DEVELOPMENT OF MEAT CHICKEN FARMS IN QUEENSLAND

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Queensland Government

This publication has been compiled by Animal Industries, Department of Agriculture and Fisheries.

Contents

1.0 Overview

1.1 The industry

The Queensland meat chicken industry makes a significant contribution to the Queensland economy. The gross value of primary production for Queensland's chicken meat sector was valued at $588 million in 2014-15[1].

Meat chicken farms are located close to processing plants to ensure the welfare of the chickens during transport and to minimise the cost of transporting the chickens.

In the past, the locations of meat chicken farms in Queensland were typically on the urban fringe. Urban encroachment has meant that meat chicken farms are now not always located in a rural setting—some are now located within urban areas of South East Queensland (SEQ). Proximity to neighbours and urban communities raises the potential for issues such as odour, dust, pests, farm traffic, noise, and visual and lighting impacts. It is therefore crucial for new meat chicken farms to be appropriately located and operated to ensure potential impacts on community health and amenity and the general environment are minimised.

1.2 Purpose

The *Development of Meat Chicken Farms in Queensland* (the document) provides information for the planning, design and development of meat chicken farms across Queensland. Whilst not a compliance, operational or management manual, it provides some advice on operational arrangements, where relevant, to managing the potential impact of meat chicken farms on the environment and broader community.

The purpose of the document is to provide consistent information for the planning and development of meat chicken farms to:

- assist local government to include relevant provisions in Local Government Planning Schemes
- assist proponents with the development of a new meat chicken farm or the expansion of an existing farm
- provide information to assist local government officers in assessing development applications
- provide an overview of planning frameworks and the development assessment process
- provide information to assist local government to protect existing and approved poultry farms from encroachment by development that would compromise the ability of the meat chicken farm to function safely and effectively.

Use of the document by local governments and proponents will contribute to a more consistent decision-making process and increased certainty for the meat chicken industry whilst reducing community conflict resulting from the expansion of the industry.

1.3 Scope

The document applies to the development of new meat chicken farms and the expansion or renovation of existing meat chicken farms.

The document is not designed to cover poultry farming activity other than meat chicken production. Egg production is excluded from this document because a significantly different production system is used. Free-to-range facilities are not considered as these require a specific site-by-site approach.

The document recognises the structure of the industry, particularly the typical involvement of both growers and processors in meat chicken production. Usually the grower directly owns and operates the rearing facility, while the processors provide and own the chickens, arrange transport, provide the feed, provide veterinary and management advice, and process and market the chickens. In most instances, the grower

[1] Australian Bureau of Statistics. 7503.0 – Value of Agricultural Commodities Produced, Australia, 2014-15. 23 March 2016.

operates under a contract with a processing company, and the ongoing performance of the farm is therefore dependent on the actions of both the grower and the processor.

The document is not designed to provide site-specific details for all possible site variables and use of the document alone will not necessarily ensure compliance with all planning and environmental management requirements.
This document describes the objectives and some acceptable outcomes that could be implemented when developing a meat chicken farm.

These requirements are provided for all parties with an interest in the development and operation of meat chicken farms, but in particular this document focuses on requirements to be taken into account when a development application is being prepared or assessed.

Proponents considering building a new facility, or expanding/renovating an existing farm, should use this document to inform the planning and design of the facility and establishment of management practices to minimise environmental impacts.

This document alone will not ensure good planning and environmental management outcomes, nor provide an exhaustive list of acceptable solutions. Site-specific data, impact assessment and alternative solutions will also be required in many instances.

1.4 Review

The document is based on current information and knowledge.

Further investigation, research and innovation in farm practice may in the future establish new and refined practices for the industry.

The state government will from time to time revise the document as new peer reviewed information relating to the design, operation, management and environmental impact of meat chicken farms becomes available.

2.0 Planning framework – relevant instruments

The Sustainable Planning Act 2009 (SP Act) provides a framework to achieve ecological sustainability by managing the process by which development takes place. This includes ensuring the process is accountable, effective and efficient and delivers sustainable outcomes; and managing the effects of development on the environment, including managing the use of the premises; and integration of planning at local, regional and State levels.

Local government planning schemes describe a council's plan for the future direction of a particular local government area. Planning schemes provide a detailed direction for the area focusing on community planning and aspirations, whilst ensuring the needs of the state and the regional community are incorporated.

Planning schemes must appropriately reflect the standard planning scheme provisions; identify the strategic outcomes for the planning scheme area; include measures that facilitate achieving the strategic outcomes; coordinate and integrate community, state and regional needs and wants; include a priority infrastructure plan; and include a structure plan for any master planned areas within the local government area.

Local planning integrates and balances economic, social and environmental needs and aspirations of the local community to provide an orderly approach to land use and change with a focus on land use, development, infrastructure and valuable features of the area.

State planning instruments are statutory instruments that articulate the government's position on planning and development related issues and provide for the protection and management of those issues within the planning and development system.

There are four types of State planning instruments under the SP Act:

1. State Planning Regulatory Provisions
2. State Planning Policies
3. Regional Plans
4. Standard Planning Scheme Provisions.

2.1 State Planning Regulatory Provisions

State planning regulatory provisions are state planning instruments that regulate development and can apply to all or part of the state.
They can be used in the following circumstances:

1. To provide regulatory support for regional planning and master planning
2. To provide for charges for infrastructure
3. To protect planning scheme areas from adverse environmental, cultural, economic or social conditions.

State planning regulatory provisions may specify categories of development, including prohibited development; specify levels of assessment, such as code assessment or impact assessment; include a code or other criteria to be used in development assessment; otherwise regulate development; provide for matters in which the state planning regulatory provision can apply.

2.2 State Planning Policies

The Queensland Government established the state planning policy (SPP) in December 2013 to simplify and clarify matters of state interest in land use planning and development.

State interests can apply to the whole or part of the state and provide overall policy direction for regional plans and for local governments' planning schemes. They may also provide detailed codes and standards used in technical aspects of development assessment. SPPs must be considered in assessing and deciding an application. They also have effect in preparing and amending planning schemes.

The SPP which replaced multiple state planning policies, is a key component of Queensland's land use planning system that enables development, protects our natural environment and allows communities to grow and prosper.
The SPP provides clarity to local governments when making and amending local planning instruments and assessing development applications and assists developers in preparing development applications. SPPs must be considered in assessing and deciding an application. They also have effect in preparing and amending planning schemes.

The SPP is supported by state interest guidelines which are provided to assist the implementation of the policy.

SPPs should be considered when identifying land for a meat chicken farm. The SPP addresses the compatibility of land uses and provides advice on separation distances required between meat chicken farms and other forms of development.

2.3 Regional Planning

The Regional Plans seek to provide strategic direction to achieve regional outcomes that align with the state's interest in planning and development.

