Western Australian Broiler Growers Association

Poultry Farmers Association of Western Australia

Environmental Code of Practice

for

Poultry Farms

in Western Australia

Western Australian Local Government Association
Shire of Gingin
Shire of Serpentine Jarrahdale

Department of Agriculture
Department of Environment
Department of Health
Department for Planning and Infrastructure

Environmental Code of Practice for Poultry Farms in Western Australia

May 2004

Prepared by:

Western Australian Broilers Growers Association
Poultry Farmers Association of Western Australia
Department of Environment
Department of Agriculture
Department of Health
Department for Planning and Infrastructure
Western Australian Local Government Association
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Note: The former State Government agencies Department of Environmental Protection (DEP) and the Water and Rivers Commission (WRC) are presently combining to form the Department of Environment (DoE). This process will not be complete until enabling legislation has been passed by Parliament and proclaimed. This document reflects a generic 'combined agency' position

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FOREWORD

The Poultry Industries in Western Australia, in close liaison with representatives from the Department of Agriculture, Department of Environment, Department for Planning and Infrastructure, Department of Health and Local Government have developed this Environmental Code of Practice for the Poultry Industries in Western Australia.

Numerous bodies, authorities and individuals with interests in all facets that impinge on the poultry industry made significant and invaluable contributions.

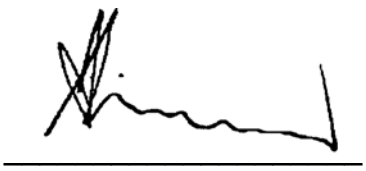
The Environmental Code of Practice outlines clear and precise guidelines, not only in planning and biosecurity, but also in good management practices. Its recommendations are underpinned by various other Codes, such as the Model Code of Practice for the Welfare of Domestic Poultry, the Avian Industries Bio-Security Plan and the Western Australian Planning Commission's Statement of Planning Policy Number 4.3 for Poultry Farms.

The Code is a fundamental point of reference to all industry members, planners, developers, government departments and members of the public interested in the poultry industries. The Code:

- Helps interpret controversial issues such as appropriate separation buffers from sensitive environments;
- Makes it easier to understand and manage the issues of concern to Government when establishing or expanding poultry farms;
- May provide a marketing advantage for the industry as it aims for sustainable, environmentally friendly production practices;
- Permits benchmarking of farms against recognised acceptable environmental practice and assists the industry in dealing with farms that operate in a sub-standard manner; and
- References relevant documentation that will aid in the Best Practice operation and management of a poultry farm.

This Code should assist all parties that are related to these dynamic and important industries in better understanding those factors that, when applied in a reasonable and practicable manner, will minimise conflict and disputes between farmers and their neighbours whilst ensuring the sustainability of the social and environmental fabric of the community in which they live.

It is of importance that industry accepts the fact that poultry farming is not an as-of-right pursuit in a rural zone and the final discretion rests with Local Government.



President
Poultry Farmers Association of WA

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May 2004

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PART 1 INTRODUCTION

Modern poultry farms are intensive agricultural industries. Many poultry farms in Perth's outer areas were established prior to the 1970s when these areas were rural. Continuing urban spread and steady industry expansion has brought some residential areas right up against farm boundaries. Resulting conflicts from odour, dust and noise are not always easy to resolve. Consideration of potential conflicts and resolution at the planning stage of new and expanding farms will prevent many problems from arising between poultry farms and neighbours.

The poultry industry is an important component of Western Australia's agricultural sector. In 2002, 40 million birds and 20 million dozen eggs were marketed, contributing approximately $300 million to the Western Australian economy.

The Western Australian Planning Commission's *Statement of Planning Policy No. 4.3 – Poultry Farms Policy* (previously referred to as *Statement of Planning Policy No. 5*) provides a planning framework for poultry farm development and urban development near poultry farms.

The Western Australian poultry industry is now striving to minimise its impacts on neighbours, ecosystems and water resources. Many farms have relocated so they are further away from residential areas; others have incorporated practical measures to manage impacts. The industry is leading the way by promoting best management practices as an industry standard and encouraging farmers to meet this standard.

This Environmental Code of Practice replaces the WA Environmental Protection Authority's *Environmental Code of Practice for the Poultry Industry 1991*.

1.1 Aims

This Code of Practice aims to:

- describe environmental issues and challenges confronting the poultry industry in WA;
- guide poultry farm planning to ensure that siting, design and operations meet the requirements of decision-making authorities;
- guide decision-making authorities in the formulation of practical requirements for the industry;
- provide advice to decision-making authorities to enable them to make consistent decisions in respect to poultry farm developments;
- suggest practical measures for minimising environmental and social impacts;
- allow industry to establish a benchmark environmental performance for members of their associations; and
- provide those adhering to the Code with 'clean, green marketing credentials'.

This Code of Practice is intended to encourage a strong environmental ethic within industry and its adoption is voluntary. It is not intended to regulate or to encroach on any other areas of legislative responsibility. However, the industry Associations expect farmers to apply the recommendations outlined in this Code in their practices wherever practical to ensure the industry is well regarded in the community and continues its economic prosperity.

1.2 Scope

This Code of Practice deals with the impacts of the two main commercial poultry enterprises - egg (layer) production, meat (broiler) production and the distinct farming operations within each enterprise. Although the Code covers only the potential impacts of farming chickens for meat and eggs, much of the information can be translated to other commercial poultry industries, such as turkey and duck farming. This Code does not cover non-commercial poultry raising, or make recommendations on bird welfare issues.

This document focuses primarily on intensive broiler and egg industries employing purpose-built housing systems. Though poultry are raised differently, free to range farming is also considered an intensive industry. As such, many of the recommendations in the document can also be applied on free to range farms. As the nature of free to range operations can lead to some specific environmental impacts, supplementary information for the free to range industry is provided in Part 5.

1.3 The poultry industry in Western Australia

The broiler industry is highly capitalised, with investment costed at $2,231,105 per Model Farm (Broiler Growers Association, 2003). In 1999, the broiler industry contributed almost $240 million to Western Australia's economy, providing direct employment for around 1,900 workers and indirectly employing another 3,000 people.

The chicken meat industry is governed by legislation, the most significant being the *Chicken Meat Industry Act 1977*. To fulfil the Act's purpose, provision is made for the establishment of a Farm Model. As part of its growing fee determinations, the Farm Model sets standards for shedding, farm equipment and stocking densities. The Chicken Meat Industry Committee (CMIC) undertakes a review of the Farm Model every three years. The Act and its regulations also make provision for a CMIC cost of production report update every six months.

In 2002, there were 96 commercial egg producers within Western Australia (Department of Agriculture, 2002). The egg industry has a capacity of 1.2 million laying hens with a 2003 capitalisation of $48 million. The egg industry is presently fully regulated and operates under the Western Australian *Marketing of Eggs Act 1945*, which manages supply and demand through licensing laying hens. The Western Australian Egg Marketing Board, trading as Golden Egg Farms, governs all eggs produced for sale in Western Australia.

'Vertical integration' is a common feature of the broiler industry. An 'integrator' (invariably the processing company) owns and operates various stages of the production process, which may include breeding stock, breeding farms, feed mills, -hatcheries and processing facilities. Some of these integrated production companies also operate poultry growing farms, however the majority of growing farms are owned by independent farmers operating under contract to the company operating the poultry processing facility.

Broiler (meat bird) farms supply labour, equipment and materials, with the integrators providing day-old chicks, feed, medicine and a grower's fee. Under contract arrangements, integrators may dictate drinking water standards, feed, bird density, shed temperature regimes, breed specification, when chicks are delivered and when grown birds are removed.

The commercial egg industry is less vertically integrated in Western Australia and individual producers typically operate only the egg production farm. A number of independent breeders, hatcheries, stockfeed mills and processors supply the egg industry. The Western Australian Egg Marketing Board controls all marketing to retailers (Note: the government has recently announced its intention to deregulate the egg industry by July 2007).

1.4 Types of poultry farms

Poultry housing systems may involve the raising of birds in cages or on litter. In caged systems, droppings fall through the bottom of the cage to accumulate on the floor below or onto conveyor belts. In litter-based systems, birds are kept on 50 to 100 millimetres depth of sawdust, wood shavings or other absorbent material over a sealed floor. Formulated feed is provided via automated delivery systems and drinking water is reticulated to the birds.

Breeder farms

Using parent breeding stock from the national breeder farms, fertile eggs are produced for use in either one of egg or meat production. Breeding commences at approximately six months of age and continues until the end of their commercial reproductive life at 16 months of age. At the end of their productive phase, breeders are removed for processing for meat or by-products. Breeding farms may incorporate cage, slatted floor or litter-based systems.

Hatcheries

Hatcheries are usually located on a separate property from the breeder farm. A small number of hatcheries supply the entire poultry industry within Western Australia and nearly always specialise in hatching for either the egg or broiler industry. In the egg industry day-old chicks from the hatchery are transported to specialist pullet growers or layer farms who rear their own pullets. Similarly, in the broiler industry the day old chicks are transported to broiler farms and housed for meat production.

Meat production (broiler farming)

The majority of farming for chicken meat is undertaken within sheds with unconstrained birds on litter. A broiler farm generally has 4-10 sheds housing between 80,000 – 350,000 birds per batch, with 5-6 batches per year.

Day-old chicks are raised to marketable weight, with the first harvest occurring at around 32 days, and subsequent harvesting at 42, 49 and up to 56 days. The poultry litter is then removed, the shed cleaned and the cycle repeated.

Chickens are also farmed for meat using free to range farming methods. In WA the number of chickens raised under this method is relatively very small.

Egg production (layer farming)

Pullet growing farms

Pullets are young hens normally less than six months of age. Pullets may be raised by the egg farmer, or by specialist pullet growers. At 16 weeks of age, when the birds are nearly mature, they are transferred to layer houses for commencement of egg production.

Layer farms

Layer farms usually employ a caged system, due to its production and labour efficiency, however litter-based barn lay or free to range systems are also used. Layer farms operate on a 12-18 month cycle depending on whether birds are purchased as day old chicks or at point of lay. Layer farms vary in size, but the average is approximately 12,000 hens. Most layers remain in production for 14 months after which they are sold to poultry abattoirs for processing. The eggs produced on Perth farms are picked up twice per week, on average, by Golden Egg Farms pick-up trucks for transportation to the central grading floor in Palmyra for grading and retail distribution.

PART 2 PLANNING FOR NEW OR EXPANDING EXISTING POULTRY FARMS

Poultry farms are often located close to urban areas for economic access to feed mills, poultry processing facilities and markets. However, these rural areas are under increasing pressure from urban encroachment.

When farms relocate or new farms are established, it is vital that farm siting and design satisfy all legal, planning, environmental and social requirements. This will minimise the potential for conflict with neighbours, manage future environmental impacts and ensure long term viability.

The Western Australian Planning Commission's *Statement of Planning Policy (SPP) No. 4.3 – Poultry Farms Policy (1998)* assists State Government agencies and local government councils in addressing potential environmental issues and land use conflicts between poultry farms and neighbouring development.

The objectives of SPP No. 4.3 are:

- "to ensure that new poultry farms are established in locations suitable to their operational requirements;
- to minimise the impact of poultry farms on residential, rural-residential and other potentially incompatible uses;
- to protect the interests of existing poultry farms in the face of encroaching development; and
- to encourage the relocation of poultry farms on land required for residential or rural-residential development."

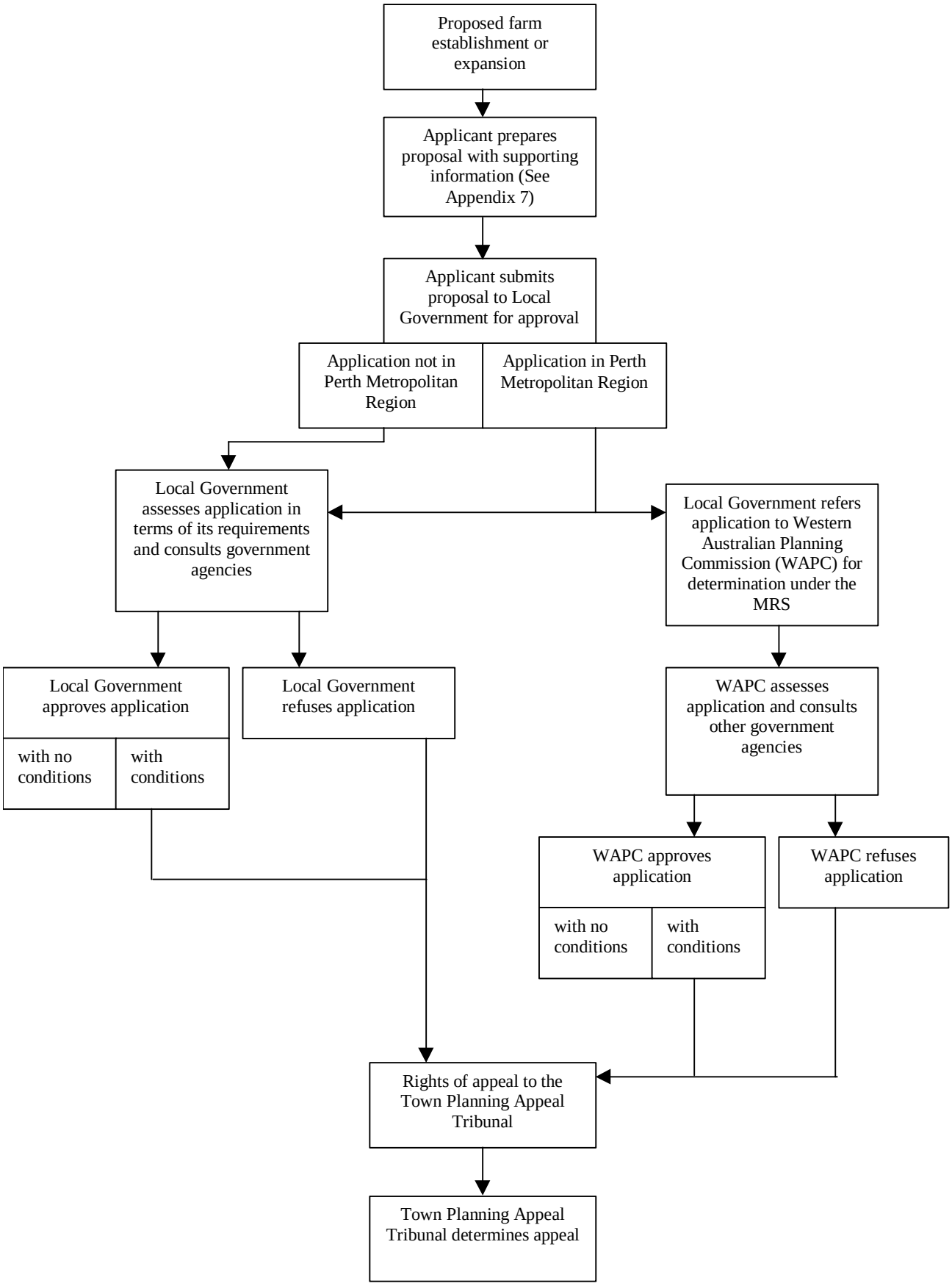
The Policy is a statutory policy and applies to all poultry farm developments, additions or extensions in excess of 100 m^2 to existing farms, and all residential and rural-residential development in the vicinity of poultry farms in Western Australia.

