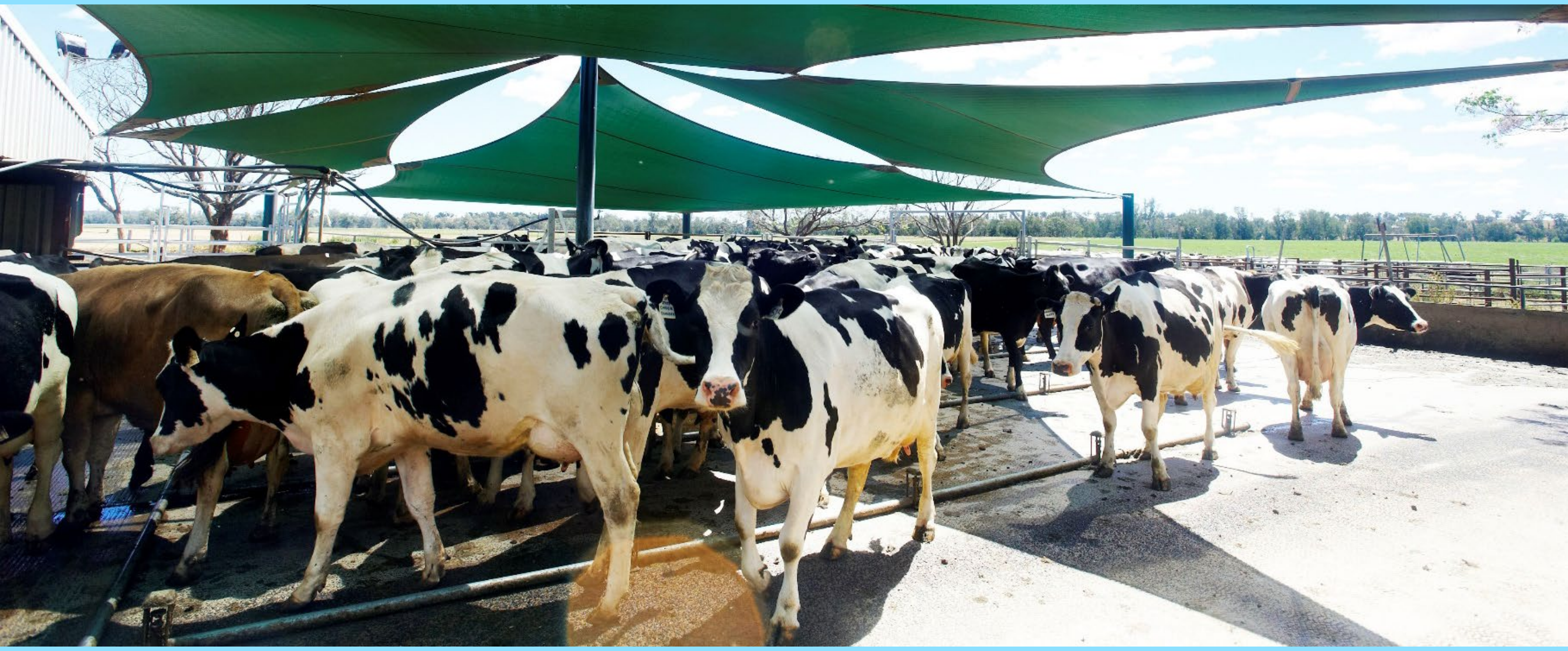

Local Government Air Quality Toolkit

Dairies guidance note

Information on good design and management practices to reduce air emissions from dairies

Acknowledgement of Country

Department of Climate Change, Energy, the Environment and Water acknowledges the Traditional Custodians of the lands where we work and live.

We pay our respects to Elders past, present and emerging.

This resource may contain images or names of deceased persons in photographs or historical content.

The Local Government Air Quality Toolkit has been developed by Department of Climate Change, Energy, the Environment and Water in collaboration with the NSW Environment Protection Authority, the NSW Department of Planning, Housing and Infrastructure, Local Government NSW and local councils.

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Environment Protection Authority and
Department of Climate Change,
Energy, the Environment and Water
Locked Bag 5022, Parramatta NSW 2124
Phone: +61 2 9995 5000 (switchboard)
Phone: 1300 361 967 (Environment and Heritage enquiries)
TTY users: phone 133 677, then ask for 1300 361 967
Speak and listen users: phone 1300 555 727, then ask for 1300 361 967
Email info@environment.nsw.gov.au
Website www.environment.nsw.gov.au

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Contents

List of figures

1. Introduction

1.1 Industry overview

This guidance note provides general information on good design and management practices to reduce air emissions from dairies. It does not cover water quality management, nutrient management, cattle health, occupational health and safety, or cattle productivity.

Dairies with the capacity to accommodate more than 800 animals used for the production of milk in free stall complexes, feed pads, loading pads, milking sheds or stand-off areas are scheduled activities under the *Protection of the Environment Operations Act 1997* (the POEO Act), being 'livestock intensive activities'. Scheduled activities require an environment protection licence and the NSW Environment Protection Authority (EPA) is the appropriate regulatory authority (ARA) for the purposes of the POEO Act.

Local government is the ARA for dairies with capacity to accommodate fewer than 800 animals used for milk production.

Local councils can influence the initial siting of all intensive agricultural industries through land-use planning and the development approval process. This is usually the most important decision on air quality management.

The environmental management and resolution of any air pollution-based nuisance or off-site impacts caused by odour and dust from dairies are the responsibility of the site operator. Dairy production systems in New South Wales are either conventional grazing, free stall or feed pad. Free stall systems can increase milk production by providing dairy cows with protection from summer sun and winter mud while feeding, but there are not many free stall systems in New South Wales.

Conventional grazing dairy farms are by far the most common (Figure 1).

Most dairies are regulated by local government under the POEO Act (Dairy Australia 2023a, 2023b).

