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# AMMONIA & NITROGEN DEPOSITION RESULTS

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Erection of an 8,000 Bird  
Extension to the existing  
Free Range Poultry Unit at  
Gwynfaes  
Rhandirmwyn  
Llandovery  
Carmarthenshire  
SA20 0NG

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## 1. INTRODUCTION

It is proposed to erect a Poultry Unit extension, 8,000 free range birds (egg production) to the existing poultry unit at Gwynfaes, Rhandirmwyn, Llandovery, SA20 0NG.

12 years ago 100% of the poultry units at Gwynfaes were deep pit. Post proposal 60% of the units at Gwynfaes will be multi-tier units with manure belts running for manure removal every 4 days. Thus only 40% will be in deep pit with most of the manure removal occurring at the end of a flock cycle.

The purpose of this Report is to explain and examine if the proposed development will have any impact on the ecological interest of the area. Particular note is given to the levels of ammonia that shall arise from the proposed extension and the cumulative impact of adjoining units.

## 2. ENVIRONMENTAL SITES

Within a 5km radius of the application site there are three Sites of Special Scientific Interest and within a 10km radius there are four Special Areas of Conservation and one Special Protection Area.

Site No.	Name	Distance(km)	Designation	Easting	Northing
1	Cwm Doethie - Mynydd Mallaen	2.719	SSSI	275552	242486
2	Cwm Doethie - Mynydd Mallaen	2.719	SAC	275552	242486
3	Elenydd - Mallaen	2.719	SPA	275552	242486
4	Rhos Dolau-Bran	3.161	SSSI	279398	238304
5	Crychan Forest Tracks	4.916	SSSI	281455	237704
6	Afon Tywi	6.54	SSSI	276161	234763
7	Afon Tywi / River Tywi	6.54	SAC	276161	234762
8	Ydw Valley and Fron Road Geological Exposures	7.759	SSSI	277604	233319
9	River Wye / Afon Gwy	8.719	SAC	285776	244761
10	Afon Irfon	8.719	SSSI	285776	244761
11	Waen Rydd	9.541	SSSI	287004	243848
12	Mynydd Epynt	9.808	SSSI	285662	235109
13	Mynydd Epynt	9.808	SAC	285662	235109

### 1) Cwm Doethie-Mynydd Mallaen SSSI

This site, consisting largely of steep-sided valleys and upland tracts, is of outstanding interest for its wealth of habitats and wildlife, in particular its birdlife. Included are herb-rich grasslands and alder-fringed rivers in the valley bottoms, remnants of sessile oakwood and heath on the steep rocky valley sides, and upland grassland, moorland and blanket bog on the unenclosed sheepwalk on the plateau areas. Crag and cliff plant communities are frequent. On the valley sides of the rivers Doethie and Pysgotwr there are fine sessile oakwoods containing large maiden oaks and occasional ash, alder, birch, elm and rowan. The diverse ground flora has an abundance of mosses and liverworts and

the older trees support a rich epiphytic lichen flora. Gorge woodlands, particularly in the Cothi and Melyn valleys, also contain notable assemblages of lower plants. In all these woods there is a rich variety of small birds.

Uncommon plants occurring in the site are globeflower *Trollius europaeus*, parsley fern *Cryptogramma crispa* and lesser clubmoss *Selaginella selaginoides*, the latter growing in the most southerly site known in Britain. The rocks at Craig Ddu and Craig Clyngwyn support a remarkable variety of calcicole species, notably marjoram *Origanum vulgare*, wall lettuce *Mycelis muralis*, fairy flax *Linum catharticum*, the rare hawkweed *Hieracium lasiophyllum* and rock stonecrop *Sedum forsterianum*, together with at least eighty other species of higher plants.