Land use planning is primarily the responsibility of local government. However, the State has an interest in ensuring that broader regional outcomes are achieved through the application of state policy in local planning.

The regional plans identify regional outcomes to help achieve state interests. Regional policies are used to facilitate these outcomes by addressing existing or emerging regional issues, such as competition between land uses.

Regional planning plays a key role in helping Queensland meet the challenges associated with managing rapid growth, population change and economic development, and protecting the environment and infrastructure provision across multiple local government areas.

Regional plans operate in conjunction with other statutory planning tools, including state planning policies, local government planning schemes, state planning regulatory provisions and development assessment processes. Statutory regional plans generally take precedence over most planning instruments, however where required, state planning regulatory provisions can override the regional plan. Non-statutory regional plans provide strategic advice and direction, but do not prevail over other planning instruments.

Regional plans identify:

- desired regional outcomes
- policies and actions for achieving desired regional outcomes
- future regional land use pattern
- regional infrastructure provision to service the future regional land use pattern
- key regional environmental, economic and cultural resources to be preserved, maintained or developed.

Regional plans are developed in collaboration with local governments, key industry groups and the wider community.

2.4 Standard Planning Scheme Provisions

The SP Act allows the making of standard planning scheme provisions, known as the Queensland Planning Provisions (QPP). The QPP are the standard planning scheme provisions made under the SP Act. This is a robust and flexible document that provides a consistent format and structure for local governments to prepare their planning schemes under the Act while allowing the flexibility to address each local government's circumstances.

The purpose of the QPP is to provide a clear and consistent framework for planning schemes in Queensland; to assist in the implementation of state, regional and local policies affecting land-use and development; and for the integration of state, regional, local and community expectations in relation to planning scheme areas.

The QPP further provides for local government to incorporate local content and variation to reflect the context of the local government area. The QPP prescribes standard land-use definitions and zones that must be included in planning schemes across Queensland as, and when, schemes are updated. Poultry farming is covered by the definition of ‘intensive animal industry’ and included under the Rural Zone. The QPP also provides for the development and adoption of standardised assessment codes.

3.0 The development assessment process

The Integrated Development Assessment System (IDAS), established under SP Act, provides a single legal administrative framework for the assessment and approval of almost all development in Queensland.
In order to carry out certain types of developments, an application may need to be made for a development permit.
The development application provides information to the assessment manager about the proposed development to enable the assessment manager to properly assess the application.

Depending on the type of development proposed, the application may require information about what the development will look like when complete, the materials to be used, and any impacts the proposed development may have on the surrounding environment.

Development applications are assessed under the SP Act. The process for assessing and deciding developments is known as the Integrated Development Assessment System (IDAS).

It is advantageous to undertake a pre-lodgement meeting with the relevant local government before the formal submission of a development application.

The information and referral stage of IDAS serves two purposes: firstly, it provides an opportunity to ask the applicant for more information; secondly, it provides for consideration of other interests by referral agencies that are outside the scope of the assessment manager.

Most meat chicken farm developments, as prescribed by local planning schemes, require public notification with subsequent appeal rights for submitters.

The decision stage of IDAS sets out the requirements for assessment managers when assessing development applications.

Throughout the process, development applications may be modified by the applicant. Depending on the nature of the change, some steps of the assessment process may need to be repeated.

3.1 Is a development permit required?

A development permit must be obtained prior to assessable development being carried out.
Development applications are required if a development is considered an assessable development under the SP Act. To determine if your proposed development is an assessable development, you will need to look at the SP Regulation, (schedule 3) and your local government's planning scheme. All development is exempt development unless it has been identified as self-assessable development, assessable development, development requiring compliance assessment or as prohibited development.

Development applications are made to the assessment manager, which in most circumstances for meat chicken farms is the local government where the farm is to be located.

The types of developments which are assessable development and therefore require a permit vary for each local government area. There is considerable variation in the definitions of meat chicken farms, what development is assessable and the level of assessment required.

The SP Regulation prescribes assessable development and this includes meat chicken farms that come within the definition of Environmentally Relevant Activity (ERA) 4 (Poultry farming) under the EP Regulation. Poultry farming consists of farming a total of more than 1000 birds for:

- producing eggs or fertile eggs
- rearing hatchlings, starter pullets or layers
- rearing birds for meat, including:
  - chickens
  - ducks
  - geese

- guineafowl
- turkeys.

3.2 Pre-lodgement meeting

Proponents of meat chicken farm developments are encouraged to consult with local government early in the planning stages. Consultation with local governments will provide preliminary feedback on the appropriateness of the proposed meat chicken farm providing for increased certainty in the development process.

Many local governments provide a pre-lodgement service that enables an applicant to discuss a proposal with them prior to lodging the development application.

The idea of seeking pre-lodgement advice is to help identify issues relevant to the proposal or site location, and to identify strategic objectives for the development of the area. It should not be used to seek determination of the application (i.e. advice on whether the application will be approved/refused.

It is also possible (and recommended) to discuss a proposal with the State Assessment and Referral Agency (SARA) during the conceptualisation phase of the project.
A fee may be charged by local government for pre-lodgement advice. For further information contact the relevant local government.

3.3 The stages of IDAS

3.3.1 Application stage

A development application must:
- be made to the assessment manager
- be in the approved form or made electronically using eIDAS
- be accompanied by any mandatory supporting information specified for the application
- be accompanied by the required fee
- include the land owner's consent, if this is required under the SP Act.

Development applications must be lodged with the assessment manager for your application. The SP Regulation, schedule 6, will assist you in determining the assessment manager for your application.

Local government will generally be the assessment manager if your application is for development completely in a single local government area and involving the following types of development:
- development made assessable under the planning scheme
- building work that is assessable under the *Building Act 1975* (note: a private certifier may act as the assessment manager for a building works application)
- reconfiguring a lot (e.g. subdivisions)
- operational work associated with reconfiguring a lot.

The State Assessment and Referal Agency (SARA) can also be the assessment manager in some cases.

State Assessment and Referral Agency applications

The State Assessment and Referral Agency (SARA) established on 1 July 2013 as the single assessment manager or referral agency for all development applications where the state has a jurisdiction.
You are encouraged to submit your development application through the online MyDAS system or through your local regional office. You may also request a pre-lodgement meeting via the pre-lodgement form.

Some of the many benefits include a single agency lodgement and assessment point for development applications, where the state has a jurisdiction; and a final decision maker to ensure no 'unreasonable' requirements are imposed on applicants.

SARA means that the chief executive of the SP Act is the assessment manager or referral agency for development applications where the state has a jurisdiction.

SARA is the first and only point of contact for development applications where the state has a jurisdiction under the SP Act.

