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# Rosedale Broiler Farm

## Odour Environmental Risk Assessment

Rural Catalyst Group Pty Ltd

17 April 2026

→ The Power of Commitment



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|                | 0        | B.Fraser                                                    | M.Asimakis | MA        | M.Asimakis         | MA        | 17/04/2026 |
|                |          |                                                             |            |           |                    |           |            |

**GHD Pty Ltd | ABN 39 008 488 373**  
180 Lonsdale Street, Level 9  
Melbourne, Victoria 3000, Australia  
**T** +61 3 8687 8000 | **F** +61 3 8732 7046 | **E** melmail@ghd.com | ghd.com

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# 1. Introduction

GHD understands that Rural Catalyst Group Pty Ltd (RCG) is proposing to develop two broiler farms at Rosedale, Victoria. To support the proposed development, RCGFarms has requested an Odour Environmental Risk Assessment (OERA) to be undertaken to assess the resultant odour impacts on the surrounding areas.

GHD Pty Ltd (GHD) has been engaged to provide Rural Catalyst Group Pty Ltd with this Odour Environmental Risk Assessment (OERA) for a proposed development of a cluster broiler farm. GHD understands that RCG is seeking to build two new farms at 178 Farrell Lane Rosedale, Victoria (the site).

## 1.1 Purpose of this report

The purpose of this report is to undertake an OERA in accordance with EPA Publication 1883 – *Guidance for assessing odour* and AgriFutures – *Planning and environment guideline for establishing meat chicken farms: Guide 1 – Assessment guide* for the development of two new broiler farms at 178 Farrell Lane Rosedale, Victoria (the site) to understand odour risks associated with proposed operations.

The findings, conclusions and recommendations of this assessment should be read in conjunction with the limitations and assumptions presented in Section 1.3 and Section 1.4, respectively.

## 1.2 Scope of works

The scope of works is as follows:

- Request and review of information
- Level 3 Odour Environmental Risk Assessment in line with EPA Victoria Publication 1883: *Guidance for Assessing Odour* and AgriFuture 2021. *Planning and environment guideline for establishing meat chicken farms: Guide 1 – Assessment guide*
- Review the odour controls for proposed operations
- Historical complaint data analysis within the area around the site
- Undertake air dispersion modelling using CALPUFF model
- Report detailing the findings of the above tasks including level of risk (or zone of risk) surrounding the site in the context of sensitive receptor impacts

## 1.3 Limitations

*This report has been prepared by GHD for Rural Catalyst Group Pty Ltd and may only be used and relied on by Rural Catalyst Group Pty Ltd for the purpose agreed between GHD and Rural Catalyst Group Pty Ltd as set out in section 1.1 of this report.*

*GHD otherwise disclaims responsibility to any person other than Rural Catalyst Group Pty Ltd arising in connection with this report. GHD also excludes implied warranties and conditions, to the extent legally permissible.*

*GHD has prepared the CALPUFF model ("Models") for, and for the benefit and sole use of, Rural Catalyst Group Pty Ltd to support odour dispersion modelling and must not be used for any other purpose or by any other person.*

*The Model is a representation only and does not reflect reality in every aspect. The Model contains simplified assumptions to derive a modelled outcome. The actual variables will inevitably be different to those used to prepare the Model. Accordingly, the outputs of the Model cannot be relied upon to represent actual conditions without due consideration of the inherent and expected inaccuracies. Such considerations are beyond GHD's scope.*

*The information, data and assumptions ("Inputs") used as inputs into the Model are from publicly available sources or provided by Rural Catalyst Group Pty Ltd. GHD has not independently verified or checked Inputs beyond its agreed scope of work. GHD's scope of work does not include review or update of the Model as further Inputs becomes available.*

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*The Model is limited by the mathematical rules and assumptions that are set out in the Report or included in the Model and by the software environment in which the Model is developed.*

*The Model is a customised model and not intended to be amended in any form or extracted to other software for amending. Any change made to the Model, other than by GHD, is undertaken on the express understanding that GHD is not responsible, and has no liability, for the changed Model including any outputs.*

*GHD has prepared this report on the basis of information provided by Rural Catalyst Group Pty Ltd and others who provided information to GHD (including Government authorities), which GHD has not independently verified or checked beyond the agreed scope of work. GHD does not accept liability in connection with such unverified information, including errors and omissions in the report which were caused by errors or omissions in that information.*

*The services undertaken by GHD in connection with preparing this report were limited to those specifically detailed in the report and are subject to the scope limitations set out in the report.*

*The opinions, conclusions and any recommendations in this report are based on conditions encountered and information reviewed at the date of preparation of the report. GHD has no responsibility or obligation to update this report to account for events or changes occurring subsequent to the date that the report was prepared.*

*The opinions, conclusions and any recommendations in this report are based on assumptions made by GHD described in this report (refer section(s) 1.4 of this report). GHD disclaims liability arising from any of the assumptions being incorrect.*

#### **Accessibility of documents**

*If this report is required to be accessible in any other format, this can be provided by GHD upon request and at an additional cost if necessary.*

## **1.4 Assumptions**

The following assumptions were utilised in the preparation of this report:

- Odour is the primary emission of concern from the broiler farm
- Odour generated from the broiler farms are linearly proportional to the throughput of the facilities
- GHD relied on EPA Publication 1883 and AgriFutures 2021 to undertake air dispersion modelling
- Odour surveillance data for Sale-Toongabbie Farm also operated by is considered representative for broiler farms with similar shed size and ventilation set up. Based on this, GHD has relied on odour surveillance data from Sale-Toongabbie Farm to undertake odour risk assessment for broiler farms in Rosedale
- All information provided is correct and representative of the proposed operations at the site
- Data obtained from Rosedale South weather station is correct
- Information regarding the existing broiler farms (independent to Johnson Polutry) has been take from publicly available information including but not limited to
  - Odour Risk Assessment for the Rosedale East Broiler Farm Expansion project (Air Environment, 2024)
  - Submission in support of planning permit application Proposed Broiler Farm Unit 3 Farrell Lane Rosedale (FocusCDS Consultants April 2022)

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## 2. Legislation and guidelines

### 2.1 Environment Protection Act 2018 (amendment to Environment Protection Act 2017)

EPA Victoria released a new legal framework on 1 July 2021, with the intention for this framework to drive environmental improvements in industrial operations. The cornerstone of the Environment Protection Act 2017 (the EP Act) is the general environmental duty (GED), which requires Victorians to understand and minimise their risks of harm to human health and the environment, from pollution and waste.

Complying with the GED is about taking reasonable proactive steps and employing good environmental work practices. Compliance with the GED can be through following responsibilities under Occupational Health and Safety (OHS) laws, meeting industry standards, adopting industry better management practices, and following other relevant legislation related to the environment. In effect, the GED makes it clear that it is the individual businesses' responsibility to reduce risk to the environment and to protect it.

### 2.2 Environment Reference Standard

The EP Act's environment protection framework includes the Environment Reference Standard (ERS). This identifies environmental values, air indicators and objectives that set the benchmark for the quality of the air environment needed to protect environmental values. The environmental values identified include:

- Life, health and wellbeing of humans
- Life, health and well-being of other forms of life, including the protection of ecosystems and biodiversity
- Local amenity and aesthetic enjoyment
- Visibility
- The useful life and aesthetic appearance of buildings, structures, property and materials
- Climate systems that are consistent with human development, the life, health and well-being of humans, and the protection of ecosystems and biodiversity

The ERS is a reference standard, not a 'compliance standard' for businesses i.e. it relates to ambient air and not any individual facility. The ERS replaces SEPP (AQM) and generally adopts the objectives in the National Environment Protection Measure (Ambient Air Quality) (NEPM AAQ) with some modifications.

The following air quality indicators, and respective objectives, relevant to this assessment are outlined below:

- **Odour**  
*An air environment that is free from offensive odours from commercial, industrial, trade and domestic activities*

As such, the 5 Odour Unit (OU) level is generally taken as the level that if the odour is offensive, it may lead to nuisance and resultant complaint. Hence, GHD has utilised the 5 OU level to assess the 99.9<sup>th</sup> percentile 3-minute average odour impact from the site.

### 2.3 Victorian Code for Broiler Farms – 2009

The Victorian Code for Broiler Farms 2009 (The Code) is the code of practice for the planning, design, assessment, approval, construction, operation, and management of broiler farms in Victoria. It was developed to provide clear environmental standards for those wishing to establish new, or expand existing, broiler farms, and assurance for the surrounding landholders who may be impacted by broiler farming activities.

The 2018 amendments include:

- New definition for broiler farm to include free-range chicken meat farms
- A minimum farm size for which the Code applies (only applies to farms with more than 10,000 birds)

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The Code details the method of calculating separation distances to assess whether a proposed broiler farm has sufficient separation to the nearest residences. However, where the farm capacity exceeds 400,000 birds, the farm is termed a Special Class and instead of using a separation distance criterion, an Odour Environmental Risk Assessment (OERA) must be conducted in accordance with the requirements outlined in Section 6 of the Code. The requirements are listed below:

Stage 1 – Odour dispersion modelling is required to assess the cumulative odour emissions from all the broiler farms within the site. The dispersion model will be used to calculate whether the predicted peak (99.9<sup>th</sup> percentile) odour levels exceed the 5 OU criterion at the site boundary<sup>1</sup>. If the criterion is met at and beyond the broiler farm boundary, then the responsible authority should accept that the risk of odour amenity impact is low, and no further assessment is required.

Stage 2 – When the odour modelling results do not meet the criterion, an analysis of the odour modelling results will be undertaken to determine the frequency (how often) of the odour impact, duration (the length of time) and extent (the number of odour units) on surrounding sensitive uses (that is for dwellings). This information can then be used to determine whether the risk of adverse odour impacts beyond the broiler farm boundary is acceptable.

Stage 3 – If, following Stage 2 analysis, the risk of adverse odour impacts beyond the broiler farm boundary is considered to be unacceptable, then the design of the broiler farm will need to be modified. This may include, for example, reducing the number of chickens and/or relocating the broiler sheds.

## 2.3.1 Project application

The OERA for this assessment will be conducted as follows:

Stage 1 – Odour dispersion modelling will be undertaken using CALPUFF, with odour emissions estimated using Ormerod and Holmes emissions method<sup>2</sup>. The predicted cumulative odour emissions from all broiler farms for all scenarios will be assessed against the 99.9<sup>th</sup> percentile 3-minute average 6 OU odour criterion.

Stage 2 – At the time this assessment was undertaken, there are no established risk assessment for assessing odour impact using predicted results from odour dispersion model. GHD has therefore adopted the assessment for risk of odour exposure presented in Section 6.3 of EPA Publication 1883 – *Risk of Offensive Odour using Area Surveillance Method* to assess the likelihood of the identified receptors in experiencing offensive odour from the broiler farm.

## 2.4 New national guideline – Meat chicken farms

In November 2021, the first national planning and environmental guideline developed for Australia's chicken meat industry was released<sup>3</sup>. Two guides have been prepared by AgriFutures Australia and include (i) Planning and environment guideline for establishing meat chicken (broiler) farms (Guide 1 – Assessment guide) and (ii) its companion document (Guide 2 – Applicant guide).

The principal aim of these guidelines is to safeguard that the chicken meat industry's ongoing economic growth upholds the principles of environmentally sustainable and socially responsible development. This is to be achieved by confirming that future meat chicken farms are located, designed, and managed sustainably and provide confidence for ongoing industry investment.

They have been developed through an extensive review of state environmental requirements and application guidance for meat chicken farms and other intensive animal industries. These guidelines were developed in collaboration and consultation with researchers and industry experts, as well as local government and state departments of planning, environment, primary industries, and agriculture.

<sup>1</sup> In accordance with SEPP (AQM) which is now superseded by the ERS.

<sup>2</sup> Ormerod and Holmes 2005. A study referenced in AgriFuture 2021 Guide – 1. However, the title and publisher of this study is not presented in Guide 1.

<sup>3</sup> <https://agrifutures.com.au/product/planning-and-environment-guideline-for-establishing-meat-chicken-farms-guide-1-assessment-guide/>

## 2.4.1 Project application

For odour dispersion modelling, CALPUFF is selected as it is the model recommended in AgriFutures Guide 1 to be used to undertake poultry assessment. This assessment also utilised the K-factor method, also known as the Ormerod and Holmes emissions method (Ormerod and Holmes 2005)<sup>4</sup>. The K-factor emissions method is based on the relationship between the number of birds present, the stocking density of the birds, the ventilation rate and overall farm management.

The K-factor method estimates hourly varying odour emission rates (OER) from a poultry farm shed using the following equation:

$$OER = 0.025 \times K \times A \times D \times V^{0.5}$$

Where:

|            |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
|------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| <b>OER</b> | Hourly odour emission rate (OU.m <sup>3</sup> /s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                           |
| <b>K</b>   | Scaling factor between 1 and 5, where a value of 1 represents a very well designed and managed shed operating with minimal odour emissions, and a value of 4 – 5 would represent a shed with serious odour management issues. For this assessment, a K factor of 1.9 has been selected. AgriFutures Guide 1 recommends that when modelling a 'greenfield' site that will be operated to best management practice, a K-factor of no less than 1.9 should be used as it represented the most recent test data from new farms. |
| <b>A</b>   | Total shed floor area (m <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| <b>D</b>   | Average bird density (kg/m <sup>2</sup> )                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| <b>V</b>   | Ventilation rate (m <sup>3</sup> /s)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                        |

## 2.5 EPA Publication 1883 Guidance for assessing odour

EPA Publication 1883 provides guidance on how to assess the risk posed by odour emission sources and to understand the receiving environment where effects might occur. The guideline is to be utilised once an assessment of the separation distance has been undertaken to assess for any potential constraints. This is to evaluate the risk of harm in accordance with ERS objective for odour.

EPA Publication 1883 focuses on the assessment of odour under the provisions of the EP Act, including the GED, which requires all Victorians to take precautionary and reasonable actions to avoid hazards causing harm. The guideline is primarily intended for government, the planning sector, practitioners, and specialists, who need to understand offensive odours that are associated with a development proposal, investigation or study where an odour assessment is required. The publication provides a framework for three levels of risk assessment, according to the odour impact potential of an industry or site. The three levels of assessment include:

- Level 1 – Gateway assessment of emissions duration, wind direction and cumulative odour sources
- Level 2 – Source-Pathway-Receptor assessment
- Level 3 – Detailed risk assessment that could include:
  - Comparisons with similar operations or case studies
  - Risk assessment using field odour surveillance data
  - Complaint assessment
  - Community odour surveys/questionnaires and odour diaries
  - The use of dispersion modelling

### 2.5.1 Project application

This assessment includes selected Level 3 tools to assess the overall odour risk from the broiler farm. The tasks associated with Level 3 assessments undertaken for this site are presented below:

- Complaint assessment
- Odour dispersion modelling
- Odour surveillance from a comparable operation

<sup>4</sup> Ormerod and Holmes 2005. A study referenced in AgriFuture 2021 Guide – 1. However, the title and publisher of this study is not presented in Guide 1.

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## 3. Site overview

### 3.1 Site location

The existing and proposed farms are located within the suburbs of Rosedale. The site and its immediate surrounding are currently zoned as Farming Zone under the Wellington Shire Council.

The township closest to the site is Rosedale, which is approximately 5 km to the north-northwest. The township of Sale is located approximately 19 km to the northeast of the site. The existing air quality in the area is considered to be typical of a rural area with mainly agricultural activities. Notably two other existing broiler farms and one proposed broiler farm (independent from the site) are located approximately 1.4 km and 1.5 km to the north of the project site boundary. Other non-agricultural activities are nearby, including a quarry 3.3 km the northeast of the site boundary.

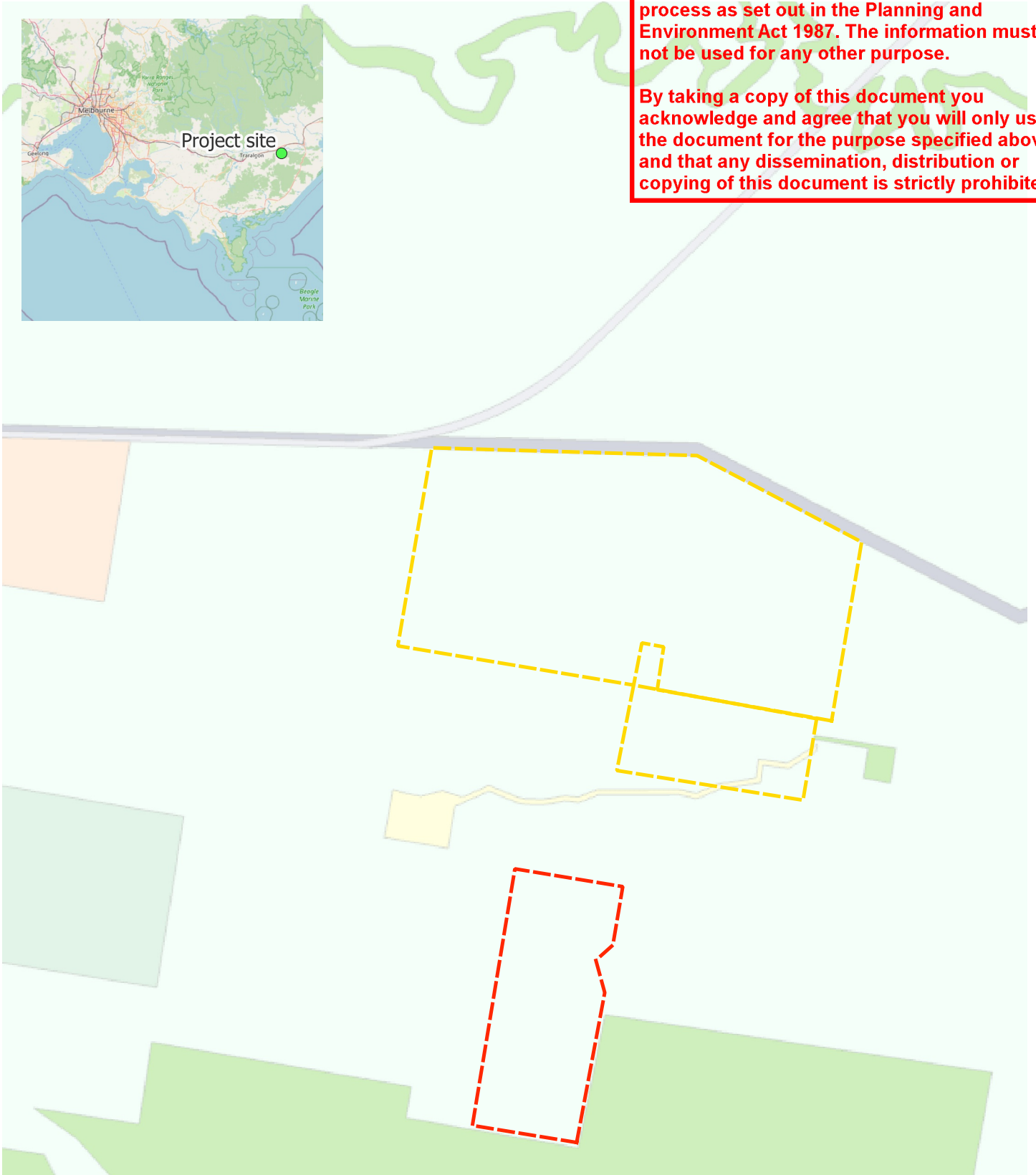
An image of the site relative to Rosedale township and land zonings are shown in Figure 1. The locations of the existing and proposed broiler farms are summarised in Table 1 and presented graphically in Figure 2.

