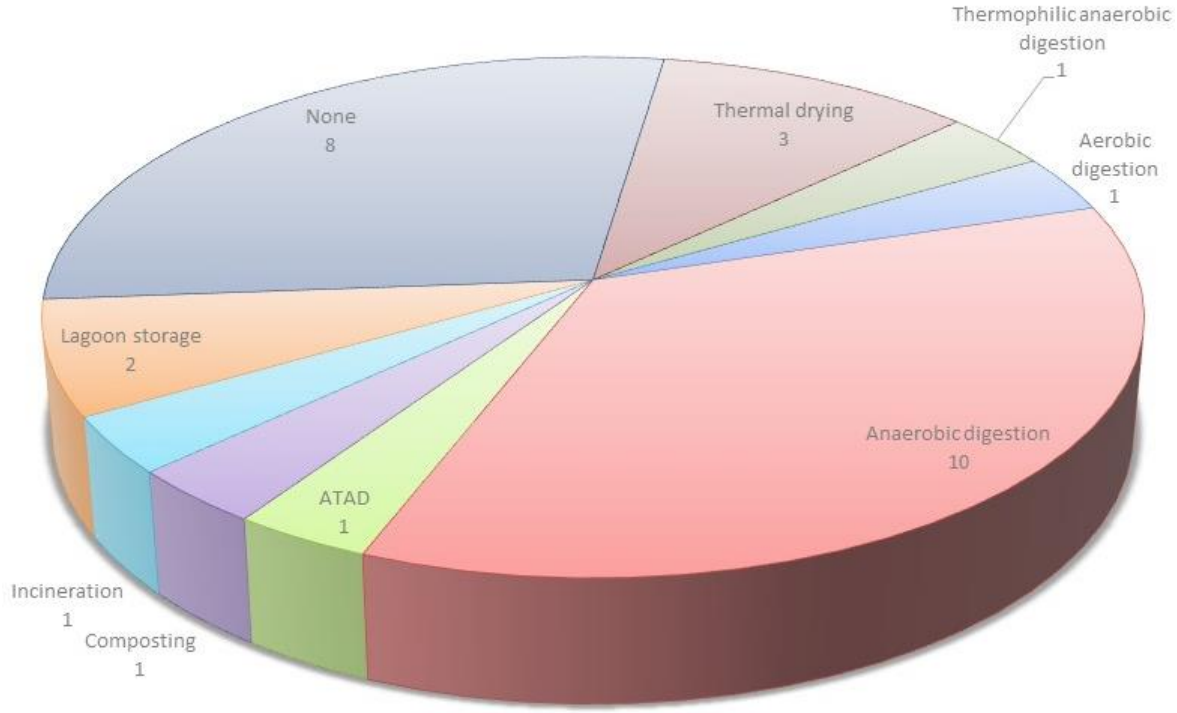

Figure 4-6 Biosolids Stabilisation Processes (Number of WWTP Basis)

The range of primary stabilisation processes used to treat biosolids in New Zealand has remained reasonably consistent with the 2017 survey.

4.5 Dewatering Process

The dewatering process used for biosolids in New Zealand is presented below:

