LEVEL 1 ODOUR IMPACT ASSESSMENT FOR DEVELOPMENT OF TURNER ROAD PRECINCT, SMEATON GRANGE, NSW

Prepared for: Growth Centres Commission

Prepared by: Graeme Hamer, Environmental Engineer
R T Benbow, Principal Consultant
BENBOW ENVIRONMENTAL

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Benbow
ENVIRONMENTAL

Engineering a Sustainable Future for Our Environment

13 Daking Street North Parramatta NSW 2151 AUSTRALIA
Tel: 61 2 9890 5099 Fax: 61 2 9890 5399
Email: admin@benbowenviro.com.au

Visit our website at: www.benbowenviro.com.au

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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 *Turner Road Precinct*, located within the Camden local government area.

Plans for the precinct would see it developed into an urban community consisting of approximately 4,000 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, as a potential odour source – a poultry farm – was identified approximately 200 metres from the southern perimeter of the precinct.

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 poultry farm near the Precinct possesses the potential to affect a 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. In addition, it has been recommended that the affected land be considered for commercial or employment uses instead of residential uses.

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 Turner Road Precinct, located within the Camden local government area.

The precinct currently contains lands used for agricultural purposes (e.g. grazing), a commercial golf course, and residences. A number of small properties, each containing at least one residence, line the south-western perimeter of the Precinct. As most of the land is contained within three major properties, there are only a couple of residences located inside the Precinct away from the perimeter. There is also one site – a poultry farm - located to the south of the Precinct that has the potential to generate nuisance odour.

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.

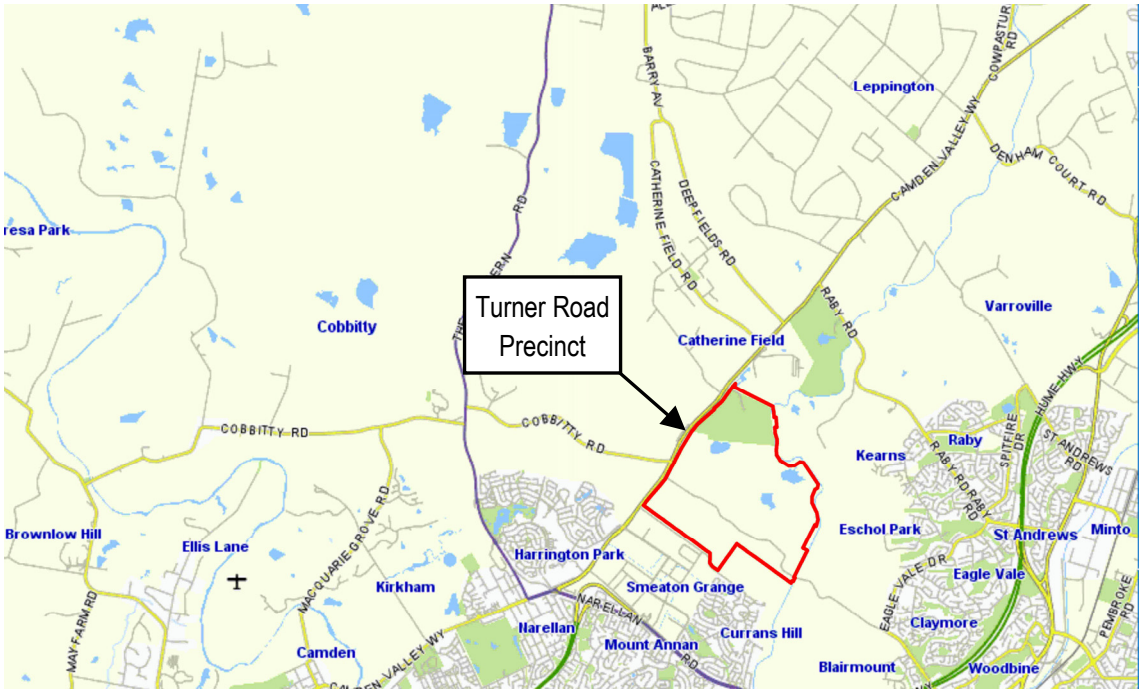
2. SITE PROFILE

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

2.1 SITE LOCATION

The Turner Road Precinct is located within the local government area of Camden, north of the Camden township centre. The Precinct is bounded by Turner Road to the south, Camden Valley Way to the west, rural properties to the north, and a Sydney Water water supply to the east. Figure 2-1, below, shows the location of the Precinct in its regional context.

