

Cinders Farm, Ruabon

Environmental Statement -
Volume II: Main Report

indigo.

Cinders Farm, Ruabon
Environmental Statement – Volume II:
Main Report
February 2018

Indigo

In conjunction with

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Main Report

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1. Introduction

- 1.1. This Environmental Statement (ES) reports the Environmental Impact Assessment (EIA) that has been undertaken to support a planning application for a proposed poultry rearing farm at Cinders Farm, Ruabon, Wrexham. The location of the Site is identified on drawing GM-MZ228-191 accompanying the planning application.
- 1.2. The planning application is submitted on behalf of Soaltar Limited to Wrexham County Borough Council.
- 1.3. The Proposal comprises:
 - Erection of four agricultural buildings for rearing livestock (poultry); ancillary buildings and plant; associated infrastructure; and landscaping.
- 1.4. An application for an Environmental Permit associated with the Proposal has been submitted to Natural Resources Wales. An Environmental Permit is sought to provide the operator with a license to carry out the following activities:
 - The rearing of poultry in a facility with a capacity for 225,000 broiler places; and
 - Operation of a biomass boiler with a maximum aggregated thermal input not exceeding 1 megawatt for site heating requirements, burning biomass fuel.
- 1.5. The Site location and the details of the Proposed Development is outlined in detail at section 3 of this ES.

Requirements for an EIA: Legislative Background

- 1.6. In accordance with the Town and Country Planning (Environmental Impact Assessment) (Wales) Regulations 2017, on the basis the Proposed Development will result in excess of 85,000 places for broilers at the site, it falls under Schedule 1 Development. As a result, this ES has been provided to accompany the planning application for the proposed poultry farm.

The Nature and Purpose of EIA

- 1.7. The objectives of EIA are as follows:
 - To identify the potential environmental impacts of a proposed development, taking into account the characteristics of the development and the local environment, and the views of local authorities and statutory consultees with responsibilities for the environment;
 - To interpret the nature of potential impacts;
 - To identify measures to mitigate adverse impacts; and
 - To report the results of the assessment in an ES for submission to the LPA.
- 1.8. The purpose of an ES is to present the findings of the assessment into the likely significant environmental impacts of the proposed development. The ES describes the assessment process, the results of the assessment of the impacts of the proposed development, assesses the significance of the impacts and describes mitigation measures proposed to reduce impacts to acceptable levels.
- 1.9. The ES is intended to enable stakeholders to understand the nature of the proposed

development and to evaluate the likely significant environmental impacts. In the case of the LPA, it will be used in the decision-making process as the relevant planning policy supports large-scale agricultural development only where there are no unacceptable environmental impacts. The ES therefore serves to aid the decision-making process and to present relevant information in a readily accessible form.

Requirements of the Regulations

1.10. The EIA Regulations requires that an Environmental Statement should include at least:

- A description of the development;
- A description of the reasonable alternatives (for example in terms of development design, technology, location, size and scale) studied by the applicant;
- A description of the relevant aspects of the current state of the environment (baseline scenario);
- A description of the factors specified in regulation likely to be significantly affected by the development: population, human health, biodiversity, land, soil, water, air, climate, material assets, cultural heritage, including architectural and archaeological aspects, and landscape.
- A description of the likely significant effects of the development on the environment;
- A description of the forecasting methods or evidence used to identify and assess the effects on the environment;
- A description of the measures envisaged to avoid, prevent, reduce or, if possible, offset any identified significant adverse effects on the environment;
- A description of the expected significant adverse effects of the development on the environment deriving from the vulnerability of the development to risks of major accidents and/or disasters which are relevant to the project concerned;
- A non-technical summary covering the above points;
- A reference list detailing the sources used for the descriptions and assessments included in the environmental statement.

Structure of the Report

1.11. The format and structure of this ES as a whole is in accordance with Schedule 4 of the Regulations and best practice guidance.

1.12. The ES comprises 3 volumes:

1.13. Volume 1 of the ES is structured as follows:

- **Chapter 1 – Introduction and EIA Methodology** - Sets out the structure of the ES and provides a summary of the process of identifying environmental matters and effects to be evaluated in the ES;
- **Chapter 2 – Scoping** - sets out scope of the ES including those items that have been scoped out of the ES.

- **Chapter 3 - Description of the Site, Proposed Development and Alternatives -** Describes the site and surroundings, relevant planning history and alternatives;
- **Chapter 4 - Highways, Traffic and Transport -** Assesses the impact of the Proposed Development on the road network;
- **Chapter 5 – Noise -** Considers the impact of noise to be generated during the construction and operational phases of the Proposed Development;
- **Chapter 6 - Air Quality –** Assesses the impact the Proposed Development will have on the air quality during construction and operation;
- **Chapter 7 - Heritage–** Assesses the impact the Proposed Development will have on the heritage assets within the surrounding area;
- **Chapter 8 - Archaeology –** Assesses the impact the Proposed Development will have on the archaeology within the surrounding area;
- **Chapter 9 - Landscape and Visual Assessment -** Examines the visual appearance of the Proposed Development in relation to their potential impact on the wider landscape context and any potential sensitive visual receptors;
- **Chapter 10 – Ecology –** Assesses the impact of the Proposed Development Examines on flora and fauna;
- **Chapter 11 – Flooding and Drainage -** presents information relating to flood risk to the Site, the potential Effects of the Proposal on flood risk elsewhere and how surface water and foul flows from the Proposal will be managed.
- **Chapter 12 – Cumulative Assessment –** Assesses the interactive and cumulative effects of the proposed Development.

- 1.14. In accordance with the requirements of the Regulations and best practice guidance, a Non-Technical Summary (NTS) of this ES has been prepared and is provided at Volume I.
- 1.15. All technical background information (plans, diagrams, tables and technical reports) is included in the Appendices at Volume III. All Appendices referred to in this report can be found in Volume III.

Planning Application Supporting Documents

- 1.16. Along with this ES, a number of other documents have been submitted to WCBC in support of the planning application, these comprise:
- Application forms, ownership and agricultural certificates and notices prepared by Indigo Planning;
 - Relevant planning drawings prepared by Knights Construction Limited;
 - Design and Access Statement, prepared by Indigo Planning;

The EIA Team

- 1.17. The applicant has instructed a team of specialist consultants to consider each issue required under this EIA. The EIA team has worked closely throughout the preparation of the ES.

- 1.18. Indigo Planning has compiled the ES, provided the introductory chapters and coordinated its production and drafted the non-technical summary. The EIA team comprises the following consultants:

Table 1.1: List of Consultants

Consultant	ES Topic	ES Chapter No.
Indigo Planning	Introduction & EIA Methodology	1
Indigo Planning	Scoping	2
Indigo Planning	Site Description, Proposed Development and Description of Alternatives	3
SK Transport Planning	Highways, Traffic and Transport	4
WSP	Noise	5
AS Modelling & Data	Air Quality	6
Castle House Heritage Consulting	Heritage	7
Aeon Archaeology	Archaeology	8
Allan Moss Associates	Landscape & Visual	9
BSG Ecology	Ecology	10
Waterco	Flooding & Drainage	11
Indigo Planning	Summary of cumulative effects, Impacts, and Mitigation	12

Availability of ES Volumes

- 1.19. Copies of the ES and non-technical summary are available to view online at www.soaltarfarming.co.uk. Computer facilities are available to view this information online at the Ruabon Library, High Street, Ruabon, Wrexham, LL14 6NH during the hours of:

- Monday & Friday (10:00 to 18:00)
- Tuesday (14:00 to 18:00)
- Wednesday & Thursday (14:00 to 17:00)

Method Statement and Assessment Criteria

- 1.20. The content and conclusions of this ES are based on a series of baseline studies and technical impact studies completed for each environmental issue assessed; development parameters; the floorspace schedule and information provided in other supporting documents such as the Transport Assessment. In particular, the ES is based on a range of qualitatively and/or quantitatively methods as follows:

- Review of the baseline situation through existing information, including data, reports, site surveys and desktop studies;
- Consideration of the relevant Planning Policy Wales (PPW) and the statutory extant and emerging development plan policies;
- Consideration of potential sensitive receptors;
- Identification of likely significant environmental effects and an evaluation of their duration and magnitude;
- Expert opinion;
- Modelling;
- Use of relevant technical and good practice guidance; and
- Specific consultations with appropriate bodies.

- 1.21. Environmental effects have been evaluated with reference to definitive standards and legislation where available. Where it has not been possible to quantify effects, assessments have been based on available knowledge and professional judgement.

Parameters

- 1.22. The principles for the Proposal are set out in the submission drawings. The drawings submitted as part of the application are:

- Existing Site Plan;
- Site Layout Plan;
- Elevations and floor plans;
- Cross Sections;
- Access Route plans;
- Highways improvements plans;
- Landscape and Biodiversity Management Plan; and
- Site Location Plan.

- 1.23. The floor plans and elevations show dimensions of the buildings.

Construction and Phasing

- 1.24. Limited information is currently available on construction. Reasonable worst case assumptions have therefore been made of likely construction processes to assess the potential environmental effects during construction. Appropriate mitigation will be specified in the Construction Management Plan which will be prepared, once further information is available on construction processes.
- 1.25. For the purposes of the assessment it is currently envisaged that the Proposed Development

would commence construction in Autumn 2018 and will take six months to complete.

- 1.26. This programme is provisional and not definitive and specialists were instructed to assess impacts on the basis that the timescale for implementation could be longer or shorter than set out based on market conditions.

Scenarios

- 1.27. The purpose of the EIA is to identify the likely 'significance' of environmental effects (beneficial or adverse) arising from the Proposed Development. Construction and operational effects have been considered under the following scenarios:

- The existing baseline i.e. the 'do nothing' scenario;
- With the Proposed Development (future baseline); and
- Cumulative / in combination effects.

Determining Significance

- 1.28. The significance of the environmental effects of these scenarios. Indirect or direct effects are associated with a specific source, receptor or resource, where:

- Sources are the construction or operational activities that may give rise to effects on specific receptors or resources; and
- Resources and receptors comprise human beings, flora, fauna, soil, water, air, climate, landscape, transport networks, local communities and other material assets.

- 1.29. Schedule 4 of the EIA Regulations requires an ES to describe:

"5. A description of the likely significant effects of the development on the environment resulting from, inter alia—

- (a) the construction and existence of the development, including, where relevant, demolition works;
- (b) the use of natural resources in particular land, soil, water and biodiversity, considering as far as possible the sustainable availability of these resources;
- (c) the emission of pollutants, noise, vibration, light, heat and radiation, the creation of nuisances and the disposal and recovery of waste,
- (d) the risks to human health, cultural heritage or the environment (for example due to accidents or disasters);
- (e) the cumulation of effects with other existing and/or approved projects, taking into account any existing environmental problems relating to areas of particular environmental importance likely to be affected or the use of natural resources;
- (f) the impact of the project on climate (for example the nature and magnitude of greenhouse gas emissions) and the vulnerability of the project to climate change;
- (g) the technologies and the substances used.

The description of the likely significant effects on the factors specified in regulation 4(2) should cover the direct effects and any indirect, secondary, cumulative, transboundary, short-term, medium-term and long-term, permanent and temporary, positive and negative effects of the development. ..."

- 1.30. The assessment of environmental effects and their significance is influenced by the 'value' and resilience of an affected resource or receptor, the duration and frequency of the effect

(positive or negative) and the ability of receptors to recover. The physical extent of the effect in terms of the geographical area affected, or the size of the human population affected, or spatial extent of any protected species or habitats affected, are all taken into account.

- 1.31. Within each chapter the assessors have determined the magnitude of impact in accordance with specific guidance notes.
- 1.32. The sensitivity of a receptor is based upon the relative importance of the receptor. The approach towards determining the sensitivity has been specified by the individual authors of the ES with reference to relevant guidance and best practice notes.
- 1.33. The significance of an environmental effect is determined with reference to the magnitude of the impact and the sensitivity of the receptor. The significance and impact may be either positive or negative. To determine the significance of an effect, reference should be drawn to the impact significance as set out in the following table. Except where assessment chapters have defined scales of significance (eg noise) only effects that are extreme or major are considered to be significant environmental effects.

Significance	Criteria
Extreme	These effects represent key factors in the decision-making process. They are generally, but not exclusively associated with sites and features of national importance and resources/features which are unique and which, if lost, cannot be replaced or relocated.
Major	These effects are likely to be important considerations at a regional or district scale but, if adverse, are potential concerns to the project, depending upon the relative importance attached to the issue during the decision making process.
Moderate	These effects, if adverse, while important at a local scale, are not likely to be key decision making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall effects on a particular area or on a particular resource.
Minor	These effects may be raised as local issues but are unlikely to be of importance in the decision making process. Nevertheless, they are of relevance in the detailed design of the project.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Mitigation

- 1.34. The incorporation of mitigation measures (measures to avoid or minimise adverse effects) is an integral part of the development design and related EIA process. Mitigation measures have been developed and incorporated into the scheme as the design has developed through a process of review and iteration to reduce potentially significant environmental effects that have been identified. Therefore, significant environmental effects have generally been 'designed out', avoiding the need for 'bolt on' measures to mitigate outstanding significant effects.

Assessing Cumulative Effects

- 1.35. This EIA has considered effects of the development cumulatively with other committed developments (those that have already commenced development or those that have not been commenced, but have valid extant permission).

- 1.36. Consideration has also been given to the interaction and in combination effects. In summary, the two types of cumulative effects can be summarised as:
- Type 1 effects – the combination of individual effects regarded as interactive effects, for example, noise, dust and visual effects, from a development on a particular receptor; and
 - Type 2 effects – effects from several developments, which individually might be insignificant, but when considered collectively, could create a significant cumulative effect.

2. Scoping and Alternatives

The Scoping Process

- 2.1. Scoping is the process of determining the amount of information on each of the principal subjects and effect types to be presented in an ES. It is regarded as an important first step in the overall EIA process, although it is not necessarily a mandatory requirement of the EIA Regulations.
- 2.2. The primary aim of EIA scoping is to facilitate the planning of a focused EIA that concentrates on the resolution of substantive environmental issues, whilst giving appropriate reduced emphasis to those of less potential importance and, where appropriate, excluding any non-issues from further consideration. It also allows primary concerns to be identified at an early stage and informs developers of aspects of concern that they may not have been aware of. Surveys and assessment methodologies can also be agreed between all interested parties such that it is less likely that additional information is required after submission of the application.
- 2.3. The EIA team has liaised directly with relevant officers at Wrexham County Borough Council to arrive at an agreed Scope of the Environmental Assessment Chapters:
 - SK Transport has liaised with Philip Palmer, highways officer at WCBC concerning scope of assessment (See **Section 4.3**);
 - WSP has liaised with Nick Minshall, Pollution Control Office at WCBC to agree baseline survey and assessment approach (See **Section 5.22**);
 - Castle House Heritage Consulting consulted relevant representatives of local and national heritage stakeholders (WCBC & CADW) regarding the Heritage Assets identified and the scope and methodology of the proposed study (See **Section 7.9**);
 - BSG Ecology consulted with Ecologist Emma Broad of Wrexham County Borough Council to agree the approach, scope and extent of further ecological survey work required to inform the future planning application (See **Appendix 10.2 Volume III**); and
 - Waterco consulted NRW and WCBC to obtain preliminary advice on the development proposals and to determine specific requirements for surface water drainage. (See **Appendix 11.1**)
- 2.4. Regulation 14 of the EIA Regulations allows potential applicants to ask the planning authority to state, in writing, the information that should be set out in an ES. A Scoping Report was issued to the LPA on 13 February 2018 to seek clarification of the items to be scoped out of the ES.
- 2.5. In addition, a pre-application advice request form was submitted to the LPA in August 2016 seeking advice from planning officers on the proposed poultry farm prior to submission of an application.

Summary of the Scoping Exercise

- 2.6. The scoping exercise has been undertaken to assess the requirements of the ES to be

submitted with the planning application at Cinders Farm. The reasons for the items scoped out of the assessment are below.

Items scoped out of assessment

- 2.7. The following items have been scoped out of the EIA:

In-combination effects of ammonia emissions on European designated ecological sites.

- 2.8. The ES does not need to provide an in-combination assessment of the impact of the development on European Protected habitats sites. The site is not located on a designated site and NRW have confirmed as part of the determination of the Environmental Permit that no in-combination assessment with other poultry / pig developments on European Protected Habitats is necessary.

Operation phase activities: particulate matter.

- 2.9. Assessment of particulate matter is screened out of the ES as the Development Proposal falls below the screening threshold set out in DEFRA Technical Guidance (TG16) for Local Air Quality Management.

Construction traffic noise

- 2.10. Traffic noise during the construction phase of the Proposed Development. The construction phase of the Proposed Scheme is likely to generate no more than 25 HGV vehicle movements per day. The additional HGV vehicle movements to and from the Site are anticipated to be minimal in context of the existing traffic flows on the surrounding local road network. Notwithstanding the potential changes in traffic composition on the surrounding local road network, the potential changes in existing road traffic noise at existing sensitive receptors from the construction phase generated traffic, are expected to be insignificant.

Traffic noise on internal access route

- 2.11. Noise from vehicle movements on the internal access route during the operational phase. There are large separation distances between the proposed internal access route and the existing noise sensitive receptors. Consideration has also been given to the presence of existing on-site buildings that have the potential to afford screening from vehicles on the access route. It is not expected that on-site vehicle movements during the operational phase will generate significant levels of noise at existing sensitive receptors.

Vibration during operation

- 2.12. Vibration during the operation of the Proposed Development. It is not expected that the development during the operational phase will generate significant levels of vibration at existing sensitive receptors.

Alternatives

- 2.13. No alternative sites have been assessed. No other design solutions have been considered: the design is typical of a poultry farm and the scale is an average sized modern broiler farm and is sufficient to provide employment for at least one full time equivalent employee.

3. Development Description

Introduction

- 3.1. This chapter provides details of and a description of the site location and characteristics and sets out the development proposals for the proposed poultry farm, alongside construction and operational arrangements of how the proposed farm will operate.

Site Location

- 3.2. The application site is located approximately 1.5km to the east of Ruabon as indicated on the location plan at **Appendix 9.2 Volume III**. Existing features in the local landscape are illustrated on the aerial photographs at **Appendix 9.3 Volume III**, which date from June 2009.
- 3.3. The site is located in a gently undulating lowland agricultural landscape. The land across the site falls from south-west to north-east across the 100m AOD contour, as illustrated on the Existing Site Plan (Dwg no 755-0717-T).
- 3.4. The main part of the site occupies part of a larger arable field which is in arable cultivation. This part of the site is bounded by mature hedgerows to the north, south and east whilst the remainder of the arable field defines the western boundary. There are occasional mature trees in the hedgerows (mostly Oak) and a drainage ditch along the northern boundary.
- 3.5. The smaller south-eastern and north-eastern part of the site occupies part of an adjacent pasture field. This part of the site is bounded by a mature hedgerow to the north-west, the existing farm buildings at Cinders Farm to the south, and the adjacent road to the east. There is no hedgerow along the roadside boundary.
- 3.6. Current access to the main part of the site is via a farm track from the south from Cinders Farm. There is an existing public footpath (RUA/91) which runs near the western site boundary. However, this cannot be well used as the crossing point to the drainage ditch near the north-western corner of the site is in very poor condition and is virtually inaccessible.
- 3.7. The OS map at **Appendix 9.5 Volume III** indicates all public rights of way in the local area and provides reference numbers for those most relevant.
- 3.8. It can be seen from the aerial photographs that the application site is surrounded by a mix of small to medium scale fields in mixed agricultural use. The fields are generally bounded by mature hedgerows with variable hedgerow tree cover.
- 3.9. The settlement of Ruabon and the A483 dual carriageway lie approximately 1.5km to the west. The historic parkland of Wynnstay Park lies approximately 1.0km to the south-west, south of the A539.
- 3.10. Elsewhere there are scattered farmsteads and cottages served by a network of country lanes. High voltage power lines on pylons cross this landscape in a north/south direction approximately 630m to the west.

Description of Development

- 3.11. Permission is sought for the following development:
- Erection of four agricultural buildings for rearing livestock (poultry); ancillary buildings and plant; associated infrastructure; and landscaping.
- 3.12. The farm will be for rearing broiler chickens for poultry meat for retail and wholesale and restaurant trade.
- 3.13. The following sections include a description of the main development components, operational arrangements and environmental controls and description of the production cycle.

Site Layout

Summary

- 3.14. The site would be laid out with **four livestock rearing houses** cut into the gentle slope of the site orientated north south. **Gentle ground modelling** would be located to the west and north of the site and in the adjoining field in the north-eastern part of the site.
- 3.15. A **yard area** would be to the north of the rearing houses and **ancillary buildings** will be located on or adjoin this yard: specifically **feed storage bins; energy distribution building; a water storage tank; a generator; electricity substation; and office building**.
- 3.16. The yard area would be connected to the local highway with an **access track** running through an existing field gateway.
- 3.17. A **biomass boiler and storage building** would be located to the north of the existing Cinders Farm and **LPG storage tanks** would be located adjoining this.
- 3.18. A **control room** would be connected to the front of each of the rearing houses.
- 3.19. A **blending shed** would be between each pair of houses.
- 3.20. **Woodland planting** and other landscape and biodiversity improvements would be located surrounding the site.
- 3.21. Two surface water **attenuation ponds** would be located to the north of the rearing houses and to the east of the biomass building.
- 3.22. **Local highway improvements** would be made to the local highway to include improvements to the visibility of the junction of the local highway with the A539 and vehicle passing places along the minor road connecting the site to the A539.
- 3.23. Above each of the poultry rearing house main doors will be 1no. 100W metal haylide lamp. Such lights give a white light and will only be used during collection of birds at night. The lights will face downwards and will be protected by a metal cowl.

Details of buildings, plant and hardstanding

- 3.24. The following table sets out the detail of the building and plant:

Table 3.1 buildings and plant

Description	Dimensions (m)				Materials	Drawing ref.
	Length	Width	Eaves	Height		
4 no Rearing Houses	110.2	26.7	2.5	6.0	Steel portal frame. Insulated composite metal sheet cladding. Each house would be fitted with 19 ventilation fans.	GM-MZ228-201(A), GM-MZ228-201 (B) GM-MZ228-201 (C
	NB, the above measurement includes roof overhang. The gross external width is 24.7.					
Control rooms	10.4	4.0	2.5	5.4	As above.	As above
Feed storage bins		3.4 Ø		8.6	Metal sheeting coloured to match rearing houses.	As above
Blending shed	3.0	3.0	2.62	3.1	Metal sheeting coloured to match rearing houses	As above
Biomass Building	35.0	24.9	7.0	10.6	Concrete and metal sheet walls with metal sheet roof.	GM-MZ228-202
Gatehouse/ Office	10.0	10.0	3.6	5.0	Brick and timber cladding walls. Metal sheet roof	GM-MZ228-203
Water Tank		9.1Ø		3.0	Galvanized corrugated metal sheet with PVC sheet cover	GM-MZ228-204
LPG compound	18.0	7.3	2.4		6no LPG gas tanks with concrete wall compound	GM-MZ228-204
Generator	2.5	1.5	1.5		Painted metal sheeting.	Q9222653-KNI-205
Energy distribution building	7.0	2.5		3.5	Painted metal sheeting	Q9222653-KNI-206
Electricity Substation	6.4	6.4	2.7	2.7	Painted metal sheeting	GM-MZ228-207
Yard area	121.2	18.8			Concrete	GM-MZ228-181
Turning area	30.7	8.9			Concrete	GM-MZ228-181
Access Track	350.0				Stone	GM-MZ228-181

Landscape and Biodiversity Management

3.25. The following table summarises the landscape and biodiversity features:

Table 3.2 Landscape works

Description	Area / Linear metres / number / volume	Details	Planning Drawing reference
New native Hedgerow Planting	658 m	Native hedgerow managed at 3.5 +.	1484.04
Existing hedgerow management and improvement	750 m	Existing hedgerow, gapped up where necessary and maintained at 3.5m +	1484.04, 1484.06
Hedgerow trees	26 no	New native hedgerow trees to be planted in hedgerows surrounding site	1484.04
Native woodland planting	1.15 ha		1484.04
Rough grassland	1 ha		1484.04
Attenuation Ponds	85 cu m, 988 cu m		Q9222653-KNI-302

Landscaping and relationship to built form

- 3.26. The purpose of this section is to demonstrate how the buildings would relate to existing and proposed landscape features and ground level surrounding the site. This section should be read with reference to Dwg no GM-MZ228-301 and Dwg no 1484.04.
- 3.27. The rearing houses would be constructed with a Finished Floor Level (FFL) of 98.5m Above Ordnance Datum (AOD).
- 3.28. The ground across the site gently rises from 96.3m AOD in the north-east to 103.0m AOD to the south-west. The existing ground below the footprint of the proposed rearing houses falls from 101.25m AOD (south-west corner) to 97.5m AOD (north-east corner).
- 3.29. The eaves of the houses would be at 101m AOD and the ridges at 104.5m AOD. The hedgerow immediately to the south of House 4 would be managed at approximately at least 104.8m AOD, or >3m above ground level (GL). It would therefore be >3.8m above the eaves and >0.3m above the ridgeline of the adjoining House 4.
- 3.30. The hedgerow directly to the south of House 1 would be managed at 101.6m AOD, therefore >0.6m above eaves and 1.9m below the ridgeline. A group of mature trees to the south of House 1 and House 2 have canopies at between 115.8m AOD and 118.1m AOD, therefore at least 11.3m above the ridge line of the houses.
- 3.31. The hedgerow along the east of House 1 would be managed at a height of at least 100.0m AOD (3.0m+ high). Woodland planting would be planted between the hedgerow and House 1. The woodland planting would reach a height of approximately 6m AOD within ten years (103m AOD). Therefore, the woodland planting would be 2m above eaves height and 1.5m below ridge height of the rearing houses.
- 3.32. Ground modelling is proposed to the west of the rearing houses and this would have a

gentle outward facing slope aligned with the existing ground level and a steep inward facing slope adjoining House 4. A hedge would be planted along the highest part of the ground modelling running in a north to south direction.

- 3.33. The ground modelling perpendicular to the north-west corner of House 4 would be 102.1m AOD and the hedgerow would be managed at >107.4m AOD. Therefore, the hedge would be >6.4m above eaves height of the houses and >2.9m above the ridges.
- 3.34. The ground modelling perpendicular to the south-west corner of House 4 would be at 104.4m AOD. The hedgerow would be managed at 107.9m AOD. Therefore, the hedge would be 6.9m above eaves heights of the houses and 3.4m above the ridges.
- 3.35. Ground modelling and woodland planting is proposed to the north and north-east of the rearing houses. At the highest point the ground modelling would be 101.1m AOD and 97.5m AOD at its lowest. Woodland planting is expected to grow to around 6m in ten years. In ten years the height of the woodland would be between 107m AOD (at the highest point) and 103.5m AOD (at the lowest point). Therefore, the woodland would be 2m to 5m above eaves heights of the houses and at its lowest the woodland would be 1m below ridge heights.
- 3.36. The feed bins are 8.6m high and therefore with a FFL of 98.5m AOD would be 107.1m AOD at their highest point. Therefore, in ten years the woodland planting would be between approximately the same height (at the highest point) or 3.6m below the heights of the feed bins (at the lowest point).

Surface water attenuation

- 3.37. On site surface water attenuation is to be provided by French drains and soakaways between the poultry rearing houses. Two surface water attenuation pools would be constructed, one to the north of the rearing houses and one to the east of the biomass building. These have been designed in consultation with the drainage engineers. The volume would be sufficient to attenuate surface water flow from the site to greenfield run-off rate from a 6-hour storm duration.
- 3.38. Details of the preliminary design of the attenuation is included in **Appendix 11.1, Volume III**. Detailed design would be controlled through an appropriately worded planning condition.

Access

- 3.39. The proposed development will be served by a new vehicular access from the unclassified rural lane that serves Cinders Farm. This lane links directly to the A539 to the south. This lane already accommodates farm traffic (including HGV movements) to the farm, as well as being used by local residents to access residential properties located adjacent to the farm, as well as other smallholdings further north towards the B5426.
- 3.40. A General Arrangement (GA) drawing (drawing reference **SK21685-05**) showing the proposed site access onto the rural lane is submitted with the application. The access has been designed to accommodate a 16.5m articulated vehicle (as shown by the vehicle tracking at **Appendix 4.6, Volume III**), and also provides junction visibility splays that relate to the recorded 85th percentile speeds on the lane.

HGV Routing

- 3.41. The site has been chosen to minimise the travel distance for HGVs from the strategic highway network. All HGV traffic associated with the proposed poultry operation will route

via the A539 via the existing rural lane. This route will be the defined route for vehicle movements associated with chick deliveries, collecting birds and delivering feed:

- HGV Route – traffic to the site will route from the A539 priority junction north along the rural lane past Cinders Farm to the new site access. The route will be reversed for outbound HGV movements.

- 3.42. A Service Delivery Management Plan will be prepared before commencement of the development to confirm the details of the frequency/staggering of deliveries, type of delivery vehicles to be used, routing of delivery vehicles and the management of car parking. This plan is in line with other recently assessed poultry schemes within Wrexham and would be secured through an appropriately worded condition.
- 3.43. Used bedding / litter generated from the proposed development will be used on land farmed by the applicant and taken from the farm by tractor and trailer. This is in line with existing farming practices on the site.

Management cycle

- 3.44. The following paragraphs set out the poultry crop production process.
- 3.45. The crop management procedures, waste management processes and environmental management procedures would be in compliance with best practice, the Red Tractor Farm assurance standards, Best Available Technique (BAT) (see below) and in accordance with the conditions of the Environmental Permit. Regular environmental and welfare compliance audits would be carried out by Independent auditors of Natural Resources Wales and Farm Assurance Scheme representatives.
- 3.46. Prior to the crop cycle, wood chip fuel from locally-grown or home-grown woodland would be delivered to the site by foresters / saw mills and stored in the biomass boiler building ready for use in two boilers.
- 3.47. The site manager would prepare the poultry rearing houses would then be pre-warmed to 31°C in preparation for the chick placement.
- 3.48. A computerised climate control system would control the temperature, humidity, and air circulation to ensure ideal conditions for the birds throughout the crop cycle.
- 3.49. An air handling unit would be positioned on the ceilings of the poultry rearing houses. This would heat the houses, deliver the correct volume of fresh pre-warmed air and dried air to reduce CO2 levels.
- 3.50. Each rearing house would be controlled by the site manager using a computerised management control system providing accurate real-time information about the conditions of each rearing house include climate; feed consumption levels; water consumption; bird weights; and alarm status. The information would be accessible and controllable via a smartphone.
- 3.51. Bedding / litter (wood shavings) would be delivered to the site and spread evenly on the floor using a 'litter spreader' to an optimal depth to ensure best environmental conditions within the houses.
- 3.52. Feed would be delivered from local feed mills and stored in the feed storage bins. Home-grown wheat for blending into the feed (in the blending sheds) would be delivered and also stored in the feed bins.

- 3.53. Once the site is prepared, the chicks would be delivered from a hatchery and placed in the rearing houses.
- 3.54. At the start of the crop cycle the chicks would be fed with starter pellets which are manually delivered to the rearing houses.
- 3.55. The feed blend would gradually change over the course of the crop cycle to reflect the needs of the birds as they grow. Feed would be blended in the blending sheds before being automatically dispensed to feeders evenly located throughout the rearing houses.
- 3.56. Water sourced from a bore hole on site would pass through UV and sediment filters and then would be provided via nipple drinkers which are designed to minimise spillage. Water use in each house is monitored daily by meters.
- 3.57. Heat would be gradually reduced over the crop cycle.
- 3.58. Veterinary surgeons would make regular visits during the crop cycle to check the health of the birds.
- 3.59. Any fallen birds would be removed twice per day by the site manager and would be stored in vermin proof sealed containers on site prior to being collected by an animal health licensed contractor.
- 3.60. When the birds reach around five weeks old, 'thinning' would take place. A team of specialist poultry handling contractors collect and transport birds from the site to an abattoir. The thinning takes place over two days. Thinning is undertaken during the day time (ie between 0700 and 2300 hours) and night time (ie between 2300 and 0700 hours of the following day). The birds would be collected at a rate of one load per hour.
- 3.61. When the birds are around six weeks old, the remainder would be collected and transported from the site. The bird collection takes place over two days. Bird removal is undertaken during the day time (ie between 0700 and 2300 hours) and night time (ie between 2300 and 0700 hours of the following day).
- 3.62. At the end of the growing period, the used bedding / litter would be transported in covered trailers by local farm workers away from the site and stored in fields off-site prior to spreading on agricultural land as organic fertiliser in accordance with a manure management (**Appendix 3.1, Volume III**). For bio security reasons no manure is stored on site, even for a short period.
- 3.63. A team of local cleaning contractors would then blow down the inside of the houses with compressed air before washing down and disinfecting the rearing houses in preparation for the next crop. The yard area is also washed down.
- 3.64. During cleaning, a diverter valve would direct all wash water from the houses and the yard area to underground tanks located to the north of the yard. The tanks would be alarmed to avoid overflow and would be emptied by a tanker before being spread to agricultural land in accordance with the manure management plan (**Appendix 3.1, Volume III**).
- 3.65. Plumbers, electricians, information technologists and other maintenance contractors would then inspect the site and would carry out a service of feeders and drinkers; the biomass boiler; water treatment facilities; lighting equipment; computer equipment and sensors.

Construction Phase

- 3.66. It is anticipated that the construction period would last for approximately six months. During this period, construction vehicles and machinery would be active on the site including excavators, dump trucks and haulage lorries.
- 3.67. The sequence of works would start with the stripping of soils. Top-soil would be placed in temporary storage areas for re-use on site. Groundworks would include cut and fill operations to achieve the required finish levels, including the proposed ground modelling.
- 3.68. All required services would be connected, including water supply, electricity supply and drainage.
- 3.69. Concrete for floors and foundations would be imported onto site and structural steelwork would be erected. Roofing and wall cladding would be fitted to the framework.
- 3.70. The buildings would be fitted out with plumbing, heating and electrics.
- 3.71. Tradesmen required for the construction and fitting-out the buildings would be working throughout the construction phase, with the numbers on site varying according to workload.
- 3.72. New landscaping (woodland planting, hedgerow planting and grass seeding) will be completed during the first planting season following occupation of the proposed buildings.