The site is noted for its variety of upland and woodland birds. It is especially important for its strong populations of carrion-feeding species, such as buzzard and raven; the rare red kite also occurs. Among the other upland birds are peregrine falcon, merlin, red grouse and ring ouzel, while golden plover has bred in the past. Typical bird communities of Welsh native woodland, including redstart, pied flycatcher, wood warbler and tree pipit are very well represented. The rivers and streams hold dipper, grey wagtail and common sandpiper, with the goosander as a very recent colonist. Farmland in the

Gwenffrwd valley and elsewhere is included in the site because it forms part of the habitat of some of these birds or their prey.

## 2) Cwm Doethie-Mynydd Mallaen SAC

**MATHAU O GYNEFIN A/NEU RYWOGAETHAU Y DYNODIR Y SAFLE O'U PLEGID:  
HABITAT TYPES AND/OR SPECIES FOR WHICH THE SITE IS DESIGNATED:**

	*	<b>Enw cyffredin</b>	<b>Common name</b>	<b>Term Gwyddonol</b>	<b>Scientific term</b>
1		Rhostiroedd sych	Dry heaths	Rhostiroedd sych Ewropeaidd	European dry heaths
2		Coetir derw asidaidd gorllewinol	Western acidic oak woodland	Hen goedwigoedd y dderwen ddigoes gydag <i>Ilex</i> a <i>Blechnum</i> yn Ynysoedd Prydain	Old sessile oak woods with <i>Ilex</i> and <i>Blechnum</i> in the British Isles

## 3) Elenydd – Mallaen SPA

Elenydd-Mallaen has, until recently, provided the last refuge for the red kite *Milvus milvus* in Britain and the long association with pastoral agriculture, principally sheep rearing, has created an important carrion-feeding bird community. The breeding density of raven *Corvus corax* is the

highest recorded in Europe and the density of buzzard *Buteo buteo* is also high.

Elenydd-Mallaen is one of the most ornithologically important areas of hill land in Wales and is

dominated by blocks of upland rising to 645m separated by steep-sided valleys. The higher ground

has heath and blanket mire, characterised by heather *Calluna vulgaris* and hare's-tail cottongrass

*Eriophorum vaginatum* or deergrass *Trichophorum cespitosum*. Much of the area is dominated by

mat-grass *Nardus stricta*, heath rush *Juncus squarrosus* or purple moor-grass *Molinia caerulea*.

Actively growing pool and hummock mire is found at Cors Lwyd and at Gors Goch. Craggs with

interesting plant communities are frequent. These areas, together with some of the hillside and

streamside flushes support rare plant species.

Many of the valley sides are clothed with sessile-oak *Quercus petraea* woodland, which in places

have a rich bryophyte and lichen flora. Occasional ash *Fraxinus excelsior*, alder *Alnus glutinosa*, elm

*Ulmus glabra*, birch *Betula pubescens* and rowan *Sorbus aucuparia* add to the variety of the

woodlands. Fast-flowing rivers run down the valleys creating gorges which, together with the many

craggs and scree slopes, support bryophyte communities confined to the Western Atlantic seaboard.

Some of the valley floor grasslands support herb-rich communities.

The Elenydd-Mallaen proposed Special Protection Area comprises land within the following SSSI;

Cwm Doethie-Mynydd Mallaen, Elenydd, Vicarage Meadows, Rhosydd Llanwrthwl, Caeau Cnwch a Ty'n-y-graig, Cwm Gwynllyn, Gweunydd Ty'n-y-llidiart, Coedydd

Glannau a Cwm Coel, Rhos-yr-hafod, Coed-yr-allt-goch, Caeau Troed-rhiw-drain, Cerrig Gwalch,

Carn Gafallt, Marcheini Uplands, Gilfach Farm and Gamallt, and Llynoedd Ieuan. .

The site qualifies under Article 4.1 by supporting internationally or nationally important breeding

populations of 2 Annex 1 species: 34 pairs of red kite, (34% of the British population and 0.3% of

the world population) and

about 7 pairs of merlin *Falco columbarius* (over 1% of the British population) .