SARA is supported by MyDAS - an online system that allows an applicant to prepare and lodge or refer applications to the single state assessment and referral agency. MyDAS provides:

- online lodgement of development application and tracking through the IDAS process
- access to and assistance with preparing IDAS forms
- integration with the DA mapping system
- electronic payment of fees.

State Development Assessment Provisions (SDAP)

The State Development Assessment Provisions (SDAP) sets out the matters of interest to the state for development assessment, where the chief executive administering the SP Act, is responsible for assessing or deciding development applications.

The SDAP is prescribed in the SP Regulation, and contains the matters the chief executive may have regard to when assessing a development application as either an assessment manager or a referral agency. When submitting a development application to the assessment manager, if there are any matters of interest to the state relevant to the proposed development, an applicant is required to provide with the application an assessment against the applicable state code(s) in the SDAP.

3.3.2 Information and referral stage

An IDA's referral agency is a generic term and covers both 'advice' agencies and 'concurrence' agencies. If there is a requirement under the SP Regulation for an entity other than the assessment manager to have input into the assessment of a development application, it is referred to that agency. A referral may be for the purpose of seeking advice on an application, or for determining any requirements an agency may impose on an application. The type of referral that applies is prescribed in the SP Regulation. Referral agencies operate within a defined jurisdiction.

An advice agency may make recommendations and offer advice on conditions of approval or regarding refusal of an application. It cannot make a request for further information or direct the decision about the application. An advice agency can ask the assessment manager to treat its response as a properly made submission and therefore opens up appeal rights. A concurrence agency, in addition to offering advice, has the power (within the jurisdiction defined in the SP Regulation) to direct the outcome of an application. It can require certain conditions be imposed on an approval, that an approval be for part only of the development or for a preliminary approval only, or that an application be refused.

Meat chicken farm developments are usually made assessable development under the local government planning scheme. As a result, local governments deal with the development application as an assessment manager. The applicant may be required under Schedule 7 of the SP Regulation to refer the application to other concurrence agencies. The assessment manager or a concurrence agency for an application may ask any person for advice or comment about the application at any stage of IDAS.

3.3.3 Notification stage

Public notification is required for certain development applications to ensure that the public is aware of the development and they have the opportunity to make submissions about it. A properly made submission will

secure for the submitter the right to appeal to the Planning and Environment Court about the assessment manager's decision.

Public notification is only required for an application for a development that requires impact assessment or a preliminary approval that affects a planning scheme.

Many local governments require impact assessment for meat chicken farms of particular intensity and particular zoning/locality. It is necessary to check the local planning schemes to determine what level of assessment applies to the proposed development.

Meat chicken farm developments that fall under the definition of ERA 4 (Poultry farming) in the EP Regulation are generally prescribed as impact assessable development and therefore require public notification.

The purpose of public notification processes is to inform the community and relevant stakeholders of the proposal and to give them the opportunity to:

a. make submissions, including objections, that must be taken into account before the application is decided
b. secure, for those that make a properly made submission, the right to appeal to the court about the assessment manager's decision if they disagree with part or all of the decision.

3.3.4 Decision stage

Assessable development may require code assessment, impact assessment or both.

The assessment manager must assess your development application against the matters specified in the *Sustainable Planning Act 2009*. These matters include:

- any applicable codes (for an application requiring code assessment). For example, this may include any codes in the local government's planning scheme
- any relevant state planning instruments, such as regional plans or state planning policies.

The assessment manager must also have regard to any submissions received during public notification where public notification is required.

Once the assessment manager has assessed the application, the assessment manager must decide the application by either approving the application (in whole or in part) or refusing the application. If the application is approved, the assessment manager may impose conditions on the approval.

After deciding the application, the assessment manager must give the applicant and any referral agencies a decision notice. Copies of the decision notice will also be provided to all principal submitters.

A development approval attaches to the nominated lots on plan to
which the approval relates; and binds the owner, the owner's successors in title and any occupier of the land.

Under the EP Act, to lawfully carry out a poultry farming ERA, a person must obtain an environmental authority from the Department of Agriculture and Fisheries (DAF).

4.0Environmental Authority

The *Environmental Protection Regulation 2008* states the environmentally relevant activity (ERA) of poultry farming consists of farming a total of more than 1000 birds for producing eggs or fertile eggs; or rearing hatchlings, starter pullets or layers; or rearing birds for meat.

The *Environmental Protection Act 1994* (EP Act) states that a person must not carry out an environmentally relevant activity unless the person holds, or is acting under, an environmental authority for the activity.

The administering authority must refuse an application for an environmental authority if the applicant is not a registered suitable operator. An entity may apply to be registered as a suitable operator for the carrying out of an environmentally relevant activity.

In the case of ERA 4 Poultry Farming, the chief executive's powers as administering authority under the EP Act have been delegated to DAF officers.

More information can be obtained at https://www.business.qld.gov.au by searching 'Forms and fees finder' or by telephoning Animal Industries on 132523.

5.0 Planning and assessment of development applications

This section provides information for local government to use in considering development applications for a meat chicken farm.

Proponents should be aware that a development application will be assessed against the local government's planning scheme.

The performance outcomes in the planning scheme prescribe the outcomes that must be achieved when developing a meat chicken farm, while the acceptable outcomes provide advice on some ways to achieve the performance outcome. Other acceptable outcomes may also be appropriate ways of achieving the required performance outcomes.

The performance criteria and outcomes may vary from local government to local government. The following performance criteria have been provided as a guide to local government and proponents as a way of achieving sustainable development. Adhering to these performance criteria is one way for local government to meet the state interest – agriculture in respect to meat chicken farms as detailed in the State Planning Policy.

The state's interest in planning for agriculture is to:
- reduce the potential for conflict between agricultural land and other uses
- protect resources from inappropriate development
- minimise encroachment to ensure viable tracts of agricultural land are maintained
- improve opportunities for increased agricultural investment, production and diversification.

The acceptable outcomes provided are based on the available scientific and experiential knowledge of the Department of Agriculture and Fisheries at this time.

5.1 Location and site selection

Meat chicken farms must be appropriately located on suitable sites having particular regard to the scale of the farm, land size and location, topography, potential for environmental impacts and potential for impact on surrounding sensitive land uses. New farms should be located on land that is suitably separated from sensitive land uses, yet within proximity to feed suppliers and processing facilities.

Meat chicken farms should be located within a rural zone (standard Queensland Planning Provisions Zone). To reflect the strategic intent of minimising the potential for land use conflicts, farms should be appropriately separated from non-rural zones and other sensitive land uses.