Environmental Controls

Environmental Permit Determination

- 3.73. An application for an Environmental Permit associated with the Proposal has been submitted to Natural Resources Wales. An Environmental Permit is sought to provide the operator with a license to carry out the following activities:
 - The rearing of poultry in a facility with a capacity for 225,000 broiler places; and
 - Operation of a biomass boiler with a maximum aggregated thermal input not exceeding 5 megawatts for site heating requirements, burning biomass fuel not comprising waste or animal carcasses.

Purpose of Environmental Permitting

- 3.74. 'Planning and permitting decisions are separate but closely linked. Planning permission determines if a development is an acceptable use of the land. Permitting determines if an operation can be managed on an ongoing basis to prevent or minimise pollution'¹.
- 3.75. The purpose of environmental permitting regime is to achieve integrated prevention and control of pollution arising from activities listed in Annex 1 of the European Council Directive 96/61/EC, leading to a high level of protection of the environment.
- 3.76. More specifically, it provides a system which requires operators and regulators to take an integrated, overall look at the polluting and consuming potential of the proposed poultry installation.
- 3.77. Central to this approach is the general principle that operators should take all appropriate preventative measures against pollution, in particular through the application of Best

¹ Guidance for developments requiring planning permission and environmental permits 2012

Available Technique (BAT), thus enabling them to improve environmental performance.

- 3.78. The permit, if granted, will require the future operator to put in place measures to prevent or minimise both noise and odour. A permit is only issued if NRW are satisfied that the development will not have a significant impact on the local environment.
- 3.79. The site will be inspected by NRW to ensure that the operator is complying with the requirements of their permit. If it is found that they are not complying enforcement action will be taken. This can include revocation of the permit. The Local Planning Authority should be satisfied that there will be an appropriate regulatory regime in place to ensure that the proposed use will not give rise to unacceptable noise or odour.

The Environmental Permitting application and determination

- 3.80. The environmental permit application included the submission of the following documents to demonstrate that the site can be managed to prevent pollution²:
 - **Environmental Management Systems** - written management system in place that identifies and reduces the risk of pollution. The permit will require the operator to ensure it manages and operates the farm in accordance with the management system.
 - **Technical Standards** - lists the technical standards and guidance notes that apply within European Guidance SGN EPR6.09 'How to comply with your environmental permit for intensive farming'.
 - **Energy Efficiency management plan** – a description of the basic measures for improving how energy-efficient the activities on the farm are.
 - **Raw materials inventory** – lists the types and amounts of raw materials that would be used on the farm.
 - **Environmental Risk Assessment** - the purpose of the environmental risk assessment is to demonstrate that the impacts of your proposals will be acceptable.
 - **Odour Management Plan** – provides details of the likely sources of odour arising from the farm and the procedures planned in order to prevent or minimise odour levels.
 - **Noise Management Plan** - establish the likely sources of noise arising from the farm and sets out the procedures planned in order to prevent or minimise noise levels.

Best Available Technique

- 3.81. The Environmental Permit requires that the farm is managed in accordance with Best Available Technique. The term “Best Available Technique” is defined in Article 2(11) of the European Directive as:

“the most effective and advanced stage in the development of activities

² The Environmental Permitting Regulations includes the following definition of pollution: “pollution”, in relation to a water discharge activity or groundwater activity, means the direct or indirect introduction, as a result of human activity, of substances or heat into the air, water or land which may— (a) be harmful to human health or the quality of aquatic ecosystems or terrestrial ecosystems directly depending on aquatic ecosystems, (b) result in damage to material property, or (c) impair or interfere with amenities or other legitimate uses of the environment; “pollution”, other than in relation to a water discharge activity or groundwater activity, means any emission as a result of human activity which may— (a) be harmful to human health or the quality of the environment, (b) cause offence to a human sense, (c) result in damage to material property, or (d) impair or interfere with amenities or other legitimate uses of the environment;

and their methods of operation which indicate the practical suitability of particular techniques for providing the basis for emission limit values designed to prevent and, where that is not practicable, generally reduce *emissions and the impact on the environment as a whole.*"

- 3.82. The Best Available Techniques to be applied to the proposed Cinders Farm poultry installation are consistent with those set out in the European Commission's Reference Document on Best Available Techniques for Intensive Rearing of Poultry and Pigs, known as the BREF document. The following systems within the BREF document are applicable to the Proposal:

- Good agricultural practice for environmental management;
- Best Available Techniques for:
 - nutritional management;
 - efficient use of water;
 - efficient use of energy;
 - the reduction of emissions from poultry housing;
 - housing of broilers;
 - the reduction of odour;
 - the reduction of emissions from storage;
 - the reduction of emissions from application of manure to land;
 - the reduction of noise emissions; and
 - the treatment and disposal of residues other than manure and carcasses.

Labour and Hours of Operation

- 3.83. The Proposal will provide additional job opportunities, including a manager and part-time assistant manager, providing a new local employment opportunity.
- 3.84. There will also be additional labour requirement relating to:

Raw Materials Production

- Production of cereals (feed wheat) on Cinders Farm;
- Feed Manufacture and delivery;
- Bedding manufacture and delivery;
- Forestry management and wood chip production and delivery;
- Chick production and delivery;

Crop Welfare

- Chick placement team;
- Fallen stock collection;
- Veterinary surgeon husbandry;
- Bird collection teams;

Cleaning and preparation

- Loading of manure, cleaning, washing;
- Carting of manure from site;

Preparing birds for market

- Factory employees

Ongoing maintenance and audit

- Natural Resources Wales, Farm Assurance auditing
- Landscape maintenance
- Plumbing, heating, electrical maintenance

- 3.85. The direct and indirect employment generated by the development amounts to the equivalent of approximately 43 FTE employees.
- 3.86. The development will require continual on site husbandry provided by existing employees and managers of the proposed poultry farm. The hours of operation are therefore continual whilst the birds are in the rearing houses; during the night time, staff are required to respond to alerts relating to any equipment repair for which an alarm system via operators' mobile phones will be in place. 24-hour support is also provided by equipment suppliers for the climate control system (heating and ventilation).

4. Transport

- 4.1. This Chapter of the ES compares the existing and future traffic generation and its impact on the surrounding highway network. A new access to the poultry farm is proposed onto the unclassified rural lane that provides access to Cinders Farm, which in turn connects with the A539 to the south. No significant effects on pedestrians, cyclists or vehicular traffic are envisaged as part of these development proposals.

Introduction

- 4.2. This Chapter of the Environmental Statement (ES) examines the environmental impacts of the proposed poultry development in relation to traffic and transport. The assessment considers the potential impacts on traffic and transportation associated with the proposed poultry development during its operation.

Scope of the Assessment

- 4.3. This assessment has taken appropriate regard of previous Transport Scope's that have been discussed and agreed with other Local Planning Authorities on comparable poultry farm schemes in the last three years, as well as the recently agreed Transport Scope with Wrexham Council for the proposed poultry scheme at Mulsford Farm in Sarn, near Malpas. In summary the previously agreed technical appraisals have asked for the following traffic and transport information to be provided:

Existing Situation

- Confirmation of the existing farm operation;
- the current level of traffic movements on the surrounding highway network i.e. number and vehicle type and over what periods?; and
- Undertake an assessment of the existing vehicular access arrangements to the site (including HGV routes), as well as a review of PIC data to consider any existing collision locations.

Proposed Development

- What are the expected traffic movements (by vehicle type) that would be generated by the four-shed broiler unit? (broken down into bird deliveries/collection, feed deliveries, removal of waste etc)?
- Over what periods will these vehicle movements take place? How has this information been sourced and arrived at? (a graph or table showing the types/numbers of vehicles generated on each day through the crop cycle has been prepared to illustrate this).
- Confirmation of the proposed route that HGV traffic associated with the proposed scheme will use, and why this route is considered suitable. If deemed necessary what highway improvements are required?

- 4.4. Responses to these questions are provided in this chapter of the ES. Note that the assessment work assumes the traffic generation for the proposed scheme has been

calculated using the DEFRA theoretical maximum 7.6 bird crop cycles per year. This has been assumed in the technical evidence provided in this chapter.

- 4.5. Based on previously agreed assessment work requested by Local Planning Authorities this chapter covers the following information requirements:

- A baseline traffic assessment;
- Trip generation and assignment onto the adjacent highway network (for bird/feed deliveries, manure/bird removals etc);
- Assessment of the traffic impact of the proposed development; and
- A routing plan for HGV traffic accessing the proposals.

Proposed Development

- 4.6. The site is undeveloped arable farmland located immediately to the north of Cinders Farm, approximately 750m from the A539 to the south. Cinders Farm is located circa 2km to the east of Ruabon and 5km west of Overton. Access to the proposed poultry farm will be via a new private access on the western side of the unclassified rural lane which runs from the A539 past Cinders Farm northwards towards the B5426.

- 4.7. The proposed development description is as follows:

'Erection of four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping'

- 4.8. The site layout is shown on Drawing "Cinders01" appended to this ES.
- 4.9. There will be 7.6 bird crop cycles per year. Delivery times vary according to the needs of the flock; in line with other poultry operations the movement of birds from the site (known as the depopulation movements) will take place from 0200 in the morning. This assessment considers these night time movements against the baseline traffic flows to give an assessment of the impact of the proposed development.
- 4.10. Employees of the farm would live in nearby properties. The operation will generate minimal additional private car movements to/from the site over and above the existing position. The collecting of birds and the cleaning of the rearing houses would be carried out by contractors.

Site Access

- 4.11. See Chapter 3 for details of the site access.

HGV Vehicle Routing

- 4.12. See Chapter 3 for details of HGV Vehicle Routing.

Technical Assessment

- 4.13. The methodology to assess the impact of the proposed development is summarised below. This assessment has been carried out in accordance with the Department for Transport's (DfT) now rescinded 'Guidance on Transport Assessment' published in 2007. It is, however, still considered relevant to use this guidance for the assessment of the development impact.

The assessment approach is directly comparable to the recently agreed scope for the proposed poultry farm at Mulsford Farm, Sarn.

- 4.14. Traffic movements that occur in the peak periods have been given appropriate consideration for the purposes of assessing the impact of future peak traffic flow events.

Traffic Generation

- 4.15. In the DfT's 'Guidance on Transport Assessment' paragraphs 4.59 states:

'there is a range of trip rate database tools available that contain national, or in some cases more local, trip rates measures for typical land use sites. However, obtaining an accurate comparison is not always straightforward, especially for atypical developments. In these instances it is recommended that, unless there is a clear valid comparable situation, the assessment trips should be constructed from first principles based on a detailed analysis of the daily operation of the proposed development'.

- 4.16. This proposal is atypical and no comparable site exists in the TRICS database. Therefore the traffic/trip generation has been prepared using comparable sites and worst-case scenarios. The movements to be generated by the proposed poultry development have been derived from a number of different poultry unit schemes including:

- Howle Manor near Newport;
- Red Hall Farm near Crewe;
- Plas Back Farm, Meifod;
- Foxholes Farm, Little Ness;
- Great Ness Poultry Ltd;
- Bradeley Farm, Bourton; and
- Far Broadway Farm.

- 4.17. First principles were derived from experience of other farms and were cross checked using standard industry figures sourced from DEFRA and Ross Broiler Guides that record the theoretical bird weights that are achievable under optimum growing conditions.

- 4.18. The traffic generation figures for the proposed development are provided later in this Chapter.

Baseline Conditions

Road Network and Traffic Flows

- 4.19. The application site is located to the north of the A539, which forms part of the strategic highway network between Ruabon and Whitchurch. The application site is on land immediately to the north of Cinders Farm. The site and local road network is shown on SKTP drawing **SK21685-01 (Appendix 4.4, Volume III)**, submitted with the planning application.

- 4.20. The site is located a 750m crowfly distance north of the A539, and is accessed via a rural

lane with a priority junction onto the A539. The proposed HGV route to the site takes traffic off the A539 at the aforementioned priority junction, and on to the rural lane before turning left into the new site access. HGV traffic leaving the site will turn right out of the new vehicular access and travel south for 750m before joining the A539 at the existing priority junction.

- 4.21. This HGV route is a voluntary scheme and is not a requirement of any previous planning consent on the farm. The operators of the proposed development will operate this HGV routing plan to avoid any conflict between poultry traffic using local routes and other vehicles. The proposed HGV route is the shortest route to the A539 and wider strategic highway network, and the applicant is not aware of any historic incidents involving HGV's along this route.
- 4.22. The proposed HGV route to and from the proposed poultry operation is shown on SKTP drawing **SK21685-02**, submitted with the planning application.
- 4.23. The rural lane from the A539 is subject to the national speed limit and varies in width from 3.0m to 4.5m along its length. As part of the baseline assessment a seven-day Automatic Traffic Count (ATC) was placed on the lane between the 3rd and 9th July 2017. The counter was located between the existing junction with the A539 and the proposed new access to the poultry farm.
- 4.24. Whilst the lane from the A539 is subject to the national speed limit (60mph for private cars) the 85th percentile vehicle speeds at the existing site access were recorded as 28.1mph and 26.6mph in the northbound and southbound directions respectively.
- 4.25. Confirmation of these 85th percentile vehicle speeds can be found in the traffic count/speed surveys in **Appendix 4.1, Volume III**.
- 4.26. The existing priority junction from the lane onto the A539 benefits from visibility splays of 2.4m by 120m in the leading (western) and trailing (eastern) traffic directions. In the leading traffic direction the visibility splay "Y" dimension is achievable to the nearside kerb, and in the trailing traffic direction the "Y" dimension can be achieved to the carriageway centreline. These existing visibility splays are provided in the publicly adopted highway, and are shown on SKTP drawing **SK21685-04 REV C** submitted with Planning application.
- 4.27. **Tables 4.1 and 4.2** provide a summary of existing directional traffic volumes on the lane from the A539 to the proposed site access.

Table 4.1- Baseline Northbound Traffic Flows

Date	Total	Cycles/M/Cycles/ Quad Bikes	Cars	LGVs	HGVs
03/07/17	38	7	31	0	0
04/07/17	44	11	29	0	4
05/07/17	39	2	36	0	1
06/07/17	44	4	36	2	1
07/07/17	40	5	33	0	2
08/07/17	24	2	22	0	0
09/07/17	29	4	25	0	0

Table 4.2- Baseline Southbound Traffic Flows

Day	Total	Cycles/M/Cycles/ Quad Bikes	Cars	LGVs	HGVs
03/07/17	36	6	36	0	0
04/07/17	32	8	20	4	0

Day	Total	Cycles/M/Cycles/ Quad Bikes	Cars	LGVs	HGVS
05/07/17	40	1	38	0	1
06/07/17	37	1	36	0	0
07/07/17	36	1	34	0	1
08/07/17	33	1	31	1	0
09/07/17	31	4	27	0	0

4.28. The two-way traffic flows on the lane are shown in **table 4.3**.

Table 4.3 - Baseline Two-Way Traffic Flows

Day	Total	Cycles/M/Cycles/ Quad Bikes	Cars	LGVs	HGVS
03/07/17	74	13	67	0	0
04/07/17	76	19	49	4	4
05/07/17	79	3	74	0	2
06/07/17	81	5	72	2	1
07/07/17	76	6	67	0	3
08/07/17	57	3	53	1	0
09/07/17	60	8	52	0	0

4.29. **Table 4.3** confirms that there is an average daily traffic flow of 37 vehicles in the northbound and 35 vehicles in the southbound direction. This gives an average daily two-way traffic flow of 61 vehicles on the lane from the A539 north towards the access to the proposed poultry farm.

4.30. In terms of service vehicles an average of 1 Light Goods Vehicles (ARX Class 4, 5 and 6) used this route on each of the surveyed days. An average of 1.4 Heavy Goods Vehicles (ARX Class 6 and above) also used this route on each of the survey days.

4.31. **Tables 4.1 to 4.3** demonstrate that the lane from Cinders Farm to the A539 is used by an average of 61 vehicles each day. A proportion of this traffic will relate to the existing farming businesses in the local area.

Personal Injury Accident Review

4.32. Personal Injury Accident (PIA) data has been reviewed from the Crashmap Website for the last five years. The accident data confirms that no collisions have been recorded in the last five years (2012 to 2016) on the lane from Cinders Farm to the A539. An extract from the Crashmap website is provided in SKTP Drawing **SK21685-03, Appendix 4.5, Volume III**).

4.33. The information provided in SKTP Drawing **SK21685-03** confirms that there have been no recorded collisions on the lane from Cinders Farm to the A539, and only two 'slight' collisions recorded on the A539 to the east of the junction with the lane to Cinders Farm. A summary of the two collisions recorded on the A539 is provided in **Table 4.4**.

Table 4.4 - Baseline Two-Way Traffic Flows

PIC Reference	Date	Severity	Weather & Road Surface Conditions	No. of Casualties	No. of Vehicles	Collision Description
201460R157993	06/10/14 at 1301 hours	Slight	Fine without High Winds Wet or Damp	1	1	Single private car collision which lost control and struck permanent obstruction
201560S113899	30/07/15 at 1415 hours	Slight	Fine without High Winds Dry	3	2	Head on collision between two private cars

4.34. The full PIC outputs are provided in **Appendix 4.2, Volume III**. Both collision reports have confirmed that there have been no recorded collisions between HGVs or agricultural traffic on the adjacent highway network in the vicinity of the development site.

4.35. The Crashmap data for the surrounding highway network confirms that there are no existing highway safety issues that would be exacerbated through the development of a new poultry farm at Cinders Farm.

Identification and Valuation of Key Impacts (Construction and Operational)

4.36. Due to the nature of poultry farming vehicle movements associated with the farming operation are concentrated around certain activities during the cycle. As an example vehicle movements associated with feed deliveries increase during the crop cycle as the bird weights increase. Manure removal takes place at the end of the crop cycle over a short period after bird removal and before chick placement. The removal of birds normally takes place in two phases during the crop cycle.

4.37. Manure removal at the close of the crop period represents the peak periods in any given 24-hour period. These are tractor and trailer movements and depending on where the manure is to be spread at times may not even route onto the adjacent public highway (i.e. the manure is spread on fields adjacent to the farm). For completeness these movements are included in **table 1** in **Appendix 4.3, Volume III**.

4.38. Bird removal (known as depopulation) at the close of the crop cycle is the most significant traffic event in terms of HGV movements. There are currently no restrictions on any HGV movements to Cinders Farm. With regard to the proposed poultry farm operation it is good practice and also in line with bird welfare standards to commence the bird depopulation no earlier than 0200.

4.39. Crop clearance will take place over a two two-day periods separated by a week, and during the 0200 to 0700 period there will be typically no more than two HGV bird removal movements to/from the site per hour.

4.40. With all poultry farm HGV traffic using the HGV routing strategy there is no possibility of these vehicles meeting each other on the 750m of public highway between the A539 and the new development access, as the loaded vehicle will not be released from the site until the arriving vehicle is on site. Communications between the site operators and the hauliers are made using radios and mobile phones, to manage the process in terms of the number of

vehicles on site at any one time, and also to manage the movement of vehicles on the adjacent public highway.

- 4.41. Given that it is normal for bird removal movements not to start before 0200 on depopulation days it is expected that there will be a maximum of ten HGV movements between 0200 and 0700 during the night for a maximum of 30 days during the year.
- 4.42. **Table 1 in Appendix 4.3, Volume III** shows the HGV movements associated with the proposed 225,000 bird operation. On 27 days of the crop cycle there will be no HGV movements to/from the site. On a further 10 days of the crop cycle there will be an average of only 1 HGV visiting the site each day. On 4 days of the crop cycle there will be 2 HGV's visiting the site each day. On only 7 days of the whole crop cycle there will be more than 2 HGV visits per day.
- 4.43. Poultry depopulation good practice and bird welfare standards will be followed and the depopulation will not start earlier than 0200; on the longest depopulation day this will be completed by 1800 hours. The crop clearance will take place over a two two-day periods separated by a week, and during the 0200 to 0700 period there will be typically no more than two HGV bird removal movements to/from the site per hour. HGV traffic will use the proposed HGV routing strategy to ensure there is no possibility of these vehicles meeting each other on the public highway.
- 4.44. There will be a maximum of ten HGV movements between 0200 and 0700 during the night for a maximum of 30 days during the year.
- 4.45. **Table 4.5** below sets out the expected vehicles movements per crop for the proposed poultry farm. The crop cycle profile is provided in **Appendix 4.3, Volume III**.

Table 4.5 – Proposed Vehicle Movements per Broiler Crop Cycle

	Description	Vehicle Type, dimensions and approximate weight: full/ empty (tonnes)	Timing of delivery/collection	Number of movements per crop (Number of HGVs)
HGV	Bedding Delivery	HGV: 2.5m wide, 15.4m long	Between 0700 to 1200	2 (1)
	Chick deliveries	HGV: 4 axle rigid. 11.5T empty, c15.3T full.	Between 0700 and 1200	6 (3)
	Fallen Stock collection	7.5 tonne HGV	Between 0700 and 1200	10 (5)
	Night time Bird Collections (thinning over two days)	HGV: 2.5m wide, 15.4m long.	Between 0200 and 0700	18 (9)
	Day time bird collections (thinning over two days)		Between 0700 and 0800	2 (1)
	Night time bird collections (final clearance over two days)		Between 0200 and 0700	20 (10)
	Day time bird		Between 0700 and	8 (4)

	Description	Vehicle Type, dimensions and approximate weight: full/ empty (tonnes)	Timing of delivery/collection	Number of movements per crop (Number of HGVs)
	collections (clearance over two days)		0900	
	Feed deliveries	HGV: 2.5m wide, 15.4m long. 17t empty, 44t full.	Between 0700 and 2300	30 (15)
Total HGV Movements				158 (79 HGV's)
Light Vehicles	Vet	Car	0700 to 2300	6
	Cleaning chemicals delivery	Van	0700 to 2300	2
	Cleaners	LGV	0700 to 2300	4
	Vaccination delivery	Van	0700 to 2300	2
	Litter spreader	LGV	0700 to 1200	2
Total Light Vehicle Movements				16

Note: one movement is a vehicle going on site, or leaving site.

Note: day time is 0700 to 2300. Night time is 2300 to 0700.

- 4.46. **Table 1 of Appendix 4.3, Volume III** confirms that the proposed poultry operation will generate a total of 130 HGV and tractor and trailer movements over its cycle, or 988 movements over the year (7.6 crop cycles).
- 4.47. When compared to the existing traffic volumes on the lane from the A539 this increase will not have any material impact on existing traffic movements, the use of the local highway network or highway safety.
- 4.48. The farm (and other associated farming and agricultural business operations) currently use the public highway network surrounding the site and the analysis of the PIA data confirms there have been no recorded conflicts between HGV or agricultural traffic in the vicinity of the site.
- 4.49. Of particular relevance to the impact of the proposed development is the likelihood of any HGV traffic related to the proposed poultry farm meeting another HGV on the highway network. With regard to the lane from the A539 to the proposed development access this route already accommodates an existing average of 1.4 HGVs in each 24-hour period.
- 4.50. The minor increase in HGV movements generated by the proposed development will have no effect on the capacity or highway safety on this route. The likelihood of the additional HGV traffic meeting existing HGV traffic travelling in the opposite direction is exceptionally low.
- 4.51. Notwithstanding the above position, the development proposals look to provide two formal passing bays on the lane to allow two HGVs to pass. This will be located on the lane from the A539 to the proposed development. The southerly passing bay is circa 125m from the existing priority junction with the A539. The northern passing bay is 380m from the aforementioned junction.
- 4.52. In the unlikely event that two HGVs did meet on this route the lane widenings (in the form of

a double width passing bay) allows for two HGVs to pass. These off-site improvements are shown in SKTP drawing **SK21685-06 REV C** and will benefit all highway users on this existing lane.

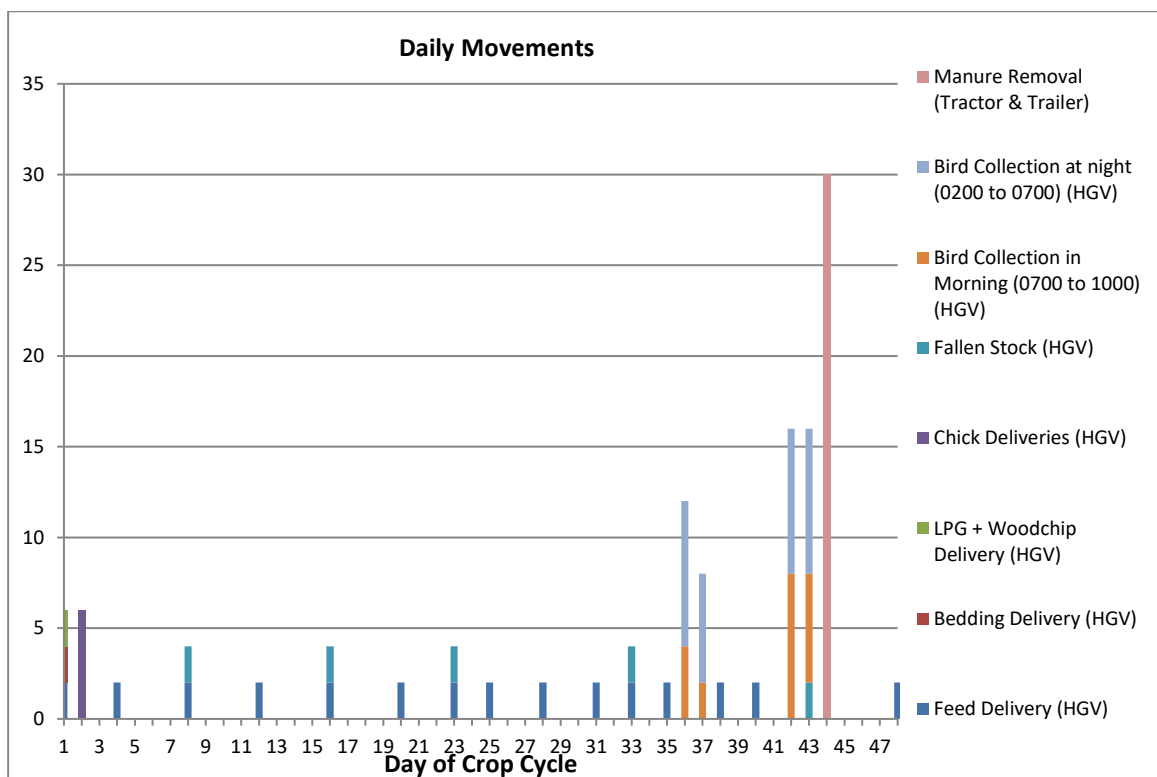
Summary of Development Vehicle Movements

4.53. The future movements associated with one crop cycle are broken down per day in graphical format in **Appendix 4.3, Volume III**. The graph shows that the peak number of vehicles in any one day will be 30 HGVs associated with the depopulation of birds and a feed delivery. The graph confirms that:

- On 27 days out of the crop cycle there will be no movements;
- On a further 10 days out of the cycle only one vehicle will visit the site;
- On a further 4 days of the cycle only two vehicles will visit the site;
- On a further 7 days of the cycle there will be two or more vehicles visiting the site; and
- In summary for 86% of the crop cycle there will be two vehicles or less visiting the site each day.

4.54. For ease of reference the graph is also provided below.

Graph 4.1- Cinders Farm Poultry Crop Cycle



Site Traffic Management

Bird Depopulation

- 4.55. As part of the poultry farming operation the depopulation activities are carefully managed to minimise the impact on the surrounding area. The depopulation process will operate with a maximum of two movements per hour between the hours of 0200 and 0700. This approach minimises disturbance to the small number of residential properties on the HGV route to/from the site to the A539. This two HGV movements/hour has previously been accepted by other Councils and the Planning Inspectorate on comparable consented schemes within 50 miles of the application site.
- 4.56. As stated above bird collections take place at two periods during the crop cycle. The Red Tractor Standard (Standard no. PT.9) states that "The processing plant is responsible for implementing a pre-planned arrivals system" for poultry transport). Approximately a week prior to bird collection the farm receives a logistics timetable from the processing company that provides a very detailed timetable for each lorry. The timetables include:
- The drivers name;
 - The load number;
 - The vehicle registration number;
 - The time that the vehicle is due to leave the poultry processor;
 - The time that the vehicle is to arrive at the farm;
 - The time that bird catching for that vehicle is due to start;
 - The time that the lorry is due to leave the farm;
 - The time that the lorry is due to arrive at the factory;
 - The identification number of the team that is due to collect the birds on the farm;
 - The house number from which the birds are to be collected;
 - The number of kilograms that are to be loaded into each draw on the lorry;
 - The number of birds that are to be placed per draw;
 - The number of draws that the lorry contains;
 - The age of the birds; and
 - The "program weight" of the birds i.e. the predicted weight of the birds.
- 4.57. This organisational approach demonstrates that the impact on the surrounding highway network will be kept to a minimum and the farm will be always aware of the times and vehicle locations during the depopulation period.

Conclusions

- 4.58. The proposed poultry farm proposals have been carefully prepared to ensure that the

development will have a minimal impact on the surrounding area. In addition this chapter of the ES has demonstrated that the proposals will generate a minimal amount of additional vehicular movements onto the surrounding highway network. The use of an HGV routeing strategy to and from the A539, and timing of HGV movements to and from the site will ensure that any impact on the residents living adjacent to the public highway on the HGV route are minimised.

- 4.59. The proposed poultry farm at Cinders Farm will provide continued diversity for the farm enterprise and ensure sustained economic growth in the rural area.
- 4.60. This assessment has demonstrated that whilst the proposed development will generate a marginal change in vehicle movements on the depopulation days, for the majority of days there will be minimal change in vehicular traffic to the farm when compared to the existing operation.
- 4.61. Based on the above there are no transport-related reasons why the proposed poultry farm should not be granted planning consent with appropriate traffic/transport planning conditions.

5. Noise

Introduction

- 5.1. This chapter assesses the likely noise impacts arising from the Proposed Development, along with establishing the existing baseline noise climate at the site and surroundings. The likely noise impacts are identified and assessed. A mitigation strategy is proposed, where applicable, and the residual effects are described.
- 5.2. This Chapter provides a review of the existing noise environment in proximity to the proposed development and an assessment of the potential noise impact of the Proposed Development. The report provides a review of the existing noise environment at the site and surroundings in particular, it considers the potential effects of the operational phase noise at identified sensitive receptor locations and the mitigation measures required to prevent, reduce, or offset the identified impacts and the residual impacts. This Chapter was prepared by WSP.
- 5.3. This Environmental Statement (ES) supports an application for planning permission for the erection of four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping. A site location plan is included at **Appendix 5.2, Figure 5.1, Volume III**.
- 5.4. Noise can have an effect on the environment and on the quality of life enjoyed by individuals and communities. The effects of noise can therefore be a material consideration in the determination of planning applications. This chapter of the ES assesses the magnitude and significance of these effects by reference to relevant planning policy, British Standards (BS), and other guidance documents.
- 5.5. This chapter should be read in conjunction with the scheme description (**Chapter 3 Site Description and Proposed Development**). Following a summary of relevant policy and legislation, the chapter outlines the data gathering methodology that was adopted as part of the noise assessment. This leads on to a description of the overall baseline conditions, scope of the assessment, the assessment methodology and an assessment of potential effects. The Chapter concludes with a summary of the results of the assessment.
- 5.6. This Chapter is necessarily technical in nature so to assist the reader, a glossary of terminology relating to noise and vibration is provided within the **Glossary**.

Policy Context

National Legislation & Policy

- 5.7. The applicable legislative framework is as follows and is summarised in **Appendix 5.1, Volume III**:
 - Sections 60 and 61 of the Control of Pollution Act 1974 (Ref. 5.1); and
 - Section 79 of the Environmental Protection Act 1990 (as amended) (Ref. 5.2).

Planning Policy

- 5.8. Planning policy at the national and local level and its relevance to environmental design and assessment is confirmed in **Chapter 1: Introduction** of the ES and the Planning Statement which accompanies the application and examines the merits of the Proposed Development against the relevant planning policy.
- 5.9. This Chapter has been prepared giving regards to applicable planning policy as follows. A summary of relevant policy documents is presented within **Appendix 5.1, Volume III**.
- Environmental Noise (Wales) Regulations (2006) (Ref. 5.3);
 - The Welsh Government Planning Policy Wales (Edition 9) (2016) (Ref. 5.4); and
 - Wrexham Unitary Development Plan (Ref. 5.5).

Guidance

- 5.10. For a development of this nature, there is no specific all-encompassing guidance relating to the standards associated with noise emission / noise effect. In lieu of any specific national and local guidance, assessing the effect of such a development during the construction and operational phases must draw upon the following Standards and guidance documents:
- Guidance relating to the effects of construction noise on sensitive receptors in the vicinity of the Site is taken from BS 5228-1:2009+A1:2014 Noise and Vibration Control on Construction and Open Sites. Part 1: Noise (BS 5228-1) (Ref. 5.6);
 - Guidance relating to the effects of construction vibration on sensitive receptors and buildings in the vicinity of the Site is taken from BS 5228-2: 2009+A1:2014 Noise and Vibration Control on Construction and Open Sites. Part 2: Vibration (BS 5228-2) (Ref. 5.7);
 - Guidance relating to the effects of operational noise of fixed plant / goods delivery noise sources on sensitive receptors in the vicinity of the Site has been taken from BS 4142:2014 Methods for Rating and Assessing Industrial and Commercial Sound (BS 4142) (Ref. 5.8);
 - Guidance relating to the effects of operational road traffic noise in accordance with the former Department of Transport/Welsh Office technical memorandum Calculation of Road Traffic Noise (CRTN) (Ref. 5.9);
 - Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (2011) (Ref. 5.10);
 - British Standard 8233:2014 Guidance on sound insulation and noise reduction for buildings (Ref 5.11).
 - World Health Organisation (WHO) Guidelines for Community Noise (1999) (Ref. 5.12)
 - A Guide to the Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq} , Report by a Working Party for the Technical Sub Committee of the Council. Noise Advisory Council (NAC) (1978) (Ref. 5.13); and
 - NANR116: Open/Closed Window Research Sound Insulation Through Ventilated Domestic Windows (2007) (Ref. 5.14).

- 5.11. **Appendix 5.1, Volume III** includes a summary of the relevant Noise and Vibration policy and guidance used for this assessment.

