APPENDIX 5 ODOUR IMPACT ASSESSMENT AP05

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Report

Separation Distance Assessment – Proposed Torrumbarry Farms – Project 4G

McLean Farms Australia Pty Ltd

Job: 25-105

Date: 4 November 2025

Astute Environmental Consulting

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1 INTRODUCTION

Astute Environmental Consulting Pty Ltd (Astute) was engaged by McLean Farms Australia Pty Ltd to perform a separation distance assessment relating to a proposed Poultry farm development application which will consist of a Rearing Farm, a Cage Free Layer Farm, and a Cage Free/Free Range Layer Farm with an ancillary Composting Facility.

1.1 Understanding of the Project

The proposed layout for the farms is shown in Figure 1-1 below. There are four elements to the overall development:

- Pollocks Block – Rearing Farm (Animal Production - Poultry farm) – 720,000 birds - 2 Stages (Stage 1, 12 sheds, Stage 2, 6 sheds) (green arrow);
- Warwick's Block – Cage Free Layer Farm (Animal Production - Poultry farm) – 1,280,000 birds - 2 Stages (Stage 1, 8 sheds, Stage 2, 8 sheds) (red arrow);
- T-Block – Free Range Layer Farm (Animal Production - Poultry farm) - 800,000 birds – 2 Stages (Stage 1, 10 sheds, Stage 2, 10 sheds) (blue arrow); and
- Ancillary Composting (pink arrow) which will be developed as part of the T-Block Farm.

Each shed will hold up to 40,000 birds except for the Warwick's block, which will hold up to 80,000 birds per shed.

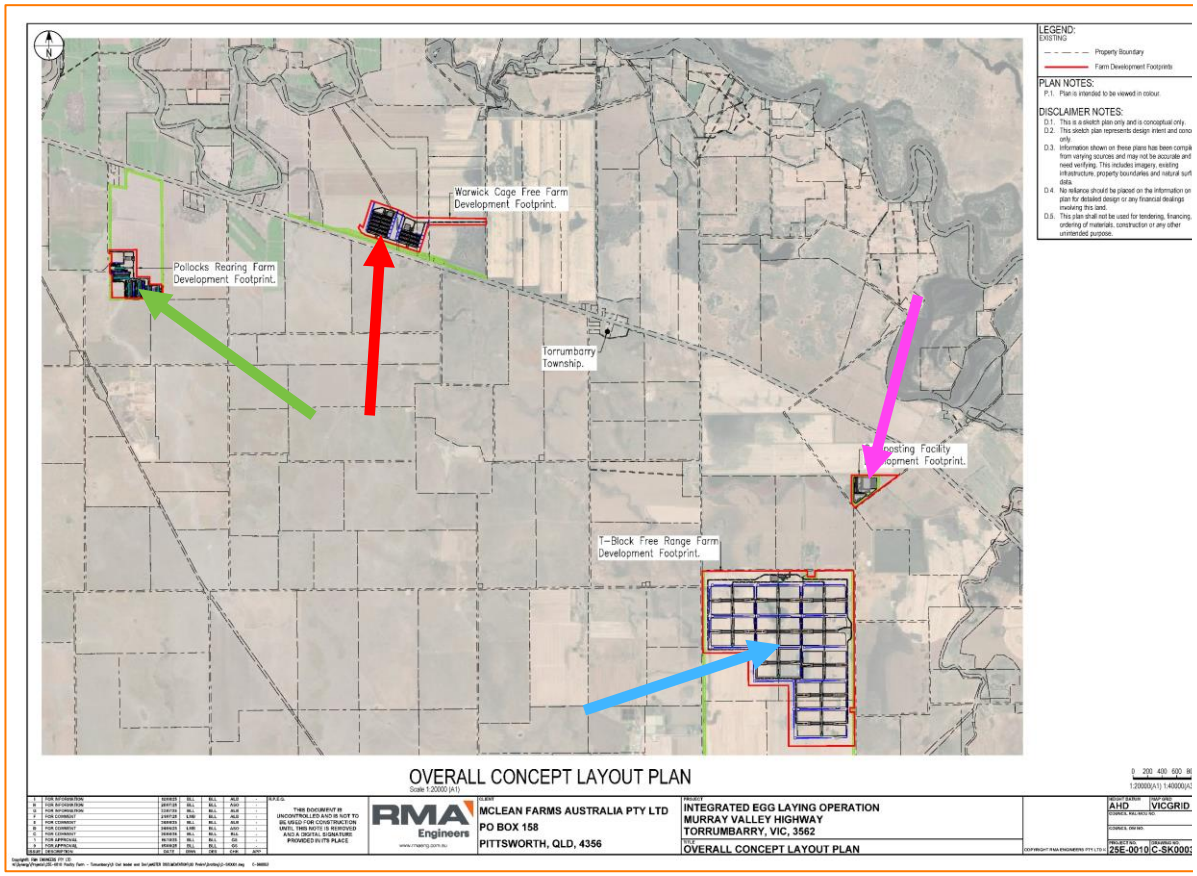

Figure 1-1: Proposed Layout (Source: RMA Engineers)

The site is also shown in Figure 1-2 below where the shed layouts are overlaid on a recent aerial image. The grey lines show the existing cadastre and nearby sensitive locations are shown as yellow markers.

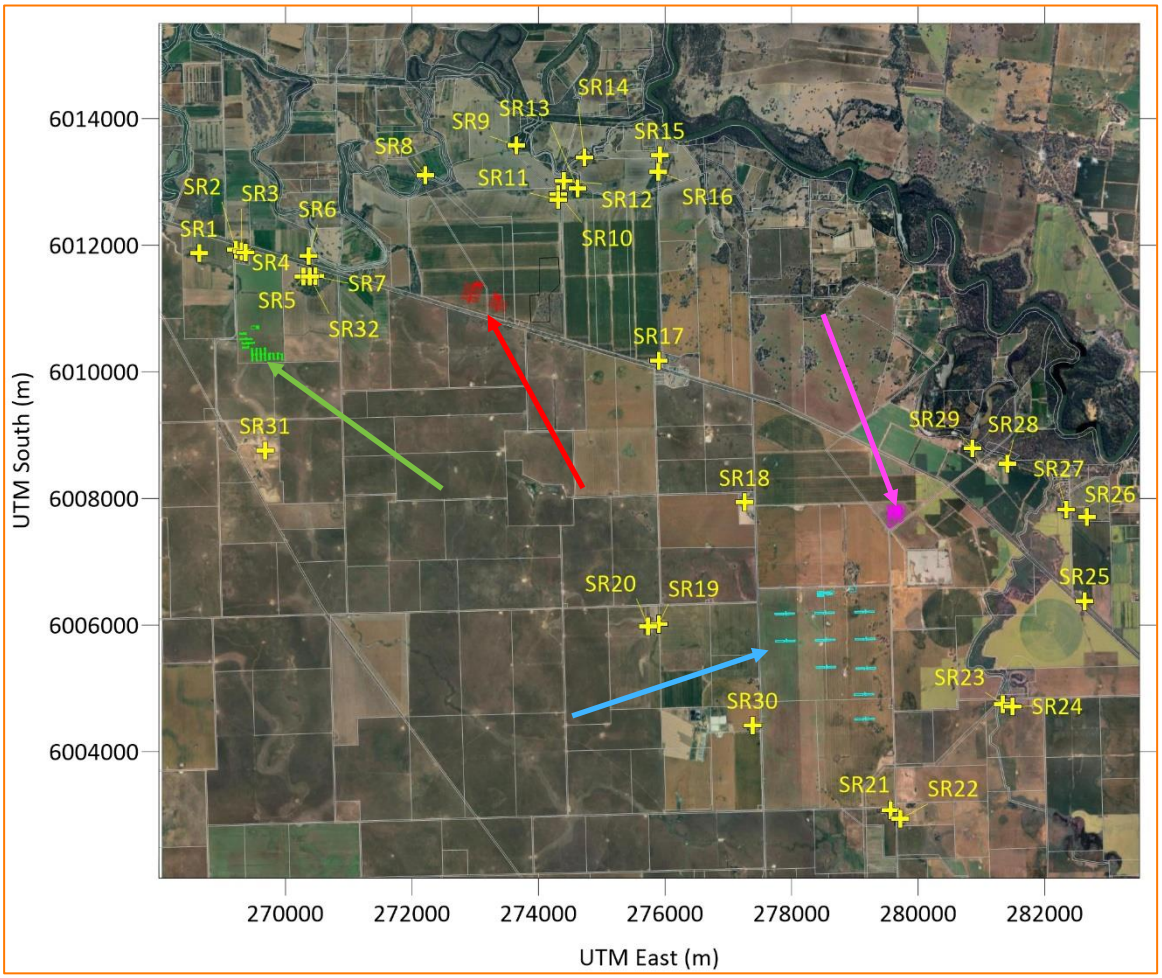

Figure 1-2: Layout and Area

1.2 Study Objective

The objective of this assessment is to determine the required separation distances for the farms in line with the *Separation Distance Guideline* (EPA Victoria, 2024a)

2 Legislation And Guidance Documents

The Environment Protection Act 2017 establishes Victoria's legislative framework for safeguarding both human health and the environment against pollution and waste. The Act places responsibilities on all members of the Victorian community, including government bodies, businesses, and individuals.

Odour is a key environmental issue set out in the Environment Protection Act 2017 (the Act). Odour is also clearly defined as a form of pollution and offensive odour constitutes a harm in accordance with the Act. Odour is also included in the environment reference standard (ERS) under section 93 of the Act. Under the Act, the risk of harm from odour that is offensive to the senses of human beings must be reduced as far as reasonably practicable, with the overall objective of an air environment that is free from offensive odours (EPA Victoria, 2022).

The methodology for determining the required separation distance for a use, in this case, layer sheds and the composting site, can be found in the Separation Distance Guideline (Publication 1949) (EPA Victoria, 2024a) (**the separation distance guideline**).

3 METHODOLOGY

To assess the risk of odour from the farms, and the composting operation, the methodology in the Separation Distance Guideline was used. The methodology including using the:

- *Egg Industry Environmental Guidelines 2nd Edition* (McGahan, Widemann, & Gould, 2018) (**the Egg Guideline**); and
- *Designing, constructing and operating composting facilities* (EPA Victoria, 2017b) document and Appendix C of the Separation Distance Guideline.

3.1 Receptors

Receptors were selected using standard definitions. The adopted receptors, and their numbering was previously shown in Figure 1-2 above are summarised below including their co-ordinates in Table 3-1.