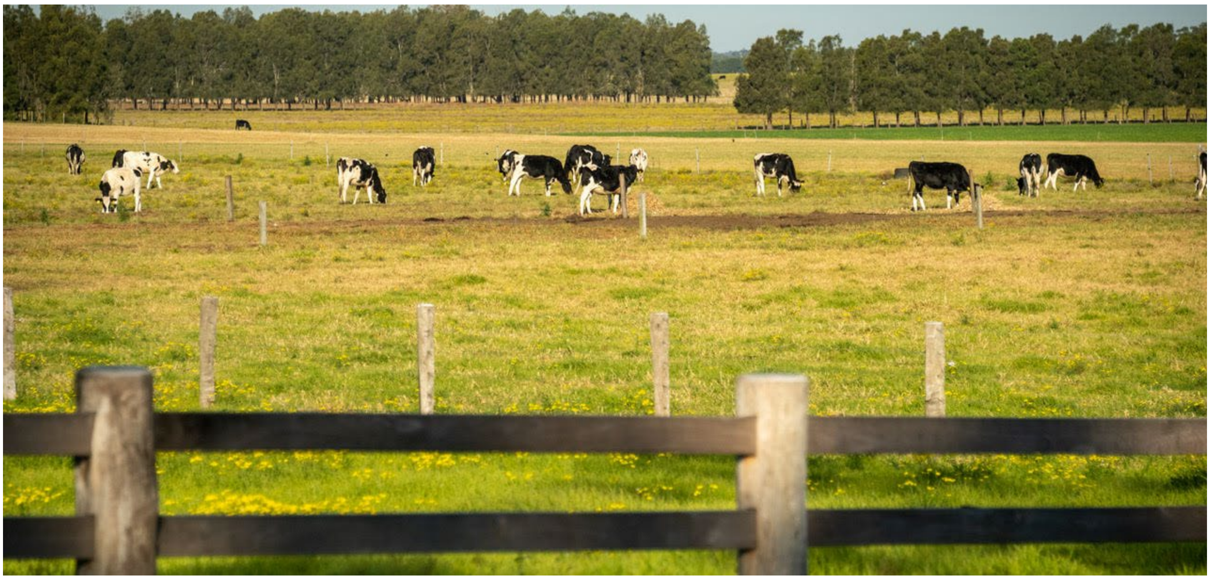

Figure 1 **A conventional grazing dairy farm**

Source: Jane Barnett/Zephyr Environmental

Pasture-based farms are the norm, with feedlot dairying being relatively uncommon in Australia.

Supplementary feeds such as hay, silage and grains are widely used. There are also a few goat and sheep farms that produce sheep or goat's milk, specialty cheeses and yoghurts.

1.2 Facility structure and design

Conventional grazing systems

In conventional grazing systems, the cows graze during the day, and move to the shed morning and night for milking. Effluent is created as the milking shed floor is flushed with water (after each milking) to remove manure, urine and any spilt milk. This effluent usually runs into a small basin, where suspended solid material settles. From here the effluent drains to a holding pond, where it is treated. It remains there until it is used for irrigation.

Free stall systems

Free stall systems accommodate the cows in stalls within sheds or barns (Figure 2). Through the centre of the barn is a laneway, where feeding takes place. Along each wall of the barn are drains that flush the manure and urine that accumulates.

These drains lead to sediment traps, where suspended solids settle, and the effluent then drains through to holding ponds.

Feed pad systems (Figure 3)

In a feed pad dairy system the cows are fed a prepared ration, similar to a feedlot but with a greater roughage or silage component. The cows then move to a shed for milking. This system is like conventional grazing. The only difference is the cows' diet is partially or fully supplemented by the farmer, in addition to, or instead of grazing pastures.

Feed pads can be a source of effluent run-off, dust and odour, and need to be managed accordingly. Odour and dust issues can occur, particularly in feeding areas and where manure collects.

Seasonal weather variation means that farmers are often faced with either too much or too little moisture, leading to either boggy or dusty conditions. However, there are several management practices that can help reduce potential issues.

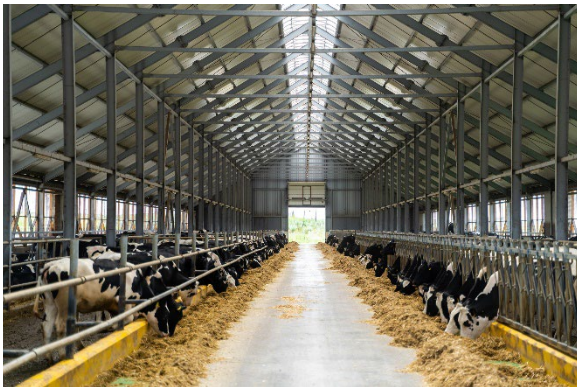

Figure 2 **Free stall dairy**
Source: Vadym Terelyuk/iStock

Figure 3 **Cows using a feed pad**
Source: AzmanL/iStock

2. Potential emissions to air

2.1 Overview

All air pollutants should be considered during the planning process and addressed within consent conditions, where relevant. The site operator is responsible for compliance with all consent conditions. The main air emissions relevant to dairy farms are odour and, to a lesser extent, dust. However, compared to other intensive animal industries, conventional pasture-fed dairy farms are not usually identified as major air emission sources.

Figure 4 represents the process through different dairy designs and the potential air quality issues associated with each stage of production.

2.2 Odour

Odours at dairies arise from:

- accumulated manure in the milking sheds, laneways and holding areas
- feed storage and spillage
- run-off / effluent collection and treatment (ponds)
- storage and processing of solids
- land application of effluent and solids
- disposal of carcasses.

2.3 Dust

Dust from dairies arises from:

- movement of animals in milking sheds, laneways and holding areas, particularly when conditions are dry
- storage and processing of solids
- land application of effluent and solids
- disposal of carcasses.