Assessment methodology and significance criteria

- 5.12. This section provides a scope of the assessment:

Insignificant Effects

- 5.13. The following effects have been considered insignificant and have therefore not been considered, or have been assessed elsewhere, within the ES:
- Traffic noise during the construction phase of the Proposed Development. The construction phase of the Proposed Scheme is likely to generate no more than 25 HGV vehicle movements per day. The additional HGV vehicle movements to and from the Site are anticipated to be minimal in context of the existing traffic flows on the surrounding local road network. Notwithstanding the potential changes in traffic composition on the surrounding local road network, the potential changes in existing road traffic noise at existing sensitive receptors from the construction phase generated traffic, are expected to be insignificant.
 - Noise from vehicle movements on the internal access route during the operational phase. There are large separation distances between the proposed internal access route and the existing noise sensitive receptors. Consideration has also been given to the presence of existing on-site buildings that have the potential to afford screening from vehicles on the access route. It is not expected that on-site vehicle movements during the operational phase will generate significant levels of noise at existing sensitive receptors.
 - Vibration during the operation of the Proposed Development. It is not expected that the development during the operational phase will generate significant levels of vibration at existing sensitive receptors.

Likely Significant Effects

- 5.14. The following effects have been considered significant and have therefore been considered in detail within the ES.

Demolition and Construction Stage

- Disturbance to sensitive receptors from noise generated by on-site (non-traffic) construction activities; and
- Disturbance to sensitive receptors from vibration generated by any non-traffic construction activities likely to be particularly vibration generative.

Operational Stage

- Post-completion noise associated with the operation of the Proposed Development with respect to the operational plant, on-site activities and off-site road traffic.

Extent of the Study Area

- 5.15. Consideration has to be given to the effects that the Proposed Development might have on nearby sensitive locations. Therefore, the study area is defined by the Site boundary and the proximity of noise-sensitive receptors in the area immediately beyond the Site and along

the proposed operational HGV haul route.

Method of Baseline Data Collation

Desk Study

- 5.16. At the outset of the assessment, and prior to undertaking the baseline noise survey, an online mapping review was undertaken to determine the potential dominant noise and vibration sources present on Site, and identify local noise sensitive receptors. This approach allowed appropriate targeting of the baseline noise measurement locations.

Baseline Noise Survey

- 5.17. In order to determine the baseline noise levels present at the Site and at locations representative of a sample of local receptors, an environmental noise survey was conducted on, and within the vicinity of, the Site and along the proposed operational HGV haul route. The baseline noise survey included long term continuous unattended measurements which were subject to periodic attendance during selected periods and fully attended locations. Noise monitoring equipment was installed on the 28 November 2017 and collected in on the 29 November 2017.
- 5.18. Noise monitoring locations were selected such that the dominant noise sources and a sample of existing noise sensitive receptors were represented. The following measurement locations were employed during the survey. The location of the measurements is shown in **Appendix 5.2, Volume III, Figure 5.2.**
- **Measurement Location P1:** (Unattended) this unattended noise monitoring position was located just to the north of Cinders Farm Cottages. The measured levels considered representative of the background sound levels at the nearest noise sensitive receptors to Cinders Farm. The microphone was positioned at a height of 1.5m above the ground. Measurements were undertaken from Tuesday 28 November at 14:00 hours to Wednesday 29 November 2017 at 11:20 hours.
 - **Measurement Location P2:** (Unattended) this unattended noise monitoring position was located approximately 10m from the nearside carriageway edge of the A539. The measured levels are considered representative of the background sound levels at the noise sensitive receptors opposite the entrance to the lane to Cinders Farm. The microphone was positioned at a height of 1.5m above the ground. Measurements were undertaken from Tuesday 28 November at 14:25 hours to Wednesday 29 November 2017 at 11:40 hours.
 - **Measurement Location R1:** this attended noise monitoring position was taken at approximately 2m from the nearside carriageway edge of the lane outside the dwellings to the east of Cinders Farm. The measured levels are considered representative of the background sound levels at the dwellings. The microphone was positioned at a height of 1.5m above the ground. Measurements commenced here at 14:50 hours on Tuesday 28 November and covered key periods of the daytime, evening, and night through to Wednesday 29 November 2017 at 01:15 hours.
 - **Measurement Location R2:** (Attended) this attended noise monitoring position was taken at approximately 20m from the nearside carriageway edge of the A539. The measured levels are considered representative of the background sound levels at the dwellings opposite the minor lane to Rhos y Madoc. The microphone was positioned at a height of 1.5m above the ground. Measurements commenced here at 20:20 hours on Tuesday 28 November and covered key periods of the evening, night and daytime

through to Wednesday 29 November 2017 at 12:00 hours.

- 5.19. Details of the sound level monitoring equipment used during the survey are presented within **Table 5.1**.

Table 5.1 – Noise Measurement Equipment

Measurement Location	Equipment	Make and Model	Serial Number
R1 & R2	Sound Level Meter	Brüel & Kjær Type 2250	2463189
	Pre-amplifier	Brüel & Kjær Type ZC 0032	2658
	Microphone	Brüel & Kjær 4189	24577838
	Calibrator	Brüel & Kjær 4231 Sound Calibrator	2464005
P1	Sound Level Meter	01 dB-Mettravib Fusion	10796
	Pre-amplifier	01dB PRE22	10882
	Microphone	GRAS 40CD	207588
	Calibrator	01 dB-Stell CAL 21	34254632
P2	Sound Level Meter	01 dB-Mettravib Fusion	10797
	Pre-amplifier	01dB PRE22	10870
	Microphone	GRAS 40CD	207593
	Calibrator	01 dB-Stell CAL 21	34254631

- 5.20. The sound level meters were calibrated before and after measurements, with no significant calibration drift recorded. An accredited laboratory calibrated the equipment not more than two years prior to the measurements being made, with the exception of the calibrators, which had been calibrated annually.
- 5.21. The weather conditions during the survey were dry with no precipitation, wind speeds ranged between 1 and 3 m/s and wind direction was generally from the north. Air temperatures ranged between 7.5°C during the daytime and 2.6°C during the night-time. It was deemed that meteorological conditions were conducive to environmental noise monitoring.

Consultation

- 5.22. **Table 5.2** provides a summary of the consultation activities undertaken in support of the preparation of this Chapter, through the scoping exercise or elsewhere.

Table 5.2 – Summary of Consultation

Body / organisation	Individual / stat body/organisation	Meeting dates and other forms of consultation	Summary of outcome of discussions
Wrexham County Borough Council	Nick Minshall, Pollution Control Officer, Environmental Health Department	Email sent 06/11/17 to seek agreement on baseline assessment approach	Confirmation of agreement with baseline survey and assessment approach received from Nick Minshall on 07/11/17

Assessment Methodology

- 5.23. The significance of each respective impact has been determined with due consideration to both the impact magnitude and receptor sensitivity.
- 5.24. Impact magnitude has been determined based on dedicated scales for each impact considered (e.g. construction noise / fixed plant noise etc.). This approach allows the applicable assessment guidance for each impact area to be adopted. The assessment methodology and impact magnitude scale adopted for each impact area is described below, as well as the adopted receptor sensitivity scale and significance of effects matrix.

Significance Criteria

- 5.25. The assessments of potential impacts as a result of the Proposal has taken into account both the construction and operational phases. The construction phase includes earthworks and construction activities as detailed in **Chapter 3: Site Description and Proposed Development**. The operational phase includes fixed plant, machinery and site activities and operational traffic on the local road network and the impact upon the existing sensitive uses in the vicinity of the Site. The significance level attributed to each environmental effect has been assessed based on the impact magnitude and the sensitivity of the affected receptor/receiving environment, as well as a number of other factors that are outlined in more detail in **Chapter 2: EIA Methodology**. Impact magnitude has been assessed on a scale of large, medium, small and negligible, and the sensitivity of the affected receptor/receiving environment has been assessed on a scale of high, medium, low and negligible.

Construction Stage

Construction Noise (non-traffic)

- 5.26. A series of construction noise level predictions have been undertaken in accordance with BS 5228-1, with the results compared against criteria also derived from this standard. These have been reported for the nearest noise sensitive dwellings as described in the Standard.
- 5.27. For construction activities, following the ABC Method for determining significance provided within BS 5228-1 (set out in **Appendix 5.1, Volume III**) and given the prevailing ambient noise levels at the sensitive receptors established as part of the baseline noise survey (as set out in **the Baseline Conditions section** of this Chapter), it is considered appropriate that the construction noise assessment be undertaken against the façade noise limits identified in **Table 5.3**. BS 5228-1, Table E.1, Note 3 states that these limits apply to residential receptors only and by assessing against this set of criteria will ensure that the significance of effects in relation to non-residential receptors is also assessed.

Table 5.3 - Criteria Used to Determine the Impact Magnitude Scale for Construction Site Noise at Dwellings

Impact Magnitude ¹	Daytime Construction Noise Level (Façade), L _{Aeq,T} (dB) ²
Large	>75
Medium	70 to 75
Small	65 to 70
Negligible	<65
¹ A lower magnitude may apply where works are very short in duration. ² Category A of the ABC Method in BS5228-1 has been adopted in determining the significance for these receptors based on a prevailing daytime noise levels established during the baseline noise survey.	

Construction Vibration (non-traffic)

- 5.28. Ground borne vibration calculations of activities / machinery associated with typical on-site construction phase activities have been performed for activities / machinery during construction based on the empirical prediction procedures presented within BS 5228-2:2009 + A1:2014.
- 5.29. The impact magnitude from vibration due to on-site clearance and construction activities has been determined according to the resulting levels in absolute terms, as presented in **Table 5.4**. The levels are based on the guidance contained within BS 5228-2 for human perception.

Table 5.1 - Criteria Used to Determine the Impact Magnitude Scale for Construction Site Vibration

Impact Magnitude	Construction Vibration Component Peak Particle Velocity (mms ⁻¹)
Large	>10.0
Medium	+1.0 to +10.0
Small	+0.3 to +0.9
Negligible	<+0.3

Source: BS 5228-2:2009 Code of practice for noise and vibration control on construction and open sites – Part 2: Vibration

- 5.30. These criteria are far more stringent than those given in BS5228-2 for determining the likely magnitude of vibration damage to buildings. Therefore, by extension, an assessment using the criteria in Table 5.4 will ensure that the significance of effects in relation to building damage is also assessed (with lower significance than the identified effects on human perception).

Operational phase

Fixed Plant, Deliveries and Site Activities

- 5.31. The Proposal in its operational phase will have a number of mechanical and electrical plant items including a biomass boiler and a backup generator, feed bins, goods deliveries and activities associated with the rearing of livestock.
- 5.32. At this stage, details of the proposed nature of operation, type, number and/or location of such plant are not available. With regard to the typical operations that will be undertaken on the Site detail is not available at this stage. Accordingly it is appropriate to specify suitable noise limits to which such plant and operations should conform.
- 5.33. Following consultation with WCBC it has been agreed that noise emission limits for any external plant items and activities operating within the boundary of the Site will be set in line with the guidance and methodology contained within BS 4142:2014.
- 5.34. The BS 4142 assessment method enables rating noise level criteria applicable to noise generating activities to be specified relative to typical background LA90,T sound levels experienced at specific receptors under consideration. On this basis, within BS 4142 it is stated;

“Where the rating level does not exceed the background sound level, this is an indication of the specific sound source having a low impact,

depending on the context.”

- 5.35. A rating level equal to the background sound level would correspond to the situation described in BS 4142 as being ‘an indication of the specific sound source having a low impact’.
- 5.36. Providing that any fixed plant sources and activities operating within the Site boundary can be designed, selected, located and/or configured such that the combined rating level does not exceed the background sound level at the assessed sensitive receptors, it is assumed that at worst only residual effects of negligible significance would remain.
- 5.37. Table 5.5 presents the impact magnitude criteria associated with noise generated.

Table 5.5 - Criteria Used to Determine Impact Magnitude Scale for Fixed Plant / Commercial Noise after Completion

Impact Magnitude	Difference Between Rating Level $L_{A,r,T}$ and Background Noise Level $L_{A90,T}$ (dB)	Commentary
Large	$\geq +10$	Likely to be an indication of a “significant adverse effect” in accordance with the BS 4142 assessment methodology.
Medium	+5 to +9	A difference of around +5dB is likely to be an indication of an “adverse effect” in accordance with the BS 4142 assessment methodology.
Small	0 to +4	An indication of the specific sound having a “low effect” in accordance with the BS 4142 assessment methodology.
Negligible	<0	An indication of the specific sound having a negligible effect in general accordance with the BS 4142 assessment methodology.

Operational off-site road traffic

- 5.38. The operational road traffic noise assessment will be undertaken using traffic flow data provided by SK Transport Planning, the Transport Planning consultants for the project. The calculations have been undertaken in accordance with appropriate methodology. The assessment is limited to the designated HGV haul route leading to and from the development that will carry operational development traffic flows.
- 5.39. The prediction and assessment of impact from off-site road traffic would usually be undertaken using the methodology contained within the Calculation of Road Traffic Noise (CRTN) and the magnitude of traffic noise impact presented in Section 3 Part 7 of the Design Manual for Roads and Bridges (DMRB) Volume 11, Section 3, Part 7 (2011).
- 5.40. The predicted traffic flows as a result of the operational aspects of the Proposal are below the required threshold for the calculation procedure in CRTN, and therefore another methodology and assessment criteria have been adopted in this Chapter.

- 5.41. The potential impacts from operational traffic flows have been established by calculating the day (07:00 – 23:00hrs) and night-time (23:00 – 07:00hrs) A-weighted continuous equivalent sound pressure level (L_{Aeq}) from vehicle movements over the reference time period, corresponding to the worst case operational periods.
- 5.42. The significance of the predicted noise level was then assessed by comparing with the desirable internal ambient noise levels for dwellings as presented in BS 8233:2014. These have been adapted and presented in **Table 5.6**.

Table 5.6 - BS 8233: 2014 guideline indoor ambient noise levels for dwellings

Location	Activity	07:00 to 23:00	23:00 to 07:00
Living Room	Resting	35 dB $L_{Aeq,16hr}$	-
Bedroom	Sleeping (daytime resting)	35 dB $L_{Aeq,16hr}$	30 dB $L_{Aeq,8hr}$
NOTE 7 Where development is considered necessary or desirable, despite external noise levels above WHO guidelines, the internal target levels may be relaxed by up to 5 dB and reasonable internal conditions still achieved.			

Source: BS8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings. Table 4.

- 5.43. For the assessment of individual noise events BS 8233:2014 advises that:

"regular individual noise events can cause sleep disturbance. A guideline value may be set in terms of SEL or $L_{Amax,F}$ depending on the character and number of events per night. Sporadic noise events could require separate values".

- 5.44. The World Health Organisation (WHO) 1999: Guidelines for Community Noise also provide guidance on suitable L_{Amax} noise levels during the night-time period. Specifically it is stated that:

"Indoor guideline values for bedrooms are 30 dB L_{Aeq} for continuous noise and 45 dB L_{Amax} for single sound events."

- 5.45. The L_{AFmax} criteria detailed within this document draws upon guidance from Vallet and Vernet, which states:

"For a good sleep, it is believed that indoor sound pressure levels should not exceed approximately 45 dB L_{AFmax} more than 10-15 times per night".

- 5.46. Where it is identified that the adopted assessment criteria are not exceeded at the worst case affected residential receptors, the impact magnitude is categorised as being negligible.

Sensitivity of receptor

- 5.47. The sensitivity criteria for the construction phase and the operational phase of the Proposal are considered to be the same and are presented in Table 5.7. The description of the receptor, the examples and assigning the sensitivity to each receptor, is derived from the Planning Advice Note (PAN) 1/2011: Planning and Noise and the Technical Advice Note (TAN) that accompanies the PAN. Although these documents are intended to provide advice on the role of the planning system in Scotland, the approach to assigning the sensitivity is well proven in the context of EIA.

Table 5.7 - Sensitivity of Receptor

Sensitivity of receptor	Description	Examples
High	Receptors where people or operations are particularly susceptible to noise and/or vibration.	Residential, schools, hotels and hospitals.
Medium / Low	Receptors of moderate to low sensitivity to noise and/or vibration, where it may cause some distraction or disturbance.	Offices and restaurants.
Negligible	Receptors where distraction or disturbance from noise and/or vibration is minimal.	Buildings not occupied, factories and working environments with existing levels of noise.

Effect Significance

5.48. The following terms have been used to define the significance of the effects identified:

- **Major effect:** where the Proposed Development could be expected to have a very significant effect (either positive or negative) on existing and proposed noise sensitive receptors both within and surrounding the Site;
- **Moderate effect:** where the Proposed Development could be expected to have a noticeable effect (either positive or negative) on existing and proposed noise sensitive receptors both within and surrounding the Site;
- **Minor effect:** where the Proposed Development could be expected to result in a small, barely noticeable effect (either positive or negative) on existing and proposed noise sensitive receptors both within and surrounding the Site; and
- **Negligible:** where no discernible effect is expected as a result of the Proposed Development on existing and proposed noise sensitive receptors both within and surrounding the Site.

5.49. Drawing upon the defined impact magnitude and receptor sensitivity, the significance criteria have been determined with reference to the significance matrix presented in **Table 5.8**.

Table 5.8 - Significance of Effects

MAGNITUDE	SENSITIVITY			
	High	Medium	Low	Negligible
Large	Major	Moderate	Minor	Negligible
Medium	Moderate	Minor	Negligible	Negligible
Small	Minor	Negligible	Negligible	Negligible
Negligible	Negligible	Negligible	Negligible	Negligible

Requirements for Mitigation

- 5.50. Where the effect significance is identified to be of moderate to major negative significance, consideration has been given to appropriate mitigation measures. Where effects of negligible and minor negative significance are identified these are considered to be “Not Significant” in EIA terms and mitigation measures have been considered to be not warranted.
- 5.51. Where prescribed, mitigation measures are committed and will be implemented.

Effect Duration

- 5.52. The duration of an effect is considered to be short-term where the activity potentially exists for up to 1 year, medium-term where the activity potentially exists for between 1 and 10 years and long-term where the activity potentially exists for greater than 10 years.

Assumptions, Uncertainties and Limitations

- 5.53. At this stage, detailed information on the techniques and equipment to be deployed during the site clearance, earth works and foundation forming and construction of the buildings themselves is not available. Consequently a number of assumptions have been made in relation to construction methods, the location of plant and activities and the operating duration on site. These assumptions, along with knowledge of typical methodologies employed at other similar sites, have been used to generate a set of indicative construction noise calculations using the methodologies presented within BS 5228-1:2009+A1 2014.
- 5.54. The assessment of vibration from construction activities has been undertaken based on vibration levels associated with a small range of key ground borne vibration generative construction activities. It is possible that activities other than those presented may take place. The approach to the vibration assessment has therefore been to consider the potential effects based on a number of assumptions of likely on-site operations based on WSP's experience gained from other similar sites.
- 5.55. At this stage, detailed information relating to the mechanical and electrical plant items including the biomass boiler and a backup generator, goods deliveries and other activities associated with the Proposed Development is not available. The approach has therefore been to set appropriate noise limits for the combined operational plant, deliveries and activities on the Site, drawing on the results of the baseline noise survey. As the detailed design of the Proposal progresses and source noise level data becomes available, the operational phase noise assessment should be updated to ensure the potential noise impacts at existing and proposed noise sensitive receptors is minimised where possible.
- 5.56. The assessment of development generated road traffic noise on the existing road network is based on notional receptor locations at 10 m from the road links considered.

Baseline conditions

Noise Survey

- 5.57. The noise environment present within and surrounding the Site predominantly consists of road traffic noise from the local road network with occasional contributions from agricultural activities.
- 5.58. A summary of the measured noise levels recorded during the baseline noise survey is presented within Tables 5.9 and 5.10.

Table 5.9 - Summary of Unattended Baseline Noise Measurements, dB Free Field

Monitoring Location	Daytime (07:00 – 23:00)		Night-time (23:00 – 07:00)	
	L _{Aeq,T}	Lowest typical L _{A90,15min} ³	L _{Aeq,T}	Lowest typical L _{A90,15min} ³
P1	50 ¹	42	40	33
P2	60 ²	45	52	34
¹ Daytime measurement period at P1 was 13 hours ² Daytime measurement period at P2 was 12.75 hours ³ For the purpose of this assessment, statistical analysis of the background sound levels has been undertaken in accordance with the example method set out in Section 8.1 of BS 4142 to establish the most regular occurring background noise level rounded to the nearest whole number.				

Table 5.10 - Summary of Attended Baseline Noise Measurements, dB Free Field

Monitoring Location	Period	Duration (min:sec)	L _{Aeq,T}	L _{AFmax}	L _{A90,15min}
R1	Day	15:00	56	-	40
R1	Day	15:00	53	-	41
R1	Day	15:00	45	-	42
R1	Evening	15:00	50	-	39
R1	Evening	15:00	39	-	37
R1	Night	15:00	35	45	32
R1	Night	15:00	32	43	28 ¹
R2	Day	15:00	63	-	45
R2	Day	15:00	66	-	47
R2	Evening	15:00	59	-	41
R2	Evening	15:00	58	-	42
R2	Night	15:00	48	73	34
R2	Night	15:00	46	75	33 ¹
¹ For the attended measurement locations the representative background sound level has been taken as the lowest value for the corresponding day and night-time reference period.					

- 5.59. For the unattended measurement locations the representative background sound level has been derived by determining the lowest most commonly occurring L_{A90,15min} value during the day and night-time periods, and has been used to set the fixed plant and operations criteria at the closest existing noise sensitive receptors.

Future Baseline

- 5.60. It is stated in **Chapter 3 Site Description and Proposed Development**, that there are no material changes forecast in the baseline conditions for the Site and the surrounding area between 2017 and the year 2018 when the development is proposed to commence construction.

- 5.61. It is likely that future baseline noise levels in 2019 (the opening year) will be subject to change due to the influence of both the Proposed Development and other committed developments within the locality.
- 5.62. The methodology adopted during the assessment and the results of the future baseline scenario are presented within the Potential Effects section of this ES.

Sensitive Receptors

- 5.63. The following are the sensitive receptors which have been assessed within this Chapter.
- Residential receptors A 192m to the south, at grid reference SJ 32469 43672;
 - Residential receptors B 400m to the south-east, at grid reference SJ 32854 43685;
 - Residential receptors C 640m to the south, at grid reference SJ 32259 43246; and
 - Residential receptors D 1036m to the south-west, at grid reference SJ 31623 43285.
- 5.64. The locations of the high sensitivity receptors are shown in **Appendix 5.2, Volume III, Figure 5.3.**

Identification and valuation of key impacts (construction and operational)

Construction Phase

Construction Noise (non-traffic)

- 5.65. It is necessary that a number of informed assumptions have been made in relation to construction methods and programmes. These assumptions are presented within **Chapter 3: Site Description and Proposed Development**. Those which are relevant to the Noise and Vibration assessment are repeated within the following paragraphs.
- 5.66. The following enabling works which have the potential to influence the associated noise and vibration assessments are anticipated as part of the Proposed Development:
- Creation of temporary construction site access, and site access;
 - Site-wide clearance (including vegetation and tree removal, where essential) and implementation of protective measures around retained features;
 - Diversion of utilities, where required;
 - Validation of ground conditions, earthworks and re-profiling to meet required levels;
 - Export of material off-site;
 - Import of material on-site (to include any requirements for ground raising or surcharge);
 - Formation of site-wide temporary / permanent drainage features; and
 - Construction of infrastructure associated with the Proposed Development.
- 5.67. It is assumed that construction traffic would enter the Site from a newly created access road

to the north of the cottages at Cinders Farm.

- 5.68. The number of construction vehicles (including private car trips from the workforce as well as HGV movements) will depend on the size and number of vehicles operated by the contractor. This will be confirmed at the detailed design stage. However, for the purposes of the ES, it is anticipated that there will be on average less than 25 vehicles accessing the Site within a 24hr period.
- 5.69. The works have been split down into the following key stages for prediction purposes:
- Phase 1: Site clearance, groundworks and site-wide enabling works including road construction works;
 - Phase 2: Building Foundations Works; and
 - Phase 3: Building Construction.
- 5.70. It has been assumed that working days / hours during the construction phase will be as follows:
- 07:30 - 17:00 hours Monday to Friday; and
 - 08:00 - 12:30 hours on a Saturday.
- 5.71. No working is anticipated on Sundays and Bank Holidays.
- 5.72. The construction phase of the Proposed Development will involve a variety of different plant and equipment to undertake relevant works, including for example, excavators, dump trucks, front loaders and diesel generators. The type and number of plant is likely to be variable over the construction period and is likely to be dependent on the nature of the construction activity being undertaken. **Table 5.11** details the assumed plant, number of plant, sound power levels for the plant and assumed percentage “on-time”.

Table 5.11 – Assumed Construction Plant and Sound Power levels

Phase	Plant Type	Sound Power Level LW dB(A)	No. of plant	Assumed percentage on-time
Phase 1 – Site clearance, groundworks and site-wide enabling works including road construction works	Tracked Excavator	102	1	50
	Dump Truck	106	1	40
	Lorry pulling up	98	1	10
	Lorry unloading	112	1	10
	Vibratory Compactor	106	1	30
	Skip wagon	106	1	10
	Diesel Generator	88	1	90
	Road sweeper	104	1	40
	Asphalt spreader and support lorry	108	1	60
	Road Roller	108	1	30
Phase 2 - Building Foundations	Excavator	101	1	50
	Truck mixer with pump	103	1	30

Phase	Plant Type	Sound Power Level LW dB(A)	No. of plant	Assumed percentage on-time
Works	Compressor	100	1	60
	Poker Vibrator	97	2	30
	Dump truck	106	1	40
	Vibratory Compactor	106	1	30
	Road sweeper	104	1	20
Phase 3 - Building Construction	Lorry Unloading	112	1	10
	Dump Truck	106	1	40
	Road Sweeper	104	1	20
	Fork lift truck	104	1	60
	Concrete Pump	103	1	10
	Wheeled Loader	109	1	40
	Mobile Telescopic Crane	105	1	40

- 5.73. In practice, the plant items identified for each stage will move around the Site, operating at different times, for different durations and at different locations on any one day for the duration of the works. As a consequence, noise levels at any receptor may vary quite considerably day-on-day. Hence, it is necessary to rationalise the geographic and temporal spread of activities to obtain a meaningful prediction (and subsequent assessment) and to this end, various assumptions have necessarily been made as described in the following paragraphs.
- 5.74. The most important assumptions relate to the location of construction plant and their operational “on-time” during the period of interest.
- 5.75. With respect to the geographical location of the plant, the full complement of plant for each stage, as identified above, is assumed to operate together at a single point as follows:
- For Phase 1 works, at the approximate centre of the Site; and
 - For Phase 2 and 3 works, at the approximate centre of the nearest proposed building.
- 5.76. Other assumptions which have been made with respect to the construction noise predictions are:
- No barriers have been included;
 - Acoustically hard ground cover has been assumed between the noise source and receptor;
 - No atmospheric absorption has been included;
 - Source and receptors have both been taken to be 1.5m high. In reality the noise sources associated with any cranes will be at a higher elevation than this. The distances to the receptor from the crane sources will be greater in reality due to the slant distance. The calculation based at 1.5m above ground therefore assumes a shorter source to receptor

distance and is worst case; and

- Meteorological conditions have been taken to be “neutral”.

- 5.77. On the basis described above, construction noise levels have been determined at the closest noise sensitive receptors, A and B, as presented in **Figure 5.3**, and are provided in **Table 5.12**. The predictions are based on the methodology contained within BS 5228-1 and are in terms of the LAeq,T noise levels over the core working day. These predictions and the assumptions upon which they are based should be re-visited at the appropriate time, when more is known about the construction process.

Table 5.12 - Predicted Unmitigated Construction Noise Levels, Façade LAeq,T dB

Receptor Location	Negligible Magnitude Of Effect For Daytime Construction Noise Levels (07:00 to 19:00)	Predicted Pre-Enabling, Enabling and Construction Noise Levels, LAeq,T dB		
		Phase 1	Phase 2	Phase 3
A (192m)	65	57.3	53.6	56.3
B (400m)	65	50.9	47.2	49.9

- 5.78. The sensitivity of assessment locations A and B is considered to be high, and drawing upon the impact magnitude scale presented in **Table 5.3**, the impact magnitude prior to mitigation, is considered to be negligible. Therefore, there is likely to be a direct, temporary, short term effect on the nearest existing residential receptors of **Negligible**.

Construction Vibration (non-traffic)

- 5.79. Ground borne vibration calculations have been performed for typical site preparation, earthworks and construction activities / machinery based on the empirical prediction procedures presented within BS 5228-2:2009+A1:2014, TRL RR 246: Traffic induced vibration in buildings: 1990 (applicable to Heavy Goods Vehicle (HGV) induced vibration), and TRL Report 429: Ground borne vibration caused by mechanical construction works: 2000 (applicable to vibratory rollers).
- 5.80. Such predictions have been performed in order to determine the possible distances at which the adopted magnitude of effect criteria may be registered based on a specified confidence limit (where applicable). In this regard, ground borne vibration levels and associated distances have been identified for a sample of typical vibration sources which may be associated with this phase.

Table 5.13 - Predicted ground borne vibration levels applicable to typical vibration generating site preparation, groundworks and construction activities

Operation	Confidence Limit	Distance (m)	PPV (mm s ⁻¹)	Impact Magnitude (Onset)
Vibratory Rollers – start & end	95	60	0.3	Small
	95	23	1.0	Medium
Vibratory Rollers – Steady State ¹	95	3.3	10.0	Large
HGVs ²	N/A	50	0.3	Small

	N/A	17	1.0	Medium
	N/A	2.5	10.0	Large
¹ Assumes 2 rollers, 0.4 mm amplitude, drum width of 1.3 m, e.g. heavy duty ride on roller. ² Assumes max height / depth of surface defect of 50 mm, max speed of 30 km/h, and that surface defect occurs at both wheels.				

- 5.81. Based on the Site Layout Plan, it is possible that, at worst, there is potential for significant construction activities to take place at distances of approximately 186m from the closest existing vibration-sensitive receptors to the Site (Cinders Farm Cottages, A).
- 5.82. Currently, the precise activities / methodologies to be undertaken during the construction phase are not known. It is therefore assumed that all of the activities listed within **Table 5.13** have the potential to occur. **Table 5.14** presents the predicted impact magnitude at the closest existing sensitive receptor. In reality, activities are expected to be undertaken at greater distances, it is therefore likely that lower vibration levels will prevail for the majority of activities and the majority of the time.

Table 5.14 - Predicted impact magnitude of construction vibration at closest sensitive receptor

Activity	Magnitude of Effect
Vibratory Rollers	Negligible (<0.3mms ⁻¹)
HGVs	Negligible (<0.3mms ⁻¹)

- 5.83. Assuming the closest existing receptors at A (186m at their closest to works) are residential the sensitivity of the receptor is high and the resultant construction vibration impact magnitude prior to mitigation is predicted to be no greater than negligible. Therefore, there is likely to be a direct, temporary, short term effect on existing residential receptors of **Negligible**.
- 5.84. Significantly higher levels of vibration than those presented are required to cause any sort of damage to buildings than those representing human perception. Consequently, considering the sources of vibration listed above, even cosmetic damage (such as hair line plaster cracks) to existing dwellings due to vibration is highly unlikely.

Operational Phase

Fixed Plant, Deliveries and Site Activities

- 5.85. The introduction of the mechanical and electrical plant items including a biomass boiler and a backup generator, feed bins, goods deliveries and activities associated with the rearing of livestock has the potential to result in negative noise effects at existing noise sensitive receptors surrounding these uses. It is therefore necessary that the layout of these uses be carefully designed with the aim of minimising potential negative noise effects. The potential noise effects which should be considered include the following:
- Noise from associated fixed plant items, including the operation of the biomass boiler, and backup generator; and
 - Noise from service areas including the arrival, departure, loading and unloading of

vehicles, from vehicles on access roads within the Site and from the movement of material around the Site.

- 5.86. The Site Layout Plan indicates that most of the fixed plant serving the rearing buildings will be located to the north of the proposed buildings and will include the following;
- the water tank, water pump and treatment room;
 - 8 feed bins;
 - the energy distribution building (including substation and generator); and
 - extract fans to be located on the roof of the chick rearing buildings.
- 5.87. The actual distance of the nearest noise sensitive receptor from the plant associated with the rearing buildings stated above is approximately 377m. It should also be noted that the rearing buildings themselves will afford a degree of acoustic screening from the activities and plant to those receptors to the south and east.
- 5.88. The biomass boiler building will be located to the south-east of the rearing buildings at a distance of approximately 192m from the nearest existing noise sensitive receptor. The concrete apron forming the access for delivery vehicles will be positioned on the north aspect of the building.
- 5.89. The access road will be located to the north of the biomass building and its closest point will be more than 196m from the nearest noise sensitive receptor, with intervening agricultural buildings providing a degree of screening.
- 5.90. At this stage details relating to the proposed type of plant / equipment, their precise positioning and the nature of their operations are not available, and it has not been possible to consider in detail, the potential noise effects associated with the rearing buildings and biomass boiler building. In the absence of detailed information it is appropriate to outline likely suitable acoustic design criteria to which any plant / equipment should conform.
- 5.91. Criteria have been determined in accordance with the methodology contained within BS 4142:2014. Such criteria should include any corrections for acoustic characteristics following the guidance contained within BS 4142:2014.
- 5.92. Design criteria have been derived based on measurements undertaken at the following measurement locations and is applicable to the presented corresponding Assessment Location:
- Assessment Location A - Design criteria derived based on Measurement Location P1; and
 - Assessment Location B - Design criteria derived based on Measurement Location R1.
- 5.93. On the basis of the above, and considering the outcome of consultation, it is expected that at each assessment location, the combined noise level from all plant and equipment and activities associated with the Proposal should be designed to meet the rating level design criteria in line with those presented in **Table 5.15**.