Figure 2-1: Regional location of subject area



Legend
Boundary of Turner Road Precinct (approximate)

Image Source:
WhereiS.com (www.whereis.com.au)

2.2 SITE DESCRIPTION AND LAYOUT

A commercial golf course located at the northern portion of the Precinct forms one of three large properties inside the Precinct. The two major landholdings south of this are rural properties used for activities such as the grazing of farm animals. The largest property belongs to St Gregory's College, though the actual college campus is located outside the Turner Road Precinct to the east of the water supply owned by Sydney Water.

The Turner Road Precinct is presented in its local context in Figure 2-2 at the end of Section 2.3.

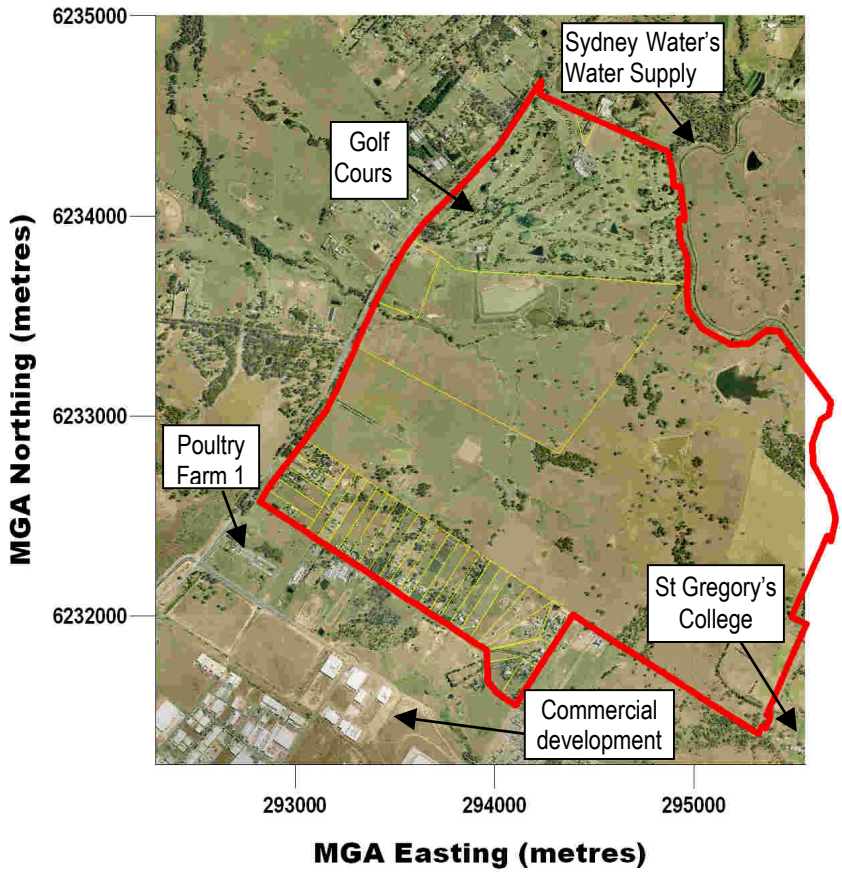
2.3 ADJACENT LAND USE

The land surrounding the Precinct is predominantly used for agricultural purposes, including grazing activities and equestrian activities. As mentioned above, a school - St Gregory's College – neighbours the Precinct on the eastern side. Land south of the Precinct is currently of a rural character but development has begun on some properties in the area to establish commercial operations. There is a poultry farm approximately 200 metres south of the Precinct.

Another poultry farm in the vicinity of the Precinct was noted at 159 Smeaton Grange Road, Smeaton Grange, approximately 2 kilometres south-east of the Precinct. The farm consists of four naturally ventilated sheds, though the farm appears to have closed and be no longer operating.

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



Legend

Boundary of Turner Road Precinct (approximate)

Image Source:
Base image provided courtesy of Camden Council (2006).

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 has 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 for 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 faming 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 Turner Road 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 Turner Road 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 Turner Road Precinct is the station operated by the Bureau of Meteorology (BoM) at Camden Airport, approximately 6 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 $m.s^{-1}$ topping the annual average of 2.7 $m.s^{-1}$. 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 $m.s^{-1}$, closely followed by Summer with an average of 2.9 $m.s^{-1}$. Autumn has the lowest average wind speed of 2.3 $m.s^{-1}$.