**Table 1**      *Locations of existing and proposed broiler farms*

| Farm        | Farm type | Address                                  | Property Parcel         |
|-------------|-----------|------------------------------------------|-------------------------|
| Farm 1 (F1) | Proposed  | 196 Farrell Lane Rosedale 3847           | 1/PS304693              |
| Farm 2 (F2) | Proposed  | 196 Farrell Lane Rosedale 3847           | 1/PS304693              |
| Farm 3 (F3) | Existing  | 494 Rosedale-Longford Road Rosedale 3847 | 63A\PP3457              |
| Farm 4 (F4) | Existing  | 542 Rosedale-Longford Road Rosedale 3847 | PC381116                |
| Farm 5 (F5) | Proposed  | Farrell Lane Rosedale 3847               | 1\PS304693 & 2\PS304693 |

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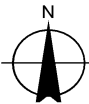
Legend

- Existing farm property boundaries
- Proposed farm property boundary
- PCRZ - Public Conservation and Resource Zone
- PPRZ - Public Park and Recreation ZONE
- PUZ1 - Public Use Zone - Service and Utility
- RLZ2 - Rural Living Zone (2)
- FZ - Farming zone

Paper Size ISO A4

0 500 1,000 m

Map Projection: Transverse Mercator  
Horizontal Datum: GDA2020  
Grid: GDA2020 MGA Zone 55



Johnson Poultry Farms Pty Ltd  
Rosedale Broiler Farm OERA

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Revision No. -  
Date. 15/12/2025

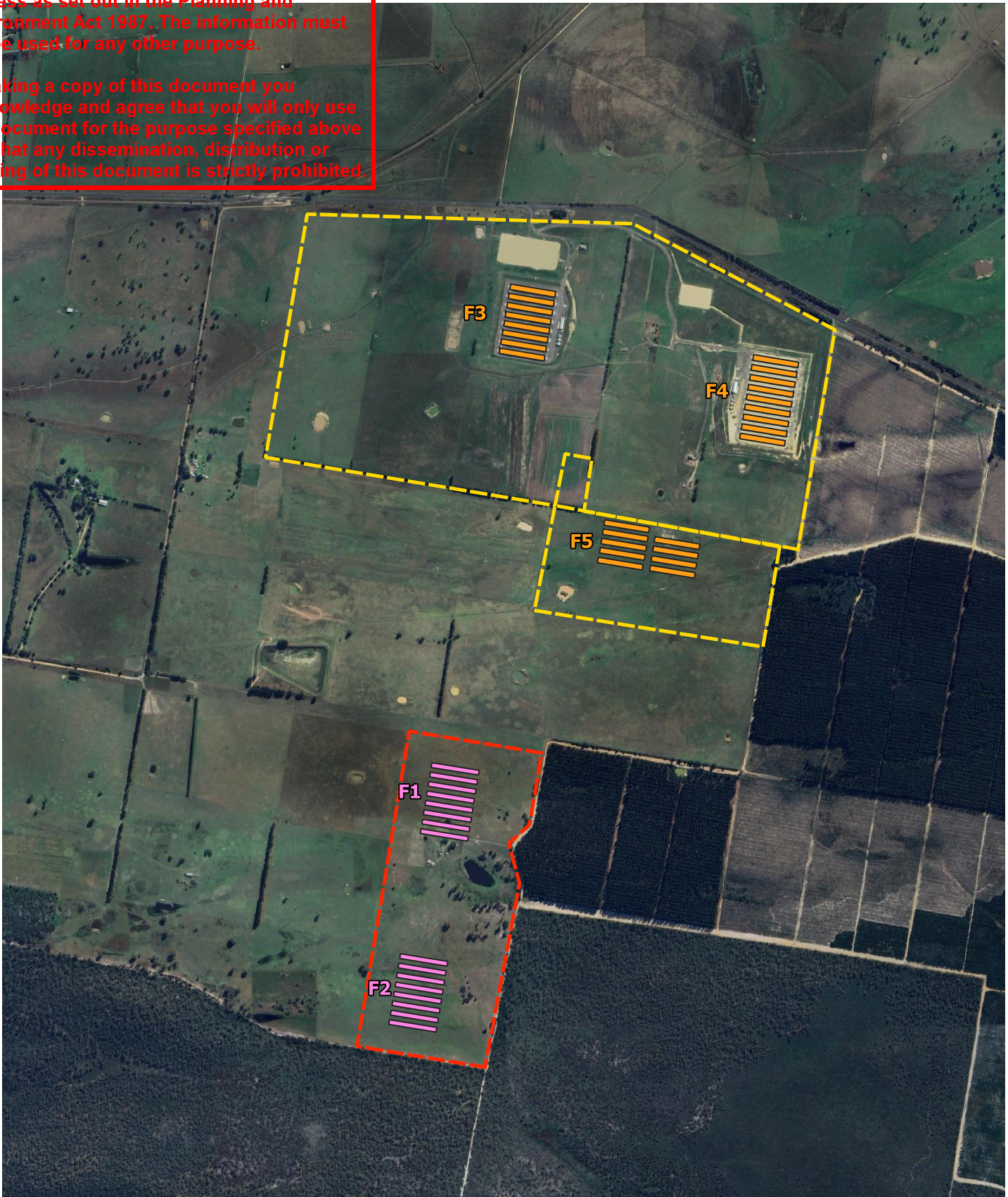
Site location

FIGURE 1.0



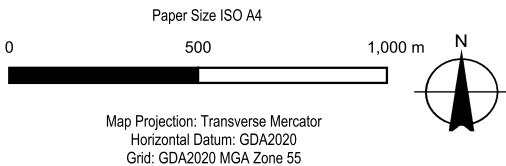
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Legend

- Existing sheds    Property boundary of existing farms
- Proposed sheds    Property boundary of proposed farms



Johnson Poultry Farms Pty Ltd  
Rosedale Broiler Farm OERA

Project No. 12677820  
Revision No. -  
Date. 12/12/2025

Existing and proposed farm locations

FIGURE 2.0



## 3.2 Site operation

This section outlines the proposed operations of the two new farms plus the three existing farms (independent to RCG) but included in the assessment to assess cumulative impacts.

### 3.2.1 Bird numbers

Table 2 summarises the number of existing and proposed sheds within each farm, number of birds in each shed and the farm identifications which GHD uses for the farms in this assessment.

**Table 2** *Farm Information*

| Farm ID | Existing    |               |                                | Proposed    |               |                   |
|---------|-------------|---------------|--------------------------------|-------------|---------------|-------------------|
|         | Shed number | Bird per shed | Total bird number <sup>5</sup> | Shed number | Bird per shed | Total bird number |
| F1      | -           | -             | -                              | 8           | 50,000        | 400,000           |
| F2      | -           | -             | -                              | 8           | 50,000        | 400,000           |
| F3      | 8           | 44,444        | 355,552                        | -           | -             | -                 |
| F4      | 9           | 44,444        | 400,000                        | -           | -             | -                 |
| F5      | 9           | 44,444        | 400,000                        | -           | -             | -                 |

### 3.2.2 Shed size

Table 3 summarises the existing and proposed shed dimensions and areas at each farm.

**Table 3** *Shed sizes*

| Farm ID | Existing        |                        | Proposed     |                        |
|---------|-----------------|------------------------|--------------|------------------------|
|         | Dimensions      | Area (m <sup>2</sup> ) | Dimensions   | Area (m <sup>2</sup> ) |
| F1      | -               | -                      | 180 m X 18 m | 3,240                  |
| F2      | -               | -                      | 180 m X 18 m | 3,240                  |
| F3      | 168 m X 17.57 m | 2,952                  | -            | -                      |
| F4      | 168 m X 17.3 m  | 2,906                  | -            | -                      |
| F5      | 168 m X 17.3 m  | 2,906                  | -            | -                      |

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<sup>5</sup> Based on bird density of 17 birds per square meter.

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### 3.2.3 Grow-out cycle

The typical grow-out cycle, or the production cycle, for the existing and proposed farms are ten weeks (70 days) in total comprising:

- 50 days of bird occupation
- Seven days of litter removal and shed cleanout
- Seven days of new bedding and preparation work for the next batch of birds

The typical bird live weight over the growth cycle is summarised in Table 4.

Table 4 Typical bird live weight over the growth cycle

| Day in growth cycle | Typical bird live weight (grams) |
|---------------------|----------------------------------|
| 0                   | 42                               |
| 7                   | 190                              |
| 14                  | 480                              |
| 21                  | 910                              |
| 28                  | 1,350                            |
| 35                  | 1,900                            |
| 42                  | 2,400                            |
| 49                  | 3,100                            |
| 56                  | 3,715                            |

### 3.2.4 Sequencing

It is understood that birds are placed in each proposed farm sequentially over a sixty-day period. The existing farms are sequenced in isolation with the proposed farms. The placement of birds in farm 3 and farm 4 is based on information provided in the Odour Risk Assessment for the Rosedale East Broiler Farm Expansion project (Air Environment, 2024) whilst farm 5 has been sequenced approximately one week after farm 4.

The placement of birds in the existing and proposed farm, relative to the growth cycle of Farm 1, are summarised in Table 5.

Table 5 Sequence of bird placement at the existing and proposed farms

| Farm ID | Placement of birds<br>(Day relative to Farm 1 growth cycle) |               |
|---------|-------------------------------------------------------------|---------------|
|         | Existing farm                                               | Proposed farm |
| Farm 1  | -                                                           | Day 1         |
| Farm 2  | -                                                           | Day 8         |
| Farm 3  | Day 2                                                       | -             |
| Farm 4  | Day 34                                                      | -             |
| Farm 5  | Day 41                                                      | -             |

### 3.2.5 Bird thinning

The RSPCA Approved Farming Scheme Standard for Meat Chicken<sup>6</sup> (RSPCA 2020), the recommended stocking density for tunnel ventilated or extractive systems is to be less than 34 kg/m<sup>2</sup>. The existing farms have placement density of 17 birds/m<sup>2</sup> and the proposed farms are expected to have the same placement density of 17 birds/m<sup>2</sup>.

Bird thinning is carried out to maintain the stocking density below the RSPCA 2020 standard of 34 kg/m<sup>2</sup>. It is understood that the proposed farms will remove 50% of the total birds at around Day 33 (during week 5), and the remaining birds at the end of the growth cycle between Day 50 – 56. Accounting for a mortality rate of around 4% for one growth cycle, this would give maximum bird mass density ranging between 27 kg/ m<sup>2</sup> and 32 kg/ m<sup>2</sup> during one growing cycle before birds are removed from the shed.

The existing farms are understood to follow a different schedule for bird thinning. First picks occur around day 33, with 33% of the total number of birds removed and second pickups occur around day 43 with another 33% removed. Remaining birds are removed at the end of the growth cycle (Day 56).

### 3.2.6 Shed temperature

The shed temperature in a shed is controlled. Generally, the shed temperature is held at approximately 31°C at the start of the growing cycle as this is the optimum temperature for baby chick comfort, health, and survival. As bird mass increases, the internal shed temperatures required for optimum bird performance decreases. The shed temperature is gradually lowered by about 0.5°C each day after the first two days, down to 20°C by week 6.

### 3.2.7 Ventilation

Ventilation is used to manage internal shed temperatures. Changes in ventilation that are required to achieve the target effective temperature are a function of ambient temperature. Each shed in the current has one tunnel ventilation fan. The tunnel ventilation capacity used for this assessment is a typical value of 10 m<sup>3</sup>/hr/bird.

Table 6 summarises the number of tunnel ventilation fans at each existing and proposed shed.

**Table 6** *Number of tunnel ventilation fans at each shed*

| Farm ID | Existing | Proposed |
|---------|----------|----------|
| F1      | -        | 12       |
| F2      | -        | 12       |
| F3      | 10       | -        |
| F4      | 10       | -        |
| F5      | 10       | -        |

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<sup>6</sup> RSPCA Approved Farming Scheme Standard for Meat Chicken, v1.1, published in August 2020 by RSPCA Australia.

### 3.3 Sensitive receptors

The sensitivity of the receiving environment has two aspects: the overall land use in the receiving environment and the compliance history, social or historical context experienced by people in determining the odour receiving environment score.

As stated in Section 5.5 of EPA Publication 1883, land use is based on the existing uses and/or land use terms and nesting diagrams in the Victoria Planning Provisions (VPP) land use terms and nesting groups (Clause 73.03 & 73.04, as shown in Table 4 of EPA Publication 1883, also shown in this report as Figure 3). Assessment is to be based on the most sensitive land-use within the separation distance (also known as buffer distance) or two kilometres, whichever is closest.

Based on the above, sensitive receptors were identified within 2 km of radius from the site (and surrounding broiler farm sites) as this is generally considered the distance at which sensitive receptors are likely to experience odour nuisance from an odour source. A total of six receptors have been identified within 2 km of all site boundaries to be included in this assessment.

Three additional structures (R7 – R9) were identified as caretaker residences. One is located on the project site and two are located within the property boundary of the existing farms to the north of the project site. Under the Separation distance guideline (EPA Victoria, 2024), caretaker residences are excluded as a sensitive land use and have therefore also been excluded from the modelling for this assessment.

Most of the identified sensitive receptors are located on lands zoned as Farming Zone which is classified as low sensitivity, shown in Figure 3. Only receptor 5 is on land zoned as rural living, classified as a high sensitivity receiving environment. Information of the identified receptors are presented in Table 7 and graphed in Figure 4.

It should be noted that the sensitive receptors are selected based on information provided by RCG, as well as information drawn from previous OERA reports, undertaken for the surrounding broiler farms. The receptor addresses are verified using VicPlan<sup>7</sup>.

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<sup>7</sup> <https://mapshare.vic.gov.au/vicplan/> - Last access December 2025



| Sensitivity | VPP Land use term or nesting group<br>(number in bold)                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                           | Existing Uses                                                                                                                                                                                                                                                                                                                                                                                                                                         |
|-------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Low         | <ul style="list-style-type: none"> <li>• <b>73.04-3</b> animal production</li> <li>• <b>73.04-2</b> agriculture</li> <li>• <b>73.04-10</b> Recreational boat facility</li> <li>• <b>73.04-15</b> Warehouse</li> <li>• <b>73.04-5</b> Industry</li> <li>• <b>73.04-7</b> Earth and energy resources</li> <li>• <b>73.04-13</b> Transport terminal</li> <li>• <b>73.04-14</b> Utility installation</li> <li>• <b>73.04-16</b> Renewable energy</li> <li>• Car Park</li> <li>• Saleyard</li> <li>• Tramway</li> <li>• Natural systems</li> <li>• Freeway service centre/service stations</li> </ul> | <ul style="list-style-type: none"> <li>• Industrial use or equivalent rural use (in the case of agricultural odours). No population nearby or uses are transient (e.g., state parks etc.).</li> <li>• Exposure to odours can easily be avoided.</li> </ul>                                                                                                                                                                                            |
| Medium      | <ul style="list-style-type: none"> <li>• <b>73.04-8</b> Office</li> <li>• <b>73.04-6</b> Leisure and recreation</li> <li>• <b>73.04-9</b> Place of assembly</li> <li>• <b>73.04-11</b> Retail premises</li> <li>• <b>73.04-12</b> Retail Premises (shop)</li> <li>• <b>73.04-4</b> Education centre</li> <li>• Research centre</li> <li>• Winery</li> <li>• Cemetery or Crematorium</li> <li>• Emergency services facility</li> <li>• Brothel</li> <li>• Art and craft centre</li> </ul>                                                                                                         | <ul style="list-style-type: none"> <li>• Business areas: exposure can typically be controlled by mitigation at the receptor (incorporated health ventilation and air conditioning systems etc.).</li> <li>• Receptors that are single dwelling or isolated rural dwellings receptor is business/commercial.</li> <li>• Enjoyment of the outdoors: recreational activities, playing sport, populations can move on or plan around exposure.</li> </ul> |
| High        | <ul style="list-style-type: none"> <li>• <b>73.04-1</b> Accommodation</li> <li>• Rural living zones</li> <li>• Hotels/motels</li> <li>• Hospital</li> <li>• Prison</li> <li>• Mixed use zones with residential apartments at ground level.</li> <li>• Residential areas</li> </ul>                                                                                                                                                                                                                                                                                                               | <ul style="list-style-type: none"> <li>• Built up area, towns, many dwellings with backyards and outdoor living areas.</li> <li>• Rural residential, schools, childcare or apartments.</li> <li>• Permanent populations where avoiding exposure is not possible.</li> </ul>                                                                                                                                                                           |

Figure 3 Receiving environment sensitivity. Extracted from Table 4 of EPA Publication 1883

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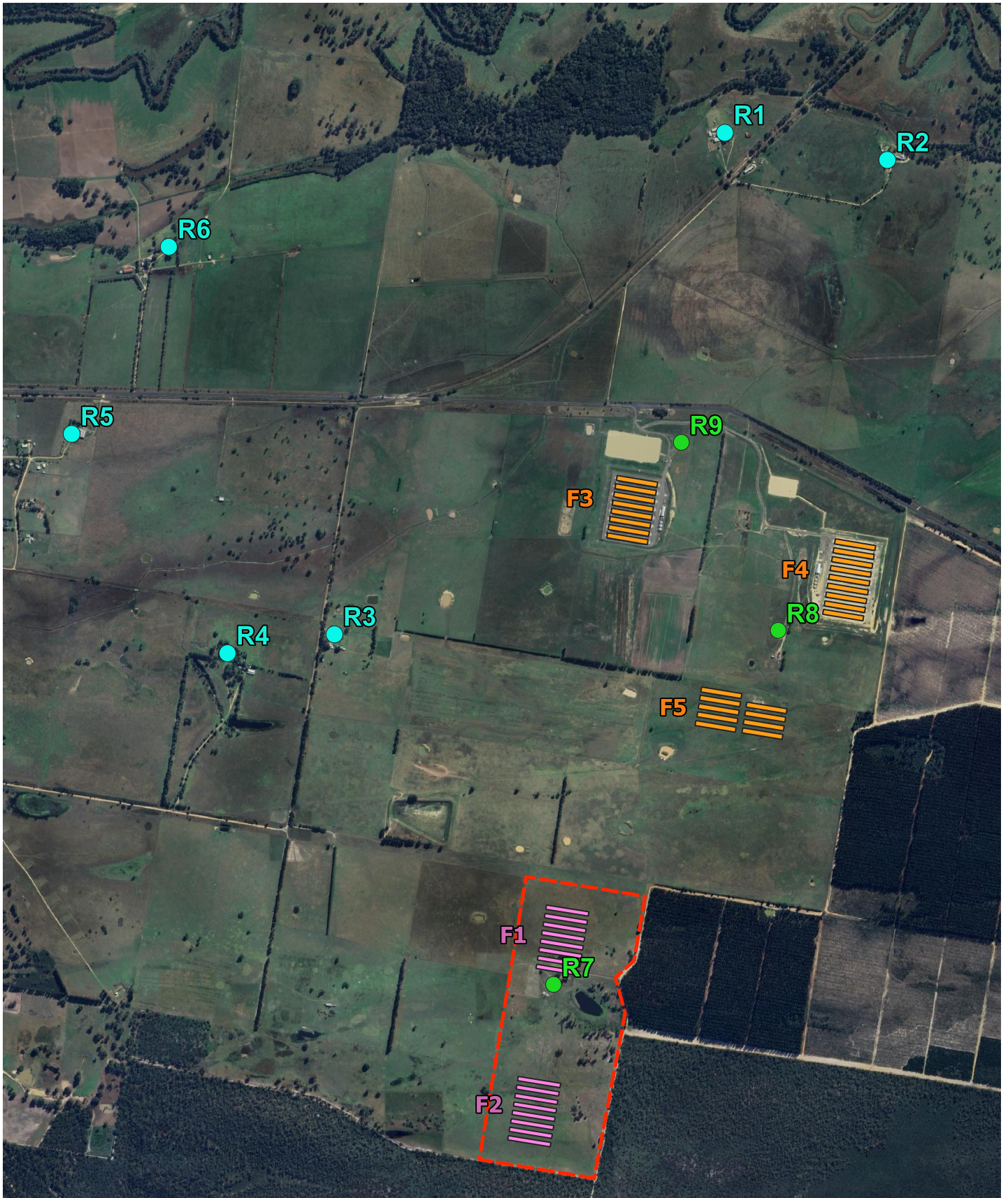
**Table 7**      *Sensitive receptors identified within approximately 2 km radius from the site boundary (including existing site boundaries)*

| Receptor | Address                              | Type of receptor                    | UTM 55 S |           | Planning zone |
|----------|--------------------------------------|-------------------------------------|----------|-----------|---------------|
|          |                                      |                                     | X        | Y         |               |
| R1       | 483 Rosedale-Longford Road           | Residential                         | 486,595  | 5,778,096 | Farming       |
| R2       | Rosedale-Longford Road               | Residential                         | 487,276  | 5,777,982 | Farming       |
| R3       | 119 Mullocky Lane, Rosedale          | Residential                         | 484,958  | 5,775,994 | Farming       |
| R4       | 169 Evergreen Road, Rosedale         | Residential                         | 484,511  | 5,775,918 | Farming       |
| R5       | 61 Kyle Street, Rosedale             | Residential                         | 483,858  | 5,776,834 | Rural living  |
| R6       | 285 Rosedale-Longford Road, Rosedale | Residential                         | 484,265  | 5,777,618 | Farming       |
| R7       | 178 Farrell Lane, Rosedale           | Accommodation (Caretaker residence) | 485,842  | 5,774,486 | Farming       |
| R8       | 494 Rosedale-Longford Road, Rosedale | Accommodation (Caretaker residence) | 486,818  | 5,776,011 | Farming       |
| R9       | 542 Rosedale-Longford Road, Rosedale | Accommodation (Caretaker residence) | 486,412  | 5,776,799 | Farming       |

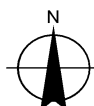
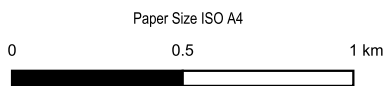
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- Sensitive receptors
- Receptors not included
- Proposed sheds
- Existing sheds
- Project site boundary



Map Projection: Transverse Mercator  
Horizontal Datum: GDA2020  
Grid: GDA2020 MGA Zone 55

Johns Poultry Farms Pty Ltd  
Rosedale Broiler Farm OERA

Project No. 12677820  
Date: 11/12/2025

Sensitive receptors

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**FIGURE 4.0**



## 4. Meteorology

The characterisation of local wind patterns generally requires accurate site-representative hourly recordings of wind direction and speed over a period of at least a year.

