

**LEVEL 1 ODOUR IMPACT ASSESSMENT FOR  
DEVELOPMENT OF ORAN PARK PRECINCT,  
ORAN PARK, NSW**

**Prepared for:** Growth Centres Commission

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*Engineering a Sustainable Future for Our Environment*

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## EXECUTIVE SUMMARY

This odour impact assessment was conducted to determine the potential for odour impacts on the intended development of the area known as the *Oran Park Precinct*, located within the Camden local government area.

Plans for the precinct would see it developed into an urban community consisting of approximately 8,500 residences, business zones, and facilities such as schools, shopping centres, and sports grounds.

The current rural nature of the precinct means that there is a possibility of existing land uses conflicting with the planned future uses of the precinct with nuisance odour impacts. Potential odour sources located within the precinct and near the perimeter of the precinct were identified as being poultry farms and cattle farms.

Assessment was made of the potential odour sources by visiting these sites and applying the techniques described in the NSW DEC Technical Notes "Assessment and management of odour from stationary sources in NSW" (November 2006). A Level 1 odour impact assessment was conducted.

It was determined that the cattle farms were not an intensive variety and so generated minimal to no perceptible odour. Two poultry farms approximately 500 metres east of the Precinct however were found to possess the potential to affect a large portion of the land intended for residential development within the Precinct.

It is recommended that a further study be conducted to verify if there is indeed a risk of odour impacts within the Precinct from poultry odour sources and the extent of the land that may be affected.



## **1. INTRODUCTION**

Benbow Environmental (BE) were commissioned by the Growth Centres Commission (GCC) to prepare a Level 1 odour impact assessment based on the intended development of the area known as the Oran Park Precinct, located within the Camden local government area.

The precinct currently contains Oran Park Raceway and a combined primary and secondary school. The majority of the land is undeveloped though and used for rural activities. As most of the land is held by two major land owners, there are only (approximately) four residences inside the precinct boundary in addition to a residence on one of the major properties. There are also several sites located within the precinct and near the precinct which have the potential to generate nuisance odour. These include cattle on the two major properties within the precinct, and poultry farms and a turkey farm near to but outside of the precinct.

This assessment has considered the potential odour impacts that could arise as a result of urban development within buffer zones around odour sources, to the degree of a Level 1 odour impact assessment. The assessment has been carried out in accordance with the NSW DEC Technical Framework document, "Assessment and management of odour from stationary sources in NSW" (November 2006), and the associated Technical Notes.

### **1.1 SCOPE**

This odour impact assessment has been prepared according to the following scope:

- a) Investigate potential sources of odour that may impact on future development, with sources including existing agricultural activities on the subject land and nearby lands;
- b) Complete a Level 1 odour impact assessment in accordance with the NSW DEC Technical Framework document "Assessment and management of odour from stationary sources in NSW" and the associated Technical Notes;
- c) Determine preliminary separation distances (buffer zones) that would be required between odour sources and urban developments;
- d) Prepare a report outlining the findings of the odour impact assessment, including indications of where urban development may encroach on the determined buffer zones; and
- e) Make recommendations for further investigations, if required.