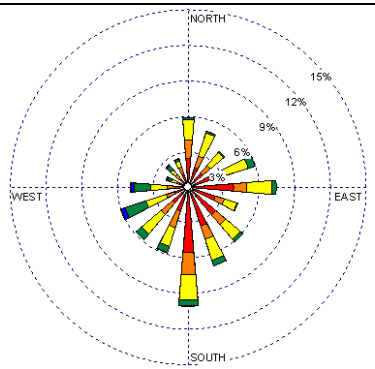
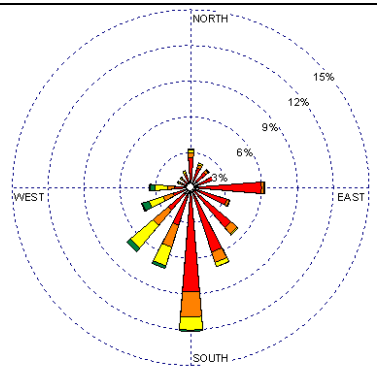
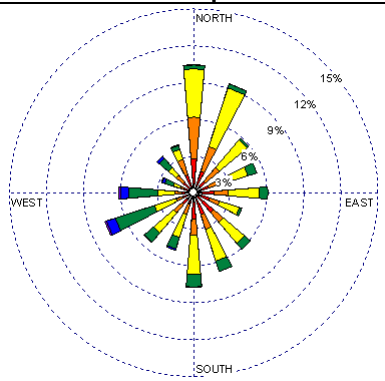
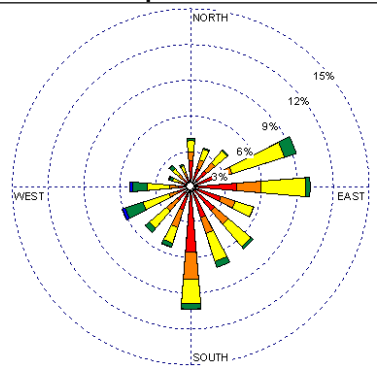
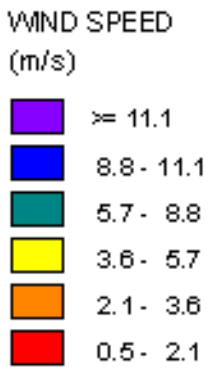
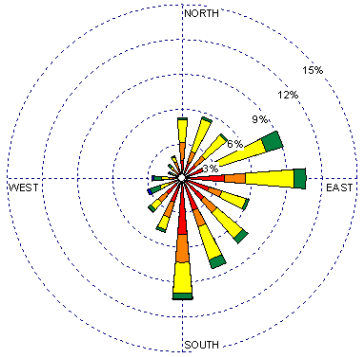
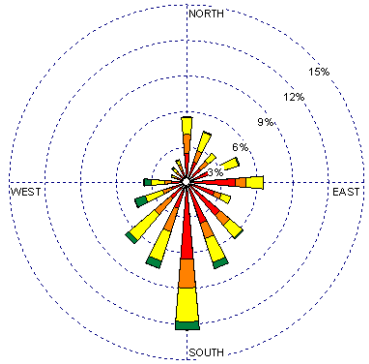
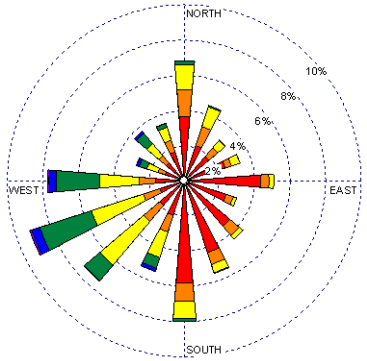
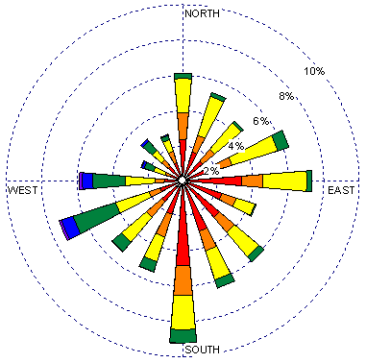
4.2.1 Wind Rose Plots

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 $m.s^{-1}$), 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.

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

All Seasons/Times	12am-8am	8am-4pm	4pm-12am	Legend
				
Ave. wind speed: 2.69 m.s^{-1} Calms: 14.39% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 1.44 m.s^{-1} Calms: 29.11% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 3.79 m.s^{-1} Calms: 3.32% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 2.83 m.s^{-1} Calms: 10.72% Axis Frequencies: 2%, 4%, 6%, 8%, 10%	
Summer	**Autumn**	**Winter**	**Spring**	
				

Ave. wind speed: 2.89 $m.s^{-1}$ Calms: 12.38% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 2.31 $m.s^{-1}$ Calms: 16.84% Axis Frequencies: 3%, 6%, 9%, 12%, 15%	Ave. wind speed: 2.53 $m.s^{-1}$ Calms: 16.41% Axis Frequencies: 2%, 4%, 6%, 8%, 10%	Ave. wind speed: 3.01 $m.s^{-1}$ Calms: 12.05% Axis Frequencies: 2%, 4%, 6%, 8%, 10%	

4.3 IDENTIFICATION AND ASSESSMENT OF ODOUR SOURCES

There are a number of potential odour sources in the areas surrounding the Turner Road Precinct, particularly in Catherine Field, 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 one poultry farm located approximately 200 metres from the southern 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 6.3.