Performance criteria	Acceptable outcomes
Setbacks	
PO1 The meat chicken farm building complex must be set back from areas of environmental interest, with the setback distance measured from the meat chicken farm building complex to the relevant feature.	**AO1.1** The meat chicken farm building complex is set back from: • non-rural zones • surface water • declared fish habitats • high ecological value waters Minimum setbacks are provided in accordance with Appendix 1 – Fixed Setback Distances for farms with more than 1,000 birds. Where involving 1,000 or less birds, lesser setbacks may be acceptable. **AO1.2** The land the meat chicken farm is developed on has an appropriate area and shape to provide for adequate setback of buildings, sheds, dams, internal roads and waste disposal areas from: • non-rural zones • surface water • declared fish habitats • high ecological value waters Minimum setbacks are provided in accordance with Appendix 1 – Fixed Setback Distances for farms with more than 1,000 birds. Where involving 1,000 or less birds, lesser setbacks may be acceptable. **AO1.3** The meat chicken farm building complex does not interfere with sites or places of significant cultural heritage or nature conservation.
Separation	
PO2 The meat chicken farm building complex must be separated from other existing sensitive land uses (not on the site of the meat chicken farm) to minimise environmental harm.	**AO2.1** Separation distances between the meat chicken farm complex and a sensitive land use (not on the site of the meat chicken farm) are determined on a site-by-site basis. Note1: Tools to calculate estimates of separation distances include an established formula based approach or odour dispersion modelling. Appendix 2 – Calculating Separation Distances provides a guide for calculating separation distances for meat chicken farms. Note 2: **AO2.2** Meat chicken farm building complexes are separated from one another to minimise the risk

	of animal to animal disease transfer between farms.

5.2 Natural environment

Meat chicken farms must be developed and managed so that the potential for significant impacts on the natural environment are minimised. This is achieved by avoiding removal of significant vegetation and by ensuring appropriate separation distances to surface water.

Performance criteria	Acceptable outcomes
PO3 The design and operation of the poultry farm incorporates integrated water management elements so that: • stormwater is prevented from entering sheds and waste storage areas • stormwater peak discharges and run-off volumes are not increased • natural drainage lines and hydrological regimes are maintained as far as practicable.	**AO3.1** The poultry farm building complex (including sheds and waste storage areas) should be located on land that is not subject to flooding by the 100 year ARI event. **AO3.2** The base of all sheds is elevated above natural ground level to ensure stormwater run-off does not enter the sheds.

5.3 Farm design

The design of meat chicken farms is a key element to a sustainable operation, reducing the potential for adverse impacts on surrounding sensitive land uses. Site layout, roads, stormwater drainage systems, farm construction methods and water and feed supply systems must be designed to prevent, minimise, manage (in this order) the potential for such impacts. Landscaping should also be used to minimise the visual impact of meat chicken farm buildings and handling areas. The design and operation of the meat chicken farm must be such as to ensure the provisions of the EP Act and regulations are achieved.

Performance criteria	Acceptable outcomes
PO4 The built form of the development is integrated into the landscape, and utilises site topography, existing vegetation supplemented by augmented planting to minimise the visual impact of the development. **PO5** Any external lighting must be designed so as that it does not cause environmental nuisance at surrounding sensitive land uses. **PO6** The meat chicken farm must be designed so that noise from the operation of the farm does not cause environmental nuisance.	**AO4** Retention of existing trees and other vegetation where practicable with provision of supplementary planting to ensure vegetated buffers are established and maintained between the meat chicken farm and sensitive land uses. **AO5** All external lighting is designed and operated in accordance with the Australian Standard AS4282: The control of obtrusive effects of outdoor lighting. **AO6.1** Access points and roads are located to minimise noise impacts on neighbouring sensitive land uses. **AO6.2** The design and siting of mechanical equipment (including fans, pneumatic feed systems and other equipment) minimises the generation of

	mechanical noise and the likelihood of off-site vibration.

6.0 Operational and management considerations

This section details the operational and environmental management considerations when assessing a development application for a meat chicken. It also provides applicants with a guide for operating and managing a meat chicken farm.

6.1 Environmental Management Plan

All meat chicken farms should develop and implement site-based EMPs that will aim to minimise the potential for operational impact on the surrounding environmental values and the amenity of neighbouring communities.

The Rural Industries Research and Development Corporation (RIRDC) has produced a National Environmental Management System for the Meat Chicken Industry – Version 2 December 2014 RIRDC Publication No. 14/100 (EMS) with an example and explanatory notes for developing an EMP. The EMS should only be considered as a starting point and application of such framework will need to further articulate site-specific considerations as well as identifying assumptions supporting air quality or acoustic modelling assessment.

The development of an EMP is a formal commitment that all reasonable and practical efforts will be made to operate the meat chicken farm in an environmentally sustainable manner. The EMP provides a system for documenting:

- environmental risks of the meat chicken farm
- how these risks will be minimised by design and management
- measurement of the effectiveness of these strategies by monitoring
- reporting of monitoring results.

The National Environmental Management System for the Meat Chicken Industry – Version 2 December 2014 RIRDC Publication No. 14/100 (EMS) provides detailed information about management practices in Part A – Manual of Good Practice for the Meat Chicken Industry.

Performance criteria	Acceptable outcomes
PO1 Documentation must demonstrate that the environmental risks of the meat chicken farm development have been identified and appropriate design and management measures have been considered and will be implemented to minimise the risks and impacts to the environment.	**AO1.1** A site-specific EMP is developed by the farm owner/manager and implemented in accordance with the National Environmental Management System for the Meat Chicken Industry – Version 2 December 2014. The EMP must include: • an assessment of environmental risks • strategies and measures for minimising environmental risks and contingency actions for managing problems that may arise • planned courses of action in cases of incidents or emergencies relating to all significant risks, including unexpected increased odour emissions, a high incidence of bird deaths, disease outbreaks and fire, in accordance with risk management principles. **AO1.2** The EMP is maintained and updated as required by the farm owner/manager and is available for inspection by the relevant regulatory authority.

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Definitions

Advice agency – Defined in the *Sustainable Planning Act 2009* as an entity prescribed under a regulation as an advice agency for the application, or if the functions of the entity in relation to the application have been devolved or delegated to another entity - the other entity.

Assessment manager – The agency responsible for deciding if a planning application has been properly made, issuing acknowledgment notices, determining the referral agencies that require input into the application assessment and determining whether the application is successful through an assessment of the environmental impact of proposals against the provisions of the EP Act and relevant industry guidelines.

Buffer zone – The distance between the meat chicken farm complex and relevant features and/or the distance between the utilisation area and relevant features (refer Appendix 1).

Centroid – A centroid is a point 25 m out from the exhaust end of a tunnel ventilated meat chicken shed, assuming that 90 per cent or more of the total emissions from the shed are discharged by fans and the shed is operated only as a fan-forced tunnel shed. Each shed will have its own centroid for the purposes of calculating separation and buffer zone distances. Where it cannot be demonstrated that 90 per cent of the emissions will be discharged from fans in sheds operated as fan-forced tunnel sheds, the centroid concept is not applicable.

