R.M & C.A BRIGHT

POULTRY UNITS AT GROES-Y-GARREG, BERRIEW, POWYS.

DRAFT ODOUR IMPACT ASSESSMENT

March 2019

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1.0 INTRODUCTION

Isopleth Ltd has been commissioned by Berrys, on behalf of R.M & C.A Bright, to carry out a detailed assessment of potential odour impacts associated with a poultry operation at Groes-Y-Garreg, Berriew, Welshpool, Powys SY21 8AU. The farm lies within the administrative area of Powys Council.

New poultry rearing (broiler) sheds are proposed on land adjacent to the farm. When complete, it is planned that the site capacity will increase to a maximum of 100,000 birds in 2 buildings.

This assessment presents the result of the detailed dispersion modelling exercise aimed at predicting the odour impact of the proposed facility.

1.1 Site Location

The application site is located to the North of Red Lane, between the B4285 to the East and the B4390 to the West. Located at OS GR 317135, 302735, the site setting can be seen in Appendix A, which are drawings submitted with the planning application and have been reproduced courtesy of Berrys.

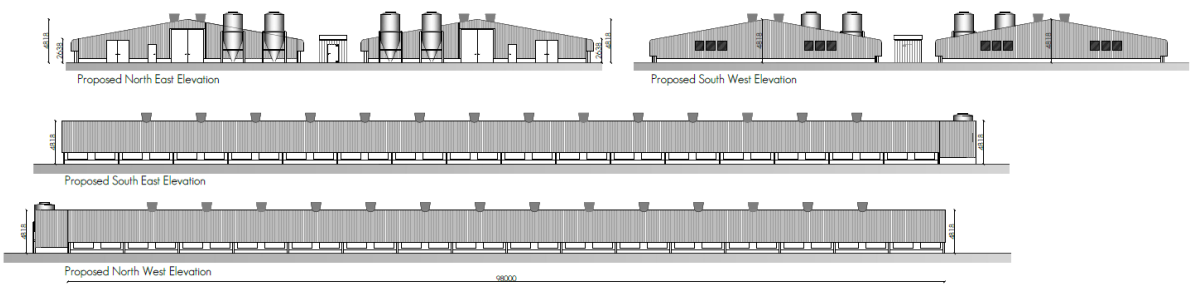
The closest residences to the poultry facility are those associated with Groes-Y-Garreg Farm (i.e. the applicant, family and tenants). Groes-Y-Garreg Farm is shown, alongside assessed receptors which are not associated with the farm, in Drawing AQ1 (Appendix A).

1.2 Proposed Development

The site is not currently developed and the applicant is now seeking to construct 2 houses for a total maximum capacity of 100,000 birds across the 2 sheds. The broilers will be brought in as day old chicks at a 50-50 mix of males and females. The 36 day growth period (with thinning at day 30) will lead to birds being around 2.0 kg in weight by clearout.

The new buildings will each measure approximately 98m by 24.5m with a height to the eaves of 2.638 metres, 4.818 metres to the ridge (average 3.728m) and the top of the fans approximately 0.8m above the ridge. The elevations for the proposed sheds are shown in Figure 1-1, below.

Figure 1-1
Elevations



For the comfort and productivity of the birds the temperature within the houses must be regulated. The new houses would be ventilated by uncapped high speed ridge mounted fans, with exhaust via a single chimney per ridge fan. Gable end fans are available for use in the warmest weather as there is sufficient fan capacity (including back-up systems) to ensure that the comfort of the birds is maintained even in the event that the outside ambient temperature rises above 30ºC.

The facility will be of modern design, utilising the current best practice control measures for minimisation of ammonia impact. This includes optimisation of diet for the growing birds and the use of nipple drinkers to reduce litter moisture content, for example. High litter moisture content, low oxygen levels, small particle size, high temperatures and low pH encourage anaerobic bacterial activity and the generation of ammonia and the facility will be operated in a manner which discourages such activity.

1.3 Environmental Permitting

The Planning and Environmental Permitting processes are separate, but complementary, as discussed further in section 3.2 of this report. At the time of writing, an application for an Environmental Permit to cover the broiler facility has yet to be made to Natural Resources Wales (NRW). An Odour Management Plan aimed at ensuring that the operation of the facility will be acceptable in relation to odour will be prepared in support of that application. application.

Paragraph 5.13.3 of Planning Policy Wales (Edition 10, December 2018) requires that the local planning authority must assume that the Permit will operate effectively in preventing unacceptable levels of odour at relevant receptor locations.

1.4 Scope and Limitations

The scope of this OIA is limited to the prediction, through atmospheric dispersion modelling, of impacts at local sensitive receptors based on design information and desktop emission rates.

Assessment of impacts associated with emissions of ammonia on sensitive ecological sites is outside the scope of this report, which deals with issues of odour only.

1.5 Aims and Objectives

The objectives of the assessment are as follows:

- To identify the odour sources which will be present at the facility;
- To estimate odour emissions from the proposed facility with additional sheds and birds;
- To quantify impacts on sensitive receptors based upon the emission values; and
- To assess the significance of these impacts.