Table 5.15 - Proposed plant rating level design criteria, Free-field, dB

Assessment Location	Period	Typical $L_{A90,T}$	Rating Level Design Criteria
A – Cinders Farm Cottages	Day (07:00 – 23:00)	42	42
	Night (23:00 – 07:00)	33	33
B – Residential to the east of Cinders Farm	Day (07:00 – 23:00)	40	40
	Night (23:00 – 07:00)	28	28

- 5.94. The above rating level design criteria apply at 3.5m from the façade of any noise sensitive receptor (Free-Field).
- 5.95. In accordance with BS 4142, assessments of plant noise emissions should include corrections for acoustic features (i.e. tonality, impulsivity, intermittency and other sound characteristics), before comparison with the above criteria.
- 5.96. The suggested noise design criteria presented within **Table 5.15** have been provided with the aim of minimising potential noise effects associated with proposed equipment and fixed plant items. As the development proposals progress, when more detail is available with respect to proposed plant, equipment, their precise location and operational characteristics, it is expected that further detailed assessments will be undertaken in order to determine potential noise effect and required mitigation. The criteria presented above provide an indication of the likely criteria which will apply within such assessments.
- 5.97. In the event that noise generative activities associated with the on-site operational aspects of the Proposal exceed appropriate criteria in line with those presented above, the impact magnitude has the potential to be small to large. Given that the sensitivity of existing dwellings is high, the impact magnitude has the potential to be small to large, and it is possible that direct, permanent, long term effects on existing receptors of **Minor to Major negative** significance have the potential to occur prior to the implementation of mitigation.

Operational off-site Road Traffic

- 5.98. The assessment of road traffic movements on the agreed access route have included for the highest vehicle flows for both day and night-time periods. A figure illustrating the access route is presented in **Appendix 5.2, Volume III, Figure 5.3**.
- 5.99. Traffic flow information has been provided by SK Transport Planning, the Transport Planning consultants for the project. A chart illustrating the transport flow numbers and type are presented in **Appendix 5.3, Volume III**.
- 5.100. The road traffic movements indicate the highest daytime and night-time movements from HGV's to occur during chick delivery (daytime only) and stock depletion (night-time only), the highest periods of which are as follows:
- Highest daytime HGV movements: 6; and
 - Highest night-time HGV movements: 10.
- 5.101. For the majority of days, the number of HGVs visiting the site ranges between 0 and 2

movements per day, with no HGVs visiting the site at night during these days. In a 48 day cycle there are approximately 27 days without vehicle movements and 4 days when HGVs will arrive during the night period.

- 5.102. The assessment of impact of the individual noise events for HGVs travelling along the access route would suggest that although there may be up to 10 vehicle movements over the course of an 8 hour night-time period, frequent excess (i.e. several times in any one hour) of the BS8233 LAFmax 45 dB criterion would therefore not occur. Additionally in accordance with the guidance in the WHO Guidelines an exceedance of the indoor 45 dB LAFmax sound pressure level would not occur more than 10-15 times in any one night-time period as a result of operational road traffic.
- 5.103. Continued occurrences of a noise event can as a cumulative effect, disturb sleep. On the basis of research undertaken, the cumulative impact of a number of individual events disturbing sleep is best determined by reviewing the LAeq, 8hr noise level. The number of vehicles passing along the access route would determine the night-time LAeq, 8hr outdoor noise level. To ensure appropriate internal conditions within bedrooms the guidance on internal night-time noise levels given in BS8233 should be considered.
- 5.104. The predictions of the operational traffic noise levels have been undertaken using the Sound Exposure Level (SEL) to LAeq,T formulae presented in the Noise Advisory Council: A Guide to Measurement and Prediction of the Equivalent Continuous Sound Level Leq, and as duplicated in **Appendix 5.1, Volume III**. As the traffic flows on the access route are less than 1000 vehicles per 18 hour day, the CRTN prediction method is not strictly applicable.
- 5.105. These calculations have been completed based on the SEL data for heavy vehicles presented in Figure 4.1.4 of the same Noise Advisory Council Guide and assuming a road traffic speed of 64 km/h on the A539 and 48 km/h on Cinders Lane. (See **Appendix 5.1, Volume III, Figure A5.2.1, NAC Figure 4.1.4**).
- 5.106. On this basis vehicles passing along the access route would generate an SEL of 78.1 dB at 10m from the nearside kerb edge when travelling at a speed of 48 km/h and 80.7 dB at 10m when travelling at a speed of 64 km/h.
- 5.107. The results of the access road calculations have been predicted at a nominal distance of 10m from the nearside kerb edge. A summary of the results are presented in **Table 5.16** along with the representative existing day and night time noise levels measured at the corresponding noise sensitive receptors represented by Measurement Locations P1 and P2. The calculation tables along with the traffic flow data are presented in **Appendix 5.3, Volume III**.

Table 5.16 – Summary of predicted off-site operational traffic noise levels, dB

Assessment Location / Corresponding measurement location	Period	Predicted external noise level LAeq,T from HGVs	Existing baseline noise level LAeq,T	Reduction from outside to inside LAeq,T	Indoor noise level LAeq,T	BS8233 Rating	Impact Magnitude
A – Cinders Farm Cottages / P1	Day (07:00 – 23:00)	38	50	Window open - 15dB	23	Good resting conditions	Negligible impact
	Night	44	40	Window	29	Good	Negligible

	(23:00 – 07:00)			open - 15dB		sleeping conditions	impact
C – Residential receptors 640m to the south / P2	Day (07:00 – 23:00)	41	60	Window open - 15dB	26	Good resting conditions	Negligible impact
	Night (23:00 – 07:00)	46	52	Window open - 15dB	31	Reasonable sleeping conditions	Low impact

- 5.108. The assessment of impact from HGV movements on the access route has compared the predicted noise levels at the worst case affected residential receptors, with allowance for the attenuation via the building envelope, which is generally governed by the weakest construction elements, acoustically speaking. Invariably, these are glazing or any ventilation openings.
- 5.109. The simplest form of natural ventilation is provided by open windows and the generally accepted rule of thumb is that a window left open for ventilation provides 10 - 15 dB attenuation from external noise sources, with the WHO Guidelines for Community Noise suggesting 15 dB. The DEFRA report NANR116: Open/Closed Window Research suggests the figure to be between 12 and 18 dB for road and rail traffic.
- 5.110. Drawing upon the criteria presented in **Table 5.6** and assuming that an exceedance of the criteria by up to 5 dB would result in reasonable conditions, the impact magnitude at receptor C when bird collections occur during the night-time periods is predicted to be small. Given that the sensitivity of existing dwelling is high, the impact magnitude has the potential to be small, it is possible that direct, permanent, long term effects on existing receptors of **Minor negative** significance have the potential to occur.
- 5.111. The assessment of worst case daytime operational traffic at Receptor C and day and night-time traffic at receptor A predicts an impact magnitude of negligible. Given that the sensitivity of existing dwelling is high, the impact magnitude has the potential to be negligible, it is possible that direct, permanent, long term effects on existing receptors of **Negligible** significance have the potential to occur.
- 5.112. As stated above the LAFmax criteria presented in this Chapter are not expected to be exceeded as a result of worst case night-time operational traffic on the access route. Therefore, given that the sensitivity of the existing dwellings is high, the impact magnitude has the potential to be negligible, and direct, permanent, long term effects on existing receptors of **Negligible** significance have the potential to occur at worst.

Cumulative effects

- 5.113. The noise and vibration assessment has considered the cumulative effects for each of the specific assessment stages as set out in the ES Chapter.
- 5.114. The methodology for the cumulative effects has remained the same as the methodology for the ES Chapter.
- 5.115. Cumulative effects associated with the construction phase have been included in the assessment. These considered various construction activities within each Phase of work occurring concurrently in the development area, with the noisiest items of plant taking place

at the closest boundary to the noise and vibration sensitive receptors. The individual contributions from each item of plant were then logarithmically summed to give a total noise level at each of the assessed receptors. The assessment therefore includes a cumulative assessment of construction noise.

- 5.116. Cumulative effects associated with the operational fixed plant, deliveries and on-site activities have been included within the ES Chapter. The presentation of the rating level design criteria is based on the combined noise level from all plant, equipment and activities associated with the Proposal. The assessment therefore includes a cumulative assessment of operational noise.
- 5.117. There are no requirements for further mitigation measures as a result of the cumulative effects assessment as these have been considered within the ES Chapter.
- 5.118. The residual cumulative effects remain the same as those presented within the ES Chapter.

Mitigation measures

Construction Phase

Construction Noise Mitigation

- 5.119. For the assessment of construction noise, given that the predicted significance of effects are negligible in the short-term, specific mitigation is not warranted.
- 5.120. However, the adoption of Best Practicable Means, as defined in Section 72 of the Control of Pollution Act 1974, is usually the most effective means of controlling noise from construction sites. Such measures could be included within a Construction Environmental Management Plan (CEMP), and may include the following:
 - Any compressors brought onto the Site to be silenced or sound reduced models fitted with acoustic enclosures;
 - All pneumatic tools to be fitted with silencers or mufflers;
 - Care to be taken when erecting or striking scaffolds to avoid impact noise from banging steel. All operatives undertaking such activities to be instructed on the importance of handling the scaffolds to reduce noise to a minimum;
 - The majority of deliveries to be programmed to arrive during normal working hours only. Care to be taken when unloading vehicles to minimise noise. Delivery vehicles to be routed so as to minimise disturbance to local residents. Delivery vehicles to be prohibited from waiting within or in the vicinity of the Site with their engines running;
 - All plant items to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive noise;
 - All plant to be sited so that the effect of noise at nearby noise-sensitive properties is minimised;
 - Local hoarding, screens or barriers to be erected as necessary to shield particularly noisy activities; and
 - Problems concerning noise from construction works can often be avoided by taking a considerate and neighbourly approach to relations with local residents. Works should

only normally take place during given periods (e.g. during normal construction hours) and not at night.

Construction Vibration Mitigation

- 5.121. For the assessment of construction vibration, given that the predicted significance of effects are negligible in the short-term, specific mitigation is not warranted.
- 5.122. However, as for construction noise, the adoption of Best Practical Means with respect to construction generated vibration and associated activities; and, indeed, many of the generic measures listed for noise will also help to keep the generation of vibration to a minimum. In particular, all plant items are to be properly maintained and operated according to manufacturers' recommendations in such a manner as to avoid causing excessive vibration, whilst careful consideration should be given to the methods of work.

Operational Phase

Fixed Plant, Deliveries and Site Activities Mitigation

- 5.123. It is assumed that the specification and location of any plant and equipment is sufficiently flexible to ensure suitably quiet plant can be procured, and/or mitigation options can be investigated, to ensure compliance with the recommended design criteria. Similarly, it is expected that the specification of buildings and / or enclosures and compounds housing plant and equipment is sufficiently flexible to enable acoustic mitigation to be built into the design of the proposed noise generative uses (e.g. biomass boiler building, water pump and treatment room, energy distribution building etc.).
- 5.124. Wherever possible it is recommended that sufficient separation distances should be allowed between the most intensive noise generative uses (expected to include the rearing buildings) and existing noise sensitive receptors. The Proposal layout has been designed such that service areas are not directly facing existing noise sensitive receptors. Where considered appropriate / necessary, local screening can be implemented to provide acoustic attenuation.
- 5.125. The recommended design criteria for noise generative plant items / equipment are applicable to the total noise from the simultaneous operation of all noise sources associated with the Proposal. As such, noise emissions from individual activities or items of plant will need to be lower than the given criteria; although, the exact design target for each individual item of plant will be dependent upon its type, noise characteristics, location, etc.
- 5.126. Once the detailed nature of the plant and equipment are confirmed, it is expected that noise from operations will be reconsidered and an appropriate noise mitigation scheme devised and incorporated into the Proposal design to ensure that the recommended criteria can be complied with. It is expected that the requirement for such further appraisal will be secured through the provision of an appropriately worded planning condition.
- 5.127. During progression of the Proposal design, it is recommended that consideration is given to the following with the aim of minimising potential adverse noise effects through mitigation by design:
 - Considerate design and layout of buildings and enclosures / compounds containing noise generative plant and equipment; and
 - Procurement of appropriate plant items and equipment paying due regard to stated noise emissions.

Operational off-site Road Traffic Mitigation

- 5.128. For the operational off-site traffic movements on the access route, given that the worst case predicted effects are of Negligible to Minor negative significance, specific mitigation is not warranted.

Residual effects

Construction phase

Construction Noise

- 5.129. Consideration to specific mitigation measures for construction noise have not been warranted therefore, there is likely to be a direct, temporary, short term residual effect on the residential receptors of **Negligible** significance.

Construction Vibration

- 5.130. Consideration to specific mitigation measures for construction vibration has not been warranted therefore, there is likely to be a direct, temporary, short term residual effect on the residential receptors of **Negligible** significance.

Operational Phase

Fixed Plant, Deliveries and Site Activities

- 5.131. The proposed acoustic design criteria have been derived with the aim of appropriately minimising the likelihood of adverse effects. Provided that these criteria are complied with, and that appropriate scheme design is progressed, the impact magnitude, following mitigation, will be negligible. Given that the sensitivity of existing noise sensitive receptors will be high, and the impact magnitude, following mitigation, is intended to be negligible, there is likely to be a direct, permanent, long-term effect on existing noise sensitive receptors of **Negligible** significance following the implementation of mitigation measures.

Operational off-site Road Traffic

- 5.132. Consideration to mitigation measures for operational off-site traffic movements have not been necessary therefore, there is likely to be a direct, permanent, long term residual effect on the residential receptors of **Minor negative** significance at worst.

References

- 5.133. Ref. 5.1 HM Government (1974), Control of Pollution Act 1974
- 5.134. Ref. 5.2 HM Government (1990), Environmental Protection Act 1990
- 5.135. Ref. 5.3 The Environmental Noise (Wales) Regulations (2006)
- 5.136. Ref. 5.4 The Welsh Government (2016) Planning Policy Wales (Edition 9) 2016
- 5.137. Ref. 5.5 Wrexham County Borough Council (2005) Wrexham Unitary Development Plan (UDP) 1996 - 2011

- 5.138. Ref. 5.6 The British Standards Institution (2014), BS 5228-1:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 1: Noise
- 5.139. Ref. 5.7 The British Standards Institution (2014), BS 5228-2:2009+A1:2014 Code of practice for noise and vibration control on construction and open sites. Part 2: Vibration
- 5.140. Ref. 5.8 The British Standards Institution (2014), BS 4142:2014 Methods for rating and assessing industrial and commercial sound
- 5.141. Ref. 5.9 Department of Transport and Welsh Office (1988), Calculation of Road Traffic Noise
- 5.142. Ref. 5.10 The Highways Agency, Scottish Government, Welsh Assembly Government and the Department for Regional Development Northern Ireland (2011), Design Manual for Roads and Bridges, Volume 11, Section 3, Part 7, HD 213/11 revision 1. Noise and Vibration
- 5.143. Ref. 5.11 The British Standards Institution (2014), BS 8233:2014 Guidance on Sound Insulation and Noise Reduction for Buildings
- 5.144. Ref. 5.12 World Health Organization (2000), Guidelines for Community Noise
- 5.145. Ref. 5.13 Noise Advisory Council (NAC) (1978), Report by a Working Party for the Technical Sub Committee of the Council. A Guide to the Measurement and Prediction of the Equivalent Continuous Sound Level L_{eq}
- 5.146. Ref. 5.14 Department for Environment, Food and Rural Affairs (DEFRA) (2007) NANR116: 'Open/Closed Window Research' Sound Insulation Through Ventilated Domestic Windows.

Glossary of Acoustic Terminology

- 5.147. Noise is defined as unwanted sound. Human ears are able to respond to sound in the frequency range 20 Hz (deep bass) to 20,000 Hz (high treble) and over the audible range of 0 dB (the threshold of perception) to 140 dB (the threshold of pain). The ear does not respond equally to different frequencies of the same magnitude, but is more responsive to mid-frequencies than to lower or higher frequencies. To quantify noise in a manner that approximates the response of the human ear, a weighting mechanism is used. This reduces the importance of lower and higher frequencies, in a similar manner to the human ear.
- 5.148. Furthermore, the perception of noise may be determined by a number of other factors, which may not necessarily be acoustic. In general, the impact of noise depends upon its level, the margin by which it exceeds the background level, its character and its variation over a given period of time. In some cases, the time of day and other acoustic features such as tonality or impulsiveness may be important, as may the disposition of the affected individual. Any assessment of noise should give due consideration to all of these factors when assessing the significance of a noise source.
- 5.149. The most widely used weighting mechanism that best corresponds to the response of the human ear is the 'A'-weighting scale. This is widely used for environmental noise measurement, and the levels are denoted as dB(A) or LA_{eq}, LA₉₀ etc., according to the parameter being measured.
- 5.150. The decibel scale is logarithmic rather than linear, and hence a 3 dB increase in sound level represents a doubling of the sound energy present. Judgement of sound is subjective, but as a general guide a 10 dB(A) increase can be taken to represent a doubling of loudness, whilst an increase in the order of 3 dB(A) is generally regarded as the minimum difference needed to perceive a change under normal listening conditions.

Terminology relating to noise

Terminology	Description
Sound Pressure	Sound, or sound pressure, is a fluctuation in air pressure over the static ambient pressure.
Sound Pressure Level (Sound Level)	The sound level is the sound pressure relative to a standard reference pressure of 20 μ Pa (20x10 ⁻⁶ Pascals) on a decibel scale.
Decibel (dB)	A scale for comparing the ratios of two quantities, including sound pressure and sound power. The difference in level between two sounds s_1 and s_2 is given by $20 \log_{10} (s_1 / s_2)$. The decibel can also be used to measure absolute quantities by specifying a reference value that fixes one point on the scale. For sound pressure, the reference value is 20 μ Pa.
A-weighting, dB(A)	The unit of sound level, weighted according to the A-scale, which takes into account the increased sensitivity of the human ear at some frequencies.
Noise Level Indices	Noise levels usually fluctuate over time, so it is often necessary to consider an average or statistical noise level. This can be done in several ways, so a number of different noise indices have been defined, according to how the averaging or statistics are carried out.
$L_{eq,T}$	A noise level index called the equivalent continuous noise level over the time period T. This is the level of a notional steady sound that would contain the same amount of sound energy as the actual, possibly fluctuating, sound that was recorded.
$L_{max,T}$	A noise level index defined as the maximum noise level during the period T. L_{max} is sometimes used for the assessment of occasional loud noises, which may have little effect on the overall L_{eq} noise level but will still affect the noise environment. Unless described otherwise, it is measured using the 'fast' sound level meter response.
$L_{90,T}$	A noise level index. The noise level exceeded for 90% of the time over the period T. L_{90} can be considered to be the "average minimum" noise level and is often used to describe the background noise.
$L_{10,T}$	A noise level index. The noise level exceeded for 10% of the time over the period T. L_{10} can be considered to be the "average maximum" noise level. Generally used to describe road traffic noise.
Free-Field	Far from the presence of sound reflecting objects (except the ground), usually taken to mean at least 3.5m.
Façade	At a distance of 1m in front of a large sound reflecting object such as a building façade.
Fast/Slow Time Weighting	Averaging times used in sound level meters.
Octave Band	A range of frequencies whose upper limit is twice the frequency of the lower limit.

Terminology Relating To Vibration

Terminology	Description
Displacement, velocity and acceleration	Vibration is an oscillatory motion. The magnitude of vibration can be defined in terms of displacement (how far from the equilibrium position that something moves), velocity (how fast something moves), or acceleration (the rate of change of velocity).
Amplification	A general term used to indicate the increase in noise or vibration, or the amount (in decibels) by which it is increased.
Transfer function	Transfer function of a vibrating system is the ratio of the output or response of the system to the input excitation, usually expressed as a complex function of frequency.
Vibration dose value (VDV)	This is a measure of the amount of vibration that is experienced over a specified period, and has been defined so as to quantify the human response to vibration in terms of comfort and annoyance. The Vibration Dose Value is used to assess the likely levels of adverse comment about

	vibration, and is defined mathematically as the fourth root of the time integral of the fourth power of the acceleration, after it has been frequency weighted to take into account the frequency response of the human body to a vibration stimulus. Measured in units of $\text{m}\cdot\text{s}^{-1.75}$
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6. Air Quality

Introduction

- 6.1. The chapter assesses the impact of odour emissions from the proposed poultry rearing houses at Cinders Farm, near Ruabon in Wrexham. LL14 6HL. The chapter is prepared in accordance with the Institute of Air Quality Management guidance on the assessment of odour for planning. An assessment of the impact of ammonia is appended to the ecological chapter. The
- 6.2. Odour emission rates from the proposed poultry houses have been assessed and quantified based upon an emissions model that takes into account the likely internal odour concentrations and ventilation rates of the poultry houses. The odour emission rates so obtained have then been used as inputs to an atmospheric dispersion model which calculates odour exposure levels in the surrounding area.

Baseline Conditions

- 6.3. Details of the Proposal including details of ventilation are described at **Chapter 3** above.
- 6.4. The site is located in a rural area with several livestock farms in the vicinity of the site:
- Cinders Farm, approximately 190m to the south;
 - Moreton Farm is approximately 500m to the north-west;
 - Llwynhywel, approximately 610 m to the south;
 - Park Eyton Farm, approximately 670 m to the south-south-east
- 6.5. There are rural cottages scattered around the surrounding area as follows:
- the farmhouse at Cinders Farm, approximately 190 m to the south;
 - Cinders Cottages, approximately 250 m to the south;
 - Cinders Farm House approximately 300 m to the south;
 - Old Crymbal, approximately 480 m to the south-east,
 - a residence approximately 520 m to the east-south-east;
 - The Cimbles and Barnwell, approximately 720 m to the east; and
 - The Schoolhouse, 620 m to the south.
- 6.6. A map of the surrounding area is provided in **Appendix 6.1, Volume III** with the location of the site shown with a blue box.
- 6.7. The Institute of Air Quality Management assists with assessing the relative sensitivity of receptors to odours. The table is provided at **Appendix 6.4, Volume III**. This table states that low sensitivity receptors would include surrounding land use where there is a transient exposure of odours. The table lists farms as an example of a low sensitivity receptor. For the purpose of this assessment all farms in the surrounding area, including Cinders Farm where the manager of the Proposed Development would live, are considered low sensitivity receptors.
- 6.8. There are transient odours relating to livestock in the surrounding area as the dominant land use is pastoral. Dwellings not connected with agricultural use in the area surrounding the

site can reasonably expect a transient exposure to odour associated with livestock production. The scattered dwellings in the surrounding area are medium sensitivity receptors to livestock related odours.

Assessment Methodology and Significance Criteria

Odour concentration, averaging times, percentiles and FIDOR

- 6.9. Odour concentration is expressed in terms of European Odour Units per metre cubed of air (ouE/m³). The following definitions and descriptions of how an odour might be perceived by a human with an average sense of smell may be useful, however, it should be noted that within a human population there is considerable variation in acuity of sense of smell.
- 1.0 ouE/m³ is defined as the limit of detection in laboratory conditions.
 - At 2.0 – 3.0 ouE/m³, a particular odour might be detected against background odours in an open environment.
 - When the concentration reaches around 5.0 ouE/m³, a particular odour will usually be recognisable, if known, but would usually be described as faint.
 - At 10.0 ouE/m³, most would describe the intensity of the odour as moderate or strong and if persistent, it is likely that the odour would become intrusive.
- 6.10. The character, or hedonic tone, of an odour is also important; typically, odours are grouped into three categories.
- Most offensive:
- Processes involving decaying 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.
- 6.11. Dispersion models usually calculate hourly mean odour concentrations and Environment Agency guidelines (adopted by Natural Resources Wales) and findings from UK Water Industry Research (UKWIR) are also framed in terms of hourly mean odour concentration.
- 6.12. The Environment Agency guidelines and findings from UKWIR use the 98th percentile hourly mean; this is the hourly mean odour concentration that is equalled or exceeded for 2% of the time period considered, which is typically one year. The use of the 98th percentile statistic allows for some consideration of both frequency and intensity of the odours.

- 6.13. At some distance from a source, it would be unusual if odour concentration remained constant for an hour and in reality, due to air turbulence and changes in wind direction, short term fluctuations in concentration are observed. Therefore, although average exposure levels may be below the detection threshold, or a particular guideline, a population may be exposed to short term concentrations which are higher than the hourly average. It should be noted that a fluctuating odour is often more noticeable than a steady background odour at a low concentration. It is implicit that within the model's hourly averaging time and the Environment Agency guidelines and findings from UKWIR that there would be variation in the odour concentration around this mean, i.e. there would be short periods when odour concentration would be higher than the mean and lower than the mean.
- 6.14. The scale of exposure (the impact) is determined by the parameters collectively known as FIDO factors (Frequency, Intensity, Duration and Offensiveness; these are described in Table 6.1. The magnitude of the effect experienced is determined by the scale of exposure (FIDO) and the sensitivity of the receptor (L, denoting the location, which is often taken to be a surrogate for the sensitivity and incorporates the social and psychological factors that can be expected for a given community.)

Table 6.1: Description of the FIDOL factors

Frequency	How often an individual is exposed to odour
Intensity	The individual's perception of the strength of the odour
Duration	The overall duration that individuals are exposed to an odour over time.
Odour unpleasantness	Odour unpleasantness describes the character of an odour as it relates to the 'hedonic tone' (which may be pleasant, neutral or unpleasant) at a given odour concentration/intensity. This can be measured in the laboratory as the hedonic tone, and when measured by the standard method and expressed on a standard nine-point scale it is termed the hedonic score.
Location	The type of land use and nature of human activities in the vicinity of an odour source. Tolerance and expectation of the receptor. The 'Location' factor can be considered to encompass the receptor characteristics, receptor sensitivity, and socio-economic factors.

Environment Agency guidelines (adopted by Natural Resources Wales)

- 6.15. In April 2011, the Environment Agency published H4 Odour Management guidance (H4). In Appendix 3 – Modelling Odour Exposure, benchmark exposure levels are provided. The benchmarks are based on the 98th percentile of hourly mean concentrations of odour modelled over a year at the site/installation boundary. The benchmarks are:
- 1.5 ouE/m³ for most offensive odours.
 - 3.0 ouE/m³ for moderately offensive odours.
 - 6.0 ouE/m³ for less offensive odours.

- 6.16. Any modelled results that project exposures above these benchmark levels, after taking uncertainty into account, indicates the likelihood of unacceptable odour pollution.

UK Water Industry Research findings

- 6.17. The main source of research into odour impacts in the UK has been the wastewater industry. An in-depth study of the correlation between modelled odour impacts and human response was published by UKWIR in 2001. This was based on a review of the correlation between

reported odour complaints and modelled odour impacts in relation to nine wastewater treatment works in the UK with on-going odour complaints. The findings of this research and subsequent UKWIR research indicated the following, based on the modelled 98th percentile of hourly mean concentrations of odour:

- At below 5.0 ouE/m³, complaints are relatively rare at only 3% of the total registered.
- At between 5.0 ouE/m³ and 10.0 ouE/m³, a significant proportion of total registered complaints occur, 38% of the total.
- The majority of complaints occur in areas of modelled exposures of greater than 10.0 ouE/m³, 59% of the total.

Choice of odour benchmarks for this study

- 6.18. Odours from poultry rearing are usually placed in the moderately offensive category. Therefore, for this study, the Environment Agency's benchmark for moderately offensive odours, a 98th percentile hourly mean of 3.0 ouE/m³ over a one year period, is used to assess the impact of odour emissions from the proposed poultry unit at potentially sensitive receptors in the surrounding area. The UKWIR research is also considered.
- 6.19. For the purpose of this assessment odour exposure of concentrations below 5.0 ouE/m³ are assessed as negligible impacts.

Quantification of odour emissions

- 6.20. Odour emission rates from broiler houses depend on many factors and are highly variable. At the beginning of a crop cycle, when chicks are small, litter is clean and only minimum ventilation is required, the odour emission rate may be small. Towards the end of the crop, odour production within the poultry housing increases rapidly and ventilation requirements are greater, particularly in hot weather, therefore emission rates are considerably greater than at the beginning of the crop.
- 6.21. Peak odour emission rates are likely to occur when the housing is cleared of spent litter at the end of each crop. There is little available information on the magnitude of this peak emission, but it is likely to be greater than any emission that might occur when there are birds in the house. The time taken to perform the operation is usually around two hours per house and it is normal to maintain ventilation during this time. There are measures that can be taken to minimise odour production whilst the housing is being cleared of spent litter and there is usually some discretion as to when the operation is carried out; therefore, to avoid high odour levels at nearby sensitive receptors, it may be possible to time the operation to coincide with winds blowing in a favourable direction.
- 6.22. To calculate an odour emission rate it is necessary to know the internal odour concentration and ventilation rate of the poultry houses. For the calculation, the internal concentration is assumed to be a function of the age of the crop and the stocking density.
- 6.23. The internal concentrations used in the calculations increase exponentially from 300 ouE/m³ at day 1 of the crop, to approximately 700 ouE/m³ at day 16 of the crop, to approximately 1,800 ouE/m³ at day 30 of the crop and approximately 2,300 ouE/m³ at day 34 of the crop. These figures are obtained from a review of available literature and measured concentrations in modern broiler houses available to AS Modelling & Data Ltd. and are based primarily on Robertson et al. (2002).

- 6.24. The ventilation rates used in the calculations are based on industry practices and standard bird growth factors. Minimum ventilation rates are as those of an operational poultry house and maximum ventilation rates are based on Defra guidelines. It is assumed that a continuous minimum ventilation rate is maintained, which provides for 2 to 3 air changes per hour of the poultry house, in order to maintain negative pressure and minimise fugitive emissions. Target internal temperature is 33 Celsius at the beginning of the crop and is decreased to 22 Celsius by day 34 of the crop. If the external temperature is 7 Celsius, or more, lower than the target temperature, minimum ventilation only is assumed for the calculation. Above this, ventilation rates are increased in proportion to the difference between ambient temperature and target internal temperature. A maximum transitional ventilation rate (35% of the maximum possible ventilation rate) is reached when the ambient temperature is equal to the target temperature. A high ventilation rate (70% maximum possible ventilation rate) is reached when the temperature is 4 degrees above target and if external temperature is above 33 Celsius the maximum ventilation rate is assumed.
- 6.25. At high ventilation rates, it is likely that internal odour concentrations fall because odour is extracted much faster than it is created. Therefore, if the calculated ventilation rate exceeds that required to replace the volume of air in the house every 5 minutes, internal concentrations are reduced (by a factor of the square root of 7.5 times the rearing house volume/divided by the ventilation rate as an hourly figure).
- 6.26. Based upon these principles, an emission rate for each hour of the period modelled is calculated by multiplying the concentration by the ventilation rate. Both the crop length and period the housing is empty can be varied. An estimation of the emission during the cleaning out process can also be included. In this case, it is assumed that the houses are cleared sequentially and each house takes 2 hours to clear.
- 6.27. In this case, it is assumed for the calculations that the crop length is 38 days, with 20% thinning of the birds at day 33 and that there is an empty period of 11 days after each crop. To provide robust statistics, three sets of calculations were performed; the first with the first day of the meteorological record coinciding with day 1 of the crop cycle, the second coinciding with day 16 of the crop and the third coinciding with day 33 of the crop. A summary of the emission rates used in this study is provided in Table 6.1. It should be noted that the figures in this table refer to the whole of the crop length whilst most figures quoted in literature are figures obtained from the latter stages of the crop cycle and therefore should not be compared directly to these AS Modelling & Data Ltd. figures. The specific odour emission rate used for the clearing process is approximately 3.20 ouE/bird/s and the 98th percentile emission rate is approximately 1.20 ouE/bird/s. As an example, a graph of the specific emission rate over the first year of the meteorological record for each of the three crop cycles is shown in **Appendix 6.2, Volume III**.

Identification and valuation of key impacts

- 6.28. For this study an Atmospheric Dispersion Modelling System was run. The details of the model parameters are set out in **Appendix 6.3, Volume III**. The model was run with the terrain module of ADMS (FLOWSTAR) and with the calms module of ADMS.
- 6.29. ADMS was effectively run thirty-six times, once for each year for four years' meteorological record and for each of the three crop cycles and using GFS meteorological data, Hawarden meteorological data and Shawbury meteorological data. Statistics for the annual 98th percentile hourly mean odour concentration at each receptor were compiled for each of the thirty-six runs.
- 6.30. A summary of the results of the thirty-six runs at the discrete receptors is provided in Table 6.2 where the maximum annual 98th percentile hourly mean odour concentration is shown.

A contour plot of the maximum annual 98th percentile hourly mean odour concentrations for the proposed poultry houses for the GFS model runs is shown in **Appendix 6.4, Volume III**.

Table 6.2: Predicted maximum annual 98th percentile hourly mean odour concentrations at the discrete receptors

Receptor number	X(m)	Y(m)	Maximum annual 98 th percentile hourly mean odour concentration (ouE/m ³)		
			Proposed with 225,000 birds		
			GFS Calms Terrain	Shawbury Calms Terrain	Hawarden Calms Terrain
1	332496	343768	4.55	4.10	2.52
2	332430	343722	2.58	2.57	2.28
3	332446	343703	2.64	2.61	2.10
4	332463	343678	2.54	2.41	1.83
5	332846	343689	1.29	1.11	0.84
6	331831	343629	0.28	0.43	0.40
7	332414	343329	0.55	0.50	0.55
8	332273	343257	0.37	0.26	0.49
9	332780	343355	1.06	0.81	0.39
10	332723	343195	0.71	0.71	0.32
11	332973	343843	1.00	0.76	0.74
12	333187	344081	0.79	0.70	0.46
13	332082	344499	1.21	0.78	0.80
14	332122	344736	0.81	0.64	0.67
15	331835	343278	0.23	0.16	0.25
16	331625	343308	0.18	0.18	0.23
17	331501	343319	0.14	0.20	0.20
18	331881	343218	0.24	0.17	0.22
19	332521	342956	0.36	0.32	0.24
20	332703	343064	0.58	0.55	0.27

6.31. In Table 6.2:

- predicted odour exposures in excess of the Environment Agency's benchmark of 3.0 ouE/m³ as an annual 98th percentile hourly mean are coloured blue (negligible impacts);
- those in the range that UKWIR research suggests gives rise to a significant proportion of complaints, 5.0 ouE/m³ to 10.0 ouE/m³ as an annual 98th percentile hourly mean, are coloured orange (negligible impacts); and
- predicted exposures likely to cause annoyance and complaint are coloured red.

6.32. Receptor number 1 is Cinders Farm. At this location the predicted odour exposure is slightly

in excess of the Environment Agency's benchmark. Having regard to the sensitivity of Cinders Farm and the magnitude of the impact the overall effect is assessed as negligible and not significant.