For further information please refer to the Policy. A copy may be downloaded from the Western Australian Planning Commission website - Publications, Statements of Planning Policy 5AA available at <www.wapc.wa.gov.au/cgi-bin/index.cgi?page=/publications/policies/Policies.htm>.

When proposing to establish or expand an existing poultry farm, it is important for the applicant/ proponent to research planning and environmental impact requirements prior to submitting plans. Figure 1 illustrates the planning approval process. Local councils often have specific requirements, such as by-laws, that may influence land use on a particular site.

All poultry farming operations require planning consent from the relevant local council. In addition, farms employing the caged bird system are deemed an offensive trade under the *Health Act 1911* because of the potential to cause a nuisance or offence from odour, attraction and breeding of flies or possible ground/ surface water pollution. These poultry farms also require an offensive trade licence from their local council.

Figure 1 Planning approvals process for poultry farms



For details of the information that should be provided with a farm development application see Appendix 7.1. For further information on applicable statutes when compiling development applications see Appendix 7.2.

Prospective broiler farmers should also refer to the Broiler Growers Association Farm Model, which provides a basis for determining the Cost of Production. It is also used by the chicken meat industry to determine the growing fee paid by processors to contracted growers. The Model is available from the Department of Agriculture. The Review of Farm Model is available on the internet site <http://agspsrv38.agric.wa.gov.au/pls/portal30/docs/FOLDER/IKMP/AAP/POU/poultry_farm_model1.pdf>.

2.1 Siting and buffers

As poultry farms require ready access to feed suppliers and processors, rural land within a suitable distance of the metropolitan area should be sought. At the time of preparing the Code, the following Perth regions were identified as possible future localities for poultry farming – Wanneroo, Bullsbrook, Muchea, Gingin, Mundijong, Chittering, Serpentine and Baldivis.

Statement of Planning Policy 4.3 - Poultry Farms Policy (1998) provides guidelines for the siting and location of new poultry farms and expansion of existing farms. Applicants should refer to and incorporate the requirements of SPP 4.3 into their applications. An extract from the guideline follows.

"New poultry farms should avoid:

- existing or proposed residential areas and land identified for future residential development in current planning strategies or town planning schemes; and

- existing or proposed rural-residential areas identified in current planning strategies or town planning schemes."

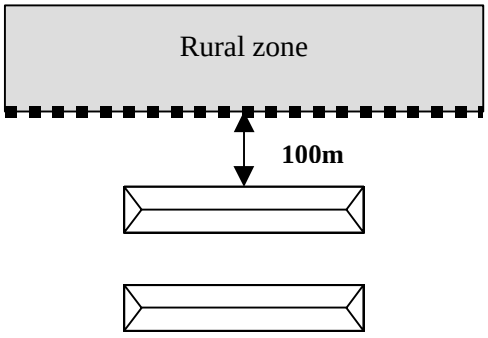
Minimum buffer distances for new poultry sheds and neighbouring land are as follows:

- "500 metres from any existing or future residential zone;
- 300 metres from any existing or future rural-residential zone; and
- 100 metres from the boundary of the poultry farm".

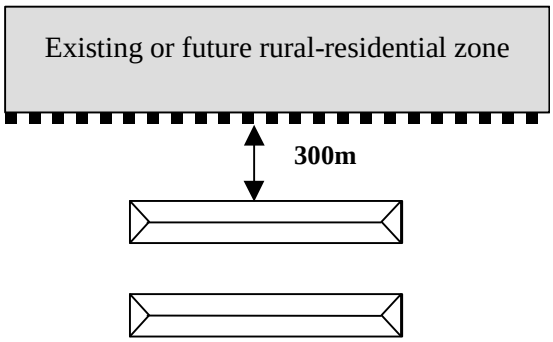
Whilst it is unlikely that a poultry farm would be sited within or next to a commercial or industrial zone, the same criteria applicable to rural zoning applies, i.e. an internal clearance of 100m from the shed to each boundary would need to be maintained and a minimum distance of 500m to the nearest residential zone would be required. In addition, approval would be subject to the discretionary power of the local council.

Poultry farms may be sited on 20 hectares if the area is square, however 40 hectares is recommended to allow for expansion and incorporate a building envelope with the required buffers. Layer farms that rear chickens require a larger area than standard layer farms, as it is necessary to isolate young chickens from laying hens. For biosecurity reasons, it is best practice to maintain a distance of 1,000 metres.

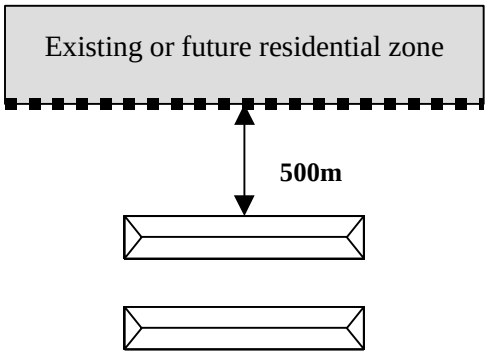
Figure 2 Recommended minimum buffer distances



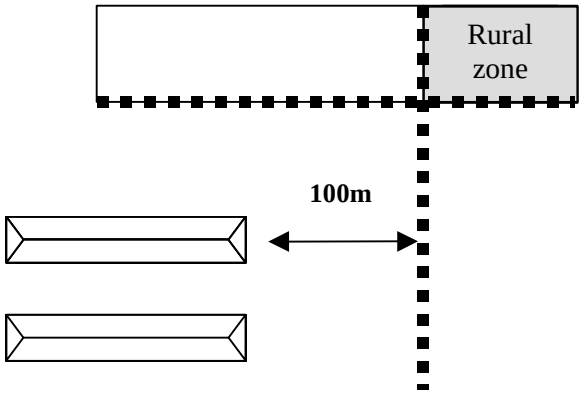
a) Buffer to rural zone



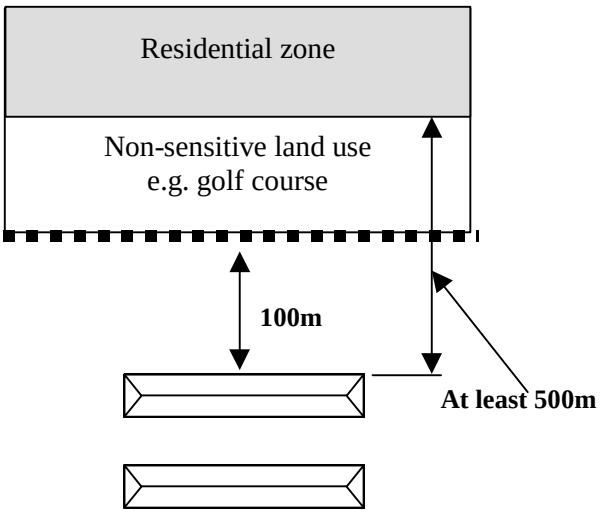
b) Buffer to existing or future rural-residential zone



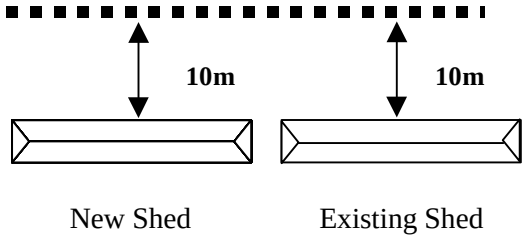
c) Buffer to existing or future residential zone



d) Buffer to boundary



e) External non-sensitive land uses as buffers



f) New shed may be as close as existing shed (although not recommended best practice)

KEY

Existing or future poultry sheds

Farm boundary

Whilst considering size and layout, note that long setbacks from road frontage makes the provision of services such as power and access roads very costly. Prospective farmers should also discuss the concept of buffers external to the farm boundary, which while not owned by the poultry farmer, can provide long term compatible land use and avoid potential conflicts (e.g. golf courses) (see Figure 2).

Rural properties containing large areas of remnant vegetation may be suitable for siting poultry farms due to the relatively small areas of clearing required to site sheds and associated infrastructure, and the buffer and screening benefits provided by existing vegetation. Other non-sensitive land uses can also be used to form buffers.

Biosecurity Buffer

Biosecurity (i.e. protecting the flock from introduced disease) governs farm planning and operations. The aim is to prevent disease outbreaks and disease transmission from one property to another. New poultry farms should be located at least 1,000 metres from any commercial or private poultry facility (measured from shed to shed). Where the new shed is on the same property the full 1,000 metre buffer is unnecessary, the distance between sheds is at the operator's discretion.

Environmental considerations

On a well-run poultry farm, all nutrient-rich material that is produced is effectively contained until removal off-site. As part of a farm development proposal, local council may require a waste management plan demonstrating good nutrient management. To ensure all nutrient-rich material can be contained, poultry facilities should be established on elevated sites, more than two metres above the maximum recorded groundwater table. Peak groundwater levels for sites on the Swan Coastal Plain can be found in the *Perth Groundwater Atlas* available at the Internet site <www.environment.wa.gov.au>. For other areas, contact the Resource Information Branch at the Department of Environment's head office.

To protect aquatic environments, vegetated buffers of resilient local native species should be maintained between poultry sheds and significant[1] wetlands, as well as waterways and floodways. Appropriately vegetated buffers decrease stormwater velocities allowing entrained material to be deposited and nutrients to be assimilated, thereby protecting the health of the wetland/waterway. Buffer width should be determined using biophysical criteria, see *Foreshore Policy 1 - Identifying the foreshore area*. As a guide, a buffer of no less than 50 metres (measured from each poultry shed to the outside edge of wetland/waterway fringing vegetation) is required provided there is adequate fringing nutrient filter vegetation, and suitable design and management measures are proposed. Where fringing vegetation has been cleared, revegetation with appropriate local native species is required. Larger buffers may be required where proposed management practices may be insufficient and where biophysical criteria indicate larger buffers are necessary. More information is available in the Department of Environment's *Wetland Position Statement* and Water Notes - *Wetland Buffers* and *Identifying the Riparian Zone* available on the Internet site <www.environment.wa.gov.au>.

[1] Conservation category wetlands and wetlands/waterways protected by any environmental protection policy (i.e. Peel Inlet - Harvey Estuary, Swan and Canning Rivers, and Swan Coastal Plains Lakes) are considered significant. Locations of such wetlands can be obtained by contacting the local regional office of the Department of Environment. They can also be checked by viewing them at www.walis.wa.gov.au

Proposals to construct poultry farms within 200 metres of a significant[1] wetland or waterway should be referred to the nearest regional office of the Department of Environment. Wetland boundary maps for a large proportion of the Swan Coastal Plain are available from the Department of Environment.

Bores should not be located within the vicinity of the water discharge area of each poultry shed. A distance of at least 50 metres from the discharge area is recommended.

Public Drinking Water Source Areas

The catchments that supply the State's drinking water are called Public Drinking Water Source Areas (PDWSAs). These areas include surface reservoirs or underground aquifers and are specially managed under State legislation to prevent contamination. A PDWSA may be known as a water reserve, catchment area or Underground Water Pollution Control Area (UWPCA). PDWSAs may also be designated as Special Control Areas under Town Planning Schemes.

By-laws/regulations are only applicable to purpose-built housed poultry operations in PDWSA. For information on free to range farming in PDWSAs see Part 5 'Supplementary information for free to range farms'.

Poultry farms are **not permitted** in Public Drinking Water Source Areas with a **Priority 1** management classification. Priority 1 means that protecting the water source from pollution is the primary land use objective for that area of land.