Table 3-1: Receptors (GDA 2020, MGA55)

Receptor	x (m)	y (m)	Description
SR1	268,638	6,011,872	Dwelling
SR2	269,220	6,011,926	Dwelling
SR3	269,310	6,011,905	Dwelling
SR4	269,375	6,011,888	Dwelling
SR5	270,280	6,011,505	Dwelling
SR6	270,367	6,011,828	Dwelling
SR7	270,480	6,011,518	Dwelling
SR8	272,211	6,013,102	Dwelling
SR9	273,649	6,013,576	Dwelling
SR10	274,312	6,012,807	Dwelling
SR11	274,306	6,012,716	Dwelling
SR12	274,404	6,013,011	Dwelling
SR13	274,617	6,012,893	Dwelling
SR14	274,723	6,013,384	Dwelling
SR15	275,917	6,013,418	Dwelling
SR16	275,897	6,013,159	Dwelling
SR17	275,741	6,010,213	Torrumbarry Village
SR18	277,257	6,007,938	Dwelling
SR19	275,900	6,006,018	Dwelling
SR20	275,733	6,005,982	Dwelling
SR21	279,563	6,003,080	Dwelling
SR22	279,721	6,002,940	Dwelling
SR23	281,343	6,004,750	Dwelling
SR24	281,491	6,004,712	Dwelling
SR25	282,631	6,006,382	Dwelling
SR26	282,661	6,007,703	Shed[a]
SR27	282,340	6,007,822	Dwelling
SR28	281,414	6,008,552	Dwelling
SR29	280,857	6,008,793	Dwelling
SR30	277,369	6,004,414	Dwelling
SR31	269,681	6,008,759	Landfill (not sensitive)
SR32	270,382	6,011,509	Dwelling

Receptor locations based on aerial photography.

3.2 Meteorological Modelling

The separation distance methodology in the Egg Guidelines requires meteorological data to develop a wind specific S Factor (S4). As there are no local weather stations with data of a suitable quality, hourly data for a recent (2020 to 2024) period was generated using The Air Pollution Model (**TAPM**) in

[a] Not sensitive

line with EPA Victoria (2013b) and EPA Victoria (2023). The use of TAPM in this fashion is also consistent with various documents including the *Planning and environment guideline for establishing meat chicken farms – Guide 1 Assessment Guide* (McGahan, Wiedemann, & Galvin, 2021).

Data from TAPM were then used in CALMET to generate an area specific three dimensional dataset.

3.2.1 TAPM

Background

TAPM (version 4), is a three-dimensional meteorological and air pollution model developed by CSIRO. TAPM is a prognostic model which uses synoptic-scale data to predict hourly meteorology in the area modelled. Details about the model can be found in the TAPM user manual (Hurley, TAPM V4 User Manual, 2008a) and details of the model development and underlying equations can be found in Hurley (2008b). Further information, including details of validation studies performed for TAPM are also available and include Hurley et. al. (2008c).

TAPM v4 predicts meteorological data including wind speed and direction in an area using a series of fluid dynamics and scalar transport equations (Hurley, TAPM V4 Part 1: Technical Description, 2008b) and it has both prognostic meteorological and air pollution (dispersion) components. The benefit of using TAPM is that key meteorological aspects including the influence of terrain induced flows are predicted both locally and regionally.

The TAPM default land use database was refined to better define the land use with the inclusion of more grassland and bushland within the 1,000 m modelling domain. The default and adjusted land-use inputs are presented in Figure 3-1. The adjustment of the inner domain land use using the characteristics summarised in Table A.1 of Hurley (2008a) was warranted due to the coarseness and age of the TAPM default dataset.

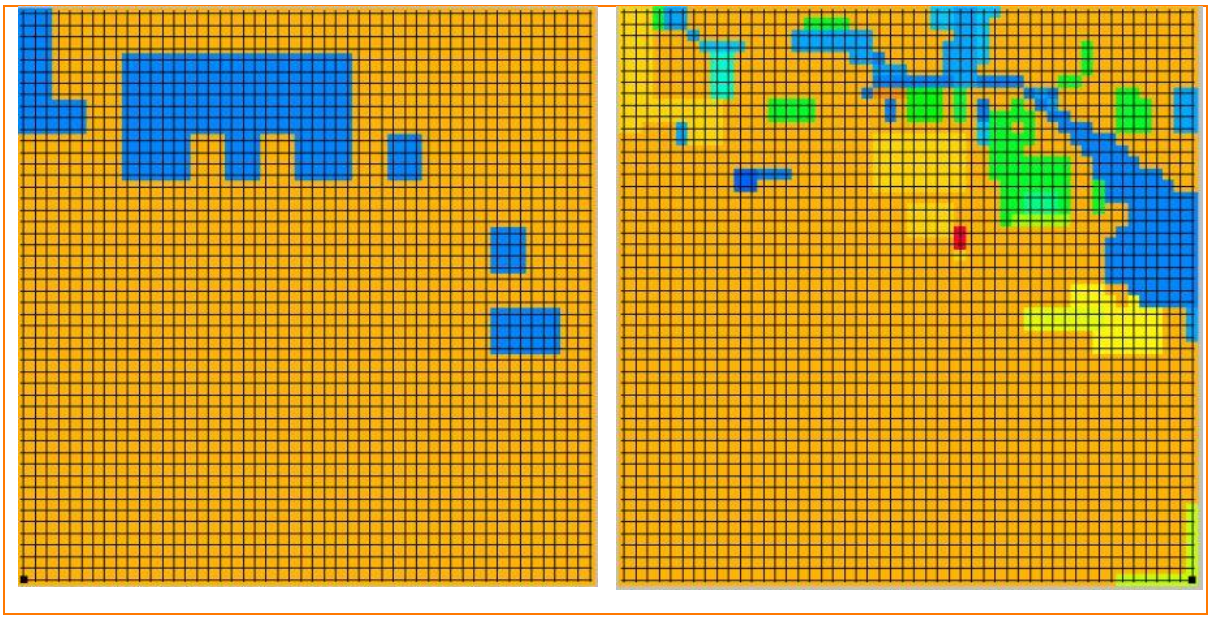

Figure 3-1: Default TAPM (left) and Adjusted Land use (right) for the Site

Performance in Northern Victoria

We have previously validated TAPM against on site data from an Australian Standard Environdata 10 m weather station north of the site, at Conargo (100 km to the north north east). The results indicated that all the relevant benchmarks for wind speed, direction and temperature detailed in USEPA (2020)

were met. This indicates TAPM performs well in the region and the use of TAPM in CALMET is appropriate.

For this project, we also obtained 1 minute data from the Bureau of Meteorology (BOM) site at Kyabram to the south east. Hourly averages were calculated in line with USEPA (2000) to derive vector wind direction and scalar wind speed values for each hour of the years 2020 to 2024. TAPM was then run using a similar setup to that above except for using a 41 x 41 grid (the minimum recommended in Victoria) and centred as near as possible to the Kyabram BOM station.

Hourly data for the years, 2020 to 2024 were then compared using the statistical benchmarks in USEPA (2020). In line with Johnson (2019) we have also included daily wind direction values.

Regarding the benchmarks adopted, complex terrain is defined as:

"*A region having irregular topography, such as mountains or coastlines. Complex terrain can also include variations in land use, such as urban, rural, irrigated, and unirrigated. Complex terrain often generates local circulations, or modifies ambient synoptic weather features, to create unique local weather characteristics such as katabatic winds, anabatic clouds, and sea breezes. In regions of complex terrain, weather forecast models must have high resolution to reproduce numerically the terrain-induced weather features* (American Meteorlogical Society, 2012)".

As the land uses changes in the area, it falls under the complex category. The results are shown below in Table 3-2 and Table 3-3. Compliance is predicted for all benchmarks for all years for both normal and complex criteria. Therefore it is appropriate to use TAPM as an input in CALMET.

Table 3-2: Wind Speed Statistics – TAPM v Kyabram BOM

Variable	2020	2021	2022	2023	2024	Criteria	Meets Criteria?
Bias	0.3	0.2	0.4	0.2	0.2	±0.5 (±2.5 complex)	Yes
RMSE	1.2	1.1	1.2	1.2	1.2	<2	Yes
IOA	0.89	0.84	0.81	0.82	0.83	>0.6	Yes
SkillE	0.8	0.8	0.9	0.9	0.8	<1	Yes
SkillR	0.7	0.7	0.8	0.8	0.8	<1	Yes
SkillV	1.0	1.1	1.1	1.1	1.1	<1	Yes

Table 3-3: Wind Direction Statistics – TAPM v Kyabram BOM

Variable	2020	2021	2022	2023	2024	Criteria	Meets Criteria?
Bias (hourly)	-2.9	-1.7	-5.7	0.4	-8.4	±10° (±20° complex)	Yes
Bias (daily)	-9.6	4.0	-5.2	2.6	-3.6		Yes
Gross Error (hourly)	26.1	26.8	26.7	27.9	29.7	≤30° (≤55° complex)	Yes
Gross Error (daily)	15.5	14.3	13.7	15.4	12.9		Yes

3.2.2 CALMET

CALMET is the meteorological pre-processor to CALPUFF and generates wind fields which include slope flows, terrain effects, and can incorporate factors including terrain blocking. CALMET uses meteorological inputs in combination with land use and terrain information for the modelling domain to predict a three-dimensional meteorological grid (which includes wind speed, direction, air temperature, relative humidity, mixing height, and other variables) for the area (domain) to be modelled in CALPUFF.

A 25 km x 25 km domain with a terrain resolution of 100 m was modelled with the centre of the domain between T Block and Pollocks. A terrain resolution of 30 m was initially taken from the Shuttle Radar Topography Mission dataset and then converted to 100 m using CALPUFF view. Land use was manually edited at 100 m resolution based on a recent aerial photograph of the area using Google Earth Pro and CALPUFF View. The TAPM and CALMET setup is summarised in Table 3-4 below.

Table 3-4: TAPM and CALMET Setup

Model	Parameter	Value
TAPM (v 4.0.5)	Number of grids (spacing)	30 km, 10 km, 3 km, 1 km
	Number of grid points	50 x 50 x 25 (vertical)
	Year of analysis	01/01/2020 to 31/12/2024 (5 separate model runs)
	Centre of analysis	36°2.50’ South (latitude), 144°30.00' East (longitude) X = 274,777 m; Y= 6,008,538 m
	Meteorological data assimilation	NA
CALMET (v 6.5.0)	Meteorological grid domain	25 km x 25 km
	Meteorological grid resolution	0.10 km
	South-west corner of domain	X = 262.000 km, Y = 5996.000 km
	Surface meteorological stations	No
	Upper air meteorological data	N/A
	3D Windfield	m3D from TAPM (1.0 km) input as in initial guess in CALMET
	Year of analysis	01/01/2020 to 31/12/2024 (5 separate model runs)
	Terrad	5.0 km
	Cloud	4 - Gridded cloud cover from Prognostic Relative Humidity at all levels
	Coriolis Parameter	0.856×10^{-4} -s
	Maximum search radius in averaging process	10 (grid cells)

Data was extracted from CALMET for each year modelled at each farm site. The average wind speed, and calm frequency for each year at each site are shown in Table 3-5 below. Differences in winds at each site are a function of the local effects at each of those sites. The wind speed and direction data is also expressed as wind roses in Figure 3-2, Figure 3-3 and Figure 3-4 below.