Community amenity – A fact or condition being agreeable to the community.

Concurrence agency – Defined in the *Sustainable Planning Act 2009* as an entity prescribed under a regulation as a concurrence agency for the application, or if the functions of the entity in relation to the application have been devolved or delegated to another entity - the other entity.

Contaminant – Defined in the *Environmental Protection Act 1994* as:
- a gas, liquid or solid
- an odour
- an organism (whether alive or dead), including a virus
- energy, including noise, heat, radioactivity and electromagnetic radiation
- a combination of contaminants.

Contamination – Defined in the *Environmental Protection Act 1994* as the release (whether by act or omission) of a contaminant into the environment.

Development approval – An approval required to expand or develop a new poultry farm under the *Sustainable Planning Act 2009* and IDAS system.

Dispersion modelling – Computer-based software modelling used to mathematically simulate plume dispersion under varying atmospheric conditions. It is used to calculate special and temporal fields of concentrations and particle deposition due to emissions from various source types.

Environmental harm – Defined in the *Environmental Protection Act 1994* as any adverse effect, or potential adverse effect (whether temporary or permanent and of whatever magnitude, duration or frequency) on an environmental value, including environmental nuisance.

Environmental nuisance – Defined in the *Environmental Protection Act 1994* as unreasonable interference or likely interference with an environmental value caused by:
- aerosols, fumes, light, noise, odour, particles or smoke
- an unhealthy, offensive or unsightly condition because of contamination
- other ways prescribed by regulation.

Environmentally Relevant Activity (ERA) – An activity prescribed in regulation if:

- a contaminant will or may be released into the environment when the activity is carried out
- release of the contaminant will or may cause environmental harm.

Environmental value – Defined in the *Environmental Protection Act 1994* as:
- a quality or physical characteristic of the environment that is conducive to ecological health or public amenity or safety
- other quality of the environment identified and declared to be an environmental value under an environmental protection policy or regulation.

Grower – Farmer who provides shedding and the care of birds from when they arrive on the farm until they are removed for processing.

IDAS – The Integrated Development Assessment System.

Local government – The council for the area in which the existing or proposed poultry farm is located.

Meat chicken farm complex – Includes the sheds used to produce meat chickens and associated infrastructure (e.g. silos) and any nearby spent litter/compost stockpiles. It excludes any spent litter utilisation areas. For tunnel-ventilated sheds it includes a distance of 25 m out from the exhaust end of the sheds.

Must – Refers to a requirement that needs to be complied with to meet relevant legislation, including acts, policies or regulations.

Non-rural zone – Land that is not zoned as the rural zone in local government planning schemes.

Poultry Farming (ERA 4) - Farming a total of more than 1000 birds for:
- producing eggs or fertile eggs
- rearing hatchlings, starter pullets or layers
- rearing birds for meat:
  - chickens
  - ducks
  - geese
  - guineafowl
  - turkeys.

Pollution – Direct or indirect alteration of the environment causing contamination or degradation.

Referral agency – Defined in the *Sustainable Planning Act 2009* as an advice agency or a concurrence agency.

Rural zone – Land zoned as the rural zone in local government planning schemes to:
 provide for a wide range of rural uses including cropping, intensive horticulture, intensive animal industries, animal husbandry, animal keeping and other primary production activities;
 provide opportunities for non-rural uses that are compatible with agriculture, the environment and the landscape character of the rural area where they do not compromise the long-term use of the land for rural purposes;
 protect or manage significant natural features, resources, and processes, including the capacity for primary production.

Sensitive land use – Means a use that is a: caretakers accommodation, child care centre, community care centre, community residence, detention facility, dual occupancy, dwelling house, dwelling unit, educational establishment, health care services, hospital, hotel, multiple dwelling, non-resident workforce accommodation, relocatable home park, residential care facility, resort complex, retirement facility, rooming accommodation, rural workers accommodation, short-term accommodation, tourist park (as defined in the Queensland Planning Provision version 4.0). Note—definition from State Planning Policy July 2014

Separation distance – The separation distance is the shortest distance measured from the centroid of the meat chicken shed to the nearest point of a sensitive land use in a rural zone or to the closest boundary of the non-rural zone.

Surface water - Surface water includes dams, impoundments, lakes, wetlands, swamps, tidal waters and all watercourses where rainfall is likely to collect.

TAPM – Air pollution model (CSIRO).

Topography – The shape of the ground surface as depicted by the presence of hills, mountains or plains i.e. a detailed description or representation of the features, both natural and artificial, of an area, such as are required for a topographic map.

Watercourse – A watercourse is a river, creek or other stream, including a stream in the form of an anabranch or a tributary, in which water flows permanently or intermittently, regardless of the frequency of flow events - in a natural channel, whether artificially modified or not; or in an artificial channel that has changed the course of the stream (refer to the *Water Act 2000*).

Appendices

Appendix 1 – Fixed setback distances

This appendix indicates minimum fixed setback distances that meat chicken farm complex and waste utilisation areas should be from surface water and other features.

Fixed setback distances are included largely to permit a simple, conservative evaluation of required buffer distances. Both site-specific separation distances to sensitive land uses and fixed buffer distances should be complied with.

One way to achieve separation and setback distances for new meat chicken farms is to ensure that development occurs on an appropriately sized block or parcel of land. It is suggested for large farms a minimum area of 100 hectares located in a rural zone would be needed, if the fixed setback and separation distances are to be achieved.

Fixed setback distances allow the development of vegetation strips that provide visual separation from other land uses which can potentially improve amenity. It is suggested that where land for new development does not have significant vegetative areas that the planting and ongoing maintenance of vegetation strips should be considered.

The local council should be contacted to determine the fixed setback distances, or methods for their calculation, applicable to the local government area.

The Queensland Planning Provisions (QPP) identify land uses that may be attached to particular zones. Broadly it is appropriate that intensive animal industries, as a rural activity, occur in a rural zone. Where intensive animal industry activities occur in proximity to a non-rural zone, where it is more likely that the cluster of activities in that zone are non-agricultural in nature, then it is reasonable that there be greater separation between the activities in different zones.

Fixed setback distances required for a meat chicken farm complex and waste utilisation areas from surface water and water supply storage are shown in Table 1.

Table 1 – Setback distances from meat chicken farm complexes and waste utilisation areas to surface water and water supply storage (based on Seqwater Development Guidelines)

Feature	**Surveyed bank of an intermittent water course**	**Surveyed bank of a permanent water course**	**Water supply**	**Upper flood margin level of an urban water supply storage**	**Wetlands and tidal waters**	**Other surface waters (not covered by the other categories)**
Separation distance (m)	50	100	250	800	250	100

Appendix 2 – Calculating separation distances

A 2.1 Introduction

Separation distances between meat chicken farms (with tunnel-ventilated sheds) and sensitive land uses can be calculated using two general approaches. These approaches, the S-factor formula approach and plume dispersion modelling for meat chicken farms are discussed in this appendix.