2.0 ASSESSMENT METHODOLOGY

2.1 General Approach

The approach taken in this assessment is consistent with that for other broiler applications in Powys, where the same general approach has been regarded as acceptable, for example:

1. Application Ref. No: P/2017/1109. Proposed erection of a broiler shed to include 2 no. feed silos and associated works. Ddole Farm, Llanbister LD1 6SS.
2. Application Ref. No: P/2017/1031 Erection of an agricultural building for free range broiler production and associated works. Tanhouse Dolau, Llandrindod Wells LD1 5TL.
3. Application Ref. No: P/2017/0325. Proposed erection of 2 no. Poultry buildings for broiler breeder rearing, four no. feed bins, new access track, improvements to existing entrance, creation of one new passing place installation of septic tank and associated development. Cwmroches, Llandrindod Wells, LD1 5SY.

In the above cases Powys Council has referred to the requirement for an NRW Environmental Permit and therefore has complied with Paragraph 5.13.3 of Planning Policy Wales thus avoiding duplication between the two regulatory regimes.

2.2 Assessment of Odour Exposure

In the UK, odour assessments for poultry facilities are most commonly undertaken using the concept of the European Odour Unit (ou_E), as defined in BS EN 13725[1]. This approach allows impact assessment of any odorous gas as it is independent of chemical constituents and centres instead on multiples of the detection threshold of the gas in question.

As the odour unit is a Standard Unit in the same way as gram or milligram, the notation used in odour assessment follows the conventions of any mass emission unit as follows:

- concentration: ou_E/m^3
- emission: ou_E/s
- specific emission (emission per unit area): $ou_E/m^2/s$

Like air quality standards for individual pollutants, exposure to odour is given in terms of a percentile of averages over the course of a year. The exposure criteria most accepted in the UK at present is given in terms of (concentration) European Odour Units as a 98th percentile (C_{98}) of hourly averages. This allows 2% of the year when the impact may be above the limit criterion (175 hours). The notation for impact is therefore: $C_{98,\ 1\ hour}$ X ou_E/m^3.

[1] BS EN 13725:2003 *Air Quality – Determination of Odour Concentration by Dynamic Olfactometry.*

Odour perception, annoyance and nuisance is related to more than simply odour impact, the five 'FIDOL' factors[2] must also be considered when assessing the acceptability of a scheme and the appropriateness of a limit criterion.

2.3 Identification of Odour Sources

Potential sources of odorous emissions from the proposed facility have been identified on the basis of a review of the proposed development design. This involves identifying sources of potential releases to atmosphere. The identified potential odour sources are as follows:

- Point sources (from the broiler house ventilation); and
- Waste product handling and spillages etc.

Control of fugitive / intermittent releases of odour will be addressed by a site Odour Management Plan as part of the Permitting process.

2.4 Derivation of Emissions

The anticipated odour emissions for the proposal have been estimated using values given in published literature in the UK and Europe for similar facilities. Ventilation flows are based on standard best practice design for UK broiler houses.

The odour emission rates applied should be considered worst case as they have been measured at facilities which do not apply the same odour prevention measures as will be adopted at the facility at Groes-Y-Garreg. In reality emission rates would be expected to be significantly lower.

2.5 Quantification of Odour Impact

Data derived from the previous stages is input to an atmospheric dispersion model. For this assessment the AERMOD model[3] has been applied with due consideration to relevant guidance[4]. This model is widely used and accepted by the NRW and UK planning authorities for undertaking such assessments and its predictions have been validated against real-time monitoring data by the USEPA. It is therefore considered a suitable model for this assessment.

Dispersion modelling guidance indicates that at least 3 (and ideally 5) years of meteorological data should be applied to ensure that infrequent weather conditions do not unduly bias the results. This results in a range of predicted impacts for different years of meteorological data and the average value is used to assess compliance, with the range of impacts used to assess likely variation between years and the risk of shorter-term impacts. This is particularly

[2] The FIDOL factors are defined as **F**requency, **I**ntensity (and therefore concentration), **D**uration, relative **O**ffensiveness (hedonic tone/character) and **L**ocation,

[3] Software used: BREEZE AERMOD Pro, v8.1.0.17

[4] USEPA, Aermod Implementation Workgroup, Aermod Implementation Guide, (EPA-454/B-18-003 April, 2018).

important in relation to odour, where acceptability of impacts is assessed by receptor over long time periods rather than as a result of infrequent or unusual meteorological conditions.

2.6 Assessment Scenarios

Two scenarios have been modelled to represent the existing emissions from the free-range layer facility and also the typical operation of the proposed facility, with the maximum proposed number of broilers on a 36 day cycle with thinning at day 30.

The results of the dispersion modelling have been presented in the form of:

- illustrations of the odour footprint as isopleths (contours of concentration) for the criteria selected enabling determination of impact at any locations within the study area; and
- tabulated odour concentrations ($C_{98,\ 1\text{-hour}}$ X ou_E/m^3) at discrete receptor locations to facilitate the discussion of results.

3.0 REGULATORY STANDARDS AND GUIDELINES

Currently, in the UK there are no statutory numerical standards for assessing the acceptability of predicted odour impacts from quantitative odour impact assessments. On this basis, odour impact criteria are typically based upon guideline documents (predominately based on research from outside of the UK), case law and research which differ depending on the regime i.e. planning (to avoid significant detriment to amenity) or permitting (to avoid unacceptable pollution).

The numerical limits applied have largely been derived from the findings of a limited number of epidemiological assessments where modelled odour impacts have been compared to the findings of quality of life surveys; a dose-effect study. These dose-effect studies have only been undertaken for a limited number of odour types; however they have been used as the foundation for the setting of acceptable odour standards in many countries.