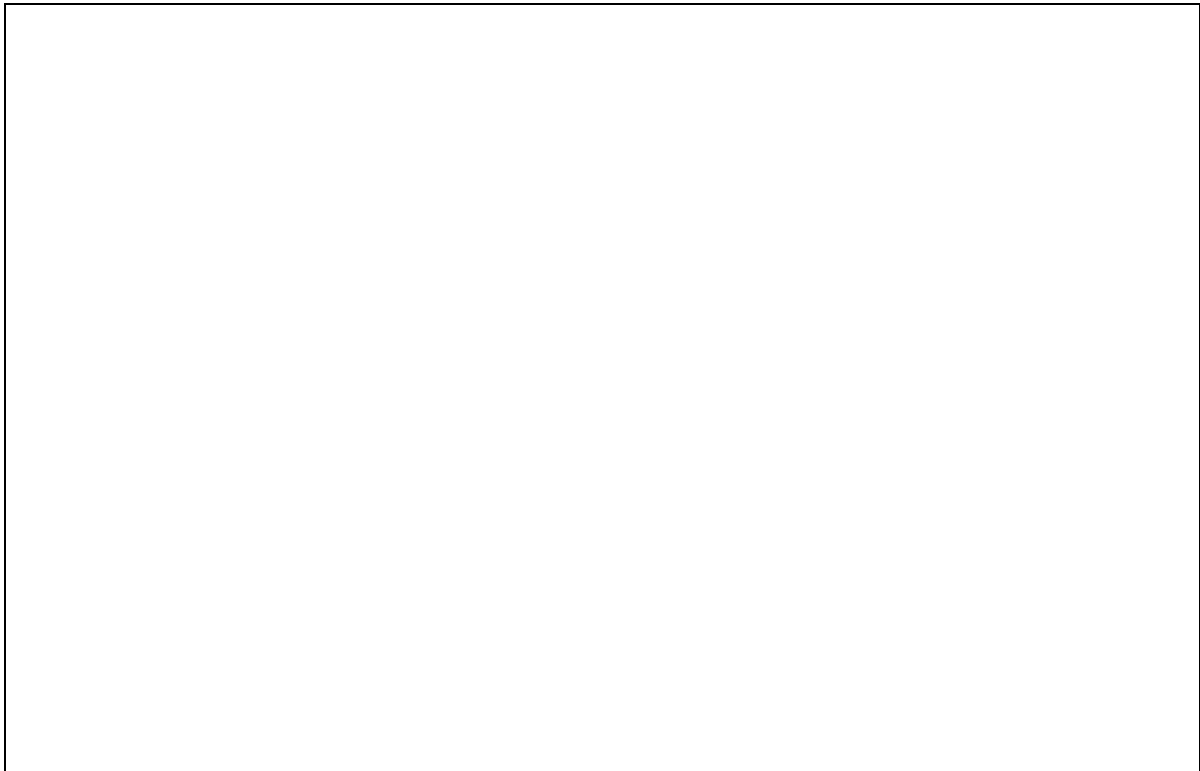
## 2. SITE PROFILE

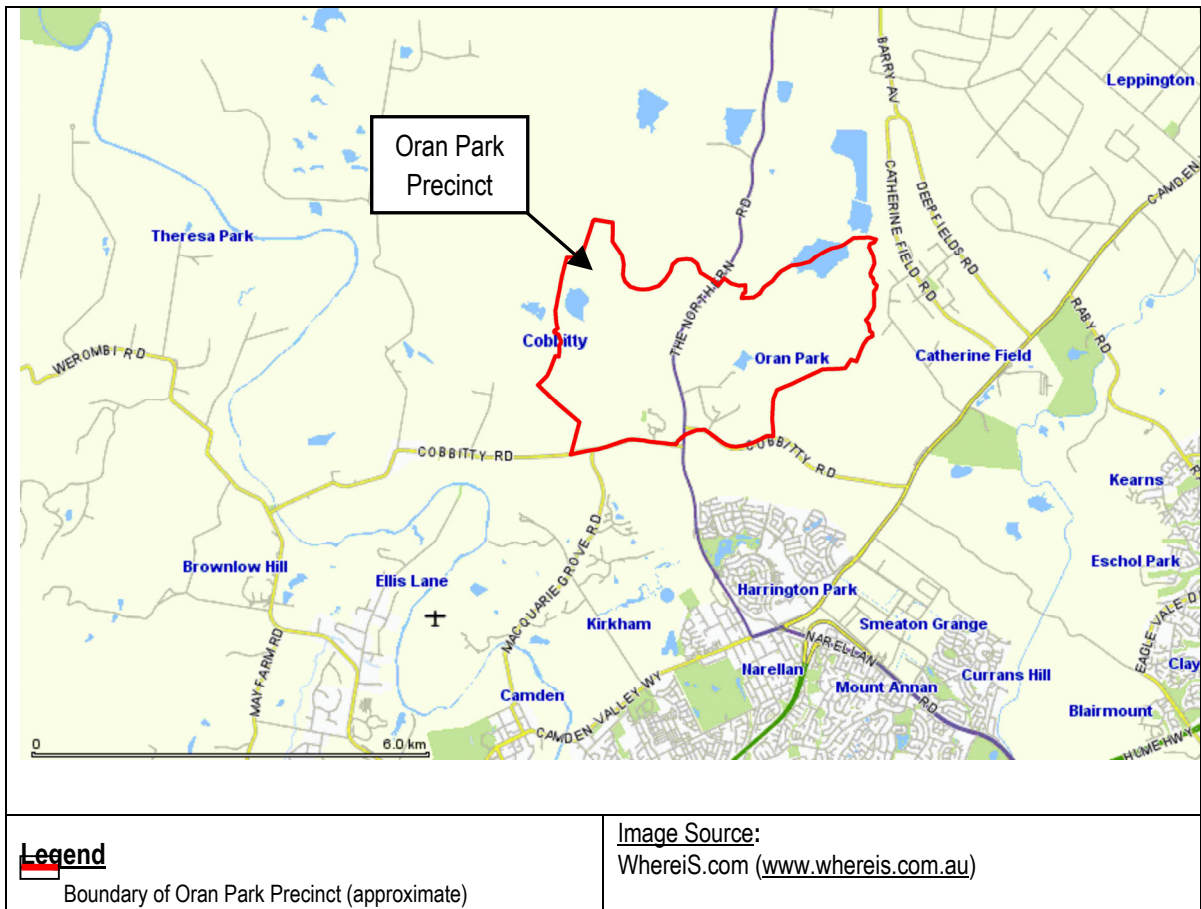
The following sections identify the subject site and provide a description of the subject site and surrounding lands.

### 2.1 SITE LOCATION

The Oran Park Precinct is located within the local government area of Camden, north of the Camden township centre. The Precinct is bounded by Cobbitty Road to the south, whilst natural geographical features (e.g. creeks) and property boundary lines form the remaining perimeter of the Precinct. Figure 2-1, below, shows the location of the Precinct in its regional context.

Figure 2-1: Regional location of subject area









## 2.2 SITE DESCRIPTION AND LAYOUT

The Oran Park Precinct is divided by The Northern Road running through the middle of it. Each side of The Northern Road has one major land holding along with several smaller land holdings. Macarthur Anglican School is located on the western side of the Northern Road next to the Precinct's southern boundary. A couple of residences are also located near the school. The major property is used for agricultural purposes, specifically the grazing of cattle.

The major property in the eastern half of the Oran Park Precinct features Oran Park Raceway. The land surrounding the Raceway is also used for the grazing of cattle. Several minor land holdings are clustered on the eastern side of the Precinct. Some of these properties extend over the Precinct boundary, however they are split by South Creek, on which the Precinct boundary is based in that part of the Precinct.

The Oran Park Precinct is presented in its local context in Figure 2-2 at the end of section 2.3.

## 2.3 ADJACENT LAND USE

The land surrounding the Precinct is predominantly used for agricultural purposes, mostly grazing activities. Catherine Field, located to the east of the Precinct (see Figure 2-1), contains a slightly higher density population than the rest of the land bordering the Precinct. There are also two poultry farms within Catherine Field near to the Precinct, approximately 500 metres from the Precinct's eastern boundary.

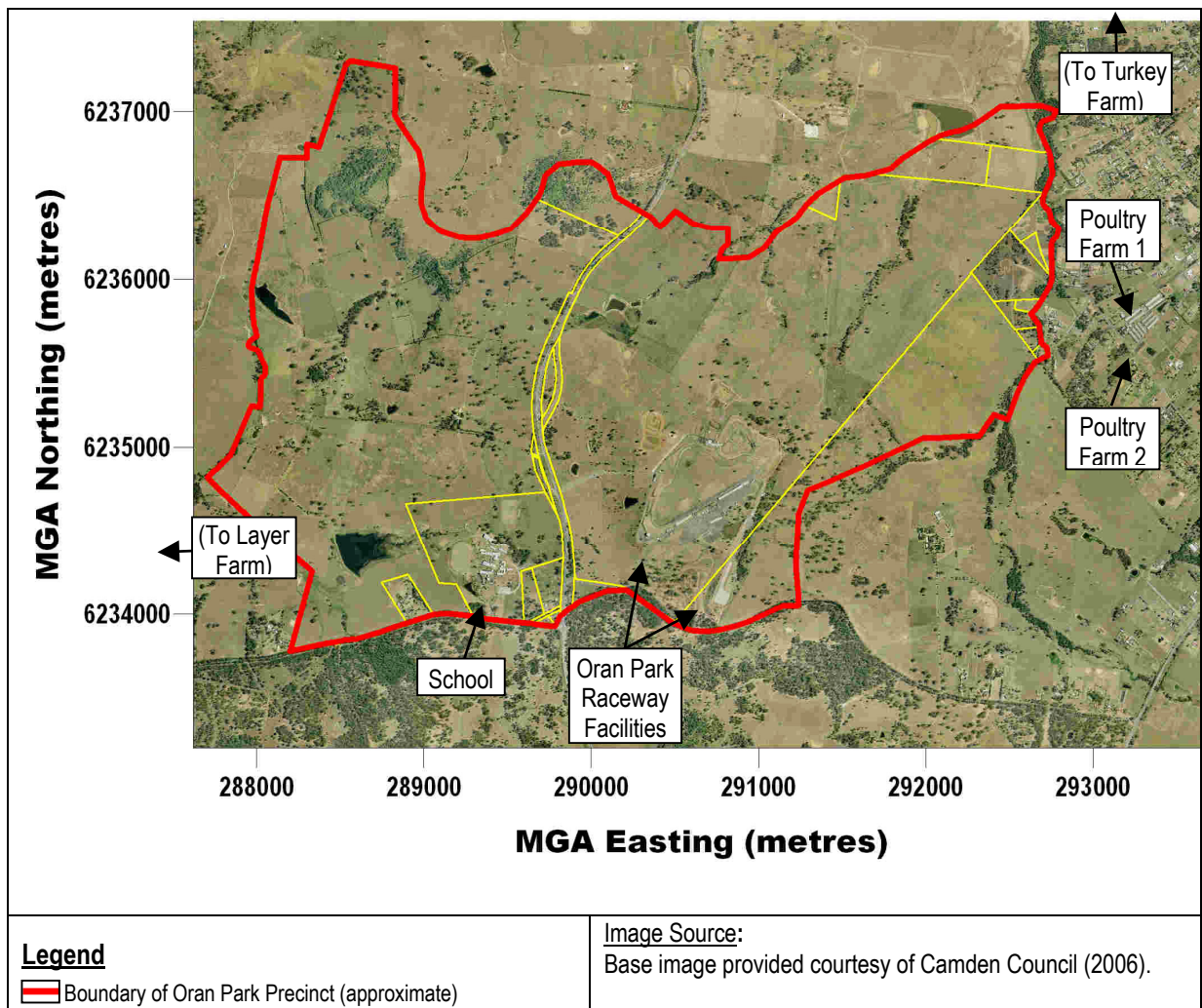
Other bird-farming activities noted in the vicinity of the Precinct are a turkey farm approximately 1 kilometre north of the Precinct and an egg layer farm approximately 2.3 kilometres west of the Precinct.