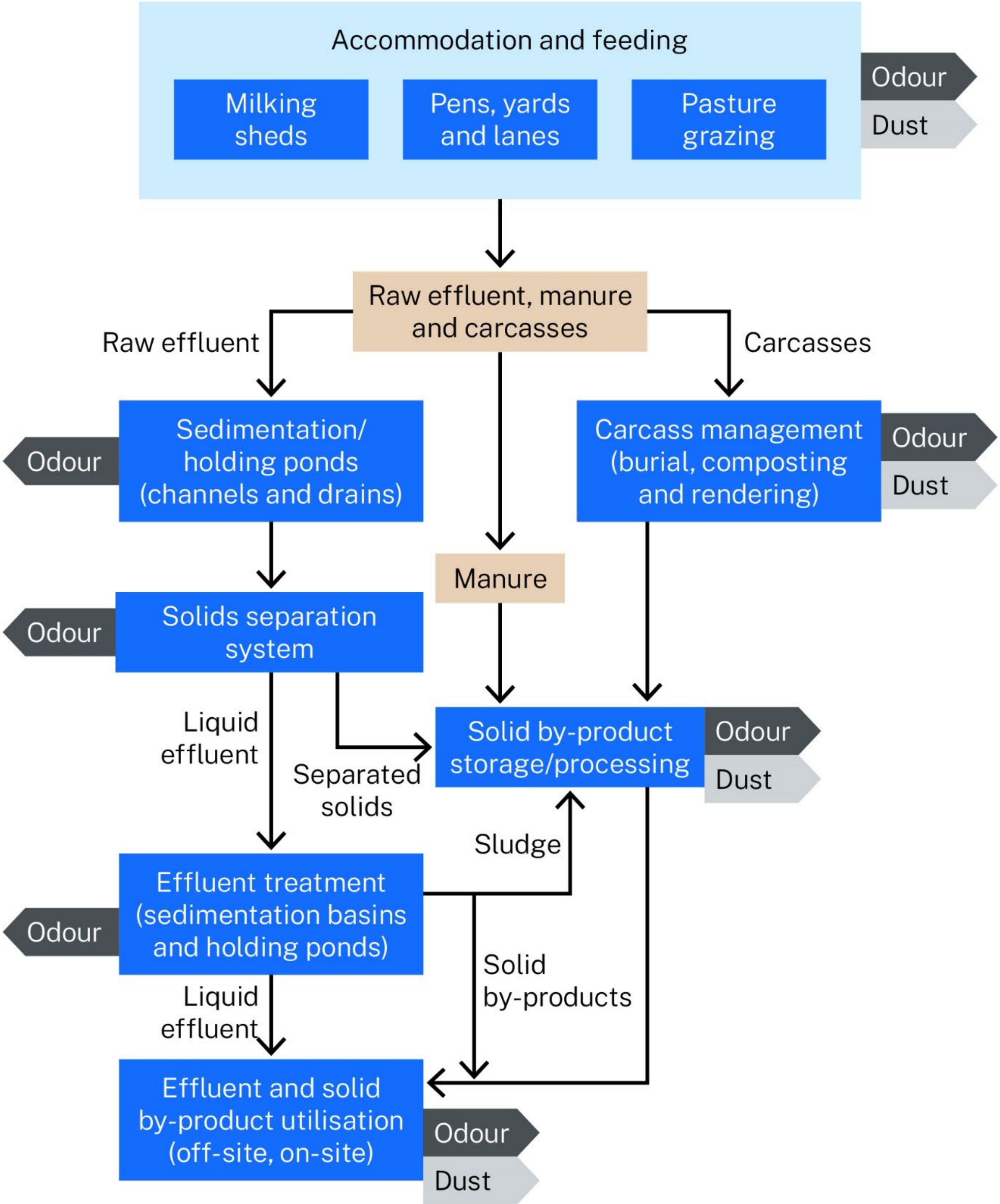

Figure 4 **Dairy process diagram showing air quality issues for each stage**

3. Managing air pollution

Control mechanisms that dairy operators can use to minimise air pollution are limited where:

- anaerobic processes are necessarily involved (the processes by which bacteria break down organic matter in the absence of oxygen, usually when material is moist and wet)
- large odorous surface areas are exposed (e.g. holding areas, collection ponds, solids storage).

Management that promotes aerobic breakdown or complete anaerobic breakdown of manure results in less odour.

The following sections outline a range of mitigation methods and best practice measures that operators can employ to reduce their air emissions and environmental impact.

3.1 Location of dairies

As noted in Section 1.1, local councils can influence the initial siting of a dairy through the development approval process. Siting the operation well by considering its proximity to sensitive neighbours is critical, because dispersion is the main method of managing off-site impacts of both odour and dust.[1]

Smaller-sized dairies are likely to be regulated by local government and are located in areas where the activity is well established. Newer, larger dairies are usually in areas relatively remote from urban settlement.

The use of appropriate separation or buffer distances is a widely recognised method of mitigating off-site odour impacts. The fundamental principle is that fugitive odour and dust emissions tend to radiate out from a source and are diluted along the way.[2]

Controlling such air emissions with pollution control equipment is not feasible for the large areas / air volumes involved, so separation distance is the most practical means of dispersion. Thorough assessment at the approval stage is therefore very important.

The *Environmental management guidelines for the dairy industry* (DPI 2008) identify minimum separation distances that apply generally in New South Wales. These distances should be used as a starting point and guide only. For example, the guidance document suggests a minimum separation distance of 200 m from the livestock complex to a neighbouring rural residence. The separation distance must be calculated using the *Technical Framework: Assessment and management of odour from stationary sources in NSW* (DEC 2006a) and the accompanying *Technical Notes: Assessment and management of odour from stationary sources in NSW* (DEC 2006b), and the greater of the 2 distances applied.

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[1] The fundamentals of dispersion and how this affects air quality are discussed in the Local Government Air Quality Toolkit – Module 3, *Air pollution control techniques*.

[2] Fugitive emissions are uncontrolled emissions that do not arise from controlled point sources, such as vents, stacks, ducts and exhausts. They typically arise from evaporation, windblown or mechanical disturbances. It is usually impractical or impossible to capture or contain such emissions – hence they are termed ‘fugitive’.

The *Technical Framework* and the *Technical Notes* outline the Level 1, or screening, assessment procedure for large diffuse sources such as dairies. This is to determine whether a facility is likely to cause odour impacts, primarily based on a calculation for optimum separation distance for the number of cattle at that facility.

The *Technical Notes* show the equation for calculating this separation distance (D) as follows:

$D = \sqrt{N} \times S$

N = Number of standard cattle units (SCU)

S = Composite site factor (S1 x S2 x S3 x S4 x S5)

Standard cattle units

Dairies may have a range of cattle types, with varying weights, and so the number of SCU can be calculated by using the data included in Table 7.1 of the *Technical Notes*. It allows the manure and odour potential of different weight cattle to be derived from SCU.