The actual acceptable level of impact will be dependent on the nature (offensiveness) of the odour and the broad sensitivity of the population. To account for this differing numerical limits are often set not only depending on the offensiveness of the odour but also the broad sensitivity of the environment.

3.1 UK Guidance

UK guidance identifies a range of odour impact criteria depending primarily on the nature of the odour (i.e. its pleasantness/unpleasantness) and the likelihood of causing unacceptable impacts based on the 98th percentile of predicted hourly average concentrations over a year.

It is therefore evident that such criteria apply only to locations where an individual's exposure is likely to occur for prolonged periods of time i.e. residential properties. Where exposure is more transient (i.e. roads, footpaths etc.) the direct application of such criteria should be treated with caution and further consideration should be given to how the duration and frequency of exposure of the individual will influence the acceptability of the predicted impact.

3.2 Planning vs. Permitting: National Planning Policy Framework (NPPF)

The Welsh Government released Planning Policy Wales (Edition 10) in December 2018. As described above, this includes information for sites which will fall under the Environmental Permitting regime, regulated by NRW:

> *'5.13.3 Planning authorities, other relevant local authority departments and Natural Resources Wales (NRW) must work closely together to ensure that conditions attached to planning permissions and those attached to Environmental Permits are complementary and do not duplicate one another. Sufficient information should accompany development proposals in order for planning authorities to be satisfied that proposals are capable of effective regulation. NRW should assist the planning authority in establishing this position through the provision of appropriate advice. The parallel tracking of planning and environmental permitting applications should be the*

preferred approach, particularly where proposals are complex, so as to assist in mitigating delays, refusal of applications or conditions which may duplicate the permit/licence.'

This is the approach that has been adopted in relation to similar applications in Powys.

3.3 NRW H4 guidance

NRW has published a number of guidance documents relating to odour assessment. These include the Horizontal Guidance EPR H4 – Odour Management[5].

The H4 guidance proposes the use of installation-specific exposure criteria (benchmarks) on the basis that not all odours are equally offensive, and not all receptors are equally sensitive. The conditions of a Permit will balance these installation-specific odour exposure criteria against what is realistically achievable in accordance with the concept of Best Available Techniques (BAT).

The Guidance states:

'..benchmarks are based on the 98th percentile of hourly average concentrations of odour modelled over a year at the site/installation boundary. The benchmarks are:

1.5 odour units for most offensive odours;

3 odour units for moderately offensive odours;

6 odour units for less offensive odours.'

Examples of these three categories are:

'Highly offensive:

processes involving animal or fish remains
processes involving septic effluent or sludge
biological landfill odours

Moderately offensive:

intensive livestock rearing
fat frying (food processing)
sugar beet processing
well aerated green waste composting

Less offensive:

brewery
confectionery
coffee roasting
bakery'

These benchmark limits are precautionary and may be relaxed in cases where the source is familiar to the location. This is particularly the case in relation to intensive agriculture in a rural setting. For example, research relating to broiler farms indicates that a more representative nuisance threshold for an agricultural area should be anywhere from 3.3 – 8.8

5 H4 Odour Management: How to comply with your environmental permit.

ou_E/m^3 as a 98th percentile of hourly means[6], or even 9.7 ou_E/m^3 (as a 98th percentile)[7]. This is consistent with guidance published by the EA in relation to nuisance thresholds as a function of site setting[8,9] and also regulation applied in Ireland, where the Environmental Protection Agency (EPA, Ireland) recommended criterion is 6.0 ou_E/m^3 as a 98th percentile of hourly means for existing units. The H4 (and IPPC SRG 6.02, below) benchmarks should therefore be seen as a guide of the relative likelihood of an odour issue being caused rather than an absolute limit value, particularly in an agricultural setting.

3.4 IAQM Odour Guidance[10]

On 20th May 2014 the Institute of Air Quality Management released guidance on the assessment of odour for planning. This was updated in 2018.

The guidance is for assessing odour impacts for planning purposes. It provides background information relating to requirements for odour impact assessments and suitable impact criteria and draws from other sources of information such as that described in the H4 guidance (Section 3.3, above).

The IAQM odour guidance requires a degree of professional judgement when considering potential effects of environmental odours. Given the site setting and the number of residences potentially affected, the IAQM odour guidance may be used to classify to the impact from an intensive agricultural facility (i.e. for a 'moderately offensive odour') in an agricultural setting as:

- 'negligible' at, or below 3 ou_E/m^3 as a 98th percentile of hourly means; or
- 'slight adverse' from 3 ou_E/m^3 - 5 ou_E/m^3 as a 98th percentile of hourly means; or
- 'moderate adverse' impact above from 5 ou_E/m^3 as a 98th percentile of hourly means.

Only a moderate impact (or greater) would be regarded as 'significant' for purposes of environmental assessment when considering the overall planning balance.

This document is not intended to provide guidance on odour for environmental protection regulatory purposes (e.g. Environmental Permitting).

[6] Misselbrook, Clarkson and Pain (1993) *Relationship between concentration and intensity of odours for pig slurry and broiler houses.*

[7] Hayes, E.T., Curran, T.P and Dodd, V.A. (2006) *Odour and ammonia emissions from intensive poultry units in Ireland*. Bioresource Technology 97 pp933-939

[8] EPA (2001) Odour Impacts and Odour Emission Control Measures for Intensive Agriculture. R&D REPORT SERIES No. 14. pp31.