Figure 2-2 shows the Precinct in a local context, with some of the noted features of the area indicated.



Figure 2-2: Site Location – Local Context







### 3. RELEVANT LEGISLATION & GUIDELINES

The *Protection of the Environment Operation Act 1997* is a key piece of legislation in the regulation of odour. It is an offence under Section 124 of the Act to allow air pollution, including odour, to be caused due to poor maintenance or operation of a plant. Section 125 of the Act provides that the maintenance of a plant is no excuse for allowing air pollution to be released, while Section 126 requires that materials be handled in such a way so as to prevent the release of air pollution. Section 128 requires that certain air pollutants, including odour, be minimised or prevented by employing best management practices.

In cases where odour affects the comfort of others as a public nuisance, local government have the power under Section 125 of the *Local Government Act 1993* to require an odour generator to minimise odour from their premises.

All of these provisions seek to keep existing odour sources operating in harmony with their surrounding environment. However when an odour source is proposed and does not yet exist, assessments must be made based on data and past experience with odour sources elsewhere to determine if the proposed source will cause odour nuisance or not. The relevant document to refer to in assessing and managing odour sources in NSW is the document, "Technical Framework – Assessment and management of odour from stationary sources in NSW" (November 2006), and the associated Technical Notes (November 2006), both produced by the NSW Department of Environment and Conservation (NSW DEC). Although these documents are in fact guidelines and not regulatory tools, regulatory bodies will often require that an existing or proposed odour source be assessed according to the methods contained within.

The Technical Framework & Notes describe three levels of assessing odour, with the level of detail increasing with the level of assessment. The most basic assessment is a Level 1 assessment, which is the basis of this report. Level 1 odour assessments are used as a screening phase, where generic values and basic details about an odour source allow the extent of odour impacts to be estimated. The outcome of the assessment indicates either that odour impacts would be generally acceptable, or else that odour impacts may be unacceptable and thus a more detailed study is required to determine if that is the case. Whilst Level 1 assessments are normally used for proposed odour sources as opposed to existing sources, the conservative techniques employed lend themselves as assessment tools for existing sources in providing the possibility of a low cost, timely assessment.

In conducting a Level 1 odour assessment, the Technical Notes provide a conservative means of estimating either the separation distance required from an odour source(s), or the level of activity that an odour source may operate at - e.g. the number of animals allowed for a intensive animal farming source. These guidance figures are calculated by considering several factors applicable to odour generation and dispersion, namely:

- Type of odour - i.e. either a single odorous pollutant or a complex mixture of odorous pollutants;
- Quantity of odour;
- Management practices;
- Presence of vegetation near the source;



- Shape of the terrain surrounding the source;
- Influence of buildings;
- Meteorology; and
- Neighbouring odour sources leading to cumulative impacts.

Different types of odour sources will use different combinations of these factors. The specific method used to determine odour impacts is discussed in Section 4.3 of this report.



## 4. ODOUR IMPACT ASSESSMENT

### 4.1 METHODOLOGY

In order to determine the potential for odour impacts inside the Oran Park Precinct, a study was made of aerial photos and maps of the Precinct and surrounding lands. At that stage sites were either determined to be odour sources requiring further attention, identified as potential odour sources requiring confirmation, or else disregarded as non-odour generating sites.

Several visits were made to the subject area to obtain information from odour source operators, confirm the existence of suspected odour sources, verify that all odour sources had been identified, and gather information on the character of the area. Some information about suspected sites was also obtained by contacting owners and operators by telephone.

Throughout the period that the study was conducted, representatives of Benbow Environmental attended meetings organised by the Growth Centres Commission in order to gain a greater understanding of the plans for the Oran Park Precinct.

The information gathered from various sources was used to calculate the area(s) of potential odour impact and develop a set of recommendations for odour management and further investigations.

### 4.2 METEOROLOGY

In determining the possible odour impacts on the subject land, attention has been given to the meteorological conditions that the region of interest is subject to, as it is ultimately the meteorology that determines the extent and distribution of impacts. Meteorology comes into play in various ways, with variables such as dominant wind directions controlling which off-site receptors may experience exposure to odour, and at what frequency, whilst wind speed affects how well odour is mixed and dispersed in the atmosphere.

The closest weather monitoring station to the Oran Park Precinct is the station operated by the Bureau of Meteorology (BoM) at Camden Airport, approximately 3 kilometres south-west of the Precinct's south-western perimeter. Wind data was referenced from this station, with data covering the period from January 2001 to February 2006, approximately 5 years of data.

Table 4-1 shows the wind rose plots for different times of the day and year to illustrate how wind trends vary for the area. The first figure in the table gives an average profile of wind over a year. It is seen that southerly winds are dominant with an occurrence frequency of approximately 10%. Winds with a southerly component (e.g. south-westerly and east westerly winds) have a strong presence throughout the year. After southerly winds, the next largest individual direction is easterly winds with an occurrence frequency of approximately 7%. Winds are least to come from north-westerly directions (i.e. north-west-west through north-north-west).