The nearest Bureau of Meteorology (BoM) stations are East Sale<sup>8</sup> (approximately 25.5 km northeast of the site) and East Sale Airport<sup>9</sup> (approximately 26.5 km northeast of the site). Another surface station, operating as part of the Latrobe Valley Air Monitoring Network is Rosedale South – located approximately 5.5 km to the southeast of the site, which is able to provide information such as temperature, wind direction and wind speed. Given the proximity to site, data from Rosedale South can be used as surface observation input for the meteorological model. In summary, TAPM was utilised to produce a three-dimensional hourly wind field for the site. Results of the TAPM model run were then utilised as initial guess field for modelling in CALMET in the “Hybrid” mode with surface observation data supplied by Rosedale South weather station. Detailed information on the setup of TAPM and CALMET, as well as model validation, are presented in Appendix A. GHD selected the period between 1 January 2020 and 31 December 2024 (five years) to model.

The effects of wind on dispersion patterns can be examined using the general wind climate and atmospheric stability class distributions. The general wind climate at a site is displayed by means of wind rose plots, giving the incidence of winds from different directions for various wind speed ranges. In this assessment, the prevailing wind directions and the relative incidence of more stable light wind conditions are of particular interest. These are assessed and presented in Section 4.1 – Section 4.3.

### 4.1 Long term pattern in wind

The average wind rose for the data period is shown in

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<sup>8</sup> East Sale – BOM station ID 085072

<sup>9</sup> East Sale Airport – BOM station ID 085314



Figure 5 and it shows the following features:

- The predominant annual average wind direction is from the west-southwest comprising 15.8% of all incident winds, followed by winds from the southwest (11%) and the east (8%).
- The average wind speed is at 2.7 m/s.
- The observed wind speed distribution indicates that the largest proportion of light winds (less than 2 m/s) occur most frequently between the south-southwest to the east. This means that odour under poor dispersion conditions will most frequently affect locations between the west to north-northeast in relation to the site.

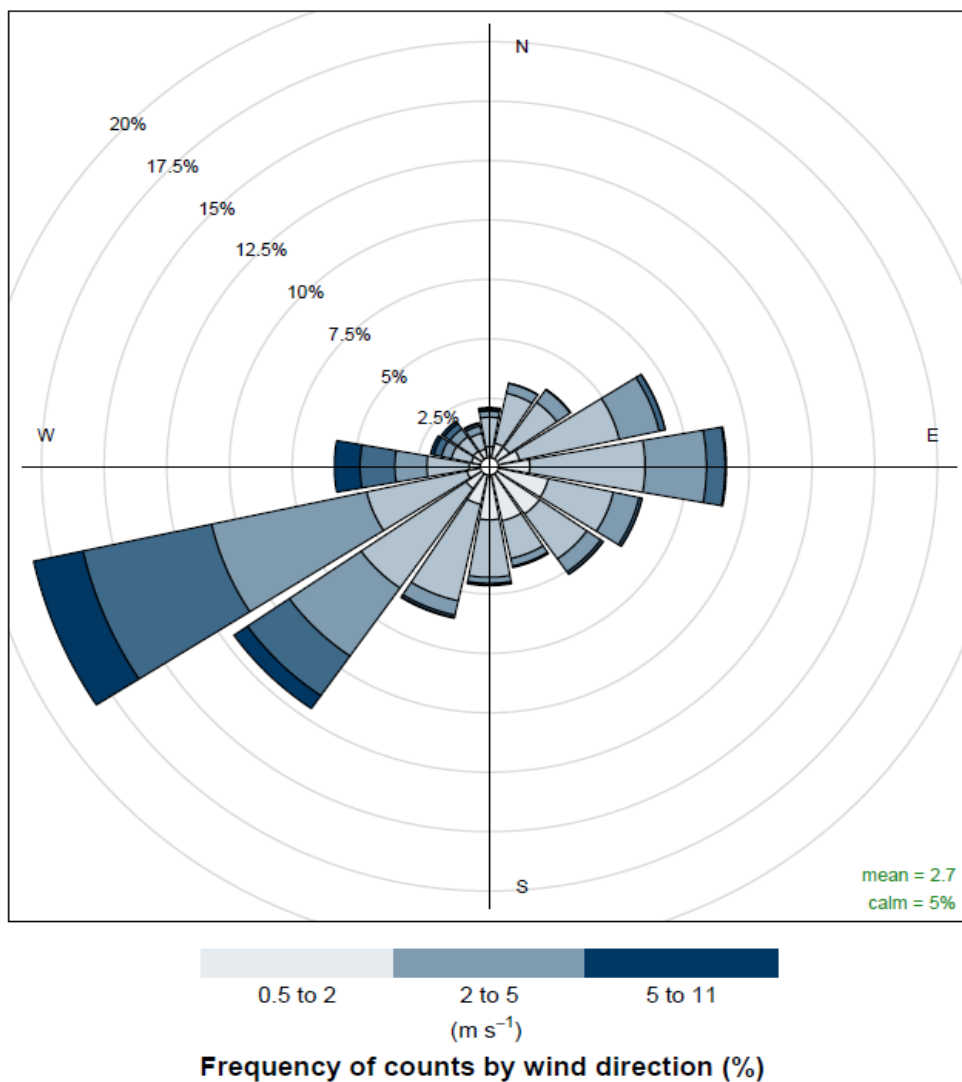


Figure 5 Wind conditions at Rosedale South Station for the period between 1 January 2020 and 31 December 2024

## 4.2 Seasonal pattern in wind

The seasonal wind roses for the same period are presented in

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Figure 6 and show that:

- The predominant wind direction in summer is west-southwest occurring approximately 14% of the time, followed by winds from the southwest (10%)  
Light winds (< 2 m/s) occur approximately 40.7 % of time during the summer period
- The predominant wind direction in winter is west-southwest occurring approximately 17.5% of the time, followed by winds from the southwest (10%)  
Light winds (< 2 m/s) occur approximately 41.1% of the time during the winter period
- The predominant wind direction in spring is west-southwest occurring approximately 14% of all incident winds, followed by winds from the east (12%)  
Light winds occur approximately 34.7% of the time during the spring period
- The predominant wind direction in autumn is west-southwest comprising 17.5% of all incident winds, followed by southwest (11.5%)  
Light winds (< 2 m/s) occur approximately 44.2% of the time
- The incidence of light winds (< 2 m/s) is greatest in autumn, followed by winter

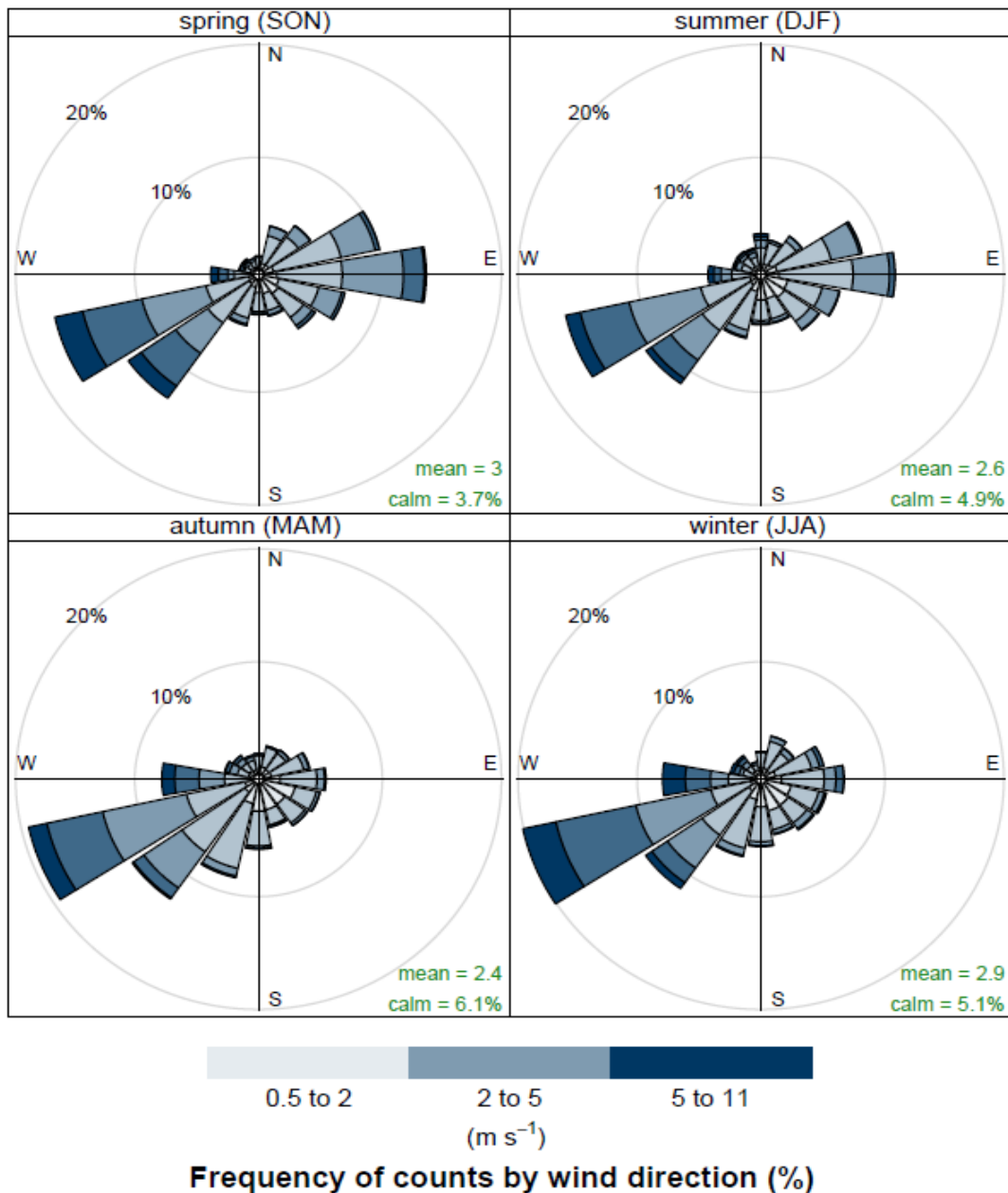


Figure 6 Seasonal wind roses between the 1 January 2020 and the 31 December 2024

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## 4.3 Pattern of atmospheric stability

Atmospheric stability substantially affects the capacity of a pollutant such as gas, particulate matter or odour to disperse into the surrounding atmosphere upon discharge and is a measure of the amount of turbulent energy in the atmosphere.

There are generally six Pasquill – Gifford classes (A – F) used to describe atmospheric stability, and these classes are grouped into three stability categories:

- Unstable (classes A – C)
- Neutral (class D)
- Stable (classes E – F)

Under unstable conditions, dispersions of emissions from near-ground sources are good due to convectively vertical turbulent mixing. Neutral stability (Class D) denotes neutral atmospheric conditions, with stronger winds in moderate temperatures or lighter winds on overcast to partly cloudy days. Classes E and F denote slightly and moderately stable atmospheres when dispersion is poorest, as vertical mixing of air is suppressed.

### 4.3.1 Atmospheric stability

Figure 7 shows the frequency distribution of stability classes at the site as predicted by CALMET. The figure shows that stable atmospheres (E and F) occur for approximately 47%, unstable atmospheres (A, B and C) occur 34% and neutral conditions (D) occur 19% of the modelled period.

Worst case pollutant dispersion typically occurs during stability class E and F conditions due to relatively low amounts of turbulence and therefore low levels of pollutant dispersion and mixing with ambient air. Stability class E and F conditions generally occur during calm periods at night and early in the morning.

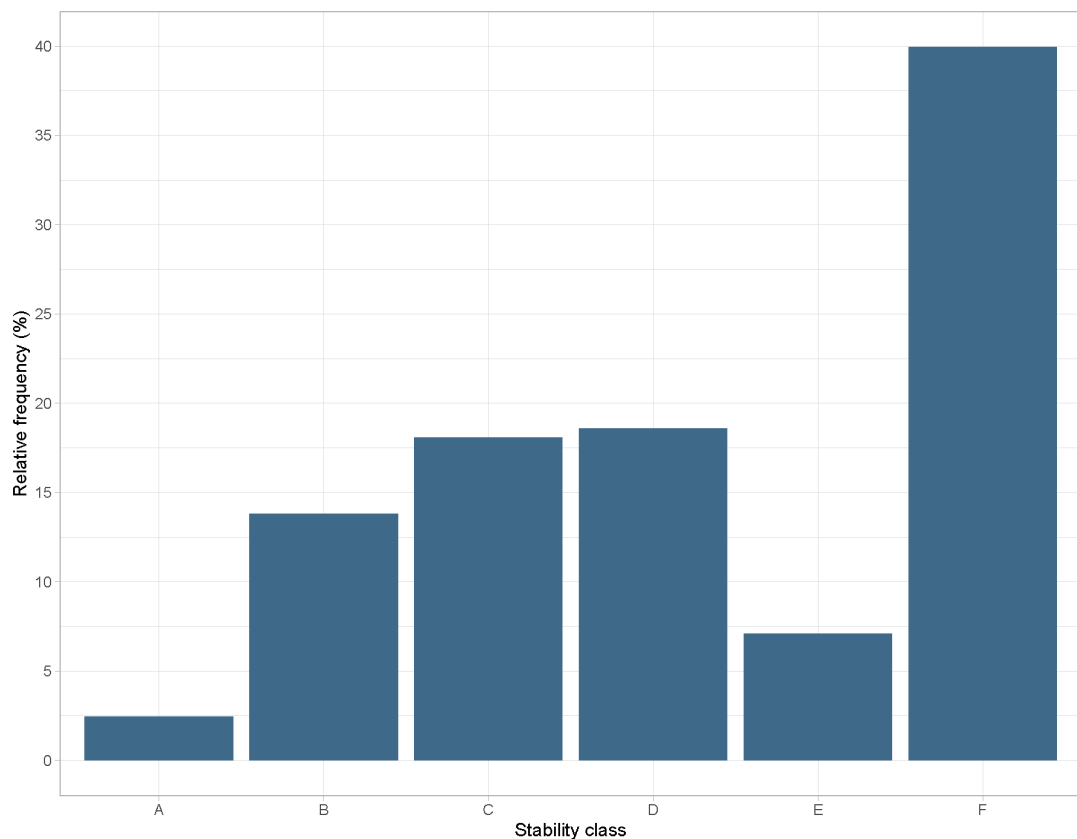


Figure 7 Stability class distribution predicted by CALMET for the site

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## 4.3.2 Mixing height

Mixing height signifies the height above the surface of the earth throughout which a pollutant can be disperse. It is often associated with a sharp increase in temperature with height (inversion), and a sharp decrease in pollutant concentration.

A box plot of CALMET predicted mixing heights for the site is shown in Figure 8. During the night and early morning hours, mixing heights are lower with an average of approximately 100 m (7:00 pm to 7:00 am), which then increase after sunrise to an average of approximately 1,500 m during the day (7:00 am to 7:00 pm).

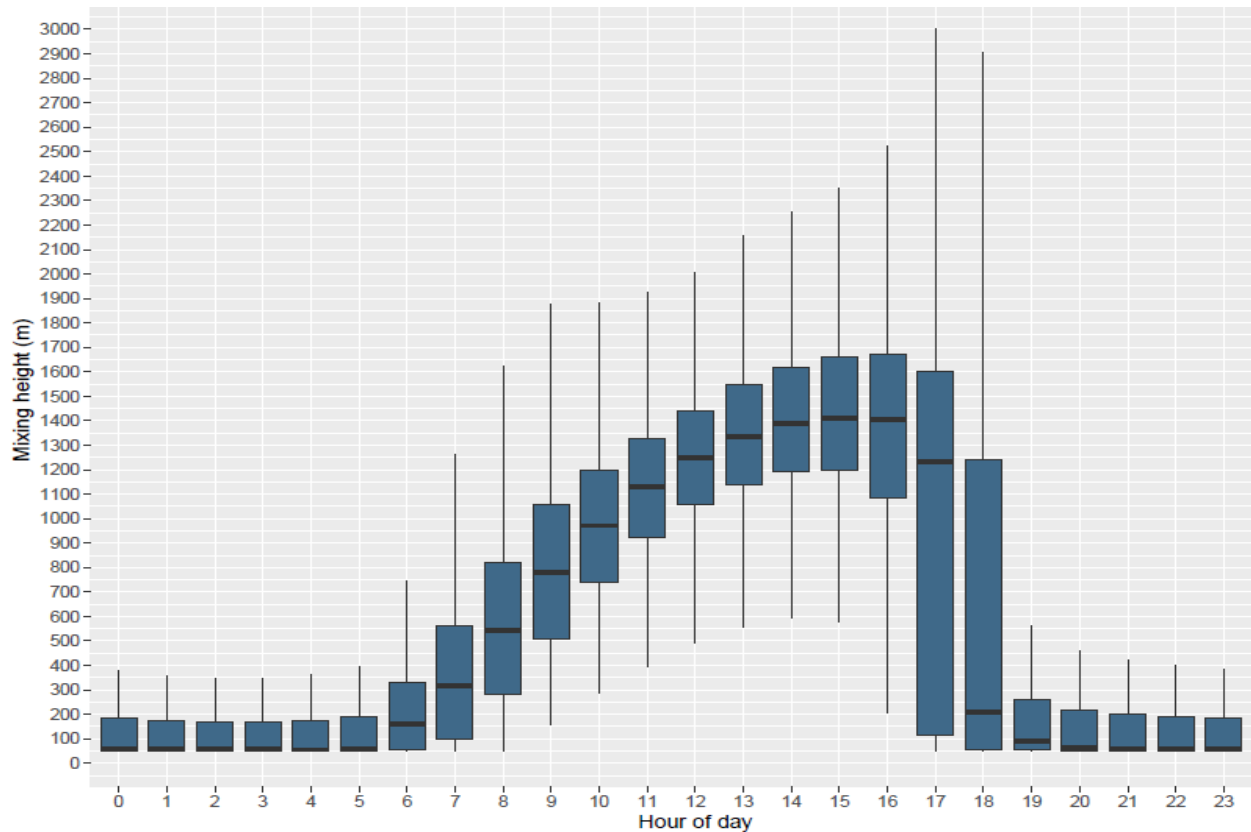


Figure 8 Mixing heights predicted by CALMET at the site

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## 5. Odour dispersion modelling

As recommended in the EPA Publication 1883, dispersion modelling is one of the Level 3 detailed risk assessment tools which can be used to support the evidence of odour risks of an activity and predict the likelihood of complaint. The purpose of odour dispersion modelling for this assessment is to provide an indication on the potential emission dispersion pattern from the proposed broiler farm and the likelihood of odour exposure for the nearby receptors. Modelling can also show the expected change in emissions for a proposed change or upgrade to a premises (relative modelling to determine how impacts from the existing use will change with the upgraded use).