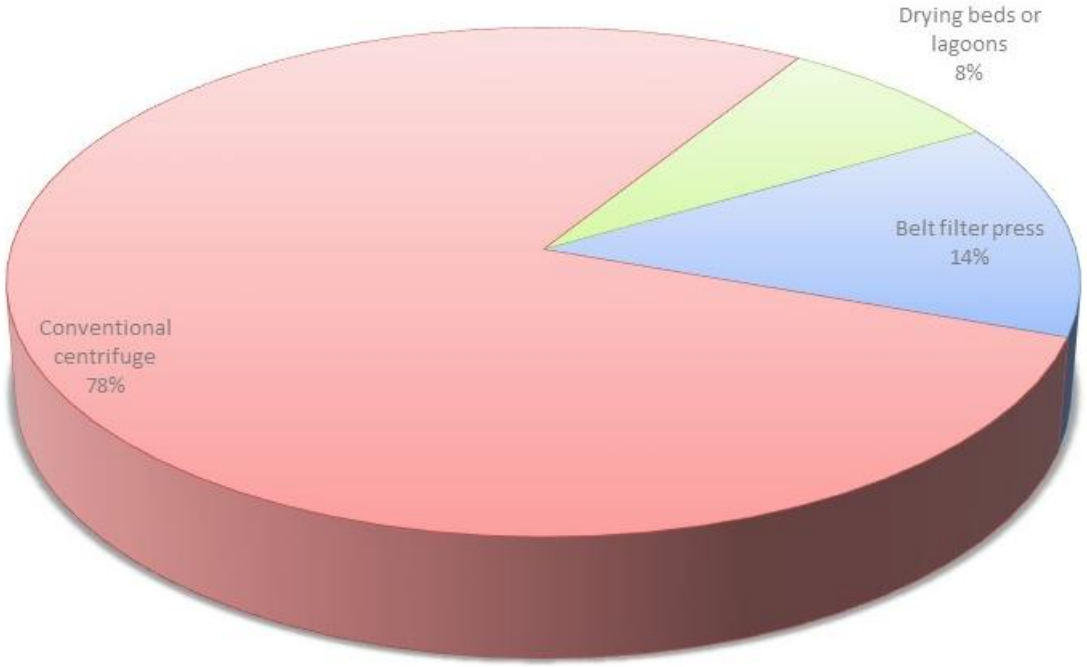

Figure 4-7 Biosolids Dewatering Processes (Mass Basis)

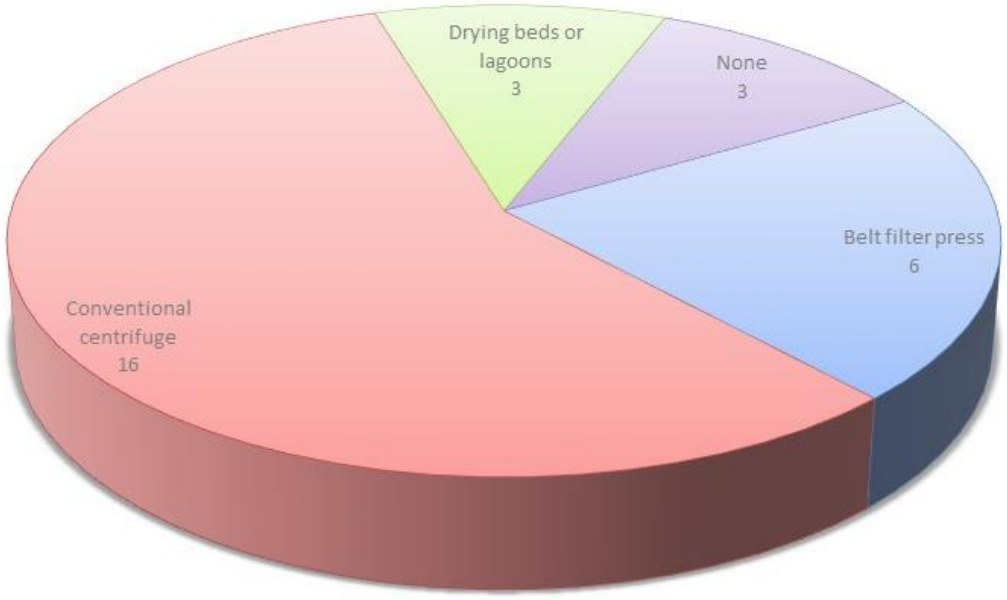

Figure 4-8 Biosolids Dewatering Processes (Number of WWTP Basis)

Dewatering processes have had little change from over time since the 2013 survey and have remained relatively constant.

Christchurch
Hazeldean Business Park, 6 Hazeldean Road
Addington, Christchurch 8024
PO Box 13-052, Armagh
Christchurch 8141
Tel +64 3 366 7449
Fax +64 3 366 7780

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