The second figure in Table 4-1 shows that in the early hours of the morning, on average, winds are most likely to come from southerly directions, similar to the year-round pattern but with minimal winds from northerly directions.

The third figure shows that during the day there are strong contributions from northerly and north-north-easterly winds, having a combined occurrence frequency of approximately 20%. Winds from the south and south-easterly directions are also prominent, whilst winds from north-westerly directions are still minor.

The fourth image shows that in the afternoon into the late evening winds from the south, east, and north-east-east are all prominent with each having an occurrence frequency greater than 9%. Winds from the south-east tend to feature most in the later hours of the day, followed by winds from the south-west, whilst winds from the north-west maintain a trend of insignificance.

During the day winds are at their strongest, with an average wind speed of 3.8 m.s<sup>-1</sup> topping the annual average of 2.7 m.s<sup>-1</sup>. As the day cools off winds weaken in the evening and are at their weakest in the early hours of the morning where there is the greatest occurrence of calm periods.

Seasonally, wind pattern variations are much more pronounced. During summer winds from the north-east-east through south are prominent, whilst winds from the south-west and north-west are minor.

Autumn is the season with the wind patterns closest to those of the yearly average. Southerly winds are dominant, with an occurrence frequency above 12%. Winds with a southerly component are featured the most during Autumn, whilst winds from the north-west are virtually the same as in Summer.

North-west-westerly winds are dominant during Winter, with an occurrence frequency of approximately 9%, followed closely by southerly, westerly, and northerly winds. Winds from the south-west are a strong feature of the season, followed by winds from the south-east.

Southerly winds are dominant in Spring, with an occurrence frequency of approximately 9%. Apart from this, winds from the north-east, south-east, and south-west are on average equal in their presence.

Winds in Spring are the strongest of the season, with an average wind speed of 3 m.s<sup>-1</sup>, closely followed by Summer with an average of 2.9 m.s<sup>-1</sup>. Autumn has the lowest average wind speed of 2.3 m.s<sup>-1</sup>.

#### **4.2.1 Wind Rose Plots**

Wind rose plots show the direction from which the wind is coming with triangles known as “petals”. The petals of the plots in the figure summarise wind direction data into 16 compass directions ie. north, north-north-east, north-east, etc.



The length of the triangles, or “petals”, indicates the frequency that the wind blows from the direction presented. Longer petals for a given direction indicate a higher frequency of wind from that direction. Each petal is divided into segments, with each segment representing one of the six wind speed classes. Thus, the segments of a petal show what proportion of wind for a given direction falls into each class. The proportion of time for which wind speed is less than speeds in the first class (i.e.  $0.5 \text{ m.s}^{-1}$ ), when speed is negligible, is referred to as calm hours or “calms”. Calms are not shown on a wind rose as they have no direction, but the proportion of time that they make up for the period under consideration is noted under each wind rose.

The concentric circles in each wind rose are the axis which denote frequencies. In comparing the plots it should be noted that the axis varies between wind roses, although all wind roses are the same size. The frequencies denoted on the axis of each wind rose are indicated beneath the wind rose.





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**Level 1 Odour Impact Assessment for Development of Oran Park Precinct**

Table 4-1: Camden Airport Wind Rose Plots for 2001 (Jan) – 2006 (Feb)

All Seasons/Times	12am-8am	8am-4pm	4pm-12am	Legend
				<p><b>WIND SPEED (m/s)</b></p> <ul style="list-style-type: none"> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: purple; border: 1px solid black; margin-right: 5px;"></span> <math>\geq 11.1</math></li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: blue; border: 1px solid black; margin-right: 5px;"></span> 8.8 - 11.1</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: teal; border: 1px solid black; margin-right: 5px;"></span> 5.7 - 8.8</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: yellow; border: 1px solid black; margin-right: 5px;"></span> 3.6 - 5.7</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: orange; border: 1px solid black; margin-right: 5px;"></span> 2.1 - 3.6</li> <li><span style="display: inline-block; width: 15px; height: 15px; background-color: red; border: 1px solid black; margin-right: 5px;"></span> 0.5 - 2.1</li> </ul>
<p>Ave. wind speed: 2.69 m.s<sup>-1</sup>            Calms: 14.39%            Axis Frequencies: 3%, 6%, 9%, 12%, 15%</p>	<p>Ave. wind speed: 1.44 m.s<sup>-1</sup>            Calms: 29.11%            Axis Frequencies: 3%, 6%, 9%, 12%, 15%</p>	<p>Ave. wind speed: 3.79 m.s<sup>-1</sup>            Calms: 3.32%            Axis Frequencies: 3%, 6%, 9%, 12%, 15%</p>	<p>Ave. wind speed: 2.83 m.s<sup>-1</sup>            Calms: 10.72%            Axis Frequencies: 2%, 4%, 6%, 8%, 10%</p>	
Summer	Autumn	Winter	Spring	



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Ave. wind speed: 2.89 m.s <sup>-1</sup> Calms: 12.38% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 2.31 m.s <sup>-1</sup> Calms: 16.84% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 2.53 m.s <sup>-1</sup> Calms: 16.41% Axis Frequencies: 2%, 4%, 6%, 8%, 10%	Ave. wind speed: 3.01 m.s <sup>-1</sup> Calms: 12.05% Axis Frequencies: 2%, 4%, 6%, 8%, 10%	
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### 4.3 IDENTIFICATION AND ASSESSMENT OF ODOUR SOURCES

There are a number of potential odour sources in the areas surrounding the Oran Park Precinct, however most of these are sufficiently distant from the Precinct to be considered of no consequence to development within the Precinct. In the assessment of odour sources in proximity to the Precinct attention has been given to two poultry farms, located side-by-side, approximately 500 metres from the eastern boundary of the Precinct.

Whilst there are other activities and operations conducted in the vicinity of the Precinct that could be considered to be odour sources, such as the use of manure-based fertilisers on market gardens and cattle grazing, those sources are infrequent and/or weak in their generation of odour. As a result of their nature, no formal method has been devised by the NSW DEC to assess those sources. Assessment is not usually necessary however, as odour produced by such sources can be minimised through management practices or else is deemed weak enough to not cause annoyance to adjacent residences.

It should be noted that whilst development of the precinct will see common agricultural odour sources leave the precinct when their sites are redeveloped, there is opportunity for new odour sources to be introduced in the form of non-agricultural businesses. These could be takeaway food shops (e.g. charcoal chicken shops) or businesses in general that produce wastes with the potential for odour generation (e.g. skip bins at the back of premises). Recommendations regarding this issue are presented in Section 6.4.