The Department of Environment assesses all poultry farm development applications within designated **Priority 2 or 3** areas. Where approvals are granted, operating conditions are normally imposed. Approvals are most likely to be granted to proposals that comply with this Code of Practice. For non-conforming poultry farms, approvals may be negotiated where a farmer can demonstrate that the risk to water resources is adequately managed.

Poultry sheds and associated infrastructure are also **not permitted** in **Wellhead Protection Zones (WPZs)** or **Reservoir Protection Zones (RPZs).** WPZs are declared in the immediate vicinity around production bores or wells to protect the quality of water extracted. RPZs are declared on land encompassing drinking water reservoirs where the risk of contaminants entering the water is too high to allow public access. These areas consist of up to a 2 kilometre buffer around reservoirs, including the reservoir itself.

For more information on Public Drinking Water Source Areas, see the Internet site <www.environment.wa.gov.au>.

Table 1 Recommended minimum buffer distances

Facility	Poultry sheds (same farm operator)	Poultry sheds (different farm operator)	Existing or future residential zone	Existing or future rural residential zone	Farm boundary	Water supply bores	Wetlands, waterways and floodways#	Water table
New poultry sheds	20m (less than this distance is acceptable for tunnel sheds	1000m	500m	300m	100m	50m from discharge area	50m	2m
New free to range sheds *(buffer starts 20 m outwards from the shed perimeter*	20m between enclosures	1000m	500m	300m	100m	50m	200m	3m
Manure storage compounds * *(construction in accordance with Figure 5)*	300m	1000m	500m	300m	100m	50m	50m	2m
Burial of dead birds *(where permitted) (buffer starts from closest edge or base of burial pit)*	N/A	N/A	N/A	N/A	N/A	100m	50m	3m
Manure/litter application to land *(in accordance with recommendations – see Appendix 7.4)*	20m	100m	500m	300m	50m	50m	50m	2m

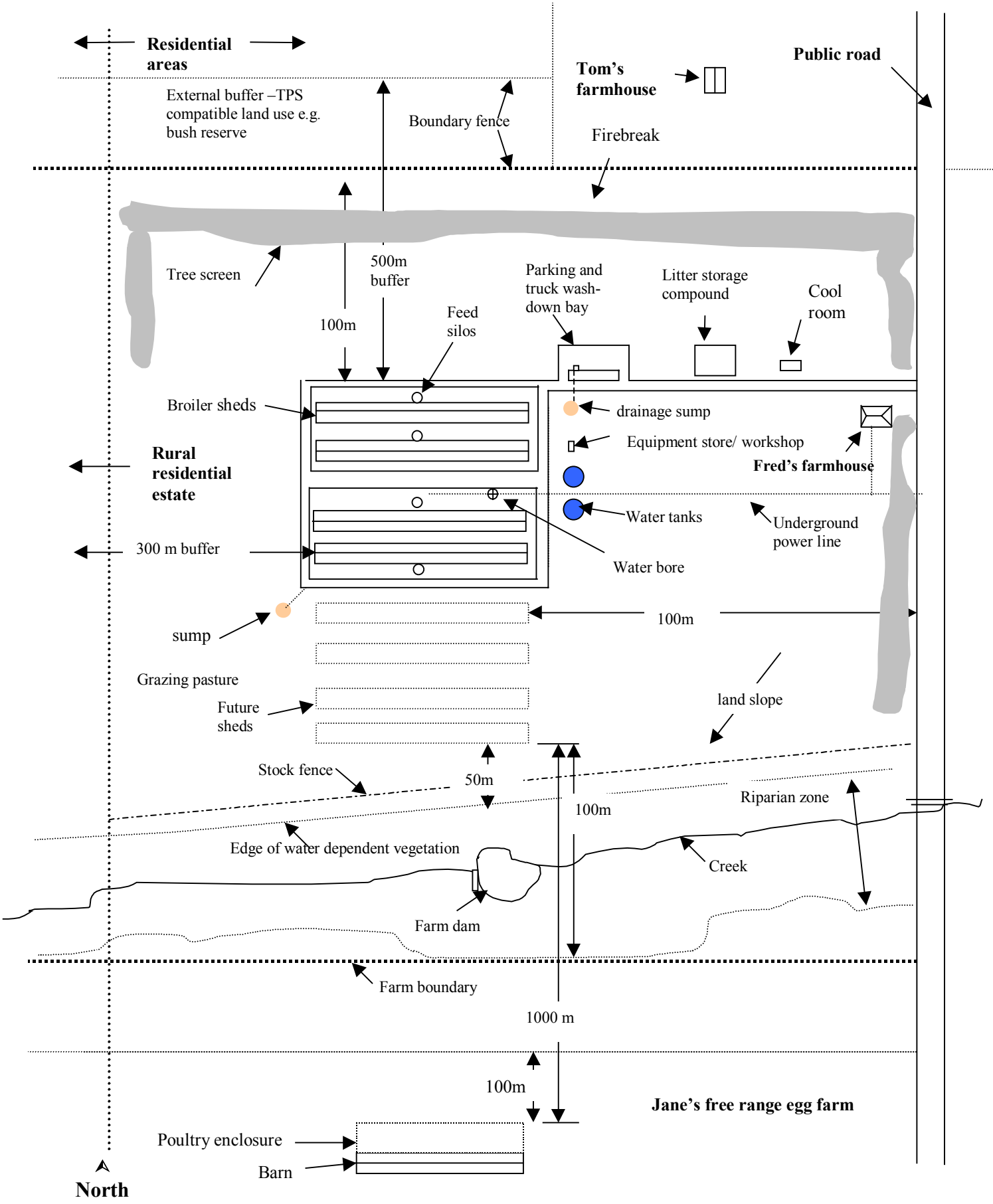
* Integrators may negotiate some of these buffers

\# Recommended minimum distance to adequately vegetated buffer, actual buffer should be determined using biophysical criteria.

Notes:

1. Sources of data: Statement of Planning Policy No. 4.3 – Poultry Farms Policy (1998), Water Quality Protection Note – Poultry Farms in PDWSA, Water Note – Wetland Buffers, Consensus view presented by working party.
2. N/A means not applicable.

Figure 3 Layout of Fred's poultry farm (typical)



Notes: 1. All dimensions shown are minimum recommended
2. Diagrammatic only

2.2 Aesthetic aspects

Poultry farms can be very visible on prominent sites. A presentable, well-screened site with trees and shrubs can lessen visual, dust and odour impacts. This will also indicate to the public that the management is sensitive to neighbours. Planting should be well back from sheds to allow for adequate airflow and fire control.

Carefully designed, planted windbreaks and vegetated buffers can minimise the risk of damage in the event of bush fire, flooding or storm damage. Vegetated buffers also reduce the risk of water pollution caused by wind blown litter and dust.

2.3 Farm water supply

For biosecurity reasons and good general farm practice, any water that can be accessed by birds should be of a potable standard. Where roof sprinkler or curtain cooling systems are used in summer, untreated bore water is normally acceptable.

If water supplies are to be drawn from bore water or from local watercourses, the Department of Environment should be contacted for advice on the requirements for a water abstraction licence under the *Rights in Water & Irrigation Act 1914.*

2.4 Expanding an existing poultry farm

According to *Statement of Planning Policy No. 4.3 – Poultry Farms Policy (1998)*:

In rural zones not identified for short or medium-term urban or rural-residential development, expansion of existing poultry farms may be permitted.

"New sheds on an existing poultry farm should be no closer than 100 metres from the poultry farm boundary (unless the nearby land does not contain an existing or proposed use sensitive to poultry farm operations, in which case the Commission (WAPC) could require a lesser setback distance). In cases where there is an existing shed located closer than 100 metres from a poultry farm boundary a new shed should generally be located no closer than the existing shed from that boundary."

Where tunnel ventilated sheds are proposed, a 100 metre buffer distance should be observed unless it can be demonstrated that noise and dust emitted from the discharge end of the units will not adversely affect neighbours.

For more information refer to *Statement of Planning Policy No. 4.3 – Poultry Farms Policy (1998)*.

2.5 Developing near a poultry farm

Statement of Planning Policy No. 4.3 – Poultry Farms Policy (1998) (Clause 5.4) provides policy guidelines to locate residential and rural residential development near poultry farms. Proposals for rezoning, subdivision and development of land for residential or rural residential purposes near poultry farms may require an assessment to demonstrate that the operation of the poultry farm will not adversely affect the amenity of the new residents. Refer to the detailed guidelines in the policy.

In certain circumstances the Western Australian Planning Commission and Local Government may provide planning incentives for poultry farms to relocate. These incentives are identified in the policy.

Industry's preferred option is that every endeavour be made to relocate the farm, as residential development is often incompatible with poultry farming activities and can impinge on the farm's ability to gain approval for the expansion of an existing operation.

If the area surrounding an existing poultry farm is to be rezoned, the developer and poultry farmer may undertake negotiations to relocate the farm or maintain appropriate buffers. The parameters for relocating farms has been dealt with by the Poultry Farm Relocation Committee which recommends that the current review of the Farm Model, as endorsed and gazetted by the Chicken Meat Industry Committee (CMIC), be used as the basis in determining the cost of broiler farms. The cost of layer farms is negotiated between the developer and the farmer. Due to the variation in the number of stock and the types of equipment and housing, there is no applicable model.

PART 3 FARM DESIGN AND OPERATIONS

It is essential that poultry farms are designed and operated to minimise conflict with neighbours and reduce the risk of harm to the environment.

Farmers establishing new farms or relocating existing farms have an opportunity to consider potential impacts at the design stage. Many farms currently operating in Western Australia were built in the 1960's and 70's, however older farms can still incorporate most of this document's operational recommendations into day-to-day activities and are encouraged to modify infrastructure as necessary, and as far as is practicable.

When assessing proposals to establish poultry facilities, local councils should ensure environmental and social impacts have been considered in the overall farm design. A proposal should show that potential impacts on neighbours have been addressed through the careful location of ventilation fans, waste bins, lights and transport routes.

Protecting the environment

Western Australia is well known for its unique and diverse environment. The Perth region is home to a number of significant wetlands with unique vegetation and fauna, some of which have international significance and are visited by migratory waterbirds from Asia and beyond. Waterways have diverse ecological functions and support a wide range of activities. They provide important linkages between landforms and are home to a wide range of plants, animals and micro-organisms.

Valuable groundwater resources underlie the fragile, sandy soils of the Swan Coastal Plain. These soils act like glass beads, letting water and mobile contaminants leach down to the water table. This groundwater is widely used for private and public drinking water supplies. If intensive agricultural industries are not well managed, wastes, chemicals and fuels can pose a significant risk to the safety of these water resources.

Poultry litter and manure, spilt feed and decaying birds are all potential sources of nutrients such as nitrogen and phosphorus. Nutrient-rich water enters groundwater supplies or wetlands and waterways through groundwater seepage or through surface run-off. Nutrient enrichment can cause algal blooms leading to the death of fish and other aquatic fauna, odour problems and midge problems. Excessive levels of nitrogen as nitrate or ammonia can make the water unsuitable for human or animal consumption.

Intensive poultry farms (free to range being the exception) house the poultry in fully enclosed sheds. This helps contain wastes, minimising the risk of polluting the environment.

The industry must comply with State legislation to minimise impacts on the surrounding environment. See Appendix 7.2 'Regulations and licences'.

3.1 Shed design and construction

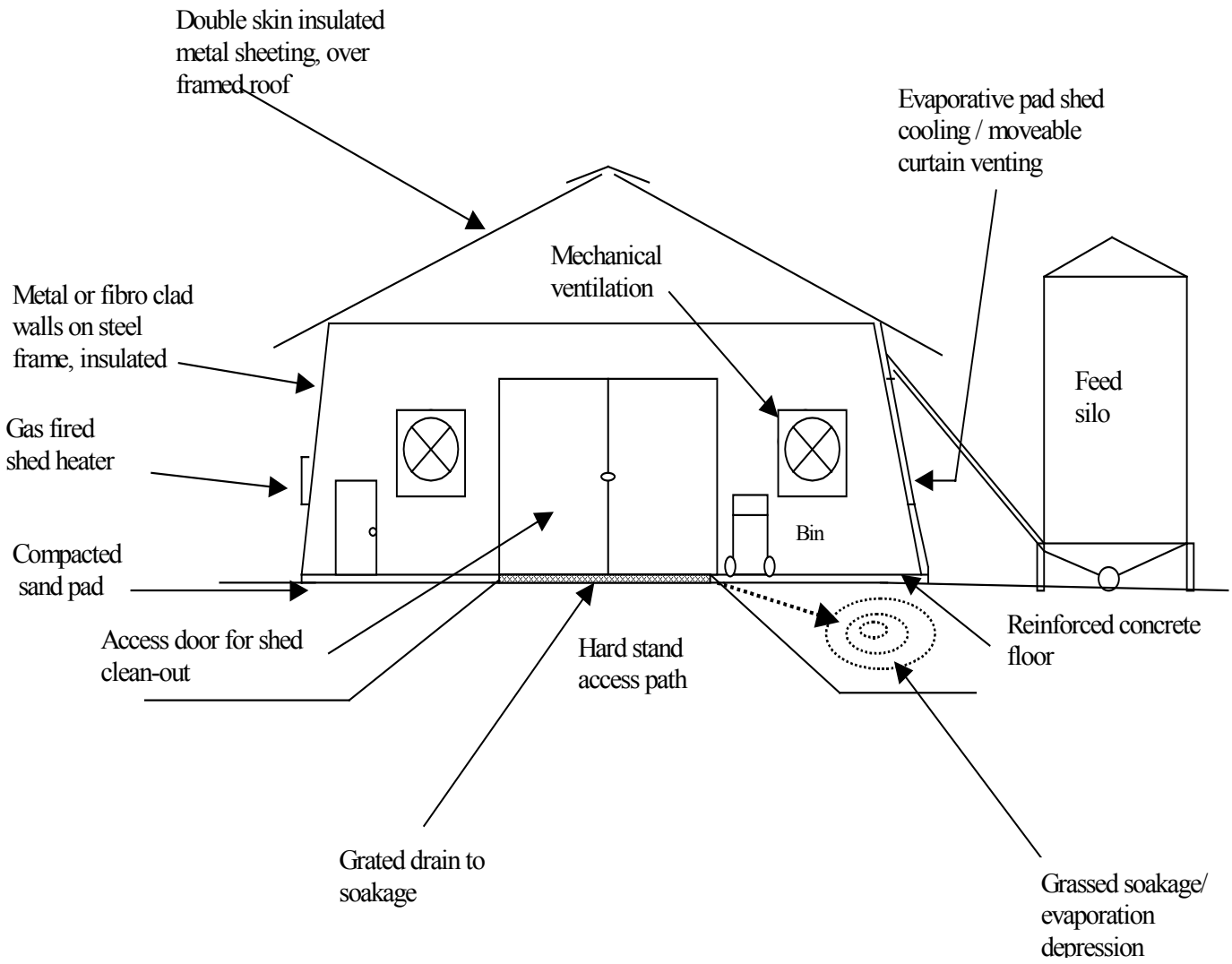
Sheds should be designed and constructed in accordance with industry best practice guidelines. Sheds should be easy to clean and ensure that water for cooling and drinking does not wet poultry litter or manure (which can result in odour problems). In litter-based housing systems the underside of the shed roof should be effectively lined with insulation for climate control and to prevent condensation forming and dripping onto the litter.