Notable also are the

following 3 Annex 1 species: 1, sometimes 2, pairs of chough *Pyrrhocorax pyrrhocorax*, part of a

small inland population that breed in dis-used lead mines and quarries, over 10 pairs of peregrine

Falco peregrinus (nearly 1% of the British population) and about 50 pairs of golden plover *Pluvialis apricaria* which are on the southern and western edge of their breeding range in Britain.

The site also supports over 50 pairs of breeding raven (about 2% of the British population). Present

also are small numbers of breeding teal *Anas crecca*, red grouse *Lagopus lagopus*, dunlin *Calidris*

alpina, snipe *Gallinago gallinago* curlew *Numenius arquata* and ring ouzel *Turdus torquatus*. Blackheaded

gull colonies occur on some of the upland pools. Breeding species along the rivers include

goosander *Mergus merganser*, common sandpiper *Tringa hypoleucos*, grey wagtail *Motacilla cinerea*

and dipper *Cinclus cinclus*.

SPA Citation

SJP September 1993

#### 4) Rhos Dolau-Bran SSSI

This part of the valley of the river Brân supports a diverse range of natural and semi-natural habitats. In this area of gravel ridges, oxbows, marsh, alder woodland, river and river-bank habitats over 150 species of higher plants have been recorded. Notable species include greater butterfly-orchid *Platanthera chlorantha*. The site would appear to support an equally diverse range of mammals, birds and invertebrates.

The continuing development of habitats of this kind is nowadays largely precluded by modern agriculture and river works, which often eliminate or reduce meanders and other features. This site demonstrates well these declining habitats and shows the importance of such places for wild plants and animals.

#### 5) Crychan Forest Tracks SSSI

A composite site made up of four forest track cuttings, which together form a key stratigraphic sequence in the type area for the Llandovery Series of the Silurian system. The tracks are situated in the central part of Crychan Forest, which lies a few miles north-east of Llandovery.

Scrach Track shows an almost continuous section across the Ordovician - Silurian boundary, from the top of the Scrach Formation, through the Bronydd and Crychan formations. The Ashgill-Rhuddanian (Ordovician - Silurian) boundary lies within the Bronydd Formation which has graptolites of the *acuminatus* Biozone near its base.

The locality at Cwm-coed-aeron shows informative track-side exposures in Llandovery (Silurian) rocks of the Trefawr Formation. Also exposed is the lower part of the Rhydings Formation, which has been interpreted as representing open marine-shelf conditions resulting from a late Llandovery transgression. This section yields a common brachiopod fauna and

occasional graptolites, and is a key stratigraphic site in the type area for the Llandovery Series of the Silurian system.

Coed Glyn Moch Track provides important sections through about three hundred metres of strata of Llandovery age (Silurian). Rocks exposed belong to the Rhydings, Wormwood and Lower Cerig formations, and contain common shelly faunas, including brachiopods.

The long Tre-fawr track section exposes most of the Llandovery Trefawr Formation. The sandy mudstones of this formation contain a graptolite and shelly fauna. This section is the stratotype for the Aeronian Stage, defined at the base of the triangulatus zone on this track. The graptolite fauna of this zone is of worldwide occurrence, one reason for its selection as an indicator of the base of the stage. Near the boundary the fauna consists mainly of brachiopods, but bivalves, gastropods, cephalopods, trilobites, corals and bryozoa also occur. This is a key stratigraphic site for studies of Llandovery strata.

#### 6) Afon Tywi SAC

**MATHAU O GYNEFIN A/NEU RYWOGAETHAU Y DYNODIR Y SAFLE O'U PLEGID:**  
**HABITAT TYPES AND/OR SPECIES FOR WHICH THE SITE IS DESIGNATED:**

	*	<b>Enw cyffredin</b>	<b>Common name</b>	<b>Term Gwyddonol</b>	<b>Scientific term</b>
1		Herlyn	Allis shad	<i>Alosa alosa</i>	
2		Gwangen	Twaite shad	<i>Alosa fallax</i>	
3		Penlletwad	Bullhead	<i>Cottus gobio</i>	
4		Lamprai neu lisywen bendoll yr afon	River lamprey	<i>Lampetra fluviatilis</i>	
5		Lamprai'r nant	Brook lamprey	<i>Lampetra planeri</i>	
6		Dyfrgi	Otter	<i>Lutra lutra</i>	
7		Lamprai neu lisywen bendoll y môr	Sea lamprey	<i>Petromyzon marinus</i>	