#### 4.3.1 Assessment of Poultry Farms

Section 5 of the Technical Notes accompanying the Technical Framework for the assessment of odour provides the following equation for the calculation of the separation distance between a poultry farm and residential area:

$$D = (N)^{0.71} \times S \quad (\text{eq. 1})$$

where: D – separation distance (metres)

N – Number of standard broiler chicken shed units (SBSCU), equivalent to 22,000 birds

S – Composite site factor, calculated as  $S = S1 \times S2 \times S3 \times S4 \times S5$ , where S1 is a Shed factor, S2 is a Receptor factor, S3 is a Terrain factor, S4 is a Vegetation factor, and S5 is a Wind frequency factor.

The selection of the values for each of the factors and the calculation of the separation distance is discussed in the following sub-sections.

##### 4.3.1.1 Odour Source 1 - Poultry Farm, 150-154 Springfield Road, Catherine Field

The farm at 150-154 Springfield Road (see Figure 5-1) consists of 4 sheds housing a total of 85,000 broiler chickens, which corresponds to 3.86 standard broiler chicken shed units (SBSCU). The sheds are of the naturally ventilated type, giving it a Shed factor, S1, of 690.



Apart from odour emitted from the sheds, generated by the birds and the manure, there are no other odour sources on the site. At the end of a batch, the litter is removed from the sheds and taken off-site in the same day. There are no formal technical controls in place to reduce odour, such as bio-filters or short-stacks.

A value of 0.75 has been chosen for the Receptor factor, S2. This value is based on an impact area containing a population of 500-2000 people. Although the Oran Park Precinct will have a capacity for up to 8,500 people, this population will be spread over a wide area, and thus only the population near to the farm needs to be considered.

The farm is located on a hill with a gentle slope falling in the south-west direction. The terrain is virtually flat between the farm and the Precinct boundary; thus a Terrain factor, S3, of 1.0 has been assigned.

The surrounding land has been cleared for residences and light agricultural use, thus there is no significant vegetation in the way of trees or long grass to assist in the dispersion of odour. Given this it would be appropriate to use a value of 1.0 for the Vegetation factor, S4. It is however noted that there is a line of trees between the poultry farm and the Precinct, which could justify reducing the Vegetation factor to at least 0.9. If at least 400 metres of wooded country exists between receptor and poultry farm, the NSW DEC Technical notes allow for a 0.2 value reduction in the Vegetation factor to 0.7. If it were to be assumed that existing vegetation and planned vegetation along the riparian corridors could form a barrier approximately 100 metres wide – a quarter of the width needed for the 0.2 concession - it may be fair to assume a quarter of the concessionary reduction, making the Vegetation factor 0.85. It should be noted that the Technical Notes advises against giving concessions for *intended* vegetation barriers.

Referring to the wind analysis in Section 4.2, it is seen that winds from the east occur more than 5% in a year. This exempts the use of a Wind frequency factor of 0.7. Winds from the north-east through south-east (inclusive) have a combined frequency of approximately 28%. As winds must blow in the direction of a receptor ( $\pm 40$  degrees) more than 60% of the time to warrant the use of the Wind frequency factor of 1.5, this choice is also eliminated. Thus it is taken that “normal wind conditions” apply and so a Wind frequency factor value of 1.0 has been determined.

Due to the existence of another poultry farm next to this farm, both farms need to be considered in the calculation of the separation distance between the farms and planned residential receptors. The separation distance is discussed below with the details of the second farm.

#### **4.3.1.2 Odour Source 2 - Poultry Farm, 138-144 Springfield Road, Catherine Field**

The farm at 138-144 Springfield Road (see Figure 5-2) is the southern neighbour of the farm at 138-144 Springfield Road. This farm consists of seven sheds housing a total of 110,000 broiler chickens, which corresponds to 5.00 SBSCU. Like the previous farm, the sheds are of the naturally ventilated type and so a value of 690 is used for S1.

Apart from odour emitted from the sheds, generated by the birds and the manure, there are no other odour sources on the site. At the end of a batch, the litter is removed from the sheds and taken off-site in the same day. There are no formal technical controls in place to reduce odour, such as bio-filters or short-stacks.



Since this farm is the immediate neighbour of the previous farm, the values for receptors, terrain, vegetation and weather, S2, S3, S4, and S5 respectively, are the same as for the previous farm.

Considering the two poultry farms as a single poultry farm and no concessions for any planned enhancement of vegetation in the riparian corridor, the separation distance needed for a population of 500-2,000 people is calculated as follows:

$$\begin{aligned} N &= (N)^{0.71} \times S \\ &= (8.86)^{0.71} \times (690 \times 0.75 \times 1.0 \times 0.9) \\ &= 2,192 \text{ metres (2.192 kilometres)} \end{aligned}$$

If a concession for vegetation is considered, reducing the S4 factor from 0.9 to 0.85 as discussed in the details of the first poultry farm, then the separation distance is by 122 metres to 2,070 metres (2.070 kilometres).

#### **4.3.2 Discussion of Odour from Cattle**

The NSW DEC Technical Notes for the assessment of odour sources contains a method for assessing cattle feedlots. Whilst there are no cattle feedlots inside or around the Oran Park Precinct, rather there are grazing lands for cattle, consideration was given to adapting the feedlot method to the less intensively farmed grazing properties. Preliminary calculations with low odour generating parameters however suggested the need for separation distances above 1 kilometre, indicating that the method was not applicable to the grazing properties.

The over-estimation of separation distances was verified by visiting the two major properties located inside the Precinct – one on each side of The Northern Road. There it was found that little or no odour could be found on the properties, and so there would certainly be no odour off the properties. At one stage during the visit, a group of cattle consisting of approximately 15 cows and 6 calves (see Figure 5-3) was approached by an observer. The observer stood approximately 10 metres west of the group. Even with a breeze blowing from the east carrying air from the animals towards the observer, odour was only marginally detectable occasionally, i.e. odour was not detected continuously during the observation.

The determination that, at worst, a buffer zone of 10 metres might be needed compared to one above a kilometre highlights the fundamental differences between feedlots and grazing lands – in the case of the former it is the high density of the animals and the management of excrement that leads to the strong odour associated with them. In the case of grazing lands, the animals are spread over great distances, thus excrement does not build up in one area and is able to be broken down by natural processes, assisted by the weather.

The difference between preliminary estimations and actual observations in the case of cattle should not be taken to suggest that the results of the separation distances are severely in error by a couple of magnitudes. In the case of cattle, the assessment method is designed for a different type of farm operation to that present in Oran Park while in the case of the poultry farms near the Precinct, the assessment method is designed specifically for those types of poultry farms.



The cattle themselves are not always the only source of odour on cattle farms. Manure-based fertilisers can be a cause of nuisance odour if they are not applied with appropriate consideration, particularly when large areas are fertilised.