[9] Environment Agency (2002) Assessment of Community Response to Odorous Emissions. R&D Technical Report P4-095/TR. pp63

[10] IAQM (2018) *Guidance on the assessment of odour for planning*

4.0 RECEPTORS, VENTILATION FLOWS AND EMISSIONS

4.1 Site Setting

Discrete receptor locations have been selected for comparative purposes to facilitate the discussion of predicted odour impacts; in general they represent the closest residential locations in each direction. These are as presented in Table 4-1 and shown in Drawing OIA1.

Table 4-1
Discrete Receptor Locations Modelled

Reference	Description	National Grid Reference	
		OS Xm	OS Ym
R1	Maes-Y-Groes	317442.2	302816.2
R2	Meadow View Barn	317544.0	302821.7
R3	Cross Lane Farm	317564.5	302778.0
R4	1 & 2 Llwyn Dderwen	317567.2	302399.5
R5	Bryn Derwen	316648.3	302504.0
R6	Bryn Awel	316536.3	302505.4
R7	Fair Oaks	316821.2	302703.5
R8	Cedar Lodge	316835.5	302909.8
R9	Property (name unknown)	317165.5	303084.7
R10	Peacehaven	317238.6	303179.7
R11	The Ffridd	317110.8	303269.2
R12	Groestyn	317820.7	303185.2
R13	Little Ffridd	316403.3	303046.8

The occupants of Groes-Y-Garreg Farm have a vested (economic) interest in the success of this development and also are in a position to directly affect the emissions from the facility and their movements in relation to them. They must therefore not be regarded as sensitive receptors for purposes of odour assessment.

In addition to assessment of impact at discrete receptors, a receptor grid has been used to allow the production of and odour isopleth drawing.

4.2 Ventilation flows

Ventilation is important for the birds' health and will therefore affect production levels. It is applied when cooling is required, and for maintaining the composition of the indoor air at the required levels. Directive 2007/43/EC lays down minimum requirements for environmental parameters that need to be ensured, namely:

- NH_3 concentration not exceeding 20 ppm;
- CO_2 concentration not exceeding 3 000 ppm;

- indoor temperature, when the outside temperature measured in the shade exceeds 30 ºC, not exceeding this outside temperature by more than 3 °C; and
- indoor average humidity, measured over 48 hours, not exceeding 70 % when the outdoor temperature is below 10 °C.

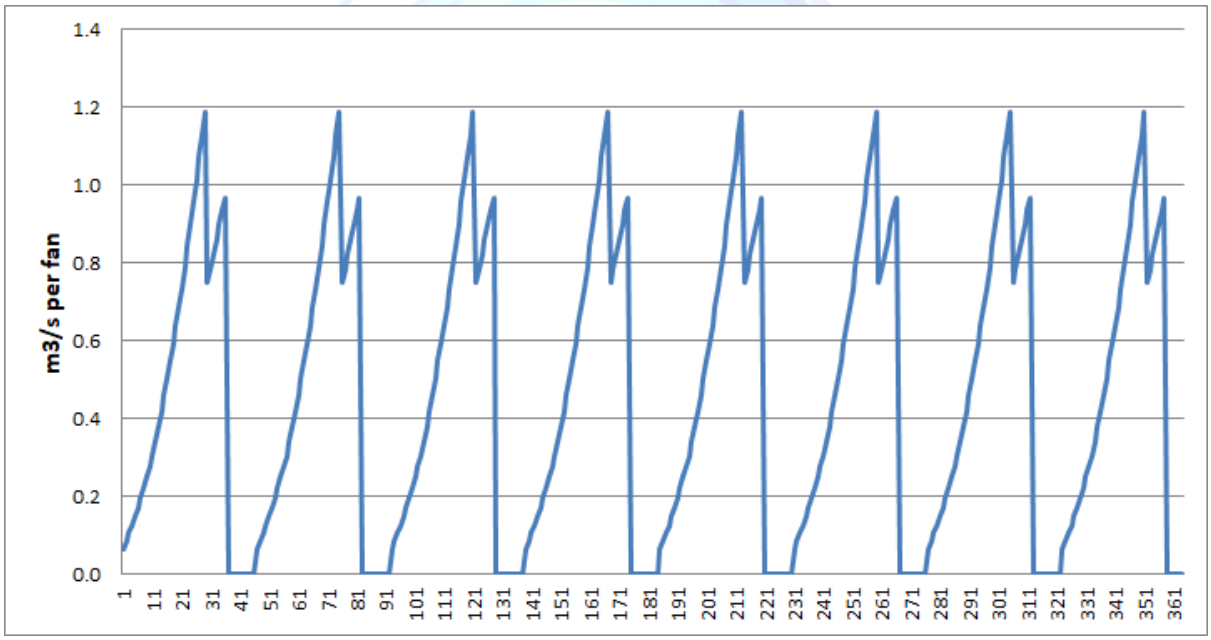
Design ventilation flows have been provided by the designers of the facility (J.F. McKenna).

The 14 No. roof ridge fans per building will be Fancom 800mm units, each capable of moving a maximum of 17500m^3/hr (4.9m^3/s). These ridge units will typically operate at low extraction rates on cool days and when the birds are young.