- 6.33. The poultry development will in any case be subject to an odour management plan and will be regulated and monitored by NRW under the Environmental Permit Regulations. The odour management plan has been submitted to NRW for approval as part of the application for the Environmental Permit.

Summary and Conclusions

- 6.34. Odour emission rates from the proposed poultry houses have been assessed and quantified based upon an emissions model that takes into account the likely internal odour concentrations and ventilation rates of the poultry houses. The odour emission rates so obtained have then been used as inputs to an atmospheric dispersion model which calculates odour exposure levels in the surrounding area.
- 6.35. The modelling predicts that, at one nearby residence, the farm house at Cinders Farm, the residence of the operator, the predicted 98th percentile odour concentrations would exceed the Environment Agency's benchmark for moderately offensive odours, a maximum annual 98th percentile hourly mean concentration of 3.0 ouE/m³.
- 6.36. At all other receptors considered, the modelling predicts that 98th percentile odour concentrations would be below the Environment Agency's benchmark value for moderately offensive odours.

7. Heritage

Introduction

- 7.1. This Chapter has been produced by Julian Bagg of Castle House Heritage Consulting Ltd and assesses Heritage Assets including Listed Buildings, Conservation Areas and Registered Parks and Gardens. The study considers the nature and significance of the Heritage Assets identified and assesses the potential impact upon that significance resulting from the constructional and operational phases of the Proposed Development. The study also includes appropriate mitigation measures where harm is identified. Note: Scheduled Ancient Monuments are assessed in Chapter 8 Archaeology.

Policy Context

- 7.2. Planning legislation relating to the built historic environment is set out in the Planning (listed Buildings & Conservation Areas) Act 1990 and Historic Environment (Wales) Act 2016. Guidance relating to this act is published as Planning Policy Wales Chapter 6: The Historic Environment 2017 (PPW6) and Technical Advice Note 24: The Historic Environment 2017 (TAN24).
- 7.3. The guidance from Conservation Principles reiterated in paragraph 1.7 of TAN 24 which defines the historic environment as:
- “All aspects of the environment resulting from the interaction between people and places through time.”
- 7.4. The guidance also encourages the use of the term ‘Heritage Asset’ to describe:
- “An identifiable component of the historic environment. It may consist or be a combination of an archaeological Site, a historic building or area, historic park and garden or a parcel of historic landscape. Nationally important historic assets will normally be designated” (para 1.7 TAN24).
- 7.5. All relevant designated Heritage Assets have been assessed in relation to this Proposal. Following Consultation with the WCBC no non-designated Heritage Assets were identified for assessment.
- 7.6. The objective of national historic environment policy is to: “To enable the historic environment to deliver rich benefits to the people of Wales, what is of significance needs to be identified and change that has an impact on historic assets must be managed in a sensitive and sustainable way” (Para 6.1.3 PPW6).
- 7.7. Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990 requires that in considering whether to grant planning permission for development affecting a listed building or its setting, the local planning authority shall have special regard to the desirability of preserving its setting.
- 7.8. In addition guidance is also provided in the form of Cadw publication Conservation Principles for the sustainable management of the historic environment in Wales (2011).
- 7.9. Wrexham Unitary Development Plan Policies relevant to the historic environment are Policy

EC9 (Listed Buildings of Special Architectural or Historic Interest) and Policy EC7 (Conservation Areas).

Assessment Methodology and Significance Criteria

- 7.10. All Designated Heritage Assets within a 2km radius of the Site were identified and plotted (see **Appendix 7.1, Volume III**). Designated Heritage Assets assessed include Listed Buildings, Conservation Areas, Scheduled Ancient Monuments and Registered Parks and Gardens. Sources of information for this study included a search of the National Historic Assets of Wales administered by Cŏf Cymru, the Historic Wales database and information regarding Conservation Areas held by WCBC.
- 7.11. Relevant representatives of local and national heritage stakeholders (WCBC & Cadw) were consulted regarding the Heritage Assets identified and the scope and methodology of the proposed study. Based on the advice received a Site visit was conducted during December 2017. Selected designated Heritage Assets such as Listed Buildings and Conservation Areas within the search area were also visited. A further refinement of selection was conducted during the site visit depending on distance, topography and screening. This exercise discounted further assessment of some designated Heritage Assets.
- 7.12. Where it was considered that views of the development Site may be possible within the context of a designated Heritage Asset the significance of the Heritage Asset and its setting has been assessed against the potential visual impact of the proposed development during the construction phase and following completion.
- 7.13. Assessment of the Impact and Effect of the Proposal upon the setting of Heritage Assets utilises the adopted methodological approach supported by CADW in their publication The settings of Heritage Assets in Wales (2017) and Draft DCLG guidance: Environmental Impact Assessment: A guide to good practice and procedures 2006 (see **Appendix 7.2, Volume III**).

Baseline Conditions

- 7.14. Data held by The National Historic Assets of Wales (administered by Cŏf Cymru), the Historic Wales database and information regarding Conservation Areas held by WCBC was examined.
- 7.15. The Site is located within gently undulating countryside. Views out from the Site are generally restricted to within a 1km radius although a limited area extends to the West to a section of ridgeline forming a short section of Wat's Dyke. An Approximate Visual Envelope around the Site has been produced by Alan Moss Associates as part of the Chapter 9 Landscape & Visual Impact Assessment. This information combined with a visual Site inspection carried out in December 2017 has been used to assess intervisibility between the Site and Heritage Assets (See **Appendix 7.3, Volume III**). A summary of the surrounding Heritage Assets is as follows:
 - There are two Heritage Assets identified within 1km of the Site. These are both Grade II Listed Buildings;
 - There are up to 20 listed buildings located to the South and South-East of the Site between 1km and 2km distant. There are 4 at Grade II* the rest being Grade II. Almost all are located within Wynnstay Registered Park and Garden (Grade I) and all are beyond the Approximate Visual Envelope;
 - The Ruabon Conservation Area is some 1.8km to the East of the Site and contains a

number of Listed Buildings; and

- There are only two Heritage Assets identified within the Approximate Visual Envelope. Lower Moreton Farmhouse (Grade II Listed Building) and Wat's Dyke (Scheduled Ancient Monument).

7.16. Having established that only two Heritage Assets are within the Approximate Visual Envelope and having confirmed this during a Site visit, all other Heritage Assets are discounted from the assessment. As such the refined assessment will be restricted to Lower Moreton Farmhouse (Grade II Listed Building).

7.17. Wat's Dyke (Scheduled Ancient Monument) will be assessed in Archaeology (Chapter 8).

The Lower Moreton Farmhouse and its setting

7.18. The farmhouse is Grade II Listed and located approximately 650m North-West of the Site (NGR SJ 32113 44755) in an isolated rural position and sits within its own defined residential curtilage facing a collection of farm buildings, some of which are large modern sheds. The farmhouse has 17th Century origins but has been altered and extended over time, most notably in 19th Century.

7.19. It would appear that little communal value could be attributed to the building but that historical, aesthetic and evidential value can be attributed as an example of a typical historic farmhouse of the region with potential surviving historic fabric charting the changing fortunes of a rural farmstead over the last 400 years.

7.20. The setting of the building and the way that its significance is experienced is generally limited to its immediate curtilage. The building is separated from the Site by open fields and screened to a degree by mature trees within the intervening hedge lines (see **Appendix 7.4, Volume III**). There are no formal historic vistas or elevated views of the Site from the Listed Building and the Site would not form a prominent or dominant feature within the visual context of the farmhouse. These views are also assessed in Chapter 9 Landscape & Visual Impact Assessment Table 9.19: Summary of Assessment of Visual Effects.

Identification of and Evaluation of Key Impacts

Construction Phase

7.21. The construction phase of the Proposal would potentially result in a visual impact on the setting of Lower Moreton Farmhouse causing an adverse effect as identified in the table 7.5 below. The visual impact would be in the form of the distribution and colours of the equipment, vehicles, storage of materials, erection of cranes and administration buildings which would be more visually intrusive than the baseline conditions present on the Site. The impact would be exacerbated by the likelihood that the landscaping plan would not be implemented at this stage.

7.22. The effect of this impact would be a low degree of discordant visual distraction to the way in which the Listed Building is experienced in some limited locations around the building or from the Southern dormer window. The magnitude of the effect would be low. The impact generating the effect would very much limited by distance, topography, intervening trees and hedges and the visually short range nature of the way in which the building's setting is experienced. The significance of the predicted effect would be moderately negative and shot term.

7.23. Some degree of intermittent distracting noise is likely to occur during the construction phase.

This would include traffic movements within the Site and deliveries to and from which will create additional and potentially distracting noise including the revving of engines and audible reversing warning devices. However, this noise is likely to be intermittent and given that the Site is some 650m distant the magnitude of this effect would be low. Furthermore, Lower Moreton Farmhouse is adjacent to a working farmyard and being close neighbours to other mechanised working farmyards generating their own similar noise the degree to which the noise from the Site would have a tangible impact is likely to be low to negligible.

- 7.24. All predicted effects resulting from the constructional phase are low adverse magnitude, of minor negative significance and short term/temporary.

Table 7.1 Potential Effects – Constructional Phase

Heritage Receptor (Heritage Asset – Built Cultural Heritage)	Importance Of Resource	Effect Magnitude	Effect Significance
Lower Moreton Farm - Grade II Listed Building	National	Adverse (Medium - Low)	Minor Negative

Operational Phase

- 7.25. Following completion of the construction work the operational phase of the Proposal would represent a collection of farm buildings finished in recessive colours and partly screened by existing and introduced trees and hedgerow.
- 7.26. Due to distance and topography only very limited views of the Site are possible from Lower Moreton Farmhouse. The visible impact would not be out of character with the existing baseline conditions within the setting of the Heritage Asset. As such the Proposal would not have a negative effect upon the setting of Lower Moreton Farmhouse.
- 7.27. New external lighting is to be kept to a minimum. Individual light sources and fittings are to be designed to be low intensity and reduce light spillage. No constant security lighting is to be installed and external lighting will only be used during working operations during the winter months. As such it is not considered that the presence of lighting within the Site of the nature described would have a negative effect upon the setting of Lower Moreton Farmhouse. Furthermore, the external lighting can all be controlled through appropriate planning conditions.
- 7.28. Operational noise from the Site would potentially be generated in a number of ways such as the operation of extraction fans and feed, ventilation and heating mechanisms. Traffic movements and deliveries could also generate noise. However Lower Moreton Farmhouse is some 650m distant from the Site. Lower Moreton Farmhouse is also located within its own working farmyard and is close neighbours to other mechanised working farmyards all of which generate their own noise. As such any noise from the Site would not have a tangible effect on the setting of the listed building.

Table 7.2 Potential Effects – Operational Phase

Heritage Receptor (Heritage Asset – Built Cultural Heritage)	Importance Of Resource	Effect Magnitude	Effect Significance
Lower Moreton Farmhouse - Grade II Listed Building	National	No Effect	None

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Cumulative Effects

- 7.29. We are not aware of any notable developments proposed within the proximity of the Site. Similar existing developments are visible within the context of the Site including Moreton Farm, Upper Moreton Farm, Llwyn Howell and Cinders Farm all of which are characterised by clusters of modern agricultural buildings. Given that landscape is punctuated by similar isolated farmsteads with collections of modern agricultural buildings the Proposal within the Site would not be out of character with the existing baseline conditions within the setting of the Heritage Assets. As such no cumulative effects have been identified.

Mitigation Measures

Construction Phase

- 7.30. As Lower Moreton Farmhouse is not physically affected by the construction phase and noise and light are not considered to have an effect the only potential effects identified are due to visual impact and are either negligible or minor and short term. The potential to mitigate the visual impact of the construction Site is limited.
- 7.31. The visual impact of the construction phase could be mitigated to an extent by restricting the length of the construction phase. Additional mitigation is possible through restriction of location of installations on the construction Site such as material storage, administration buildings and plant which could be strategically positioned behind existing screening to reduce visual impact. However, due to the short term nature of the impacts identified the only mitigation recommended is to control the length of the construction period. As such installation of visually recessive external finishes to the structures and implementation of the landscape and planting plan should be secured within a reasonable timescale through an appropriately worded planning condition.

Operational Phase

- 7.32. No impact upon the setting of Lower Moreton Farmhouse has been identified in association with the operational phase of the Proposal. As such no mitigation is required.

Residual Effects

- 7.33. It is considered that due to distance, the use of visually recessive construction materials and colours, screening by trees, vegetation and topography and implementation of an appropriate lighting strategy that there will be no negative residual effects upon the setting of the Heritage Asset.

Policy Compliance

- 7.34. It is considered that provided the Development is completed within a reasonable timescale the Proposed Development would not conflict with Section 66(1) of the Planning (Listed Buildings and Conservation Areas) Act 1990, Chapter 6 of Planning Policy Wales and WCBC Unitary Plan policies EC7 and EC9.

References

- CADW (2017) Setting of Historic Assets in Wales HMSO.
- DCLG (2006) Environmental Impact Assessment: A guide to good practice and

- procedures draft guidance HMSO.
- Moss A (2017) Cinders Farm Landscape & Visual Impact Assessment. Alan Moss Associates.
- Welsh Government (2016) Planning (listed Buildings & Conservation Areas) Act 1990 HMSO.
- Welsh Government Historic Environment (Wales) Act 2016 HMSO.
- Welsh Government (2016) Planning Policy Wales Chapter 6: The Historic Environment HMSO.
- Welsh Government (2017) Technical Advice Note 24: The Historic Environment HMSO.
- Wrexham County Borough Council (1996) Unitary Development Plan 1996 – 2011.

Glossary

Designated heritage asset

- A World Heritage Site, Scheduled Monument, Listed Building, Protected Wreck Site, Registered Park and Garden, Registered Battlefield or Conservation Area designated under the relevant legislation.

Heritage asset

- An identifiable component of the historic environment resulting from the interaction between people and places through time and identified as having a degree of significance meriting consideration in planning decisions, because of its heritage interest. Heritage Asset includes designated Heritage Assets and assets identified by the local planning authority.

Historic environment

- All aspects of the environment resulting from the interaction between people and places through time, including all surviving physical remains of past human activity, whether visible, buried or submerged and landscaped and planted or managed flora.

Magnitude (of effect)

- A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.

Proposal

- The Proposed Development including its location, extent, form, scale, mass and the components of its design finishes enclosures and landscaping.

PPW6

- Abbreviation for Planning Policy Wales Chapter 6: The Historic Environment 2017.

Significance (of effect)

- In relation to an Environmental Impact Assessment the term describes a measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.

Significance (Heritage)

- The sum of the cultural and natural heritage values of a heritage asset and the components which contribute to that significance.

Site

- The area subject to development as defined by the red line plan submitted as part of the planning application.

TAN24

- Abbreviation for Technical Advice Note 24: The Historic Environment 2017.

WCBC

- Abbreviation for Wrexham County Borough Council.

8. Archaeology

Introduction

- 8.1. This chapter assesses the likely and significant environmental effects in relation to archaeology and cultural heritage associated with the Proposal. This chapter has been prepared by Aeon Archaeology.
- 8.2. Archaeology is the study of human history and prehistory through the excavation of sites and the analysis of artefacts and other physical remains. Cultural heritage is the legacy of the physical attributes of a group or society that are inherited from past generations. For the purposes of this assessment archaeological assets can be considered as buried remains in the forms of deposits, structures and artefacts and cultural heritage can be considered as upstanding attributes such as historic buildings, monuments, hedgerows, historic landscapes and battlefields.
- 8.3. This chapter describes the methods used to assess the impacts, the baseline conditions currently existing at the site and surroundings, the potential direct and indirect impacts of the Proposal arising from construction and use of the proposed development, the mitigation measures required to prevent, reduce, or offset the impacts and the residual impacts.
- 8.4. The assessment is derived from a full and comprehensive examination of data related to designated and undesignated archaeological sites and monuments including historic landscape, hedgerows, undesignated historic buildings, Registered Battlefields, Scheduled Ancient Monuments and World Heritage Sites and benefits from asset mapping drawn from detailed on-site observations and documentary research. The chapter should be read in conjunction with the Archaeological and Cultural Heritage Desk-Based Assessment provided in **Appendix 8.1, Volume III**.

Policy Context

International Conventions and National Legislation

- 8.5. At an international level there are two principal agreements concerning the protection of the cultural heritage and archaeological resource – the UNESCO Convention Concerning the Protection of World Cultural and Natural Heritage³ and the European Convention on the Protection of the Archaeological Heritage⁴, commonly known as the Valetta Convention. The latter was agreed by the Member States of the Council of Europe in 1992, and also became law in 1992. It has been ratified by the UK, and responsibility for its implementation rests with Department for Culture Media and Sport.
- 8.6. The management and protection of the historic environment in Wales is set out within the following legislation:
 - The Planning (Listed Buildings and Conservation Areas) Act 1990 (As amended);
 - The Historic Environment (Wales) Act 2016;

³ UNESCO, 1972, Convention Concerning the Protection of the World Cultural and Natural Heritage

⁴ Council of Europe, 1992, European Convention on the Protection of the Archaeological Heritage

- The Town and Country Planning Act 1990;
 - The Ancient Monuments and Archaeological Areas Act 1979; and
 - The Town and Country Planning (General Permitted Development Order) 1995 (As amended).
- 8.7. The Historic Environment (Wales) Act is the most recent legislation for the management of the Historic Environment and amends two pieces of UK legislation — the Ancient Monuments and Archaeological Areas Act 1979 and the Planning (Listed Buildings and Conservation Areas) Act 1990. The new Act has three main aims:
- To give more effective protection to listed buildings and scheduled monuments;
 - To improve the sustainable management of the historic environment; and
 - To introduce greater transparency and accountability into decisions taken on the historic environment.
- 8.8. With respect to the cultural heritage of the built environment the Planning (Conservation Areas and Listed Buildings) Act⁵ 1990 applies. The Act sets out the legislative framework within which works and development affecting listed buildings and conservation areas must be considered. This states that:
- “In considering whether to grant planning permission for development which affects a listed building or its setting, the local planning authority or, as the case may be, the Secretary of State shall have special regard to the desirability of preserving the building or its setting or any features of special architectural or historic interest which it possesses” (s66(1)).*
- 8.9. Other known sites of cultural heritage/archaeological significance can be entered onto county-based Historic Environment Records under the Town and Country Planning 1995.
- 8.10. Planning Policy Wales sets out the land use planning policies of the Welsh Government. Chapter 6 covers the historic environment and emphasises that the positive management of change in the historic environment is based on a full understanding of the nature and significance of historic assets and the recognition of the benefits that they can deliver in a vibrant culture and economy.
- 8.11. Various principles and policies related to cultural heritage and archaeology are set out in the Planning Policy Wales which guide local planning authorities with respect to the wider historic environment.
- 8.12. The following paragraphs from Planning Policy Wales are particularly relevant and are quoted in full:
- 8.13 Paragraph 6.5.5 concerns planning applications:
- “The conservation of archaeological remains is a material consideration in determining a planning application, whether those remains are a scheduled monument or not. Where nationally important archaeological remains, whether scheduled or not, and their settings are likely to be affected by proposed development, there should be a presumption in

⁵ Great Britain. Planning (Conservation Areas and Listed Buildings) Act. Elizabeth II.(1990), London: The Stationery Office

favour of their physical protection in situ. It will only be in exceptional circumstances that planning permission will be granted if development would result in an adverse impact on a scheduled monument (or an archaeological site shown to be of national importance) or has a significantly damaging effect upon its setting. In cases involving less significant archaeological remains, local planning authorities will need to weigh the relative importance of the archaeological remains and their settings against other factors, including the need for the proposed development.”

- 8.13. Planning Policy Wales is supplemented by a series of Technical Advice Notes (TAN). Technical Advice Note 24: The Historic Environment contains detailed guidance on how the planning system considers the historic environment during development plan, preparation and decision making on planning and listed building consent applications. TAN 24 replaces the following Welsh Office Circulars:

- 60/96 Planning and the Historic Environment: Archaeology;
- 61/96 Planning and the Historic Environment: Historic Buildings and Conservation Areas; and
- 1/98 Planning and the Historic Environment: Directions by the Secretary of State for Wales.

Local Planning Policy

- 8.14. Policy EC11 concerning Archaeology states:

“Development which would adversely affect the site or setting of a Scheduled Ancient Monument or archaeological site of national significance will not be permitted. Development that directly affects non-scheduled sites of archaeological importance will only be permitted if an archaeological investigation has been carried out to determine the nature, extent and significance of the remains, and this investigation indicates that in-situ preservation is not justified, and a programme of excavation and recording has been agreed. Development will also be carefully controlled to ensure that the setting of non-scheduled sites of archaeological importance is not harmed where appropriate.”

Assessment methodology and significance criteria

- 8.15. The overall objective of the archaeology and cultural heritage assessment is to provide an assessment of likely and significant effects with reference to archaeological and cultural heritage assets and to allow for an informed decision-making process. The relevant guidance for this assessment includes Guidelines for Environmental Impact Assessment ⁶, the Chartered Institute for Archaeologists Standard and Guidance for Historic Environment Desk-Based Assessment ⁷, the Historic England document The Setting of Heritage Assets – Historic Environment Good Practice Advice in Planning Note 3 ⁸, and the Department for Communities and Local Government document Planning Practice Guidance – Conserving and Enhancing the Historic Environment ⁹. The methodological approach to the assessment

⁶ Institute of Environmental Management and Assessment, 2004, Guidelines for Environmental Impact Assessment

⁷ Chartered Institute for Archaeologists, 2014, Standard and Guidance for Historic Environment Desk-Based Assessment

⁸ Historic England, 2015, The Setting of Heritage Assets – Historic Environment Good Practice Advice in Planning Note 3

⁹ Department for Communities and Local Government, 2013, Planning Practice Guidance – Conserving and Enhancing the Historic Environment

is founded on the preparation of a desk-based assessment which is provided at **Appendix 8.1, Volume III**.

- 8.16. The assessment involved the study of the regional Historic Environment Record (HER) and secondary information held within the HER which included unpublished reports and aerial photographs. The core HER contained a register of Listed Buildings, Scheduled Ancient Monuments and Archaeological Events and information was enhanced by the examination of data at the Wrexham Record Office. Secondary sources were also examined, including the Victoria County History and works held within the regional libraries. Results from previous archaeological work within the area were also reviewed and a site walkover was carried out on 15th December 2017.
- 8.17. The aim of the assessment is to:
- Identify any archaeological and cultural heritage assets that may be affected by the Proposal;
 - Outline any likely environmental impacts of the Proposal on the identified archaeological and cultural heritage assets, likely to be affected, assessing the magnitude of any identified impacts;
 - Assess the effects of the Proposal upon those archaeological and cultural heritage assets, categorising the scale of effect against significance;
 - Identify where relevant any mitigation measures and assess the likely residual impact after such mitigation on the identified archaeological and cultural heritage assets; and
 - Determine if and where there is any potential for cumulative effects on archaeological and cultural heritage assets in conjunction with other developments.
- 8.18. All designated and non-designated archaeological and cultural heritage assets, both within the site and within approximately 1km of the site centre (the assessment area) have been identified. The archaeological and cultural heritage assets in the assessment area have been identified and considered in order that the known and potential archaeological and cultural heritage assets of the Site can be placed in the broader context of the known knowledge-base of the area and a 1km radius assessment area is considered adequate for assessment purposes. However, certain assets which, although located beyond the assessment area, have also been taken into account and have been considered during this assessment process using professional judgment and discrimination. It is considered that the assessment process, whilst it needs to be conducted with reference to a framework defined by geographical limits, should not be rigidly constrained by such a framework and particular archaeological and cultural heritage assets should not be omitted from the assessment solely on a consideration of distance from the Site. With this in mind certain assets beyond the Assessment Area have been taken into account.
- 8.19. In order to identify and examine the archaeological and cultural heritage assets within the Site and the assessment area a preliminary survey of source material was undertaken by means of consultation with a variety of data holders. The results of the desk study were complemented by a further element of work – a walk-over survey in order to examine the ground surface within the site for evidence of archaeological and cultural heritage features and previous impacts to the land which may have compromised, disturbed or removed archaeological assets. The walk-over survey also included perambulations in the assessment area to establish general lines of sight towards, from and across a variety of

locations which form the setting of the archaeological and cultural heritage assets. The results of all elements of work have been used to prepare this chapter.

- 8.20. The Clwyd-Powys HER was consulted to obtain the latest information on known sites and features of archaeological and cultural heritage interest within the site and the assessment area. The Clwyd-Powys HER is the recognised regional repository of archaeological data. The Clwyd-Powys HER data has been supplemented and cross-referenced by means of examination of historic mapping of the assessment area, aerial photographs of the site and published works such as archaeological/historic journals issued by learned societies and reference books on the archaeology and history of the area. Searches were also made of data in the Wrexham Record Office, and a number of on-line sources such as the Heritage Gateway database, the MAGIC database, the National Heritage List, and the National Monuments Record's Coflein database.
- 8.21. Archaeological and cultural heritage assets may be valued for a number of reasons: based on criteria such as rarity or degree of preservation and the EIA process identifies this value as 'importance'. Some resources, not remarkable in terms of rarity or state of preservation terms, may nonetheless be considered to have value for a particular community, especially if they are accessible and contribute to local distinctiveness, identity or economy. For the purposes of this assessment, assets have been considered principally with reference to their value to the quality and understanding of Wales's history, as set out in national legislation priorities and frameworks. However, the international, regional and local perspective has also been taken into account. In addition, the significance of archaeological and cultural heritage assets was addressed using professional judgment and discrimination in the light of guidance and advice provided in Planning Policy Wales. Identified assets are characterised according to their intrinsic importance. A six-fold scale based on the Design Manual for Roads and Bridges¹⁰ has been utilised in order to characterise the value of identified assets, incorporating any relevant designations or best-practice, so that any identified sites can be gauged according to these and assigned a value level as defined in Table 8.1.
- 8.22. With respect to the baseline data and the assessment process there is a high confidence level that the data upon which the work is based is of high quality. The baseline data is generated and maintained by regional or national agencies with a proven track record of data capture and curation and the attributes of the data in terms of veracity and impartiality can be considered to be exemplary.

Baseline conditions

- 8.23. This section summaries the baseline conditions at the site (and in the assessment area). A detailed technical assessment of the archaeological and cultural heritage background and the results of detailed inquiries have are provided in the Archaeological and Cultural Heritage Desk-Based assessment (**Appendix 8.1, Volume III**).
- 8.24. The town was established between the two great Anglo-Saxon dykes: Offa's Dyke runs approximately 600m to the west, Wat's Dyke less than one kilometre to the east.
- 8.25. A number of archaeological and cultural heritage assets have been identified within the site and the assessment area. Indices of these assets are maintained by a variety of organisations and in order to simplify reporting the entire asset group has been brought together in a gazetteer, with each asset receiving a unique gazetteer number. The location and distribution of the assets can be seen on Figures. 3, 4, 5 and 14 in **Appendix 8.1, Volume III**.

¹⁰ Highways Agency, 2009, *Design Manual for Roads and Bridges – Volume 11 – Environmental Assessment*

- 8.26. In summary there are 5 identified assets within the site, which include 4 important field boundaries and 1 feature encompassing three extant field boundaries. All of the identified assets within the site are non-designated assets.
- 8.27. In addition, the Scheduled Ancient Monument of Wat's Dyke (De155) has been identified as lying just outside of the assessment area of 1.0km at approximately 1.2km away from the Site boundary, but due to the elevated environs of the monument has been included within the gazetteer.

Table 8.1: Asset Summary

Gazetteer Reference	Name	Status	Value (Importance)	Distance from Site boundary (m)
Gaz. No. 1	Field Boundary	Non-designated	Low	0
Gaz. No. 2	Field Boundary	Non-designated	Low	0
Gaz. No. 3	Field Boundary	Non-designated	Low	0
Gaz. No. 4	Field Boundary	Non-designated	Low	0
Gaz. No. 5	Extant Field Boundaries	Non-designated	Negligible	0
Gaz. No. 6	Wat's Dyke SAM (De155)	Scheduled Ancient Monument	High	1200
Gaz. No. 7	Unknown buried archaeological remains	Non-designated	Unknown	0

Identification and valuation of key impacts (construction and operational)

- 8.28. Previous activities at the site need to be considered with respect to potential pre-existing impacts to archaeological and cultural heritage assets before a discussion on the potential impacts to the assets represented by the Proposal. The most significant impact to the known and potential archaeological and cultural heritage assets on the site has been long-duration arable regime across much of the site. Plough action is acknowledged as a vector of detrimental impacts to sub-surface archaeological remains. There are acknowledged methodological approaches to test for plough interaction with sub-surface layers that would contain archaeological remains. However, determining how active the interaction is or the rate at which it is taking place are more difficult estimations. No previous attempts to test for plough interaction at the site has been undertaken and so the fact of and degree of plough interaction is unknown. Taking into account a precautionary approach the assessment assumes that there is little or no plough damage to sub-surface archaeological remains that may be present on the site in order that a realistic estimation of impact can be extrapolated.

Demolition and Construction

- 8.29. With respect to the scale and type of direct impact to which the activities required by the Proposal would lead, it is assessed that the impact would be permanent, irreversible and local.

Completed Development

- 8.30. There is scope for some direct impacts to archaeological assets during the use of the development as archaeological remains may be disturbed during building operations for extensions or further new buildings, roads and services. However, these impacts would be dealt with via future planning applications and are not considered within this assessment.
- 8.31. With respect to indirect non-physical (visual) impacts the effect of development on the

significance of the settings of archaeological and cultural heritage assets is a material consideration in determining a planning application. In this instance, and taking into account current guidance it is determined that the identified archaeological and cultural heritage assets and their settings within the landscape are visible from a number of locations – publicly accessible areas such as footpaths, streets and the open countryside and also private spaces such as dwellings and private land. The majority of the sightlines from to, into and across heritage assets are, therefore, incidental and are not intrinsically or intimately associated with the significances assigned to any given archaeological or cultural heritage asset. There are no apparent instances within the assessment area where the characteristics of sightlines may have been intentionally designed and as part of the setting are integral to the significance. Taking into account these considerations the identified assets do not require a detailed setting assessment as the impact to the setting can be gauged in a straightforward manner as detailed in **Appendix 8.1, Volume III**.

- 8.32. The setting of Wat's Dyke (Gaz. No. 6), a Scheduled Ancient Monument does, however, as a consequence of its designated status, perhaps merit some further discussion. The SAM is located c. 1.2km to the west of the western boundary of the Site. The immediate setting is a linear earthwork comprising ditch to the west and bank to the east, roughly orientated north-south. The wider setting is provided by the town of Ruabon to the west, and enclosed agricultural fields to the north, east and south. The setting makes a positive and significant contribution to the heritage significance of the Dyke.
- 8.33. A view is the consequence of a formally constructed landscape in which vantage points and observable features have been created or modified in order to engender a visual response. Due to the elevated environs of the monument there is a section of approximately 720.0m that has been identified within the Landscape and Visual Impact Assessment by Alan Moss Associates to lie within an area of inter-visibility between the Site and SAM. This impact has been assessed through the use of photographs taken at 35mm to simulate actual viewpoints from the Site looking towards the SAM, from the unnamed road looking across the Site towards the SAM, and from the SAM looking towards the Site.
- 8.34. The Proposal will not impact upon any significant views into, out of, or across the SAM, but will have an impact when viewing eastward from the SAM across enclosed agricultural fields towards the Site. Due to the relatively large distance involved between the SAM and the Site, coupled with the single-storey form of the Proposal and the existence of the current farm buildings, this indirect non-physical (visual) impact of the Proposal at the Site is considered to be negligible to low adverse.
- 8.35. The likely impacts, their magnitudes and the significance of effects for the construction/demolition stages and the completed development are shown in table 8.2 below.

Table 8.2: Magnitude of Impact and Significance of Effect Summary

Number	Name	Importance	Impact	Significance of effect
PHYSICAL DIRECT AND INDIRECT IMPACTS				
1	Field boundary	Low	Negligible adverse direct physical (construction)	Neutral /Slight adverse
2	Field boundary	Low	Negligible adverse direct physical (construction)	Neutral /Slight adverse
3	Field boundary	Low	None	Neutral

4	Field boundary	Low	None	Neutral
5	Extant Field Boundaries	Negligible	Major adverse direct physical (construction)	Slight adverse
6	Wat's Dyke SAM (De155)	High	Negligible to minor adverse indirect non-physical (visual) (construction and completion)	Slight adverse
7	Unknown buried archaeological remains	Unknown	Unknown	Unknown

Direct physical impact

Construction phase

- 8.36. The Proposal is expected to have a negligible adverse direct physical impact upon two field boundaries (features 1 and 2) during the construction phase resulting in a neutral / slight adverse significance of effect. In addition, it is expected that there will be a major adverse direct physical impact upon three extant field boundaries (feature 5) during the construction phase. These are all considered to be of negligible importance resulting in a slight adverse significance of effect.

Completion phase

- 8.37. The Proposal is not expected to have any direct physical impact upon any known sites of archaeological and historical significance upon completion.

Indirect physical and non-physical (visual) impact

Construction phase

- 8.38. The Proposal is expected to have a negligible to minor adverse indirect non-physical (visual) impact upon the Scheduled Ancient Monument of Wat's Dyke (De155) when viewing eastward from the SAM towards the Site during the construction phase, resulting in a slight adverse significance of effect.

Completion phase

- 8.39. The Proposal is expected to have a negligible to minor adverse indirect non-physical (visual) impact upon the Scheduled Ancient Monument of Wat's Dyke (De155) when viewing eastward from the SAM towards the Site during the completion phase, resulting in a slight adverse significance of effect.

Cumulative effects

- 8.40. Awaiting cumulative impact assessment report from Indigo – no cumulative effects anticipated.

Mitigation measures

- 8.41. This section describes the specific measures which are recommended to mitigate the predicted significant environmental impacts and are specifically those measures which are not designed in to the proposals and which the Applicant invites WCBC to cover by a condition of the planning permission if consented.
- 8.42. Mitigatory measures have been proposed for a basic record to be taken of the two field boundaries to be breached (features 1 and 2), however the record presented in the **Appendix 8.1, Volume III** should be seen as being commensurate with a basic record level and as such no further mitigatory measures are proposed for these two features.
- 8.43. Site specific recommendations have been made for a geophysical survey of the Site in order to ascertain the potential for buried archaeological remains to persist at sub-surface level (feature 7). The results of this survey will inform the requirement, if any, for further assessment or mitigatory measures.
- 8.44. It has also been recommended that Cadw be consulted on the Proposal and potential impact upon the Scheduled Ancient Monument of Wat's Dyke (De155) (feature 6).