Staff from Leppington Pastoral Company (LPC) and Camden Council have indicated that LPC uses poultry manure on its cattle farm in Oran Park and on a dairy north of Oran Park. As LPC is one of the two major land-holders in the Oran Park Precinct, its cattle farm has potential to generate nuisance odour when manure is applied. Council has confirmed that complaints have been received in the past when manure has been used. The practice of using this manure will require consideration in planning the development of the Precinct.

### **4.3.3 Distant and Low-significance Odour Sources**

In addition to the aforementioned odour sources, there are several other sites near to the Oran Park Precinct that have been identified as odour sources but deemed to have no consequence for the development of the Precinct. They are still worthy of mention though to show that they have been considered.

#### **4.3.3.1 Turkey Farm, 291-295 Deepfields Road, Catherine Field**

The turkey farm at 291-295 Deepfields Road (see Figure 5-4) is located approximately 1 km north of the Precinct. Consisting of two shed, the farm has capacity for approximately 20,000 birds. The farm was visited during field surveys, where it was found that odour could not be detected at the front of the property on the street.

The farm is considered to be of no consequence for the Precinct due to its large separation distance from the Precinct, the small size of the farm, the fact that turkeys tend to smell less compared to chickens, and the plan for vegetation around the north-east corner of the Precinct that would have an attenuating effect on any incoming odour.

#### **4.3.3.2 Poultry farms at 56 Coats Park Road and Lot 5 Plan 1012683, Cobbitty**

To the west of the Precinct there are two poultry farms adjacent to each other, located at 56 Coats Park Road and Lot 5 Plan 1012683. There are four sheds on each farm, giving a combined total of 8 sheds. Camden Council reports that approval has been issued to erect another 3 sheds, which would give a combined total of 11 sheds. These farms are actually approximately 2.2 km from the Precinct boundary, which is the buffer distance specified for the two poultry farms that total 11 sheds to the east of the Precinct (see Section 4.3.1.2).

Whilst shed numbers alone are no basis for determining buffer zones, shortened buffer zones would result in considering that easterly winds are more common than westerly winds (see Table 4-1), and there is more vegetation between these farms and the Precinct compared to those on the eastern side. Furthermore, the heritage property of the Denbigh homestead, on which there will be no development, effectively provides additional buffering for residences east of the homestead.



#### **4.3.3.3 Sewage Treatment Plant and Associated Pumping Stations**

It is known that an additional sewage treatment plant (STP), along with pumping stations, will be required to service the Oran Park Precinct, though no final determination has been made for its location. Sydney Water has a policy to set a 400 metre buffer zone (measured from the boundary of the plant) around STP's to minimise the effects of STP's on nearby populations, including nuisance odour (Sydney Water 1997). The current Indicative Layout Plan for the Precinct does not show any area to be under consideration for the placement of an STP, and were that to happen it would greatly reduce the number of houses possible inside the Precinct.

At the time of writing it was understood that the STP to service Oran Park would most likely be established further north of the Precinct and so hold no consequences for the Precinct. Tentative plans for pumping stations are understood to include the south-western corner of the Precinct. Pumping stations with appropriate seals and enclosures should pose no risk of odour. The risks of odour impacts on residential and employment zones would be further reduced if the pumping station were to be placed where surrounding land uses would provide a buffer, such as open spaces / public reserves like those planned for the south-western corner of the Precinct.

#### **4.4 ODOUR IMPACT CONSEQUENCES FOR PROPOSED DEVELOPMENT**

The separation distances calculated in the previous section are quite broad, reaching as far as 1.5 kilometres into Oran Park Precinct. Had there only been one poultry farm instead of two, the separation distance would have extended a maximum of approximately 900 metres into the Precinct.

Figure 4-1 shows the original separation distance and separation distance based on a vegetation concession. It should be noted that the parameters defining the separation distance are only valid for the Oran Park Precinct west of the poultry farms, as the separation distance would vary in other directions when terrain, populations, vegetation and wind frequency are considered.

Whilst the outcome of this assessment seems to prohibit a large portion of the developable area, it should be kept in mind that a Level 1 odour assessment is only a screening stage. In such a study a "fail" result merely means that a more refined study should be conducted to obtain better estimates of the separation distances needed.

Dick Benbow & Associates (now Benbow Environmental) prepared an odour report in 2005 (DBA 2005) for a proposed residential development in Catherine Field. The modelling program AUSPLUME was used to model odour from the two poultry farms considered in this report along with a turkey farm 1 kilometre further east of the poultry farms. Meteorological data measured at the Bureau of Meteorology's Camden monitoring site was used. The area of interest assessed for odour impacts was east of the farms.



The report was unavailable from the party who commissioned it, though the odour impact contours from the modelling have been presented in

Figure 4-2. It will be noted in this figure that the two separation distances mostly contain the DBA 2005 1 OU impact, with the 1 OU impact venturing past the separation distance perimeters near the northern boundary of the Precinct. The separation distance based on a vegetation concession makes a better approximation of the 1 OU impact than the original separation distance. An impact of 1 OU is quite low however, with the DEC specifying a 2 OU limit for large populations.

If the calculated separation distances were observed, they would certainly ensure that odour would not be detected at any development outside of their perimeters. This would however mean a great loss of otherwise developable land between the separation distance perimeters and the 2 OU impact contour.

Referring to Table 3.1 of the NSW DEC Technical Framework, it is seen that odour impacts above 2 OU are acceptable for smaller populations, which could make it possible to develop east of the 2 OU contour line (i.e. where the odour is above 2 OU) perhaps as far as the 4 OU contour line. The most impacted area where the odour impacts are predicted to be 7 OU or greater, will contain a public reserve, which is an acceptable use of the land. This reduces the un-developable land to that between the 4 OU and 7 OU contours. It would be appropriate, however, to advise any residents considering moving into areas predicted to have impacts above 2 OU that they may notice odour occasionally.

Of course it is advisable to take a cautious approach and so it is a recommendation of this report that a further detailed study be undertaken to confirm the area that is adversely affected by odour.