For this assessment, the dispersion model CALPUFF (v7) was used to simulate the dispersion characteristics of odour generated from the two proposed farms at the site plus the cumulative impacts from the three existing farms independent to RCG. CALPUFF is a non-steady state, Lagrangian Gaussian puff model recommended in AgriFutures Guide 1 for poultry farm assessments.

### 5.1 CALPUFF configuration

The model parameters and inputs were:

- Three-dimensional wind field from CALMET simulated wind as described in Appendix A
- CALPUFF computational domain size of 11 km x 11 km with 0.25 km spacing, and a sampling grid of 11 km x 11 km with 0.25 km spacing
- CALPUFF model settings were selected based on *The Generic Guidance and Optimum Model Settings for the CALPUFF modelling System 2011* and the recommended settings in Appendix B of AgriFutures Guide 1
- The tunnel ventilation of each shed was modelled as a time varying volume source

### 5.2 Odour emission rates

This assessment utilised the K-factor method, also known as the Ormerod and Holmes emissions method (Ormerod and Holmes 2005)<sup>10</sup>. This method is one of the odour emission models recommended in AgriFutures Guide 1.

The K-factor emissions method is based on the relationship between the number of birds present, the stocking density of the birds, the ventilation rate and overall farm management. The K-factor method estimates hourly varying odour emission rates (OER) from a poultry farm shed using the following equation:

$$OER = 0.025 \times K \times A \times D \times V^{0.5}$$

The parameters used for the estimation of odour emissions rates from each shed are summarised in Table 8. The hourly varying bird density (D) and ventilation rate (V) for a year of typical bird growth cycles, approximately six cycles in a year, are shown in Appendix B for all existing and proposed sheds. Based on the parameters in Table 8, the modelled odour emission rate for each shed for a year is shown in Appendix C. Note that the birds are placed in the sequence discussed in Section 3.2.4.

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<sup>10</sup> Ormerod and Holmes 2005. A study referenced in AgriFuture 2021 Guide – 1. However, the title and publisher of this study is not presented in Guide 1.

**Table 8** *Parameters used in estimating odour emissions rates for each shed*

| Parameter | Value                | Unit              | Description                                                                                                                                                                                                                            |
|-----------|----------------------|-------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| K         | 1.9                  | -                 | A K-factor of 1.9 has been selected (Based on AgriFutures Guide 1)                                                                                                                                                                     |
| A         | Varies between farms | m <sup>2</sup>    | Calculated based on shed dimensions shown in Table 3 (Section 3.2.2)                                                                                                                                                                   |
| D         | Hourly varying       | kg/m <sup>2</sup> | Based on the number of birds and weight of each bird in the growth cycle                                                                                                                                                               |
| V         | Hourly varying       | m <sup>3</sup> /s | The estimated ventilation required for a tunnel ventilated shed is based on bird age, target temperature inside the shed and ventilation profile as a percentage of maximum ventilation provided in Appendix B of AgriFutures Guide 1. |

## 5.3 Modelled results

This section presents the odour dispersion modelling results for this assessment.

The five-odour unit (OU) 99.9<sup>th</sup> percentile 3-minute average of odour modelling results is generally used to assess the predicted downwind odour concentrations during short time worst-case, poor dispersive meteorological conditions. This 99.9<sup>th</sup> percentile is generally taken as the level that if the odour is obvious and has an offensive character, it may lead to nuisance and resultant complaint.

Table 9 presents the odour impact predicted at the six receptors identified within 2 km radius from the current and proposed farms, showing the 99.9<sup>th</sup> percentile 3-minute average odour concentrations and the estimated factor of increase in odour impact as a result of bird number increase. The predicted results are also plotted in Figure 9, showing contour plots for the modelled 99.9<sup>th</sup> percentile 3-minute average odour concentrations from the current and proposed farms, over 1 year of modelled meteorology. The year chosen, 2022, represents the worst case year from 5-year period modelled (2020 – 2024). This is based on impacts at sensitive receptors, particularly at the nearest receptors to the project site, R3 and R4, where the highest odour concentrations are experienced.

The German standard VDI 3882/1 'Determination of Odour Intensity' is also presented in Table 10 which shows the link between odour level and perceived intensity (a subjective measure) for poultry odour. Note that the Weber Fechner Law has been used to find the line of best fit of the individual presentations.

Based on the modelling results presented in Table 9 and Figure 9, as well as Table 10 on perceived intensity, the following features of the predicted results are observed:

- From the proposed establishment of Farm 1 and Farm 2, the 99.9<sup>th</sup> percentile offsite concentrations are predicted to be below the 5 OU 99.9<sup>th</sup> percentile at all six receptors.
- From the current three farms (F3, F4 and F5) plus the proposed establishment of Farm 1 and Farm 2, the 99.9<sup>th</sup> percentile offsite concentrations are predicted to be above the 5 OU 99.9<sup>th</sup> percentile at all six receptors.
- The increase in odour impact, as a result of increase in bird numbers, is most prominent at R3, followed by R4.
- Table 10 shows that for poultry odour, the odour level needs to almost treble before an increase in perceived intensity is registered. This comparatively gradual response to increased odour level is a relevant factor when assessing predicted peak odour levels. Hence this suggests that the increase at all receptors including the largest increase of 4.1 OU at R3 will not be perceived as the factor of increase is below 2.7 (factor only 0.4).

As the 99.9<sup>th</sup> percentile odour concentrations at R1 – R6 (total of six receptors) are predicted to be above 5 OU for cumulative scenario, it is important to consider the likelihood of adverse odour impact at the receptors. GHD has undertaken a risk assessment on the identified receptors, presented in Section 5.4.

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**Table 9** Predicted odour impact at nearby receptors (2022)

| Receptor | Odour impact from current farms                   | Odour impact from proposed farms                  | Odour impact from current and proposed farms      | Factor of increase                  |
|----------|---------------------------------------------------|---------------------------------------------------|---------------------------------------------------|-------------------------------------|
|          | 99.9 <sup>th</sup> percentile, 3-min average (OU) | 99.9 <sup>th</sup> percentile, 3-min average (OU) | 99.9 <sup>th</sup> percentile, 3-min average (OU) | (Increase/odour from current farms) |
| R1       | 7.2                                               | 1.4                                               | 8.6                                               | 0.2                                 |
| R2       | 7.7                                               | 1.6                                               | 9.3                                               | 0.2                                 |
| R3       | 10.7                                              | 4.1                                               | 14.7                                              | 0.4                                 |
| R4       | 8.2                                               | 4.0                                               | 12.1                                              | 0.5                                 |
| R5       | 5.5                                               | 2.3                                               | 7.9                                               | 0.4                                 |
| R6       | 5.7                                               | 2.0                                               | 7.6                                               | 0.3                                 |

**Table 10** Perceived Intensity vs Odour Level – Poultry Odour<sup>[1]</sup>

| Odour Strength   | Intensity Level | Concentration <sup>1</sup><br>OU | Ratio between Intensity levels |
|------------------|-----------------|----------------------------------|--------------------------------|
| Extremely Strong | 6               | 144                              | 2.7:1                          |
| Very Strong      | 5               | 52                               |                                |
| Strong           | 4               | 19                               |                                |
| Distinct         | 3               | 7.0                              |                                |
| Weak             | 2               | 2.5                              |                                |
| Very weak        | 1               | 0.92                             |                                |
| Not Perceptible  | 0               | 0.34                             |                                |

<sup>1</sup> WA DEP 2002, "Odour Methodology Guideline", Table 3 Department of Environmental Protection Perth March 2002

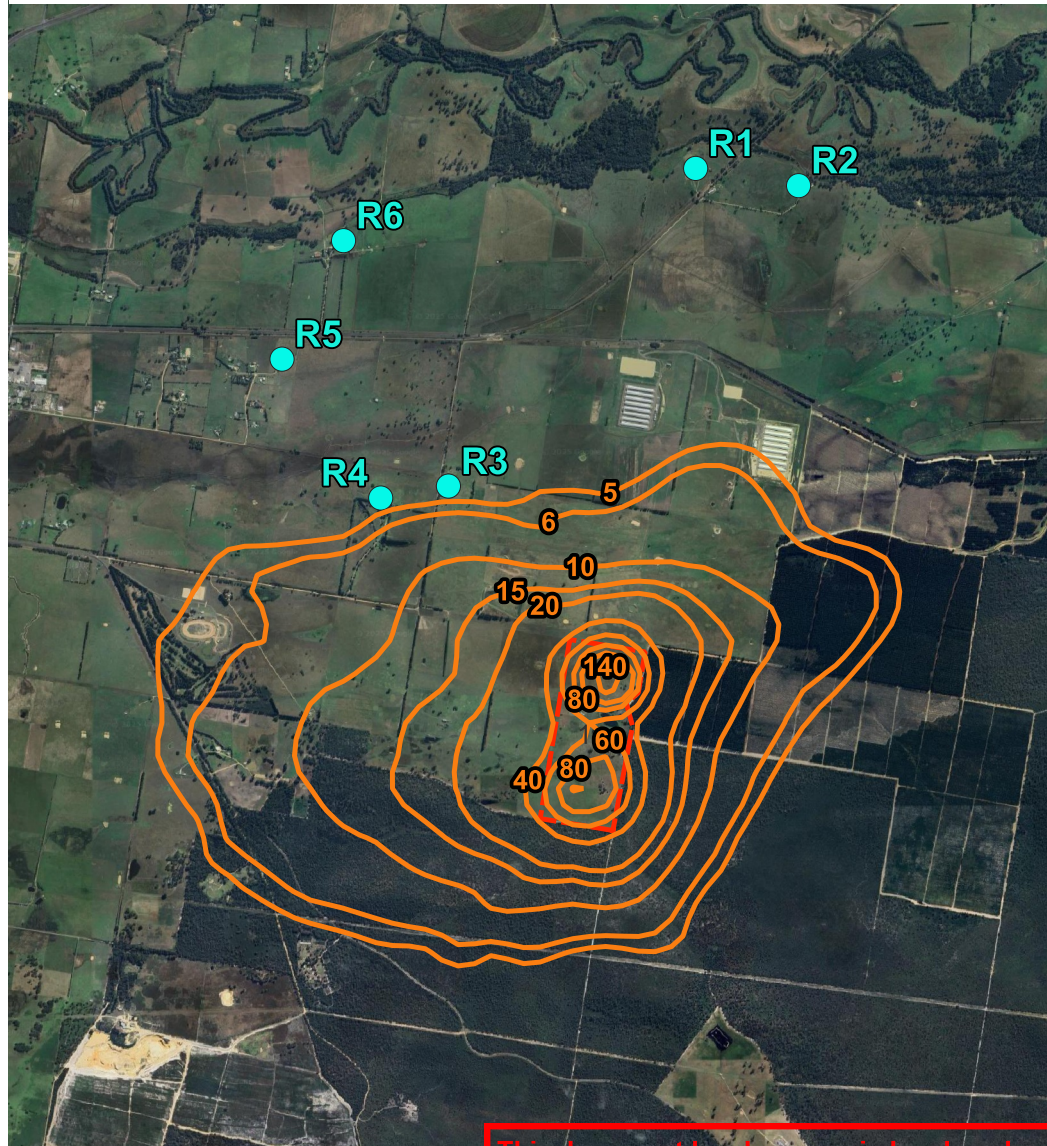
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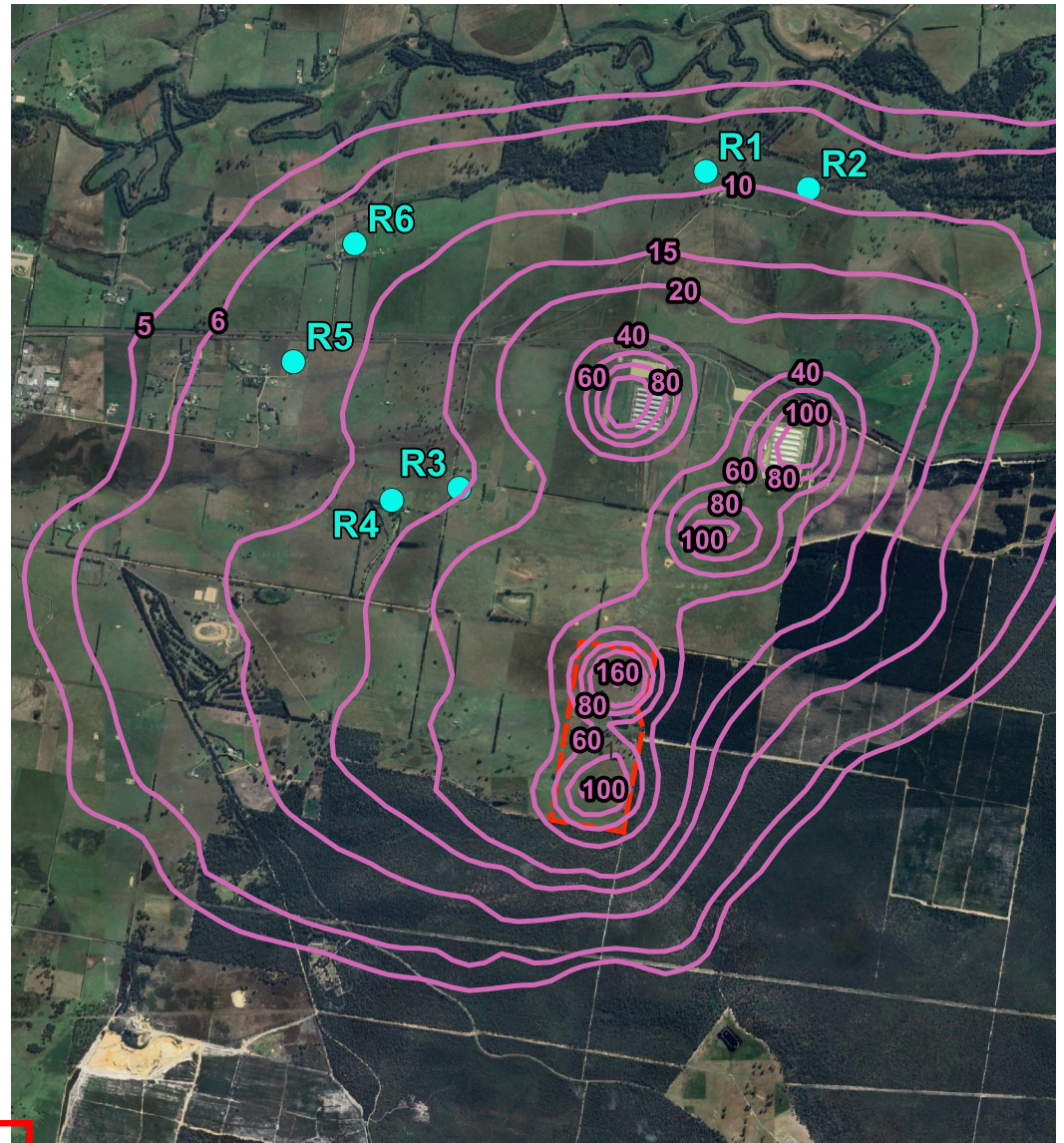
<sup>[1]</sup> WA DEP 2002, "Odour Methodology Guideline", Table 3 Department of Environmental Protection Perth March 2002



Proposed farms (F1, F2)



Proposed farms and existing farms (F3, F4, F5)



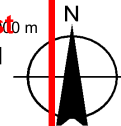
## Legend

- Sensitive receptors
- ▭ Property boundary for proposed sheds

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Map Projection: Transverse Mercator  
Horizontal Datum: GDA2020  
GDA2020 MGA Zone 55



Johnson Poultry Farms Pty Ltd  
Rosedale Broiler Farm OERA

Predicted odour impact - Existing and proposed farms  
99.9% 3-minute average odour concentrations (OU)

Project No. 12677820  
Revision No. -  
Date. 11/12/2025

**FIGURE 8.0**

Data Source: Google Earth Imagery 2025.  
Created By: bfraser4

Document Path: \\ghdnet\ghd\AU\Melbourne\Projects\3112677820\GIS\Maps\Working\12677820\_01122025.mxd  
Print Date: 11/12/2025

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## 5.4 Risk assessment

As shown in Section 5.2, the predicted 99.9<sup>th</sup> percentile cumulative concentrations at all six receptors are predicted to be above 5 OU. GHD has undertaken a risk assessment to assess the likelihood of adverse impacts from the current and proposed farm development on the identified receptors. This risk assessment has been undertaken using the modelled results from 2022. This represents the worst-case year from the 5-year period modelled (2020-2024), based on odour concentration and number of exceedances at the most-impacted sensitive receptors. The other 4 years generally had lower impacts.

At the time this assessment was undertaken, there were no established risk assessment for assessing odour impact using predicted results from odour dispersion model. GHD has therefore adopted the assessment for risk of odour exposure presented in Section 6.3 of EPA Publication 1883 – *Risk of Offensive Odour using Area Surveillance Method* to assess the likelihood of the identified receptors in experiencing offensive odour from the poultry farm.

Based on the calibration results, the odour concentration which could describe as ‘Obvious’ odour is 6 OU. Details of the odour surveys, calibration methodology and calibrated results used in the odour assessment prepared for Sale – Toongabbie broiler farm are presented in Appendix D.

### 5.4.1 Method

The risk of offensive odour (area surveillance method) assessment outlined in EPA 1883 involves four steps when assessing the likelihood of the receiving environment in experiencing offensive odour. The description of each step, the method used and its application to this assessment are summarised in Table 11.