Discussion of a proposed sewage treatment plant (STP) is also provided.

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:

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

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 x S2 x S3 x S4 x 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, 536 Camden Valley Way, Smeaton Grange

The farm at 536 Camden Valley Way (see Figure 5-1) consists of 4 sheds housing a total of 70,000 broiler chickens, which corresponds to 318 standard broiler chicken shed units (SBCSU). 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, the only other odour source on the site is a small pile of litter from the sheds and a pile of mushroom compost stored on the northern side of the sheds. These materials are blended, packaged in plastic bags, and then sold as a fertiliser near the entrance to the premises from Camden Valley Way. The litter and mushroom compost piles are considered to be minor in comparison to the odour from the sheds.

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 0.55 has been chosen for the Receptor factor, S2. This value is based on an impact area containing a population of 125-500 people. Although the Turner Road 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 population near to the farm is reduced due to the intention to establish a business area on the western side of the Precinct, including the south-west corner of the Precinct which is the closest part to the poultry farm.

The terrain around the farm rises in a crest to the north-east of the farm, and falls in the south and south-east directions. Thus the Turner Road Precinct, being north of the farm, would be uphill from the farm. The terrain is considered varied enough to justify the use of a Terrain factor, S3, of 0.9.

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. Grasses on adjacent properties are kept short either by animal grazing or the use of cutting machinery. Given the low vegetative profile, a Vegetation factor of 1.0 has been chosen.

Referring to the wind analysis in Section 4.2, it is seen that winds from the west and south-west occur more than 5% in a year. This exempts the use of a wind frequency factor of 0.7. Winds from the south through west (inclusive) have a combined frequency of approximately 33%. 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.

The factors selected culminate in the calculation of the separation distance as follows:

$$N = (N)^{0.71} \times S$$
$$= (3.18)^{0.71} \times (690 \times 0.55 \times 0.9 \times 1.0)$$
$$= 777 \text{ metres } (0.777 \text{ kilometres})$$

Thus a separation distance of 777 metres is recommended.

4.3.2 Sewage Treatment Plant and Associated Pumping Stations

In addition to the aforementioned odour sources, a proposed sewage treatment plant is the only other odour source believed to possibly hold consequences for the development of the Precinct. It is known that an additional sewage treatment plant, along with pumping stations, will be required to service the Turner Road Precinct. 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 the Precinct would most likely be established south of the Precinct on Camden Valley Way. The exact placement of the STP and associated pumping stations was not known though and so no comment can be provided on the consequences for the Precinct. Pumping stations with appropriate seals and enclosures, however, should pose no risk of odour to the Precinct. The risks of odour impacts on residential and employment zones would be further reduced if pumping stations were to be placed where surrounding land uses would provide a buffer, such as open spaces / public reserves.

4.4 ODOUR IMPACT CONSEQUENCES FOR PROPOSED DEVELOPMENT

The separation distance calculated in the previous section is quite broad, reaching as far as 500 metres into Turner Road Precinct. Figure 4-1 shows the separation distance in relation to the Precinct boundaries while Figure 4-2 shows the separation distance laid over the Precinct Indicative Layout Plan. Figure 4-2 indicates that the residential area (coloured yellow) on the southern boundary could potentially be affected and a minor portion of the employment and commercial areas (coloured purple and red, respectively).

It should be noted that the perimeter defining the separation distance is only valid for the Turner Road Precinct north of the poultry farm, 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 noticeable 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.

Some concept plans for the Precinct show the commercial zone to extend all the way to the southern boundary of the Precinct in place the residential area described above. In the absence of further odour studies, following through with zoning the area along Turner Road – not necessarily all of the land but only a portion slightly larger than that that could be affected – for commercial or employment uses may be acceptable if odour impacts do in fact extend into the Precinct.

This is because the worst odour impacts often occur in the evening, when businesses would be closed, when wind conditions are still. In such circumstances, however, odour would be more inclined to flow south and to the south-east following the terrain under katabatic flow.

