REPORT

Tonkin+Taylor

Airport Drive Free Range Poultry Farm

Odour Assessment

Prepared for
Airport Farm Trustee Limited
Prepared by
Tonkin & Taylor Ltd
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Airport Farm Trustee Ltd

Tonkin & Taylor Ltd (FILE)

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1 Introduction

1.1 Background

Airport Farm Trustee Ltd (AFTL) operates a four shed poultry broiler farm at 58 Airport Drive, Bell Block, Taranaki.

AFTL holds a number of resource consents for the site including resource consent R2/5262-2.1 to *discharge emissions into the air from a poultry farming operation and associated activities including waste management activities*, which expires on 31 May 2026.

To extend the ability to operate the farm at the site beyond the 2026 consent expiry, AFTL has lodged an application to replace the resource consent from the Taranaki Regional Council (TRC) for discharges to air (as well as to replace the consent for discharge to water).

Since lodging the application, AFTL has modified its proposed use of the site and now proposes to convert all four poultry sheds from conventional (i.e. non-free range) broiler poultry configuration to free range configuration. This will have the effect of reducing the overall housing capacity at the site from 95,000 birds allowed at present to 61,020 birds. ATFL is therefore updating its consent application to provide for the proposed conversion to free-range operation.

This report, prepared by Tonkin & Taylor Ltd (T+T) on behalf of AFTL[1], describes an assessment of the potential environmental effects of odour emissions from the proposed free range operation to be authorised by the consent.

This report provides an update to the following report prepared by T+T assessing the air quality effects of emissions from the previously proposed operation:

- "*Airport Drive Poultry Farm Odour Assessment*", December 2020.

The previous report was prepared in response to a TRC request for further information on the application.

1.2 Purpose and scope

The purpose of this report is to describe an assessment of the actual and potential effects of the odour emissions from the proposed free-range poultry farm on the environment.

Specifically, this document provides the following:

1 A description of the site activities.
2 A description of the nature of the odour emissions and sources
3 A description of the environmental setting of the emissions.
4 An assessment of the potential environmental nuisance effects of the odour emissions.
5 Conclusions in relation to the assessment.

Items provided by T+T on behalf of AFTL previously in response to the TRC's request for further information have also been updated as follows:

- A map identifying dwellings within 300 m of the sheds is provided in Appendix A. This map has been updated to reflect the 300 m separation distance from dwellings recommended for intensive poultry farming activities of the scale now proposed in the Regional Air Plan for Taranaki (RAQPT).

[1] In accordance with our engagement dated 24 September 2020 and variation dated 25 May 2021.

- An updated assessment of the application against the policies of the RAQPT and Part II of the Resource Management Act 1991 (RMA) is provided in Appendix B.
- A description of the improvements made to the management of emissions to air from the site since the existing consent was granted is provided in Appendix C. No update to this description has been required.

2 Activity description

2.1 Site and locality

As illustrated in Figure 2.1, the broiler poultry farm is located at 58 Airport Drive, Bell Block, Taranaki (the site), to the east and northeast of the Bell Block urban area and to the south of New Plymouth Airport.

Figure 2.1: AFTL site and locality

2.2 Site description

A broiler farm has been operated at the site for more than 40 years. As shown in Figure 2.2, the site currently features four broiler chicken sheds, housing a total for the site of up to 95,000 chickens. Two sheds are located parallel orientated southwest to northeast, with the other two adjacent to the east in a northwest to southeast orientation.

A 4 m high vegetated shelter belt surrounds the site, with exception of the southeastern boundary. Additional shelter belts align the site access road, and the southwestern side of the sheds closest to the road.

In addition to the sheds, the farm has a utility block featuring staff amenities, facilities for storing and conveying feed to the sheds, two water storage tanks and a 110 kVA diesel-fired standby electrical generator. An access road runs between the sheds, and along the eastern boundary of the site to allow access during clean out.

Figure 2.2: Site layout including sheds and proposed range areas *Source: AFTL*

2.3 Existing poultry sheds, operation and exhaust discharges

Each of the broiler sheds feature the following:

- A floor area of 1,017 m^2 each.
- Seven fans operated to maintain under negative pressure, with six located on the outside wall of each shed (facing the site boundary) and one next to the end door. In most circumstances, cross flow ventilation will occur with operation of the side wall fans and intake of air through the VentiFlap vents located along the opposite wall. The fans have been replaced since the last consent renewal. The four sheds on site are oriented such that the exhaust fans along the single side of the shed will be pointing towards the site boundary. Further cooling is provided on hot days with evaporative misting sprays.
- Each shed is equipped with 3 direct-fired natural gas heaters on the ventilator wall for internal shed climate control. Heat provided in the sheds will vary throughout the run cycle depending on the age of the chickens.
- A dry feed storage silo is installed on each shed, which conveys feed to pan feeders. Water is provided by nipple feeders.

Each shed is operated on an approximate 8-week cycle. Day old hatchlings are brought onto the site and housed for 42 days before the birds are caught and removed (catching of part of the batch may occur periodically in the latter stages in the cycle). Dry pellet feed will be conveyed from enclosed storage silos to feed pans within the sheds. Hydration of birds will be via nipple drinkers to reduce water spillage (which would promote anaerobic degradation of litter).