Floors should be constructed from reinforced concrete (laid on a lapped polyethyene membrane), rolled limestone or other impermeable material. Shed floor construction should aid in the removal of litter and manure and prevent the leaching of contaminants into underlying soil. Sheds should also incorporate solid all weather drainage control aprons and well made access roads to facilitate movement of vehicles and material into, out of and around sheds.

Minimum equipment requirements e.g. feeders, drinkers, number of fans, etc necessary for optimum performance (the specifications must also coincide with bird welfare as a minimum) are specified in the Cost of Production Model, within the Review of Farm Model for broilers.

Minimum equipment requirements for all poultry industries are included in the *Model Code of Practice for the Welfare of Animals – Domestic Poultry* (current edition) available from the Internet site <www.publish.csiro.au>.

Figure 4 Typical broiler farm shed (end elevation)



3.2 Climate and ventilation

Chickens are more susceptible to temperature extremes than most other farm animals. In WA high temperatures are a problem and must be modified within intensive housing to within at least what the chicken can survive in. Means of controlling high shed temperatures include insulation and fine mist sprays within the shed. However care should be taken to prevent increasing litter/manure water content when using water evaporation methods. Though not essential, it is desirable for the long axis of sheds to align east-west to diminish the surface area that is exposed to the sun's rays at high angles as it travels from east to west, to reduce the heat load from the sun.

Ventilation supplies fresh air and helps reduce the extremes of temperature, humidity and air contamination. Ventilation systems employ either natural airflow or mechanical air movement (fans). The two systems are sometimes combined to improve comfort to poultry during extreme conditions at minimum cost.

Improved ventilation systems, in particular tunnel systems, have made possible higher densities of livestock. Tunnel systems consist of an airtight shed with computer-controlled forced air extraction combined with water-moistened evaporative pads to cool incoming air during hot weather rather than water mist within the shed. Evaporative pads are a more efficient method of cooling than misting or fogging sprays.

A good mechanical ventilation system can mitigate problems from excessive dust and assist drying of wet litter. The location and size of the fans and inlets are critical for efficient ventilation and climate control. Care should be taken to ensure fan outlets are directed away from neighbour's residences wherever practical to minimise noise, dust and odour impacts.

It is vital that there is an adequate backup power source available at all times to ensure the welfare of the stock, particularly for farms relying on tunnel ventilation systems that have completely enclosed sheds.

3.3 Lighting

Sheds are internally lit to maintain regular light periods for poultry and for night collection of birds on broiler farms (most catching operations are undertaken in subdued blue lighting). Farms may also be lit externally for security and other reasons. Where possible, external farm lights should be angled or shaded to prevent them from shining directly into any nearby houses. Barriers and vegetated screens may also reduce light impacts to acceptable levels.
Positioning of sheds in relation to car parks and roads should also be considered as motor vehicle headlights and shadows can easily frighten poultry in open sheds. Energy-efficient lighting and timers can be used to control switching for optimum production efficiency. Farm lighting should be well-maintained.

Contractors and staff should be instructed to operate vehicle lights on low beam. This should be reinforced through farm signage.

3.4 Noise

Excessive noise (especially at night) can cause stress to nearby residents. Annoyance will be increased if the noise is tonal (revving, humming, whining), impulsive (beeping or banging) or varies in level or pitch. Constant noise of certain frequencies can also be disturbing. Sudden, unfamiliar or loud noises can panic poultry leading to injury and even death through suffocation under 'pile-ups'.

Noise is generated by normal operations. However, poorly maintained ventilation systems or feeder units can generate additional noise. Transport of birds (undertaken at night to reduce heat stress and dehydration), general transport in and out of the farm and the sounding of equipment alarms can also contribute to noise emissions.

One of the main purposes of a buffer is to accommodate unavoidable noise that can occasionally occur above background levels, especially in quieter rural areas. Along with ensuring buffers are adequate, noise control should be considered at the farm planning and design stage. An acoustic consultant can provide advice that may ultimately be cheaper and more effective.

Noise impacts can be minimised by:

- obtaining noise data from the manufacturer when selecting new equipment or requesting noise reduction options such as high performance shrouds or mufflers;
- positioning noisy operations and equipment away from noise-sensitive areas, in insulated plant rooms where possible;
- locating vehicle parking and delivery truck routes away from noise-sensitive areas;
- using buildings, earth bunds or natural topography as noise barriers where possible (Note: trees do not effectively stop noise!);
- positioning tunnel sheds carefully as the larger fans required in tunnel sheds may cause concern in noise-sensitive areas;
- setting a low speed limit for on-farm transport movements;
- keeping equipment well-maintained;
- educating employees and contractors on noise minimisation, reinforced through farm signage;
- scheduling noisy activities to occur during the day where practicable; and
- the use of quietened forklifts with strobe lights instead of beepers (subject to Occupational Health and Safety legislation. An Alternate Method of Compliance is subject to WorkSafe approval).

3.5 Poultry litter and manure

Poultry litter refers to manure mixed with sawdust or other absorbent bedding material. 'Manure' refers to material that is 100% bird droppings.

Meat birds produce approximately 1.5 tonnes of dry poultry litter per 1,000 birds in about seven weeks, comprising 50% manure and 50% litter. The weight of litter or manure produced by layer hens will depend on the production system used. 1,000 layer hens in belt-cleaned cages produce 21 tonnes (41 m^3) of manure annually, whereas an equal number of barn layers produce 10 tonnes (18 m^3) of litter annually, comprising approximately 5% sawdust. The difference in cubic measure and weight between the housing types is related to the frequency of clean-out regimes, which affects moisture reduction and the natural breakdown of the material in-situ.

The broiler industry produces 100,000 tonnes of litter and the egg industry produces approximately 15,000 tonnes of poultry manure annually. As nutrient and energy-rich by-products, the challenge is to manage these resources in a sustainable manner without causing environmental nuisance or pollution. Poultry litter, when managed inappropriately, can be a conducive breeding environment for flies, particularly stable fly. Industry should ensure the end product is either composted, used for power generation or value added by pelletising.

On broiler farms, poultry litter is collected by skid steer loader or similar at the end of the production cycle, following removal of the birds for processing. The litter should be loaded into a truck with minimum spillage and dust creation. Any small amounts of litter remaining after shed cleaning should be swept or vacuum cleaned prior to shed wash-down and disinfection.

On layer farms, a variety of methods are used to remove manure and spent litter. In caged systems, manure should be removed from belt-cleaned sheds weekly and in conventional caged systems two or three times per year. In high-rise cage or slats and barn systems, manure is usually removed approximately every 14 months.

Poultry litter and manure are high in nitrogen and phosphorus and can contain trace elements and microbes. The isolation of poultry litter/manure from water resources is an essential requirement of all aspects of poultry farming and relies upon:

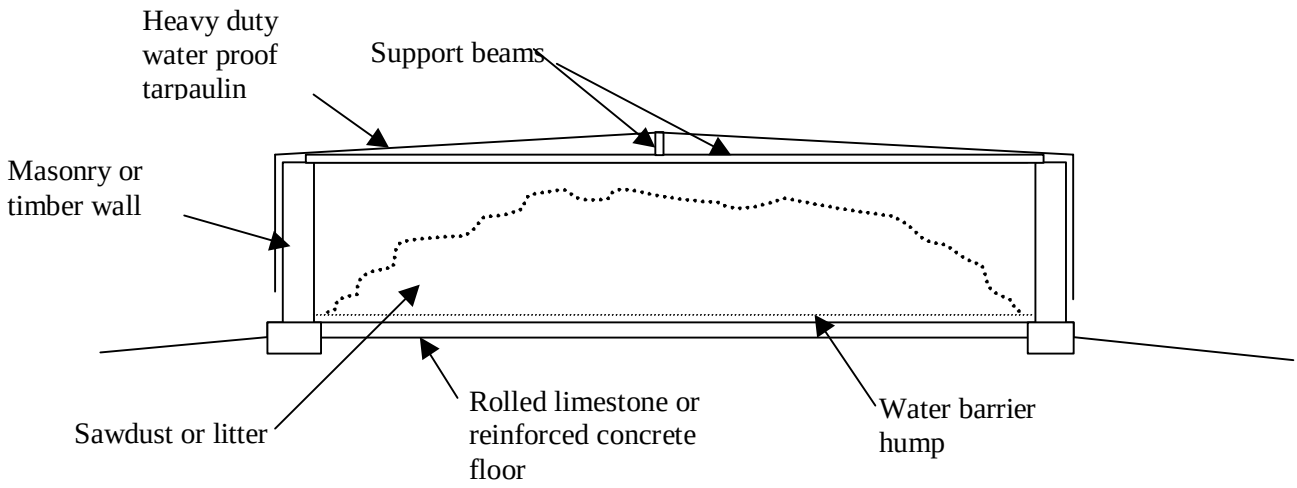
- location of farms away from water resources;
- shed design measures to contain litter and manure;
- sound waste management practices; and
- careful consideration of the end use of poultry litter.

Nutrients from poultry litter/manure should not be allowed to leach into the environment, either directly from sheds or during any storage prior to removal. Though it is not current practice on broiler farms to store litter temporarily, egg farmers may need to undertake temporary storage on occasions, as provided for under the *Health (Poultry Manure) Regulations 2001*. Poultry farms (within designated districts) are permitted to stockpile poultry manure at the place of production.

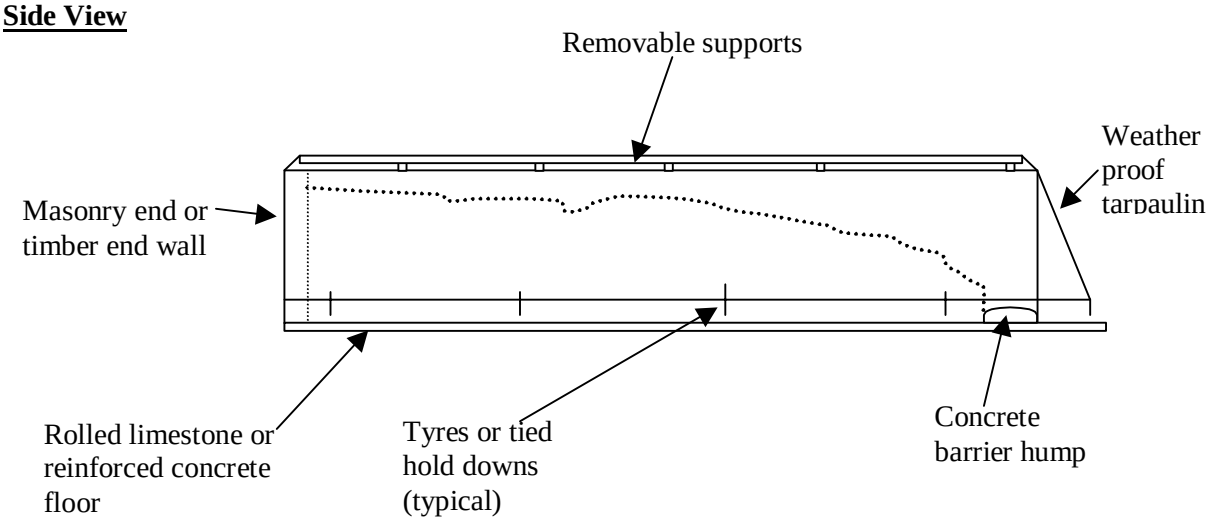
There is no restriction on the quantity that can be stored, or timing. Where litter/manure is stored temporarily, it should be contained in a weather-proof compound (preferably on hard-stand areas within a shed) until removal from the farm for disposal. For further information refer to the *Draft Guidelines for the Storage, Processing and Recycling of Organic Waste* available from the Department of Environment.