The Fancom 34132 (54”) gable end tunnel fans are available in the event that the temperature within the house may not be maintained by the ridge fans. This is therefore a back-up system only for use on the hottest days and towards the latter stages of the crop.

Figure 4-1 below presents the variation in flow (m^3/s) per shed against one year (8 complete crop cycles) for a minimum ventilation rate. The drop at day 30 in the graph relates to the reduced numbers after thinning of the crop.

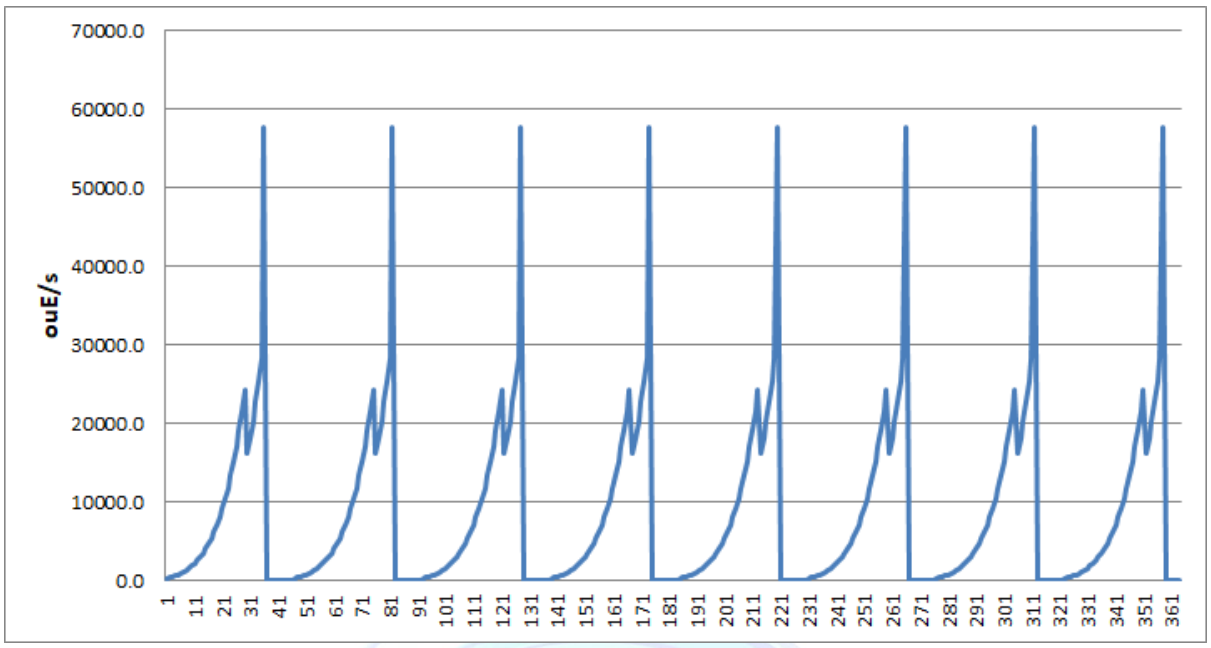
Figure 4-1
Required Minimum Ventilation Rate (total)



4.3 Emission Rates

The emission rates used are calculated from an internal concentration of odour taken from published values which indicate a likely range for a well run modern farm of 300ou_E/m^3 – 2300 ou_E/m^3 across a 36 day growth cycle. The time varying emission rates used represent the emissions for each shed (housing 50,000 birds) is as shown below.

Figure 4-2
Emission rate (ou_E/s per house)



It can be seen in Figure 4-2 that the relative proportion of emissions will vary across the cycle, with the peak during clearing out (as would be expected) where an emission rates of 2ouE/s per bird has been assumed for an entire day.

Research has shown that the use of indirect heating, will result in a significantly improved building environment and lower emissions, particularly of ammonia and carbon dioxide. This in turn improves the growth rate and performance of the birds. The quality of the litter and in particular the moisture content, will also determine the overall odour emission.

5.0 ODOUR IMPACT ASSESSMENT

The dispersion model was constructed based on the input parameters described below.

5.1 Model Domain

Modelling was carried out at 50m resolution over a 1.35 km by 1.35 km grid. In addition, the identified potentially sensitive locations, detailed in Table 4-1, were modelled as discrete receptors.

Other receptors may be relevant, such as other individual residences in Berriew and for these receptors, the odour isopleths are available.

5.2 Model Assumptions

The temperature of the flows from the fan units has been assumed at 25ºC, which is at the lower end of the range for the entire cycle (the younger birds will typically be housed at a temperature slightly above this). The velocity from the ridge fans has been taken as 3m/s which is regarded as cautious in terms of dispersion. As the gable end fans are for back-up only, they have not been considered as odour sources given that odour assessment works on the basis of the 98th percentile impact (unlike ammonia ecological impacts, for example, which are calculated as an annual average).

5.3 Building Downwash / Entrainment

The movement of air over and around buildings and other structures generates areas of flow re-circulation that can lead to increased ground level concentrations of pollutants close to the source. Where the stack height is less than 2.5 times the height of any nearby building (within 5 stack heights), downwash effects and entrainment can be significant.

Buildings have been incorporated into the dispersion model as detailed in the modelling files at a height of 3.728m (the average of eaves to ridge). This compares with the 4.53m stack heights modelled and gable fans for the which have been modelled as area sources (with no vertical velocity).