The composite site factors are determined according to site-specific information relating to:

- stocking density
- facility class
- receptor
- terrain/vegetation
- wind factor.

Each of these factors is described in detail in the *Technical Notes*, however a worked example is provided below.

Worked example

Scenario: A new 500 head dairy is proposed in an area with 600 mm annual rainfall, has a feed pad stocking density of 15 m^2 per cow, is near a rural residence, on an undulating site with crops only and low frequency winds toward the receptor. The average cattle weight is 650 kg.

Calculation of SCU

Number of SCU (Table 7.1 of *Technical Notes*) = 500 x 1.06 = 530 SCU

Site data

S factor	Value	Feature	Reference in *Technical Notes*
S1	127	–	Table 7.2a
S2	0.3	Rural farm residence	Table 7.3
S3	0.9	Undulating terrain	Table 7.4
S4	1.0	Crops only, no tree cover	Table 7.5
S5	0.7	Low frequency of winds towards receptor	Table 7.6

Equations

$S = S1 \times S2 \times S3 \times S4 \times S5$

$D = \sqrt{N} \times S$

Calculations

The minimum distance from a rural residence is:

$\sqrt{530} \times 127 \times 0.3 \times 0.9 \times 1.0 \times 0.7 = 553$ m

Two dairies considered as one dairy

For calculating the separation distance to a receptor, the 2 dairies can be considered as one single dairy if they are closer than half the shortest separation distance from each dairy to the receptor.

For example, if 2 dairies have individual separation distances of 400 m and 600 m from a receptor, they will be assumed to be one dairy for the purpose of calculating separation distances if they are closer than 200 m from one another. If the dairies are further apart than 200 m, they will be treated as separate dairies.

Two dairies considered separately

Where the 2 dairies are considered as separate entities, a 20% increase in separation distance may apply to the proposed second dairy. For each dairy:

1. add 20% to the required separation distance
2. consider this distance as the radius of a 'separation zone'
3. determine whether the 2 zones overlap.

If the zones overlap, the added 20% applies to the separation distance of the second dairy. If the zones don't overlap, the 'normal' separation distance applies and the separation distance of the existing dairy is not affected for its current level of operation.

Figure 5 is a visual representation of this method.

As noted previously, this is a screening method to understand if impacts on local receptors may occur. The screening assessment should present all the information used to calculate the separation distances as well as justification for all inputs.

The screening methodology is by nature conservative. Therefore, where sensitive receptors are sufficiently removed to fall outside the calculated separation distance, the likelihood of impacts is low and no further odour assessment is needed.

However, when receptors fall within this zone, dispersion modelling may be needed to refine the assessment further. For requirements and considerations for modelling, see Section 4.3 of this guidance note.

Each assessment should be site-specific and determined on a case-by-case basis whether it is appropriate to use a separate distance calculation and/or air modelling.

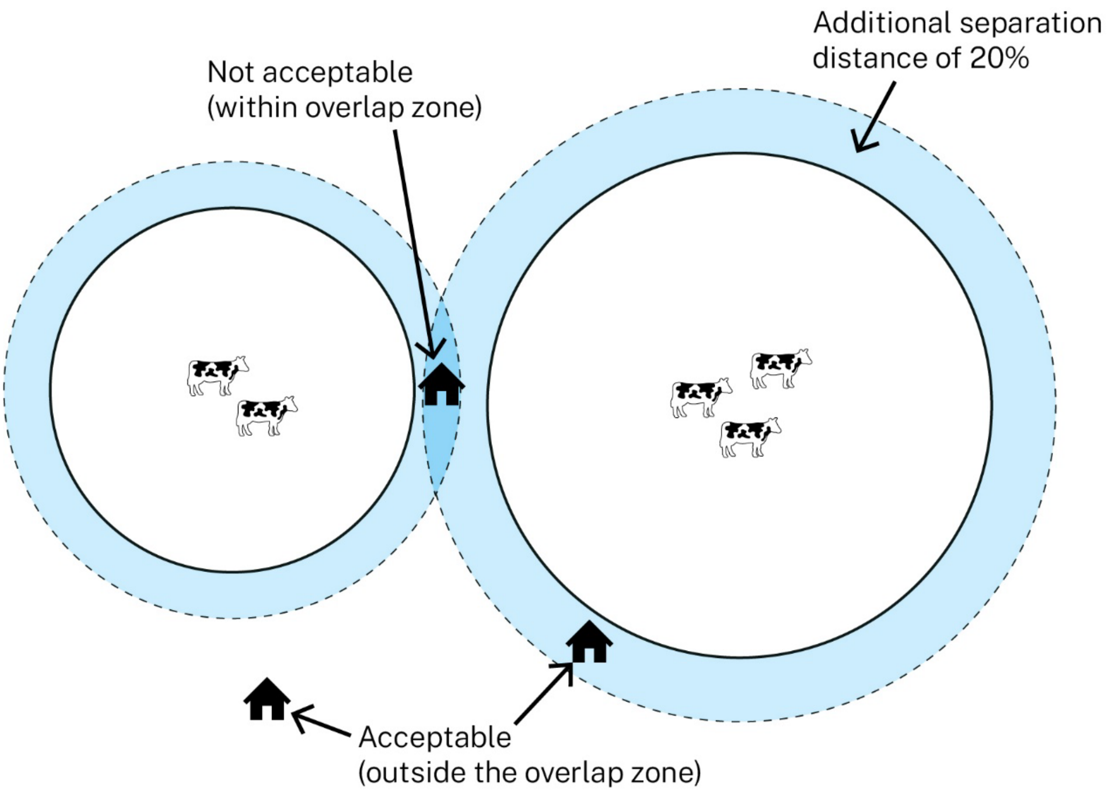

Figure 5 **Separation distance when 2 dairies are considered separately**
Source: adapted from DEC 2006b

3.2 Managing odour

Some of the measures that can be adopted to minimise odour emissions, and that may be adopted within consent conditions at the site development planning and approval stage, are detailed below.