Table 3-5: Summary of Wind Speed by Year and Site

Model	Year	Average Wind Speed (m/s	Calm Winds Frequency (%)
Pollock's	2020	3.1	0.4
	2021	3.1	0.1
	2022	3.1	0.1
	2023	3.0	0.2
	2024	3.1	0.2
Warwick's	2020	2.9	0.3
	2021	2.9	0.1
	2022	2.9	0.1
	2023	2.8	0.2
	2024	2.9	0.2
T Block	2020	3.4	0.3
	2021	3.4	0.1
	2022	3.4	0.1
	2023	3.3	0.1
	2024	3.3	0.3

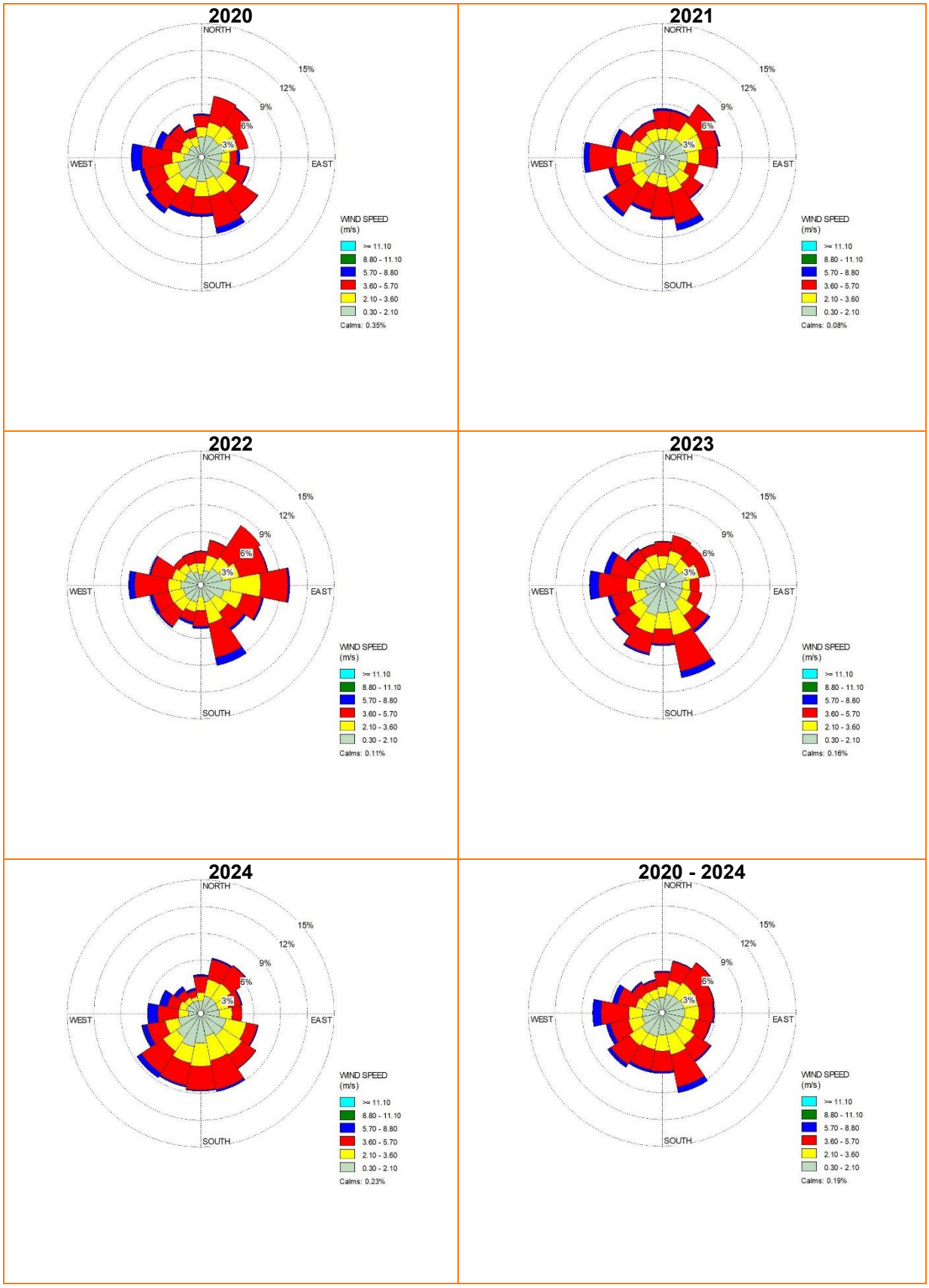

Figure 3-2: Annual Wind Roses for Pollock's Rearers

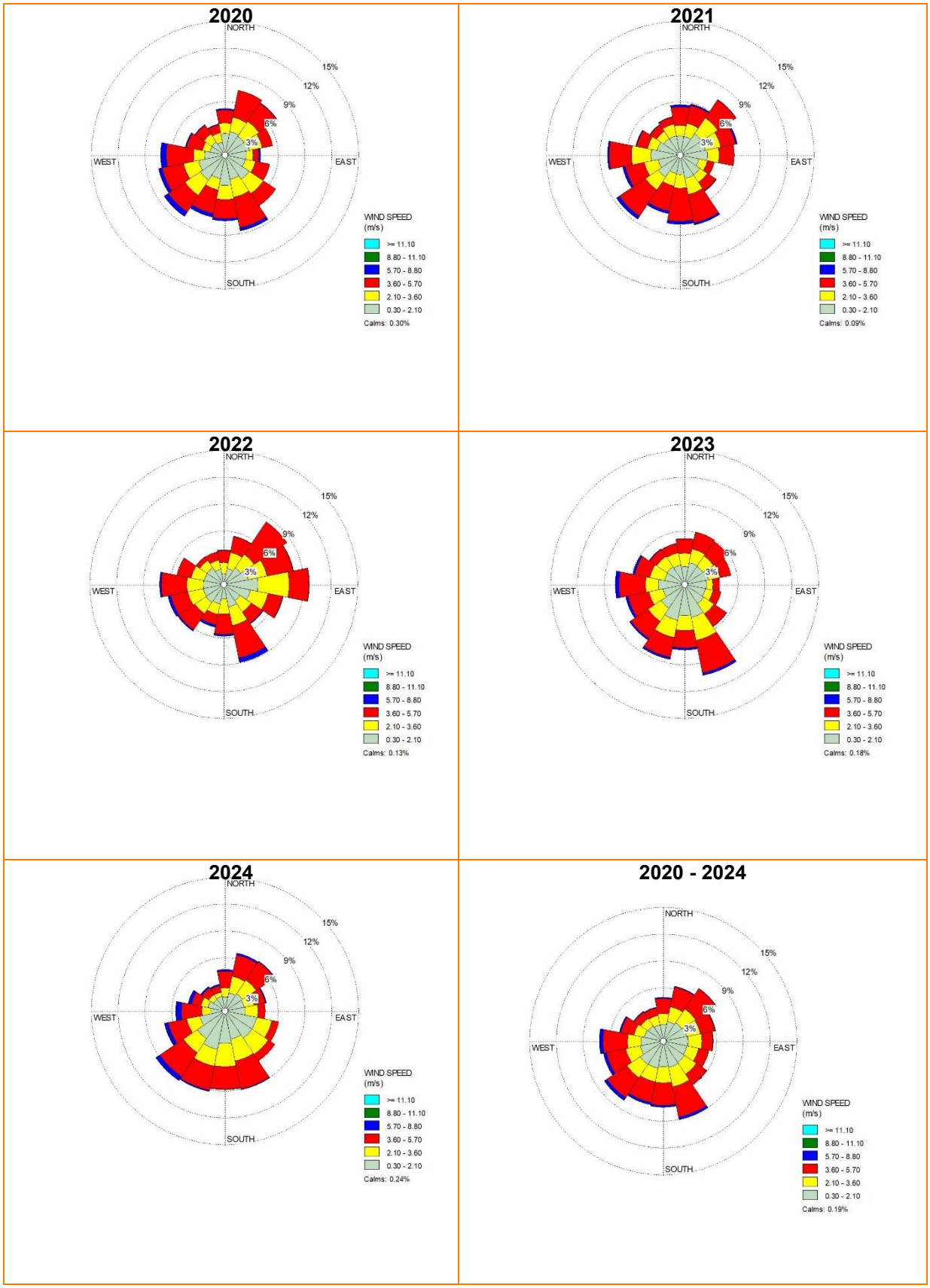

Figure 3-3: Annual Wind Roses for Warwick's Cage Free

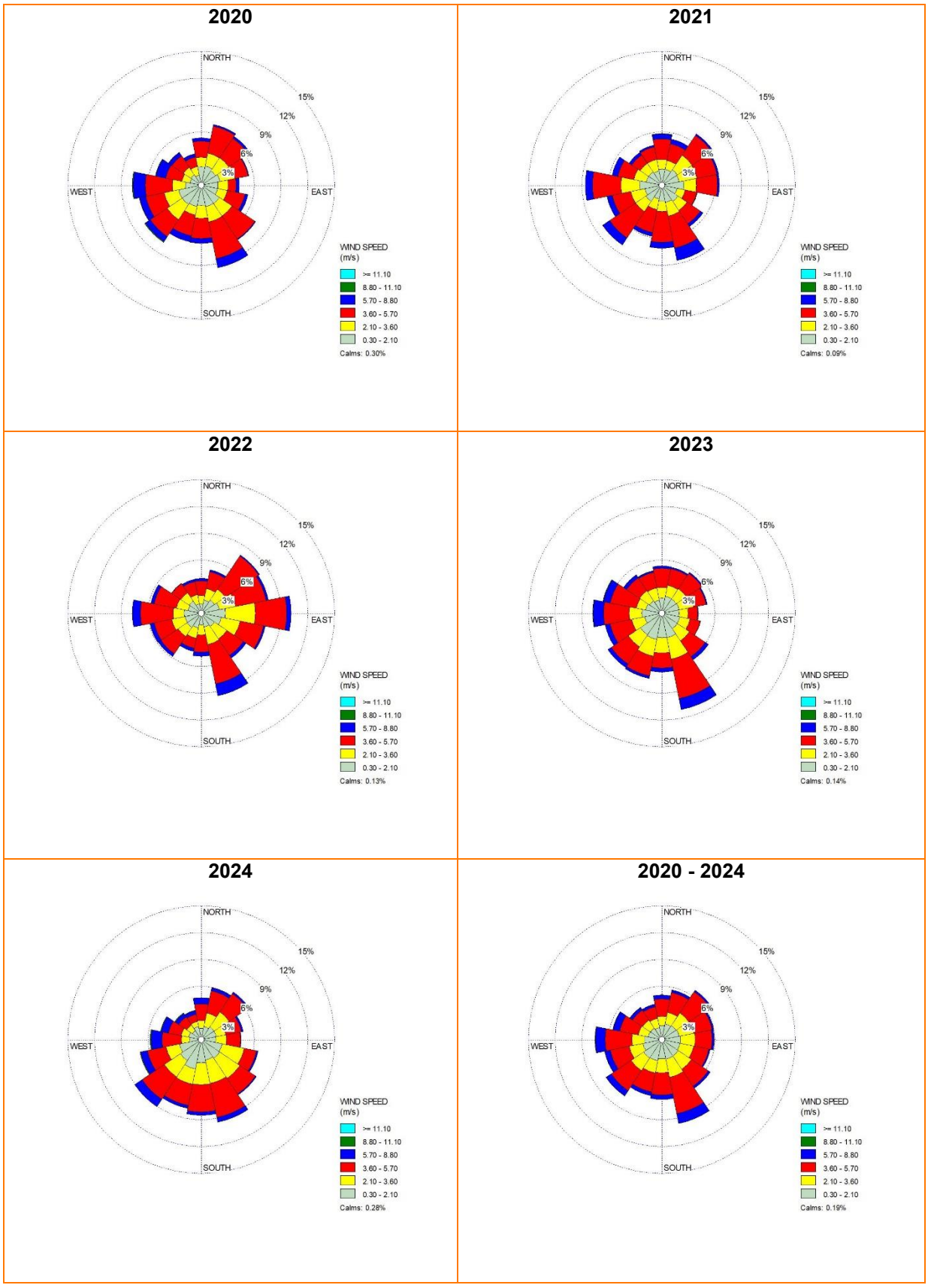

Figure 3-4: Annual Wind Roses for T Block

3.3 Separation Distances

The separation distances have been calculated using the method in the Egg Guidelines. The S Factor equation from the Egg Guidelines is shown as Equation 2 below where:

- N is the number of birds;
- S1 is the sensitive land use factor;
- S2 is the surface roughness factor;
- S3 is the terrain weighting factor; and
- S4 is the wind frequency factor (optional).

$$D = (\frac{N}{1000})^{0.63} \times S_1 \times S_2 \times S_3 \times S_4$$ **Equation 1**

The land use factor defines whether the receptors are rural or non rural. All receptors had a S1 value of 20 applied, except for SR17 – Torrumbarry Village, which had a value of 30 (non rural zone).