Figure 4-1: Separation distances for the two poultry farms east of Oran Park Precinct

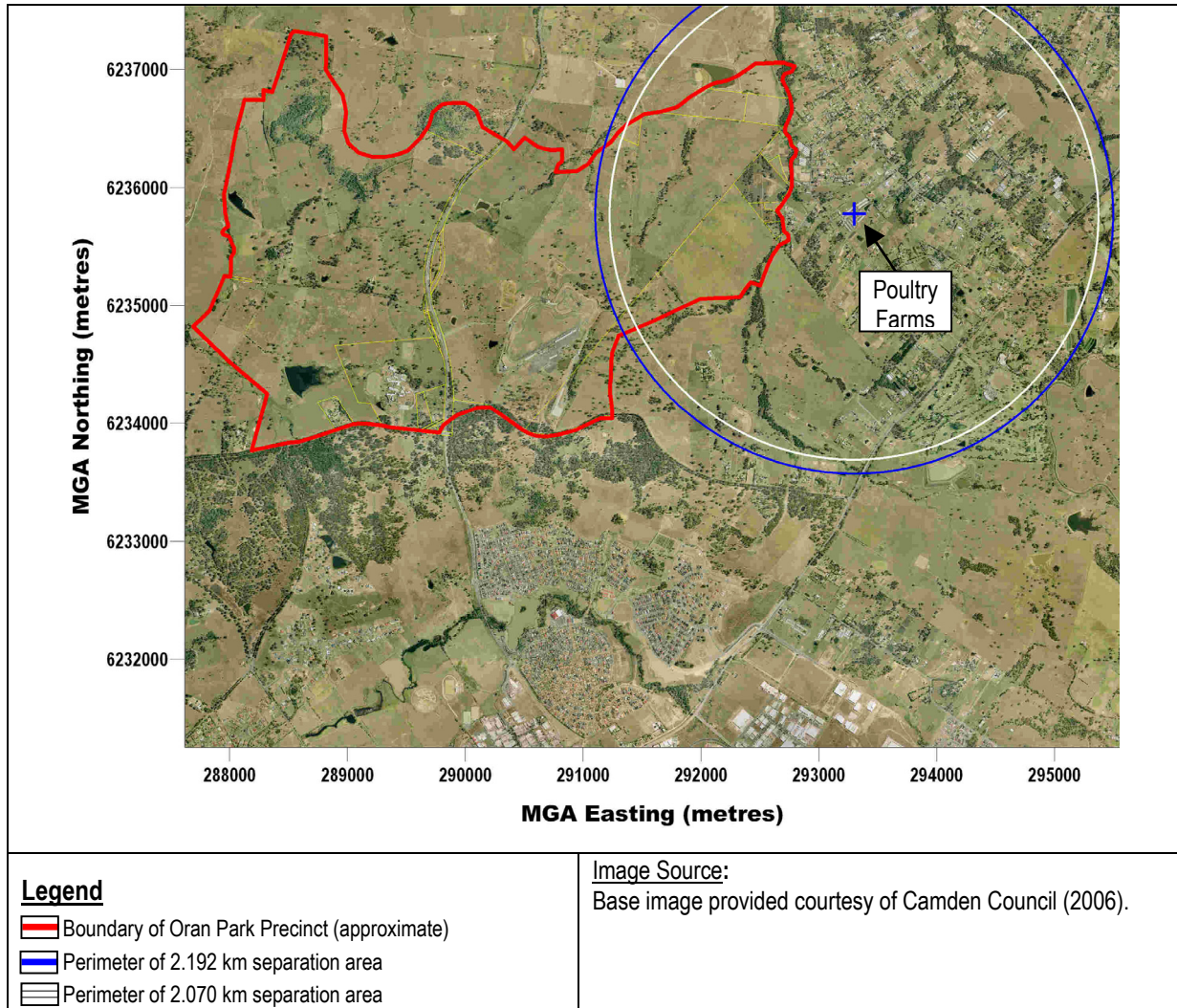
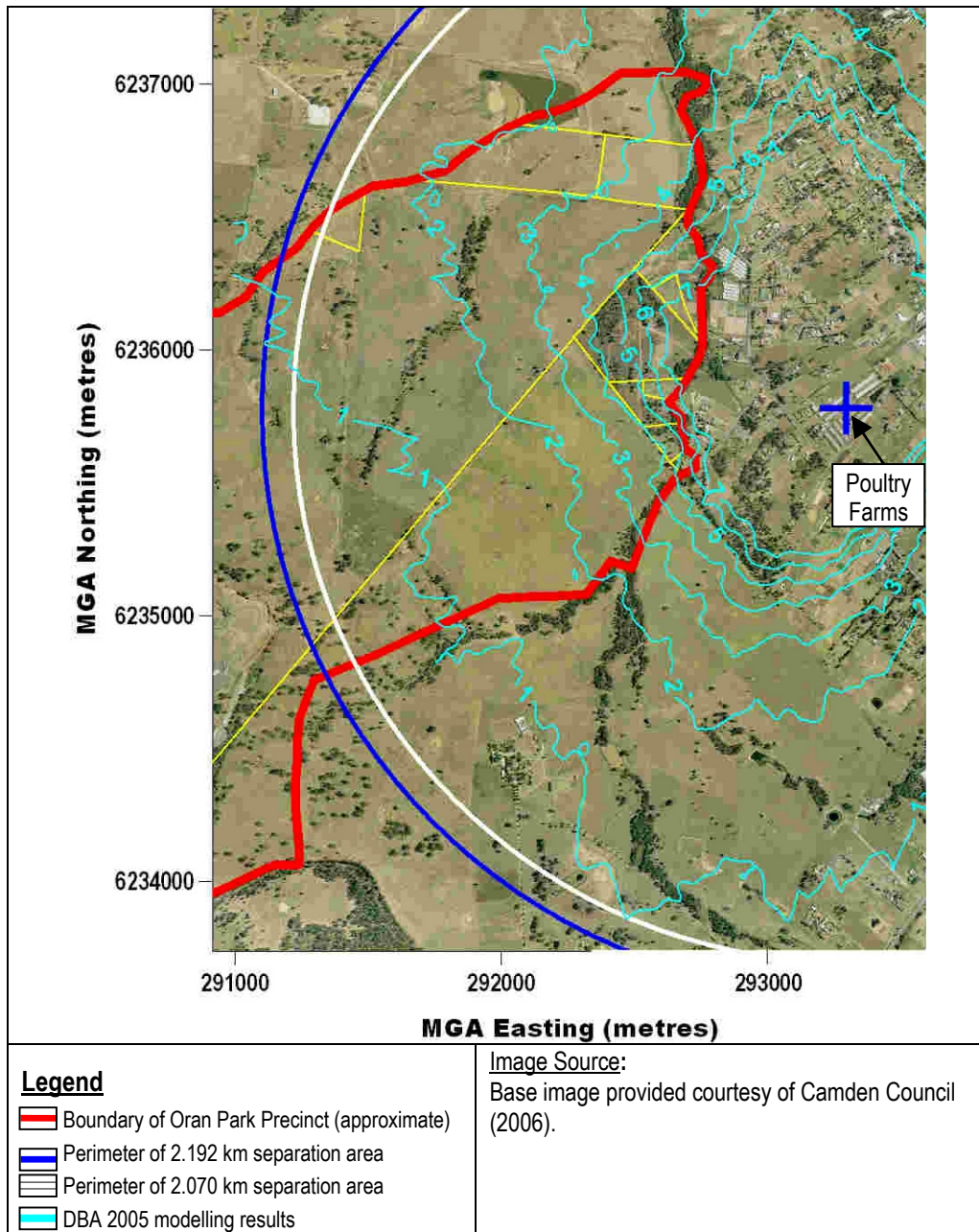