Further reasons to support commercial/employment uses in the potentially affected area are that the buildings associated with these uses are usually self-contained, meaning people would rarely be outside to sense odour; there are few windows or openings that allow air (and odour) to flow inside; and the buildings are large enough to effectively alter the flow of wind around them and local areas behind them.

As the land that lines Turner Road is already elevated above the poultry farm, and any building along the Road may result in structures further elevated above the ground due to the change in grade, if buildings were built with their backs to Turner Road then air heading from the poultry farm towards the precinct would encounter the buildings as an obstacle, be forced to rise above the buildings and as a result be further dispersed. Landscaping including fences and tall vegetation would further assist in enhancing dispersion and shielding the areas behind them from odour.

4.4.1 Results of Level 3 Odour Assessment – Harrington Park II and Mater Dei Odour Study

The poultry farm considered in this report was the subject of a Level 3 odour assessment carried out by Heggies Australia for the rezoning of areas known as Harrington Park II and Mater Dei (Heggies 2006). Odour from the farm was sampled and an odour emission rate was calculated. Meteorological data measured at the Bureau of Meteorology's Camden monitoring site was used. Odour impacts from the farm were predicted using the dispersion model AUSPLUME.

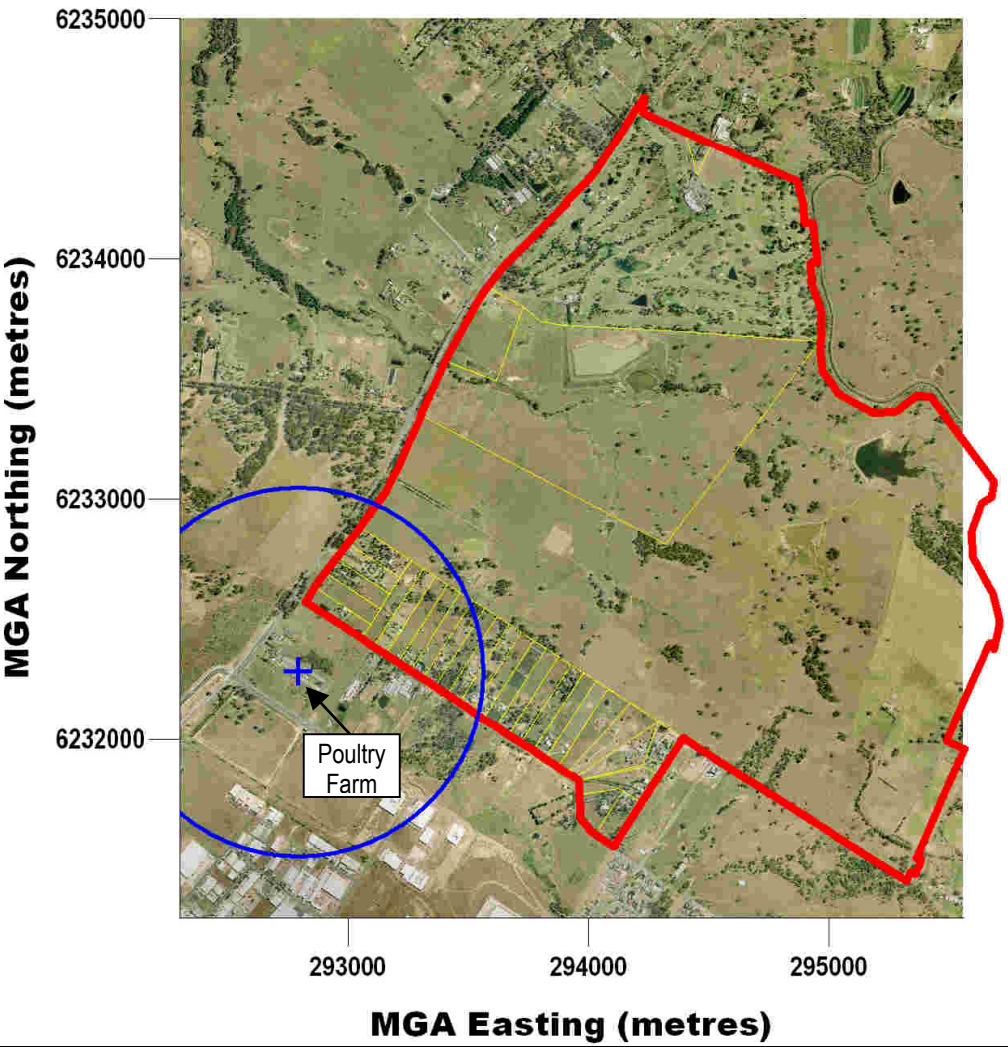
The model predicted impacts have been shown in Figure 4-3 for comparison with the calculated separation distance. Note the contours shown in the figure are not the original contours but a re-creation of the original contours through tracing. The re-created contours are accurate enough though to see the consequences of the poultry farm on the Precinct predicted by the modelling.