5.4 Local Wind Speed and Direction Data

The most important meteorological parameters governing the atmospheric dispersion of pollutants are wind direction, wind speed and atmospheric stability.

For meteorological data to be suitable for dispersion modelling purposes a number of meteorological parameters need to be measured on a continuous basis. There are only a limited number of sites where the required meteorological measurements are made. In the UK, all of these sites are quality controlled by the Met Office.

The closest Met Office sites to Groes-Y-Garreg, Berriew are:

- Shawbury (43km from Scout Road, 75.9m AoD); and
- Shobdon (49 km from Groes-Y-Garreg, 99m AoD);.

Both of these sites are exposed airfields and over 40km from Groes-Y-Garreg. Following consultation with the meteorological data provider, it was concluded that neither of these sites are ideal for the Groes-Y-Garreg area with the site lying at over 200m AoD. Under these circumstances, the impact may be modelled using a 5 year Global Forecasting System (GFS) resolution Numerical weather prediction (NWP) meteorological data set.

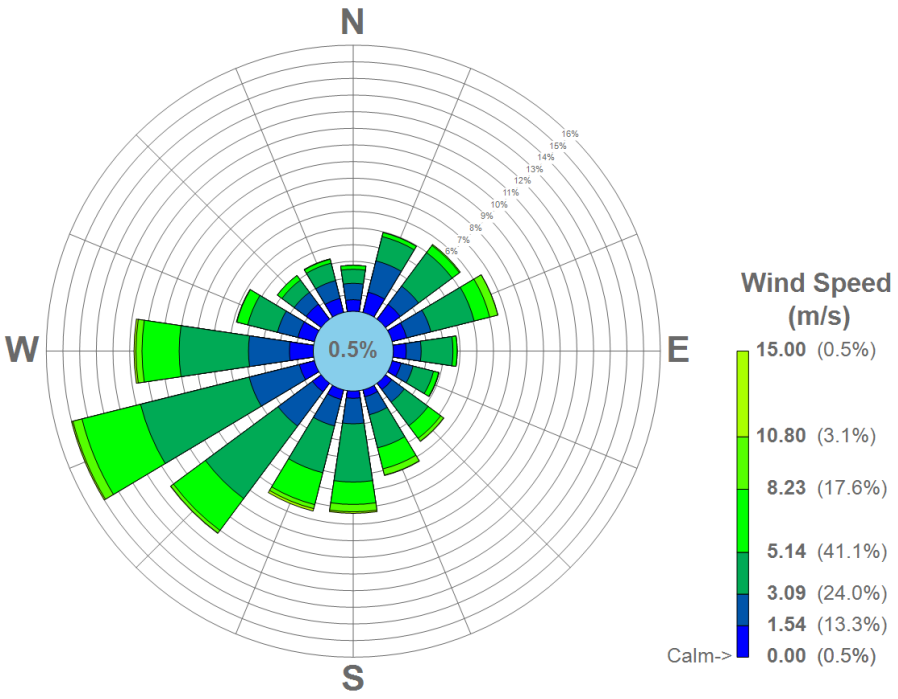
The GFS is a spectral model and data are archived at a horizontal resolution of 0.5 degrees (approximately 50 km over the UK). The GFS resolution adequately captures major topographical features and the broad-scale characteristics of the weather over the UK. Smaller scale topological features may be included in the dispersion modelling by using the flow field module of ADMS (FLOWSTAR).

This NWP meteorological data is accepted for use in dispersion modelling assessments in the UK and provides the advantage of a more site-focussed data set than would be the case for data collected by the Met Office in the UK.

A 5-year NWP data set, covering the period 2014-2018 has been used for this assessment and this is presented as a windrose in Appendix B.

A windrose providing the frequency of wind speed and direction for 5 years of data is presented in Figure 5-1, below.

Figure 5-1
NWP Data: Windrose (5 years)



5.5 Temperature

Analysis of 5 years (2014-2018) meteorological data recorded at Shobdon (the closest recording site) shows that temperatures very rarely exceed 25°C. Missing data has been excluded.

Table 5-1
Shobdon Meteorological Summary (5 years data)

Minimum Temp °C	Maximum Temp °C	Number of Hours	% of year	% of year cumulative	Average hours per year
	<-10	4	0.01%	0.01%	1
-10	-5	100	0.2%	0.24%	20
-5	0	1753	4.0%	4.26%	351
0	5	7198	16.5%	20.80%	1440
5	10	13071	30.0%	50.82%	2614
10	15	12726	29.2%	80.04%	2545
15	20	6914	15.9%	95.92%	1383
20	25	1545	3.5%	99.47%	309
25	30	225	0.5%	99.99%	45
30		6	0.0%	100.00%	1
	TOTAL	**43542**	**100%**		**8708**

5.6 Met Data Preparation

Meteorological data was obtained in .met format and converted to .sfc and .pfl formats for use in AERMOD using AERMET Pro. Shobdon meteorological data has been processed according to US EPA methodology[11]. Surface roughness length is based upon land use characteristics 1km from the point source.

The determination of Bowen ratio and albedo is defined by a 10km by 10km region around the site. The surrounding land use has been characterised as grassland and cultivated land.