#### 7) River Wye SAC

**MATHAU O GYNEFIN A NEU RYWOGAETHAU Y DYNODIR Y SAFLU O'U PLEGID:**  
**HABITAT TYPES AND/OR SPECIES FOR WHICH THE SITE IS DESIGNATED:**

*	Ew cyffredin	Common name	Term Gwyddonol	Scientific term
1	Herlyn	Alis shad	Alosa alosa	
2	Gwangen	Twaite shad	Alosa fallax	
3	Cimwch yr afon	White-clawed (or Atlantic stream) crayfish	Austropotamobius pallipes	
4	Penllebwad	Bullhead	Cottus gobio	
5	Lamprai neu llysywen bendoll yr afon	River lamprey	Lampetra fluviatilis	
6	Lamprai'r nant	Brook lamprey	Lampetra planeri	
7	Dyfrgi	Otter	Lutra lutra	
8	Lamprai neu llysywen bendoll y môr	Sea lamprey	Petromyzon marinus	
9	Eog yr Iwerydd	Atlantic salmon	Salmo salar	
10	Corsydd gelyb lawn a adwaenir yn aml oddi wrth eu harwyndd ansad 'crynedig'	Very wet mires often identified by an unstable 'quaking' surface	Corsydd trosiannol a siglennydd crynedig	Transition mires and quaking bogs
11	Afonydd gyda llystyliant nofnadwy - hynny'n aml yn grafanc y dŵr yn benaf	Rivers with floating vegetation often dominated by water-crowfoot	Cyrsiau dŵr o'r iseldir hyd at safleoedd mynyddig gyda llystyliant Ranunculus fluitans a Callitriche-Batrachion	Water courses of plain to montane levels with the Ranunculus fluitans and Callitriche-Batrachion vegetation

8) Mynydd Epynt SAC

No details of SAC.

**3. SCAIL MODELLING – ASSESSMENT OF AMMONIA**

The SCAIL calculation stands for a Simple Calculation of Atmospheric Impact Limits. It is a screening tool for assessing the impact from agricultural sources on semi natural areas such as SSSI's. The SCAIL model was developed from the Integrated Pollution Prevention and Control (IPPC) Directive which requires permits for pig and poultry systems with more than a certain number of livestock. It is noted that for poultry units the IPPC directive only applies to poultry units with more than 40,000 places. We emphasise that the SCAIL model is only a precautionary approach to the assessment of risk and actually provides the reader with the worst case scenario to the impact of such developments.

The Environment Agency provide detailed Guidance regarding the Ammonia, Nitrogen and Background levels together with sources, critical loads and levels from farming operations within their document – “H1 Environmental Risk Assessment for Permits, Annex B – Intensive Farming” December 2011.

The snapshot Table below is taken from the Environment Agency;

## Appendix 1: Poultry Ammonia, Dust and Methane Emission Factors

### Ammonia - poultry housing

Housing type	Ammonia Emission Factor (kg NH <sub>3</sub> /animal place/year)
<b>Layers</b>	
Cage with deep pit manure storage beneath	0.29
Ventilated deep pit	0.20
Manure removal twice a week by manure belt	0.035
Vertical tiered cages with forced air drying once a week removal	0.035
Vertical tiered cages with whisk forced air drying once a week removal	0.09
Vertical tiered cages with manure belt with drying tunnel over cage 24-36 hour removal	0.035
<b>Barn and free range</b>	
Perchery with deep litter	0.29
Litter system with forced air drying	0.12
Litter system with perforated floor and forced air drying	0.10
Aviary system	0.08

It is noted that ammonia releases, odour and fugitive emissions (dust and flies) are considered in this assessment.

