

# Ammonia Impact Assessment

## Technical Note

### Proposed Free-Range Egg Laying Unit, Land at Delgate Bank, Weston, Spalding

|                               |                                                                        |
|-------------------------------|------------------------------------------------------------------------|
| Site                          | Land at Delgate Bank, Weston, Spalding, Lincolnshire                   |
| Applicant                     | W Dring and Sons Ltd                                                   |
| Proposal                      | Erection of a free-range egg laying unit and associated infrastructure |
| Capacity                      | 32,000 free-range laying hens                                          |
| System                        | Free-range; belt-cleaned (manure belts, removed twice weekly)          |
| Source grid reference (SCAIL) | E 528918 / N 320751                                                    |
| Modelling tool                | SCAIL-Agriculture v1.2.0                                               |
| Meteorological dataset        | PETE (surface station 03672, 2019)                                     |
| Run mode                      | Realistic                                                              |
| Report date                   | June 2026                                                              |

## 1. Introduction

This technical note has been prepared to accompany a planning application submitted by W Dring and Sons Ltd for the erection of a new free-range egg laying unit on land at Delgate Bank, Weston, Spalding, Lincolnshire. The purpose of this note is to present the findings of an Ammonia Impact Assessment (AIA) undertaken to inform the determination of the application and to demonstrate that the proposal will not give rise to a likely significant effect on statutorily designated ecological sites through atmospheric emissions of ammonia (NH<sub>3</sub>).

## 2. Proposed Development

The proposal comprises a single free-range egg laying unit to house a maximum of 32,000 free-range laying hens, together with a linked egg packing and storage building, feed silos and associated hardstanding. The main poultry building measures approximately 110.5 m (length) × 24.5 m (width), with an eaves height of 3.5 m and a ridge height of 6.86 m; the linked packing/storage building measures approximately 24.0 m × 12.0 m (eaves 4.5 m, ridge 6.14 m).

The unit operates on a free-range basis with a tiered perchery over manure belts. The belts are emptied on a twice-weekly basis, preventing the build-up of manure within the building and limiting the potential for ammonia and odour release. Ventilation is automatic and thermostatically controlled, with stale air extracted through gable-end (end-wall) fans and fresh air drawn in through inlets located at ridge level.

## 3. Regulatory Context and Screening Approach

The assessment has been carried out in accordance with Natural England's published guidance "*Air pollution and development: advice for local authorities*" (October 2025). This guidance requires the assessment of all Sites of Special Scientific Interest (SSSI) within 5 km of the proposed emission source.

A SCAIL-Agriculture screening run was undertaken, and a review of the output confirmed that only one statutorily designated site lies within 5 km of the source:

Cowbit Wash SSSI (Site Reference 2000265) — approximately 4.95 km WSW of the source. The site is not designated for a nitrogen- or acid-sensitive habitat in the SCAIL/APIS dataset (“no sensitive habitat or species at this site”); the relevant screening test at this receptor is therefore the ammonia Critical Level.

No other statutorily designated sites lie within 5 km of the source, and no further receptors are carried forward to the formal screening assessment.

The applicable ammonia Critical Level of  $3 \mu\text{g m}^{-3}$  (higher plants) has been applied, consistent with APIS / Air Quality Technical Advisory Group guidance.

In accordance with Environment Agency and Natural England screening practice, a Process Contribution (PC) of less than 1% of the Critical Level (for ammonia concentration) or the Critical Load (for nitrogen and acid deposition) is considered insignificant and can be screened out from further assessment. Where the PC is below 1% at a designated site, the development is not considered to give rise to a likely significant effect on the interest features of the site, either alone or in combination.

#### 4. Methodology

Atmospheric dispersion modelling has been undertaken using SCAIL-Agriculture version 1.2.0, a screening-level Gaussian dispersion tool developed by the Centre for Ecology & Hydrology, SEPA and the Environment Agency and endorsed for the screening of agricultural ammonia emissions. SCAIL-Agriculture incorporates the AERMOD dispersion model.