Figure 5 Typical sawdust /litter storage compound

Front View



Side View



Litter/manure should be well separated from any surface waters and not stored in Priority 1 or 2 Public Drinking Water Source Areas (PDWSAs) or Wellhead Protection Zones (contact DoE for location data). Temporary stockpiles should also be positioned as far from the property boundary as possible. During transportation off-site, poultry litter/manure should be fully contained, especially on public roads.

In sensitive environments e.g. PDWSAs and close to wetlands, waterways and flood-ways, poultry manure/litter should not be applied to land unless approved by the Department of Environment, after consideration of a nutrient and irrigation management plan. For more information see the Department of Environment's Water Quality Protection Note – *Nutrient and Irrigation Management Plans.*

For information on managing litter/manure to minimise odour, see 3.7 'Odour'. For information on land application of litter/manure see Appendix 7.4 'Land application of poultry litter and manure'.

3.6 Wash-down water

Following sweeping or vacuuming of poultry sheds to remove litter, sheds are washed to remove any residual material. Wash-down water often contains some residual nutrients and microbes. No direct discharge should be made into wetlands or waterways. In Priority 2 and 3 Public Drinking Water Source Areas and in areas near significant[1] water resources, wash-down water should be directed to a sump or depression vegetated with bio-filter grasses to absorb nutrient discharge. Thorough mechanical collection of litter prior to wash-down should result in a very low level of nutrients in wash-down water.

3.7 Odour

Like most farming activities, a well-managed poultry farm will generate some odour as a normal part of day-to-day operations. Most people can accept this kind of odour, and at present there are no practicable means to completely eliminate it.

Characteristic agricultural smells are a normal part of any rural environment and those seeking the benefits of rural living should expect 'normal' low level agricultural odours.

However, the odour from tens of thousands of warm birds and fresh excreta confined in sheds is characteristic and generally considered unpleasant. Some people find the odour intrusive and the level of perception and tolerance varies between individuals and with weather conditions.

During the cleaning of sheds – when litter/manure is disturbed – ammonia and other odours are released in greater than normal quantities and it is at this time that most complaints are received. It should be noted that cleaning and removal of litter/manure from sheds is usually done in a matter of hours and is a small percentage of the bird growing cycle.

All poultry litter/manure usually contains at least some water. This is essential to avoid dust problems, allow for ease of handling, and promote a suitable environment for beneficial insects and other organisms. Ideally, litter and manure will be sufficiently dry to be friable (i.e. contain water levels of 30 - 40%).

Excessively wet litter is the most likely source of offensive odour. Excessive odour from decaying litter and manure usually signals a breakdown in best management practices or inappropriate feed formulation. Prompt action should be taken to remedy the situation. The table below provides a guide on the moisture content of litter and manure.

Table 2 Litter/manure condition related to moisture

Litter/manure condition	Moisture (%)
dusty	less than 15
dry	15 -30
friable and moist	30 - 40
damp and commencement of caking	40 - 50
wet and heavy caking	50 - 60
very wet and sticky	more than 60

Note: all 'fresh' droppings are initially high in moisture (between 70 and 80%).

Litter/manure moisture content can be managed by:

- preventing water from rain, irrigation sprinklers and surface water from entering poultry sheds and storage facilities;
- preventing overstocking in sheds;
- rotary hoeing of litter in breeder sheds/broiler sheds;
- covering litter with fresh absorbent materials;
- removing wet patches of litter/manure;
- ensuring drinker nipples close with a positive action and do not leak;
- adjusting drinkers regularly to suit the height of the birds;
- adjusting fogging systems for cooling so that the droplet size is not too large (if the droplets are too heavy, they will reach the litter);
- maintaining feeders to minimise spillage; and
- using poultry feed nutritionally formulated so as not to cause excessively wet faeces.

Poultry farm odour complaints can be further minimised by:

- careful site selection and farm design with adequate buffer distances to sensitive environments;
- considering prevailing wind direction, especially during summer;
- optimising the frequency of shed clean-out;
- keeping dust levels low, as odours are absorbed and carried by dust particles;
- not exceeding recommended bird stocking densities;
- utilising up-to-date technology and replacing malfunctioning or old, inefficient equipment;
- ventilation that achieves the maximum possible dilution of odour strength during shed clean-out;
- using dense vegetation buffer screens to cause turbulent airflow (to disperse odour), filter dust and redirect odour away from sensitive areas;
- positioning tunnel sheds carefully in terms of the direction of exhaust vents; and
- containing litter and manure under weatherproof covering, prior to removal from the property.

For information on litter/manure management refer to Section 3.5 ‘Poultry litter and manure’.

For further information on odour management, refer to the Environmental Protection Authority’s *Assessment of Odour Impacts on New Proposals* and the Department of Environment’s *Odour Methodology Guideline*, in particular Sections 5.0 and 5.1.

3.8 Dust

There is always some dust from litter and feathers (dander) on a poultry farm, with most dust generated through farm operations and transport movements. Dust from poultry sheds can transmit odour and cause discomfort to neighbours.

Dust management associated with large scale bird movements is generally more of an issue for broiler farming due to the regular *‘all in, all out’* system of farming.

Good farm management is important in minimising dust problems and should include:

- driving supply & product export trucks at moderate speeds especially on unsealed roads;

- covering loads, such as litter, manure and feed;
- using ground-cover plants, shrub and tree screens to intercept dust;
- preventing litter/manure from becoming excessively dry; and
- managing build up of dust in sheds.

3.9 Transport

Poultry farms rely on frequent transport movements in and out of the farm. Due to limited storage capacity on broiler farms, feed is delivered every few days. During a production cycle, a 100,000 bird broiler farm will need approximately 400 tonnes of feed. A 20,000 bird layer farm uses about 16 tonnes of feed per week.

The most common problems resulting from the frequent transfer of supplies, birds and litter/manure are odour, noise, dust, feathers and vehicle lights. Broiler enterprises may experience specific problems due to the necessity for birds to be harvested at night.

Transport impacts can be minimised by:

- Ensuring loads are appropriately sized, secured and covered to minimise odour and prevent the discharge of feathers, dust or waste (in accordance with the *Road Traffic Act 1974);* and
- Liaising closely with contract drivers, pick-up crews and processors on ways to minimise potential impacts, especially noise at night-time.

Live birds must be handled and transported in accordance with the *Model Code of Practice for the Welfare of Animals: Land Transport of Poultry,* available from the Internet site <www.publish.csiro.au>and the Department of Local Government and Regional Development's *Code of Practice for the Transport of Poultry in Western Australia* available from <www.dlgrd.wa.gov.au/pub/docs/AnimalWelfare/Codes_of_Practice.shtml>.

3.10 Dead bird and unhatched egg disposal

A mortality rate of 4-6% per batch on broiler farms and 5% per batch on layer farms is considered normal. A dead bird and unhatched egg pick-up service is now a standard procedure for all broiler and breeder farms in the Perth metropolitan region. To ensure that the system is operated to the highest possible standard with minimum odour and risk of disease transmission, a cool room is an essential on-farm component if dead birds are held for more than one day. Dead birds should be stored in the cool room or similar facility until nearing time of collection.
Dead birds and unhatched eggs should be placed in a weather and vermin proof receptacle (e.g. 240 litre wheeled bin) for collection and removal to a by-products/ rendering facility. The receptacle should be left as close as possible to the entrance of the property so that the pick-up vehicle does not have to enter the property. Transport to the rendering plant or disposal site must be such that it not only minimises odour, but prevents the discharge of feathers or leakage occurring during transit.

Where a regular off-farm service is not linked to a rendering facility, e.g. egg farms or isolated areas such as country towns, dead birds and unhatched eggs should be collected regularly and transported to an incineration plant or approved landfill site.

For management recommendations on *mass* bird deaths, see 4.1 'Accident and emergency response'.

3.11 Chemicals and fuels

Storage

Fuels and chemicals, i.e. pesticides, disinfectants and pharmaceuticals, may be used on poultry farms and can be toxic even at very low concentrations. Without proper storage, water resources can become contaminated either through leaching to groundwater or run-off into surface water. If chemicals such as fuel enter groundwater, the contamination can persist for long periods. Clean up may be technically difficult and is always costly.

Chemicals should not be stored within 200m of any significant[1] wetland or waterway. It is recommended that the 200m buffer be vegetated with local native species.

On-site fuel storage systems (in quantities greater than 200 litres) in Underground Water Pollution Control Areas require permit approval from the Department of Environment.

The following Water Quality Protection Notes prepared by the Department of Environment outline the recommended practices for storage of chemicals and the design of fuel storage systems:

- *Tanks - above ground chemical storage tanks in Public Drinking Water Source Areas;* and
- *Toxic and hazardous substance - storage and use.*

Pesticide use

The use of pesticides in the poultry industry is normally minimal. All pesticides are stored, applied, transported and disposed of in accordance with the *Health (Pesticides) Regulations 1956*.

The Heath authorities' food safety standards and Integrators protocols control the nature and application of pest control on farms, for example the National Egg Quality Assurance Program.

There are many factors relating to application, disposal and storage of pesticides that can minimise the risk of potential water source contamination. Some effective management techniques include:

- Only using pesticides when problems observed, not as a preventative (see the Department of Environment's *Statewide Policy No. 2 – Pesticide use in Public Drinking Water Source Areas 2000* available at the Internet site <www.environment.wa.gov.au)>;
- Selecting pesticides with the lowest persistent toxicity and water contamination potential;
- Ensuring application concentrations strictly adhere to the manufacturer's and any Department of Health or Agriculture recommendations;
- Maintaining adequate buffers to sensitive environments;
- Managing pesticides carefully during mixing and dilution to reduce the risk of accidental spillage;
- Testing and calibrating pest control equipment regularly to avoid over or under applying any pesticide;

- Wash-water from equipment used to apply a specific pesticide should be retained in marked containers and used to dilute subsequent applications of that pesticide; and
- Storing pesticides carefully to prevent leakage and provide protection from fire damage, storms or other natural disasters.

The use of pesticides in Underground Water Pollution Control Areas requires permit approval from the Department of Environment.

For more information refer to the Department of Environment's Water Quality Protection Note – *Pesticide use in sensitive environments*. For recommendations on managing chemical spills see 4.1 'Accident and emergency response'.

3.12 Operational Biosecurity

Biosecurity is driven by the poultry industry's fundamental concern for sanitation, disease control and vermin management to ensure that their flocks remain healthy and that the meat and eggs supplied to customers are uncontaminated and disease free.

A primary aim is to prevent outbreaks of disease and transmission of disease from one property to another, which can cost the poultry industry millions of dollars in lost production, pose immense dead bird disposal problems and lead to loss of public confidence.

For detailed information on biosecurity recommendations, refer to the industry-developed biosecurity codes. *The National Biosecurity Manual for Contract Meat Chicken Farming* is available from the Australian Chicken Meat Federation. *The Code of Practice for Biosecurity in the Egg Industry* is available from the Rural Industries Research and Development Council website at <www.rirdc.gov.au/reports/EGGS/01-109.pdf>. The Department of Agriculture's *Avian Industries Biosecurity Plan 2002* is available at the Internet site <www.agric.wa.gov.au>.

All avian industries are expected to adhere to the above biosecurity documents. If a poultry farm fails to demonstrate that best management practices have been followed, they may not be eligible for compensation in the event of a serious disease outbreak.

3.13 Farm maintenance

Aspects of poultry farming such as biosecurity, odour transmission, dust containment and general community attitude can be influenced by the overall level of farm maintenance.

Maintaining the overall site including shed and equipment integrity, security fencing (such as on breeder farms) and vegetation and grassed buffers, will ensure the continued effectiveness of any design features to minimise environmental impacts.

Keeping grass short and green near sheds will help control pests (such as rodents), improve ventilation, assist in cooling in hot weather and maintain the overall appearance of the property.

The exterior of buildings should be maintained to keep the appearance, ventilation, security, and general functioning of the structures to a high standard.

3.14 Animal welfare

The professional poultry farmer will be concerned for the welfare of his stock. Poorly cared for birds will not thrive or produce efficiently.

Farm managers have legal and moral animal welfare obligations to uphold and the standard of care required is contained in relevant State and Commonwealth animal welfare legislation.

Poultry industries endorse the *Model Code of Practice for the Welfare of Animals - Domestic Poultry* (current edition) and require all members of the industry to adhere to its principles. This model has been adapted for use in Western Australia by the Department of Local Government and Regional Development in the *Code of Practice for Poultry in Western Australia* (current edition) available from <www.dlgrd.wa.gov.au/pub/docs/AnimalWelfare/Codes_of_Practice.shtml>.

PART 4 OTHER CONSIDERATIONS

4.1 Accident and emergency response

Mass bird deaths – Heat stress

Occasionally, large numbers of birds can die from abnormal heat stress. In this situation, the dead bird pick-up service should be used to transport birds off site to an approved disposal facility. The broiler industry has an arrangement with a rendering plant to provide skip bins and dispose of any large losses resulting from adverse weather conditions.

Mass bird deaths – Disease or other causes

The process for dealing with losses resulting from a disease outbreak is covered by a Memorandum of Understanding between all parties and agencies involved. In the event of mass bird deaths where disease is the likely cause, poultry farmers should obtain a veterinary report and immediately contact a local government Environmental Health Officer (EHO). The EHO should report all mass bird death incidents to the Department of Agriculture and provide available infectious disease data to the Department of Health. These agencies will provide guidance on disease control and hygiene, and transport and disposal of diseased dead birds.