Figure 4-2: Comparison of Level 1 separation distances with DBA 2005 modelling results



## 5. PHOTOGRAPHIC SECTION

Figure 5-1: Poultry farm at 150-154 Springfield Road, Catherine Field



Figure 5-2: Poultry farm at 138-144 Springfield Road, Catherine Field



Figure 5-3: Turkey farm at 291-295 Deepfields Road, Catherine Field



Figure 5-4: Cattle on the McIntosh property – major property on western side of the Northern Road





## 6. RECOMMENDATIONS

### 6.1 POULTRY FARMS

The Camden region contains many poultry farms within its governmental boundaries. It is recommended that Camden Council require all future developments with the potential to generate odour in proximity to the boundaries of the Precinct to give careful consideration to the planned establishment of communities within the Precinct and how their operations could affect those communities. This applies in particular to the existing poultry farms which may choose to expand their operations in the future. At a bare minimum, no new poultry farms should be established within 1.5 kilometres of the Precinct boundary except where it can be demonstrated that odour will be minimised by advanced control strategies.

The separation distances calculated along with the predicted modelling impacts in DBA 2005 indicate that a large portion of land on the eastern side of the precinct may be adversely affected by odour from poultry farms further east. It is recommended that a Level 3 odour impact assessment be undertaken to verify if the poultry farms do actually have the potential to generate nuisance levels of odour within the Precinct, and refine the estimate of affected land. It is recommended that the dispersion-modelling program CALPUFF be used in the assessment.

Site-specific meteorological data is the ideal choice as input data for CALPUFF. If timing permits, it is recommended that a meteorological station be sited near the eastern boundary of the precinct to gather 12 months of meteorological data. If such a period is not possible, it is recommended that a meteorological station be sited in the Precinct but for a shorter time period (at least one month) with measurements compared against corresponding measurements made at the Bureau of Meteorology's (BoM) Camden monitoring station. From the comparison it should be determined how similar meteorological conditions are between the BoM's site and Oran Park and how any differences would influence the odour modelling.

To complement the odour modelling, it is recommended that the use of an electronic odour monitoring device known as an "E-Nose", produced by the company of the same name in Sydney be considered for use. In particular, the E-Nose should be considered for the applications of verifying the gradient of change in odour with distance from the sources, calibrating modelled odour impacts, and/or determining where the 2 OU impact threshold actually is.

If development is to occur inside the calculated separation perimeters, it is recommended that a staged approach be taken where development begins away from the poultry farms and progresses west to east. Regular follow-up should be done on completed development stages, with occupants of those developments surveyed for their comfort in terms of air amenity. If it were found that odour was not noticed in a stage, then the next stage should be commissioned, and the procedure repeated until occupants report a mild detection of odour, after which no development further east should proceed without odour abatement.



An obvious solution to development restrictions on odour impacted land within the Precinct is for developers and/or Council to either purchase the land of the poultry farms and close the farms or else assist in relocating the farms, if the farm operators should be agreeable to such a proposal. Even the removal of one farm would reduce the separation distance calculated from 2.2 km to 1.1 km – 1.3 km, depending on which farm was removed. It is recommended that Council and Oran Park stakeholders consider beginning negotiations with the poultry farm operators if it is desired to develop the eastern side of the Precinct in the near future.

## **6.2 CATTLE FARMS**

As it is likely that portions of the cattle farms will be developed while adjacent portions continue to hold cattle, it is recommended that farm operators be aware that it may be necessary to introduce practices to manage odour if it occurs and causes nuisance for residents. Such practices may include removing shelter and attractions for the animals near residences and establishing sheltering away from residences to encourage them to congregate there. It may also be necessary to erect temporary fencing on farms to provide a buffer between animals and residences and prevent animals approaching the fences of residences.

One practice that cattle farm operators, particularly Leppington Pastoral Company, will need to consider is how to apply manure-based fertilisers without causing nuisance odour in residential areas once they are established. This might involve blending manure with other materials, or else carefully planning to spread manure when weather conditions will assist in minimising odour. It is recommended that if odour complaints result from the use of manure-based fertilisers, that Council require the farm operator to devise and implement a management plan with a view to minimising the generation of odours.

## **6.3 SEWAGE TREATMENT PLANTS (STP's)**

Whilst it appears that a sewage treatment plant will not be established inside Oran Park Precinct, it is recommended that a Level 3 odour assessment be undertaken if a STP is proposed in or near the Precinct.

## **6.4 ODOUR SOURCES IN COMMERCIAL/EMPLOYMENT AREAS**

Council should also be watchful of new odour sources seeking establishment inside the Precinct, such as the takeaway shops and businesses producing waste with potential for odour generation. Consideration of these activities will obviously require particular attention if they are proposed near boundaries separating commercial and employment zones from residential zones, or if they have potential to adversely impact on neighbouring businesses.



## 7. CONCLUSION

A Level 1 odour impact assessment was conducted for the proposed development of the Oran Park Precinct into residential areas and associated facilities. The investigations conducted as part of this study were consistent with the requirements for a Level 1 assessment as set out in the current NSW DEC Technical Notes "Assessment and management of odour from stationary sources in NSW" (November 2006).

It has been determined in this assessment that lands planned for residential development may be affected by odour impacts as a result of the existence of two poultry farms 500 metres east of the Precinct. Other bird farming operations further away appear to pose no risk of odour impacts to the Precinct. It is believed that odour from cattle on farms within the Precinct will be of no consequence to development, and odours from manure-based fertilisers should be manageable. No other significant sources of odour have been identified either within the Precinct or in proximity to it.

Recommendations for further assessment, including a Level 3 odour impact assessment, and management strategies, such as development staging, have been provided in this report. Most recommendations understandably concern the said poultry farms, since they hold the greatest consequences for the Precinct.

This concludes the report.

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## 8. REFERENCES

1. NSW DEC Technical Framework  
"Technical Framework – Assessment and management of odour from stationary sources in NSW",  
November 2006
2. NSW DEC Technical Notes  
"Technical Notes – Assessment and management of odour from stationary sources in NSW", November  
2006
3. Camden Airport Meteorological Data 2001 (Jan) – 2006 (Feb), Bureau of Meteorology, Station ID  
068192
4. Sydney Water 1997  
Sydney Water Corporation – Development Services Branch, "Sewage Treatment Plant (STP)  
Buffer Zone Policy", March 1007.
5. DBA 2005  
Dick Benbow & Associates, "Land Use Planning Survey (Odour)", October 2005.





## 9. LIMITATIONS

Our services for this project are carried out in accordance with our current professional standards for site assessment investigations. No guarantees are either expressed or implied.

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