Milking shed, yard and laneway surfaces

Measures that can be adopted to minimise emission of odour from surfaces accommodating cows include:

- cleaning sheds of manure and spilt feed after every milking
- making sure yards, laneways and feeding areas are well drained. This can be achieved by:
  - surfaces with low permeability
  - slope of 2–5% to ensure run-off; the wetter the locality, the greater the slope needed
  - run-off directed away from yards or feed areas
- maintaining water troughs to prevent wet patches in yards and feeding areas:
  - avoiding leaky watering points
  - providing good drainage
- designing cow accommodation sheds so they have proper orientation (with openings away from prevailing winds and upwind of receptors) and good ventilation.

Figure 6 **Good sloping ground from the pens towards the effluent dam downhill**
Source: Jane Barnett/Zephyr Environmental

Figure 7 **Effluent dam at the base of the sloping ground**
Source: Jane Barnett/Zephyr Environmental

Managing feed storage

Measures that can be adopted to minimise odour emissions from feed storage facilities include:

- controlling moisture content
- aeration
- controlling temperature.

Chapter 30 of the Feedlot Design Manual (Watts et al. 2016) notes that standard grain grades with moisture contents of 13–18% do not usually cause problems flowing freely through storage silos, but high moisture content grain can lead to material flow issues. Moisture content of the grain can change with the environment in which it is stored and this should be monitored to help ensure the overall condition of the grain.

Temperature is also important in conjunction with moisture content. As the temperature rises, the safe level of moisture in the grain must be reduced for good quality storage. Keeping these 2 in balance helps feed flow remain consistent, reducing clogging and the build-up of odour. Watts et al. (2016) provide more advice on optimising these.

Silage pits can also generate nuisance odours and need to be sufficiently separated from receptors.[3]

The key issue for odour emissions from feed distribution is feed wastage. To help avoid this, feed supply needs to be matched to cattle requirements.

Handling and treating run-off

While handling and treating run-off is predominantly a water quality management activity, there are significant implications for odour generation associated with this activity. For this reason, good practice measures are discussed below.

Drains convey manure from the milking shed, holding yard, free stall barn or feed pads to a treatment and holding system.

Drains collect run-off from areas within a dairy (predominantly pen surfaces and roads) and transport it to the effluent treatment system. The lengths of drains and the catchment area serviced by each drain vary with the dairy layout.

The effluent treatment system at most dairies consists of a sediment trap (basin) and holding ponds. Sediment traps capture solids before the effluent is discharged to the holding ponds. Holding ponds are used to treat effluent before it is used for irrigation or as flushing water in the holding yard.

Measures to manage odour from run-off treatment and handling are outlined below.

Drain design and management

- Adequate slope is required (generally 0.5%).
- Appropriate surface for self-cleaning drains (to prevent scouring).
- Drains should be kept free of manure.

[3] Silage is a type of fodder made from green foliage crops that have been preserved by fermentation to the point of acidification.

Sediment trap design

Important factors to consider:

- weir design
- trap volume
- vehicle access for solids removal
- use of parallel sediment traps, allowing one to dry out while using another.

Sediment trap operation

Important factors to consider:

- weir maintenance
- regular removal of solids to avoid blockage of flow
- maintaining the inflow area.

Holding pond design

Important factors to consider:

- volume – adequate capacity to treat incoming effluent
- volume changes after an inflow event
- using parallel ponds, to alternate de-sludging and treatment.

Holding pond management

An ongoing maintenance program is important for assessing potential problems and enabling them to be rectified before they eventuate. Important factors to consider:

- retaining some effluent in the holding ponds at all times, providing there is sufficient capacity to prevent overtopping during inflow events
- de-sludging of ponds with sufficient frequency to ensure pond capacity for liquid storage is not reduced
- where pond capacity is inadequate, the following options are available to increase the pond treatment volume:
  - increase frequency of de-sludging
  - improve solids separation before discharge to the effluent treatment pond
  - install a second treatment pond in parallel, requiring diversion of some of the untreated effluent into the new pond.

Sludge removal using a vacuum tanker (Figure 8)

Important factors to consider when using a vacuum tanker to remove sludge:

- ensure this causes minimal disturbance of the pond
- the activity requires having sufficient land close to the pond for immediate spreading
- this involves safety hazards for workers due to the extreme toxicity of the hydrogen sulfide gas that can be released when handling sludge; appropriate health and safety precautions must be followed. Refer to the SafeWork NSW *Exposure of workers to hydrogen sulphide gas safety alert* (SafeWork NSW 2018) and Safe Work Australia confined spaces code of practice (Safe Work Australia 2011).

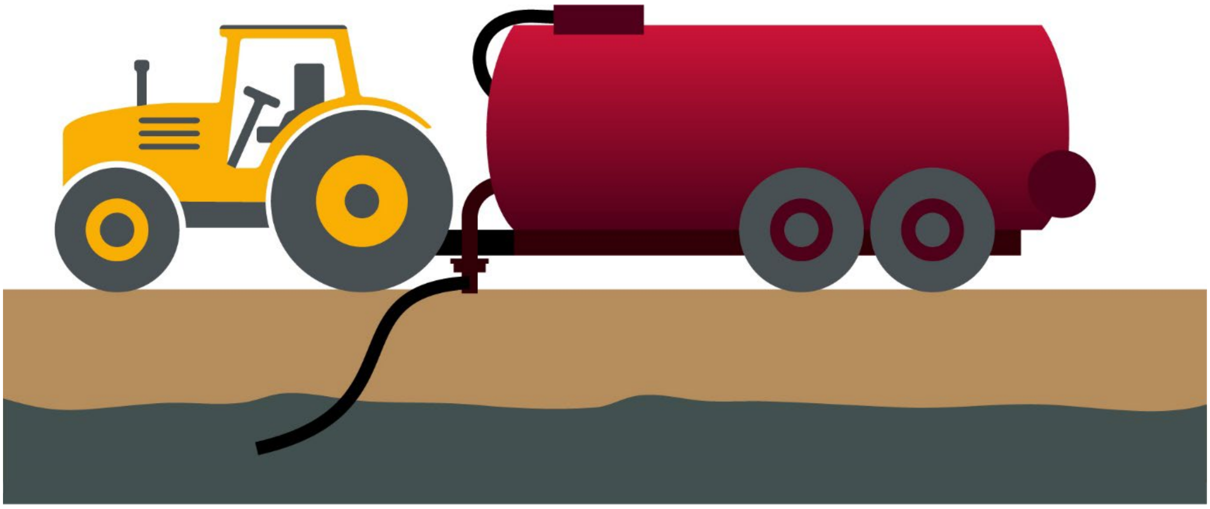

Figure 8 **Sludge removal using a vacuum tanker**

Sludge removal using an excavator (Figure 9)

When using an excavator for this process it is important to consider:

- this method completely empties the pond and may disturb the pond lining
- the sludge is likely to be an odour source when wet and may take time to dry
- de-sludging should be done in dry weather only.