Ammonia emission rates were derived from default SCAIL emission factors for free-range laying hens on a belt-cleaned manure system. Source parameters used in the model reflect gable-end (end-wall) extraction, with the discharge modelled at a release height of 3.4325 m above ground level (mid-height of the building) and a low-momentum, near-horizontal discharge characteristic of side-of-building ventilation (modelled exit velocity  $0.01 \text{ m s}^{-1}$ , stack diameter 1.0 m); fresh-air inlets are provided at ridge level. The model was run in “Realistic” mode using the closest representative AERMOD-compatible meteorological dataset (PETE; surface station 03672, 2019). Building downwash effects have been accounted for using the building dimensions (building height 6.865 m).

The model outputs the Process Contribution (PC) and Predicted Environmental Concentration (PEC) for ammonia concentration, nitrogen deposition and acid deposition at each designated receptor. Background concentrations and site-specific Critical Loads have been taken from the Air Pollution Information System (APIS).

#### 5. Emission Inventory

The modelled emission parameters used in the SCAIL run for the proposed unit are summarised below:

|                                     |                                                |
|-------------------------------------|------------------------------------------------|
| <b>Source</b>                       | Proposed free-range egg laying unit (1 source) |
| <b>NH<sub>3</sub> emission rate</b> | 2.9 t NH <sub>3</sub> yr <sup>-1</sup>         |
| <b>Ventilation</b>                  | Gable-end extraction; inlets at ridge level    |
| <b>Discharge height</b>             | 3.4325 m above ground level                    |
| <b>Building height (downwash)</b>   | 6.865 m                                        |

## 6. Results

The SCAIL-Agriculture model output for Cowbit Wash SSSI is summarised in Table 1 below.

**Table 1 – SCAIL results: Cowbit Wash SSSI**

| Parameter                                                                          | Cowbit Wash SSSI                |
|------------------------------------------------------------------------------------|---------------------------------|
| Distance from source (approx.)                                                     | ~4.95 km WSW                    |
| Site reference number                                                              | 2000265                         |
| Relevant sensitive habitat                                                         | None designated for N / acidity |
| <b>Ammonia concentration</b>                                                       |                                 |
| NH <sub>3</sub> Critical Level (µg m <sup>-3</sup> )                               | 3                               |
| PC NH <sub>3</sub> (µg m <sup>-3</sup> )                                           | 0.00991                         |
| Background NH <sub>3</sub> (µg m <sup>-3</sup> )                                   | 2.06                            |
| PEC NH <sub>3</sub> (µg m <sup>-3</sup> )                                          | 2.06991                         |
| PC as % of Critical Level                                                          | 0.33%                           |
| PEC as % of Critical Level                                                         | 69.0%                           |
| <b>Nutrient nitrogen deposition</b>                                                |                                 |
| N Critical Load (kg N ha <sup>-1</sup> yr <sup>-1</sup> )                          | n/a                             |
| PC N deposition (kg N ha <sup>-1</sup> yr <sup>-1</sup> )                          | 0.05                            |
| Background N deposition (kg N ha <sup>-1</sup> yr <sup>-1</sup> )                  | 16.71                           |
| PEC N deposition (kg N ha <sup>-1</sup> yr <sup>-1</sup> )                         | 16.76                           |
| PC as % of Critical Load                                                           | n/a                             |
| <b>Acid deposition</b>                                                             |                                 |
| Acid Critical Load (keq H <sup>+</sup> ha <sup>-1</sup> yr <sup>-1</sup> )         | n/a                             |
| PC acid deposition (keq H <sup>+</sup> ha <sup>-1</sup> yr <sup>-1</sup> )         | 0.004                           |
| Background acid deposition (keq H <sup>+</sup> ha <sup>-1</sup> yr <sup>-1</sup> ) | 1.304                           |
| PEC acid deposition (keq H <sup>+</sup> ha <sup>-1</sup> yr <sup>-1</sup> )        | 1.308                           |
| PC as % of Critical Load (acid)                                                    | n/a                             |

## 7. Screening Assessment

The Process Contributions for ammonia concentration, nitrogen deposition and acid deposition have been compared against the 1% screening threshold, as shown in Table 2.