5.7 Topography

The site is located at approximately 201m AOD. Information relating to the topography of the area surrounding the site has been used to assess the impact of terrain features on the dispersion of emissions from the site. Topographical data has been obtained in digital (.ntf) format and incorporated into the assessment.

[11] US Environmental Protection Agency (2008). AERMOD Implementation Guide, AERMOD Implementation Group.

5.8 Modelled Release Parameters

The release parameters for each stack are as shown in Appendix B.

6.0 RESULTS

Results may be compared against the benchmark criterion of 3 ou_E/m^3 as a 98th percentile of hourly means appropriate for a 'moderately offensive' odour. Given the site setting and the number of residences potentially affected, the IAQM odour guidance would regard the impact as:

- 'negligible' at, or below this concentration; or
- 'slight adverse' from 3 ou_E/m^3 - 5 ou_E/m^3 as a 98th percentile of hourly means; or
- 'moderate adverse' impact above from 5 ou_E/m^3 as a 98th percentile of hourly means.

The 5-year average odour exposures predicted as a result of emission from the facility are presented in Table 6-1 below and Appendix C.

Table 6-1
Results (ou_E/m^3)

Ref	2014	2015	2016	2017	2018	Ave
R1	1.44	1.14	1.56	2.42	2.41	1.79
R2	0.82	0.71	0.96	1.65	1.53	1.12
R3	0.69	0.66	0.94	1.68	1.27	1.01
R4	0.10	0.22	0.22	0.27	0.12	0.18
R5	0.12	0.14	0.23	0.04	0.22	0.16
R6	0.09	0.08	0.15	0.03	0.13	0.09
R7	0.54	0.34	0.49	0.11	0.24	0.32
R8	0.13	0.13	0.08	0.07	0.06	0.09
R9	0.53	0.59	0.73	0.49	0.49	0.56
R10	0.35	0.35	0.41	0.39	0.36	0.37
R11	0.20	0.19	0.33	0.15	0.16	0.20
R12	0.38	0.22	0.32	0.39	0.53	0.35
R13	0.06	0.05	0.05	0.02	0.02	0.04

The highest average predicted impacts from the proposed 100,000 bird broiler facility are at the nearest houses to the east, at Maes-Y-Groes (Crosslane Bungalow). As described in section 3.7 of this report, this would be considered as a 'slight adverse' effect. Occasional odour will be perceived this location (i.e. they will not be 'odour free') as shown in the inter-year results variation, however this will not be at a level which would normally be considered unacceptable at this location according to IAQM Guidance or NRW.

Furthermore, if additional measures are taken to mitigate this odour, particularly in relation to prevention of odour within the houses through effective litter management (particularly when cleaning out the buildings at the end of the cropping cycle) this would be reduced still further.

These additional operational measures (i.e. control of processes or emissions) remain matters for the environmental permitting process and therefore regulated through the Environmental Permit as detailed in a site Odour Management Plan to be submitted with the Permit application.

7.0 SENSITIVITY TEST

The site is over 40km from any Met Office recording stations with data quality (and completeness) suitable for dispersion modelling. As such, GFS (NWP) data has been used in this assessment for Groes-y-Garreg as it is considered to be more suitable in this individual case. Notwithstanding this, a meteorological data set sensitivity assessment has been completed which compares the results of the modelling (GFS) with those for an identical model using data from Shobdon airfield for the same 5 years of 2014 – 2018.

Table 7-1
Results: Sensitivity Test

Site	GFS Data: 5 year average	Shobdon Data: 5 year average	Difference
R1	1.79	1.89	+0.10
R2	1.12	1.17	+0.04
R3	1.01	1.19	+0.17
R4	0.18	0.51	+0.32
R5	0.16	0.92	+0.76
R6	0.09	0.65	+0.56
R7	0.32	2.05	+1.73
R8	0.09	0.37	+0.28
R9	0.56	0.67	+0.12
R10	0.37	0.38	+0.01
R11	0.20	0.22	+0.02
R12	0.35	0.25	-0.11
R13	0.04	0.24	+0.20

It remains the Isopleth view that, although the use of Met Office recorded data is normally preferred when a suitable data set is available, the use of GFS data is more appropriate in this case given the distance (>40km) from any site for which good quality data has been recorded in a format required for detailed dispersion modelling. The results of this meteorological data sensitivity test indicate that the selection of data set for purposes of the odour modelling modelling does not make a material difference to the conclusions of the assessment. Although there is a marked increase in the odour impact at some receptors, most notably R5 Bryn Derwen and R7 Fair Oaks both to the west of the farm.