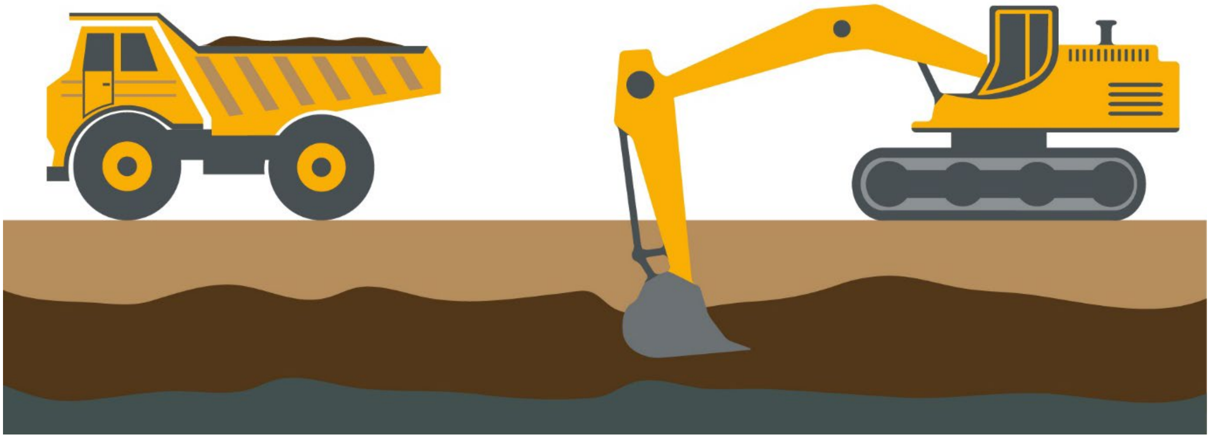

Figure 9 **Sludge removal using an excavator**

Sludge removal by agitating and pumping (Figure 10)

- Agitating the sludge and pumping it out also causes a large disturbance to the pond volume.
- Sufficient land must be available close to the pond for applying the sludge mix.

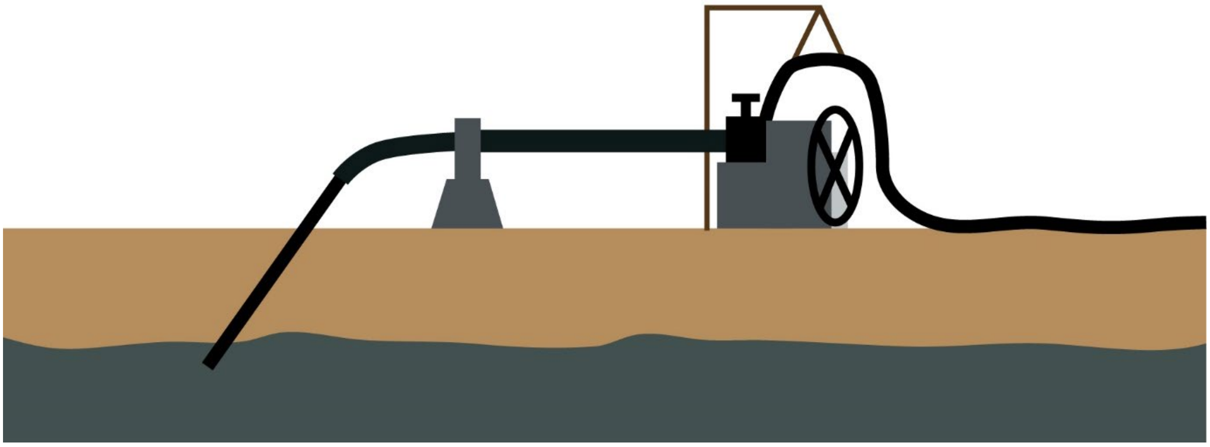

Figure 10 **Sludge removal using pumps**

Land application of effluent

Dairy effluent (waste solids) is usually reused through irrigation to land as fertiliser. Effluent irrigation is encouraged when it is safe and practical to do so and where it provides the best environmental outcome (DEC 2004). In most instances, the effluent is applied to each area in small quantities. Prior to reuse via application to land, the current orders and exemptions should be reviewed to ensure conditions are met (see EPA 2014a, 2014b).

When effluent is applied to land, the key management factors influencing odour are:

- quantity of material remaining on the soil surface after application
- odour potential of the material applied
- avoiding application onto wet soil
- prevailing and forecast weather conditions and the location of the land application relative to receptors – avoid spreading in calm conditions (early morning, late afternoon) when dispersion is likely to be poorer, and make sure receptors are upwind
- avoiding weekend application if local odour impacts are likely
- irrigation method suits the site and management
- level of treatment achieved – effluents should be aerobic if applied by spray
- quantity of air emissions formed during application.

> The potential for air emissions to impact on receptors depends largely on the proximity of receptors to the application area and the dispersion conditions at the time of application.

Odour emissions are influenced by the method of application and how the application is managed. Effluent application methods include:

- spray irrigators (Figure 11) – low pressure systems produce less airborne contaminants than high pressure systems
- surface drip or trickle (surface or subsurface) irrigation – produces less air emissions than spray irrigation but is often not a practical alternative
- tanker spreading (Figure 12) – distributes effluent evenly and produces less air pollution

- travelling drip irrigators – distribute effluent evenly and produce less air pollution
- direct (deep) injection – minimises odour
- open pipe – is a poor option; while spreading effluent directly from the pipe produces fewer airborne contaminants it spreads effluent very unevenly, which can result in pooling
- irrigation with droppers.