No integrated Pollution and Prevention Control Permit is required for the free range enterprise at Gwynfaes.

Ammonia is the emissions that is of most concern in this report, from animal housing, manure storage, and manure spreading. The United Nations Economic Commission for Europe (UNECE) has adopted critical levels for ammonia to protect sensitive vegetation, the annual critical level average is 3  $\mu\text{m}^3$ .

As well as Housing of the Birds, the application of manure to the land can have an impact on the designated site. The Application proposed will see manure taken from the building every 4 days and broadcast spread on the available farm land, in accordance with the Codes of Good Agricultural and Environmental Condition and Cross Compliance Regulations.

In the worst case scenario if weather does not permit spreading, manure will be stored in the existing manure store on farm. Please see Manure Management Plan.

Manure will be:

1. Spread in suitable weather conditions.
2. At least 10 meters away from any water course.
3. Incorporated into the ground within a maximum of 24 hours after application (weather dependant).



SSSI Name	Background levels		Contribution to ammonia average (NH3) concentration from this proposal	% contribution to NH3 critical levels (CL for habitat is 3ug)*	Contribution to Nitrogen (N) deposition from this proposal	CL for habitat (kg/ha/yr)	% contribution to N critical loads (CL for habitat) High Level	% contribution to N background level
	NH3 (ug)	N (kg)						
Cwm Doethie – Mynydd Mallaen SSSI	0.86	20.44	0.10	3.33	0.78	10	7.8%	3.82%
Cwm Doethie – Mynydd Mallaen SAC	0.86	20.44	0.10	3.33	0.78	10	7.8%	3.82%
Elenydd-Mallaen	0.86	13.58	0.10	3.33	0.52	10	5.2%	3.83%
Rhos Dolau-Bran	1.09	21.42	0.07	2.33	0.55	10	5.5%	2.57%
Crychan Forest Tracks	0.87	13.72	0.04	1.33	0.21	5	1.05%	1.53%

Afon Tywi	1.20	15.96	0.02	0.66	0.10	10	1.0%	0.63%
Afon Gwy	0.79	13.58	0.01	0.33	0.05	10	0.5%	0.37%

The above table summarises that the ammonia contribution from the proposal on all SSSI's are acceptable and are less than the critical load of range of 0-8% and less than 1% for the SAC's respectively.

The proposed development results in ammonia emissions lower than those considered acceptable by both Natural Resources Wales and the Environment Agency, who indeed have differing Critical Load Thresholds.

The Clients are proposing a free range laying unit where manure shall be removed every four days thus reducing the ammonia emissions from the proposal into the atmosphere. Upon application of manure to the land by broadcast method, within 24 hours all manure shall be incorporated into the land. The prevailing wind does not take exhaust air in the direction of the SSSI.

The majority of the concentration of NH<sub>3</sub> comes from existing background concentrations, in line with this the contribution from the proposal is not considered unacceptable especially given the nitrogen measures outlined.

#### **4. CONCLUSION**

Earlier in this document it has been noted that the SCAIL model is a precautionary approach to the assessment of risk. The SCAIL currently available does not provide for detailed information such as topography and vegetation to be taken into consideration.

The submitted planning application is for an extension to the existing poultry unit to accommodate a further 8,000 free range birds, this is below the required number of birds for the IPPC permit to be enforced.

The following points are noted with regards to the proposal.

1. The development proposed is of limited scale and operation, underneath the requirements of the IPPC permit.

2. The entire enterprise is a free range unit where the birds are free during the day to roam any part of the surrounding designated land. Ammonia levels in the poultry unit proposed at Gwynfaes are extremely low because the pop holes in the building are open from dawn to dusk resulting in natural ventilation through the building.
3. Manure is taken out on a 4 day cycle reducing the manure standing in the building and thus reducing ammonia levels.

In reviewing the poultry unit proposed at Gwynfaes it is concluded that there would be no detrimental impact upon environmental sites within 5km and 10km of the development.

## **APPENDIX 1**