8.0 CONCLUSIONS

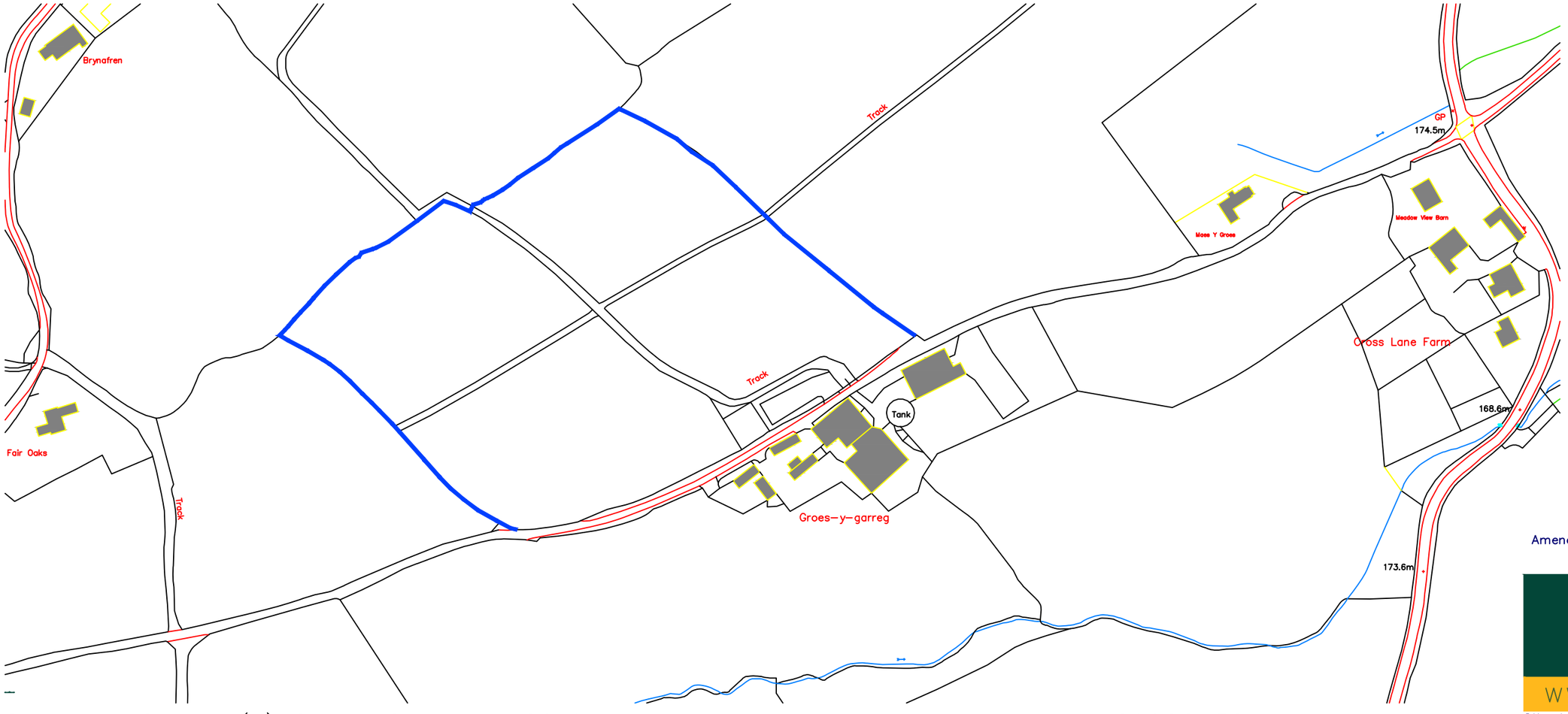
This report presents a detailed odour impact assessment (OIA) of the proposed poultry development at Groes-Y-Garreg Farm, Berriew

Dispersion modelling has been completed, which predicts that the occasional odour will be perceived the closest locations, however the proposed development is unlikely to lead to odour impacts at a level which would be regarded as unacceptable, when operated in accordance with best practice.

Should the odour control measures detailed in a site odour management plan be followed during typical operation and abnormal events, these potential impacts will be reduced even further.

APPENDIX A

(plans reproduced courtesy of Berrys)



1:2500 @ A3

0 25 50 100 200

Amendments:

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Client:
R.M & C.A Bright

Project:
Proposed Poultry Units at Groes-y-Garreg, Berriew

Drawing:
Location Plan

Drawing:	Rev.	Scale	Paper	Drawn By: PH
SA 31747 01		1:2500	A3	Date: 07.02.2019

APPENDIX B

Table B-1
House 1: Stack Locations

Stack ID	OS GR Xm	OS GR Ym
Building 1 vent 1	317101.0	302711.9
Building 1 vent 2	317105.0	302717.4
Building 1 vent 3	317111.7	302717.7
Building 1 vent 4	317115.6	302723.3
Building 1 vent 5	317122.4	302723.7
Building 1 vent 6	317126.3	302729.2
Building 1 vent 7	317133.1	302729.5
Building 1 vent 8	317137.0	302735.0
Building 1 vent 9	317143.8	302735.4
Building 1 vent 10	317147.8	302741.0
Building 1 vent 11	317154.5	302741.3
Building 1 vent 12	317158.4	302746.8
Building 1 vent 13	317165.2	302747.2
Building 1 vent 14	317169.1	302752.7

Table B-2
House 2: Stack Locations

Stack ID	OS GR Xm	OS GR Ym
Building 2 vent 1	317116.7	302683.5
Building 2 vent 2	317120.7	302689.0
Building 2 vent 3	317127.4	302689.3
Building 2 vent 4	317131.3	302694.9
Building 2 vent 5	317138.1	302695.3
Building 2 vent 6	317142.0	302700.8
Building 2 vent 7	317148.8	302701.1
Building 2 vent 8	317152.7	302706.6
Building 2 vent 9	317159.5	302707.0
Building 2 vent 10	317163.5	302712.6
Building 2 vent 11	317170.2	302712.9
Building 2 vent 12	317174.1	302718.4
Building 2 vent 13	317180.9	302718.8
Building 2 vent 14	317184.8	302724.3

APPENDIX C

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