Figure 11 Effluent irrigator
Source: Lakeview Images/iStock

Figure 12 Tanker spreading of effluent
Source: Andrew Linscott/iStock

Solid waste handling and land application

- Odour emissions can be minimised by maintaining a dry surface and preventing water-logging of materials.
- Solid by-products should be formed into piles where possible.
- Piles should be established on a low-permeability, slightly sloping surface.
- Operations disturbing stockpiled material should be undertaken away from neighbouring receptors and during the middle of the day as much as possible, when weather conditions are most likely to disperse any odour.
- Solid wastes (manure, settled solids from sedimentation and treatment ponds, carcasses, spilt feed and grain dust) should be treated as soon as possible after collection.

Downwind odour

Downwind odour concentrations are influenced by the timing of operations that disturb stockpiled materials (e.g. shifting piles or spreading material).

Anaerobic activity in solid waste

Anaerobic activity (processes by which bacteria break down organic matter in the absence of oxygen) in solid wastes can be avoided by composting the material, but this requires extra management and access to appropriate equipment.

Important factors to consider:

- moisture levels, degree of aeration and other factors influence the odour emissions
- a delay between collection and treatment of solid by-products influences odour emissions.

Composting Animal Manures: A guide to the process and management of animal manure compost (Keena 2022) provides general information on this process.

Treatment of carcasses

Common treatments for carcasses include composting, rendering or burial. Information on best-practice procedures for different treatment options can be found in the *Animal carcass disposal* fact sheet (DPI 2021).

Composting

Carcasses are readily composted, but the volume of material used to cover the carcass is important for controlling odour emissions. Information specific to composting animal carcasses can be found in the *Animal carcass disposal* fact sheet (DPI 2021).

Regarding composting, the size of the operation and type of waste will determine whether the scheduled activity of 'composting' under the POEO Act is being carried out at the facility or whether a non-scheduled activity is being carried out, and therefore who the ARA is. This is detailed in Chapter 4 of this guidance note.

Rendering

Rendering carcasses is suitable disposal method for producers located near a rendering plant.

Burial

For carcasses that are buried, odour emissions are influenced by the amount of soil cover over the carcasses. Information on burial pits depths and soil cover is in the *Animal carcass disposal* fact sheet (DPI 2021).

Incineration and burning

Incineration is rarely feasible on a farm and burning is not advisable as it releases smoke, odour and potentially biohazardous material into the air. Burning may only be permissible in response to a disease outbreak or a mass mortality incident.

Treating odour emissions

Solid by-products should be treated as soon as possible after collection to minimise odour.

Where by-products are stored, temperature and exposure to wind and water should be minimised as much as possible.

A good depth of soil or compost substrate should cover carcasses (2 m minimum) and surface water run-off should not be able to enter the area.

3.3 Managing dust

Dust emissions from dairies are unlikely to cause impacts unless receptors are close to operations, or conditions are exceptionally dry. Consent conditions will most likely relate to odour rather than dust as dust can generally be controlled with good management practices for heavy vehicle movement, windblown dust from large exposed dry areas, feed storage, processing and handling, and spreading of manure.

Issues to be aware of regarding dust management:

- Dispersion conditions (separation from sensitive sources) that are adequate to manage off-site odour impacts will usually also be adequate to manage off-site dust impacts.
- Moisture content and particle size of materials can be important. Manure, grain dust and composted material contain fine particles that contribute to dust emissions when these materials are dry, and can be blown over large distances when they become airborne, particularly on windy days.

- Dust can arise from the feedstuffs and feed infrastructure used. Attention should be paid to:
  - design and management of storage and feed processing areas and enclosing them if necessary
  - siting storage and feed processing areas away from sensitive receptors
  - reducing drop heights from silos to delivery equipment.
- Dust can be generated from cows' movement over extremely dry ground. Over time the ground may become dusty and cause a problem.
- Constructing roads with low silt-content materials (such as gravel) can reduce wheel generated dust.
- The quantity of dust carried off site can be reduced by installing windbreaks, such as vegetative screens or hessian walls, or by wetting dusty material.
- Water sprays can settle dust and consolidate dusty surfaces but will not be feasible in many dairy situations as they introduce more water to the site, requiring efficient drainage.
- Timing and management of any operations involving the movement of dusty materials is critical. For example, moving dusty material during periods of high winds is not desirable.

4. Considerations for local councils

4.1 Scheduled or non-scheduled activity

As discussed previously, an activity carried out at a facility is designated as scheduled or non-scheduled under the POEO Act depending on its size and the processes being undertaken at the site.

If the activity is a scheduled activity then the EPA is the ARA. Schedule 1, Part 1 of the POEO Act provides a definition of the scheduled activity of *Livestock intensive activities* and specifically *dairy animal accommodation*.

Clause 22 Livestock intensive activities

1. This clause applies to the following activities—

   dairy animal accommodation, meaning accommodation—

   a. of animals used for the production of milk (dairy animals), and
   b. in free stall complexes, feed pads, loading pads, milking sheds or stand-off areas, but not in pasture, calving areas or calving sheds.
2. Each activity referred to in Column 1 of the Table to this clause is declared to be a scheduled activity if it meets the criteria set out in Column 2 of that Table.

Column 1 Activity	Column 2 Criteria
dairy animal accommodation	capacity to accommodate more than 800 dairy animals at any time

If the activity is non-scheduled then the local council is the ARA for the purposes of the POEO Act and can also direct the operators to ensure that the activity is carried on in an environmentally satisfactory manner and in accordance with best practice.

Existing problems can be addressed using 2 sets of regulatory tools:

- orders requiring compliance with consent conditions under Division 9.3 and Schedule 5 of the *Environmental Planning and Assessment Act 1979* (the EP&A Act)
- environment protection notices under Chapter 4 of the POEO Act (see Local Government Air Quality Toolkit – Module 2 and Module 4), including:
  - a prevention notice (Part 4.3) or series of notices, where the ARA suspects the activity is being carried out in an environmentally unsatisfactory manner
  - a clean-up notice (Part 4.2), where there is a pollution incident within the meaning of the POEO Act
  - both a prevention notice and a clean-up notice.

If issues are identified, the following tools are available in the Local Government Air Quality Toolkit – *Resource pack*:

- Chapter 3 – checklists for investigating odour, fallout (dust deposition) or other complaints
- Chapter 6 – checklists for reviewing air quality assessments and dispersion modelling.