Composting of carcasses has potential as a means of effective disposal, but requires further detailed investigation for large scale operation. Under extreme circumstances, quarantine measures may be required, in which case, on-site controlled incineration or chemical-aided processing of dead birds e.g. liming, may be necessary. Burial of carcasses on the property or within a designated disposal site, such as a Class III licensed landfill, is considered the most appropriate method of disposal for diseased stock.

The Department of Environment should be consulted regarding preferred methods for on-site disposal if there is a possibility that the disposal site is near a sensitive environment. Minimum requirements for disposal include:

- Disposal pits should be constructed with low permeability liners or in natural clays to ensure negligible leaching of nutrients into ground or surface waters, no access to other animals, the site is permanently marked and a record kept of the location and number of carcasses buried;

- Pits should not be constructed in areas subject to water-logging, overland water flow, drainage lines, within 200 metres of a wetland or waterway, where the water table is within 1.5m of the surface, in water supply source areas and in soils with high permeability (therefore eliminating the option for on-site disposal over most of the Swan Coastal Plain);

For further information on disposal options refer to the Department of Agriculture's *Avian Industries Biosecurity Plan*.

Chemical and fuel spills

Where significant amounts of toxic or hazardous chemicals are held e.g. fuel (in excess of 200 litres), pharmaceuticals or pesticides (in excess of 20 litres), the farmer should prepare an *Emergency response plan* to deal with possible chemical spills, natural disasters, fires, vandalism or equipment problems. Containment barriers can minimise the escape of spilled chemicals to the environment and materials should be readily available to absorb spilled chemicals.

The plan should identify sensitive environments e.g. water supply sources, wetlands, waterways and flood-ways. Employees should be trained in procedures to block chemical escape pathways and clean up spills.

For more information refer to the Department of Environment's Water Quality Protection Note – *Chemical spills - emergency response planning.*

Bush fire, flooding and storm damage

Where circumstances arise that threaten infrastructure, damage can be limited by using the following measures:

- Ensuring that shed cladding is secure;
- Closing any shed openings not essential to ventilation;
- Removing any loose or flammable materials near sheds;
- Maintaining a mobile water cart to put out spot fires;
- Irrigating shed roofs, if practical, when fire threatens; and
- Ensuring essential equipment is available to repair or mitigate any after-affects with minimum delay.

Where damage does occur, weatherproofing should be restored as soon as is practicable to prevent contact between poultry wastes and rainfall. Options include the use of tarpaulins to cover damaged areas and precautionary removal of litter or manure. In the event that stormwater becomes contaminated, a contingency plan should be in place outlining strategies for collection, treatment and disposal where practicable.

Extended power failures

Power failures may disrupt water supply, feed distribution, heating for chicks and mechanical ventilation of sheds. Back-up procedures should be available to maintain essential services in the event of power failure. This may include access to portable generators (back up generators are compulsory on all meat bird farms, as are alarm systems), fuel powered pumps, manual distribution of water and feed, and the use of temporary openings to ventilate sheds.

4.2 Quality assurance

Quality assurance is governed by two national voluntary standards. The AS/NZS ISO 9000 series details *Quality Management Systems* and the AS/NZS ISO 14000 series deals with *Environmental Management Systems*. Implementation of environmental quality assurance schemes ensures the farm can continue to operate efficiently when faced with operational challenges, and demonstrates an image of 'clean and green' to the consumer. It is therefore an effective marketing tool. Best practice is to adhere to the standards, which are available from Standards Australia at <www.standards.com.au>.

Layer farm managers should utilise the *National Egg Quality Assurance Program,* which addresses operational practices designed to address food safety, animal welfare, environmental practice, and incident management. Good operational practices can be reinforced with signage. Broiler industry processors generally adopt a Quality Assurance program in response to product distributor's requirements.

4.3 Public relations

Poultry farm managers should actively promote a good relationship with neighbours. Some complaints from farm neighbours arise from ignorance of normal farm operations and fear based on misconceptions. All complaints should be dealt with in a concerned, professional and sympathetic manner. A visitor and complaints log book should be maintained, refer to Appendix 7.5.

Warning signs should be posted at the farm entrance to advise potential neighbours of possible undesirable environmental impacts associated with normal operations. For more information refer to S*tatement of Planning Policy No. 4.3 – Poultry Farms Policy (1998).*

4.4 Staff training

Poultry farm staff should be encouraged to develop a commitment to being good neighbours and protecting the environment. They should be aware of any operations that may cause pollution or nuisance to neighbours and take all practicable steps to minimise impacts.

Some larger operations have started their own environmental awareness campaigns for staff and have developed company-based environmental management policies. These initiatives aim to:

- Encourage environmental awareness and responsibility amongst staff;
- Increase adoption of measures to prevent environmental impacts; and
- Provide advice on steps to take when problems arise.

4.5 Occupational health and safety

Section 19 of the *Occupational Safety and Health Act 1984* states that an employer shall as far as practicable, provide and maintain a working environment in which employees are not exposed to hazards, through:

- Maintaining safe workplaces, plant and work systems;
- Providing information, instruction and training enabling employees to work without hazards;
- Consulting with employee-elected health and safety representatives and/ or other employees about occupational health, safety and welfare;
- Providing adequate personal protective clothing and equipment; and
- Ensuring all work procedures are undertaken without exposing workers to hazards.

Issues to consider in a poultry farm work environment are;

- Zoonotic disease transmission;
- Respiratory hazards from airborne particulates;
- Chemical handling;
- Manual handling; and
- Vehicle and equipment safety.

Disease transmission from poultry to humans can occur. The main zoonotic diseases associated with poultry are caused by *Campylobacter* and *Salmonella* species which are found in poultry manure. Both pathogens can cause diarrhoea, cramping, fever, nausea and vomiting. Viruses such as the H5N1 strain of avian influenza, which affected several Asian countries in January 2004, can also be passed from poultry to humans. Staff need to be educated on preventing infection by thorough handwashing after work and before eating and also by changing work clothes and boots. Disease transmission by other vectors such as vermin and insects can be controlled with effective pest control management as required for biosecurity measures.

Respiratory hazards could be a potential source of disease transmission and infection of the lungs. Particular jobs, such as shed clean out or batch exchange of birds, should be completed using respiratory protection.

Safe chemical handling is often overlooked in the workplace. Ensure chemicals are stored in an designated enclosed area, and material safety data sheets (MSDS) are within easy reach of these chemicals. MSDS provide advice on storage, emergency and first aid. Read the MSDS to find out if particular chemicals need special storage conditions. Ensure that there is basic first aid facilities for staff and clean up equipment for any spills that occur.

One particular chemical exposure associated with poultry farms is with the ammonia produced in the poultry shed. Ammonia needs to be minimised for the health of the birds, however there is a maximum permitted occupational exposure for employees. Currently, the occupational exposure standard (upper limit) for ammonia in air is 25 parts per million (time weighted average).

The other common chemical exposure to be wary of is the use of formaldehyde disinfectant. Formaldehyde is regarded as a suspect human carcinogen, and should only be applied by certified contractors. WorkSafe Australia has currently assigned a draft time weighted air exposure standard (upper limit) of 1 ppm.

Training should be provided for all staff to ensure adequate knowledge of safe manual handling and correct use of equipment and vehicles. The training should cover all other safety procedures to ensure that general work safety exists on the poultry farm.

In the case of a workplace accident, resulting in injury or death of an employee, WorkSafe must be notified by telephoning 1800 678 798.

For more information on workplace safety contact WorkSafe.

4.6 Monitoring and reporting

There are two main types of monitoring that may be required or recommended by government agencies. These are for odour complaints if the farm is located near residential areas, and less frequently, water quality monitoring, if farms are located near sensitive water resources and considered likely to pose a contamination risk.

Where the farm location may lead to concerns about its effects on people or the environment, the farmer should maintain a logbook recording the following information:

- Details of the time, weather conditions and nature of any incident or abnormal operating circumstances on the farm e.g. during shed clean-out; and

- Details of any complaints received, who made them, what was affected and actions taken in response.

Where an audited permit or licence is *not* required under the environmental statutes (see Appendix 7.2 'Regulations and licences'), the site should be periodically inspected by local government officers. An inspection will establish whether a farmer is meeting any requirements that were attached to a development approval.

A water quality monitoring program might be required where poor management practices are suspected by a regulatory body. Water resource contamination could occur under the following circumstances:

- Poultry shed flooring is not completely sealed or could occasionally be flooded;
- Litter/manure has been stored temporarily during inclement weather without suitable protection; and
- Liquid chemicals e.g. disinfectants, escape from the shed in significant volumes.

A typical six monthly water quality monitoring program is located in Appendix 7.3.

Further advice on water monitoring is contained in the *National Water Quality Management Strategy - Australian Guidelines for Water Quality Monitoring and Reporting* 2000. Copies may be obtained via the library service or Commonwealth government bookshops.

National Pollutant Inventory (NPI)

The NPI is an internet database designed to provide the community, industry and government with information on the types and amounts of certain substances being emitted into the environment. There are legal obligations for companies to report the emissions of specific substances from the their facilities, as set out in the *Environmental Protection (NEPM-NPI) Regulations 1998*. The onus is on each facility to report emissions of all NPI substances which exceed NPI usage thresholds.

Within the poultry industry, the substance most likely to reach an NPI threshold is ammonia. The reporting threshold for ammonia is usage of 10 tonnes or more per year. This means that a facility emitting 10 tonnes or more of ammonia must report to the NPI on an annual basis.

The *Emission Estimation Technique Manual for Intensive Livestock – Poultry Raising* contains default emission factors for ammonia for one bird and can be used to calculate total emissions from a farm. This document may be accessed at <www.npi.gov.au/handbooks/approved_handbooks/poultry.html>.

PART 5 FREE TO RANGE POULTRY FARMS- SUPPLEMENTARY INFORMATION

5.1 Introduction

In the past, 'free to range' or 'open range' described poultry held in simple coops which opened to outdoor enclosures. When poultry farming began to take place on a larger scale, the industry shifted toward more intensive housed systems, and ultimately cage housing systems for improved production efficiency. In recent years, demand for a perceived more 'natural' product has renewed interest in less intensive methods of poultry farming.

Poultry is described as free to range if access to an outside area on which to range is provided during daylight hours, from morning to dusk, except where inclement weather or other causes which are temporary in nature give good reason for the birds to be kept indoors. Birds are free to range once fully feathered. As birds have freedom of movement between inside and outside areas, at any one time only a proportion of birds may actually venture outside. Feed and water is usually only provided in the shed.

There are now a number of free to range egg farms on Perth's outskirts and both free to range egg and meat farms in country areas. There are also several very small, non commercial "organic" ("chemical" free) egg producers in WA. Note: Golden Egg Farms does not sell "organic" eggs because of the difficulty of getting "organic" feed in WA, but this may change.

Whereas conventional poultry farming systems allow full containment of litter and manure, free to range systems rely partly on the ability of the land to assimilate nutrients. Free roaming birds also present special considerations for biosecurity as they may come into close contact with wild birds.

This section should be read in conjunction with the main body of the Code.

5.2 Planning for free to range poultry farms

A development application, with accompanying documentation, is required by the relevant local government authority prior to the construction of a new farm, or the expansion of or addition to an existing farm.

Siting

Free to range poultry farms share many of the same siting considerations as intensively housed systems (refer to Section 2.1). Free to range farms should be located on rural zoned land within a reasonable distance to suppliers, processors and markets. Layer farms do not necessarily need to be located near the metropolitan area, however consideration needs to be given to transportation economics.

Although there is no model farm size, biosecurity buffers are applicable and proximity to sensitive environments requires consideration.

Particular attention should be paid to potential weather effects on range areas that may impact on poultry, soil or water resources. Free to range enclosures should be sited where the ground surface is at least three metres above the water table to reduce the risk of flooding. Where soils have low permeability, floodwaters may transport nutrients from manure into waterways or wetlands. A site where open areas of standing water may occur should be avoided as wild birds may be attracted, exposing poultry to an increased risk of disease.

Organochlorines such as DDT, dieldrin and heptachlor were pesticides commonly used in metropolitan and rural areas during the mid 20th century. As free to range poultry have direct contact with the ground, the soil on a proposed farm site should be checked if it is suspected of being contaminated with pesticide residues. The soil may contain very low levels of organochlorines but they become concentrated in the bird's fat and egg yolk fats. Thus the levels of organochlorines in poultry meat and eggs, even from poultry raised on soils with very low levels of organochlorines, can exceed permitted levels. In addition, old fence posts and power poles that were treated are of particular risk.

Free to range poultry farms are **unacceptable** (based on water contamination risk) in Public Drinking Water Source Areas (PDWSAs) with a **Priority 1 or 2** management classification. (Priority 1 indicates that protecting the water source from pollution is the primary objective for that area of land; Priority 2 indicates that there should be no increased risk of pollution). Free to range farms are also **unacceptable** in **Wellhead Protection Zones** or **Reservoir Protection Zones.**

Poultry farms in PDWSAs with a **Priority 3** classification are managed as a ***conditional*** land use and require written approval from the Department of Environment. For more information on PDWSAs, contact the Department or see the Internet site <www.environment.wa.gov.au>

Free to range poultry farms are unacceptable within 200m of a conservation category wetland or wetland listed on any environmental protection policy. Proposals to construct free to range poultry farms within 200 metres of any other wetland or waterway (measured to the outside edge of the wetland or waterway's fringing vegetation) should be referred to the nearest regional office of the Department of Environment for assessment, response and best practice recommendations. Wetland and waterway maps for a large proportion of the Swan Coastal Plain are available from the Department.