Residual effects

- 8.45. The effects upon archaeological assets for which a significant effect has been identified, will be reduced through the completion of the mitigation measures and the residual effect will be less significant, or will have been suitably compensated for, than would be the case in the absence of mitigation.
- 8.46. The recommended mitigation responses for unavoidable direct impacts to archaeological assets would not diminish the direct, physical impact upon the assets. The mitigation measures would ameliorate the impact by the creation of information and knowledge of public benefit through the preservation by record of the archaeological feature. The residual effects are set out in Table 8.3.

Table 8.3: Residual Effects Summary

Impact Phase and Asset	Significance of Effect	Mitigation	Residual Significance of Effect
Construction and Demolition			
Gaz. No. 1 Field boundary	Neutral /Slight adverse	Basic record (complete)	Neutral
Gaz. No. 2 Field boundary	Neutral /Slight adverse	Basic record (complete)	Neutral
Gaz. No. 3 Field boundary	Neutral	None	Neutral
Gaz. No. 4 Field boundary	Neutral	None	Neutral
Gaz. No. 5 Extant Field Boundaries	Slight adverse	None	Slight adverse
Gaz. No. 6 Wat's Dyke SAM (De155)	Slight adverse	Contact Cadw regarding Proposal	Slight adverse
Gaz. No. 7 Unknown buried archaeological remains	Unknown	Geophysical survey of Site	Dependent upon results of geophysical survey

Conclusion

- 8.47. This chapter has assessed the potential direct and indirect environmental effects in relation to archaeology associated with the Proposal.
- 8.48. The assessment comprises an examination of data related to archaeology, and cultural heritage and has established that the Proposal will directly physically impact upon three sites – two field boundaries (features 1 and 2) and extant field boundaries (feature 5). Features 1 and 2 are considered to be of low importance and will require breaching by the proposed access road resulting in a neutral/slight adverse significance of effect. As such recommendations have been made for a basic record of these hedgerows prior to breaching, however the record presented in **Appendix 8.1, Volume III** is considered commensurate with a basic record level and as such no further recommendations are made for these features.
- 8.49. Feature 5 consists of three field boundaries now removed and as such their level of preservation is unknown but remains are likely to persist in some form at buried sub-surface level. The Proposal will result in the removal of this feature however its importance is considered to be negligible and as such will result in a slight adverse significance of effect. Therefore, no further assessment or mitigatory measures are made for this feature.
- 8.50. The Proposal is also expected to have a negligible to minor adverse visual impact when viewing east from approximately 720.0m of the Scheduled Ancient Monument of Wat's Dyke resulting in a slight adverse significance of effect. As the expected effect level of the Proposal is so slight no further recommendations for assessment or mitigatory measures are proposed aside from contacting Cadw to consult them on the Proposal.
- 8.51. It has been determined that the Site would have been conducive to habitation throughout antiquity and as such it is recommended that a geophysical survey be undertaken to ascertain whether any preserved buried remains persist at the Site. The results of the survey will inform whether any further assessment or mitigatory measures are required.

9. Landscape

Introduction

Scope of Report

- 9.1. This Landscape & Visual Impact Assessment (LVIA) provides an evidence base to inform the decision making process from a landscape character and visual amenity perspective. In particular this chapter covers the following matters:
- Landscape description of the site and the surrounding locality; a description of overall visibility; and the identification of potential visual receptor locations relevant to the proposed development;
 - Identification of relevant landscape character classifications;
 - Assessment of landscape quality (or condition), landscape value and landscape susceptibility against appropriate criteria;
 - Assessment of the magnitude and significance of the landscape effects of the proposed development against appropriate criteria;
 - Assessment of visual amenity value and visual receptor susceptibility against appropriate criteria; and
 - Assessment of the magnitude and significance of the visual effects of the proposed development against appropriate criteria.
- 9.2. The report has been prepared by Allan Moss of Allan Moss Associates Ltd. He is a chartered landscape architect and planner with over 37 years' experience in both private and public sectors. He was involved in preparing the Landscape Institute/IEEMA's Guidelines on best practice for landscape and visual impact assessment (GLVIA), published in April 2002⁽¹⁾.
- 9.3. The site and the surrounding landscape was visited in July 2017 for the purpose of preparing this LVIA, although an earlier visit was made in December 2016 for scoping purposes.
- 9.4. A list of references is given at the end of this report and the various plans and photographs referred to are included as appendices. All the photographs, apart from aerial views, have been taken with a Canon EOS 5D MkIII DSLR camera (full frame sensor) fitted with a fixed 50mm lens. Photograph locations are indicated on the plan at **Appendix 9.6, Volume III**.

Methodology

- 9.5. The methodology used in this assessment takes account of the 'Guidelines for Landscape and Visual Impact Assessment: Third Edition 2013' (GLVIA3)⁽²⁾. The guidelines are not intended as a prescriptive set of rules. They indicate that landscape and visual impact studies can be undertaken at differing levels of detail depending on the scale and nature of the project. The approach adopted should be proportional to the scale of the project that is being considered and the nature of its likely effects. In accordance with the EIA Regulations, the guidelines advise that assessments should focus on the identification of likely significant

effects. There is no requirement to assess all effects.

- 9.6. The level of detail provided in this assessment is considered to be sufficient to inform the decision making process for a development of this nature from a landscape character and visual amenity perspective.
- 9.7. The LVIA assessment criteria are set out at **Appendix 9.1, Volume III**.

Limitations

- 9.8. The effects of the proposed development on the surrounding locality are considered on the basis of views from publicly accessible locations only. No attempt is made to negotiate blocked or hazardous routes that may be unsafe to the assessor. Views from private property are generally considered on the basis of inter-visibility with the application site rather than visits to individual properties.
- 9.9. The assessment is based on fieldwork carried out during July when the trees were in full leaf. It is likely that parts of the site will be more visible in winter when there are no leaves on the trees and hedgerows have been trimmed.
- 9.10. Any heritage assets referred to in the assessment are assessed in accordance with the GLVIA3 guidelines (i.e. as effects on people or the landscape resource at those locations). The assessment is not intended to be an assessment on heritage assets or their settings, as these matters are covered in Chapters 7 & 8.

Study Area

- 9.11. The study area is represented by the plan at **Appendix 9.6, Volume III**, which identifies the main locations from where the proposed development might potentially be seen. This has been established by way of desk study and detailed observations in the field.

Landscape & Visual Baseline

Description of Site and Surrounding Locality

- 9.12. The application site is located approximately 1.5km to the east of Ruabon as indicated on the location plan at **Appendix 9.2, Volume III**. Existing features in the local landscape are illustrated on the aerial photographs at **Appendix 9.3, Volume III**, which date from June 2009. Views from the surrounding locality are illustrated in the photographs at **Appendix 9.4, Volume III**.
- 9.13. The site is located in a gently undulating lowland agricultural landscape. The land across the site falls from south-west to north-east across the 100m AOD contour, as illustrated on the location plan.
- 9.14. The main part of the site occupies part of a larger arable field which was covered in a crop of winter wheat at the time of the visit. This part of the site is bounded by mature hedgerows to the north, south and east whilst the remainder of the arable field defines the western boundary. There are occasional mature trees in the hedgerows (mostly Oak) and a drainage ditch along the northern boundary.
- 9.15. The smaller south-eastern part of the site occupies part of an adjacent field which was covered in grassland at the time of the visit. This part of the site is bounded by a mature hedgerow to the north-west, the existing farm buildings at Cinders Farm to the south, and the adjacent road to the east. There is no hedgerow along the roadside boundary.

- 9.16. Current access to the main part of the site is via a farm track from the south from Cinders Farm. There is an existing public footpath (RUA/91) which runs near the western site boundary. However, this cannot be well used as the crossing point to the drainage ditch near the north-western corner of the site is in very poor condition and is virtually inaccessible. There are also other footpaths and bridleways in the surrounding countryside with potential views of the site. The OS map at **Appendix 9.5, Volume III** indicates all public rights of way in the local area and provides reference numbers for those most relevant.
- 9.17. It can be seen from the aerial photographs that the application site is surrounded by a mix of small to medium scale fields in mixed agricultural use. The fields are generally bounded by mature hedgerows with variable hedgerow tree cover.
- 9.18. The settlement of Ruabon and the A483 dual carriageway lie approximately 1.5km to the west. The historic parkland of Wynnstay Park lies approximately 1.0km to the south-west, south of the A539. Elsewhere there are scattered farmsteads and cottages served by a network of winding country lanes. High voltage power lines on pylons cross this landscape in a north/south direction approximately 630m to the west.

Overall Visibility

- 9.19. The site is relatively low lying and well contained visually to the south and south-west by rising ground and hedgerows as demonstrated in Photographs 3, 11, 13 & 14 at **Appendix 9.4, Volume III**.
- 9.20. The site is more open to view from the north, east and north-west as a result of the undulating topography, but the cumulative effect of trees and hedgerows in the local landscape helps to limit the degree and extent of visibility as distances increase, as illustrated in Photographs 7, 8, 9, 10 & 12. Even from closer distances the site is generally seen against a backdrop of rising ground and tree cover as illustrated in Photographs 4, 5 & 6.
- 9.21. The general extent of visibility is represented by the visual envelope on the Visual Receptor Plan at **Appendix 9.6, Volume III**, which has been established by way of desk study and detailed observations in the field. Relevant topographical and vegetation barriers to wider visibility are also illustrated on this plan. The existing trees on the southern site boundary provide a useful point of reference in assessing the visibility of the proposed development when built.

Visual Receptors

- 9.22. Visual receptor locations with potential views of the site are listed in Table 9.1 below. Each location is numbered and can be cross referenced to the Visual Receptor Plan at **Appendix 9.6, Volume III**. The photographs from the various viewpoints referred to are provided at **Appendix 9.4, Volume III**.

Table 9.1: Potential Visual Receptor Locations				
Ref	Receptor Location	Distance from Site	Elevation (AOD)	Comments
	Public locations with potential views of site:			
1	Footpath RUA/91	50-460m	99-110m	Short & middle distance views (Photos 1, 2 & 3)
2	Unnamed road to east	Adjacent	97-99m	Short distance views (Photo 4)

3	Footpaths to north (RUA 115/112/111)	320-750m	95-107m	Variable middle distance views (Photos 5, 6, 7 & 8)
4	Footpaths to west (RUA 87A/88/89/90/ 107)	600-1200m	103-140m	Filtered elevated long distance views (Photos 9 & 10)
5	Footpath RUA/95	450-530m	115-120m	Site hidden behind hedges & trees (Photo 11)
6	Footpath RUA/93 & roads to south-east	250-550m	95m	Site hidden behind hedges & topography (Photos 12 & 13)
7	Cinders Lane/A539	200-600m	108m	Main site hidden behind hedges & trees (Photo 14)
	Private dwellings with potential views of site:			
8	Cinders Farm/Cinders Cottages	50-140m	101m	Upstairs windows/door visible from site
9	Moreton Farm	430m	110m	Middle distance view
10	Lower Moreton Farm	640m	115m	Garret window visible from site
11	Astridge	830m	95m	Upstairs window visible from site
12	The Crimbles	650m	95m	Garret window visible from site
13	Dwellings along A539	620-950m	108-122m	Upstairs windows of 4 dwellings visible from site
NB. Elevations for receptor locations compare with an elevation of approx 96-104m AOD for the site.				

- 9.23. The extent to which the proposed development would be seen from each of these receptor locations is considered in Section 9.119 to 9.141.

Landscape Character Classifications

Definitions

- 9.24. GLVIA3 provides the following definitions:
- **"Landscape character:** A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse."
 - **"Landscape classification:** A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape."

Wrexham LANDMAP SPG 2007

- 9.25. The Wrexham LANDMAP Supplementary Planning Document 2007⁽³⁾ classifies the application site as falling within Landscape Character Area 13a: Welsh Maelor (central part). The character of this area is summarised as:

"Attractive undulating lowland farmland to the south of Wrexham town and west of the River Dee, containing a number of large estates."

- 9.26. The key landscape characteristics of Welsh Maelor are summarised as:

Visual character:

- Good views to the hills and over the Dee Valley from higher ground.
- Undulating estate farmland with mosaic of farmland and trees (N. and S. areas) and undulating open farmland in the central area.
- Designed parks and gardens.
- Generally an abundance of well managed hedgerows and hedgerow trees.
- Traditional red brick farmsteadings but many barns now converted to residential uses.
- Tranquillity and landscape quality affected by A483 and pylons to west.

Geological character:

- Deep deposits of glacial drift overlie bedrock of Carboniferous and Triassic age.
- Glacial till (boulder clay) covers a large part of the character area, with glacial sands and gravels found mainly in the area immediately to the south of Wrexham town, and in the river terrace on which Eyton Grange is situated.
- The area drains to the Clywedog in the north and to the River Dee in the east and south.

Ecological character:

- The River Clywedog valley south of Wrexham town has a diverse range of valuable semi-natural habitats including wet woodlands, lowland meadows and nationally important wetlands (especially for invertebrates) with areas of fen sedge, herb-rich swamp and rush pasture.
- Farm orchards are now rare, but a valuable old orchard survives at Erddig.
- Semi-natural upland mixed ash woodlands, other broadleaved woodlands and plantations are characteristic of the northern and southern areas, forming a mosaic of woodland and farmland. Mixed plantations are also found in the south.
- Although most grassland is improved, remnants of high value neutral grassland survive in the central and northern areas.
- The Welsh Maelor has valuable remnants of estate parkland or wood pasture with mature and veteran trees - a Biodiversity Priority Habitat.
- Field ponds are frequent, and valuable for wildlife.

Historical character:

- Medieval military feature - Wat's Dyke earthen bank and ditch cuts across farmland.
- Widespread evidence of medieval open fields - ridge and furrow remnants of the Wrexham Lowlands.
- Important designed parklands on Cadw Register at Erddig, Wynnstay and Brynkinalt, as well as Penylan, Erbistock and Rosehill.
- Non-planned settlement with medieval origins at Gyfelia and Crabtree Green.
- 19th/20th century ribbon development at Marchwiel.
- Disused Ellesmere railway.
- Remnants of former ordnance depot at Parkey area south of Wrexham Industrial Estate.

Cultural character:

- Still predominantly agricultural, with dispersed farms
- Farmsteads and villages affected by commuter pressure, with residential conversions and new housing

- Sense of place - Erddig and Wynnstay in particular
- Wynnstay Estate once culturally dominated the southern part of the Welsh Maelor but the buildings of the core area are being converted to residential accommodation, enabling restoration of the Grade 1 Capability Brown pleasure gardens
- High level of recreational use in Erddig and Clywedog Valley, and extensive network of small lanes and rights of way in all parts except Wynnstay.

- 9.27. With respect to landscape sensitivity the SPG advises that the traditional Welsh Maelor landscape is very vulnerable to continuing development and recreational pressures, to economic changes which threaten traditional farming, and from land use practices and development which do not take historical landscape features into account.
- 9.28. Full details along with advice on management guidelines for LCA 13a: Welsh Maelor are provided at **Appendix 9.7, Volume III**.

Landscape Quality (Condition)

Definition

- 9.29. GLVIA3 provides the following definition:
- "Landscape quality (condition):** A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements."
- 9.30. There have been different definitions of landscape quality in the past. Some of which have included subjective criteria such as landscape value and aesthetic appeal. Under this current definition the assessment of landscape quality is a more objective matter, comparing the condition and distinctiveness of a landscape against other landscapes of the same type.
- 9.31. It is not intended as a means of evaluating one landscape character type against another. Such comparisons obviously require subjective judgements to be made and are dealt with under the heading of 'landscape value'.

Landscape Quality Criteria

- 9.32. The landscape quality criteria in Table 9.2 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which any baseline landscape can be assessed.

Landscape Quality Assessment

- 9.33. The 1st Edition OS Map of 1873/74 at **Appendix 9.8, Volume III** provides a useful baseline against which the condition of the present day landscape in the vicinity of the application site can be considered.
- 9.34. When compared to the aerial photographs at **Appendix 9.3, Volume III** it is evident that there has been notable hedgerow loss in the local landscape over the years as fields have been adapted to changing agricultural practices. It is also likely that the remaining hedgerows are clipped more tightly today than they would have been prior to the advent of mechanical clipping.
- 9.35. Hedgerow loss is particularly noticeable in the application site field which was originally divided into 5 smaller fields. Along with the hedgerow loss there has been a notable

reduction in the number of hedgerow trees giving rise to a landscape that is more open in character than it would have been historically. Nevertheless the overall field pattern is still recognisable to that which existed in 1873/74.

- 9.36. In terms of modern development the most incongruous features in the local landscape are the powerlines that cross the higher ground to the west of the application site. Otherwise the settlement pattern of farmsteads and country lanes remains reasonably intact, although there will inevitably have been an increase in the number and size of farm buildings to meet the requirements of modern agriculture.
- 9.37. Overall whilst the local landscape has been subjected to ongoing change, particularly during the post-war period, the character of the landscape is still reasonably intact compared to that of 1873/74 and a moderate strength of character is still retained. Taking account of the criteria in Table 9.2, the local landscape is therefore assessed as having Medium Landscape Quality.

Landscape Value

Definition

- 9.38. GLVIA3 provides the following definition:

'Landscape value: The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons."

- 9.39. Landscape value therefore involves a degree of subjectivity, in that it calls for comparisons between one landscape and another. All landscapes have value to someone, however, landscapes of recognised value at a national, county or district level have traditionally been recognised by the making of landscape designations.

Landscape Value Criteria

- 9.40. The landscape value criteria in Table 9.3 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which any landscape area or landscape feature can be assessed.

Landscape Value Assessment

- 9.41. There are no national or local landscape designations affecting the countryside in the immediate vicinity of the application site. However, the adopted Wrexham UDP proposals map indicates that the wider countryside to the south and east falls within a Special Landscape Area (Policy EC5). This is a non-statutory landscape designation that conveys recognition of the landscape at a unitary authority level. The boundary of this local landscape designation relative to the application site is indicated on the plan at **Appendix 9.6, Volume III**.
- 9.42. In cases where there is no existing evidence to indicate landscape value GLVIA3 suggests that we draw upon the factors set out in Box 5.1 of that document. These are: landscape quality (condition), scenic quality, rarity, representativeness, conservation interests, recreation value, perceptual aspects and associations. Each of these factors are considered in turn below.

Landscape Quality (Condition)

- 9.43. Landscape quality (condition) is considered in some detail in Section xxx where the local landscape is assessed as having Medium Landscape Quality.

Scenic Quality

- 9.44. Scenic quality is variable. There are panoramic views from the higher ground to the west looking eastwards, although these are impaired to some degree by the intervening powerlines as illustrated in Photographs 9 & 10. Elsewhere there are occasional glimpses of Ruabon Mountain to the west, as illustrated in Photograph 12, although generally views from the lower ground are restricted by the undulating topography and tree and hedgerow cover.

Rarity and Representativeness

- 9.45. The local landscape is representative of the Welsh Maelor character area, however similar landscapes can be found in the other rural lowland character areas to the south and east of Wrexham as well as the adjoining counties of Cheshire and Shropshire.

Conservation Interests

- 9.46. The ecology report indicates that there is one Special Area of Conservation (SAC) and seven non-statutory Local Wildlife Sites within 2km of the site. However, none of these appear to fall within the visual envelope.
- 9.47. The only designated built heritage assets within the visual envelope are Lower Moreton Farm (Grade II listed; 640m to north-west) and Wat's Dyke (SAM; 1.2km to west). Wynnstay Park, a Grade 1 registered parkland, lies approximately 800m to the south on the edge of the visual envelope.

Recreation Value

- 9.48. There is an existing public footpath (RUA/91) which runs along the western site boundary. There are several other footpaths and bridleways in the surrounding countryside as indicated on the plan at **Appendix 9.5, Volume III**. These provide reasonable access to the local countryside for walkers and horse riders.
- 9.49. Wat's Dyke Way, which runs approximately 1.2km to the west, is a promoted long distance recreational route.
- 9.50. The unnamed roads to the east of the application site form part of the Gyfelia road riding route which is a promoted recreational route for horse riders.

Perceptual Aspects

- 9.51. Box 5.1 of GLVIA3 indicates that a landscape may be valued for its perceptual qualities, notably wildness and/or tranquillity. However, the application site is located near to both visible and audible signs of human activity and development including the busy A483 and A539, several working farmsteads and the overhead powerlines to the east. There is therefore no real sense of remoteness or tranquillity.

Associations

- 9.52. Box 5.1 of GLVIA3 also indicates that some landscapes are associated with particular people, such as artists or writers, or events in history that contribute to perceptions of the

natural beauty of the area. There are several famous people associated with the nearby settlement of Ruabon, although none of them appear to have any direct associations with the application site. Nearby Wynnstay is the ancestral seat of the Wynn family and Capability Brown is accredited with the design of part of the grounds which are now a Grade 1 registered parkland.

Conclusion

- 9.53. None of the above indicators suggest that the application site and its immediate surroundings should be treated as having high landscape value. However there are indicators that the local countryside is perhaps of more than just local level value.
- 9.54. Taking account of the criteria in Table 9.3 the local landscape in the vicinity of the application site is therefore assessed as having Parish/Community Level Value.

Landscape Susceptibility

Definition

- 9.55. GLVIA3 provides the following definition:

"Susceptibility: The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences."

Landscape Susceptibility Criteria

- 9.56. The landscape susceptibility criteria in Table 9.4 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which landscape areas can be assessed in terms of their ability to accommodate the development proposed.
- 9.57. Table 9.5 (**Appendix 9.1, Volume III**) identifies factors that can affect landscape susceptibility. It provides a general guide, but it is not a rigid checklist, as most landscapes will display a mixture of factors indicating both a greater and lesser degree to which development can be accommodated. These factors therefore need to be considered 'in the round'.

Landscape Susceptibility Assessment

- 9.58. The landscape character, landscape quality and general visibility of the application site and surrounding locality have been considered under the headings Landscape Quality and Landscape Value above. The factors set out in Table 9.5 are assessed below on a site specific basis.

Landform (Moderate)

- 9.59. The site is located in a gently undulating lowland landscape with low ground to the east/north-east and rising ground to the west/south-west which helps to provide visual containment and limit the effects of the proposed development to a localised area.

Landscape Patterns and Complexity (Low/Moderate)

- 9.60. The application site is surrounded by a mix of small to medium scale fields of regular to sub-regular shape. Several of the larger fields, including the application site field, have been formed by the amalgamation of smaller fields as illustrated on the historical map at

Appendix 9.8, Volume III. This has tended to reduce the complexity of the landscape pattern.

Settlement and Man-Made Influences (Moderate)

- 9.61. The settlement of Ruabon and the A483 dual carriageway lie approximately 1.5km to the west. The historic parkland of Wynnstay Park lies approximately 1.0km to the south-west, south of the A539. Elsewhere there are scattered farmsteads and cottages served by a network of winding country lanes. High voltage power lines on pylons cross this landscape in a north/south direction approximately 630m to the west.
- 9.62. The application site is near to the existing farm buildings at Cinders Farm and it is located in a settled landscape which includes other farmsteads with modern farm buildings.

Inter-visibility with Adjacent Landscapes (Moderate)

- 9.63. There are no sensitive or designated landscapes affected by the proposed development. The Special Landscape Area to the south lies on the edge of the visual envelope approximately 800m away. Whilst the woodland on the edge of the Special Landscape Area is visible from the site, the site is not visible from this designated landscape, nor the registered parkland at Wynnstay.
- 9.64. Inter-visibility with the surrounding landscape is limited to a localised area as illustrated by the visual envelope on the Visual Receptor Plan at **Appendix 9.6, Volume III**. Within that visual envelope, visibility is further restricted by the local tree and hedgerow cover. There are no recognised or promoted viewpoints affected by the proposed development. Public views of the site are limited to those footpaths and roads identified on the plan.

Perceptual Aspects (Low/Moderate)

- 9.65. The application site is located near to both visible and audible signs of human activity and development including the busy A483 and A539, several working farmsteads and the overhead powerlines to the east. There is evidence all around that it is part of a settled working landscape. There is therefore no real sense of remoteness or tranquillity.

Existing Mitigating Features or Potential for New Mitigation (Moderate)

- 9.66. The site is relatively low lying and well contained visually to the south and south-west by rising ground and hedgerows. The site is more open to view from the north, east and north-west as a result of the undulating topography, but the cumulative effect of trees and hedgerows in the local landscape helps to limit the degree and extent of visibility as distances increase. Even from closer distances the site is generally seen against a backdrop of rising ground and tree cover.
- 9.67. There is scope for further hedgerow and tree planting around the site in a way that is appropriate to the character of the local landscape. The proposed structures can also be finished in a dark receding colour appropriate to this rural setting.

Proximity of Sensitive Landscape Features (Low/Moderate)

- 9.68. There do not appear to be any particularly sensitive landscape features in the immediate vicinity of the application site. The only designated built heritage assets within the visual envelope are Lower Moreton Farm (Grade II listed; 640m to north-west) and Wat's Dyke (SAM; 1.2km to west). Wynnstay Park, a Grade 1 registered parkland, lies approximately

800m to the south on the edge of the visual envelope.

Conclusion

- 9.69. There are no indicators that suggest that the site and surrounding landscape should be treated as having high landscape susceptibility. Most of the indicators suggest medium or low/medium landscape susceptibility to the type of development proposed. The site should therefore be reasonably capable of accommodating the proposed poultry development.
- 9.70. Taking account of the criteria in Tables 9.4 & 9.5 the application site and surrounding landscape is assessed as having Medium Landscape Susceptibility to accommodating the proposed development.

Susceptibility to night-time lighting

- 9.71. In order to properly assess the significance of the night-time effects of new lighting that would be introduced by the proposed development, it is first important to consider the susceptibility of the local landscape to additional night-time lighting. The criteria indicated in Table 9.6 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which any baseline landscape can be considered.
- 9.72. The application site is located approximately 1.5km to the east of Ruabon which is a substantial settlement with street lighting. There is also street lighting on the A539 near to the junction with the A483.
- 9.73. Whilst there is no street lighting in the immediate vicinity of the application site there are existing light sources associated with nearby farmsteads and cottages as well as night-time traffic using the local road network. In addition there will be a seasonal occurrence of more intense light sources from agricultural vehicles operating in the fields during the hours of darkness during harvesting and other operations.
- 9.74. Taking account of the criteria in Table 9.6 it is considered that the night-time landscape in the immediate locality of the application site is of Medium Susceptibility to new lighting.

Magnitude of Landscape Effects

Definition

- 9.75. GLVIA3 provides the following definition:

"Magnitude (of effect): A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration."

Magnitude of Landscape Effects Criteria

- 9.76. The criteria in Tables 9.7, 9.8 & 9.9 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which the magnitude of landscape change can be assessed.

Assessment of Magnitude of Landscape Effects

- 9.77. The proposed development would result in approximately 4.0ha of farmland being permanently lost from arable production (to buildings, access, hardstandings, ground

modelling, landscaping and attenuation pond). However there would be no loss of any existing trees or hedgerows on the site other than a short 2.0m section of hedge where the access road enters the poultry houses field.

- 9.78. The southern passing bay along Cinders Lane would require the translocation of approximately 25m of existing hedgerow and the existing hedgerow along the eastern visibility splay at the junction of Cinders Lane with the A539 would require hard trimming.
- 9.79. The associated landscape proposals would result in an increase of approximately 658m of new hedgerow planting and 37 new hedgerow trees along with 11,500m² of new native woodland planting.
- 9.80. Although the poultry houses would occupy a relatively large footprint, they are relatively low structures compared with other types of modern farm buildings. They would be partially cut into the slope to the south and west. The finished floor level for each poultry house would be 98.5m AOD resulting in a ridge height of 104.5m AOD for each building. The biomass boiler building would have a finished floor level of 97.5m AOD resulting in a ridge height of 108.1m AOD.
- 9.81. The existing hedgerows along the southern, northern and eastern site boundaries would be managed at a height of 3m+ to help soften the outline of the buildings from those directions. The new hedgerow planting (and ground modelling) along the western boundary would have a similar effect from that direction once established. The additional tree, woodland and hedgerow planting around the site would further enhance the softening effect. Full landscape proposals are indicated on the Landscape/Biodiversity Proposals plan and would be secured by way of a planning condition.
- 9.82. All the structures would be finished in a dark receding colour which will help to reduce their impact (again secured by a planning condition). The associated landscape mitigation and enhancement measures would enable the development to be integrated into the landscape in a way that is appropriate to the character of the Welsh Maelor landscape.
- 9.83. The trees, hedgerows and woodlands in the surrounding countryside would help to further reduce the impact on the wider landscape although the development is still likely to be visible to some degree from those locations identified on the Visual Receptor Plan.
- 9.84. Taking account of the criteria in Tables 9.7, 9.8 & 9.9 the proposed development is assessed as having a High and permanent adverse scale of effect on the character of the application site itself during construction and on completion. The effect on the character of the immediate adjoining countryside would be Medium adverse in the Medium Term until the proposed landscaping takes effect. The scale of effect on the character of the wider landscape would be Low adverse until the proposed landscaping takes effect.

Effects of night-time lighting

- 9.85. New external lighting would be kept to a minimum. The front gable ends of each unit would be lit externally with a single low-wattage fitting of low intensity. All external lighting would be downward facing and protected with a cowl to reduce light spillage. Lighting of the site would only be required during working hours in the winter months and during bird catching. There would be no round the clock external lighting of the site and no use of high intensity security lighting. All external lighting would be controlled by a planning condition requiring the submission and approval of a lighting plan.
- 9.86. Taking account of the criteria in Tables 9.7, 9.8 & 9.9 the night-time lighting of the proposed development is assessed as having a Low adverse scale of effect on the character of the

local landscape. The effect would be of Low geographical extent and Intermittent in nature.

Significance of Landscape Effects

Definition

- 9.87. GLVIA3 provides the following definition:

"Significance: A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic."

With respect to determining significance the guidelines advise that there are two main alternative approaches to combining the individual judgements made under the various contributing criteria:

"1. They can be sequentially combined: susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale,

geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance.

2. All the judgements against the individual criteria can be arranged in a table to provide an overall profile of each identified effect. An overview can then be taken of the distribution of the judgements for each criterion to make an informed professional assessment of the overall significance of each effect."

- 9.88. This assessment follows the second approach.

Landscape Significance Criteria

- 9.89. The criteria in Table 9.10 (**Appendix 9.1, Volume III**) provide a recognisable scale against which the significance of effects can be assessed. The criteria are based on Environmental Impact Assessment: A Guide to Good Practice and Procedures Consultation Paper (DCLG 2006)⁽⁴⁾.
- 9.90. Whilst the EIA Regulations require the likely significant effects of a development to be identified, there is no specific guidance as to where the threshold between 'significant' and 'not significant' lies. For the purposes of this assessment any adverse impacts assessed as Major or Severe are considered to be potentially significant to the decision making process.

Assessment of Significance of Landscape Effects

- 9.91. All the assessments relating to landscape value, landscape susceptibility, scale of effect, geographical extent, duration and reversibility have been arranged in Table 9.11 below to provide an overall profile of each identified effect. An informed professional judgement has then been made of the overall significance of each effect, as explained in the following paragraphs.
- 9.92. The local landscape in the vicinity of the application site has been assessed as having Parish/Community level value and Medium susceptibility to this type of development.

- 9.93. The main direct effects that the proposed development would have on existing landscape features would be the loss of approximately 4.0ha of arable farmland (and associated natural topography); the loss of a negligible 2.0m section of hedge to accommodate the site access; and the translocation of approximately 25m of off-site hedgerow to accommodate the southern passing bay along Cinders Land. Although the land loss would be a long term effect, the geographical extent would be low. Arable land is the dominant land use in this area and it is not considered to be a particularly sensitive landscape feature.
- 9.94. In terms of indirect effects on the adjoining countryside, although the poultry houses would occupy a relatively large footprint, they are relatively low structures compared with other types of modern farm buildings. They would be partially cut into the slope. All the structures would be finished in a dark receding colour which would help to reduce their impact. The associated landscape mitigation and enhancement measures would enable the development to be integrated into the landscape in a way that is appropriate to the character of the Welsh Maelor landscape.
- 9.95. The trees, hedgerows and woodlands in the surrounding countryside would help to further reduce the impact on the wider landscape although the development is still likely to be visible to some degree from those locations identified on the Visual Receptor Plan.
- 9.96. The scale of landscape effect has therefore been assessed as High adverse at a site specific level, reducing with distance to Medium adverse in terms of the immediate adjoining countryside and Low adverse on the wider landscape until the new landscaping takes effect.
- 9.97. In terms of landscape character the proposed development does not raise any issues of national, regional or district level importance. Whilst such factors may be raised as local issues that are relevant to the design of the project they are unlikely to be overriding decision making issues in this case. There is nothing particularly unusual about this development compared to other poultry developments that have been approved in countryside locations.
- 9.98. In terms of the overall effects on landscape character the proposed development is therefore considered to be of Minor adverse significance at a site specific level; of Moderate adverse significance in terms of the immediate adjoining countryside; and of Minor adverse significance on the wider landscape.
- 9.99. The local landscape is considered to have Medium susceptibility to new lighting sources. The scale of effect of the new lighting introduced by this particular development is likely to be Low adverse over a Low geographical area and Intermittent in nature. This has therefore been assessed as being of Negligible adverse significance.

Table 9.11: Summary of Assessment of Landscape Effects

Effect	Sensitivity of Landscape Receptor		Magnitude of Landscape Effect			Significance of Landscape Effect	
	Landscape Value	Landscape Susceptibility	Scale of Landscape Effect	Geographical Extent	Duration & Reversibility	Degree of Significance	Significant or Not Significant
Effect on character of application site	Parish / Community	Medium	High adverse	Low	Long Term	Minor adverse	Not significant

Effect on character of immediate adjoining countryside	Parish / Community	Medium	Medium adverse	Low / Medium	Medium Term	Moderate adverse	Not significant
Effect on character of wider landscape	Parish/Community	Medium	Low adverse	Medium	Medium Term	Minor adverse	Not significant
Effects of night-time lighting	Parish/Community	Medium	Low adverse	Low	Intermittent	Negligible adverse	Not significant

Visual Amenity Value

Definition

9.100. GLVIA3 provides the following definition:

"Visual amenity: The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area."