The approaches and matters for consideration outlined below are based on work undertaken in 2011 by odour modelling consultants PAE Holmes on behalf of the Queensland Government.

The S-factor formula approach is only applicable to farms with a maximum of 300 000 birds. For farms with more than 300 000 birds detailed plume dispersion modelling should be undertaken. Plume dispersion modelling can also be used for meat chicken farms with less than 300 000 birds, if available separation distances are less than required by the S-factor methodology. When considering a new development or expansion of an existing meat chicken farm, the S-factor formula approach can be used to obtain an indication if the available separation distances would be suitable for the proposed development.

While the minimum buffer distances and minimum land area for a new meat chicken farm provide a simple evaluation of buffers, a site-specific assessment of separation distances between meat chicken farms and sensitive land uses must also be undertaken. This site-specific assessment includes both the calculated separation distances to sensitive land uses and the fixed buffer distances.

The local government should be contacted to determine the fixed buffer distances, or methods for their calculation, applicable in a particular local government area.

Sites that have multiple separate meat chicken farm units on the one property should apply the S-factor formula to the combined units and for each sensitive land use apply the separation distances and buffer zones from the closest farm odour centroid. Guidance should be obtained from the local government authority to apply the calculations individually to separate units on the same property.

A 2.2 Concepts in calculating separation distances

Optimum separation distances between a meat chicken farm and sensitive land uses depend on a number of factors. These include the type of sensitive land use, topographical features (terrain), vegetation and surface roughness between the farm and sensitive land uses, and the size of the meat chicken farm.

Separation distance refers to the shortest distance measured from the centroid (see definition of ‘centroid’) of the meat chicken shed to the nearest wall of a sensitive land use in a rural zone or to the closest boundary of the non-rural zone.

Odour has been identified as the principal community amenity concern for meat chicken farms. Hence the focus of separation distance requirements is the limiting of the potential for nuisance odours.

Separation distances for the meat chicken farm complex are measured from the centroid of the odour source, which is not necessarily the centre of the sheds. For tunnel-ventilated sheds the measuring point is taken to be 25 m out from the exhaust end of each shed.

Both the site-specific separation distances and the fixed buffer distances to other features must be complied with.

A 2.3 S-factor formula for calculating separation distances

The separation distance formula only applies to farms with a maximum of 300 000 birds. For farms larger than this, refer to Section 2.6. For farms with more than 300 000 birds, the formula is unreliable for several reasons: more complex layout, larger spread of sheds around the site and the increased distance of odour plume travel, which can begin to create more complex plume patterns. The formula is designed to be used for simple farm layouts where a 'centroid' can be easily identified and sheds are not located hundreds of metres from the centroid.

The separation distance provided between a meat chicken farm and sensitive land uses depends upon a number of factors, including:

- size – defined as the number of birds in the complex
- meat chicken farm design and management, which for the purpose of the formula approach is assumed to comply with current best practice
- meat chicken farm site, considering:
  - proximity to a sensitive land use (within a rural zone)
  - proximity to a non-rural zone
  - topographic setting and features (hills, undulating valleys, etc.) between the meat chicken farm and the receptor
  - vegetation/surface roughness between the meat chicken farm and the receptor
  - terrain effects around the site, particularly on meteorology of the area.

Site-specific separation distances are based on the dispersion of odours from their source.

Different air quality objectives were chosen depending on whether the distance is to be calculated to a sensitive land use in a rural zone or to a non-rural zone.

Calculation of separation distances for each sensitive land use within a rural zone and the closest boundary of the non-rural zone is as follows:

Separation distance (D) = $N^{0.63}$xS1xS2xS3

N – Maximum number of birds (to be housed on the farm at any one time) divided by 1000.
$^{0.63}$ – Exponent determined using the results of modelling.
S1 – Sensitive land use factor for estimating the relative odour impact potential of a development.
S2 – Surface roughness factor for estimating the potential changes to odour dispersion due to changes in the land surface.
S3 – Terrain weighting factor for estimating the potential changes to odour dispersion in situations where meteorological conditions may be influenced by local terrain influences.

Note: The separation distance formula only applies to farms up to 300 000 birds.

The S-factors to be used with this formula are presented in Table 1.

The available separation distances between the meat chicken farm and sensitive land uses are generally the key factors limiting the number of birds that can be accommodated on a particular site. Separation distances require assessment in all directions to ensure that the potential for unacceptable odour nuisance is minimised. Where other significant odour sources are located in proximity to the proposed meat chicken farm, the cumulative odour impact from both sites may require consideration.

Table 1 – Summary of S-factors for use with Level 1 calculations

Factor description		**Value**
S1 – Sensitive land use factor		
Receptor type		
Sensitive land use (within a rural zone)		30
Non-rural zone (closest boundary of the non-rural zone)		50
S2 – Surface roughness factor		
Surface roughness features		
Limited ground cover/short grass		1.00
Undulating hills		0.93
Level wooded country		0.85
Heavy timber		0.77
Significant hills and valleys		0.68
S3 – Terrain weighting factor		
Terrain	**Weighting factor**	
	Downslope of site	Upslope of site
Flat	1.0	1.0
Valley drainage zone – (Broad valley >10 km and/or a valley or gully with low side walls, where the average slope from centre of valley/gully to confining ridgeline is <2%)	1.2	1.0
Valley drainage zone – (Average slope from centre of valley/gully to confining ridgeline is 2–5%)	1.5	1.0

Valley drainage zone – (Average slope from centre of valley/gully to confining ridgeline is >5%)	2.0	1.0
Low relief at >2% from farm site (Not in a valley drainage zone, but the source lies above the receptor at an average grade of more than 2%)	1.2	-
All other situations	1.0	1.0

Notes:
S1 – Sensitive land use factor – refer to Section 2.3.2 for determination of the appropriate factor.
S2 – Surface roughness factor - refer to Section 2.3.3 to enable calculation of an appropriate factor.
S3 – Terrain weighting factor - refer to Section 2.3.4 to enable calculation of an appropriate factor.
The minimum reduction factor allowed for surface roughness and terrain weighting (S2 X S3) is 0.68.

A 2.3.1 Farm size

N refers to the maximum number of birds (divided by 1000) to be housed on the farm at any one time.

A 2.3.2 Sensitive land use factor S1

The sensitive land use factors presented in Table 2 account for the variation in odour sensitivity and risk of exposure of residents neighbouring a meat chicken farm. The meat chicken farm sensitive land use factor will require calculation for all relevant sensitive land uses and may be different for each one.