At the end of the cycle, litter is cleared from the sheds by specialist contractors (Osflow) and the sheds are cleaned. Litter is cleared by Bobcat mini-excavator onto the concrete pad at the end of each shed and loaded onto trucks with enclosed trays for disposal off-site (litter is not stored or composted on-site). The cleaning process typically takes approximately four hours for each shed.

Mortalities are removed from the sheds on a daily basis and stored frozen before disposal off-site.

2.4 Proposed modifications to site operation

AFTL proposes to convert the operation from conventional to free range configuration, which will include the following:

- Reduction in stocking density to 15 birds/m^2 of shed floor area, which will reduce the overall housing capacity of the operation to 61,020 birds. This represents a 36% reduction from the current capacity allowed under resource consent R2/5262-2.1 of 95,000 birds.
- Provision of outdoor range areas alongside each shed corresponding to the shed area (at a minimum).
- Installation of pop holes along the side of the sheds to allow birds to access the range areas in the following circumstances:
  - Once the birds are old enough to self-regulate body temperature at 21 days; and
  - During daylight hours thereafter (except during inclement weather).
- Planting of trees within the range areas and hanging of shade cloth from the sheds to provide shade for the birds using the range areas.

3 Odour emissions and sources

Intensive poultry operations have a potential to emit odour and dust. Odour is primarily generated from anaerobic degradation of manure and excreta from the housed chickens.

The anaerobic decomposition process results in the generation of a variety of volatile odorous nitrogen, sulphur and carbon-based compounds, including mercaptans and fatty volatile acids (VFAs). Due to the excretion of uric acid from chickens (in a more concentrated form than occurs from larger animals), the products of decomposition include ammonia.

Anaerobic decomposition requires a number of environmental factors to occur, including:

- An organic matter substrate material (manure and excreta in this instance).
- Anaerobic bacteria (present in the manure).
- A lack of oxygen (aerobic decomposition, which does not produce odorous compounds, will occur preferentially in the presence of oxygen until available oxygen is depleted).
- Water/moisture.
- Temperature – decomposition will be inhibited as temperatures reduce.
- Sufficient time for decomposition to occur – which will be dependent on the other factors.
- Manipulation or control of one or more of the factors can reduce odour generation.

In a litter-based free range broiler farm operation, the manure/excreta is present for a limited duration for anaerobic decomposition to commence. The potential for odour from litter will increase with increasing amounts as the chickens grow. Thus, the likelihood of anaerobic decomposition occurring will increase nearer the end of the cycle (normally from 3 weeks onwards). However, manipulation or control of one or more of the factors listed above can reduce odour generation.

Odour emissions from the proposed free-range operation are likely to be substantially reduced by the conversion to free range configuration for the following reasons:

- The stocking density will be reduced to 15 birds/m^2 from the effective stocking density allowed by the current consent of over 23 birds/m^2 (representing a 36% reduction).
- Free range operations allow the housed birds to roam over adjacent ranging areas, which we result in deposition of manure over range areas (though the bulk of deposition is likely to occur indoors where feeders are located).

Each of these factors will result in a reduction in the amount and density of manure deposited within the sheds.

In addition to the on-going odour generated from the breeding sheds, the potential for odour discharges will increase temporarily when anaerobic by-products are disturbed as litter is cleaned out and removed from site at the end of each batch.

Other free range poultry broiler farm odour sources include:

- Manure handling and storage – in this case manure/litter from shed is to be transferred off-site upon removal and manure/litter is not proposed to be stored on-site.
- Decomposition of bird carcasses – in this case dead birds are disposed of off-site.
- Storage/treatment/disposal of other waste.
- Feed decomposition.
- The birds themselves.
- Occasional diesel combustion (standby generator).

The nature of the odour types, the sources from which they are generated and the character and intensity are summarised in Table 3.1.

Table 3.1: Summary of poultry odour sources and types

Odour type	Sources	Character/offensiveness/intensity
Manure/excreta/litter	Sheds. Litter removal trucks.	Generally, strongly negative hedonic tone and potentially of strong intensity at source within the sheds, particularly when disturbed during removal.
Birds	Sheds	Moderately negative hedonic tone. Likely to be of lower intensity than manure odour emitted from the sheds.
Spoiler feed	Feed storage silos, feeding areas within sheds	Low potential for occurrence if feed is well managed.
Diesel	Standby generator	Moderately negative hedonic tone. Low intensity at source and likely to be operated infrequently.

4 Environmental setting

4.1 Adjacent activities

The site is located in a rural area to the south of New Plymouth airport, and east of Bell Block township. The local area is occupied by pastoral and cropping activities as well as large lot rural residential properties.

Due to infrequent occupation and potential for agricultural background odours pastoral and cropping activities are relatively insensitive to odour. However, sensitivity to odour will be elevated at the rural residences in the area, where consistent human occupation is likely, and expectations of amenity will be higher. The site lies in the Future Urban Development zone under the Operative New Plymouth District Plan (ONPDP) and Special Purpose - Future Urban Zone under the Proposed New Plymouth District Plan (PNPDP). Adjoining properties on the east side of Airport Drive feature the same zoning. This highlights the future intent of the NPDC for eventual urban development of the area though we understand that no structure plan has been released to set out this intent for properties east of Airport Drive.