In Figure 4-3 it is seen that the predicted 2 OU contour line approximates the perimeter of the calculated separation distance north of the farm. To the east however, the calculated separation distance appears to be more conservative, extending approximately twice as far from the farm as the 2 OU contour line.

The model results again support the commercial/employment use of the south-western corner of the Precinct. Whilst the impacts in the corner make the land unsuitable for residential use, the establishment of buildings and careful design of openings would allow businesses to function with no sensation of the odour impacts as predicted.

It is noted that terrain effects were not considered in Heggies 2006. These effects would be important particularly at night, as already noted, when odour will follow the gradient of the terrain under katabatic flow. Unfortunately the report did not comment on the variation of odour impacts with the time of day. This is of significance as it is likely that the impacts presented occurred in the evening, and so lower impacts would be expected in the day, placing less restrictions on the affected land.

Figure 4-1: Separation distances for the poultry farm south of the Turner Road Precinct



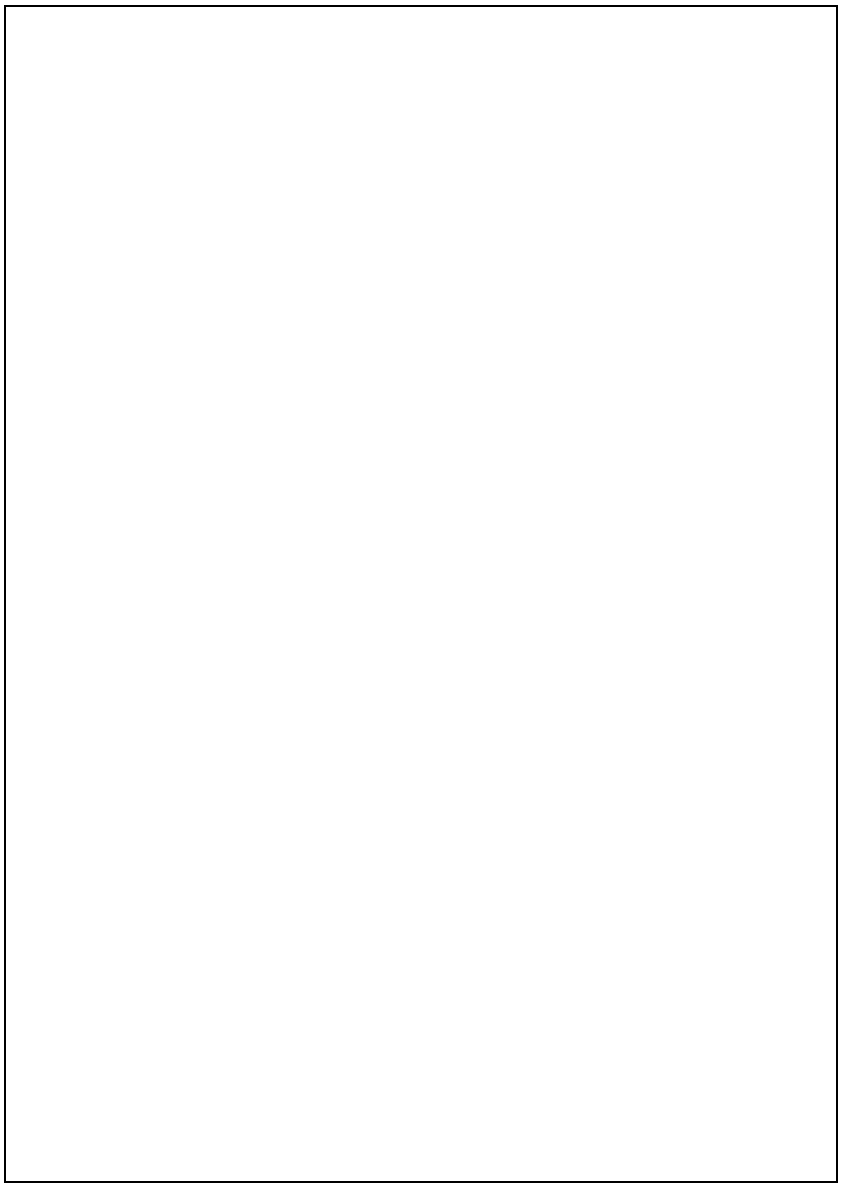
Legend

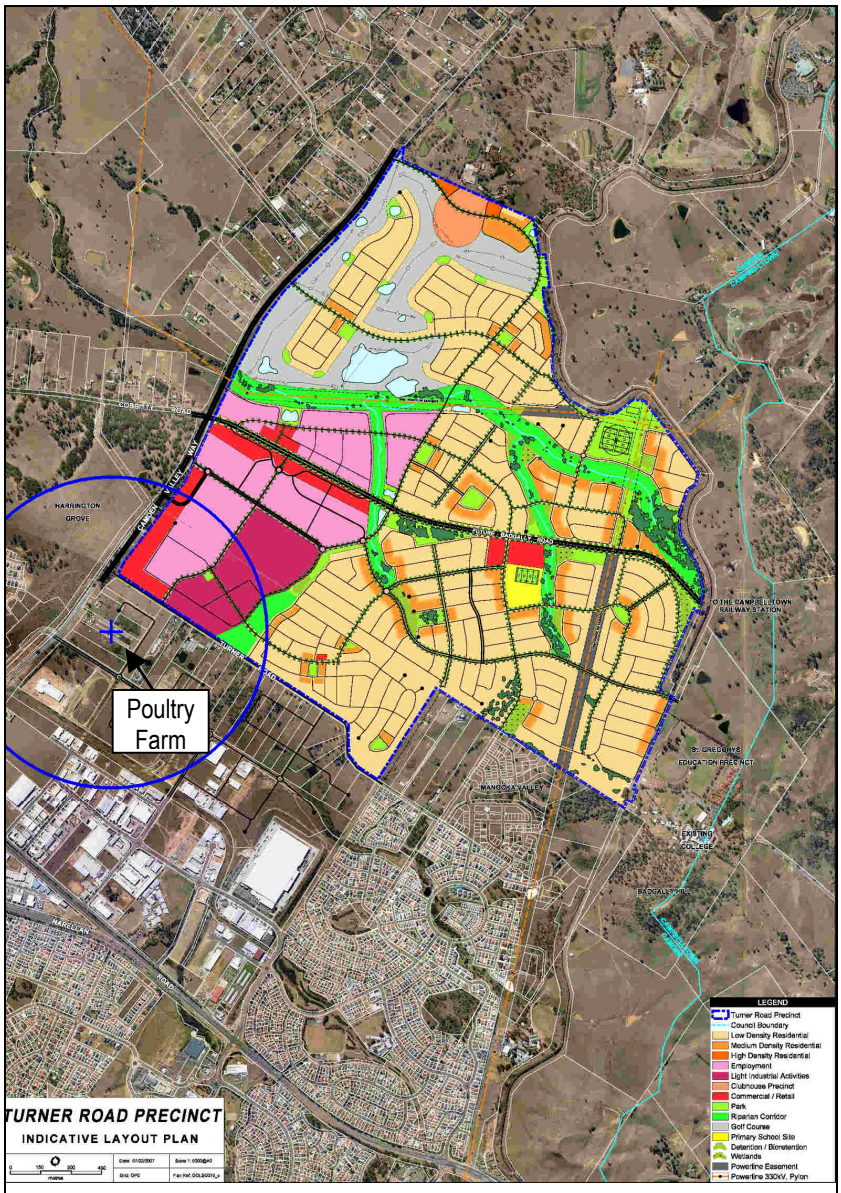
Boundary of Turner Road Precinct (approximate)

Perimeter of 0.777 km separation area

Image Source:
Base image provided courtesy of Camden Council (2006).