Table 2 – Values of sensitive land use type S1

Sensitive land use	Factor
Sensitive land use (within a rural zone)	30
Non-rural zone (closest boundary of the non-rural zone)	50

Notes:
1. The definitions in Table 2 should be based on local government land use zoning as stated in planning schemes and associated maps and the relevant regional plan.
2. When determining the location of the sensitive land uses, land zoning and pending development applications lodged, but not yet under construction should be taken into account. The local government can provide this information.
3. Public areas such as camping grounds or picnic areas should be considered as part of the assessment. The frequency of use and the time of day the area is occupied provide guidance to the level of protection required. For example, day-use only areas are a substantially lower risk for odour impact than areas frequently used at night.

A 2.3.3 Surface roughness factor S2

The surface roughness factor varies according to the roughness of the land surface between the meat chicken farm and the relevant feature (closest sensitive land use). The principal elements that determine surface roughness are vegetation density and surface topography. Recommended values of surface roughness are provided in Table 3. The values presented in this table are not to be summed (i.e. only the value for the single category which best represents the site conditions should be selected).

The roughness factors given in Table 3 assume that the selected roughness is continuous between the meat chicken farm and the sensitive land use. Where roughness is variable or non-continuous, judgement should be used in selecting an appropriate composite factor.

The values in Table 3 should be used with care, and a number of qualifications apply to their use. For sensitive land uses located at larger distances, multiple surface roughness factors may apply over different sections of the separation distance. In this instance, the surface roughness factor applied should be selected after considering the relative weighting of the different factors. When selecting factors based on the presence of vegetation, some consideration should be given to the potential for the vegetation to be cleared during the life of the meat chicken farm. For example, off-site vegetation is beyond the control of the meat chicken farm but may be regarded as permanent depending on the owner of the land (e.g. national park/state forest where no timber harvesting is undertaken).

Table 3 – Values of surface roughness factor S2

Surface roughness features	Notes	Factor
Cropland or grass, few trees	1	1.00
Undulating hills	2	0.93
Level wooded country	3	0.85
Heavy timber	4	0.77
Significant hills and valleys	5	0.68

Notes:
1. Open country with few or scattered trees. Topography would be predominantly flat to slightly undulating.
2. Situations where topography consists of continuous rolling, generally low level hills and valleys, but without sharply defined ranges, ridges or escarpments (assumes minimal vegetation).
3. Open forest country with tree density not sufficient to provide a continuous canopy but sufficiently dense to influence air movement. There would be little or no lower storey vegetation. The density is such that the vegetation can be considered as a continuous belt.
4. Generally tall forests with dense timber stands, providing a continuous canopy. There is limited understorey vegetation mainly associated with regrowth.
5. Situations where one or more lines of hills sufficiently large enough to influence air movement exist between the relevant feature and the meat chicken farm.

A 2.3.4 Terrain weighting factor S3

The terrain weighting factor (S3) relates to the potential for an odour plume to be exaggerated in particular directions depending on local topography. A variety of terrain weighting factors have been developed in recent years, based on both modelling (e.g. Pacific Air & Environment (2003c)) and more subjective judgement. Work conducted by PAE Holmes as background to this version of the formula used more refined model inputs than in past work. The results, taken with other work, showed that it is not feasible to define a set of weighting factors covering highly detailed terrain types, since the relationship between regional wind patterns and local terrain is highly variable and not able to be classified beyond a fairly basic level.
The factors are shown in Table 4, along with the direction in which each factor should be applied. The slope referred to is determined by the topographical features of each site.

Table 4 – Values of terrain weighting factor S3

Terrain	Weighting factor	
	Downslope	Upslope
Flat	1.0	1.0

Valley drainage zone – (Broad valley >10 km and/or a valley or gully with low side walls, where the average slope from centre of valley/gully to confining ridgeline is <2%)	1.2	1.0
Valley drainage zone – (Average slope from centre of valley/gully to confining ridgeline is 2–5%)	1.5	1.0
Valley drainage zone – (Average slope from centre of valley/gully to confining ridgeline is >5%)	2.0	1.0
Low relief at >2% from farm site (Not in a valley drainage zone, but the source lies above the receptor at an average grade of more than 2%)	1.2	-
All other situations	1.0	1.0

Notes:

1. These factors may not apply where:
   a) sea-breezes are a significant influence on weather patterns (i.e. in coastal regions)
   b) odour is emitted from elevated vent sources (If sheds are fitted with elevated vents proceed to Section 2.6 Plume dispersion modelling).
2. These terrain weighting factors should be applied:
   a) by checking the location of the meat chicken farm in relation to the topography
   b) for the range of distances applicable to meat chicken farm impacts. However, the application of these weighting factors is dependent on the homogeneity of terrain between source and sensitive land use. For example, if the terrain remains similar between the meat chicken farm and sensitive land use the weighting factor can be applied for an indefinite distance. The weighting factor is, however, less reliable if significant terrain changes occur between source and sensitive land use.
3. The use of these terrain weighting factors does not affect the application of surface roughness factors discussed in Section 2.3.4.
4. Downslope factors should be applied across an angle of 90^{o} centred on the terrain feature. Upslope factors should be applied across an angle of 60^{o} centred on the terrain feature.

A 2.4 Example calculation – S-factor formula

Example 1
Consider a proposed new 200 000 bird facility, consisting of five tunnel-ventilated sheds.

Step 1 – Location of sensitive land uses

The site is located 1200 m west of a small village. A number of farm houses are sited on properties adjoining the proposed meat chicken farm site—the nearest is located 770 m to the north, another 900 m to the west and another 850 m to the south. The local government has been consulted regarding the boundary of residential zonings for the village. The meat chicken farm site, village boundary zone and neighbouring farm houses have been located using a GPS unit with +/- 5 m accuracy.

The S1 factors are:

- 50 for the boundary of the village zone—this is a non-rural zone.
- 30 for the three neighbouring farm houses (sensitive land uses) to north, south and west.

Step 2 – Determination of surface roughness factor S2

The property is located in an area of flat to undulating topography, with mixed farming and forestry land the dominant land uses. The forestry land has not been logged for many years, with logging or clearing unlikely to occur in the near future. The land between the proposed meat chicken farm and the farmhouse to the north is undulating with an established 100 m thick continuous timber belt along the northern boundary within the property. Forestry land extends from the eastern boundary of the property to the boundary of the village zone. The land between the proposed meat chicken farm site and the farmhouses to the south and west is flat to undulating with scattered clumps of trees and a few trees along fences.