Land to the west of Airport Drive (currently occupied by rural residential properties and agricultural activities) is zoned residential under both the operative and proposed district plans. Table 4.1 details rural dwellings within 400 m of the shed boundary, which are illustrated in Appendix A.

Table 4.1: Separation distances of the sheds to sensitive activities within 300 m*

Address	Distance from nearest shed	Direction from sheds
66 Airport Drive	55 m	N
52 Airport Drive	65 m	WSW
46 Airport Drive	100 m	SSW
69 Airport Drive	130 m	NW
71 Airport Drive	150 m	NW
47 Airport Drive	170 m	WSW
40 Airport Drive	190 m	SW
65 Airport Drive	185 m	NW
81 Airport Drive	190 m	NNW
82 Airport Drive	215 m	NE
34 Airport Drive	230 m	SW
87 Airport Drive	230 m	NNW
32 Airport Drive	240 m	SSW
35 Airport Drive II	255 m	SW
93 Airport Drive	260 m	N
22 Airport Drive	295 m	SSW

*Distance measured to the façade of the building

4.2 Topography

The topography of the area can influence localised wind and air flow patterns and therefore the dispersion of odour emitted from a site.

The site is located on a coastal plain and relatively flat land. Rolling country is present to the east (rural) and west (urban) of site, although the topography around site is relatively unvaried. The terrain rises to ranges to the south of the site and Mt Taranaki lies to the southwest. Each of these topographical features is likely to influence local meteorological conditions.

The topography of the site and immediate surrounds will also influence localised wind flows. The Mangaoraka Stream is around 370 m to the east of site and the Tasman Sea is located approximately 1.5 km to the north.

Temperature inversion conditions may occur overnight in clear, calm weather and produce calm, stable atmospheric conditions in which odour dispersion will be poor and the potential for accumulation of odour high. In these conditions, katabatic drainage flows will likely gently push air and accumulated odour from the sheds downgradient, in this case to the east of the site and down the Mangaoraka Stream (away from the nearest houses). The frequency of inversion conditions in this coastal area is likely to be low compared with inland areas.

4.3 Meteorological conditions

Weather conditions can have a significant influence on the dispersion of odour emissions. The most influential meteorological parameters on the dispersion of odour from diffuse emission sources such as the broiler farm operation are wind speed and direction, and atmospheric stability.

Surface winds in the area are likely to be strongly influenced by the orientation of and proximity to the coast and terrain (particularly the location relative to Mt Taranaki). The wind rose frequency analysis of wind speed and directions (wind blowing from) observed at the nearby New Plymouth Airport meteorological station over the period 2010-2012 is provided in Figure 4.1.