9.101. The guidelines also offer the following guidance about judging the value attached to views:

"Judgements should also be made about the value attached to the views experienced. This should take account of:

- recognition of the value attached to particular views, for example in relation to heritage assets, or through planning designations;
- indicators of the value attached to views by visitors, for example through appearances in guidebooks or on tourist maps, provision of facilities for their enjoyment (such as parking places, sign boards and interpretive material) and references to them in literature or art (for example 'Ruskin's View' over Lunedale, or the view from the Cob in Porthmadog over Traeth Mawr to Snowdonia which features in well-known Welsh paintings, and the 'Queen's View' in Scotland)."

Visual Amenity Value Criteria

9.102. The visual amenity value criteria in Table 9.12 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which the value of views can be assessed.

Visual Amenity Value Assessment

9.103. The views identified on the Visual Receptor Plan at **Appendix 9.6, Volume III** are generally of value at a Local Level to local residents and users of the local roads, footpaths and bridleways.

9.104. None of the views identified in this study are considered to be of more than Local Level

Value.

Visual Receptor Susceptibility

Definitions

9.105. GLVIA3 provides the following definitions:

"Visual receptors: Individuals and/or defined groups of people who have the potential to be affected by a proposal."

"Susceptibility: The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences."

9.106. The guidelines also offer the following guidance about judging the susceptibility of visual receptors to change:

"The susceptibility of different visual receptors to changes in views and visual amenity is mainly a function of:

- the occupation or activity of people experiencing the view at particular locations; and
- the extent to which their attention or interest may therefore be focused on the views and the visual amenity they experience at particular locations."

9.107. Whilst the guidelines indicate that visual receptors most susceptible to change are likely to include residents at home it is a well-established planning principle that there is no right to a view. There have been a number of planning appeal decisions in recent years where Planning Inspectors considering the outlook from residential properties have adopted a stringent approach, whereby a visual impact would have to be overwhelming to the degree that a property would come to be widely regarded as an unattractive and unsatisfactory place in which to live, before giving rise to a reason for refusal. This has become known as the 'Lavender Test'.

9.108. As with landscape susceptibility, the susceptibility of visual receptors is also likely to vary according to the type of development envisaged. For example, residential properties on existing farmsteads are likely to be less susceptible to agricultural development than residential properties not associated with farmsteads.

Visual Receptor Susceptibility Criteria

9.109. The criteria in Table 9.13 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which potential visual receptors can be assessed in terms of their susceptibility to the development proposed.

Visual Receptor Susceptibility Assessment

9.110. Potentially susceptible visual receptor locations are listed in Table 9.14 below. Each location is numbered and can be cross referenced to the Visual Receptor Plan at **Appendix 9.6, Volume III**. The susceptibility of each receptor is also assessed in Table 9.14, using the criteria from Table 9.13 (**Appendix 9.1, Volume III**).

Table 9.14: Assessment of Visual Receptor Susceptibility

Ref	Receptor Location	User Type	Susceptibility
	Public locations with potential views of site:		
1	Footpath RUA/91	Walkers	Medium/High
2	Unnamed road to east	Walkers/horse riders Motorists	High Medium
3	Footpaths to north (RUA 115/112/111)	Walkers	Medium/High
4	Footpaths to west (RUA 87A/88/89/90/ 107)	Walkers	High to Medium/High
5	Footpath RUA/95	Walkers	Medium/High
6	Footpath RUA/93 & roads to south-east	Walkers/horse riders Motorists	High to Medium/High Medium
7	Cinders Lane/A539	Walkers Motorists	Medium/High Medium
	Private dwellings with potential views of site:		
8	Cinders Farm/Cinders Cottages	Residents/visitors	Medium
9	Moreton Farm	Residents/visitors	Medium
10	Lower Moreton Farm	Residents/visitors	Medium
11	Astridge	Residents/visitors	Medium
12	The Crimbles	Residents/visitors	Medium
13	Dwellings along A539	Residents/visitors	Medium

- 9.111. Walkers using Footpaths RUA/87A & RUA/107 have been treated as having High susceptibility as these footpaths form part of the Wat's Dyke long distance recreational route. Walkers and horse/riders using the unnamed roads to the east and south-east have also been treated as having High susceptibility as these road form part of the Gyfelia road riding route.
- 9.112. Walkers using other local footpaths, bridleways and minor roads have generally been treated as having Medium/High susceptibility on the basis that these are people who may be engaged in more local level recreational activities.
- 9.113. Motorists using the local country roads have been treated as having Medium susceptibility on the basis that these are relatively slow and minor rural roads where views may be of some value.
- 9.114. Occupants of residential properties in this rural area would normally be treated as having Medium/High susceptibility. However, none of residential properties visible from the site appear to have any principal daytime rooms facing the site. The only windows visible are upstairs windows, garret windows or doors. As these are unlikely to be principal daytime rooms all the properties have been treated as having Medium susceptibility.
- 9.115. The extent of potential visibility and degree of visual impact for each receptor location is discussed under the heading Magnitude of Visual Effects below.

Magnitude of Visual Effects

Definition

- 9.116. GLVIA3 provides the following definition:

"Magnitude (of effect): A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration."

Magnitude of Visual Effects Criteria

- 9.117. The criteria in Tables 9.15, 9.16, & 9.17 (**Appendix 9.1, Volume III**) have been developed to provide a recognisable scale against which the magnitude of visual change can be assessed.

Assessment of Magnitude of Visual Effects

Footpath RUA/91

- 9.118. Footpath RUA/91 runs from Cinders Cottages to Moreton Farm. The middle section of this route lies approximately 50m away from the western boundary of the proposed development. There are short distance views of the main site from this footpath as illustrated in Photographs 1 & 2 at **Appendix 9.4, Volume III**, as well as middle distance views as illustrated in Photograph 3.
- 9.119. The poultry houses would be partially cut into the slope on this side of the development and the proposed ground modelling along the western site boundary would further help to reduce their impact from this direction. Whilst upper parts of the poultry houses and feed bins would be readily visible from this footpath in the short term, once the new boundary hedgerow becomes established and managed at a height of 3.0m+ the effect of the development would be substantially reduced.
- 9.120. Taking account of the criteria in Tables 9.15, 9.16 & 9.17 the proposed development is assessed as having a Medium/High adverse scale of effect of Medium geographical extent along Footpath RUA/91. The duration of this effect would be Short/Medium term.

Unnamed road to east

- 9.121. The unnamed road to the east, adjacent to the proposed site entrance has short distance views of both the south-eastern field and the main site as illustrated in Photograph 4.
- 9.122. The new site entrance, the biomass boiler building and the easternmost poultry house would be readily visible from this road in the short term. However, new hedgerows would be planted along this section of road (there are none at present) and these would be managed at a height of 3.0m + once established. In addition new areas of native woodland would be planted along the roadside and to the east of the poultry houses to further soften and screen the development from this direction once established.
- 9.123. The proposed development is assessed as having a Medium/High adverse scale of effect of Low/Medium geographical extent along this road. The duration of this effect would be Medium term until the new planting takes effect.

Footpaths to north (RUA 115/112/111)

- 9.124. There are three footpaths to the north (RUA 115/112/111) between 320m and 750m away from the application site. There are variable middle distance views from these footpaths as illustrated in Photographs 5, 6, 7 & 8.
- 9.125. From these footpaths the proposed development would be visible in the middle distance against the backdrop of rising ground and tree cover. The foreground trees and hedgerows would also provide a filtering/softening effect. Substantial tree planting and ground modelling is proposed on the north side of the poultry houses and as this becomes established the development would become increasingly softened from this direction.
- 9.126. The proposed development is assessed as having a Medium to Low adverse scale of effect (depending on distance) of Medium geographical extent along these footpaths. The duration of this effect would be Medium term until the new planting takes effect.

Footpaths to west (RUA 87A/88/89/90/107)

- 9.127. There are several footpaths to the west (RUA 87A/88/89/90/107) varying in distance from 600-1200m away from the application site. There are filtered elevated long distance views towards the site from sections of these footpaths as illustrated in Photographs 9 & 10. However, the site falls away from these viewpoints towards the east.
- 9.128. The poultry houses would be partially cut into the slope on the western side of the development and the proposed ground modelling along the site boundary would further help to reduce their impact from this direction. Whilst there would be long distance views of the upper parts of the poultry houses and feed bins in the short term, against the backdrop of mature trees, the development would be substantially softened once the perimeter tree and hedgerow planting takes effect.
- 9.129. The proposed development is assessed as having a Low adverse scale of effect of Medium geographical extent along these footpaths. The duration of this effect would be Short/Medium term.

Footpath RUA/95

- 9.130. Footpath RUA/95 lies to the south-east. There are potential views of the proposed development from a short section of this footpath, approximately 450-530m away as illustrated in Photograph 11, although the application field itself is hidden from view behind the hedgerows and trees.
- 9.131. The poultry houses would be partially cut into the slope on the southern and western side of the development. However, it is possible that the upper parts of the buildings and feed bins would be visible from this location, although the foreground trees and hedges would have a substantial filtering/softening effect. The biomass boiler building would also be partially visible between the trees, adjacent to the existing farm buildings at Cinders Farm.
- 9.132. The proposed development is assessed as having a Low adverse scale of effect of Low geographical extent along Footpath RUA/95. The duration of this effect would be Medium term until the new tree planting takes effect.

Footpath RUA/93 and roads to south-east

- 9.133. Footpath RUA/93 and the unnamed roads to the south-east lie approximately 250-550m away from the site. Although the application site itself is hidden from view from these

locations as illustrated in Photographs 12 & 13, there would be potential views of the proposed development.

- 9.134. From these locations it is likely that the upper parts of the proposed buildings and feed bins would be partially visible between the trees. However, it should be noted that some of the existing farm buildings at Cinders Farm, Moreton Farm and Llwynhywel are already visible from these locations.
- 9.135. The proposed development is assessed as having a Low adverse scale of effect of Low/Medium geographical extent along Footpath RUA/93 and the roads to the south-east. The duration of these effects would be Medium term until the new planting takes effect.

Cinders Lane/A539

- 9.136. There is only one gateway along the A539, at the junction with Cinders Lane, where there would be a potential view of the main development, approximately 600m to the south. Although the application site field is hidden from view from this location behind trees and hedges, as illustrated in Photograph 14, there would be a potential view of the upper parts of the proposed buildings and feed bins.
- 9.137. The main visual effects along Cinders Lane and the A539 would be the creation of the passing bays and associated hedgerow translocation along with the hard trimming of the existing hedgerow along the eastern visibility splay at the road junction.
- 9.138. The proposed development is assessed as having a Low/Medium adverse scale of effect of Low/Medium geographical extent along Cinders Lane and the A539. The duration of this effect would be Short/Medium term.

Residential Properties

- 9.139. Based on observations from the application site there are approximately 10 dwellings with potential views of the site, varying in distance from 50m to 950m away. These are: Cinders Farm/Cinders Cottages, Moreton Farm, Lower Moreton Farm, Astridge, The Crimbles and 4 dwellings along the A539. However, none of properties appear to have any principal daytime rooms facing the site. The only windows visible are upstairs windows, garret windows or doors.
- 9.140. The proposed development is assessed as having a Medium adverse scale of effect at Moreton Farm and a Low adverse scale of effect at the other properties. In each case the geographical extent would be Low and the duration of effect would be Medium term until the new planting takes effect.

Significance of Visual Effects

Definition

- 9.141. GLVIA3 provides the following definition:

"Significance: A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic."

- 9.142. With respect to determining significance the guidelines advise that there are two main alternative approaches to combining the individual judgements made under the various contributing criteria:

"1. They can be sequentially combined: susceptibility to change and value can be combined into an assessment of sensitivity for each receptor, and size/scale, geographical extent and duration and reversibility can be combined into an assessment of magnitude for each effect. Magnitude and sensitivity can then be combined to assess overall significance.

2. All the judgements against the individual criteria can be arranged in a table to provide an overall profile of each identified effect. An overview can then be taken of the distribution of the judgements for each criterion to make an informed professional assessment of the overall significance of each effect."

- 9.143. This assessment follows the second approach.

Visual Significance Criteria

- 9.144. The criteria in Table 9.18 (**Appendix 9.1, Volume III**) provide a recognisable scale against which the significance of effects can be assessed. The criteria are based on Environmental Impact Assessment: A Guide to Good Practice and Procedures Consultation Paper (DCLG 2006)⁽⁴⁾.
- 9.145. Whilst the EIA Regulations require the likely significant effects of a development to be identified, there is no specific guidance as to where the threshold between 'significant' and 'not significant' lies. For the purposes of this assessment any adverse impacts assessed as Major or Severe are considered to be potentially significant to the decision making process.

Assessment of Significance of Visual Effects

- 9.146. All the assessments relating to visual amenity value, visual receptor susceptibility, scale of effect, geographical extent, duration and reversibility have been arranged in Table 9.19 below to provide an overall profile of each identified effect. An informed professional judgement has then been made of the overall significance of each effect, as explained in the following paragraphs.
- 9.147. The main public views of the proposed development would be from the unnamed road to the east that runs past the site entrance and from Footpath RUA/91 to the west. Whilst recreational users of these routes have been treated as having High or Medium/High susceptibility the views are only considered to be of local level value. Whilst the scale of the visual effect along these routes is assessed as Medium/High adverse over Medium or Low/Medium geographical areas the duration of these effects would be limited to the Medium or Short/Medium Term until the proposed hedgerow and tree planting takes effect.
- 9.148. Such visual effects do not raise any issues of national, regional or district level importance. Whilst the visual effects on these routes are relevant to the design of the project they are unlikely to be overriding issues in the decision making process. They are therefore considered to be of Moderate adverse significance in both cases.
- 9.149. Whilst there are varying views towards the site from the footpaths to the north (RUA 115/112/111) and the footpaths to the west (RUA 87A/88/89/90/ 107) the scale of effect would reduce with distance, varying from Medium to Low adverse. In all these cases the views are considered to be of local level value, and any adverse effects on visual amenity would gradually reduce as the proposed tree and hedgerow planting takes effect. The

overall level of significance of the visual effect on these footpaths is therefore considered to be Minor adverse.

- 9.150. The main visual effects along Cinders Lane and the A539 would be the creation of the passing bays and associated hedgerow translocation along with the hard trimming of the existing hedgerow along the eastern visibility splay at the road junction. These are also considered to be matters of Minor adverse significance.
- 9.151. The level of effect on all the other publicly accessible views identified in this study is considered to be of Negligible adverse significance.
- 9.152. In terms of private views, the main residential property affected by the proposed development would be Moreton Farm where the scale of effect could be Medium adverse until the new tree and hedgerow planting takes effect. However, Moreton Farm is already part of an existing working farm with large agricultural buildings of its own. In addition the views would be from upstairs windows only, so no principal daytime rooms would be affected. The overall level of significance of the visual effect on Moreton Farm is therefore considered to be Minor adverse.
- 9.153. The level of visual effect on all the other private residential properties identified in this study is considered to be of Negligible adverse significance.

Table 9.19: Summary of Assessment of Visual Effects

Table 9.19: Summary of Assessment of Visual Effects								
Effect		Sensitivity of Visual Receptor		Magnitude of Visual Effect			Significance of Visual Effect	
		Visual Amenity Value	Visual Receptor Susceptibility	Scale of Visual Effect	Geographical Extent	Duration & Reversibility	Degree of Significance	Significant or Not Significant
Ref	Public Views:							
1	Footpath RUA/91 Walkers	Local	Medium/High	Medium/High adverse	Medium	Short/Medium Term	Moderate adverse	Not Significant
2	Unnamed road to east Walkers/horse riders Motorists	Local	High Medium	Medium/High adverse	Low/Medium	Medium Term	Moderate adverse	Not Significant
3	Footpaths to north (RUA 115/112/111) Walkers	Local	Medium/High	Medium to Low adverse	Medium	Medium Term	Minor adverse	Not Significant
4	Footpaths to west (RUA 87A/88/89/90/107) Walkers	Local	High to Medium/High	Low adverse	Medium	Short/Medium Term	Minor adverse	Not Significant
5	Footpath RUA/95 Walkers	Local	Medium/High	Low adverse	Low	Medium Term	Negligible adverse	Not Significant
6	Footpath RUA/93 & roads to south-east Walkers/horse riders Motorists	Local	High to Medium/High Medium	Low adverse	Low/Medium	Medium Term	Minor adverse	Not Significant

7	Cinders Lane/A539 Walkers Motorists	Local	Medium/High Medium	Low/Medium Adverse	Low/Medium	Short/Medium Term	Minor adverse	Not Significant
	Private views:							
8	Cinders Farm/Cinders Cottages Residents/visitors	Local	Medium	Low Adverse	Low	Medium Term	Negligible adverse	Not Significant
9	Moreton Farm Residents/visitors	Local	Medium	Medium Adverse	Low	Medium Term	Minor adverse	Not Significant
10	Lower Moreton Farm Residents/visitors	Local	Medium	Low Adverse	Low	Medium Term	Negligible adverse	Not Significant
11	Astridge Residents/visitors	Local	Medium	Low Adverse	Low	Medium Term	Negligible adverse	Not Significant
12	The Crimbles Residents/visitors	Local	Medium	Low Adverse	Low	Medium Term	Negligible adverse	Not Significant
13	Dwellings along A539 Residents/visitors	Local	Medium	Low Adverse	Low	Medium Term	Negligible adverse	Not Significant

References

1. The Landscape Institute and Institute of Environmental Management & Assessment. April 2002. Guidelines for Landscape and Visual Impact Assessment: Second Edition.
2. Landscape Institute and Institute of Environmental Management & Assessment. April 2013. Guidelines for Landscape and Visual Impact Assessment: Third Edition.
3. Wrexham Country Borough Council 2007
Wrexham LANDMAP Supplementary Planning Guidance
4. DCLG June 2006
Environmental Impact Assessment: A Guide to Good Practice and Procedures
Consultation Paper

Abbreviations

LVIA Landscape & Visual Impact Assessment

Glossary

Designated Landscape:

Areas of landscape identified as being of importance at international, national or local levels, either defined by statute or identified in development plans or other documents.

Landscape character:

A distinct, recognisable and consistent pattern of elements in the landscape that makes one landscape different from another, rather than better or worse.

Landscape classification:

A process of sorting the landscape into different types using selected criteria but without attaching relative values to different sorts of landscape.

Landscape quality (condition):

A measure of the physical state of the landscape. It may include the extent to which typical character is represented in individual areas, the intactness of the landscape and the condition of individual elements.

Landscape receptors:

Defined aspect of the landscape resource that have the potential to be affected by a proposal.

Landscape value:

The relative value that is attached to different landscapes by society. A landscape may be valued by different stakeholders for a whole variety of reasons.

Magnitude (of effect):

A term that combines judgements about the size and scale of the effect, the extent of the area over which it occurs, whether it is reversible or irreversible and whether it is short or long term in duration.

Significance:

A measure of the importance or gravity of the environmental effect, defined by significance criteria specific to the environmental topic.

Susceptibility:

The ability of a defined landscape or visual receptor to accommodate the specific proposed development without undue negative consequences.

Visual amenity:

The overall pleasantness of the views people enjoy of their surroundings, which provides an attractive visual setting or backdrop for the enjoyment of activities of the people living, working, recreating, visiting or travelling through an area.

Visual receptors:

Individuals and/or defined groups of people who have the potential to be affected by a proposal.

10. Ecology

Introduction

- 10.1. This Chapter presents the approach and findings of the assessment of potential effects on ecology. The Chapter presents the methods followed, and provides a review of the baseline conditions within the Site and surrounding area. The Chapter then presents the results of the assessment of the effect of the Proposal on the baseline in order to determine the anticipated magnitude and significance of ecological effects. Mitigation measures are proposed and, where necessary, discussed to avoid and minimise the effects of the Proposal during the construction and operational phases.
- 10.2. This assessment has been undertaken by BSG Ecology on behalf of Indigo Planning.

Definition of Terms

- 10.3. For clarity of understanding, the following terminology is used within this chapter:
- 10.4. Application Site: reference to the application site area as set out on the red line plan is referred to as the “Site”.
- 10.5. Proposed Development: reference to the planning application proposal uses the term the “Proposal”.
- 10.6. Off-site Highways Improvements: reference to the off-site highways improvements that will involve the installation of two passing bays along Cinders Lane and management of the hedgerow to the north of the A539.

Background

Policy context

- 10.7. There are a number of national and local policies and guidance documents that relate to nature conservation and ecology within the planning process that are relevant to the Proposal. The relevant legislative protection, national and local planning policies are listed below, with further details provided in **Appendix 10.1, Volume III**.
- The Welsh Government Planning Policy Wales (Edition 9, November 2016);
 - Technical Advice Note (TAN) 5 Nature Conservation and Planning (2009);
 - Environment (Wales) Act 2016;
 - Wrexham County Borough Council Unitary Development Plan (UDP) adopted 14 February 2005;
 - UK Post-2010 Biodiversity Framework (2012);
 - The Conservation of Habitats and Species Regulations 2017; and
 - The Wildlife and Countryside Act 1981 (as amended).

Assessment methodology and significance criteria

Study Areas

- 10.8. The study area has been extended from the Site for the desk study for a 2km radius (5km for statutory sites) and breeding bird surveys to the adjacent surrounding fields.
- 10.9. Where the study area has varied from the Site boundary, it is described below.

Consultation

- 10.10. Preliminary pre-application advice for the Proposal was provided by Natural Resources Wales on 26 October 2017.
- 10.11. Consultation was undertaken with the Ecologist Emma Broad of Wrexham County Borough Council on 18 April 2017. The purpose of this discussion was to agree the approach, scope and extent of further ecological survey work required to inform the future planning application, based on the findings of the desk study and the outcome of the extended Phase 1 habitat survey. A summary of this discussion is presented in **Appendix 10.2, Volume III**.

Sources of Information

Desk Study

- 10.12. A data trawl was commissioned from Cofnod on 24 March 2017. This included a request for records of statutory and non-statutory sites of nature conservation value (such as Sites of Special Scientific Interest or Local Wildlife Sites) and protected or notable species. The search area for the data trawl is an area including the Site and a 2km radius from the centre of the Site.
- 10.13. In addition to the data trawl commissioned from Cofnod for a 2km radius, Natural Resources Wales (NRW) website was searched for information on statutory sites information up to 5km from the centre of the Site (November 2017).
- 10.14. Aerial photographs and 1: 25 000 Ordnance Survey maps were reviewed to characterise the habitats present within and surrounding the Site, to evaluate the ecological context of the Site within the surrounding landscape, and to identify ponds within 500m of the Site (20 March 2017).

Field Survey

- 10.15. The Site has been subject to ecological survey work in 2017 and 2018. Survey work has been devised and carried out with reference to standard methods and guidance where appropriate, according to the habitat or biotic group (as detailed in the relevant sections below). This includes the following work:
 - Extended Phase 1 habitat survey;
 - Badger *Meles meles* survey;
 - Breeding birds survey;
 - Invasive species survey; and
 - Assessment of the habitats suitability to support great crested newt *Triturus cristatus*,

reptiles, water vole *Arvicola amphibius*, otter *Lutra lutra*, hazel dormouse *Muscardinus avellanarius* and white-clawed crayfish *Austropotamobius pallipes*.

- 10.16. Details of the survey methods and relevant study area for each survey are summarised in the following subsections.

Extended Phase 1 Habitat Survey

- 10.17. The extended Phase 1 habitat survey was undertaken on 28 March 2017, 23 May 2017 and 17 January 2018. The Site was walked over and the habitats were described using the Phase 1 Habitat Survey methodology (JNCC, 2010), the habitats present were mapped and, where appropriate, target notes were made of habitats or any features of particular interest. As part of the extended element of the Phase 1 habitat survey, searches were made for evidence of, and habitats were assessed for the following protected species:

- Bats;
- Great crested newt;
- Dormouse;
- White-clawed crayfish;
- Water vole;
- Otter;
- Birds;
- Reptiles;
- Badger; and
- Invasive non-native species.

- 10.18. In addition to the extended Phase 1 habitat survey, the following targeted survey was undertaken:

- Breeding bird survey on 23 April, 23 May and 13 June 2017.

- 10.19. No survey work was considered necessary for invertebrates following completion of the extended Phase 1 habitat survey due to the low suitability of habitats on Site for invertebrates would be affected by the Proposal.

- 10.20. An extended Phase 1 habitat survey and protected species assessment was undertaken of land adjacent to Cinders Lane, specifically focussing on the locations of the Off-Site Highways Improvements.

- 10.21. The methodology and results are presented in an Ecological Appraisal Report in **Appendix 10.3, Volume III** and in an Ecological Report (Off-site Highways Improvements) in **Appendix 10.4, Volume III**.

Survey scope

- 10.22. Consultation was undertaken on 18 April 2017 with Wrexham County Borough Council

Ecologist Emma Broad to agree the extent of further ecological survey work required in order to support a future planning application, based on the findings of the desk study and extended Phase 1 habitat survey.

- 10.23. With respect to bats it was agreed that, since no trees with bat roosting potential were to be affected and that the majority of the works were to be sited within sub-optimal bat foraging habitat, no further bat survey would be necessary.
- 10.24. With respect to nesting birds, it was agreed that targeted breeding bird surveys would be undertaken to confirm the breeding bird species using the Site.
- 10.25. With respect to great crested newt, it was agreed that a precautionary RAMs approach would be appropriate and that additional terrestrial habitat should be provided. Further survey work of the off-site ponds was not considered to be necessary.

Assessment Process/Criteria

- 10.26. The evaluation and assessment within this chapter has been undertaken with reference to relevant parts of the 2016 Guidelines for Ecological Impact Assessment in the United Kingdom Ireland: Terrestrial, Freshwater and Coastal. 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester. Although this is recognised as the industry standard for ecological assessment, the guidance is not prescriptive; rather, it aims to “provide guidance to practitioners for refining their own methodologies”.

Important Ecological Features

- 10.27. A first step in EcIA is determination of which ecological features (habitats, species, ecosystems and their functions/processes) are important. Important features should then be subject to detailed assessment if they are likely to be affected by the Proposal. It is not necessary to carry out detailed assessment of features that are sufficiently widespread, unthreatened and resilient to effects of the Proposal, such that there is no risk to their viability.
- 10.28. Ecological features can be important for a variety of reasons and the rationale used to identify these is explained below. Importance may relate, for example, to the quality or extent of designated sites or habitats, to habitat/species rarity, to the extent to which they are threatened throughout their range, or to their rate of decline.

Evaluation: Determining Importance

- 10.29. The importance of an ecological feature should be considered within a defined geographical context. The following frame of reference has been used in this case:
 - International and European;
 - National (Wales);
 - County (Wrexham);
 - Vice County (Denbighshire);
 - Local (between Site and Vice County); and
 - Site.

- 10.30. Features, including those at Local and Site levels, are included in the assessment taking into account the 2016 CIEEM guidance with respect to the importance and significance of ecological features. In addition to the designated sites, the 2016 CIEEM guidance advises that important ecological features can include:
- Habitats and Species of Principal Importance for the conservation of biodiversity (Listed under Section 7 of the Environment (Wales) Act 2016);
 - UK and Local Biodiversity Action Plan Habitats and Species; and
 - Red Listed, Rare and Legally Protected Species.
- 10.31. The 2016 CIEEM guidance (Paragraph 5.26) advises in respect of significance that:
- “A significant effect is simply an effect that is sufficiently important to require assessment and reporting so that the decision maker is adequately informed of the environmental consequences of permitting a project. A significant effect is a positive or negative ecological effect that should be given weight in judging whether to authorise the project: it can influence whether permission is given or refused and, if given, whether the effect is important enough to warrant conditions, restrictions or further requirements such as monitoring. A significant effect does not necessarily equate to an effect so severe that consent for the project should be refused planning permission.”
- 10.32. Therefore, ecological features, including at Site Levels, are included in the assessment where their importance fits within that set out in the CIEEM guidance and their significance is such that their assessment allows the decision maker to be adequately informed of environmental consequences, either positive or negative, of the Proposal.

Impact Assessment

- 10.33. The impact assessment process involves:
- Identifying and characterising impacts;
 - Incorporating measures to avoid and reduce (mitigate) these impacts;
 - Assessing the significance of any residual effects after mitigation;
 - Identifying appropriate compensation measures to address significant residual effects; and
 - Identifying opportunities for ecological enhancement.
- 10.34. It is only necessary to assess and report significant residual effects (those that remain after mitigation measures have been taken into account). However, it is good practice to make clear both the potential significant effects without mitigation and the residual significant effects following mitigation (CIEEM, 2016). This process of assessment without mitigation helps to identify necessary and relevant mitigation measures that are proportionate to the size, nature and scale of anticipated impacts.
- 10.35. The assessment only needs to describe those characteristics of impacts that are relevant to understanding the ecological effect and determining the significance. It should consider, as appropriate: direct, indirect, secondary and cumulative impacts and whether the impacts and

their effects are short, medium, long-term, permanent, temporary, reversible, irreversible. In this Chapter, positive and negative effects are referred to. The assessment of impacts then takes into account the baseline conditions to describe:

- The existing baseline i.e. the do nothing option;
- With the proposed development (future baseline);
- As allocated in the local plan (alternative future baseline); and
- Cumulative/in combination effects.

Significant Effects

- 10.36. The CIEEM guidance sets out information about the concept of ecological significance, and also how this relates to the ability to deliver biodiversity conservation objectives for a given feature.
- 10.37. Significant effects are qualified with reference to an appropriate geographic scale, and the scale of significance of an effect may or may not be the same as the geographic context in which the feature is considered important.
- 10.38. The nature of the identified effects on each assessed feature is characterised. This is considered, along with available research, professional judgement about the sensitivity of the feature affected, and professional judgement about how the impact is likely to affect the Site, habitat, or population's structure and continued function. Where it is concluded that an effect would be likely to reduce the importance of an assessed feature, it is described as significant. The degree of significance of the effect takes into account the geographic context of the feature's importance and the degree to which its interest is judged to be affected.

Limitations

- 10.39. There was no access to six off-site ponds located within 500m of the Site (between 230m and 450m) as these are within different landownership meaning that these ponds could not be assessed for their potential to support great crested newt. This has been taken into account within the ecological appraisal and is not considered to present a significant constraint to the impact assessment, based on the location and nature of the Proposal and due consideration has been given in respect of reasonable avoidance and mitigation measures for this legally protected species and its habitat.
- 10.40. It was not possible to access the wet ditch along the northern boundary of the survey area, because this is within different landownership, precluding detailed searches for evidence of water vole, otter or white-clawed crayfish. Since the proposed works will attain a minimum stand-off of 20m from the banks of the ditch as part of the Proposal design, the proposals are considered unlikely to result in an adverse impact on any of these three species, should they be present within this watercourse. Therefore, the lack of access is not considered to be a significant constraint.

Baseline conditions

- 10.41. This section sets out a summary of the results of the baseline ecological survey work and desk study. It then goes on to assess the interest of the identified ecological features.
- 10.42. Ecological features are considered in the following order:

- Protected Sites - both statutory (e.g. Sites of Special Scientific Interest/SSSI or Local Nature Reserves/LNR) and non-statutory (e.g. County Wildlife Sites/CWS) protected sites.
- Habitats - including a description of the habitats present within the Site, consideration of those habitats listed as being of principal importance for the purposes of conserving biodiversity in accordance with reference to Section 7 of the Environment (Wales) Act 2016.
- Protected or otherwise notable species-this includes consideration of those species protected under UK or EU derived legislation (e.g. bats) and consideration of those species listed as being of principal importance for the purposes of conserving biodiversity in accordance with reference to Section 7 of the Environment (Wales) Act 2016.

10.43. It has also been possible to “scope out” of the assessment, at this stage, several species and habitats that are not likely to be significantly affected (for example by virtue of the design or operation of the Proposal, or because they are very commonplace). Where it has been possible to scope out a particular ecological feature, this is described in the text, and summarised in Table 10.4, together with a clear rationale for doing so.

Designated Sites

Statutory Designated Sites

10.44. One statutory site, Johnstown Newt Sites Special Area of Conservation (SAC)/Stryt Las a'r Hafod Sites of Special Scientific Interest (SSSI) is located within 2km of the Site, with a further three sites located within 5km of the Site. Details are provided in Table 10.1. The location of these sites is presented on a plan in **Appendix 10.5, Volume III**.

Table 10.1: Statutory designated nature conservation sites

Site Name	Habitats/Interest	Distance from the Site
Johnstown Newt Sites SAC/Stryt Las a'r Hafod SSSI	This is a composite site with a special interest for its amphibians. The waterbodies are known to support one of the largest known breeding populations of great crested newt in Great Britain (JNCC, 2017). The site is managed by Wrexham County Borough Council as a community nature park.	1.9km to the north-west of the Site at its nearest point
River Dee SSSI/River Dee & Bala Lake SAC	The NRW SSSI citation states that this “is of special interest for its fluvial geomorphology, Carboniferous geology, range of river habitat types, saltmarsh transition habitat, populations of floating water <i>plantain</i> , <i>slender hare's-ear</i> , sea barley, hard-grass, otter, salmon, sea lamprey, brook lamprey, river lamprey, club-tailed dragonfly and other aquatic invertebrates”. The SAC is classified for the following habitat types/species: bullhead, river lamprey, brook lamprey, floating water plantain, otter, sea lamprey, Atlantic salmon and floating vegetation.	3.2km to the south-east, south and south-west.

Site Name	Habitats/Interest	Distance from the Site
Nant-y-Belan & Prynella Woods SSSI	This is designated for its botanical interest. The CCW citation states “the largest and one of the best examples of a woodland type largely restricted to Wales and south-west <i>England...thus represents a significant area of largely semi-natural woodland. The woods are very variable...with a well-developed understorey.</i>	3.2km south south-west
Sontley Marsh SSSI	This is designated for its botanical interest. The CCW citation states “one of the best wetland <i>examples in Clwyd of the “southern mesotrophic mire” type more characteristic of south-west Wales. Extensive areas of alder carr woodland...tall fen vegetation...herb-rich damp grassland.</i>	4.1km north-east

- 10.45. The SACs are of International Importance and the SSSIs are of National Importance.
- 10.46. A report on the “Modelling of the Dispersion and Deposition of Ammonia from the Proposed Broiler Chicken Rearing Houses at Cinders Farm” produced by AS Modelling & Data Ltd (**Appendix 10.6, Volume III**) provides an assessment of the proposed impact of ammonia emissions from the Proposal. Conclusions from this report are set out below along with details on site relevant critical loads from the Air Pollution Information System website.