Buffers

If there is more than one free to range shed on a property, an appropriate separation buffer should be maintained between each roaming (range) area. This will enable the environment to assimilate nutrient runoff and prevent pockets of the property from becoming significantly degraded.

Buffers between free to range farms and surrounding land uses should be consistent with those set out in *Statement of Planning Policy No. 4.3 – Poultry Farms Policy (1998*). Buffers to sensitive land uses and environmental features should also reflect the recommendations in Section 2.1 'Siting and Buffers'.

A biosecurity buffer of 1,000m, measured from the perimeter fence of the roaming yard, should be maintained between poultry farms, both free to range and intensive. A minimum vegetated buffer of 200 metres is recommended between the end of the roaming area to any wetland or waterway to prevent the possibility of contaminated soils being carried away during a storm event and to discourage interaction between domestic poultry and wildfowl.

5.3 Farm design and operations

Free to range farms essentially consist of a weatherproof shelter providing nest boxes, litter material on a hard-stand floor, feed, drinking water and access to a vegetated outdoor area.

Specific operational requirements of free to range farms are described within the *Code of Practice for Poultry in Western Australia.*

Birds are provided with adequate access ways to freely move between the shelter and the outdoor pastured range area. The land where birds are permitted to range must have shade, shelter and palatable vegetation. A suitable area should be provided to allow roaming birds to forage without causing significant soil damage, nutrient leaching or loss of contaminant filtering vegetation to property boundaries, waterways and water bodies. Rotating the use of roaming areas may be necessary during dry summer months and wet winter months to allow vegetation to regenerate.

Due to the innate tendency of chickens to stay together as a flock and the attraction of remaining close to food and water (and shade if it is hot), most birds do not venture more than 100 metres from the shed exits.

Biosecurity, disease and protection from predators

A reasonable attempt must be made to protect birds from predators at all times. Outdoor ranges should be securely fenced. Fencing material should extend in a curve below the soil line to prevent burrowing predators e.g. foxes from gaining access to the enclosure.

Where the risk from winged predators and/or wildfowl is high, ranges may also be enclosed with overhead netting to protect poultry and prevent avian vermin from entering the yards and sheds, thereby reducing the risk of disease transmission from other avian species. This may be most practical where the range includes an orchard.

For additional information on biosecurity the reader should refer to the industry-developed biosecurity codes (see Section 3.12).

Water Supplies

Poultry water supplies drawn from the local environment should be treated to potable standards i.e. filtered and disinfected, to minimise disease risk.

Litter management

In free to range meat bird systems, most manure is deposited in the sheds near the primary feed source, it is estimated that 10% of manure is deposited outside. Litter is collected from sheds following removal of the birds for processing. On free to range layer farms, litter may remain in the shed until the end of the productive cycle (approximately 16 months). The depth of bedding material used should reflect the stocking density. Following collection of litter, sheds should be swept or vacuum cleaned to collect residual litter prior to the sheds being washed and disinfected.

During a cycle, poor shed litter management may lead to litter that is caked, wet or excessively dusty. In addition, it may encourage the breeding of flies, particularly stable fly. Operators should prevent these conditions from occurring and rectify them on discovery, should they occur.

Feed and water must be available in such a way that spillage is minimised and litter is prevented from becoming too moist. Excessively moist litter can compromise flock health and lead to odour problems. If flooding occurs, the wet litter must be replaced with dry litter immediately.

Soil protection

Repeated grazing and scratching of poultry over heavily accessed areas can leave soil exposed and devoid of vegetation. This is particularly the case with soil immediately adjacent to sheds. Rotating the range-land by using fencing/gate controls or mobile housing systems can minimise soil and pasture damage.

Unduly restricted or overstocked ranges can lead to a build up of manure that may exceed the soil's capacity to break down nutrients, damage pasture, break down soil structure and increase the risk of erosion. A reduced ability for the soil to support vegetation may also result. Maximum stocking densities should be observed as stated in the *Model Code of Practice for the Welfare of Animals – Domestic Poultry* (current edition).

Wetlands and waterways

When manure is deposited directly onto soil, nutrients not absorbed by vegetation will runoff or leach into groundwater, wetlands or waterways. For this reason, it is critical that proposals for free to range farms reflect recommended siting criteria and adhere to buffer guidelines. Vegetated buffers containing local native species should also be maintained between ranges and any significant[1] wetlands, waterways and flood-ways. Refer to Section 2.1 'Siting and buffers'.

Animal welfare

Industry is required to meet the *Model Code of Practice for the Welfare of Animals – Domestic Poultry.* In addition, the *Code of Practice for Poultry in Western Australia* makes reference to free to range farming. Commercial egg producers are also required to have in place the National Egg Quality Assurance Program.

PART 6 REFERENCES AND CONTACTS

6.1 References and further reading

a. AUSTRALIAN AND NEW ZEALAND ENVIRONMENT AND CONSERVATION COUNCIL AND AGRICULTURE AND RESOURCE MANAGEMENT COUNCIL OF AUSTRALIA AND NEW ZEALAND *National Water Quality Management Strategy - Australian Guidelines for Water Quality Monitoring and Reporting (2000)*

b. *AUSTRALIAN CHICKEN MEAT FEDERATION INC National Biosecurity Manual for Contract Meat Chicken Farming (2002)*

c. CSIRO *Model Code of Practice for the Welfare of Animals - Domestic Poultry* (current edition)

d. CSIRO *Model Code of Practice for the Welfare of Animals – Land Transport of Poultry* (current edition)

e. DEPARTMENT FOR PLANNING AND INFRASTRUCTURE *Statement of Planning Policy No. 4.3 - Poultry Farms Policy (1998)*

f. DEPARTMENT OF AGRICULTURE *Avian Industries Biosecurity Plan (2002)*

g. DEPARTMENT OF ENVIRONMENT *Draft Guidelines for Storage, processing, recycling of organic wastes (1997)*

h. DEPARTMENT OF ENVIRONMENT *Odour Methodology Guideline (2002)*

i. DEPARTMENT OF ENVIRONMENT – Policies / Position Statements

- *Foreshore Policy No. 1 – Identifying the Foreshore Area*
- *Statewide Policy No. 2 – Pesticide use in Public Drinking Water Source Areas (2000)*
- *Wetland Position Statement*

j. DEPARTMENT OF ENVIRONMENT – Water Notes

- *WN4 - Wetland Buffers*
- *WN 10 – Protecting riparian vegetation*
- *WN 11 - Identifying the riparian zone*
- *WN 23 – Determining foreshore reserves*
- *WN 29 – Long term management of riparian vegetation*

k. DEPARTMENT OF ENVIRONMENT - Water Quality Protection Notes

- *Irrigating vegetated land with nutrient-rich wastewater*
- *Poultry Farms in Public Drinking Water Source Areas*
- *Tanks - above ground chemical storage in Public Drinking Water Source Areas*
- *Toxic and hazardous substance – storage and use*
- *Nutrient and irrigation management plans*
- *Chemical spills - emergency response planning*
- *Pesticide use in sensitive environments*

l. DEPARTMENT OF ENVIRONMENT – Other Useful Information

- Viewing wetland information on the WALIS website <www.walis.wa.gov.au>

m. DEPARTMENT OF LOCAL GOVERNMENT AND REGIONAL DEVELOPMENT *Code of Practice for poultry in Western Australia (current edition)*

n. DEPARTMENT OF LOCAL GOVERNMENT AND REGIONAL DEVELOPMENT *Code of Practice for the transport of poultry in Western Australia (current edition)*

o. DEPARTMENT OF THE ENVIRONMENT AND HERITAGE *Emission Estimation Technique Manual for Intensive Livestock – Poultry Raising (2002).*

p. ENVIRONMENTAL PROTECTION AUTHORITY *Assessment of Odour Impacts on New Proposals (*2002)

q. NATIONAL HEALTH AND MEDICAL RESEARCH COUNCIL AND AGRICULTURE AND RESOURCE MANAGEMENT COUNCIL OF AUSTRALIA AND NEW ZEALAND *Australian Drinking Water Guidelines* (1996)

r. *RURAL INDUSTRIES RESEARCH & DEVELOPMENT CORPORATION Code of Practice for Biosecurity in the Egg Industry (current edition)*

s. WESTERN AUSTRALIAN BROILER GROWERS ASSOCIATION *Farm Model-WA Model (2003)*

t. WESTERN AUSTRALIAN BROILER GROWERS ASSOCIATION *Review of Farm Model (2002)*

6.2 Contacts

Western Australia Broiler Growers Association
Secretary
Chicken Meat Industry Committee
C/- Department of Agriculture
Baron-Hay Court
SOUTH PERTH 6151
Locked Bag 4 Bentley Delivery Centre 6983
Tel: 9368 3333
Fax: 9367 2625
<www.agric.wa.gov.au>

Poultry Farmers Association of Western Australia
John Simpson
President
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Tel: 9457 4893
Fax: 9457 6594

Department of Agriculture
Baron-Hay Court
SOUTH PERTH 6151
Locked Bag 4 Bentley Delivery Centre 6983
Tel: 9368 3333
Fax: 9367 2625
<www.agric.wa.gov.au>

Department of Environment
Water Source Protection Branch
Level 2 Hyatt Centre
3 Plain Street
EAST PERTH WA 6004
Tel: 9278 0300
Fax: 9278 0585
<www.environment.wa.gov.au>

Department of Health
Grace Vaughan House
Stubbs Terrace
SHENTON PARK 6008
Tel: 9388 4999
Fax: 9388 4955
<www.health.wa.gov.au>

Department for Planning and Infrastructure
Albert Facey House
469 Wellington Street
PERTH WA 6100
Tel: 9264 7777
Fax: 9264 7566
<www.dpi.wa.gov.au>

WA Local Government Association
15 Altona Street
WEST PERTH 6005
Tel: 9321 5055
Fax: 9322 2611
<www.walga.asn.au>

WorkSafe
1260 Hay Street
WEST PERTH WA 6005
Tel: 9327 8777
Fax: 9321 8973
<www.worksafe.gov.au>

PART 7 APPENDICES

7.1 Information required for poultry farm proposals

In submitting an initial proposal to a local council (and government agencies if required) the following information should be provided:

a) A brief description of the project, including land area, number and type of vehicle movements and the maximum number of poultry to be held at any time;
b) A plan of the property on which the farm is to be located, showing site access, parking/ loading areas, setbacks from boundaries, shed dimensions, the location of existing facilities and proposed improvements including waste treatment and disposal facilities;
c) A map showing any neighbouring dwellings within 1000 metres of the site, any patches of remnant vegetation, any bores, wells, wetlands (Conservation Category Wetlands or wetlands listed in Environmental Protection Policies), surface water, drains or water courses within 500 metres of the shed or enclosure;
d) A description of land form, soil types and contours (or details of land slope) and (if applicable) groundwater depth, quality and flow direction;
e) Details of on-site drainage, waste and stormwater handling facilities. This should include details of rainfall, evaporation, infiltration and run-off factors. Data is available from the Bureau of Meteorology and *Australian Rainfall and Runoff*, published by the Institution of Engineers Australia;
f) Identification of 1 in 100 year flood level (generally available from Department of Environment), or areas of flood prone land;
g) A Waste Management Plan, detailing waste quantities produced, the method of treatment, recycling and disposal;
h) Details of any land area to be used for waste disposal and a description of the land form; and
i) Identification of any aboriginal archaeological sites or other significant areas.

The information provided does not have to be professionally drafted, but must be clear, unambiguous and provide an understanding of the proposed treatment and control methods.

Proposals to establish or expand an existing poultry farm in sensitive environments will require additional information. This information ensures that all aspects of nutrient and waste management are considered. Some recognised sensitive environments include:

- Waterway systems protected by the *Waterways Conservation Act 1976*, e.g. the Avon River, Peel-Harvey and Swan-Canning catchments;
- Lakes and wetlands subject to policy protection under the *Environmental Protection Act 1986* e.g. the Yalgorup Lakes catchment, incorporating Lakes Clifton and Preston, the Peel Inlet - Harvey Estuary Environmental Protection Policy area;
- Public and private drinking water sources;
- Wetlands with recognised conservation values; and
- Waterways with significant ecological, commercial or recreational value.

Other generic environments regarded as sensitive:

- Land subject to seasonal flooding; and
- Locations with buffer distances less than those shown in Table 1.