**Table 2 – Screening of Process Contributions against the 1% threshold**

| Pollutant / parameter         | Screening threshold  | Cowbit Wash SSSI (PC %) |
|-------------------------------|----------------------|-------------------------|
| NH <sub>3</sub> concentration | 1% of Critical Level | 0.33%                   |
| Nutrient N deposition         | 1% of Critical Load  | n/a                     |
| Acid deposition               | 1% of Critical Load  | n/a                     |

At Cowbit Wash SSSI the Process Contribution for ammonia concentration is well below the 1% screening threshold, at 0.33% of the Critical Level. The site is not designated for a nitrogen or acid-

sensitive habitat, so no nutrient-nitrogen or acidity Critical Load applies and the ammonia Critical Level is the operative screening test. On this basis, the contribution from the proposed free-range egg laying unit is considered insignificant and not capable of giving rise to a likely significant effect on the designated features of the SSSI, either alone or in combination with other plans or projects.

## 8. Conclusion

An Ammonia Impact Assessment has been carried out for the proposed erection of a 32,000-bird free-range egg laying unit on land at Delgate Bank, Weston, Spalding, in accordance with Natural England's *"Air pollution and development: advice for local authorities"* (October 2025).

Screening modelling using SCAIL-Agriculture v1.2.0 shows that at the only SSSI within 5 km of the proposal — Cowbit Wash SSSI — the Process Contribution for ammonia concentration is well below the 1% screening threshold for the Critical Level. The site carries no nitrogen- or acid-sensitive habitat, so no deposition Critical Load applies.

On the basis of this assessment, the proposed development is not considered likely to give rise to a significant effect on the integrity, features or condition of the SSSI, either alone or in combination with other plans or projects. It is respectfully submitted that no further assessment of ammonia impacts is required and that the proposal should be considered acceptable in air quality / ecology terms.

## Appendix A – Input Parameters and Modelling Notes

**Model:** SCAIL-Agriculture v1.2.0 (AERMOD-based); run dated 25/11/2024.

**Meteorological data:** Closest representative AERMOD-compatible dataset, PETE; surface data station 03672, 2019.

**Source location:** OSGB E 528918 / N 320751.

**Source parameters:** Gable-end (end-wall) extraction with fresh-air inlets at ridge level; modelled release height 3.4325 m above ground level modelled exit velocity  $0.01 \text{ m s}^{-1}$  (low-momentum side discharge); stack diameter 1.0 m; building height for downwash 6.865 m.

**Emission rate:** Default SCAIL emission factor for free-range laying hens on a belt-cleaned system:  $2.9 \text{ t NH}_3 \text{ yr}^{-1}$ .

**Run mode:** Realistic (England region); SCAIL search radius 10 km, with the formal screening assessment focused on SSSIs within 5 km of the source.

**Assessed receptor:** Cowbit Wash SSSI (Site Ref 2000265) — the only statutorily designated site within 5 km of the source. The SCAIL run was carried out to a 10 km radius and also returned Surfleet Lows SSSI (Site Ref 1000524) at approximately 8.6 km; this site lies beyond the 5 km screening distance and screens out (all Process Contributions below 1%).

**Background data:** Air Pollution Information System (APIS) 3-year mean backgrounds ( $\text{NH}_3$ , N deposition, acid deposition) interrogated for the receptor grid reference.

**Critical Levels / Loads:**  $\text{NH}_3$  Critical Level of  $3 \mu\text{g m}^{-3}$  applied (higher plants). Cowbit Wash SSSI is not designated for a nitrogen- or acid-sensitive habitat in the dataset, so no nutrient-nitrogen or acidity Critical Load applies and only the ammonia Critical Level is assessed.