S2 is a surface roughness factor. Checks of aerial imagery as well as observations made during the site visit confirmed that the land use in the area was best described as limited groundcover/short/grass/cropland, few trees therefore a S2 value of 1 was applied.

For S3, terrain was checked using the SRTM-derived 1 Second Digital Elevation Model data from geoscience Australia. Checks between each farm unit and the various receptors found that the terrain between the sheds and receptors was flat (<2%). Therefore, a S3 of 1 was applied.

The S4 factors were based on the five years of data presented in Section 3.2 above. Details of the method used to calculate the S4 factors can be found in Appendix A of the Egg Guidelines. In simple terms, the winds above 3 m/s are removed from the dataset and the dominant wind direction is determined. For example, if winds most frequently blow **from the** south, the largest direction S4 = 1, will be **to the** north. The factors are calculated by direction, N, NNE etc, and then applied to receptors by direction.

4 RESULTS

4.1 Pollocks Rearer Farm

For Pollocks, Stage 1 is 12 sheds (480,000 birds) and Stage 2 is an additional 6 sheds (240,000 birds) for a total of 720,000 birds. The relevant receptors, as shown in Figure 1-2 above, are SR1 through SR7 and SR32. These and are shown in Figure 1-1 where the green shapes show the outline of the sheds. The figure shows the outline of the pad the sheds sit on. Therefore, the shapes are slightly larger than the actual shed sizes.

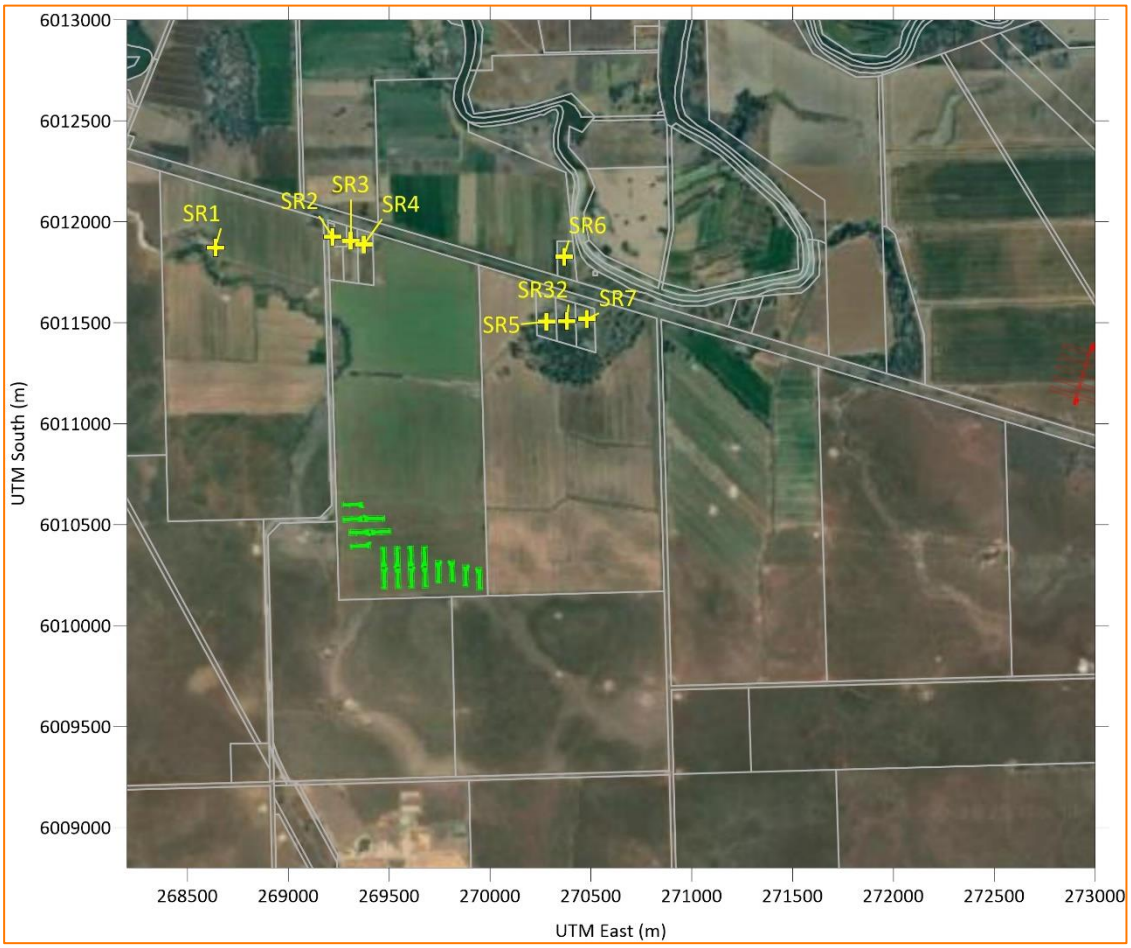

Figure 4-1: Pollocks and Receptors

The S Factor equation for layers is shown as Equation 2 below where:

- N is the number of birds;
- S1 is the land use factor;
- S2 is the surface roughness factor;
- S3 is the terrain weighting factor; and
- S4 is the wind frequency factor (optional).

$$D = (\frac{N}{1000})^{0.63} \times S_1 \times S_2 \times S_3 \times S_4$$ **Equation 2**

The following S factors were adopted for the calculations:

- S1 – Rural house – S1=20;

- S2 – Limited groundcover (aerial photography, conservative) – S2=1;
- S3 – flat terrain (based on terrain data)– S3=1;
- S4 – wind frequency – See Table 4-1.

The S4 frequencies were calculated in accordance with the Egg Guideline, based on the data summarised in Figure 3-2 above. It is noted that the first step is to remove winds above 3 m/s and then process the remaining data. Therefore, the resultant S4 values below will not align perfectly with the wind roses. The resultant factors, with and without the recommended 20% safety factor are shown in Table 4-1.

Table 4-1: S4 - Pollocks

Direction	Bearing (°)	S4 (no safety)	S4 (20%) Safety
N	0	0.88	1.00
NNE	22.5	0.91	1.00
NE	45	0.91	1.00
ENE	67.5	0.83	1.00
E	90	0.75	0.95
ESE	112.5	0.64	0.84
SE	135	0.59	0.79
SSE	157.5	0.59	0.79
S	180	0.59	0.79
SSW	202.5	0.79	0.99
SW	225	0.80	1.00
WSW	247.5	0.88	1.00
W	270	0.85	1.00
WNW	292.5	0.85	1.00
NW	315	0.89	1.00
NNW	337.5	1.00	1.00

The distance to each receptor from the closest point of fan end of the sheds was calculated using trigonometry. Terrain heights were calculated using Geoscience Australia 1 second (30 metre) SRTM derived data and all found to be “flat”. The available distance to each receptor along with the predicted separation distance for Stage 1 are shown in Table 4-2. Stage 2 results are shown in Table 4-3. The fans direction on the sheds is not all in the same direction. Consistent with the Egg Guideline, measurements have been taken from the closest fan end of each shed.

The separation distances are shown from the closest relevant receptors in Figure 4-5 and Figure 4-6 for Stage 1 and Stage 2 where the distance is shown from each of the closest receptors. If the sheds are outside the circles, compliance is indicated. The purpose of the figures is to show the farm is located beyond the required distances.

The results are discussed in Section 5 below.

Table 4-2: Pollocks Rearer – Stage 1 (480,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
1	1,417	NNW	20	1	1	1	978	69%	Pass
2	1,322	N	20	1	1	1	978	74%	Pass
3	1,301	N	20	1	1	1	978	75%	Pass
4	1,288	N	20	1	1	1	978	76%	Pass
5	1,266	NNE	20	1	1	1	978	77%	Pass
6	1,593	NNE	20	1	1	1	978	61%	Pass
7	1,383	NE	20	1	1	1	978	71%	Pass
32	1,320	NNE	20	1	1	1	978	74%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

Table 4-3: Pollocks Rearer – Stage 2 (720,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
1	1,417	NNW	20	1	1	1	1,262	89%	Pass
2	1,322	N	20	1	1	1	1,262	95%	Pass
3	1,301	N	20	1	1	1	1,262	97%	Pass
4	1,288	N	20	1	1	1	1,262	98%	Pass
5	1,266	NNE	20	1	1	1	1,262	100%	Pass
6	1,593	NNE	20	1	1	1	1,262	79%	Pass
7	1,383	NE	20	1	1	1	1,262	91%	Pass
32	1,320	NNE	20	1	1	1	1,262	96%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