**Table 11** Summary of recommended methods used when undertaking risk of offensive odour assessment

| As described in EPA Publication 1883 |                                                                                                                                                 |                                                                                                                                                                                                                        | Application to this assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                              |
|--------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step                                 | Description                                                                                                                                     | Method                                                                                                                                                                                                                 |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |
| 1                                    | Determining when source odours have been confirmed                                                                                              | This step is to determine if an odour was recognized, there are single or multiple odours and if the odours were obvious or subtle.<br><br>The odour character is determined using Appendix B of EPA Publication 1883. | Based on Appendix B of EPA Publication 1883, the odour character from the chicken (sheds) is categorised to have an “Unwelcome character”.<br><br>GHD has categorised the intensity of odour experienced at each receptor based on the maximum 99.9 <sup>th</sup> percentile 3-minute average odour concentration predicted at the receptor. Obvious odours are odour concentrations predicted to be above 6 OU. 6 Odour Unit (OU) level is generally taken as the level that if the odour is offensive, it may lead to nuisance and resultant complaint. This is between weak and distinct from the perceived intensity of poultry odour given in Table 9. |
| 2                                    | Determining the frequency at which source odours were confirmed for each odour character and its associated offensiveness potential             | In EPA Publication 1883, the frequency of odour occurrence is determined from odour surveillance.                                                                                                                      | GHD determines the frequency of odour occurrence based on the number of hours the 99.9 <sup>th</sup> percentile 3-minute average maximum odour concentration has exceeded the 6 OU 99.9 <sup>th</sup> percentile at all identified receptors.                                                                                                                                                                                                                                                                                                                                                                                                               |
| 3                                    | Combining odour frequency with odour character and intensity to determine the likelihood of odour exposure at a given point or series of points | This step involves determining the risk of odour exposure by combining odour character, intensity and frequency using Table 11, Table 12, and Table 13 from EPA Publication 1883.                                      | As described in method.                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |

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| As described in EPA Publication 1883 |                                                                                                                                                                        |                                                                                                                                                                                                                                                                                                                                                                                                                                                                  | Application to this assessment                                                                                                                                                                                                                                                                                                                                                                                                                                                                                 |
|--------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------|------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Step                                 | Description                                                                                                                                                            | Method                                                                                                                                                                                                                                                                                                                                                                                                                                                           |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
|                                      | (for example in a suburb or a block)                                                                                                                                   | These tables are presented in this report as Figure 10, Figure 11, Figure 12, respectively.                                                                                                                                                                                                                                                                                                                                                                      |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                |
| 4                                    | Combining the likelihood of odour exposure with the sensitivity of the receiving environment to determine the overall risk that there will be offensive odour impacts. | <p>This step assesses the land use of the site where odour is observed and the associated beneficial uses.</p> <p>The overall risk of offensive odour is determined using Table 14 and Table 15 from EPA Publication 1883, based on the surrounding land use and the risk of odour exposure outcome determined in Step 3.</p> <p>Table 14 and Table 15 from EPA Publication 1883 are presented here as Figure 13 and Figure 14, respectively as a reference.</p> | Land use is based on the land use terms and nesting diagrams in the Victoria Planning Provisions (VPP) groups, which are grouped into three categories. The dwellings surrounding the site boundary are single, isolated dwellings located in a Farming Zone so it can be assumed the receiving environment falls within the agriculture VPP land use term. The receiving environment is therefore classified as low sensitivity except for R5 located in rural living zone is classified as high sensitivity. |

|                                                                                     |                            |                                      |
|-------------------------------------------------------------------------------------|----------------------------|--------------------------------------|
|    | <b>Negligible exposure</b> | Almost no chance of odour exposure   |
|    | <b>Low exposure</b>        | Odour exposure unlikely              |
|    | <b>Moderate exposure</b>   | Likely chance of odour exposure      |
|   | <b>High exposure</b>       | Highly likely to have odour exposure |
|  | <b>Very high exposure</b>  | Odour exposure near certain          |

Figure 10 Risk of odour exposure potential – colour key. This is Table 11 from EPA Publication 1883.

| Frequency          | Hours per year (indicative) | Obvious odour character                                                             |                                                                                     |                                                                                     |
|--------------------|-----------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|-------------------------------------------------------------------------------------|
|                    |                             | unsafe                                                                              | unwelcome                                                                           | innocuous                                                                           |
| <b>0.5 - 2.0%</b>  | < 200                       |  |  |  |
| <b>2.1% - 6.0%</b> | 200 to 525.                 |  |  |  |
| <b>6.1% - 10%</b>  | 526 to 875                  |  |  |  |
| <b>&gt; 10%</b>    | (> 875 hrs/yr.)             |  |  |  |

Figure 11 Risk of odour based on character, obvious odour intensity and frequency of predicted odour. This is Table 12 from EPA Publication 1883.

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| Frequency   | Hours per year<br>(indicative) | Subtle odour character<br>(Obvious odour is < 2%) |           |           |
|-------------|--------------------------------|---------------------------------------------------|-----------|-----------|
|             |                                | unsafe                                            | unwelcome | innocuous |
| 0 - 2.0%    | < 200                          |                                                   |           |           |
| 2.1% - 6.0% | 200 to 525.                    |                                                   |           |           |
| 6.1% - 10%  | 526 to 875                     |                                                   |           |           |
| > 10%       | (> 875 hrs/yr.)                |                                                   |           |           |

Figure 12 Risk of odour based on character, subtle odour intensity and frequency of predicted odour. This is Table 13 from EPA Publication 1883.

| Rating    | Likelihood of offensive odour |
|-----------|-------------------------------|
| Very high | Almost certain                |
| High      | Highly likely                 |
| Moderate  | Likely                        |
| Low       | Unlikely but still possible   |

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Figure 13 Risk of offensive odour key. This is Table 14 from EPA Publication 1883.

| Risk of odour exposure | Receiving environment sensitivity |          |          |
|------------------------|-----------------------------------|----------|----------|
|                        | High                              | Medium   | Low      |
| Very high exposure     | Very high                         | High     | Moderate |
| High exposure          | High                              | High     | Moderate |
| Moderate exposure      | High                              | Moderate | Low      |
| Low exposure           | Moderate                          | Moderate | Low      |
| Negligible exposure    | Low                               | Low      | Low      |

Figure 14 Risk of offensive odour. This is Table 15 from EPA Publication 1883.

## 5.4.2 Risk assessment outcome

The overall risk of offensive odour impact at the identified receptors are derived using the method described in Section 5.4.1. GHD assessed the overall risk of offensive odour impacts as shown below:

- Overall risk of offensive odour impacts from proposed farms, summarised in Table 12.
- Overall risk of offensive odour impacts from current farms, summarised in Table 13.
- Overall risk of offensive odour impacts from current and proposed farms, summarised in Table 14.

Based on Table 12, the risk of offensive odour from the proposed farms is low at all the identified receptor locations. This means all identified receptors are unlikely to experience offensive odour from the proposed farms.

Based on Table 13, the risk of offensive odour from the current farms on their own is moderate at R3 and low at all other receptors. This means that R3 is predicted to likely experience offensive odour, while all other receptors are unlikely to experience offensive odour from the current farms.

Based on Table 14, with the establishment of the proposed farms, the cumulative risk of offensive odour is moderate at R3 and low at all other receptors. This is unchanged from the existing situation with the three existing farms on their own.

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**Table 12** Risk of offensive odour from proposed farms

| Receptor | Land use sensitivity | 99.9 <sup>th</sup> percentile, 3-min average (OU) | Odour intensity <sup>1</sup> | Number of 6 OU exceedance over a year | Frequency (%) | Risk odour exposure potential | Risk of offensive odour |
|----------|----------------------|---------------------------------------------------|------------------------------|---------------------------------------|---------------|-------------------------------|-------------------------|
| R1       | Low                  | 1.4                                               | Subtle                       | 0                                     | 0             | Negligible                    | Low                     |
| R2       | Low                  | 1.6                                               | Subtle                       | 0                                     | 0             | Negligible                    | Low                     |
| R3       | Low                  | 4.1                                               | Subtle                       | 2                                     | 0.02          | Negligible                    | Low                     |
| R4       | Low                  | 4.0                                               | Subtle                       | 0                                     | 0             | Negligible                    | Low                     |
| R5       | High                 | 2.3                                               | Subtle                       | 0                                     | 0             | Negligible                    | Low                     |
| R6       | Low                  | 2.0                                               | Subtle                       | 0                                     | 0             | Negligible                    | Low                     |

**Note:**

1. GHD has categorised the intensity of odour experienced at each receptor based on the maximum 99.9<sup>th</sup> percentile 3-minute average odour concentration predicted at the receptor. Obvious odours are odour concentrations predicted to be above 6 OU.

**Table 13** Risk of offensive odour from current farms

| Receptor | Land use sensitivity | 99.9 <sup>th</sup> percentile, 3-min average (OU) | Odour intensity <sup>1</sup> | Number of 6 OU exceedance over a year | Frequency (%) | Risk odour exposure potential | Risk of offensive odour |
|----------|----------------------|---------------------------------------------------|------------------------------|---------------------------------------|---------------|-------------------------------|-------------------------|
| R1       | Low                  | 7.2                                               | Subtle                       | 33                                    | 0.4           | Negligible                    | Low                     |
| R2       | Low                  | 7.7                                               | Subtle                       | 33                                    | 0.4           | Negligible                    | Low                     |
| R3       | Low                  | 10.7                                              | Obvious                      | 177                                   | 2.02          | High                          | Moderate                |
| R4       | Low                  | 8.2                                               | Obvious                      | 76                                    | 0.9           | Moderate                      | Low                     |
| R5       | High                 | 5.5                                               | Subtle                       | 2                                     | 0.02          | Negligible                    | Low                     |
| R6       | Low                  | 5.7                                               | Subtle                       | 7                                     | 0.1           | Negligible                    | Low                     |

**Note:**

1. GHD has categorised the intensity of odour experienced at each receptor based on the maximum 99.9<sup>th</sup> percentile 3-minute average odour concentration predicted at the receptor. Obvious odours are odour concentrations predicted to be above 6 OU.

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Table 14 Risk of offensive odour from current and proposed farms

| Receptor | Land use sensitivity | 99.9 <sup>th</sup> percentile, 3-min average (OU) | Odour intensity <sup>1</sup> | Number of 6 OU exceedance over a year | Frequency (%) | Risk odour exposure potential | Risk of offensive odour |
|----------|----------------------|---------------------------------------------------|------------------------------|---------------------------------------|---------------|-------------------------------|-------------------------|
| R1       | Low                  | 8.6                                               | Obvious                      | 48                                    | 0.6           | Moderate                      | Low                     |
| R2       | Low                  | 9.3                                               | Obvious                      | 45                                    | 0.5           | Moderate                      | Low                     |
| R3       | Low                  | 14.7                                              | Obvious                      | 184                                   | 2.1           | High                          | Moderate                |
| R4       | Low                  | 12.1                                              | Obvious                      | 81                                    | 0.9           | Moderate                      | Low                     |
| R5       | High                 | 7.9                                               | Subtle                       | 5                                     | 0.1           | Negligible                    | Low                     |
| R6       | Low                  | 7.6                                               | Subtle                       | 8                                     | 0.1           | Negligible                    | Low                     |

**Note:**

1. GHD has categorised the intensity of odour experienced at each receptor based on the maximum 99.9<sup>th</sup> percentile 3-minute average odour concentration predicted at the receptor. Obvious odours are odour concentrations predicted to be above 6 OU.

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## 5.5 Model result summary

The odour modelling results show the following features:

- From the proposed establishment of Farm 1 and Farm 2, the 99.9<sup>th</sup> percentile offsite concentrations are predicted to be below the 5 OU 99.9<sup>th</sup> percentile at all six receptors.
- From the current three farms and proposed establishment of Farm 1 and Farm 2, the 99.9<sup>th</sup> percentile offsite concentrations are predicted to be above the 5 OU 99.9<sup>th</sup> percentile at all six sensitive receptors.
- The increase in odour impact, as a result of increase in bird numbers, is most prominent at R3, followed by R4. However, the modelled increases are unlikely to be perceived (as the factor of increase is 0.4), the odour level needs to almost treble before an increase in perceived intensity is registered.

Using the odour dispersion modelling results, GHD has undertaken a risk of offensive odour assessment to assess the likelihood of the identified receptors in experiencing offensive odour from the existing and proposed farms. GHD has categorised the intensity of odour experienced at each receptor based on the maximum 99.9<sup>th</sup> percentile three-minute average odour concentration predicted at the receptor. Obvious odours are odour concentrations predicted to be above 6 OU. The risk assessment results indicate that:

- The risk of offensive odour from the two proposed farms is low at all the identified receptor locations.
- The risk of offensive odour from the current farms on their own is moderate at R3 and low at all other receptors.
- When the proposed farms are in place, the cumulative risk is unchanged from the current farms risk. The cumulative risk figure is shown in Figure 15.
- “Low risk” means a receptor is unlikely but still possible to experience offensive (obvious) odour but likely to be minimal.
- “Moderate risk” means a receptor is likely to experience offensive (obvious) odour. Although there may be some residual risk, it is possible it can be practically and effectively managed.

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**Legend**

- |                |                     |                                |
|----------------|---------------------|--------------------------------|
| Proposed sheds | Sensitive receptors | <b>Risk of Offensive Odour</b> |
| Existing sheds |                     | Moderate risk                  |
|                |                     | Low risk                       |

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Paper Size ISO A4

0 0.5 1 km

Map Projection: Transverse Mercator  
Horizontal Datum: GDA2020  
Grid: GDA2020 MGA Zone 55

Johnson Poultry Farms Pty Ltd  
Rosedale Broiler Farm UENA

Project No. 12677820  
Revision No. 1  
Date: 12/12/2025

**Level of risk of offensive odour plot**

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**FIGURE 14.0**



## 6. Conclusion

GHD understands that Rural Catalyst Group Pty Ltd is proposing to develop two new broiler farms of 400,000 birds each (Farm 1 and Farm 2) at Rosedale, Victoria. To support the proposed development, RCG has requested an Odour Environmental Risk Assessment (OERA) to be undertaken to assess the resultant odour impacts on the surrounding areas.

This report presents the OERA undertaken in accordance with EPA Publication 1883 – *Guidance for assessing odour* and AgriFutures – *Planning and environment guideline for establishing meat chicken farms: Guide 1 – Assessment guide* for the proposed broiler farm at Rosedale (the site), to understand odour risks associated with proposed operations.

### Odour dispersion modelling results

The odour impact from the proposed development of Farm 1 and Farm 2 in addition to the cumulative impact from current farms (Farm 3, 4 and 5 which are independent of RCG) was assessed using CALPUFF modelling. The predicted 99.9<sup>th</sup> percentile 3-minute average of off-site odour concentrations over five years of modelled meteorology were assessed against the five-odour unit (5 OU) level to understand the predicted downwind odour concentrations during short time worst-case, poor dispersive meteorological conditions. The 5 OU has been taken as the level that if the odour is obvious and has an offensive character, it may lead to nuisance and resultant complaint.

The 99.9<sup>th</sup> percentile offsite concentrations for the proposed two farms are predicted to be below the 5 OU 99.9<sup>th</sup> percentile at R1 – R6 (total of six receptors).

The 99.9<sup>th</sup> percentile offsite concentrations are predicted to be above the 5 OU 99.9<sup>th</sup> percentile at R1 – R6 (total of six receptors) for the cumulative impact scenario including the existing three farms nearby (two operational, one proposed). The increase in odour impact, as a result of increase in bird numbers, is most prominent at R3, followed by R4. However, the modelled increases are unlikely to be perceived as the odour level needs to almost treble before an increase in perceived intensity is registered (actual factor increase is 0.4).

### Risk of offensive odour assessment

GHD calibrated the odour dispersion model and compared the modelled results with odour survey observations undertaken at a similar broiler farm located in Sale – Toongabbie Road also owned and operated by RCG. GHD identified the likely modelled odour concentrations which could describe the 'Obvious' odour experienced by the surveyors to be 6 OU. The identified odour concentrations for 'Obvious' odour is then used as the level which may lead to nuisance and resultant complaint assesses the odour risk.

The risk assessment results indicate that the risk of offensive odour is low at all the identified receptor locations for the proposed two farms. The risk of offensive odour from the current farms on their own is moderate at R3 and low at all other receptors. When the proposed farms are in place, the cumulative risk is unchanged from the current farms risk. "Low risk" means a receptor is unlikely but still possible to experience offensive (obvious) odour but likely to be minimal. "Moderate risk" means a receptor is likely to experience offensive (obvious) odour. Although there may be some residual risk, it is possible it can be practically and effectively managed such as through developing a vegetation buffer on the north western corners of the two proposed farms, to reduce the dispersion of poultry odour from the farms.

### Conclusion

For the proposed development of Farm 1 and Farm 2, the risk assessment indicates that odour risk is low at all nearby receptors. When cumulative impacts are considered, the risk levels are low at all receptors and moderate at R3, this is unchanged from the existing situation of the three farms on their own. Therefore, based on the assessment results, the proposed two farms are considered to not adversely impact the surrounding areas.

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# Appendices

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# Appendix A

## TAPM and CALMET setup

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## A-1 TAPM

The Air Pollution Model (TAPM) Version 4 is a prognostic model developed in Australia by the Commonwealth Scientific and Industrial Research Organisation (CSIRO). The TAPM prognostic model was run to obtain a three-dimensional meteorological gridded dataset for the site for the modelled period between 1 January 2020 and 01 January 2025 (five years).

The configuration of the TAPM model was in accordance with the guidance outlined in EPA Publication 1550 and is presented in Table B.1.

*Table A.1 TAPM model setup*

| Parameter                        | Value                                                                                                                                                                                                                                               |
|----------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Modelled Period                  | 01 January 2020 – 01 January 2024                                                                                                                                                                                                                   |
| Domain centre                    | UTM 55S Easting – 485,403 m<br>UTM 55S Northing – 5,773,830 m<br><br>Latitude – 38° -11' S<br>Longitude – 146° 50' E                                                                                                                                |
| Number of vertical levels        | 25                                                                                                                                                                                                                                                  |
| Number of Easting Grid Points    | 41                                                                                                                                                                                                                                                  |
| Number of Northing Grid Points   | 41                                                                                                                                                                                                                                                  |
| Outer Grid Spacing               | 10,000 m x 10,000 m                                                                                                                                                                                                                                 |
| Number of Grid Levels            | 4                                                                                                                                                                                                                                                   |
| Grid Level Horizontal Resolution | Level 2 – 3,000 m<br>Level 3 – 1,000 m<br>Level 4 – 300 m                                                                                                                                                                                           |
| Local met assimilation           | None                                                                                                                                                                                                                                                |
| Surface vegetation database      | Default TAPM V4 database at 3-minute grid spacing – Australian vegetation soil type data provided by CSIRO Wildlife and Ecology. From this, vegetation data was manually adapted to suit current conditions, given the age of the default database. |
| Terrain database                 | Default TAPM V4 database at 9-second grid spacing – Australian terrain height data from Geoscience Australia                                                                                                                                        |

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## A-2 CALMET

CALMET is a meteorological model that develops hourly winds and other meteorological fields on a three-dimensional gridded domain as required as inputs to CALPUFF dispersion model. Associated two-dimensional fields such as surface characteristics and dispersion properties are also included. The interpolated wind field is then modified within the model to account for the influence of topography, sea breezes, as well as differential heating and surface roughness associated with different land uses across modelling domain. These modifications are applied to the winds at each grid point to develop a final wind field. The final hourly varying wind field thus reflects the influences of local topography and land uses.

Upon completion of TAPM modelling, a CALMET simulation was set up to run for the model period (1 January 2020 – 31 December 2024), combining the three-dimensional gridded data output from the TAPM model and site-specific surface data. Local topography and land use information were used in CALMET to refine the wind field predetermined by TAPM output. This approach is consistent with the New South Wales (NSW) Approved Methods 2022<sup>11</sup>. The CALMET model domain of 11 x 11 km is selected to include Rosedale South weather station as surface station data.

CALMET was run using the “Hybrid” mode (NOOBS = 1) with the Grid 4 TAPM data (Grid resolution of 300 m) as initial guess field. All model settings (except TERRAD, Kinematic effects and O’Brien adjustment for vertical smoothing) were selected based on the guidance document, Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System<sup>12</sup> (Generic Guidance) referenced in the NSW Approved Method 2022, for “Hybrid” mode. The CALMET model parameters selected for this assessment are summarised in Table B.2. Terrain and land use data for the CALMET modelling are presented in Figure B.1 and Figure B.2, respectively.