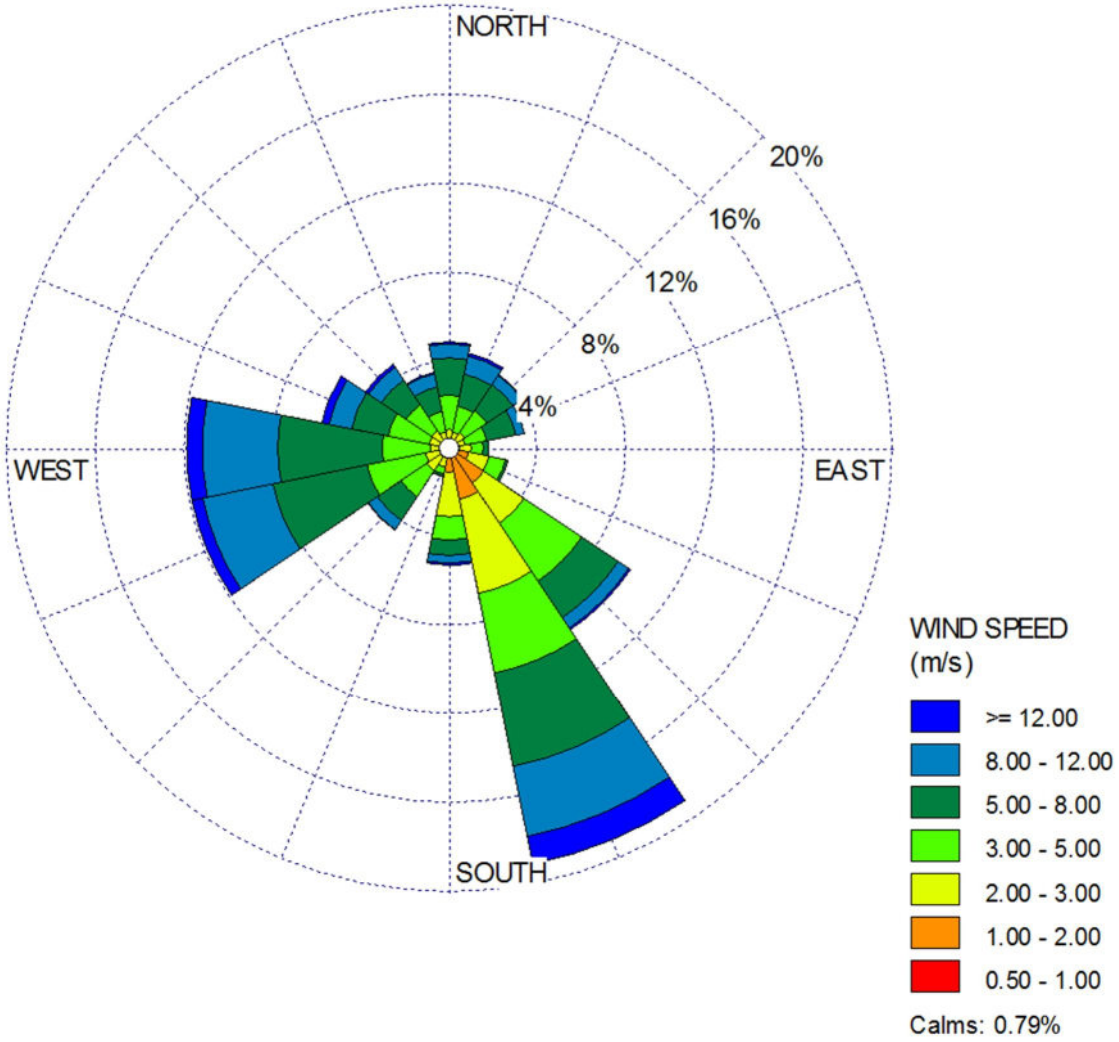

Figure 4.1: Frequency distribution of wind speeds and direction measurements, New Plymouth Airport 2010-2012 (winds bowing from, 1-hour averages, data sourced from the NIWA CliFlo database).

The airport meteorological station is located adjacent to the coast in flat terrain around 1.7 km to the north-north east of site. Given the proximity of the station to the site, wind speeds and directions measured at the airport are likely to provide a good representation of wind conditions experienced at the site.

The low frequency calm conditions (0.79%) and relatively high average wind speed (5.3 m/s) indicate the airport site is reasonably breezy and similar conditions are likely to exist at the site.

There is a strong prevalence of wind from the south to southeast directions (particularly in relation to calm to light winds of less than 3 m/s in which odour dispersion is poorest). This reflects the deflection by Mt Taranaki of winds from the southerly quarter to the southeasterly quarter, southeasterly drainage of cold air from the slopes of Mt Taranaki and night-time land breezes[2]. There is a secondary prevalence for westerly winds at this location, though the significant majority of wind from this direction is of reasonably high speeds (greater than 5 m/s).

In terms of dispersion of emissions, winds at the site are most likely to disperse odour emissions most frequently towards the nearest dwellings to the north west, where the nearest property is 130 m from the sheds.

The nearest dwelling is to the north (66 Airport Drive; 55 m from the sheds) and while winds from the south are relatively infrequent, they are typically weak. Light wind speeds in other directions are infrequent.

[2] Chappell P.R. (2014) The Climate and weather of Taranaki. 2nd Edition. *National Institute of Water and Atmospheric Research*

5 Assessment of odour effects

5.1 Assessment methodology

The discharges to air from the operation include odour and a small amount of dust. As the odour emissions have the greater potential to cause adverse effects on the environment, this assessment focusses on odour emissions.

The Ministry for the Environment (MfE) guidance on the assessment of odour impacts[3] (MfE Odour GPG) sets out various approaches and information that can be used to carry out odour impact assessments, depending on the particular circumstances of the discharge and receiving environment.

Table 5.1 considers the relevance of odour assessment tools described in Appendix 2 of the MfE Odour GPG for preparing or evaluating resource consents for existing discharges.

Table 5.1: Consideration of odour assessment tools described in MfE Odour GPG

Assessment tool	Relevance in relation to this assessment
Community consultation	AFTL has not consulted with neighbours in relation to this application and the complaint record has been relied upon for community feedback in relation to odour.
Complaint records	Discussed in section 5.2.
Industry/council experience	Experience of the TRC at similar sites has also been taken into account via a comparison of geographical separation from sensitive activities with the recommendations of regulatory authorities based on similar sites (refer section 5.3).
Odour annoyance surveys	This type of assessment is only available where there is sufficient population density in the receiving environment to draw statistically significant conclusions, which is not the case in this rural environment.
Meteorology and terrain assessment	Discussed in section 4.
Odour diaries and weather monitoring	The complaints record has not indicated that odour is prevalent on neighbouring properties and an odour diary programme was therefore not considered suitable for this assessment.
Olfactometry and modelling of odour sources	In relation to the use of odour dispersion modelling, the Odour GPG recommends that it is only potentially useful for the assessment of new discharges. In this case the poultry farm is currently in existence with expansion or increase in activity proposed as part of this application. Dispersion modelling is therefore not considered appropriate in this instance.
Review of process emission control system(s), odour management plan and contingency procedures, risk assessment	Discussed in section 5.3

This assessment of potential odour nuisance effects has therefore been based on the following assessment methods, which are considered consistent with MfE Odour GPG guidelines:

1 A review of historical complaints received by AFTL and the TRC in relation to odour from the existing operation (section 5.2).

2 A review of the odour generating activities and the measures proposed to manage odour emissions and mitigate the potential for odour nuisance effects (section 5.4).

[3] MfE. 2016. "Good Practice Guide for Assessing and Managing Odour in New Zealand" Appendix 2.