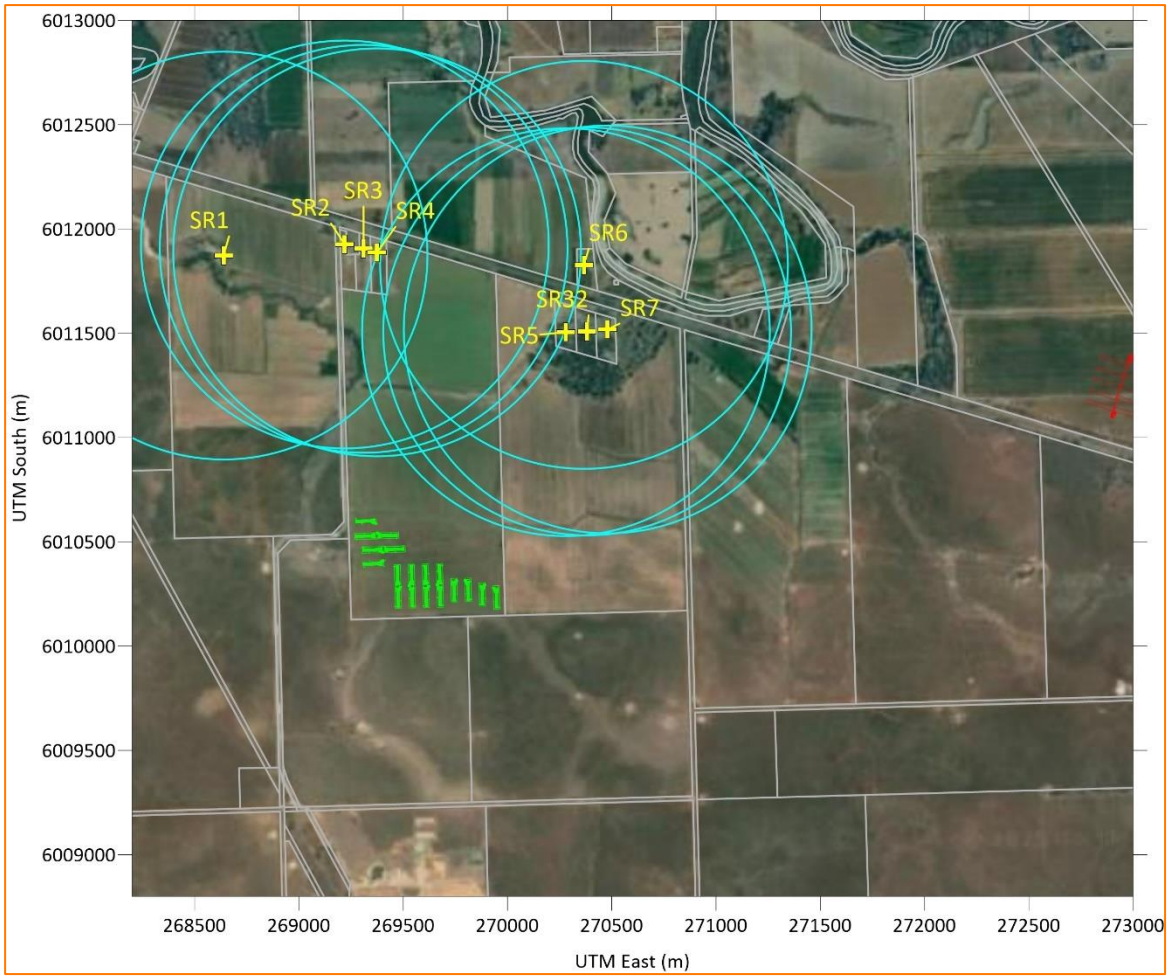

Figure 4-2: Pollocks Stage 1

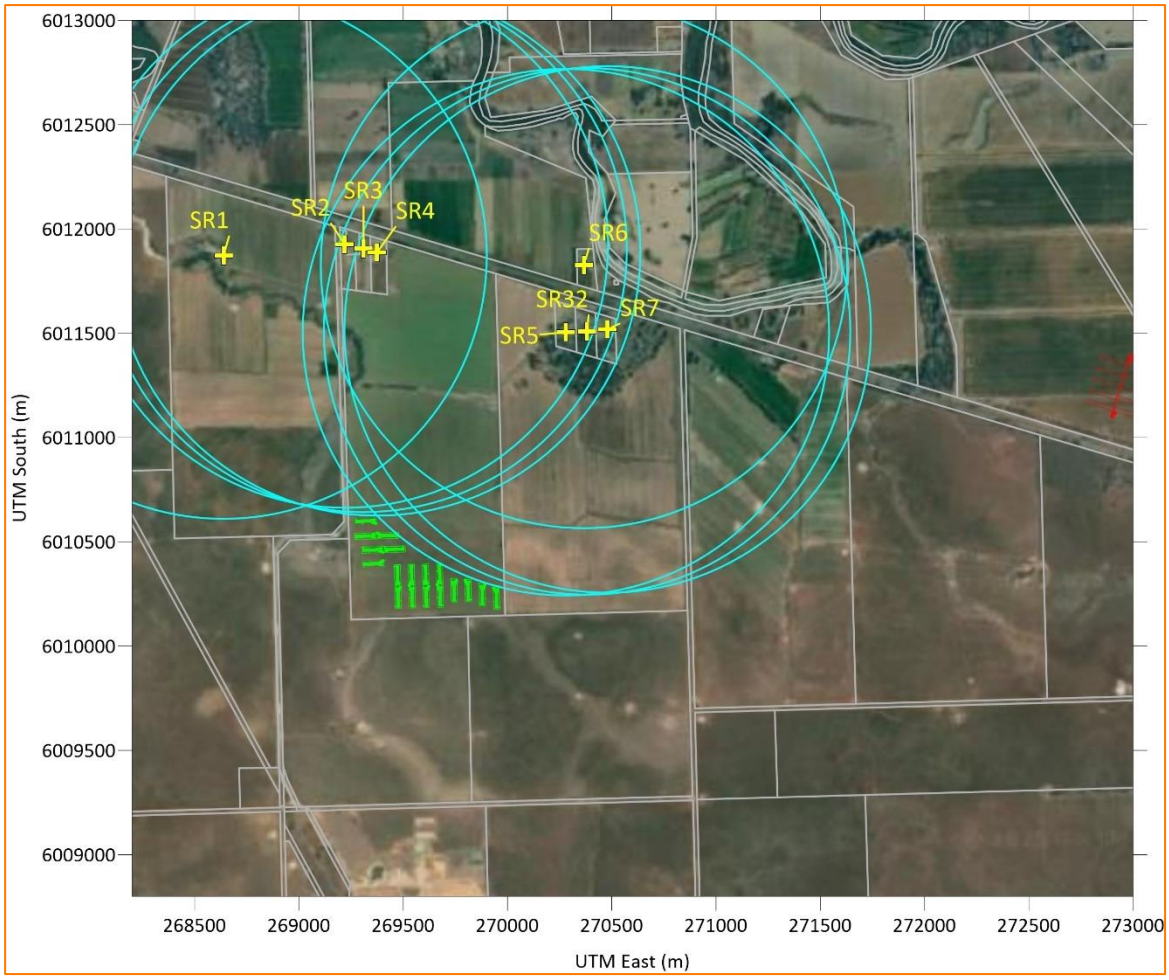

Figure 4-3: Pollocks Stage 2

4.2 Warwick's Cage Free

For Warwick's, Stage 1 consists of 8 sheds (640,000 birds) and Stage 2 consists of a further 8 sheds (640,000 birds). The relevant receptors from the larger receptor dataset for Warwick's are SR5 through SR17 and SR32. These are shown in Figure 4-4 below where the grey lines show the cadastre, and the yellow markers show the receptors.

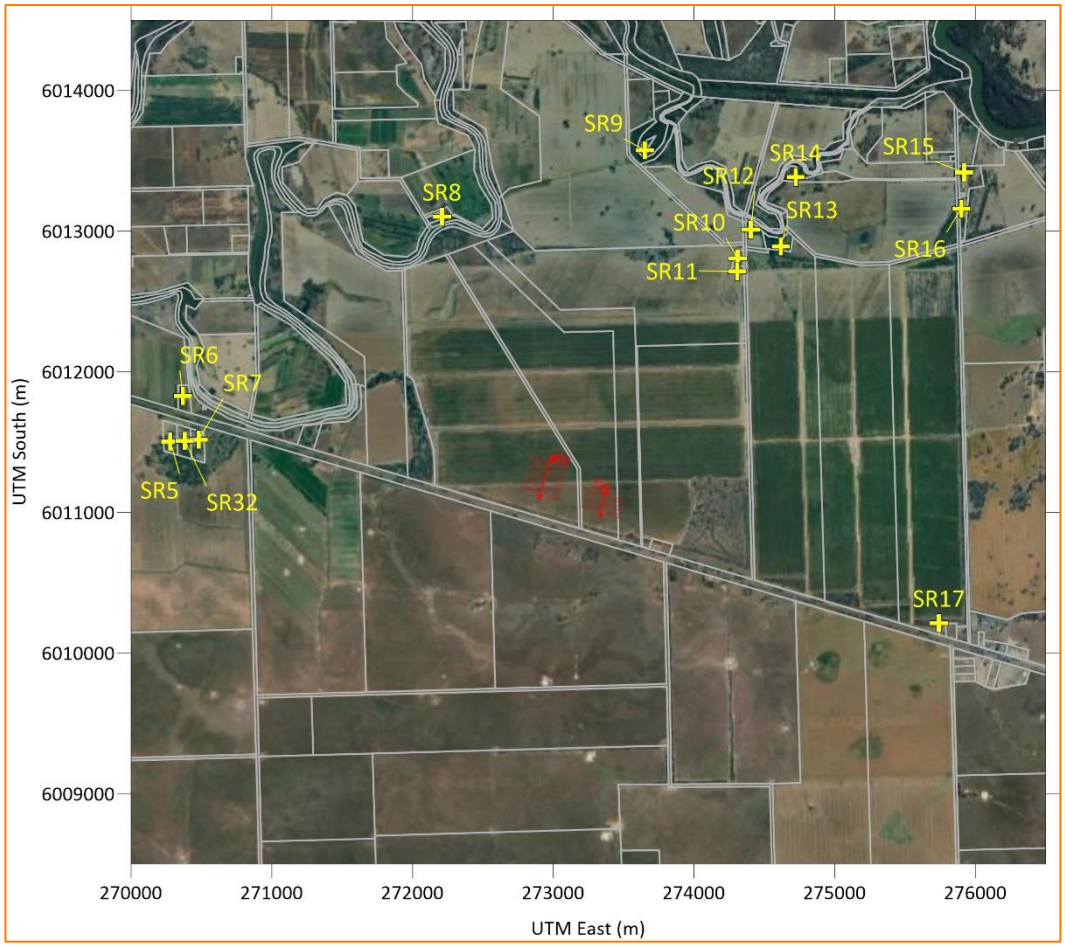

Figure 4-4: Warwick's and Receptors

The S Factor equation for layers was shown as Equation 2 above. The following factors have been adopted for Warwick's:

- S1:
  - Rural house – S1=20;
  - Torrumbarry (SR17) S1=30;
- S2 – Limited groundcover (aerial photography) – S2=1;
- S3 – Flat terrain (based on SRTM data)– S3=1;
- S4 – Wind frequency - See Table 4-4.

The S4 frequencies were calculated in accordance with the Egg Guideline, based on the data summarised in Figure 3-3 above. The resultant factors, with and without the recommended 20% safety factor are shown in Table 4-4.

Table 4-4: S4 – Warwick's

Direction	Bearing (°)	S4 (no safety)	S4 (20%) Safety
N	0	0.89	1.00
NNE	22.5	0.93	1.00
NE	45	0.94	1.00
ENE	67.5	0.87	1.00
E	90	0.74	0.94
ESE	112.5	0.67	0.87
SE	135	0.60	0.80
SSE	157.5	0.60	0.80
S	180	0.59	0.79
SSW	202.5	0.77	0.97
SW	225	0.80	1.00
WSW	247.5	0.86	1.00
W	270	0.81	1.00
WNW	292.5	0.82	1.00
NW	315	0.86	1.00
NNW	337.5	1.00	1.00

The distance to reach receptor from the closest point of the shed areas was calculated using trigonometry. Terrain heights were calculated using Geoscience Australia 1 second (30 metre) SRTM derived data and all found to be "flat". The available distance to each receptor along with the predicted separation distance for Stages 1 and 2 is shown in Table 4-2 and Table 4-6. The results are discussed in Section 5 below.

The separation distances are shown from the closest relevant receptors (SR7, SR8, SR11 and SR17) in Figure 4-5 and Figure 4-6 for Stage 1 and Stage 2 where the distance is shown from each of the closest receptors. If the sheds are outside the circles, compliance is indicated.