Under the POEO Act notice provisions, local councils are empowered to direct a recipient to take clean-up action or preventative action, for example, requiring studies to be carried out by the operation's management. Time spent making sure the brief for any investigation is thorough and covers all the relevant aspects raised in this guideline, is time well spent – for the management, for local council and for the neighbours and wider community.

Composting and the POEO Act Schedule 1

Composting on site is permitted, providing there is development consent for this activity and relevant guidelines, protocols and legislation are complied with. For example, responsibilities under biosecurity legislation are met and composting ensures adequate pasteurisation to manage pathogen and weed risks.

Compost generated exclusively from on-site organics does not trigger the licensing thresholds for the scheduled activity of 'composting' under clause 12 of Schedule 1 of the POEO Act. This includes disposal of carcasses generated exclusively on site via alternative methods not captured under Schedule 1, such as pit burial.

Receipt of carcasses from off site for burial, composting or similar that are above prescribed thresholds would trigger licensing requirements.

Licensing requirements for composting are only triggered when the organic materials are received from off site and are above the thresholds set out in Schedule 1 of the POEO Act.

The composting thresholds may vary depending on the location of the receiving site and whether the organics received are classified as putrescible or non-putrescible. For further details please refer to clause 12 of Schedule 1 of the POEO Act (excerpt below) and clause 50 of Schedule 1 of the POEO Act for definitions of the terms 'organics' (including 'putrescible organics' and 'non-putrescible organics') and 'regulated area'.

Schedule 1, Part 1, clause 12 – Composting

1. This clause applies to composting, meaning the aerobic or anaerobic biological conversion of organics into humus-like products—
   a. by methods such as bioconversion, biodigestion or vermiculture, or
   b. by size reduction of organics by shredding, chipping, mulching or grinding.
2. The activity to which this clause applies is declared to be a scheduled activity if –
   a. where it takes place inside the regulated area, or takes place outside the regulated area but receives organics from inside the regulated area (whether or not it also receives organics from outside the regulated area)—
      i. it has on site at any time more than 200 tonnes of organics received from off site, or
      ii. it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics, or
   b. where it takes place outside the regulated area and does not receive organics from inside the regulated area—
      i. it has on site at any time more than 2,000 tonnes of organics received from off site, or
      ii. it receives from off site more than 5,000 tonnes per year of non-putrescible organics or more than 200 tonnes per year of putrescible organics.

3. For the purposes of this clause, 1 cubic metre of organics is taken to weigh 0.5 tonnes.

Consideration should be given to existing non-scheduled activities that may be approaching the production limits outlined above.

Composts containing animal carcasses cannot be supplied for use off site (i.e. outside the premises where the compost was generated) unless a site has obtained a specific resource recovery order and resource recovery exemption from the EPA that covers that particular waste type. The EPA’s order for compost (the compost order; EPA 2016) defines compost as any combination of mulch, garden organics, food waste, manure and paunch that has undergone composting. It was not developed for composting carcasses and does not apply to composting dead stock or animal parts.

‘Paunch’ is defined in the compost order as the undigested food contained in the stomach of ruminant animals. This is generally considered to include partially digested grass, hay and other feed products such as grain.

Any person proposing to produce/supply compost should give careful consideration to the intended use and all relevant regulatory requirements before determining whether to include animal parts or carcasses in the process.

While carcasses are not an allowed input under the existing compost order, a specific order and exemption can be sought by making a submission to the EPA under the Resource Recovery Framework. Supporting evidence is needed to show that the final compost generated is beneficial or fit for purpose and poses minimal risk of harm to the environment and human health. Information on applying for a specific exemption is available on the EPA’s *Apply for an order and exemption* webpage (EPA 2018).

4.2 Compliance testing

The need for compliance testing should be considered in each situation, balancing potential expense incurred by the operator against likely sensitivity and the extent of likely impact.

Typical compliance testing conditions are included in Chapter 7 of the Local Government Air Quality Toolkit – *Resource pack*.

4.3 Assessment and dispersion modelling

There are a few important aspects for local government to consider when reviewing external consultants’ air quality assessment and dispersion modelling studies, to make sure the best outcome is achieved. These are included in Chapter 6 of the Local Government Air Quality Toolkit – *Resource pack*.

It should also be noted that dispersion modelling only applies to projects during the development and approvals stage. Once a facility is operational, odour surveys can be a more useful tool for addressing complaints. The methodology for conducting an odour survey is provided in Chapter 3 of the Local Government Air Quality Toolkit – *Resource pack*.

4.4 Operational and control recommendations

If the local council is the ARA for the purposes of the POEO Act, consideration should be given to appropriate operational procedures to control and limit air emissions. Chapter 7 of the Local Government Air Quality Toolkit – *Resource pack* lists several operational measures that are helpful in reducing emissions and impacts from dairies.

Sections 3.2 and 3.3 of this guidance note indicate a number of odour and dust mitigation considerations that could be included in consent conditions. In addition, where odour is considered to be a significant air quality issue, an Odour Management Plan may be required as a consent condition to ensure the operator is aware of the odour sources and what measures they should have in place to mitigate these.

The council may need to conduct a site inspection to investigate current management practices. Chapter 2 of the Local Government Air Quality Toolkit – *Resource pack* provides helpful information for council officers prior to these inspections.

Before going on site for an inspection, council officers should be aware of whether scheduled or non-scheduled activities are being carried out at the facility and should review any previous reports (including diagrams, photographs and maps).

5. References and other resources

All documents and webpages that are part of the Local Government Air Quality Toolkit are available from the EPA website.

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EPA (2014b) *Resource Recovery Order under Part 9, Clause 93 of the Protection of the Environment Operations (Waste) Regulation 2014: The effluent order 2014*, NSW Environment Protection Authority, Parramatta NSW, www.epa.nsw.gov.au/-/media/epa/corporate-site/resources/waste/rro14-effluent.pdf [PDF 51 KB].

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EPA (2018) *Apply for an order and exemption*, NSW Environment Protection Authority, Parramatta NSW, www.epa.nsw.gov.au/your-environment/recycling-and-reuse/resource-recovery-framework/apply-for-an-order-and-exemption.

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