3 A consideration of the receiving environment in terms of sensitivity and the degree of geographical separation between the proposed odour sources and local sensitive activities (section 5.3).

4 A summary consideration of the FIDOL factors for odour nuisance (section 5.5).

5.2 Complaint and compliance records

While odour complaints are not conclusive indicators of the presence/absence of odour nuisance, the record of odour complaints and any confirmed incidences of offensive or objectionable odour can provide a broad indication of odour nuisance experienced in the vicinity of the existing operations.

This is turn may provide an indication of potential for odour nuisance associated with the proposed operation, though the substantial modifications proposed, notably the reduction in stocking density and capacity, should be taken into account.

The complaint record indicates that up to 2013 when AFTL took ownership of the site fourteen complaints had been received by the TRC in relation to the poultry farming operation (the exact date of the complaints is unclear from the record).

Since AFTL took ownership of the site in 2013, there have been two odour complaints recorded by TRC - both in 2015. Since that time there have been no complaints in relation to the site recorded by TRC. AFTL has no record or recollection of having received complaints relating to odour from the site and questioned whether the complaints relate to other sites it operates.

TRC records indicate that none of the historical complaints have resulted in confirmation of offensive or objectionable odour beyond the boundary as a result of emissions from the site (or other breaches of the existing of previous discharge to air consents).

Overall, while complaints from the surrounding area regarding odour from the site had been recorded by TRC in the past, AFTL is not aware of any complaints since it took ownership of the site in 2013. The cessation of complaints has coincided with a number of improvements to odour management that AFTL implemented at the site.

The potential for odour nuisance should be further reduced by the conversion to free range operation (and reduction in stocking density and capacity).

5.3 Consideration of geographical separation from sensitive activities

A comparison of the separation distances that exist between odorous and sensitive activities with relevant separation distance guidance recommendations of regulatory agencies can provide a rough indication of the potential for odour nuisance effects. However, separation distance recommendations are typically published to provide guidance on the appropriateness of a proposed introduction of a new discharge activity to an area rather than to assess the impact of existing activities.

The RAQPT recommends buffer distances for poultry operations and dwellings or sensitive areas are specified in four categories based on the number of birds housed. As noted above, Appendix V of the RAQPT recommends a 300 m separation between off-site dwellings and intensive poultry operations housing between 60,000 and 80,000 birds (as is proposed in this case).

As identified in section 4.1 and illustrated in Appendix A, 16 existing dwellings are located within 300 m of the sheds.

The TRP separation distance recommendations are generic and are based on housed population as a measure of the potential scale of effects from intensive poultry farming. The recommendations do

not take account of the standard of odour management and control employed at a particular site. Notwithstanding this, the location of 16 existing dwellings within a 300 m radius highlights the reasonably sensitive nature of the receiving environment (compared to other rural receiving environments) and that a standard of odour management should reflect this degree of sensitivity.

5.4 Management of odour and mitigation of nuisance effects

AFTL utilises an array of measures to manage odour emissions and mitigate the potential for off-site nuisance impacts. These measures are principally directed at minimising odour generation through control of moisture content and temperature of manure, to reduce the potential for anaerobic degradation. Specific measures employed at the site include:

- Computerised climate control based on continuous monitoring and maintenance of temperature and humidity levels within the shed. Prior to 2013, automated control of shed climate appears to have been limited without direct control of humidity levels. Older poultry sheds may feature natural ventilation with little control over humidity levels.
- In relation to heating of the sheds, AFTL has installed additional insultation to more effectively maintain internal temperatures. A direct-fired shed heating system is employed involving direction of heated exhaust gases from externally mounted heaters into each shed. This type of heating is more likely to increase shed humidity than indirect heating methods, which provide dry heat.
- Avoidance of direct introduction of water to litter, both on an on-going basis through use of nipple drinkers to avoid drip losses and continuous monitoring of water usage and auditing of sheds five times a day to detect unintentional leakage.
- Feed quality can influence odour generated from manure. The dry pellet feed used at the site is supplied by Tegel and is consistent across poultry operations across Taranaki and other regions of New Zealand.
- Mortalities are removed from the sheds on a daily basis and stored frozen before disposal off-site.
- The potential for odour emissions will increase during shed clean-out at the end of a batch and in order to clear the sheds efficiently, the sheds are cleared sequentially, thereby minimising the potential for simultaneous emissions. Manure is to be removed from the site by specialist contractors as it is cleared from the sheds and is not proposed to be stored or composted on-site.
- Mature screen vegetation along the boundaries of the site will reduce wind velocities through the site and disturbance of litter (leading to generation of dust and odour emissions) during clean out. The planting also provides visual screening of the site from neighbouring properties.

The odour management regime at the site features a number of modifications implemented by AFTL since it took ownership of the site in 2013. The majority of modifications, such as automated climate control and additional insulation will have mitigated the potential for nuisance impacts on neighbouring properties. With those measures in place, a high standard of odour management is employed at the site.

A further modification to the operation is the proposed conversion from conventional to free range broiler operation. This has the effect of lower both the stocking density and capacity of the operation and allows for the chickens to range for at least part of the time. Each of these factors thereby reducing the amount of manure deposited in the sheds, which in turn should in turn result in a substantial reduction in the intensity of odour emitted from the sheds.