Table 4-5: Warwick's – Stage 1 (640,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
5	2,517	W	20	1	1	1.00	1,172	47%	Pass
6	2,497	WNW	20	1	1	1.00	1,172	47%	Pass
7	2,321	W	20	1	1	1.00	1,172	50%	Pass
8	1,815	NNW	20	1	1	1.00	1,172	65%	Pass
9	2,319	NNE	20	1	1	1.00	1,172	51%	Pass
10	1,901	NNE	20	1	1	1.00	1,172	62%	Pass
11	1,817	NNE	20	1	1	1.00	1,172	65%	Pass
12	2,125	NNE	20	1	1	1.00	1,172	55%	Pass
13	2,123	NNE	20	1	1	1.00	1,172	55%	Pass
14	2,601	NNE	20	1	1	1.00	1,172	45%	Pass
15	3,356	NE	20	1	1	1.00	1,172	35%	Pass
16	3,167	NE	20	1	1	1.00	1,172	37%	Pass
17	2,396	ESE	30	1	1	0.87	1,522	64%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

Table 4-6: Warwick's – Stage 2 (1,280,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
5	2,517	W	20	1	1	1.00	1,814	72%	Pass
6	2,497	WNW	20	1	1	1.00	1,814	73%	Pass
7	2,321	W	20	1	1	1.00	1,814	78%	Pass
8	1,815	NNW	20	1	1	1.00	1,814	100%	Pass
9	2,319	NNE	20	1	1	1.00	1,814	78%	Pass
10	1,901	NNE	20	1	1	1.00	1,814	95%	Pass
11	1,817	NNE	20	1	1	1.00	1,814	100%	Pass
12	2,125	NNE	20	1	1	1.00	1,814	85%	Pass
13	2,123	NNE	20	1	1	1.00	1,814	85%	Pass
14	2,601	NNE	20	1	1	1.00	1,814	70%	Pass
15	3,356	NE	20	1	1	1.00	1,814	54%	Pass
16	3,167	NE	20	1	1	1.00	1,814	57%	Pass
17	2,396	ESE	30	1	1	0.87	2,355	98%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

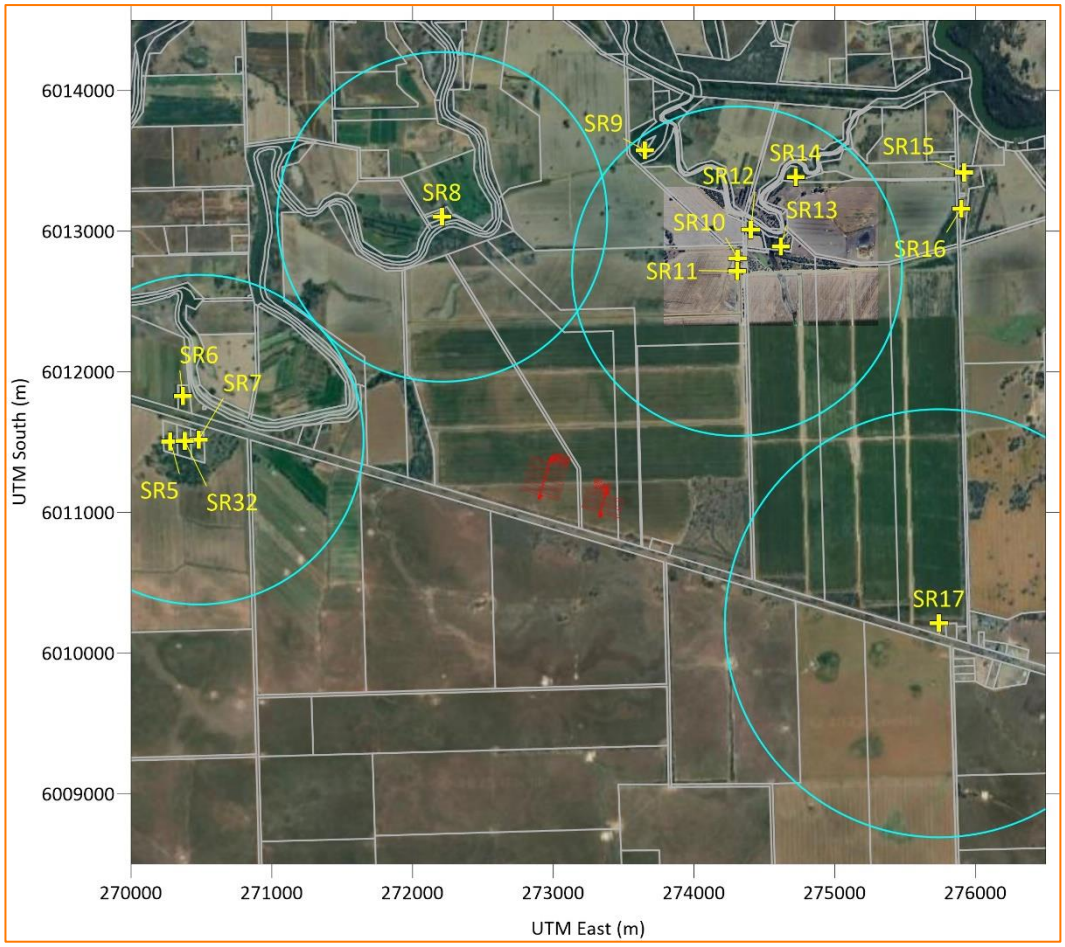

Figure 4-5: Warwick's Stage 1 (Closest Receptors)

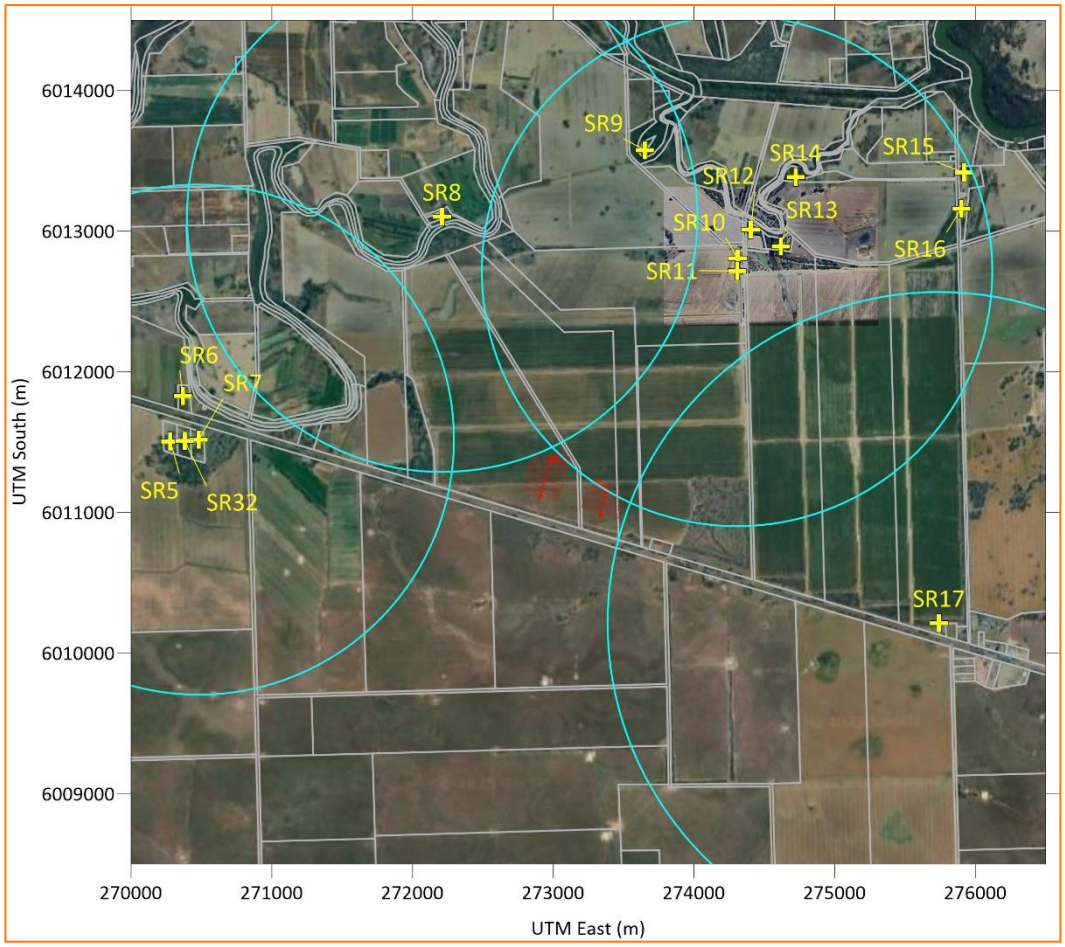

Figure 4-6: Warwick's Stage 2 (Closest Receptors)

4.3 T-Block Free Range

Unlike Pollocks and Warwick's, T-Block is a free range layer facility where the sheds are spread out with a extended distance between them as the birds require areas to range outdoors. In contrast to this, the S Factor method assumes sheds are side by side which requires a larger separation distance to receptors when compared to a free range facility. Therefore, the S Factor approach for T-Block is conservative.

T-Block will consist of up to 20 sheds in total, 10 sheds in Stage 1 (400,000 birds), and 10 sheds (400,000 birds), in Stage 2. The layout of T-Block, along with the relevant receptors are shown in Figure 4-7.

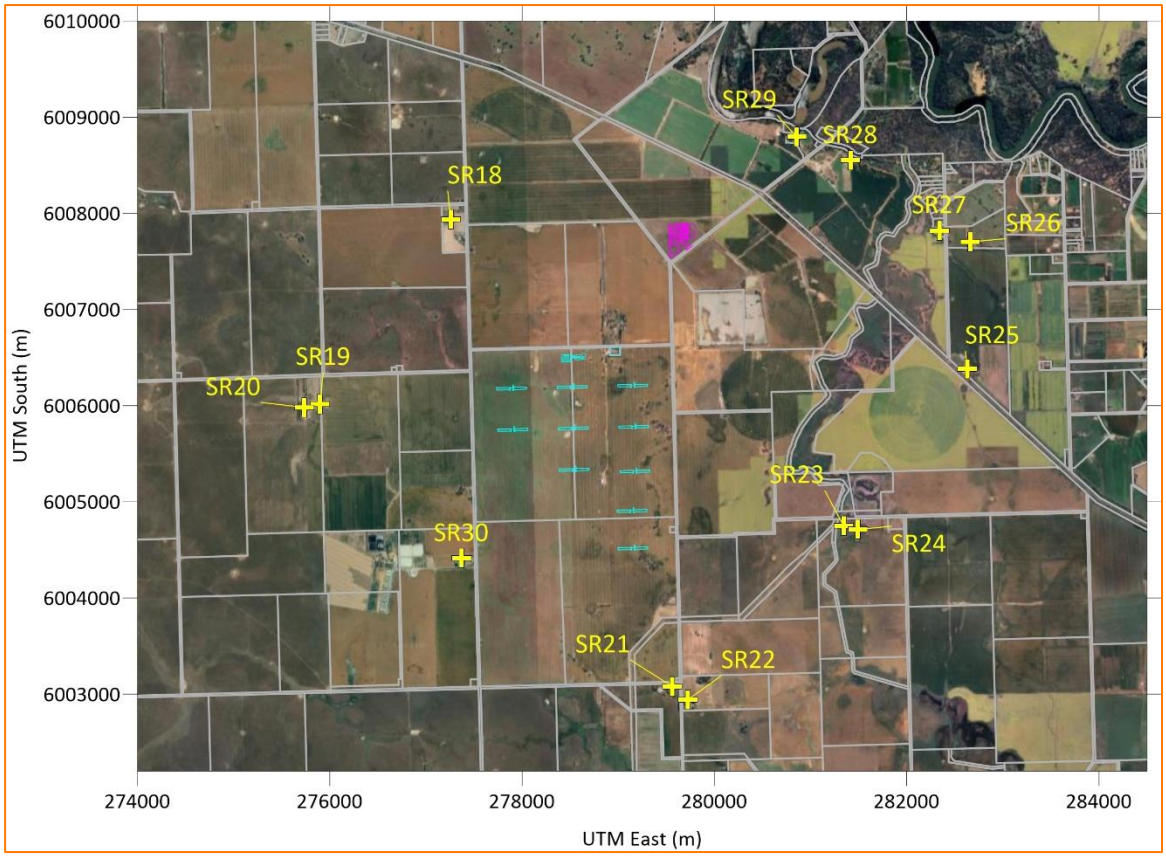

Figure 4-7: T-Block and Receptors

The S Factor equation was shown as Equation 2 above. The following factors have been adopted for T-Block

- S1 - Rural house – S1=20;
- S2 – Limited groundcover (aerial photography) – S2=1;
- S3 – Flat terrain (based on SRTM data) – S3=1;
- S4 – Wind frequency - See Table 4-7.