Table A.2 Summary of CALMET model parameters

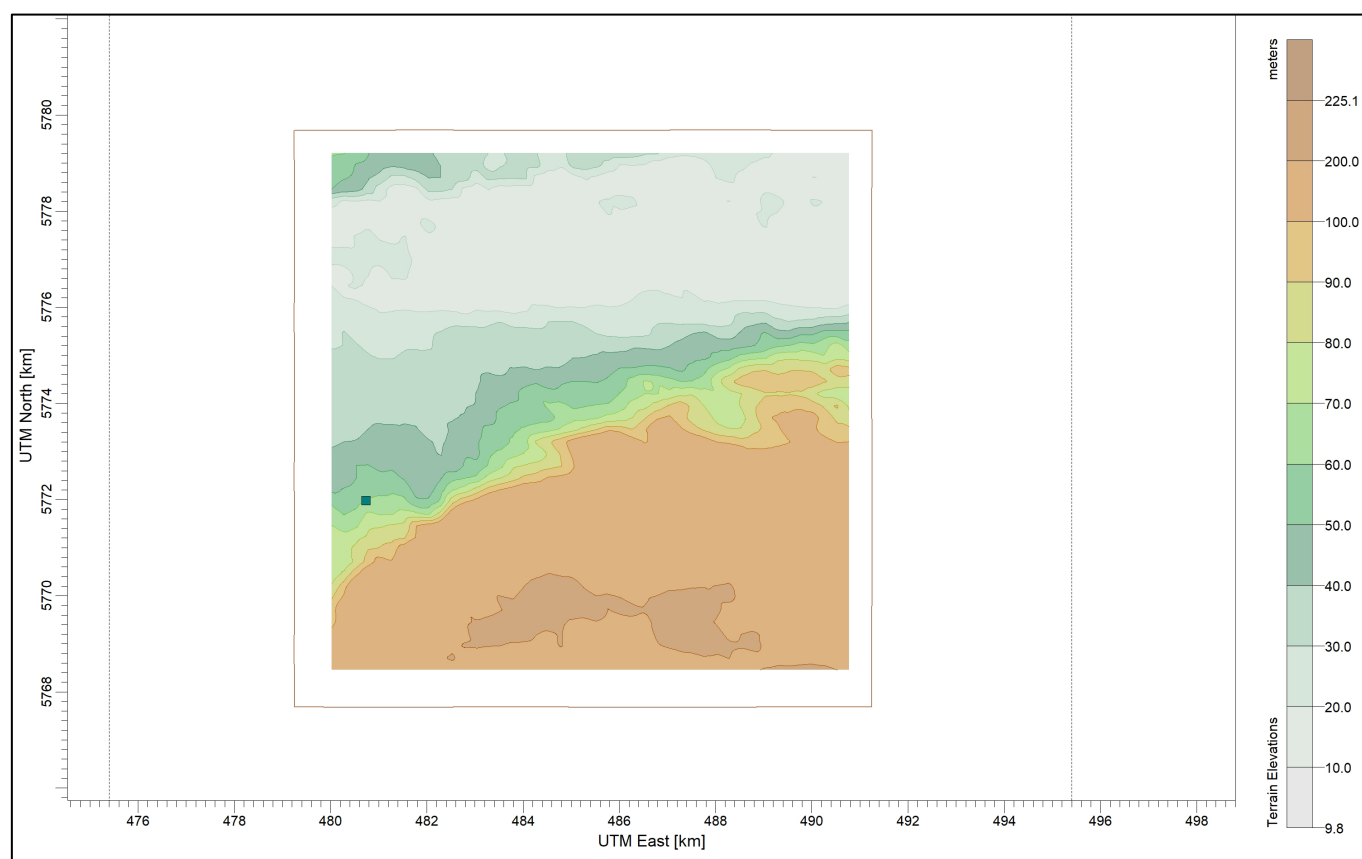
| Parameters                 | Value                                                                                                           |
|----------------------------|-----------------------------------------------------------------------------------------------------------------|
| Modelled period            | 01 January 2020 – 31 December 2024                                                                              |
| Mode                       | Hybrid (NOOBS = 1)                                                                                              |
| UTM Zone                   | 55                                                                                                              |
| Domain Origin              | Easting: 485.403 km<br>Northing: 5,773.830 km                                                                   |
| Domain size                | 44 x 44 at 0.25 km resolution<br>(11 km x 11 km)                                                                |
| Number of vertical levels  | 10                                                                                                              |
| Vertical levels (m)        | 0,20, 40, 80, 160, 320, 640, 1200, 2000, 3000, 4000                                                             |
| TERRAD                     | 5 km                                                                                                            |
| Kinematics effects (IKINE) | Off (0)                                                                                                         |
| Other CALMET settings      | Slope flow effects (ISLOPE) = On<br>Froude Adjustment (IFRADJ) = On<br>Vertical velocity adjustment (IOBR) = On |
| R1, R2, RMAX1, RMAX2       | R1 – 10 km<br>RMAX1 – 20 km<br>R2 and RMAX2 – 0.1 km (No Upper air station included in assessment)              |

<sup>11</sup> New South Wales Environment Protection Authority – Approved Methods for the Modelling and Assessment of Air Pollutants in New South Wales, August 2022.

<sup>12</sup> Generic Guidance and Optimum Model Settings for the CALPUFF Modelling System for Inclusion into the ‘Approved Methods for the Modelling and Assessments of Air Pollutants in NSW, Australia’, March 2011.

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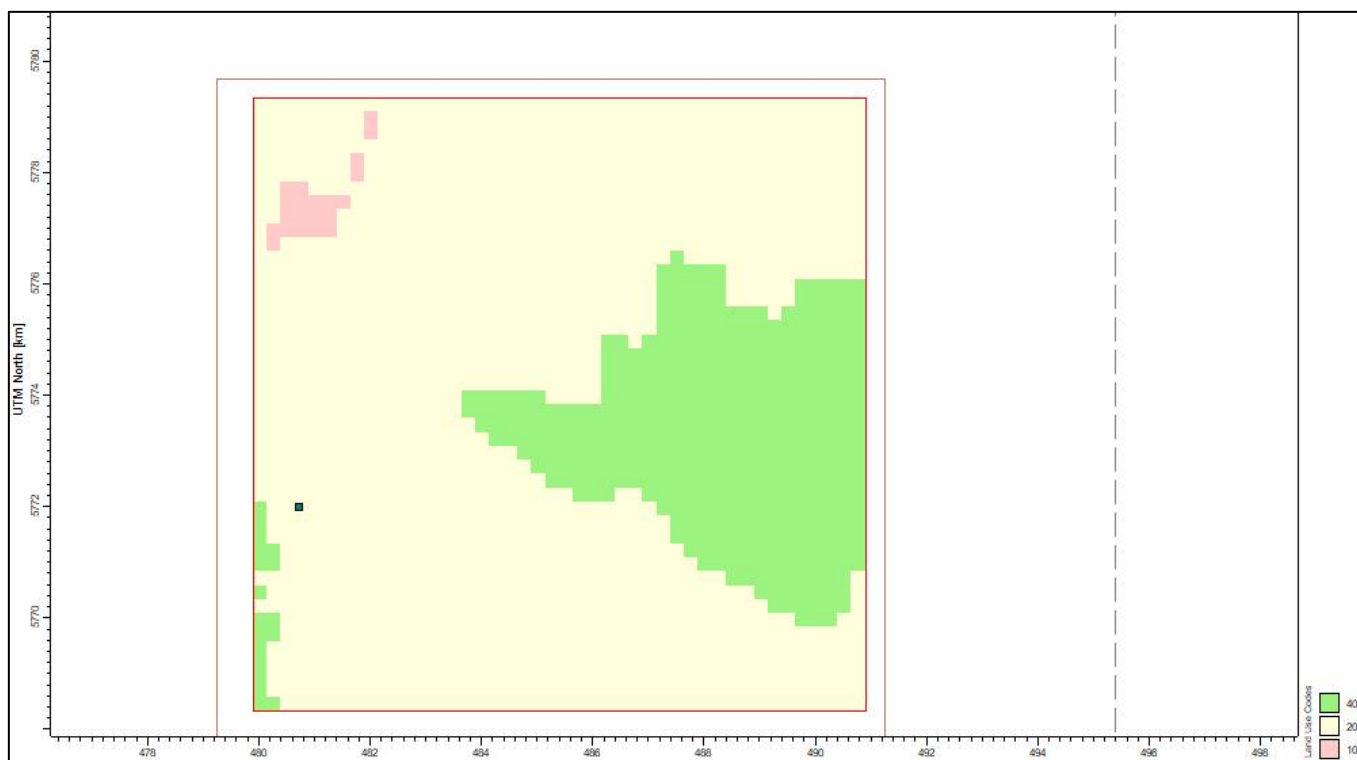
| Parameters           | Value                                                                                                                                                                                                                                                                                                        |
|----------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Initial guess field  | TAPM.m3d file derived from Grid 4 (300 m spacing, 41 X 41 Grid points)                                                                                                                                                                                                                                       |
| Surface station data | Rosedale South weather station<br>Latitude: - 38.20<br>Longitude: 146.78                                                                                                                                                                                                                                     |
| Upper air data       | No site-specific upper air data was used (up.dat). Upper air data is included within the TAPM .m3d initial guess field.                                                                                                                                                                                      |
| Land use data        | The land use data for the modelling domain was derived from the Global Land Cover Characterization Version 2 for Australia Pacific, with a resolution of approximately 1 km.<br>Land use data code:<br>10 – Urban<br>20 – Agricultural Land<br>30 – Rangeland<br>40 – Forest Land<br>51 – Streams and canals |
| Terrain data         | The terrain data was extracted from 1 arc-second (~30 m) spaced elevation data obtained via NASA's Shuttle Topography Radar Missions (STRM1 – Version 3).                                                                                                                                                    |



**Figure A.1** Terrain data used for CALMET modelling (11 km X 11 km, centred at the site). Square marker shows location of Rosedale South Station.

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**Figure A.2** Land use data for CALMET (11 km X 11 km, centred at the site). Square marker shows location of Rosedale South weather station

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## A-3 Model validation

The modelled meteorological data (CALMET extracted data) at Rosedale South station is compared with the actual meteorological data measured at Rosedale South station between 2020 to 2024 to assess the validity of CALMET simulated winds.

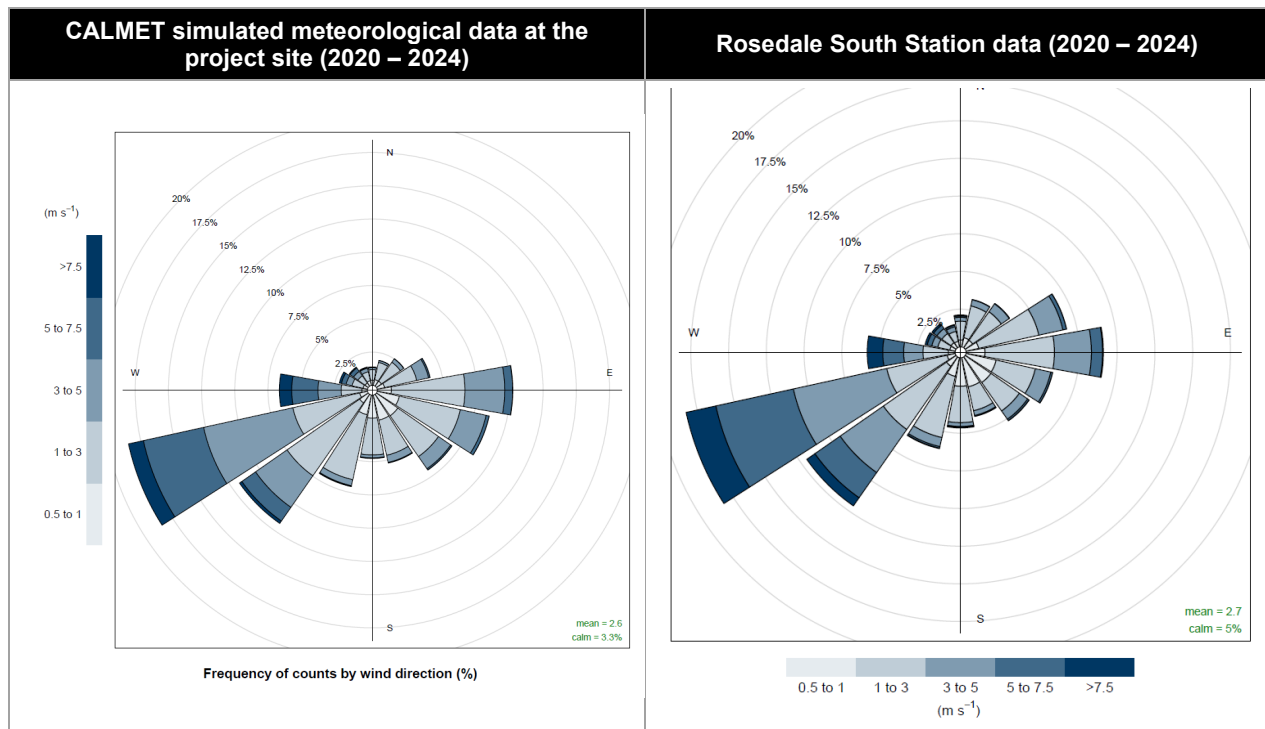
The data is presented in Table B.3, in the form of annual wind roses, for the period between 1 January 2020 and 31 December 2024, comparing CALMET simulated winds and BoM measured winds at Rosedale South station.

Based on Table B.3, the following are observed:

- CALMET simulated winds captured the predominant wind direction from the south-southwest.
- CALMET simulate winds underpredicts the frequency of calm winds (by 1.7%). Mean wind speeds are only slightly less (2.6 m/s compared to 2.7 m/s)
- Based on Table B.3, the CALMET simulation produces a slightly higher frequency of light winds between 0.5 - 1 m/s than was measured at BoM station

Overall, CALMET simulated winds produces very similar annual wind patterns at the Rosedale South station. The greater amount of lower wind speeds predicted by the CALMET simulation would result in a more conservative assessment as odour impacts are greater in lighter winds.

**Table A.3** CALMET modelled meteorological data compared with AWS measured data in the form of wind roses



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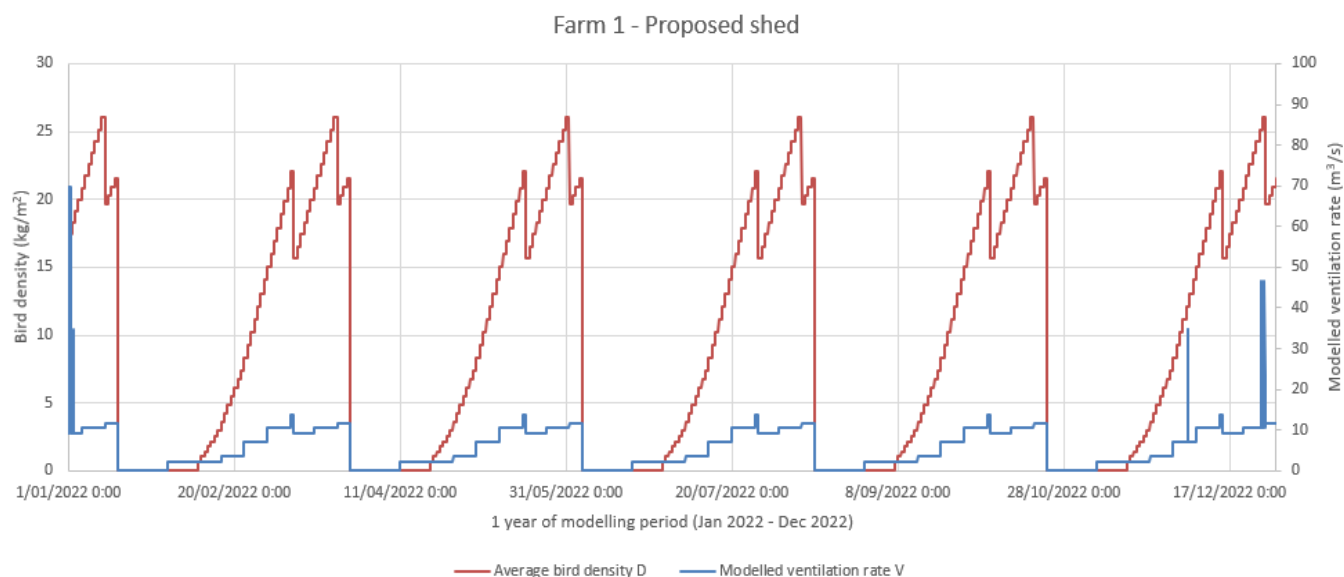


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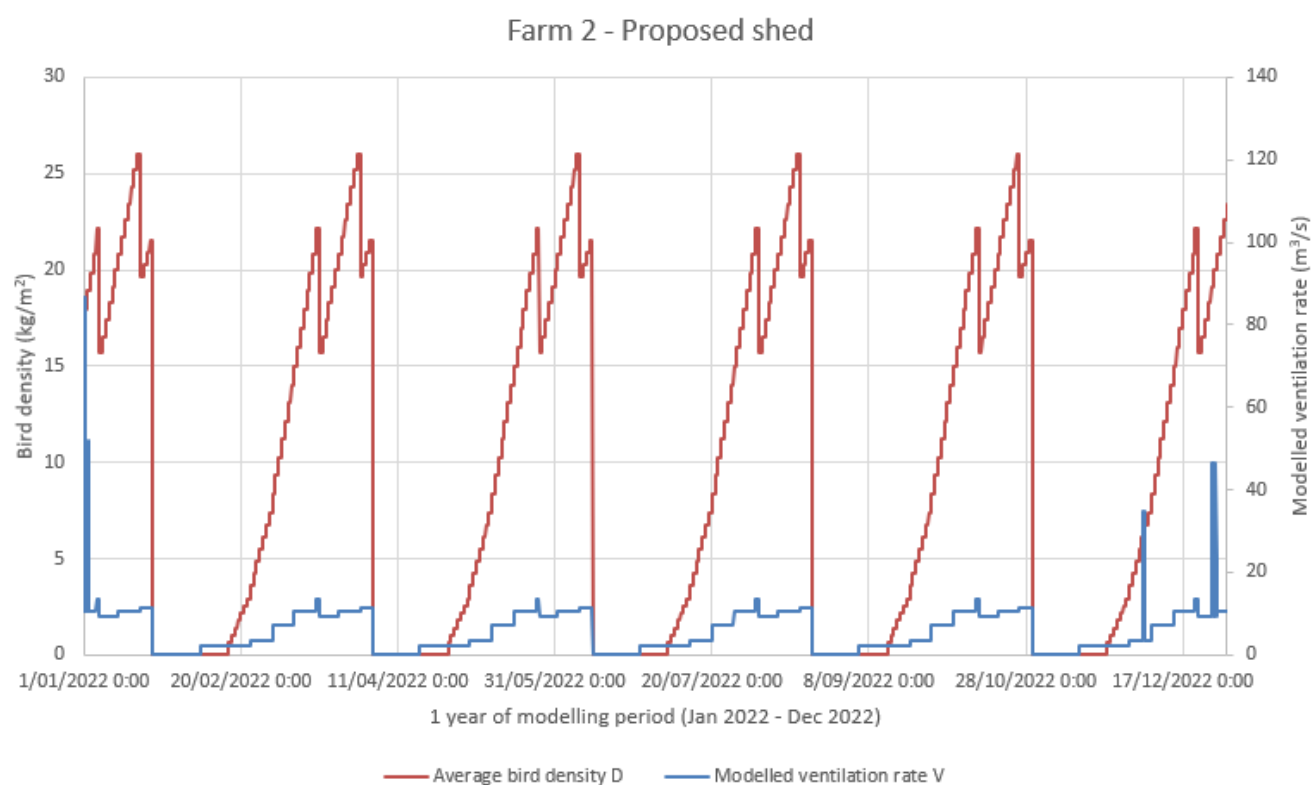
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# Appendix B