- The surface roughness used for the village would be heavy timber ($S2_S$ = 0.77) due to the well-established continuous stand of forestry and the fact that it is unlikely to be cleared.
- The surface roughness used for the farmhouse to the north would be level wooded country ($S2_S$ = 0.85) due to the undulating nature of the terrain plus the continuous belt of established timber within the property in those directions.
- The surface roughness used for the farmhouses to the south and west of the proposed development would be limited ground cover/short grass ($S2_S$ = 1.0) due to the flat to undulating nature of the terrain and the lack of a continuous, thick tree cover.

Step 3 – Determination of terrain weighting factor S3

The terrain of the area is flat to undulating, thus the terrain weighting factor S3 = 1.

Step 4 – Calculation of required separation distances

The required separation distance for the farmhouse to the north:
- Check S2*S3 – > 0.68
- $D = (200000/1000)^{0.63} * 30 * 0.85 * 1.0 = 718$ m

This is less than the actual distance of 770 m.

- The required separation distance for the farmhouses to the west and south:
- Check S2*S3 - > 0.68
- $D = (200000/1000)^{0.63} * 30 * 1.0 * 1.0 = 845$ m

This is less than the actual distance of 900 m (west) and 850 m (south).

The required separation distance from the boundary of the village zone:
- Check S2*S3 - > 0.68
- $D = (200000/1000)^{0.63} * 50 * 0.77 * 1.0 = 1084$ m

This is less than the actual distance of 1200 m and exceeds the minimum requirement of 300 m.

Example 2
Consider the proposed meat chicken farm development described in the previous example. The maximum number of birds allowed on the site can be calculated.

The factor values are calculated in the same manner as presented in the previous examples. Maximum bird numbers require calculation for the distance available for each combination of receptor class/surface roughness category.

Maximum bird numbers (N) = $1000 * (D / (S1 * S2 * S3))^{1/0.63} = (D / (S1 * S2 * S3))^{1.59}$

- Maximum bird numbers for the site (farmhouse north) $N = 1000 * (770 / (30 * 0.85 * 1.0))^{1.59} = 225{,}487$ birds.

- Maximum bird numbers for the site (farmhouse west) N = 1000 * (900 / (30 * 1.0 *1.0))$^{1.59}$ = 223,163 birds.

- Maximum bird numbers for the site (farmhouse south) N = 1000 * (850 / (30 * 1.0 *1.0))$^{1.59}$ = 203,776 birds.

- Maximum bird numbers for the site (village) N = 1000 * (1200 / (50 * 0.77 *1.0))$^{1.59}$ = 237,146 birds.

The maximum number of birds allowed on the proposed site is 203 776, with the limitation being the distance to the farmhouse to the south.

A 2.5 Multiple odour sources

The necessity of including other odour sources in odour modelling needs to be judged based on individual site assessments. The major factors influencing the potential interaction of odour plumes will be:
- size of each facility
- prevailing meteorological conditions and topography of the area
- design and management of each facility.

A simple method for assessing the need to include other facilities in modelling is to use the S-factor formula (Section 2.3) to calculate separation distance for each facility. The calculated separation distances essentially approximate the extent of any potential odour impact. 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.

It is suggested that if the neighbouring facility's calculated 'odour plume' from the separation distance formula (Section 2.3) overlaps, then the calculated separation distances and buffer zones will need to be increased by 50 per cent (i.e. multiply the distance by 1.5). If the calculated separation distances are likely to impact on sensitive land uses, then odour modelling is required to determine variable separation distances (Section 2.6), with all facilities included.

A 2.6 Plume dispersion modelling

Where initial separation distance estimates from the S-factor formula approach (refer to section 2.3) are inadequate, and there is reason to believe that site-specific factors may favour the development of the proposed farm or the farm is greater than 300 000 birds, it is recommended that plume dispersion modelling be conducted.

This should entail a modelling-based study along the lines of the methodology set out in the guideline 'Odour Impact Assessment for Developments' (Environmental Protection Agency, 2004b). This will include:
- estimation of hourly varying emission rates based on factors such as bird numbers, bird age, ventilation (or ambient temperature) and preferably design and management factors. An example of odour emissions modelling that incorporates design and management factors is contained in Ormerod & Holmes (2005). More information is provided in the report 'Best Practice Guidance for the Queensland Poultry Industry – Plume Dispersion Modelling and Meteorological Processing (PAE Holmes, 2011)'
- use of site-specific meteorological data, obtained either through a suitably configured and sited on-site weather station, or from a recognised meteorological model (e.g. The Air Pollution Model [TAPM], developed by CSIRO). In the case of data derived from a simulation model, evidence of suitable model settings and validation of model performance in the region is necessary. Also, even short-term deployment of a weather station on site can help to confirm behaviour of important conditions such as drainage flows, and is recommended. Recommendations on meteorological data for use in odour assessments have been produced for the pig industry and are relevant also to meat chicken farms (Pacific Air & Environment, 2003a)

- additional guidance regarding surface roughness factors for use in dispersion modelling can be found in the separate report ‘Best Practice Guidance for the Queensland Poultry Industry – Plume Dispersion Modelling and Meteorological Processing (PAE Holmes, 2011)'
- use of a suitable plume dispersion model - refer to ‘Best Practice Guidance for the Queensland Poultry Industry – Plume Dispersion Modelling and Meteorological Processing (PAE Holmes,2011)’
- appropriate configuration of odour sources in the dispersion model. Consideration should be given to the best parameterisation of the odour sources in the model, taking into account the fact that exhaust air is normally vented horizontally but may differ in temperature from the ambient air significantly at times, resulting in buoyant effects in the near field. Such behaviour may be significant in relation to impacts at sensitive sites, especially if they are within 500 metres or there is complex terrain. Refer to ‘Best Practice Guidance for the Queensland Poultry Industry – Plume Dispersion Modelling and Meteorological Processing (PAE Holmes, 2011)’.

In addition, modelled odour levels should be assessed against the following criteria:

- 2.5 OU, 99.5%, 1 hour average for a sensitive land use in a rural zone
- 1.0 OU, 99.5%, 1 hour average for the boundary of a non-rural zone.

Note: The stringent recommendation for a non-rural zone takes into account a risk-based odour assessment procedure, such as that used in New South Wales. The value of 1 OU (99.5%, 1 hour average) is approximately equivalent to the odour performance criterion for urban areas in New South Wales (2 OU, 99%, 1 second). This recommended impact criterion is significantly more stringent than the ‘default’ odour criterion generally used in Queensland, as set out in 'Odour Impact Assessment for Developments' (Environmental Protection Agency, 2004b).

Where local governments require independent third party reviews of any air quality reports submitted. Dispersion modelling and associated odour impact assessment should be conducted by a consultant based on the ‘Best Practice Guidance for the Queensland Poultry Industry – Plume Dispersion Modelling and Meteorological Processing (PAE Holmes, 2011)’.