The S4 frequencies were calculated in accordance with the Egg Guideline, based on the data summarised in Figure 3-4 above. The resultant factors, with and without the recommended 20% safety factor are shown in Table 4-7. The calculated separation distances are shown in for Stage 1 and Stage 2 in Table 4-8 and Table 4-9. The results are discussed in Section 5 below.

The separation distances are shown from the closest relevant receptors (SR18 and 19, SR 21 and SR23 and SR 29 and SR30) in Figure 4-8 and Figure 4-9 for Stage 1 and Stage 2.

Table 4-7: S4 – T-Block

Direction	Bearing (°)	S4 (no safety)	S4 (20%) Safety
N	0	0.86	1.00
NNE	22.5	0.92	1.00
NE	45	0.93	1.00
ENE	67.5	0.88	1.00
E	90	0.77	0.97
ESE	112.5	0.66	0.86
SE	135	0.57	0.77
SSE	157.5	0.55	0.75
S	180	0.59	0.79
SSW	202.5	0.73	0.93
SW	225	0.78	0.98
WSW	247.5	0.87	1.00
W	270	0.84	1.00
WNW	292.5	0.88	1.00
NW	315	0.86	1.00
NNW	337.5	1.00	1.00

Table 4-8: T Block– Stage 1 (400,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
18	1,828	NNW	20	1	1	1	872	48%	Pass
19	1,843	W	20	1	1	1	872	47%	Pass
20	2,012	W	20	1	1	1	872	43%	Pass
21	1,451	S	20	1	1	1	872	60%	Pass
22	1,622	SSE	20	1	1	1	658	41%	Pass
23	2,047	E	20	1	1	1	845	41%	Pass
24	2,191	E	20	1	1	1	845	39%	Pass
25	3,327	E	20	1	1	1	845	25%	Pass
26	3,670	ENE	20	1	1	1	872	24%	Pass
27	3,432	ENE	20	1	1	1	872	25%	Pass
28	3,147	NE	20	1	1	1	872	28%	Pass
29	3,010	NNE	20	1	1	1	872	29%	Pass
30	1,362	SW	20	1	1	1	872	64%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

Table 4-9: T Block – Stage 2 (800,000 birds)

Receptor	Available Distance (m)	Direction to Receptor from Closest Farm Point	S1	S2	S3	S4	Required Distance (m)	% of Available	Pass/Fail
18	1,828	NNW	20	1	1	1.00	1,349	74%	Pass
19	1,843	W	20	1	1	1.00	1,349	73%	Pass
20	2,012	W	20	1	1	1.00	1,349	67%	Pass
21	1,451	S	20	1	1	1.00	1,349	93%	Pass
22	1,622	SSE	20	1	1	0.75	1,018	63%	Pass
23	2,047	E	20	1	1	0.97	1,308	64%	Pass
24	2,191	E	20	1	1	0.97	1,308	60%	Pass
25	3,327	E	30	1	1	0.97	1,963	59%	Pass
26	3,670	ENE	30	1	1	1.00	2,023	55%	Pass
27	3,432	ENE	30	1	1	1.00	2,023	59%	Pass
28	3,147	NE	20	1	1	1.00	1,349	43%	Pass
29	3,010	NNE	20	1	1	1.00	1,349	45%	Pass
30	1,362	SW	20	1	1	1.00	1,349	99%	Pass

Note: Direction calculated using trigonometry based on closest point of farm to receptor. Direction was then assigned based on Appendix A of the egg guidelines.

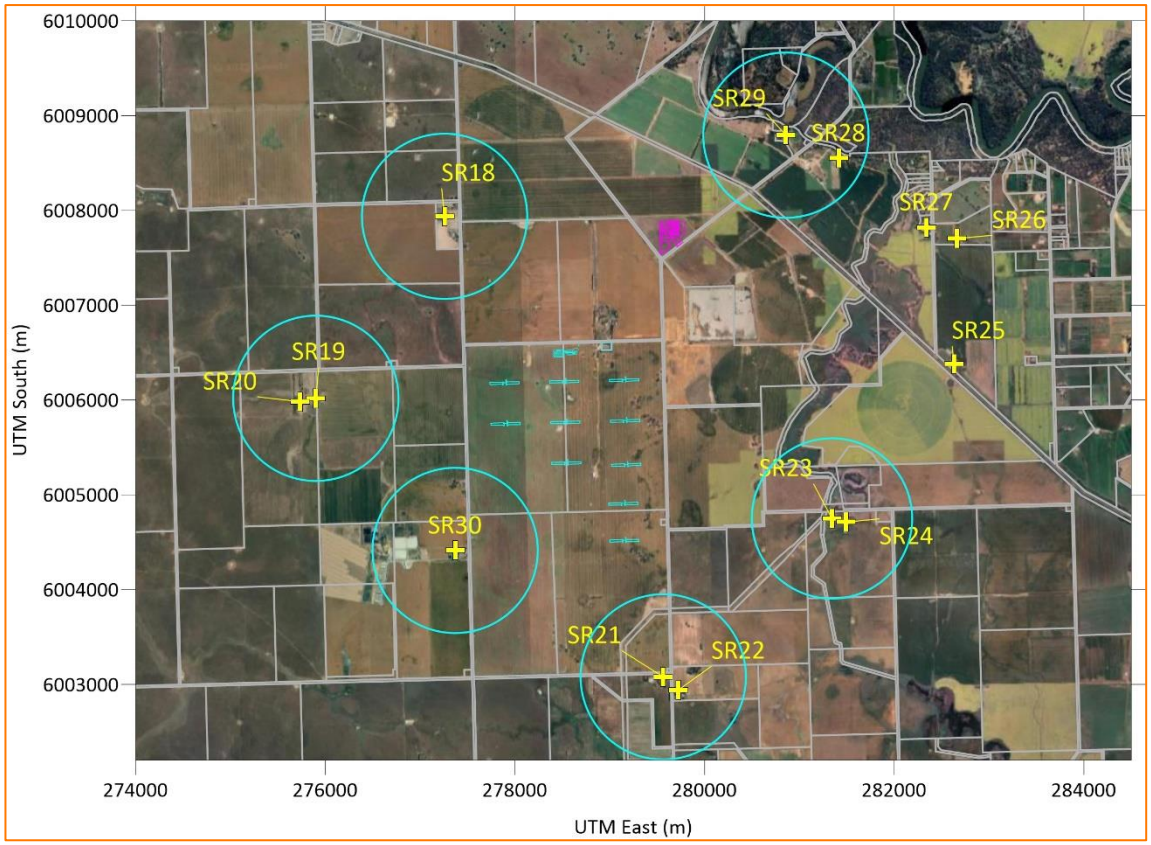

Figure 4-8: T Block Stage 1 (Closest Receptors)

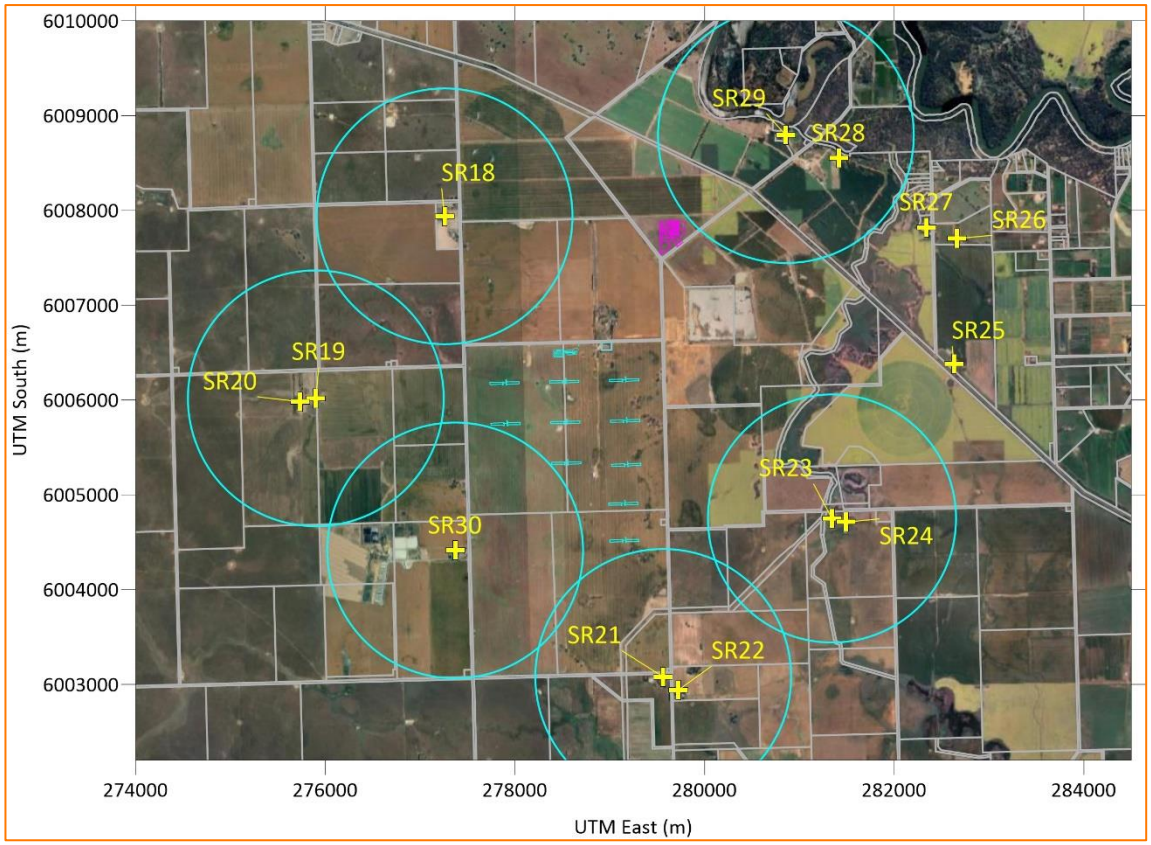

Figure 4-9: T Block Stage 2

4.4 Composting

The composting facility is an ancillary use and is located on Lot 2 on PS404891. The facility is located directly to the north-east of T-Block farm and will accept manure and floor litter directly from the poultry farm which is then composted to create a soil conditioner and fertilizer product which will be fertiliser product. It was shown as pink lines in Figure 4-7. The composting facility will be sized to also take material from Mclean Farms' proposed Cage Free and Rearing Farms in Torrumbarry processing over 50,000 tons per year. For Stage 1, the throughput will be under 50,000 tons per year.