5.5 Summary consideration of potential for odour nuisance

Table 5.2 sets out an evaluation of the potential for the discharges from the expanded site to cause odour nuisance based on the FIDOL factors (frequency, intensity, duration, offensiveness/character, and locational sensitivity).

Table 5.2: FIDOL assessment of the proposed odour discharge

Factor	Consideration
Frequency/ duration	The frequency and duration of odour observations at receptor locations in the receiving environment will be dictated by the frequency of emissions and by wind conditions. As noted below odour generation is likely to nil during the sterilisation period between shed cleanout and the commencement of the cycle and minimal during the early stages of the cycle. From that point (e.g. after the first three weeks of the cycle) odour generation within the sheds will be generally consistent and the frequency of odour emissions will be dependent on ventilation. The frequency of odour emissions of litter clean-out will be low – approximately on 8 days over the year. As noted below, the conversion to free range configuration will reduce the intensity of odour emitted from the operation and observed in the surrounding area. This is also likely to reduce the frequency and duration of observed odour to some degree (where the intensity of observed odour is reduced below a detectable level). Odour propagation towards off-site receptors is likely to be greatest in light wind conditions (generally winds 0.5-3 m/s). As noted in section 4.3, observations from the New Plymouth Airport weather station should provide a good representation of conditions at the site. Based on station wind measurements, there is a strong prevalence for winds of speeds of 0.5-3 m/s from the south to southeast range of directions (51% of winds of this strength, 14% of wind overall). The dwelling on the adjacent property to the north at 66 Airport Drive and houses beyond Airport Drive to the north and northwest would therefore be downwind most frequently. The frequency of light winds blowing in other directions is low.
Intensity	Intensity of odour observed at neighbouring sensitive receptor locations will depend on the intensity of emissions and the degree of their dispersion in the environment (dispersion being a function of separation distance and meteorology). The proposal to convert to free range configuration and reduce the stocking density and capacity of the operation by 36% should result in a substantial reduction in the amount and density of manure deposited within the sheds. This in turn should substantially reduce the intensity of odour emitted from the sheds. Manure deposited over the range areas is unlikely to materially increase the intensity of odour. The intensity of odour from the broiler sheds will vary over the cycle - odour generation will be largely absent in the cleaned sheds prior to commencement of the cycle, and will be minimal in the early stages of the growing cycle (e.g. the first three weeks) as the birds come to maturity. Odour generation within the sheds is then likely to steadily increase as manure accumulates in the litter. The increase in bird size over the cycle will also lead to increased manure deposition generation but this is regularly off-set by partial catches and removal of birds from the sheds during the cycle. The potential for odour generation will then increase briefly during shed-cleanout at the end of the cycle (around 4 hours). The intensity of odour emissions is able to be further mitigated through good odour management. As noted in section 5.4, a high standard of odour management is employed at the site. The dispersion of odour emissions will be reduced in stable atmospheric conditions and calm or light wind. The frequency of these conditions is relatively low (for example based on Airport measurements calm conditions with wind speeds of less than 0.5 m/s occur for only 0.8% of the time).

Factor	Consideration
Offensiveness (character)	Odour derived from the anaerobic degradation of chicken manure comprises a range of odorant components and overall has an unpleasant (strongly negative) hedonic tone. Odour from bird feathers is associated with a negative hedonic tone through will be more moderate in terms of offensiveness.
Locational sensitivity	The local environment is currently rural in nature and in the pastoral areas forming the majority of the receiving environment will have a low sensitivity to odour given the infrequent and transient human occupation of these areas. However, sensitivity will be increased at the rural residential dwellings that currently existing in the area. Prolonged human occupation will occur at these dwellings and expectations of amenity will generally be high. However, in relation to the general sensitivity of rural residential activities Ministry for the Environment (MfE) guidance on assessing and managing odour[4] states: *Population density is lower than in residential areas, so the opportunity to be adversely affected is lower. However, people of high sensitivity can still be exposed at all times of the day and night.* The MfE guidance subsequently states in relation to the general sensitivity of rural areas: *People living in and visiting rural areas generally have a high tolerance for rural activities and their associated effects. Although these people can be desensitised to rural activities, they may still be sensitive to other types of activities (e.g. industrial activities).* Therefore, in general terms the sensitivity to poultry odour is likely to be higher at rural dwellings compared to the rest of the rural environment but will not be as high as in urban residential areas. As noted in section 5.3, 16 houses are located within the 300m of the sheds, which indicates that the sensitivity of the receiving environment overall is higher than less populated rural environments.

In summary, the presence of a number of rural residential properties in the area surrounding the site and residential zoning across Airport Drive means that sensitivity to odour is higher than many less populated rural areas. Exposure to winds that could propagate odour from the site will be most frequent at dwellings to the northwest.

The sensitivity of the environment necessitates odour management measures that will manage the intensity and frequency of odour to avoid or mitigate potential odour nuisance impacts. AFTL has implemented a number of measures to improve odour management at the site since it took ownership of the site and a generally high standard of odour management is employed. These improvements have coincided with an absence of odour complaints in at least the last five years.