**Hourly varying bird density (D) and ventilation rate (V)**



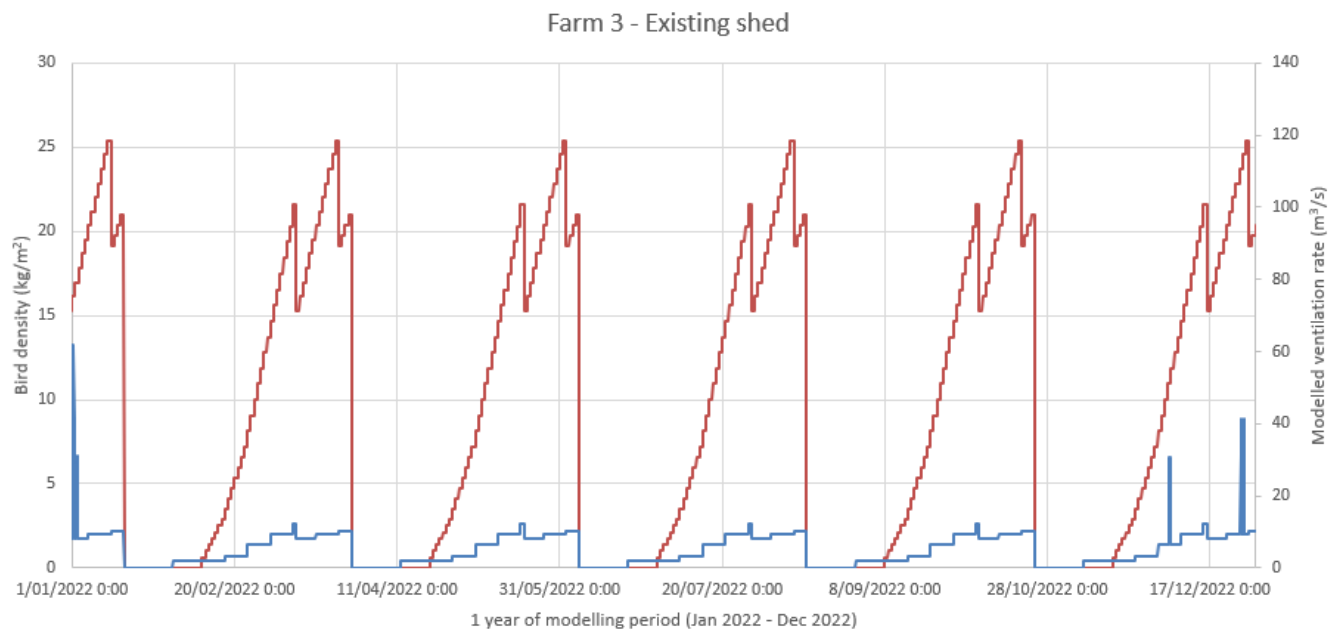
**Figure C.1**      *Farm 1 – Proposed farm sheds*



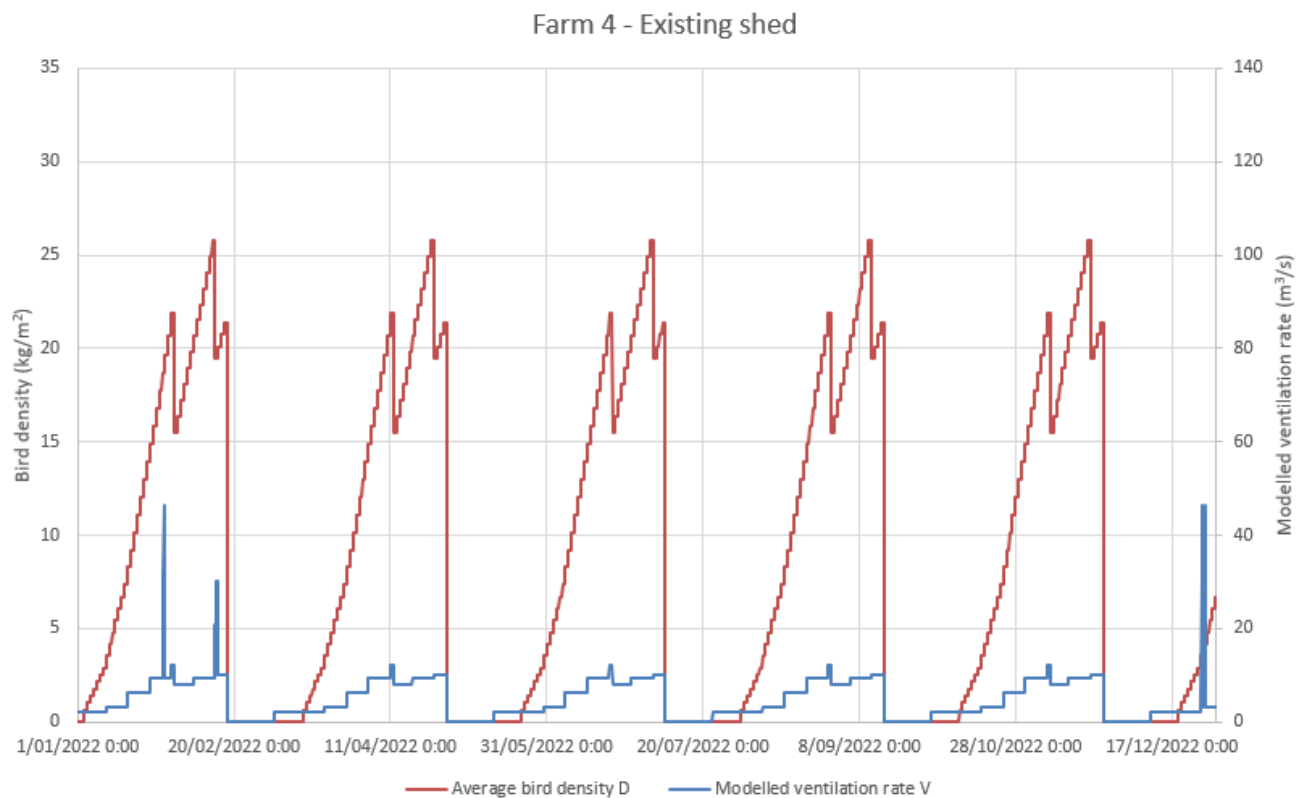
**Figure C.2**      *Farm 2 – Proposed farm sheds*

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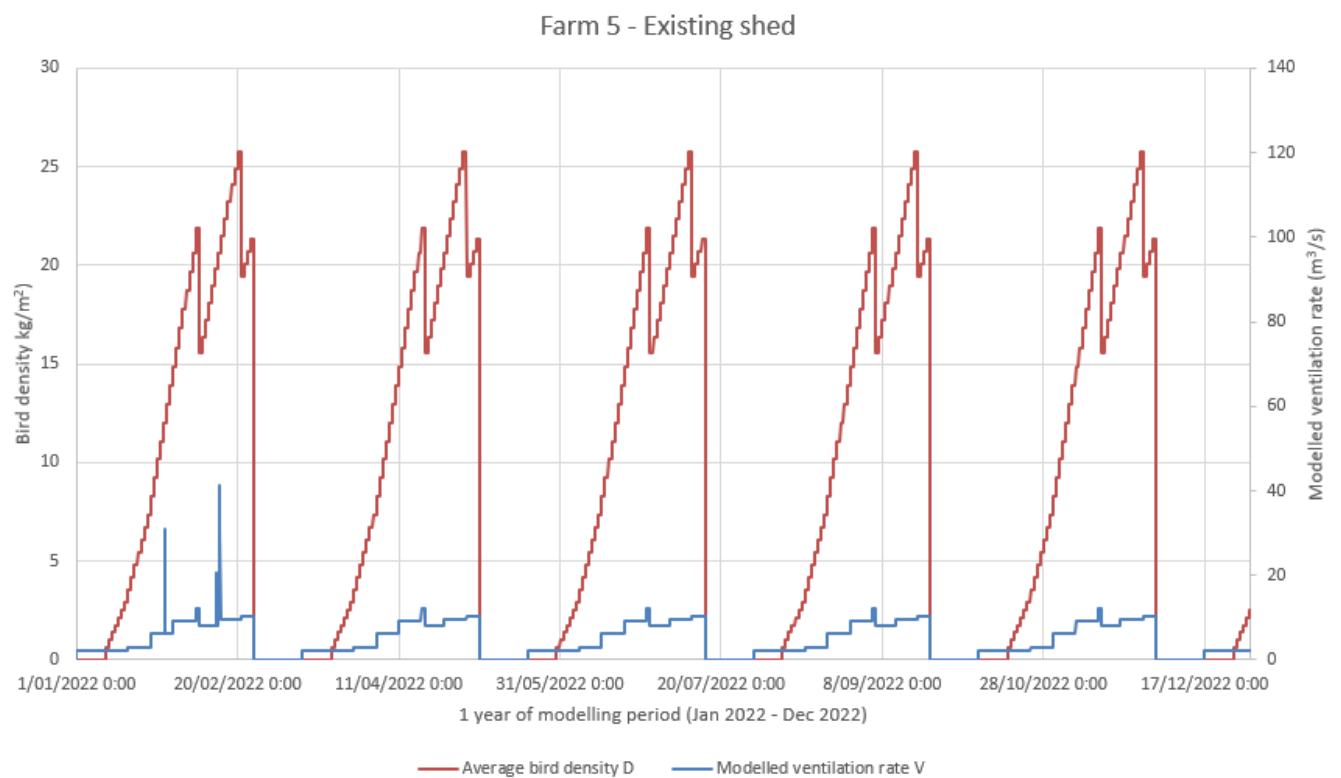
**Figure C.3** Farm 3 – Existing farm sheds



**Figure C.4** Farm 4 – Existing farm sheds

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**Figure C.5**      *Farm 5 – Existing farm sheds*

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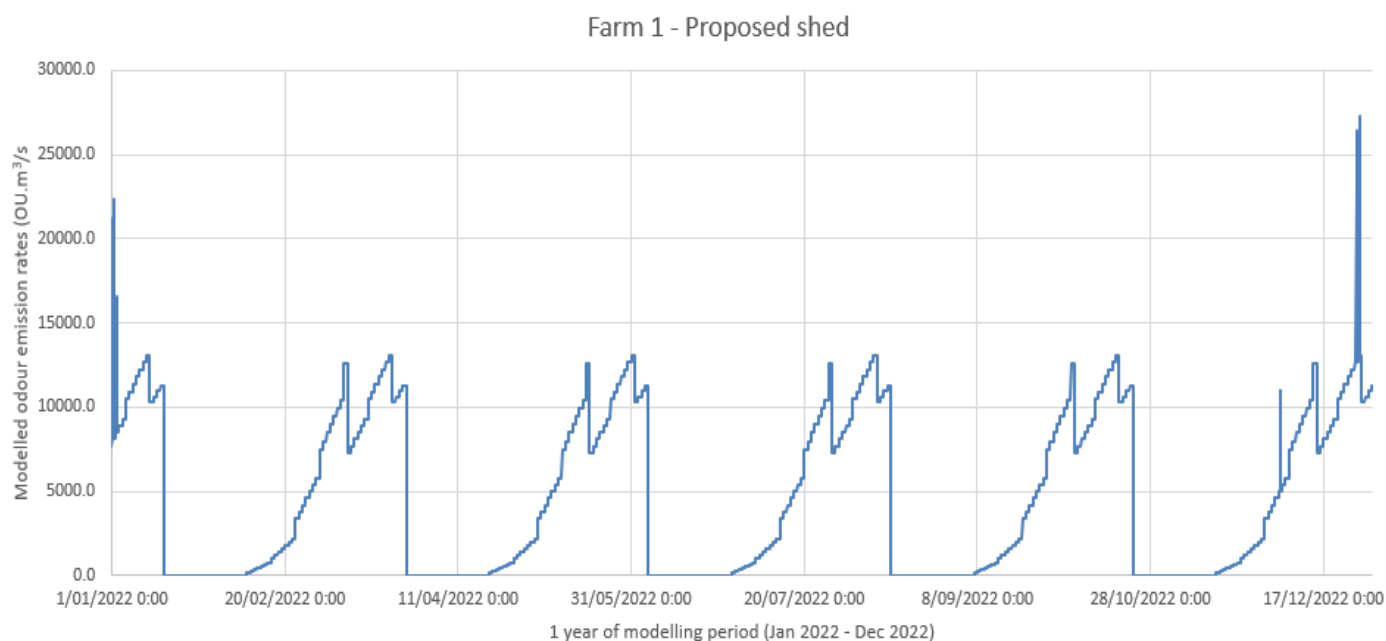
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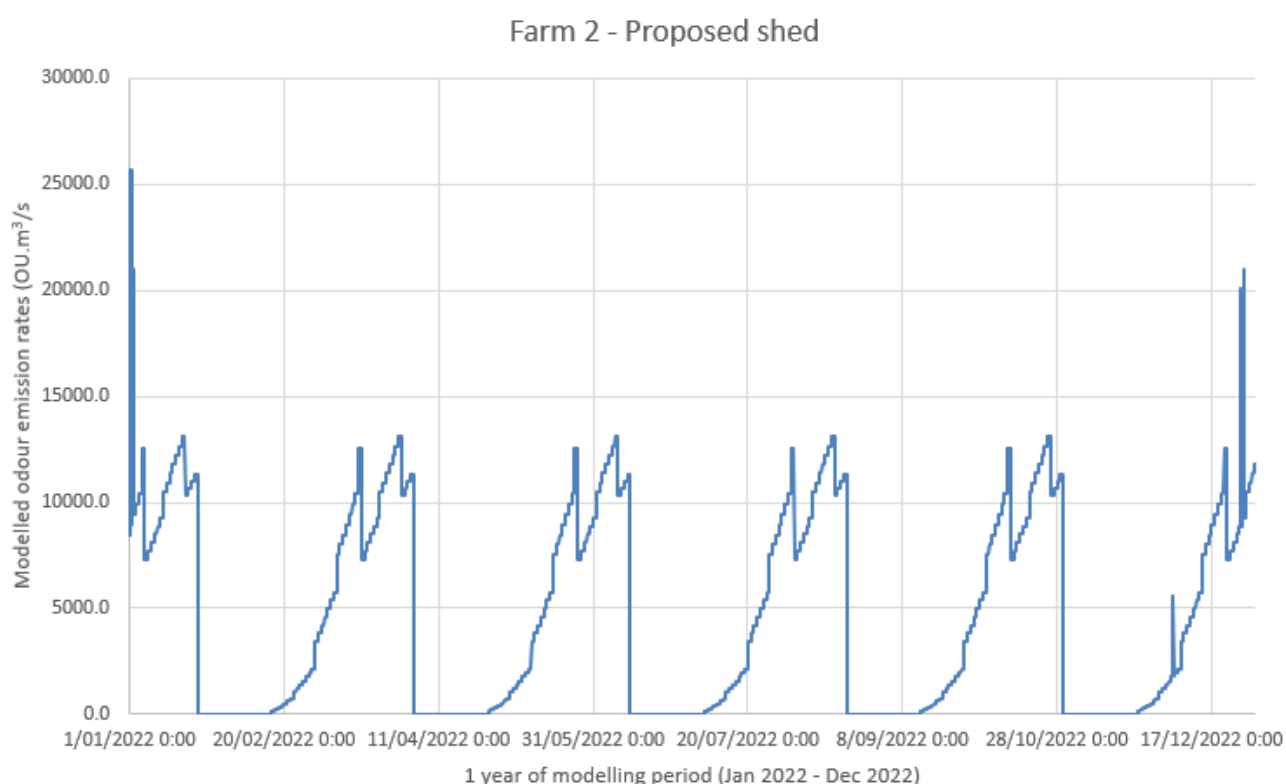
# **Appendix C**

## **Modelled odour emission rates**





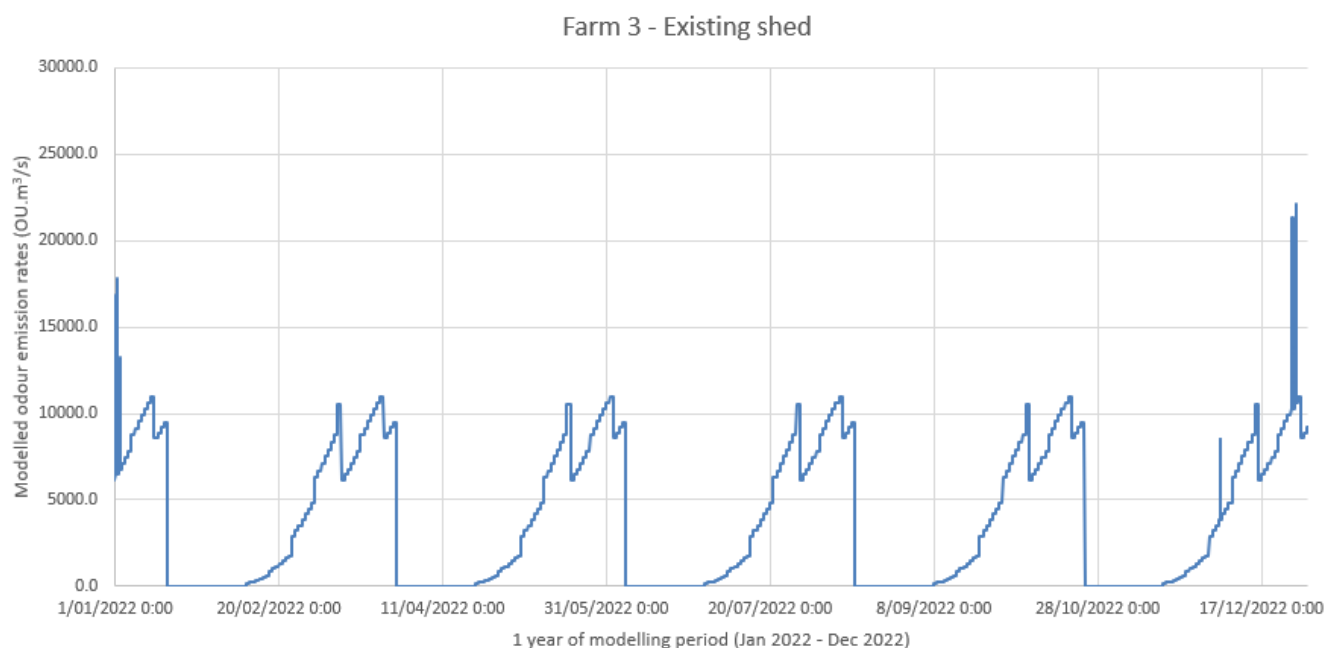
**Figure D.1**      *Farm 1 – Proposed farm sheds*