Concerning separation distances, the recent publication, Operating organic waste processing facilities (EPA Victoria, 2024b) refers to the *Separation Distance Guideline* (EPA Victoria, 2024a) which has Appendix C for composting operations.

For the input material, EPA Victoria (2024b) defines fresh manure as a high risk waste (Table 1). For a high risk feedstock, odour control would be required. This assumes that the composting operation will be commercial and accept a variety of high risk wastes not just manure with bedding, which is the case here. This means that the control measures proposed here, may, for manure and bedding compost result in greater efficacy than if more odour waste streams were included.

Potential control measures in EPA Victoria (2024a) include:

- Control of waste deliveries to the site;
- Receival direct to composting bunkers or receival under cover;
- Covering of bunkers with permeable or impermeable covers, and forced aeration to maintain aerobic conditions;

- Collection and management of leachate in an enclosed tank before re mixing within the windrows, the management can also, if required include the aeration of the leachate storage areas; and
- Open air or under cover maturation.

While the final plant design and layout is yet to be defined, McLeans has committed to best practice odour management. A benefit to the staged approach of the site is that the composting system can be fine-tuned to minimise odour emissions prior to stage 2.

This means for the proposed volume of manure, the separation distance required will be in the order 1,000 m. The use of odour control, and only performing, as an example, open air maturation of fully composted product will ensure a low risk of impact.

Figure 4-10 below shows the composting circles, with a 1,000 m. As shown, the neared sensitive receptor is setback a minimum of 1,400 m from the composting facility.

The composting facility is discussed in Section 5 below.

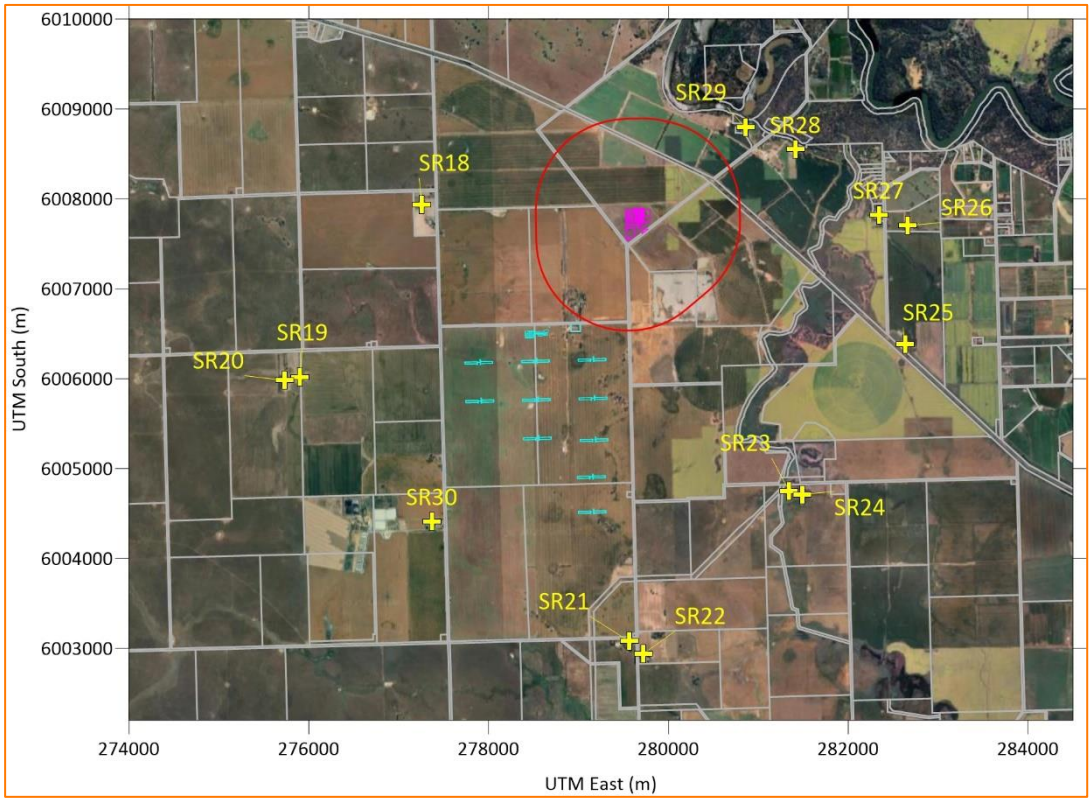

Figure 4-10: Composting Buffers (Red, 1 km)

5 DISCUSSION

5.1 Use of S Factors

The assessment here has relied on the S Factor approach for Stage 1 and Stage 2 of each farm. Specific comments relating to the various elements of the site are provided below.

For the normal sheds, the S Factor method provides a simple assessment method, however is overly simplistic in terms of taking into account factors such as cumulative impacts, or the spreading of sheds (T Block). Concerning T Block, applying a separation distance of 1,349 m is considered conservative due to the spreading of odour sources.

This is discussed further below.

5.2 Layer Sheds

Each component of the development will occur in Stages. Stage 1 is the first stage, and then once established, Stage 2 will proceed.

For Stage 1, the results for Pollocks (Table 4-2), Warwick's (Table 4-5) and T Block Table 4-8) show compliance. For Stage 2 (Figure 4-3, Figure 4-6 and Figure 4-9) compliance is also predicted for all farms, but closer to the required distances.

As shown above, all farms meet the S Factor at nearby receptors. Appendix A of the Egg Guideline includes a procedure for assessing the cumulative impact of farms. It states "Where the 'odour plume' from any neighbouring facility overlaps the 'odour plume' from the facility being assessed, cumulative odour impact is recommended, and the neighbouring facility should be included in the assessment."

Figure 5-1 below shows the separation distances for Stage 2 for both Pollocks and Warwick's. The distances do not overlap, therefore a cumulative assessment is not required.

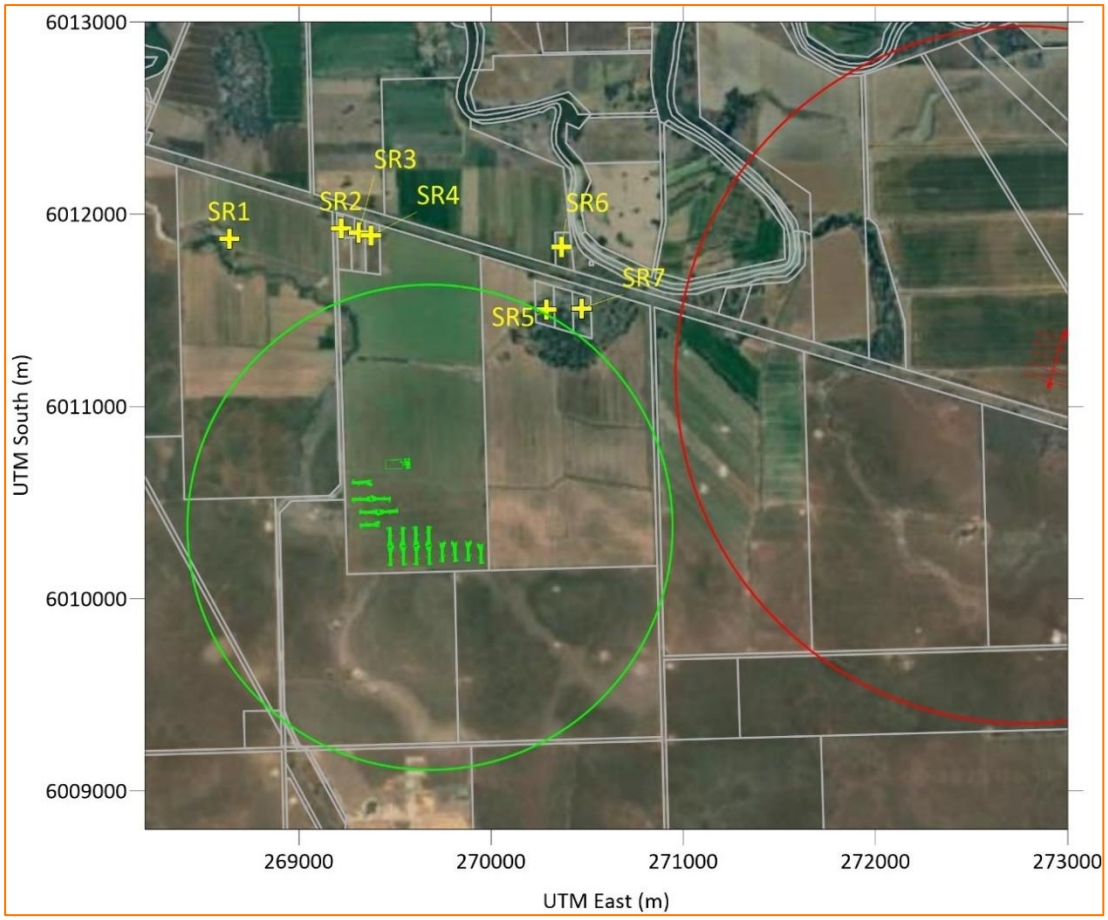

Figure 5-1: Cumulative Analysis[b]

5.3 Composting

The methodology in the Separation Distance Guideline assumes that a series of odorous inputs are used for a commercial composting operation. The more odorous the inputs, the higher risk. Given the size of the facility and the definition of the waste being high risk McLeans has committed to best practice odour management.

Here the primary inputs will be manure from the sheds, water and a carbon source. Therefore, potentially odorous inputs such as offsite wastewater or putrescible waste will not be included in the process.

As such, it is not expected that the odour from the composting will result in a cumulative impact with the layer sheds.

5.4 Other Odour Sources

There are three other odour sources in the area:

- The Patho Landfill south of Pollocks;
- A piggery approximately 2.5 km to the south west of Pollocks; and
- A piggery approximately 2 km to the south west of T-Block.

[b] Circles are from closest point of fan end of closest shed for each farm.

The other sources of odour identified above have a different type of odour (character) compared to layer sheds. Typically layer farms require smaller separation distances compared to the same sized meat chicken farms (as an example). Their odour potential is a function of their management, which primarily include feed conversion which results in less manure.

When compared to the two piggeries, the layer farms will not have an cumulative impact, as the piggery odour will be more offensive, and thus likely to dominate any odour in the area. In any case there are suitable separation distances.

For the landfill, again, the odour from the landfill is unlikely to be additive with the layer odour.

During a site visit on 18 March 2024, Mr Galvin, Mr Mcintosh of McLeans, and Mr Bydder of EPA Victoria drove the area, focussing on the three farm sites and the odour sources identified above.

It was Mr Bydder's view at the time, which is consistent with our opinion, that due to the relatively inoffensive nature of layer farms, the odours wouldn't be additive in addition to the fact that the various sources are separated from each other.

6 CONCLUSION

Separation distances have been predicted for the Rearer Farm (Pollocks), the Cage Free Layer farm (Warwick's) and the free range farm in line with the Separation Distance Guideline. Using the Egg Guideline S Factor method, all farms comply for Stage 1 and Stage 2. As the separation distances are met, there is no requirement for further odour risk assessment.

For the composting operation, when odour control is considered, the separation distances are met, therefore no cumulative impact is expected.

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