The intensity (as well as the frequency and duration to a lesser degree) of odour emissions will be further reduced by the proposed conversion to free range operation and the associated 36% reduction in stocking density, thereby further reducing the potential for nuisance effects.

Overall, the evaluation of the proposed odour discharges against the FIDOL assessment framework indicates that the proposed conversion to free range operation should substantially reduce the potential for odour nuisance. Objectionable or offensive odour beyond the site boundary is unlikely and adverse effects on air quality in the surrounding area are assessed as being no more than minor.

[4] MfE. 2016. Good Practice Guide for Assessing and Managing Odour.

6 Conclusions

The conclusions of this assessment of the air quality impacts of discharges to air from ATFL's intensive broiler chicken farming operation at Airport Drive are as follows:

- The existing four shed conventional broiler shed operation is proposed to be converted to free range operation, resulting in a 36% reduction in housing capacity to 61,020 birds.
- Intensive poultry farming operations have the potential to emit odour, which is generated mainly from anaerobic degradation of manure/excreta from the housed birds. The odour emissions from this operation should be substantially reduced by the proposed free-range conversion and associated reduction in stocking density and capacity.
- The environmental setting of the site is rural in nature (typically of a low sensitivity to odour) and the site is well separated from urban residential areas where sensitivity to odour is highest. However, the presence of a number of rural residential dwellings increases the sensitivity of the environment compared to most rural environments.
- ATFL has implemented a number of measures to improve management of odour at the site to reflect the sensitivity of the surrounding environment. ATFL's improvements have coincided with an absence of complaints relating to odour from the site, which would support the efficacy of the improved odour management regime. Odour emissions and potential for nuisance effects should also be substantially mitigated by the proposed free-range conversion.
- Having regard to the FIDOL factors for assessing nuisance effects, the proposed conversion to free range operation should substantially reduce the intensity of odour observed beyond the site (and to a lesser degree the frequency and duration), which will reduce the potential for odour nuisance effects. Provided the current odour management regime is implemented effectively, odour emissions from the proposed operation are unlikely to cause odour that is offensive or objectionable beyond the site boundary. The proposed (reduced) emissions to air are unlikely to have more than minor air quality effects in the receiving environment (including at local rural residential dwellings).

7 Applicability

This report has been prepared for the exclusive use of our client Airport Farm Trustee Ltd, with respect to the particular brief given to us and it may not be relied upon in other contexts or for any other purpose, or by any person other than our client, without our prior written agreement.

We understand and agree that our client will submit this report in relation to an application for resource consent and that Taranaki Regional Council as the consenting authority will use this report for the purpose of assessing that application.

Tonkin & Taylor Ltd

Report prepared by:	Authorised for Tonkin & Taylor Ltd by:
	
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Appendix A: Dwellings located within 300 m of the sheds

Appendix B: Statutory assessment

B1 Overview of Statutory Assessment

The TRC request for information has sought assessment of the application proposal against the following, the response to which is set out below:

- Policies of the RAQPT; and
- Part 2 of the RMA.

B2 RAQPT policies

The relevant policies of the RAQPT to the application are considered in the following table.

Table B7.1: Evaluation against RAQPT policies

Policy		Evaluation
Policy 1.2: Odour	Ensure that, (to the fullest extent practicable), any discharges to air of odorous contaminants do not cause odours beyond the boundary of the property of the discharger that are offensive or objectionable.	Policy 1.2 sets out a bottom line for nuisance effects of odour discharges – that offensive or objectionable odour should be avoided to the fullest extent practicable. There is no record of the TRC having confirmed odour from the site as resulting in offensive or objectionable effects beyond the site boundary. Furthermore, the assessment provided in this document indicates the proposed free-range conversion will reduce potential for nuisance effects and that offensive or objectionable effects are unlikely to occur in future.
Policy 2.6: Cumulative effects	Discharges of contaminants to air should not occur at a rate or in a manner that contribute to a cumulative effect which over time, or in combination with other effects, is likely to have an adverse effect on human health and safety, ecosystems, property or other aspects of the environment.	In relation to the potential cumulative of the odour emissions from the site with background odour levels, background odour could result from agricultural activities in the wider area. However, the character of background odour is likely to differ from there are no poultry operations that would likely result in background levels of similar odour

Policy		Evaluation
Policy 2.7: Best practicable option	The Taranaki Regional Council may, when provided for in the Rules of the Plan, require the adoption of the best practicable option to prevent or minimise adverse effects on the environment from the discharge of contaminants to air arising from the process under consideration. When considering what is the 'best practicable option' to reduce the effects of the discharge, the Taranaki Regional Council will give consideration to the following factors when applying the definition in the Act, of best practicable option: a) the implementation of Policies 1.1, 1.2 and 1.3, when having regard to the nature of the discharge; b) any sensitive receiving environments (areas) as described in Policy 2.3; c) the capital, operating and maintenance costs of relative technical options to reduce the effects of the discharge, the effectiveness and reliability of each option, and the relative benefits to the receiving environment offered by each option; d) the weighing of costs in proportion to any benefits to the receiving environment to be gained by adopting the method or methods; and e) maintaining and enhancing existing air quality in the neighbourhood as far as practicable.	Policies 2.7 and 7.2 require consideration of the measures implemented to avoid, mitigate and minimise potential adverse environmental effects, which are discussed in section 5.4. The receiving environment is reasonably sensitive compared to most rural environments and a high standard of odour management is currently implemented as a result. Considering the costs likely to be involved in implementing alternatives, the measures equate to the best practicable option for mitigation of odour nuisance effects. As concluded in the assessment above, with the proposed odour management regime in place offensive or objectionable odour or other significant adverse effects on air quality should be avoided.
Policy 7.1: Avoidance, remediation or mitigation – General policy	The discharge of contaminants to air from aquaculture or intensive farming processes, including the rate and concentration of the discharge, will be managed to avoid, remedy or mitigate any significant off-site adverse effects on the environment arising from the discharge.	