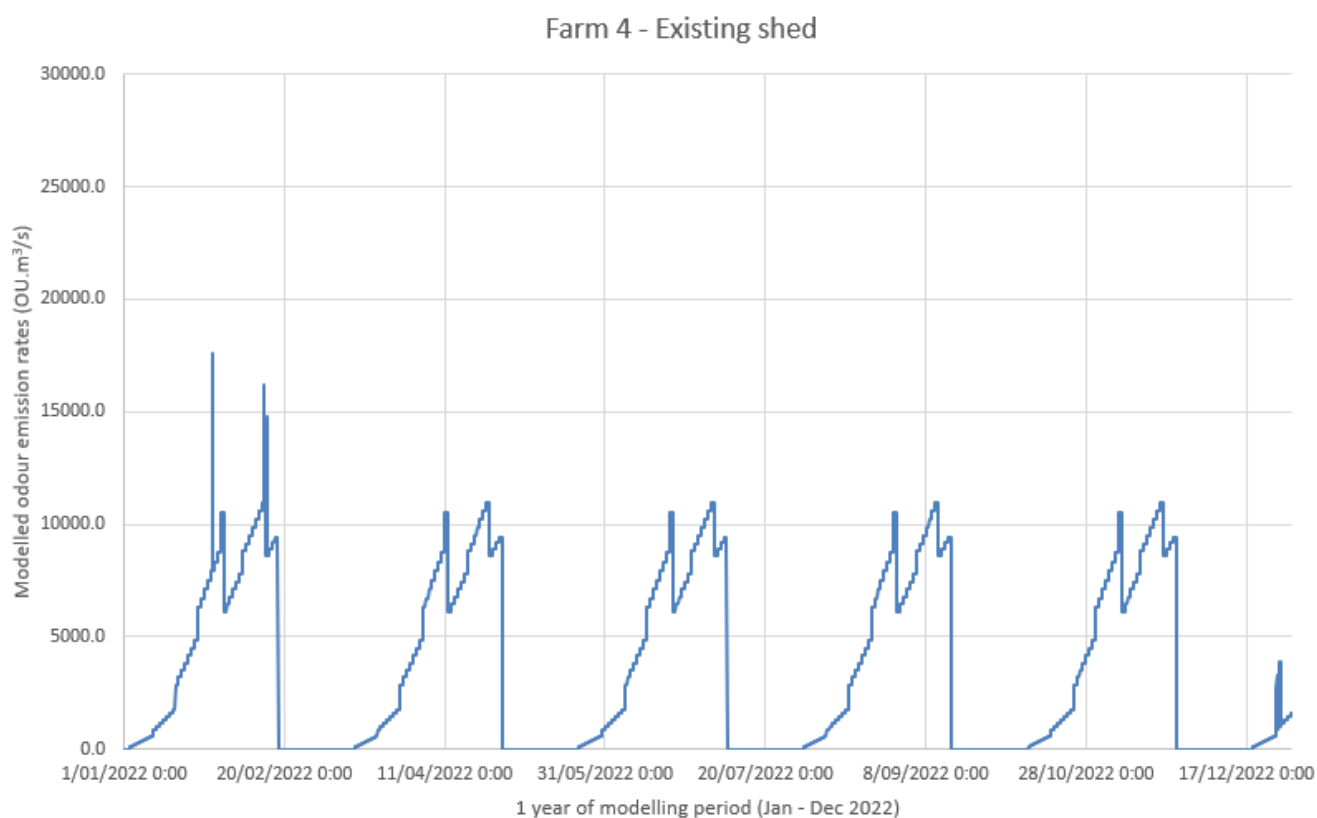
**Figure D.2**      *Farm 2 – Proposed farm sheds*

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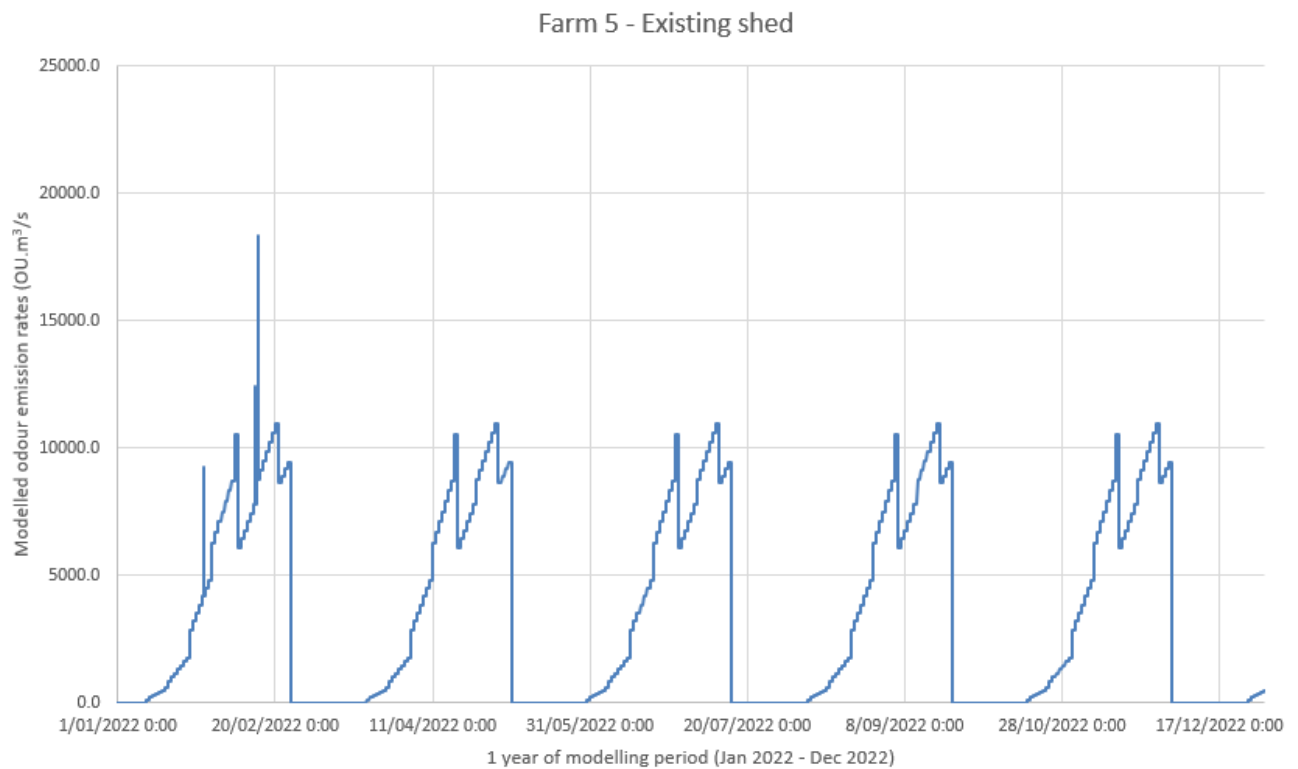
**Figure D.3** Farm 3 – Existing farm sheds



**Figure D.4** Farm 4 – Existing farm sheds

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**Figure D.5**      *Farm 5 – Existing farm sheds*

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# **Appendix D**

**Sale-Toongabbie broiler farm odour survey observations and model calibration**

## D-1 Sale-Toongabbie Farm information

The Sale-Toongabbie Farm currently consists of four farms, and each farm has eight sheds. Each of the current shed has a floor area of 3,520 m<sup>2</sup> (176 m x 20 m), with the capacity to hold 50,000 birds. The mainly ventilation used to manage internal shed temperatures at the Sale – Toongabbie Farm is tunnel ventilation fan.

## D-2 Odour surveys

Odour emanating from the Sale-Toongabbie Farm was observed during all ten odour surveys conducted by GHD in accordance with EPA guidance 1881. The odour surveys were undertaken on three separate days, listed as follows:

- Odour survey 1 – 5 were undertaken on 23 November 2023, between 10:00 and 16:00 prior to first pick
- Odour survey 6 – 8 were undertaken on 11 December 2023, between 12:00 and 19:00 prior to final pick
- Odour survey 9 – 10 were undertaken on 12 December 2023, between 06:45 and 09:30 prior to final pick

The odour surveys were undertaken at times to capture peak odour conditions at Farm 2 (just prior to first pick and just prior to final pick) and during early morning and late evening. The age of the birds during the two events were 28 days and 47 days respectively.

As the operations for both Farm 1 and Farm 2 at Sale-Toongabbie Farm are similar, the odour surveillance program was undertaken for Farm 2 only. It is expected for odour emissions from Farm 1 to be similar to Farm 2, therefore surveillance results have been applied to Farm 1.

## D-3 Model calibration using odour survey observations

The odour dispersion model results prepared for Sale-Toongabbie Farm are spot calibrated using the odour surveillance observations with the aim to compare and identify the likely modelled odour concentrations which could describe the 'Obvious' and 'Subtle' experienced by the surveyors.

## D-4 Calibration methodology

The odour dispersion model is updated and run based on the following:

- The number and age of birds present at Sale-Toongabbie Farm 2 during the three days when odour surveys were undertaken
- Average temperature, wind speed, wind direction, relative humidity and cloud amount observed on those days

A summary of the above data used to update the odour dispersion model is summarised in Table F.1. The updated odour dispersion model results are then compared with the odour survey results to identify odour concentrations for 'Obvious' and 'Subtle' odour.

**Table E.1** Summary of data used to update odour dispersion model prepared for Sale-Toongabbie Farm

| Odour survey number | Farm 2 bird |         | Average temperature | Average wind speed | Average wind direction | Relative humidity | Cloud amount <sup>13</sup> |
|---------------------|-------------|---------|---------------------|--------------------|------------------------|-------------------|----------------------------|
|                     | Maximum Age | Number  | °C                  | m/s                | °                      | %                 | tenths                     |
| 1 – 5               | 28          | 400,000 | 20 – 24             | 2.5                | 80 – 90                | 53                | 6                          |
| 6 – 8               | 47          | 200,000 | 21                  | 2                  | 80 – 90                | 90 – 95           | 10                         |
| 9 – 10              | 47          | 200,000 | 19 – 20             | 3                  | 80 – 90                | 90 – 95           | 10                         |

<sup>13</sup> Based on La Trobe Airport data which is measured in eighths



## D-5 Calibrated results

The odour dispersion model, updated with the data presented in Table F.2, are plotted with the odour intensities recorded during the odour surveys and are presented in Figure F.1. Using Figure F.1, odour concentrations which could be described as 'Obvious' and 'Subtle' are determined as follows:

- 'Obvious' odour – Identifying the mean of the two lowest contour areas of odour concentrations where the odour intensity was still observed as obvious
- 'Subtle' odour – Identifying the mean of the two lowest contour areas of odour concentrations where the odour intensity was still observed as subtle

Table E.2 presents the derivation of odour concentrations identified as 'Obvious' and 'Subtle' odours. It shows that the odour concentration which could describe 'Obvious' and 'Subtle' odour are 6 OU and 4.5 OU, respectively.

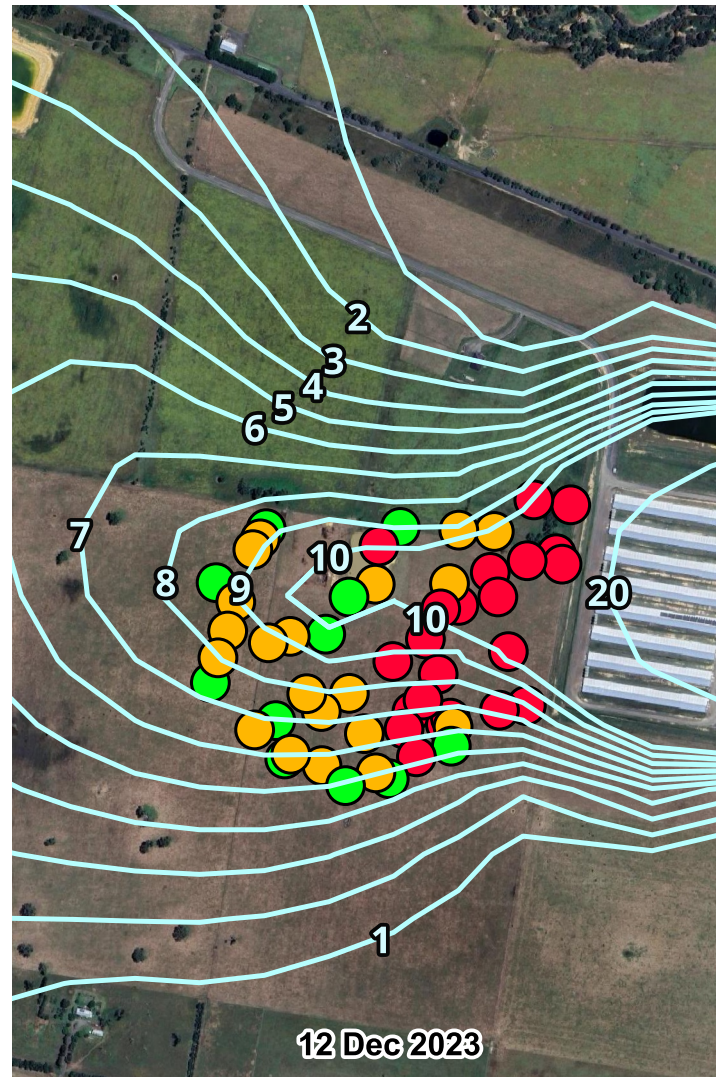
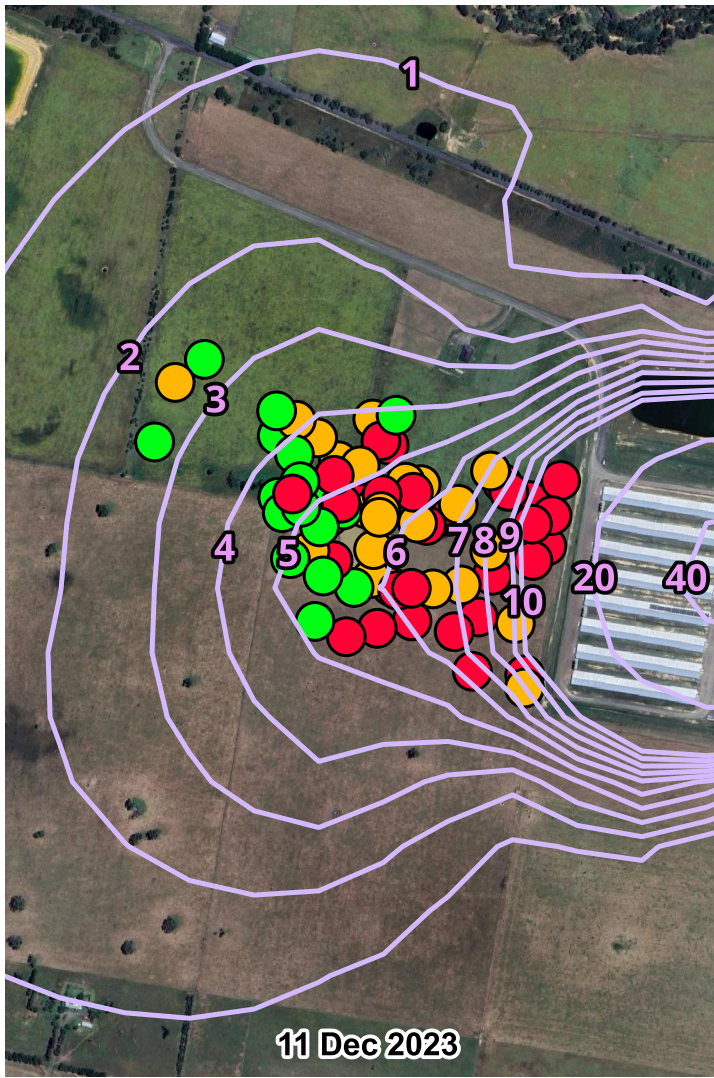
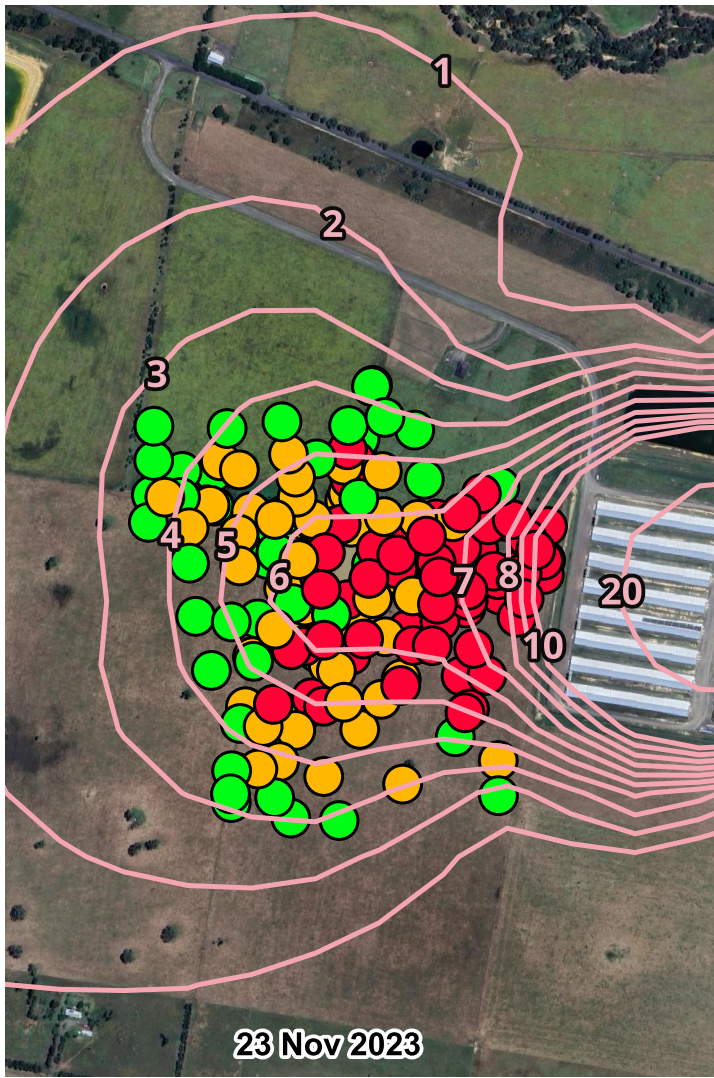
**Table E.2** Determining odour concentrations which could be described as 'Obvious' and 'Subtle'

| Obvious odour                                |                                  |                                                        |        |        |
|----------------------------------------------|----------------------------------|--------------------------------------------------------|--------|--------|
| Areas of lowest odour concentrations         | Average value within the contour | Number of points observed as ‘obvious’ within the area |        |        |
|                                              |                                  | 23 Nov                                                 | 11 Dec | 12 Dec |
| 4 – 5 OU                                     | 4.5                              | 2                                                      | 5      | -      |
| 5 – 6 OU                                     | 5.5                              | 11                                                     | 6      | 1      |
| 6 – 7 OU                                     | 6.5                              | -                                                      | -      | 3      |
| Mean of the two lowest contour areas (in OU) |                                  | 5.35                                                   | 5.05   | 6.25   |
| Average concentration described as ‘Obvious’ |                                  | 5.6 (approximately 6 OU)                               |        |        |
|                                              |                                  |                                                        |        |        |
| Subtle odour                                 |                                  |                                                        |        |        |
| Areas of lowest odour concentrations         | Average value within the contour | Number of points observed as ‘subtle’ within the area  |        |        |
|                                              |                                  | 23 Nov                                                 | 11 Dec | 12 Dec |
| 3 – 4 OU                                     | 3.5                              | 6                                                      | 1      | -      |
| 4 – 5 OU                                     | 4.5                              | 9                                                      | 4      | -      |
| 5 – 6 OU                                     | 5.5                              | -                                                      | -      | 3      |
| 6 – 7 OU                                     | 6.5                              | -                                                      | -      | 3      |
| Mean of the two lowest contour areas (in OU) |                                  | 4.1                                                    | 3.58   | 6.0    |
| Average concentration described as ‘Subtle’  |                                  | 4.5 OU                                                 |        |        |

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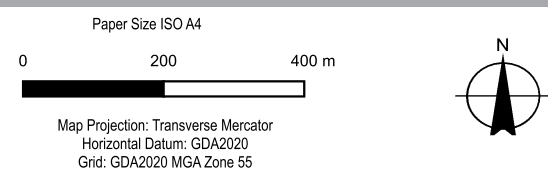


**Legend**

-  Site Boundary
-  Predicted odour impact on 23 Nov 2023
-  Predicted odour impact on 11 Dec 2023
-  Predicted odour impact on 12 Dec 2023

**Odour survey observations**

-  Obvious
-  Subtle
-  No odour



Johnson Poultry Farm Pty Ltd  
Sale-Toongabbie Road Broiler Farm Odour Assessment

**Calibrated odour impact 99.9%ile 3-minute average odour concentration (OU) from Farm 2 compared with odour survey observations**

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FIGURE F.1

Data Source: Google Earth Imagery 2024.

Document Path: \\ghdnet\ghd\AU\Melbourne\Projects\31112619933\Tech\Air Quality\06\_GIS\12619933\_Toongabbie.gqz  
Print Date: 05/02/2024

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