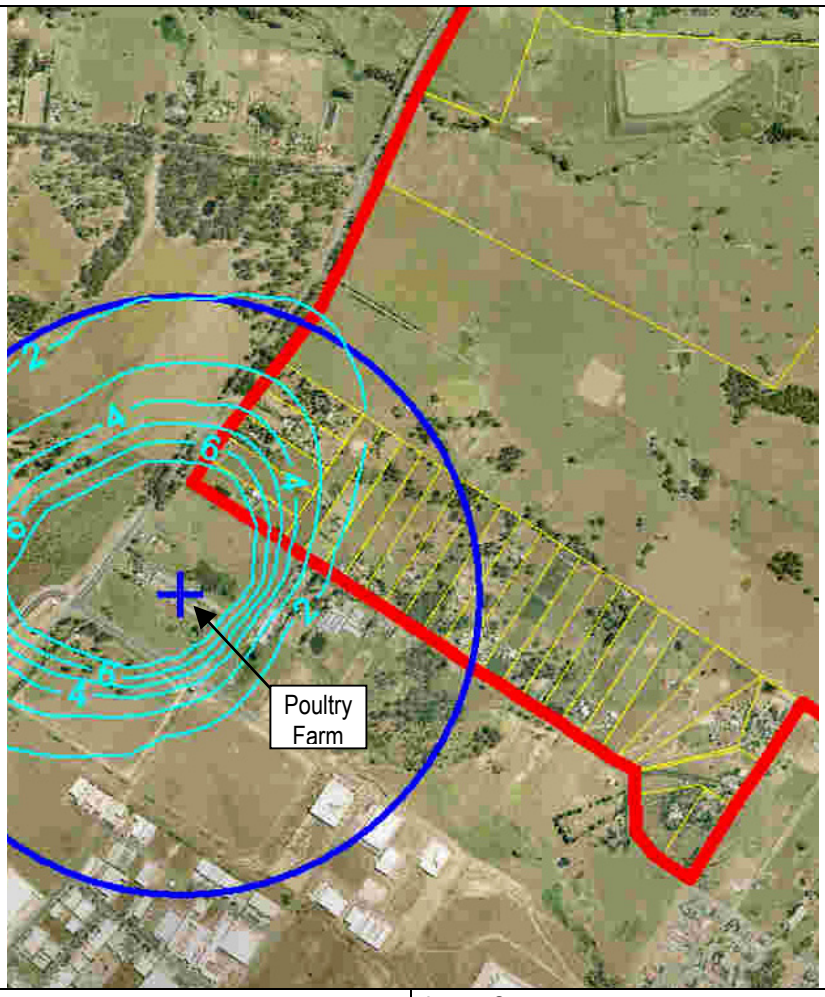
Figure 4-2: Separation distance for the poultry farm south of the Turner Road Precinct, as layed over the Indicative Layout Plan.





Legend	Image Source:
Boundary of Turner Road Precinct (dashed line) Perimeter of 0.777 km separation area	Base image provided courtesy of Camden Council (2006).

Figure 4-3: Comparison of Level 1 separation distances with Heggies 2006 modelling results



Legend

- Boundary of Turner Road Precinct (approximate)
- Perimeter of 0.777 km separation area
- Heggies 2006 modelling results (2-7 OU impacts)

Image Source:
Base image provided courtesy of Camden Council (2006).

5. PHOTOGRAPHIC SECTION

Figure 5-1: Poultry farm at 536 Camden Valley Way, Smeaton Grange – View from Turner Road

Figure 5-2: View south-east from corner of Turner Road and Camden Valley Way, with poultry farm at 536 Camden Valley Way, Smeaton Grange visible to the right.

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 farm which may choose to expand or alter its 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 Heggies 2006 indicate that a significant portion of land in the south-western corner of the Precinct may be adversely affected by odour from the poultry farm south of the Precinct. It is recommended that a Level 3 odour impact assessment be undertaken to verify if the said poultry farm does actually have the potential to generate nuisance levels of odour within the Precinct refine the estimate of affected land. It is recommended that the dispersion-modelling program CALPUFF be used in the assessment. This recommendation has also been made in the report prepared by Benbow Environmental[1] for the Oran Park Precinct north-west of the Turner Road Precinct. The modelling of the Turner Road Precinct could certainly be included in the same scenario as that of the Oran Park Precinct.

Modelling for the Turner Road Precinct should include terrain effects. Odour impact results should be reported as those that would occur during the day, night and in general, so as to further ascertain the appropriateness of using the south-western corner of the Precinct for commercial/employment uses.

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 within 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 the Turner Road Precinct and how any differences would influence the odour modelling. It would also be appropriate to use meteorological data from Oran Park if it were to be measured there.

Should further odour studies not be undertaken, then it is recommended that the land adjoining Turner Road in proximity to the poultry farm be used solely for commercial/employment purposes and not residences. This may still be recommended though at the conclusion of a more detailed odour study.

[1] Benbow Environmental, "Level 1 Odour Impact Assessment for Development of Oran Park Precinct", January 2007.

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 farm and close the farm or else assist in relocating the farm, if the farm operator should be agreeable to such a proposal. It is recommended that Council and Oran Park stakeholders consider beginning negotiations with the poultry farm operator if it is desired to develop the south-western corner of the Precinct for residential use.

6.2 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.

6.3 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 Turner Road 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 presence of a poultry farm 200 metres south 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 the grazing of animals within the Precinct will be of no consequence to development. 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.

Prepared by

Graeme Hamer
Environmental Engineer

R T Benbow
Principal Consultant

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)
5 Heggies 2006
Heggies Australia, "Harrington Park II and Mater Dei Rezoning Level 3 Odour Impact Assessment (Stage 2 Investigations)", October 2006

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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