7.2 Regulations and licences

Table 3 Regulations and licences

What's regulated	Statute	Regulatory agency
Farm model and activities	• *Chicken Meat Industry Act, 1977*	• Chicken Meat Industry Committee
Supply and demands of eggs within the State	• *Marketing of Eggs Act, 1945*	• Western Australian Egg Marketing Board, T/A Golden Egg Farms
Subdivision of land	• *Town Planning and Development Act, 1928*	• WA Planning Commission • Dept for Planning and Infrastructure
Land zoning and development approval	• *Town Planning and Development Act, 1928*	• Local Government • Dept for Planning and Infrastructure
Impact on the values and ecology of land or natural waters Odour emissions	• *Environmental Protection Act, 1986*	• Environmental Protection Authority • Department of Environment
Noise emissions	• *Environmental Protection (Noise) Regulations, 1997*	• Department of Environment
NPI substance emissions, i.e. ammonia	• *Environmental Protection (NEPM-NPI) Regulations, 1998*	• Department of Environment – NPI
Licence to take surface water and groundwater	• *Rights in Water and Irrigation Act, 1914*	• Department of Environment – Regional offices
Development in Public Drinking Water Source Areas	• *Metropolitan Water Supply, Sewerage and Drainage (MWSS & D) Act, 1909 or* • *Country Areas Water Supply (CAWS) Act, 1947*	
Approval for developments that may affect the Swan – Canning estuary	• *Swan River Trust Act, 1988*	Swan River Trust
Storage of fuels, solvent, explosive and dangerous goods	• *Explosive and Dangerous Goods Act, 1961*	Department of Industry and Resources
Registration of offensive trades; handling of poultry manure	• *Health Act, 1911 (as amended)*	Local Government (Council)
Use, storage, handling and disposal of pesticides	• *Health (Pesticides) Regulations, 1956*	Department of Health
Sale, supply and use of poultry manure	• *Health (Poultry Manure) Regulations, 2001*	Department of Health
Transport load size and containment	• *Road Traffic Act, 1994*	Western Australia Police Service
Safety in the workplace	• *Occupational Safety and Health Act, 1984*	Worksafe
Eradication, control and prevention of disease	• *Exotic Diseases of Animals Act, 1993*	Chief Veterinarian, Department of Agriculture

7.3 Water quality monitoring

Surface water (and occasionally sediment) samples may be collected from waterways or wetlands. It is usually necessary to take water samples upstream and downstream of sites where contaminants could be entering the waterway. Groundwater samples are normally taken from water supply wells or specially constructed monitoring bores**.**

A typical **six monthly** water quality monitoring program for waters in the environment may include:

a. Water level or flow rate and environmental conditions e.g. weather conditions at the time of sampling;
b. Physical parameters e.g. pH, electrical conductivity, temperature and turbidity;
c. Chemical parameters e.g. N as ammonia, N as nitrate, phosphorus, surfactants, and chemicals routinely used on the farm; and
d. Microbiological indicators e.g thermo-tolerant coliforms.

Further advice on water monitoring is contained in *the National Water Quality Management Strategy - Australian Guidelines for Water Quality Monitoring and Reporting* 2000. Copies may be obtained via the library service or Commonwealth government bookshops.

Monitoring records should be kept for a minimum of two years for inspection or reporting to government agencies.

7.4 Land application of poultry manure and litter

The *Health (Poultry Manure) Regulations 2001* impose restrictions over the sale, supply and use of poultry manure, particularly during the warmer (summer) months. The Regulations were introduced as part of a strategy to control the breeding of stable flies and other nuisance flies associated with the end use of the manure. The Regulations only apply to 13 local government districts. The main districts are situated along the Swan Coastal Plain and bordering Perth.

Traditional Perth end users of poultry manure (market gardeners) are no longer permitted to obtain or use raw poultry manure for crop production between the months of 1st September to 30th April each year.

Where poultry litter or manure (composted or non-composted) is used as a soil conditioner, the location and application rates need to be carefully considered to avoid contaminants leaching into groundwater or waterways.

Application of poultry manure or litter to land should not occur in the following situations:

- In Priority 1 or 2 Public Drinking Water Source Areas or Wellhead Protection Zones;
- Within 50 metres of any private water supply bore or in-ground reservoir,
- Within at least 50 metres of the outside edge of a wetland/waterway's fringing vegetation (dependent on adequacy of fringing vegetation);
- Within 200m of a Conservation Category Wetland or wetland/waterway listed on any Environmental Protection Policy.
- Land susceptible to flooding or where the water table may rise to within two metres of the surface;
- Where the topography or soil factors may cause stormwater run-off to flush contaminants into surface waters; and
- Spread on land between poultry sheds or on land within the recommended buffer to another owner's poultry sheds.

Composted poultry litter and manure applications should not significantly exceed the seasonal nutrient uptake needs of vegetation at the site of application. Information on this topic is provided in the Department of Environment's Water Quality Protection Notes -*Nutrient and irrigation management plans* and *Irrigating vegetated land with nutrient-rich wastewater.* To obtain a copy, refer to the Internet site <www.environment.wa.gov.au> or contact the Communications Branch at the Department.

Table 4 Indicative characteristics of poultry manure and litter

Parameter	Layer shed-caged (manure only)		Layer shed –barn/ free to range litter		Broiler sheds litter		Comments
	Range	Average	Range	Average	Range	Average	
Production rate/ bird /week (unless noted) (70-80% moisture when fresh)	0.6 - 1.1kg	1kg	0.95 - 1.5kg	1.3 kg	0.95 - 1.1kg (as mature bird)	#4 kg	#over 6-7 weeks growing
Moisture content (% of solids)	7 - 46	30	22 - 29	25	10 - 60	25	At shed cleanout
Dry solids production (grams/bird/week)	ID	300	ID	400	ID	450	
Dry density (kilograms/ cubic metre)	ID	550	320 - 600	550	500 - 650	550	At ~25% moisture content
pH	ID	8.0	ID	8.0	6.0 - 8.8	8.1	Mildly alkaline
Ash (kg/ cubic metre)	ID	ID	ID	ID	ID	16	
Salt (kg/cubic metre)	ID	ID	ID	ID	ID	2.2	Salt from feed, not water
Concentrations expressed as a % of dry solids (residue after moisture removed)							
Calcium (Ca)	3.6 - 6.0%	3.9%	0.1 - 1.7%	1.4%	1.7 - 3.7%	2.5%	
Carbon (as organic C)	ID	29%	ID	38%	28 - 40%	36%	
Chloride (Cl)	ID	2.4%	ID	1.3%	0.5 – 1.5	1.0%	
Iron (Fe)	0.1 - 0.56%	0.3%	0.53 - 1%	0.8%	0.06 - 0.6%	0.2%	
Magnesium (Mg)	0.2 - 0.7%	0.5%	0.1 - 0.4%	0.3%	0.35 - 0.8%	0.5%	
Nitrogen (total N)	1.3 - 7.2%	4.6%	1.7 - 6.8%	4.1%	1.3 - 8.4%	2.6%	
Nitrogen as ammonia (N-NH_4)	0.2 - 3.0%	1.4%	0.01 - 2.0%	0.3%	ID	0.5%	
Phosphorus (P)	0.5 - 3.4%	2%	0.8 - 2.6%	1.4%	1.2 - 2.8%	1.8%	
Potassium (K)	1.2 - 3.2%	2.1%	1.3 - 4.6%	2.1%	0.9 - 2.0%	1 %	
Trace elements (expressed as parts per thousand or kg/tonne in dry solids)							
Arsenic (As)	ID	0.03	ID	ID	ID	ID	
Boron (B)	ID	0.02	ID	ID	0.02 - 0.06	0.03	
Copper (Cu)	ID	0.02	ID	ID	0.01 - 0.2	0. 2	
Manganese (Mn)	0.26 - 0.38	0.3	0.17 - 0.32	0.27	0.02 – 0.5	0.3	
Molybdenum (Mo)	ID	ID	ID	ID	0.001 – 0.01	0.005	
Selenium (Se)	ID	ID	ID	ID	4.7 - 20	12	
Sodium (Na)	2 - 7.4	4.2	0.7 - 5.3	3.3	0.4 - 6.5	3	
Sulphur (S)	ID	4	ID	ID	4.5 - 7.5	6	
Zinc (Zn)	ID	0.35	ID	ID	0.09-0.6	0.3	

Notes:
1. The composition of poultry manure varies with the type of bird, the feed ration, the proportion of litter to droppings, the manure handling system and the type of litter. All manures should be sampled and analysed for specific content before being applied to the land. Feed conversion to bird weight gain ratio is reported to be about 1.8 to 1.
2. Nitrogen figures assume approximately 25% loss of N as ammonia gas to atmosphere.
3. Absorbent material e.g. sawdust, wood shavings or absorbent soil granules used as bedding is often incorporated with manure to create poultry litter. The blended material changes the characteristics of the manure. Poultry litter often contains 25-50% sawdust (mainly as organic carbon).
4. Data sources (desktop search only): DPI Qld, Griffiths (2003), Edwards and Daniel (1992), Hawson (AgWA), O'Malley (AGWA), L Turner & J. Stevens.
5. **ID** denotes insufficient data.

Example calculation for application of chicken manure to land

Background

Fred's farm has 25 cubic metres of dry layer-shed litter to be applied to a strawberry farm. The manure has been stored for 6 months and is considered stable. How much land is required to meet crop nutrient needs and avoid a harm to the environment?

Manure data

From Table 4, the following data on the quality of manure:

- Dry manure weighs 550 kg/cubic metre, hence 25 cubic metres =13,750 kilograms

Nutrient content	Nitrogen (N)	Phosphorus (P)	Potassium (K)
% of dry solids	4.1	1.4	2.1
Nutrient load in manure	564kg	192kg	289kg

Manure application site

The site is an irrigated strawberry farm on the Swan Coastal Plain located at Gingin on leached yellow sand. Groundwater has pH of 7.5, salinity of 100 mg/ litre & no significant toxins. It is therefore suited to most types of water use, including horticulture. The surrounding area is rural land used for mixed grazing and intensive horticulture. Strawberries have been grown at this site for more than ten years and a 400 millimetre deep layer of humus-rich topsoil has built up. Iron oxide-rich industrial residue was added to the soil at 20 tonnes/ hectare two years ago to build up the P retention of the soil. The phosphorus retention index of the topsoil has been measured at 60, hence the soil is capable of holding P without leaching. Soil testing has shown 15 kg of N, 10 kg of P and 2 kg of K / hectare is presently available in topsoil on site. Groundwater rises to 2 metres below the surface at the end of winter. No other sources of nutrients e.g. farm animals, are held on the property.

Two hundred metres to the west of the farm is a conservation category wetland, as defined by the Department of Environment as a result of research into its ecology. The wetland is replenished by groundwater flow to the west.

Nutrient budget assessment

Strawberry growing requires the application of fertiliser which is described in the Department of Agriculture's Farm-note: *Strawberry growing in WA*. For crop maintenance, the following plant-available nutrients along with trace elements are needed **each month** over the warm weather growing season:

N =55 kg/ hectare; P= 60 kg/ hectare; and K =87 kg/ hectare

How much manure can be applied without harming the environment?

An analysis of the farm water supply indicates that the groundwater drawn from a well from the watertable contains 12 mg/ litre of N as nitrate and ammonia, 2 mg/ litre of P (as ortho-phosphate) and 1 mg/ litre of potassium (K). The water is irrigated over the summer months at a rate 2000 kL / hectare / month.

This means during the summer period, October to April:

N is being applied in irrigation water at 12 g/ kL =12 x 2,000 = 24 kg / hectare/ month,
P is being applied in irrigation water at 2 g/ kL = 2 x 2,000 = 4 kg / hectare/ month,
K is being applied in irrigation water at 1 g/ kL = 1 x 2,000 = 2 kg / hectare/ month.
The poultry manure will be applied in late March, hence irrigation water contributes nutrients to the crop. From the Water Quality Protection Note: *Irrigating vegetated land with nutrient rich wastewater* the site is category **C,** i.e. loam soil draining to waters with a significant eutrophication risk (the wetland).

The porous sandy soils will freely leach nutrients not taken up by plants. Excess nutrients entering groundwater could harm the ecology of the wetland which operates in a low nutrient environment.

The maximum recommended application rate from table 2 in the water quality protection note is: N = 300 kg / hectare / year and P = 50 kg / hectare/ year.
(If the soils were not amended, vulnerability category **A** would have applied at the site and much lower levels of nutrients would have been acceptable.)

K is not an environmental concern as long as the salinity of groundwater is low (i.e. less than 500 mg/ litre).

The **April** nutrient budget for the crop is as follows:

Description	N / hectare	P / hectare	K / hectare	Comments
In top soil	15 kg	10kg	2kg	(a)
Irrigation water	24kg	4kg	2kg	(b)
Crop requirement	55 kg	0 kg	87kg	(c)
Fertiliser deficit	16 kg	Nil	83kg	= (c) – (a) –(b)

From the above table, the N requirement will govern the manure application rate. Assuming 30% loss of N as ammonia to the atmosphere, the calculation for poultry manure application is as follows:

$$\text{No of hectares} = \frac{\text{N Load x \% available}}{\text{N deficit /ha}} = \frac{564\text{kg} \times 0.7}{16} = \textbf{24 hectares.}$$

The poultry manure will supply $\frac{289\text{ kg}}{24\text{ha}} = 11.6$ kg /ha of K. The balance of the deficit
i.e. ~70 kg / hectare may need to be met by application of potassium sulphate (35% K) at 200 kg/ hectare.

The crop P need is met at establishment in December and by further NPK application in June.

Assuming N is applied at 46 kg / hectare pre-planting in early December, then at 55 kg / hectare for 6 months =330kg, the total N applied =376 kg / hectare / year. This exceeds the recommended annual N application rate of 300 kg / hectare / year for wetland protection. Careful monitoring of crop topsoil moisture to minimise leaching may be required in addition to a monitoring bore on the western boundary of the property to assess groundwater quality flowing towards the wetland.

7.5 Visitors and Complaints logbook

Table 5 Visitors and Complaints logbook

The purpose of the logbook is to ensure there is a traceback in the case of an exotic outbreak and to ensure that all complaints against the farm are monitored and logged.

Date/time	Visitor's / Complainant's details	Comment / Concern	Relationship to farm activity	Response (if required)	Comment
e.g. 16/08/03 2.30pm	Bill Jones (neighbour) of lot 34 Piper Road Pinjar phoned	Odour from shed	Shed clean-out in progress	Reassured Bill that problem transient during shed clean, odour should not be noticeable by tonight	Bill seemed reassured

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