Policy		Evaluation
Policy 7.2: Actual or potential effects that require particular consideration	In considering the effects of any discharge of contaminants to air from aquaculture or intensive farming processes, particular regard will be had to the following effects:	
	a) any actual or potential effects on the health and functioning of ecosystems, plants and animals including indigenous ecosystems and plants and animals of commercial significance;	Emissions of contaminants from the operation, such as dust or ammonia, that could potentially have adverse ecological effects if exposure to the contaminants is excessive are small in scale. Off-site exposure of plants or animals to the emissions is therefore unlikely to result in this type of effect, which have not been identified to have occurred as a result of emissions from the site to date.
	b) any actual or potential effects on amenity values, including any effects of odour or particulate matter arising from the discharge, and any nuisance effects;	Odour is the contaminant emitted from the site that is most likely to adversely impact amenity or cause nuisance effects. Those effects are addresses in this assessment, which indicates that the potential for odour nuisance effects is low.
	c) any actual or potential adverse effects on areas, places, sites or features identified in Policy 2.3;	No adverse effects on management areas described in Policy 2.3 are anticipated as a result of emission from the site.
	d) any actual or potential adverse effects on other receiving environments;	The discharge to air of dust and ammonia from the farming operation could potentially lead to deposition of these contaminants to land or surface water in the vicinity of the site. However, the discharge of these contaminants is of small scale and unlikely to result in any adverse effects on these receiving environments.
	f) any cumulative adverse effects identified in Policy 2.6;	Although there is a substantial number of intensive poultry farming operations in the wider region, there are none within proximity where cumulative odour impacts would be possible. Other emissions (e.g. dust and combustion contaminants) from the site of small scale and unlikely to have any significant cumulative impact with background sources of these emissions.
	g) any adverse effects of low probability but high potential impact	ATFL implements a range of measures such as continuous monitoring and alarming of shed operational parameters, standby electrical supply that allow it to minimise and respond to the risk of high potential environmental impact events.
	h) any positive effects of the discharge, including social and economic benefits of activities using air resources.	The operation is long established economically productive activity and will continue to have positive effects through direct and indirect employment, economic output and through providing a source of food source for the community.

The discharges are considered to be consistent with the policies of the RAQPT overall.

B3 Part 2 of the RMA

Part 2 of the RMA sets out the purpose and principles of the Act. The purpose of the RMA is to promote the sustainable management of natural and physical resources.

In relation to Section 5, this application is consistent with the purpose of the RMA as it provides for the social and economic wellbeing of the community while avoiding or mitigating adverse effects on the environment.

In relation to Sections 6 - 8, no matters of national importance or matters specified in Section are considered to be of specific relevance to this application. The granting of consent for the discharge, which has occurred for a number of years, is not anticipated to be contrary to the principles of the Treaty of Waitangi.

Overall, the granting of consent for the discharges is considered to be consistent with the purpose and principles of the RMA.

Appendix C: Descriptions of improvements

The following is a list of improvements at the site by ATFL since the existing consent was granted:

1 New doors on every shed that provide sealed air environments.

2 Insulation added and all gable ends re-clad to improve energy efficiency.

3 New heating system in each shed consisting of 3 x Hired Hand externally mounted gas fired heaters per shed.

4 New feeding and drinking system in each shed.

5 LED lighting - Hato LED lighting added to each shed to create natural daylight spectrum and dawn to dusk lighting patterns.

6 Agrologic Controllers per shed which control all ventilation, heating, feeding, drinking lighting, humidity and alarm systems

7 Fans - additional fans added to each shed to increase ventilation capacity and provide greater flexibility with air control

8 Replaced all side vents with like for like to make the sheds more airtight.

9 Generator - replaced old generator with new 100 kVA alarmed generator

10 Alarm system - installed new alarm system and back up for each shed and farm as a whole. Works in conjunction with the new Agrologic Controllers.

11 Concrete floors - major concrete floor repairs in each shed, some areas replaced, some patched.

12 Roading - new track installed around back of Shed 3 and 4 so that trucks are able to perform a loop of the farm. This reduces trucking movements and noise.

13 Misting system installed on each shed to aid with cooling of air in sheds on very hot days

14 Electrical boards - all boards upgraded in each shed to remove old fuses and switches. Tested with heat imaging cameras.

15 In shed camera network - cameras installed in each shed to allow real time monitoring of birds and also visits from catchers, shed cleaners and staff.

16 Nib walls on each shed sealed with concrete waterproof sealant to make the sheds less likely to bring moisture into shed through concrete.

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