Table 10.2: Statutory designated sites and air quality

Site Name	Habitats/Interest	Distance from the Site	AS Modelling & Data Ltd Conclusions	Nitrogen	Ammonia
Johnstown Newt Sites SAC/Stryt Las a'r Hafod SSSI	This is a composite site with a special interest for its amphibians. The waterbodies are known to support one of the largest known breeding populations of great crested newt in Great Britain (JNCC, 2017). The site is managed by Wrexham County Borough Council as a community nature park.	1.9km to the north-west of the Site at its nearest point	<i>At the Stryt a'r Hafod SSSI/Johnstown Newt Sites SAC; there are small predicted exceedances of 1% of the Critical Level of 3.0ug-NH³/m³ and larger exceedances of the lower bound of the Critical Load of 10 kg-N/ha/y. However, there are no predicted exceedances of 8% of either Critical Level or Critical Load.</i>	Larger exceedances of the lower bound of the Critical Load of 10kg-N/ha/y.	Small predicted exceedances of 1% of the critical level of 3ug-NH ³ /m ³ . This is not considered to have a significant effect on the integrity of the site.
River Dee SSSI/River Dee & Bala Lake SAC	The NRW SSSI citation states that this "is of special interest for its fluvial geomorphology, Carboniferous geology, range of river habitat types, saltmarsh transition habitat, populations of floating water plantain, slender hare's-ear, sea barley, hard-grass, otter, salmon, sea lamprey, brook lamprey, river lamprey, club-tailed dragonfly and other aquatic invertebrates". The SAC is classified for the following habitat types/species: bullhead, river lamprey, brook lamprey, floating water plantain, otter, sea lamprey, Atlantic salmon and floating vegetation.	3.2km to the south-east, south and south-west.	<i>At River Dee SSSI and Bala Lake SAC there are small predicted exceedances of 1%, the lower threshold percentage, of the strictest Critical Level of 1.0ug-NH³/m³ along parts of the River to the south and east of Cinders Farm. Note, however, that it is not known if sensitive lichens and/or bryophytes are present along these stretches of the River and that if they are not present, then there would be no predicted exceedances of 1% of the Critical Level of 3ug-NH³/m³ for higher plants.</i>	No predicted exceedances.	Small predicted exceedances of 1% along parts of the River Dee. This relates to lower plants, for example mosses, bryophytes and aquatic plants. For higher plants there are no predicted exceedances. This suggests that bryophytes could be affected. Bryophytes are referred to within the citation but are not a designating feature. This is not considered to have a significant effect the integrity of the site.

Nant-y-Belan & Prynela Woods SSSI	This is designated for its botanical interest. The CCW citation states <i>“the largest and one of the best examples of a woodland type largely restricted to Wales and south-west England...thus represents a significant area of largely semi-natural woodland. The woods are very variable...with a well-developed understorey.</i>	3.2km south south-west	<i>At the Nant-Y-Belan and Prynela Woods SSSI, there are no predicted exceedances of the lower threshold percentage of the Critical Level or Load (1% for SSSIs).</i>	No predicted exceedances.	No predicted exceedances.
Sontley Marsh SSSI	This is designated for its botanical interest. The CCW citation states <i>“one of the best wetland examples in Clwyd of the “southern mesotrophic mire” type more characteristic of south-west Wales. Extensive areas of alder carr woodland....tall fen vegetation....herb-rich damp grassland.”</i>	4.1km north-east	<i>At Sontley Marsh SSSIs, there are small predicted exceedances of 1%, the lower threshold percentage, of the Critical Load of 10 kg-N/ha/y. Note that this assumes a deposition velocity of 0.03m/s for wooded areas; if a deposition velocity of 0.02m/s for short vegetation is assumed there are no predicted exceedances</i>	Small predicted exceedances of the Critical Load. The effects on different vegetation types will vary. Alder carr woodland possibly affected but mire, fen and grassland vegetation unaffected.	No predicted exceedances.

10.47. The AS Modelling & Data Ltd report goes on to state *“where predicted process contributions to ammonia concentrations and nitrogen deposition rates are between the lower and upper thresholds at a SSSI or SAC, whether or not the impact is deemed acceptable is at the discretion of Natural Resources Wales. In making their decision, Natural Resources Wales will consider whether other farming installations might act in combination with the proposed poultry houses and the sensitivities of the wildlife sites.”*

10.48. At the current time a cumulative assessment of the potential impacts of other farming installations has not been completed and correspondence from Natural Resources Wales (Jacqui Collier, 26 01 2018) has stated that an “in-combination assessment” is not required.

Non-statutory Designated Sites

10.49. There are seven non-statutory designated sites of nature conservation interest sites within 2km of the Site. Details of these sites are provided in Table 10.3. The location of these sites is presented on a plan in **Appendix 10.7, Volume III.**

Table 10.3: Non-statutory designated nature conservation sites

Site Name	Habitats/Interest listed by Cofnod	Distance from the Site
Caldecott's Wood	"This site is an area of semi-natural, broad-leaved woodland".	920m east of the Site at its nearest point
Gefeiliau Brook	"A series of woods, marshes and neutral grasslands along the Gefeiliau Brook".	1.38km north east of the Site at its nearest point
Long Wood and Grassland, Erbistock	"An ancient broad-leaved woodland. It is one of only two ash/wych elm woods in North Wales".	1.44km south east of the Site at its nearest point
Nanterral Wood	"A large ancient semi-natural woodland on the valley sides of the Nanterral brook".	1.46km south east of the Site at its nearest point
Sall's Wood	"An estate woodland which has a mixed canopy composition".	1.69km east of the Site at its nearest point
Oak Wood	"A small unfenced woodland dominated by mature oaks."	1.73km north east of the Site at its nearest point
Bathground Wood	"A large area of mixed woodland along the River Eitha".	1.74km south west of the Site at its nearest point

- 10.50. Local Wildlife Sites (LWS) are of **County Importance**. Given their distance and geographical separation from the Site, direct impacts on all of the LWS can be scoped out of the assessment.
- 10.51. A report on the "Modelling of the Dispersion and Deposition of Ammonia from the Proposed Broiler Chicken Rearing Houses at Cinders Farm" produced by AS Modelling & Data Ltd (**Appendix 10.5, Volume III**) provides an assessment of the proposed impact of ammonia emissions from the Proposal. In relation to broad-leaved woodland habitats, this report states that "at the nearby ancient woodlands (i.e. the Local Wildlife Sites), there are no predicted exceedances of the upper and lower threshold percentage of Critical Level or Load". Given this assessment it is considered that further assessment of indirect impacts on the Local Wildlife Sites can be scoped out.

Habitats and Species

- 10.52. A summary of the findings of the 2017 surveys is set out below, along with a consolidated evaluation of each habitat or species/species group.

Habitat Description

- 10.53. The Site comprises an arable field and a species-poor semi-improved neutral grassland which is grazed by cattle. The arable field is bounded by hedgerows at the northern, eastern and southern boundaries, the majority of which contain occasional mature trees and are species-rich. Wet ditches are present alongside the northern and eastern Site boundaries.

Arable Field

- 10.54. The arable field was sown with wheat in 2017 and did not support any field margins.

Species-poor semi-improved neutral grassland

- 10.55. The species-poor semi-improved neutral grassland is short-grazed with areas of bare ground, with the following species recorded present: perennial rye-grass *Lolium perenne*, white clover *Trifolium repens*, red clover *Trifolium pratense*, common mouse-ear *Cerastium fontanum*, broadleaved dock *Rumex obtusifolius*, creeping thistle *Cirsium arvense* and common field-speedwell *Veronica persica*.

Hedgerows

- 10.56. The hedgerows are generally dominated by hawthorn *Crataegus monogyna*, and the majority contain mature oak *Quercus* sp. trees, with other woody species present including blackthorn *Prunus spinosa*, elder *Sambucus nigra*, holly *Ilex aquifolium*, rose *Rosa* sp., hazel *Corylus avellana* and bramble *Rubus fruticosus* agg.. The hedgerows at the northern and eastern boundaries of the arable field are species-rich, and the hedgerow along the southern boundary is species-poor.
- 10.57. Species-rich and species-poor hedgerows are located on either side of Cinders Lane, and along the northern boundary of the A539.

Wet ditches

- 10.58. The wet ditch located just beyond the northern boundary of the Site is approximately 50cm wide, had an average water depth of 5cm at the time of survey, but is considered to be ephemeral. The water appeared relatively clear, with earth banks and base and flows in an easterly direction. The ditch is located outside the land ownership boundary, and is bordered by a hedgerow along the majority of its southern bank, meaning that it was not possible to view the majority of the ditch.
- 10.59. The wet ditch at the northern boundary crosses into the species-poor semi-improved neutral grassland field, and then runs along the eastern boundary of the Site adjacent to the minor road where it passes through the Site. In this location, the ditch is shaded by overhanging tall ruderal vegetation and scrub, with a maximum water depth of 10cm at the time of survey. Species present include bramble and common nettle *Urtica dioica*, with occasional cock's-foot *Dactylis glomerata*, red fescue *Festuca rubra*, meadowsweet *Filipendula ulmaria*, hogweed *Heracleum sphondylium*, great willowherb *Epilobium hirsutum*, rosebay willowherb *Chamerion angustifolium*, broadleaved dock, cleavers *Galium aparine* and common vetch *Vicia sativa*.

Evaluation of habitats

- 10.60. The arable field, the wet ditches and the species-poor, semi-improved neutral grassland do not conform to the definition of Habitats of Principal Importance/Priority Habitat type (BRIG, 2011). These habitat types are assessed to be of low ecological value at a Site level, being widespread and common habitat types. Given this assessment, detailed consideration of impacts upon these habitats is considered unnecessary as part of the EcIA; these habitats are not considered further in this assessment.
- 10.61. The species-rich and species-poor hedgerows that border the north, east and southern boundaries of the arable field and located to the east and west of Cinders Lane conform to the definition of a Habitat of Principal Importance/Priority Habitat type for hedgerows. The

species-poor hedgerow is assessed to be of **Site Importance**. The species-rich hedgerows are assessed to be of **Local Importance**.

- 10.62. The Proposal will result in the loss of 2 linear metres of species-rich hedgerow (no trees will be affected) which is located immediately adjacent to an existing gateway. Given that the incorporated design measures will result in the planting of 658 linear metres of species-rich native hedgerow, the loss of existing hedgerow is considered to be negligible and is therefore scoped out of the assessment.
- 10.63. The Off-Site Highways Improvements will result in the translocation of 25 linear metres of species-rich hedgerow (no trees will be lost) along the western side of Cinders Lane. Given that this hedgerow will be translocated to mitigate the loss, a significant ecological impact is not anticipated and is therefore scoped out of this assessment.

Bats

- 10.64. Cofnod provided 18 records for bats within the desk study area. Table 10.4 sets out details of the different bat species records and their proximity to the Site; no further details, such as whether these records relate to roosts, were provided by Cofnod. There are no records for bats within the Site.

Table 10.4: Bat records

Species	Number of records	Date range of records	Closest record to the Site	
			Distance from the Site	Date
Common pipistrelle <i>Pipistrellus pipistrellus</i>	8	1982-2015	1.1km to the north	2015
Myotis bat species	1	2015	1.1km to the northeast	2015
Noctule <i>Nyctalus noctule</i>	1	2015	1.1km to the northeast	2015
Soprano pipistrelle <i>Pipistrellus pygmaeus</i>	1	2015	1.1km to the northeast	2015
Unidentified bat species	6	1983-2015	1.5km to the east	2005
Unknown pipistrelle <i>Pipistrellus</i> species	1	2004	1.8km to the west	2004

- 10.65. All trees situated within the Site were assessed from the ground for any suitable bat roosting features. Twelve trees, located at the boundaries of the Site, are assessed as supporting features that could be utilised by roosting bats. These features include splits in limbs, knot holes, dead wood and lifted bark.
- 10.66. The network of dense hedgerows, trees and ditches at the boundaries of the Site provides suitable foraging and commuting habitats for bats, which connect to further suitable habitat within the wider landscape. The species-poor semi-improved neutral grassland and arable field are considered to offer low quality habitat for foraging bats.

Evaluation

- 10.67. Bats are European Protected Species (EPS) that are fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary this legislation means that bats are protected against

disturbance, killing or injuring and their roosts are protected against obstruction, damage or destruction. A bat roost may be any structure a bat uses for breeding, resting, shelter or protection. Seven UK bat species are also listed as Species of Principal Importance under Section 7 of the Environment (Wales) act 2016.

- 10.68. The value of the Site for bats is considered to be **Site Level Importance**.
- 10.69. Given that the Proposal will not result in any direct or indirect impacts on any potential bat roost sites and the loss of high quality foraging habitat is minimal (overall the loss of potential bat foraging habitat is 2 linear metres of hedgerow adjacent to an existing gateway and translocation of 25 linear metres of hedgerow) it is considered possible to scope bats out of the assessment.
- Great crested newt
- 10.70. Cofnod provided 68 records for great crested newt within the desk study area dating between 1991 and 1997. The nearest two records originate from Pond 1, located 190m to the west of the Site; these records date from 1992. Records of this species were also provided for Ponds 2, 5 and 8, located 230m to the northwest, 450m to the northeast and 430m to the southeast of the Site respectively.
- 10.71. In addition to the records provided by Cofnod, Johnstown Newt Sites Special Area of Conservation (SAC)/Stryt Las a'r Hafod Site of Special Scientific Interest (SSSI) is located 1.9km to the northwest of the Site at its nearest point. This is a composite site with a special interest for its amphibians, and the waterbodies are known to support one of the largest known breeding populations of great crested newt in Great Britain.
- 10.72. There are no ponds within the Site, and the majority of the Site is formed of sub-optimal terrestrial habitat (arable field and short-grazed grassland). The bases of the hedgerows at the field boundaries, and the vegetated banks of the wet ditch along the eastern edge of the Site, provide some areas of suitable terrestrial habitat for great crested newts, if present.
- 10.73. Access was possible to Ponds 1, 8 and 9, and these three ponds are described below. Access was not possible to the remaining six ponds located within 500m of the Site. The location of ponds is show on a plan in **Appendix 10.3, Volume III**.
- 10.74. Pond 1 located 190m to the west of the Site has a HSI score for the pond is 0.85, which indicates that the pond has “excellent” suitability to support a population of great crested newts (ARG UK, 2010). This pond is surrounded by grassland and scattered mature trees, which provide suitable terrestrial habitat for great crested newt.
- 10.75. Pond 8 located 430m to the southeast of the Site has a HSI score for the pond is 0.77, which indicates that the pond has “good” suitability to support a population of great crested newts (ARG UK, 2010).
- 10.76. Pond 9 located 440m to the south of the Site has a HSI score for the pond is 0.66, which indicates that the pond has “good” suitability to support a population of great crested newts (ARG UK, 2010).
- 10.77. The new poultry units will be sited within the centre of the arable field, and the new access road will bisect the eastern grazed species-poor semi-improved neutral grassland field. These fields are both considered to provide sub-optimal habitat for amphibians including great crested newt, due to the lack of cover that they provide. The most suitable terrestrial habitat which will be affected is the base of the hedgerow between the two fields and the vegetated banks of the wet ditch; up to 10m of wet ditch will require removal to facilitate

access. These features are located 380m and 280m from the nearest ponds respectively.

- 10.78. The Off-Site Highways Improvements are located 228m from Pond 8 where records of great crested newt were recorded in 1992 and 135m from a pond located adjacent to a hedgerow to the north of the A539. The Off-Site Highways Improvements will not result in loss of optimal habitat as 25 linear metres of hedgerow will be translocated.
- 10.79. The aerial photographs show that the land immediately surrounding Ponds 1-9 typically comprises hedgerows, grassland margins and/or areas of trees, which provide suitable terrestrial habitat for great crested newt, and it is considered unlikely that newts would travel over 250m to enter the suitable habitats within the proposed development Site. Natural England guidelines (2001) state that suitable terrestrial habitat within 250m of a great crested newt breeding pond is likely to be used most frequently, and more recent studies (Natural England, 2007) have shown that great crested newt densities are very low over 100m from a breeding pond. The chance of encountering a newt during the course of the works is, therefore, considered unlikely.
- 10.80. The presence of great crested newts within the proposed working area is considered to be unlikely. As a precaution, and through consultation with Emma Broad, the Wrexham County Borough Council Ecologist (18 April 2017), Reasonable Avoidance Measures (RAMs) will be adopted throughout the construction phase. These are set out in **Appendix 10.3, Volume III**.

Evaluation

- 10.81. Great crested newts and their habitats are protected under the Wildlife and Countryside Act 1981 (as amended), and by the Conservation of Habitats and Species Regulations 2017. Great crested newt is listed as Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.
- 10.82. Great crested newt is assessed to be unlikely to be present within the Site or within the locations of the Off-Site Highways Improvements; and together with the Precautionary RAMs in place as part of construction phase of the Proposal it is considered possible to scope great crested newt out of the assessment.

Birds

- 10.83. Cofnod provided 145 records for notable bird species within the desk study area, relating to 47 species dating from 2005-2017. None of the records relates to the Site. The nearest records are of house sparrow *Passer domesticus*, mistle thrush *Turdus viscivorus*, starling *Sturnus vulgaris* and whitethroat *Sylvia communis*. The location of these records is only accurate to 1km and therefore the precise distance from the Site cannot be determined.
- 10.84. A total of 28 bird species were recorded within the breeding bird survey area during the three survey visits combined, of which 17 are confirmed or probable breeders within the survey area. Of these 17, four occurred within the Site: blackbird *Turdus merula*, great spotted woodpecker *Dendrocopos major*, robin *Erithacus rubecula* and whitethroat *Sylvia communis*.
- 10.85. In addition to the species recorded during the breeding bird surveys, the ground-nesting species lapwing (one individual) was also recorded within the eastern field (grazed grassland) to the north of the Site. The Wrexham County Borough Council Ecologist, Emma Broad (pers comm 18 April 2017), also advised that barn owl *Tyto alba* is known to roost within one of the mature trees within the breeding bird survey area. Neither lapwing nor barn owl was subsequently recorded within the breeding bird survey area during the targeted breeding bird surveys.

Evaluation

- 10.86. All nesting birds are protected under the Wildlife and Countryside Act 1981 (as amended), which makes it an offence to kill, injure or take any wild bird or take, damage or destroy its nest whilst in use or being built, or take or destroy its eggs. A number of species are also listed as Species of Principal Importance under the provisions of the NERC Act 2006.
- 10.87. The surveys did not reveal any Species of Principal Importance breeding within the Site. Four bird species, blackbird, whitethroat, greater spotted woodpecker and robin were recorded as confirmed or probable breeders within the Site. These species were recorded in association with tree and hedgerow habitats.
- 10.88. Skylark which is a Species of Principal Importance was recorded over an adjacent cereal field (30m from the Site) during the breeding bird surveys and is considered to be a probable breeder in this adjacent field. Skylark was not recorded on Site. The Breeding Birds of North Wales Atlas (Brenchley et al., 2013) states that “the UK skylark population declined by 55% between 1975 and 1994 and since then the BBS trend for Wales has shown a further decline of 15% between 1995 and 2010”.
- 10.89. The Proposal will not result in a significant loss of habitat for the bird species recorded as probable or confirmed breeders within the Site as these species are all associated with hedgerow and tree habitats which will be retained as part of the Proposal (with the exception of a loss of 2 linear metres of hedgerow). The Proposal will result in the loss of 3.4ha of arable land which will result in the loss of suitable breeding habitat availability for skylark although this species was not recorded breeding within the Site. This habitat type is abundant in the wider landscape and this loss is not considered to be significant.
- 10.90. The value of the Site for breeding birds is assessed to be of conservation importance at a **Site Level**.
- Water vole
- 10.91. Cofnod provided one water vole record from 1995 for a location 1.5km to the east of the Site.
- 10.92. Two wet ditches are located within or immediately adjacent to the Site: the wet ditch located just outside the northern boundary of the Site, and the section of this same ditch which is located alongside the minor road, at the eastern boundary of the Site. No evidence to suggest the presence of water vole was recorded within the section of ditch along the eastern edge of the Site. The section of ditch located just beyond the northern Site boundary is mostly obscured from view by the hedgerow along the northern edge of the Site, meaning that a detailed check for evidence of water vole was not possible, and the presence of this species cannot be completely ruled-out.

Evaluation

- 10.93. Water vole is protected under the Wildlife and Countryside Act 1981 (as amended). This makes it an offence to kill, injure or take any water vole, damage, destroy or obstruct access to any place of shelter or protection that the animals are using, or disturb voles while they are using such a place. Water vole is also listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.
- 10.94. No evidence of water vole has been identified in association with the ditch along the eastern boundary which is to be directly affected by the Proposal. It was not possible to fully determine the presence/absence of water vole along northern boundary ditch; however this is located off-site and will remain unaffected by the Proposal with a minimum stand-off of

20m incorporated into the Proposal design. It is therefore considered possible to scope water vole out of this assessment.

Otter

- 10.95. Cofnod did not provide any otter records within the desk study area.
- 10.96. No evidence to suggest the presence of otter was recorded within the Site. Access was not possible to the ditch located just outside the northern Site boundary, meaning that detailed searches for this species were not possible. However, the overall lack of deep water and ephemeral nature of the ditch, the lack of cover along the length of the ditch and the lack of connectivity to larger watercourses and to other ditches in the surrounding area means that this ditch is considered to provide less suitable habitat for otter, and the presence of this species is considered unlikely.

Evaluation

- 10.97. Otter is fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary, this legislation means that otter is protected against disturbance, killing or injuring and their holt and laying-up sites are protected against obstruction, damage or destruction. Otter is also listed as a Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.
- 10.98. The presence of otter within the Site is considered to be unlikely and it is considered possible to scope otter out of the assessment.

White-clawed Crayfish

- 10.99. Cofnod did not provide any records of white-clawed crayfish within the desk study area.
- 10.100. The wet ditches located within and just outside the Site boundaries are considered sub-optimal to support this species, due to the lack of rocks or pools, and that the ditches are likely to be ephemeral and dry out during the drier months. Overall the presence of this species is considered to be unlikely.

Evaluation

- 10.101. Given the limited suitability of the Site and its aquatic habitats, it is considered possible to scope white-clawed crayfish out of this assessment.

Dormouse

- 10.102. No dormouse records were provided by Cofnod.
- 10.103. Although the hedgerows located at the boundaries of the Site are relatively dense, the Site itself is considered to have low potential to support dormouse, given the lack of connectivity between the hedgerows to any optimal dormouse habitat such as mature, well-established and structurally-diverse woodlands in the surrounding landscape. Overall, given the lack of suitable dormouse habitats within and in close proximity to the Site, the presence of this species within the hedgerows at the field boundaries of the Site is considered to be unlikely.

Evaluation

- 10.104. Dormouse is fully protected under the Conservation of Habitats and Species Regulations 2017 and under the Wildlife and Countryside Act 1981 (as amended). In summary this

legislation means that dormouse is protected against disturbance, killing or injuring and their nests are protected against obstruction, damage or destruction.

- 10.105. Given the limited suitability of the Site and the lack of habitat connectivity with suitable off-site habitats, it is considered possible to scope dormouse out of this assessment.

Reptiles

- 10.106. One record of slow-worm *Anguis fragilis* was provided by Cofnod for a location 1.8km to the west of the Site.
- 10.107. The majority of the Site is formed of sub-optimal reptile habitat (arable field and short-grazed grassland). The bases of the hedgerows at the field boundaries, and the vegetated banks of the wet ditch along the eastern edge of the Site, provide some suitable habitat for reptiles.

Evaluation

- 10.108. All British reptiles are protected under the Wildlife and Countryside Act 1981 (as amended) against intentional killing or injury and against sale. In addition, all British reptiles are Species of Principal Importance under Section 7 of the Environment (Wales) Act 2016.
- 10.109. Given the limited suitability of the Site, providing appropriate precautionary measures are incorporated into the vegetation clearance works, it is considered possible to scope reptiles out of this assessment. Detailed RAMs will be adopted through the construction phase and will be set out in a Construction Environmental Management Plan.

Badger

- 10.110. Cofnod provided 16 badger records for a 2km radius from the centre point of the Site. No evidence of badger was recorded on Site; however the habitats within the Site could provide suitable bat foraging and commuting habitat for foraging badger and sett construction. A dead badger was recorded at the side of a minor road along the eastern Site boundary during the second breeding bird survey on 23 May 2017. It is considered likely that the badger may have been a road casualty.

Evaluation

- 10.111. Badger is protected under the Protection of Badgers Act 1992. This makes it an offence to wilfully kill, injure, take, possess or cruelly ill-treat a badger, or to attempt to do so; or to intentionally or recklessly interfere with a sett. Sett interference includes disturbing badgers whilst they are occupying a sett, as well as damaging or destroying a sett or obstructing access to it. A badger sett is defined in the legislation as “a structure or place, which displays signs indicating current use by a badger.”
- 10.112. There is no evidence that badger is present on Site, although there is evidence to suggest that this species is active in the local area. With precautionary measures incorporated into the construction phase of the Proposal to avoid harm, it is considered possible to scope badger out of this assessment.

Invasive non-native species

- 10.113. Invasive non-native plants such as Japanese knotweed were not recorded during the survey work. Since there is no evidence to indicate invasive non-native species are present it is considered possible to scope them out of this assessment.

Identification and valuation of key impacts (construction and operational)

- 10.114. This section describes the potential environmental effects of the Proposal (both positive and negative) in relation to both the construction and operational phases, taking into account incorporated (good practice) and design measures which are embedded within the design of the Proposal.
- 10.115. These are described for each feature (i.e. each habitat or vegetation community, species or site of interest). They are assessed firstly in this section, without mitigation measures. Residual effects, which are anticipated to exist following the application of mitigation measures, are identified in Section 8.
- 10.116. The significance of any effects is assessed at an appropriate geographical level using the levels of significance derived from the CIEEM guidance.
- 10.117. Ecological features that are to be excluded from further assessment either due to their geographical distance, the lack of anticipated direct or indirect effects, or the feature having low ecological value are identified in Table 10.4.
- 10.118. Incorporated design measures and good practice measures to be adopted are listed below.

Measures incorporated into the design of the Proposal

- 10.119. The following measures have been identified on the basis of forming an integral component of the Proposal or constitute good practice measures as part of the construction phase. These measures will be incorporated into a Construction Environmental Management Plan (to be prepared) and Landscape and Biodiversity Management Plan (reference Landscape/Biodiversity Proposals 1484.04 dated 16.01.18).
 - a. Landscaping measures have been incorporated into the Proposal design which include the planting of native hedgerows, native woodland, creation of rough grassland and planting hedgerow trees.
 - b. The loss of hedgerow has been minimised as part of the Proposal design. Retained hedgerows will be subject to a minimum 5m stand-off from the development, which will be temporarily fenced off during the construction phase and will be included in a tool box talk to contractors.
 - c. All trees within the retained hedgerows will be retained and fenced during construction and a toolbox given to contractors.
 - d. Wherever possible habitats and features of ecological value, including the hedgerows and mature trees have been avoided or loss minimised through the design of the Proposal.
 - e. Where possible, any work requiring vegetation removal or ground clearance work (particular any work affecting hedgerows) will be carried out between September and January, in order to avoid the bird breeding season. As a guide the bird breeding season is between February and August inclusive; dates vary by species and can be affected by prevailing weather conditions. The majority of birds do not start breeding until March/April. If the work has to take place during the bird breeding season, then the suitable nesting habitat will be surveyed for active nests by a suitably qualified ecologist before the work is carried out. If active nests are present, the work within the area supporting the nests would be delayed until the nesting bird activity had ceased.

- f. Lighting during construction will be directed away from retained trees with potential to support roosting bats and features that have potential to be used by foraging and commuting bats such as hedgerows, mature trees and wet ditches.
- g. Permanent external lighting will be kept to a minimum. The front gable ends of each poultry unit will be lit externally with a single low-wattage fitting of low intensity. The external lighting will be downward facing and protected with a cowl to reduce light spillage. Lighting of the site will only be required during working hours in the winter months and there will be no round the clock external lighting of the site and no use of high intensity security lighting. This will ensure that dark movement corridors are maintained around the Site.
- h. Reasonable Avoidance Measures (RAMs) will be adopted with respect to great crested newt following agreement through consultation discussion with the County Ecologist on 18 April 2017, see **Appendix 10.3, Volume III**.
- i. Any removal of sections of hedgerow for the creation of the road access will take place under the supervision of an ecologist to avoid the potential risk of killing/injuring reptiles.
- j. During construction trenches left open overnight will have an earth ramp to prevent badgers and other mammals becoming trapped.
- k. A pre-construction ecological walkover survey will be undertaken prior to the commencement of the Proposal. This survey will specifically focus on badger due to the high mobility of this species, to search for any new evidence of badger or sett creation. This survey will identify if any additional construction phase mitigation is required.

Construction and Operational Phase Impacts

- 10.120. The following summarises the principal impacts (positive and negative) of development during the construction and operational phases taking into account the incorporated and design measures previously referred to.

Construction Phase

- Permanent loss of 0.6ha of species-poor semi-improved neutral grassland due to the construction of a biomass boiler building, access road and ground modelling/landscaping.
- Permanent loss of 3.4ha of arable farmland due to the construction of attenuation pond, poultry rearing houses, access road, associated structures and ground modelling/landscaping.
- Permanent loss of 10 linear metres of wet ditch due to the creation of the access road.
- Permanent loss of 2 linear metres of hedgerow due to the creation of the access road.
- Creation of 658 linear metres of native hedgerow.
- Creation of 11,500m² of native woodland planting.
- Creation of 1ha of rough grassland.
- Creation of two attenuation basins.
- Short-term direct disturbance of nesting bird species in retained hedgerows through construction noise and movement.

Operational Phase

- Impacts on Johnstown Newt SAC and River Dee and Bala Lake SAC through changes in air quality during the operational phase.
- The habitat losses and gains identified for the construction phase remain in the operational phase of the development.
- The newly created hedgerows, hedgerow trees and native woodland planting will become established during the operational phase and will provide new habitat for nesting birds and foraging bats.

Features to be excluded from further assessment

- 10.121. At this stage of the assessment it is possible to scope out particular ecological features from further assessment of potential negative impacts, taking into account the likelihood of an impact occurring, the evaluation of the feature, incorporated design mitigation and good practice measures during construction.
- 10.122. Ecological features to be excluded from further assessment of potential negative impacts and those to be taken forward are summarised in Table 10.5.

Table 10.5: Summary of ecological features

Feature	Evaluation	Assess	Scope out	Rationale
Statutory designated sites-SAC (Johnstown Newt SAC & River Dee and Bala Lake SAC)	International	✓		Potential increases in nitrogen deposition rates and ammonia concentrations from the poultry units. The assessment will be undertaken as part of the HRA by NRW. As such any mitigation measures will be taken into account as to whether the project would be likely to have a significant adverse effect on the European designations (alone or in-combination).
Statutory designated sites-SSSI (Sontley Marsh)	National	✓		Potential increases in nitrogen deposition rates and ammonia concentrations from the poultry units. The assessment will be undertaken as part of the permit application process by NRW. As such any mitigation measures will be taken into account as to whether the project would be likely to have any significant impacts on the qualifying features of the SSSI.
Statutory designated sites-SSSI (Nant-y-Belan & Prynella Woods)	National		✓	There are no predicted exceedances of the lower threshold percentage of the Critical Level or Load (1% for SSSIs). Further assessment is not required.
Non-statutory designated sites	County		✓	Direct and indirect impacts on the LWS can be scoped out of the assessment on the basis of their distance and geographical separation from site.
Arable field	Site		✓	This habitat does not conform to the definition of a Habitat of Principal Importance. A widespread and common habitat of low ecological value.
Species-poor semi-improved neutral grassland	Site		✓	This habitat does not conform to the definition of a Habitat of Principal Importance. A widespread and common habitat of low ecological value.

Species-rich hedgerows	Local/Site		✓	A Habitat of Principal Importance. With incorporated design measures and adoption of good practice measures only 2 linear metres of species-rich hedgerow will be lost. There will be a net gain of 658 linear metres of species-rich hedgerow within the Site.
Wet ditches	Site		✓	This habitat does not conform to the definition of a Habitat of Principal Importance. A widespread and common habitat of low ecological value.
Bats	Site		✓	No potential bat roosts will be directly or indirectly affected by the Proposal. The arable field and grassland is considered to be of low value for foraging bats. The hedgerow, tree and ditch habitats which are of greater value for bats will be retained and protected as part of the proposal. With incorporated design measures and good practice measures potentially adverse effects will be avoided.
Great crested newt	N/A		✓	The presence of great crested newt on Site or within the Off-Site Highways Improvements is unlikely and with the Precautionary RAMs in place (as agreed with the County Ecologist) it is considered possible to avoid potentially adverse impacts.
Breeding birds	Site		✓	No Species of Principal Importance have been recorded on Site. The probable and confirmed breeding species recorded are associated with boundary habitats which will be retained (with the exception of 2 linear metres of hedgerow). Potentially suitable habitat for skylark will be lost but this is not considered to be significant and there is no evidence of skylark breeding on Site. With incorporated design measures and adoption of good practice measures to avoid the bird breeding season, potentially adverse effects on breeding birds will be avoided.
Water vole	N/A		✓	No evidence to indicate this species is present or to be affected.
Otter	N/A		✓	No evidence to indicate this species is present or to be affected.

White clawed-crayfish	N/A		✓	No evidence to indicate this species is present or to be affected.
Dormouse	N/A		✓	No evidence to indicate this species is present or to be affected.
Reptiles	N/A		✓	With incorporated design measures and adoption of good practice measures to avoid killing/injuring of reptiles, potentially adverse effects on reptiles will be avoided. These measures will be detailed in the Construction Environmental Management Plan.
Badger	N/A		✓	No evidence to indicate that this species is present and with incorporated design measures and adoption of good practice measures any potentially adverse effects on badger will be avoided.

Other species

- 10.123. Invasive non-native plants such as Japanese knotweed were not recorded present during the survey work. Given that there is no evidence to indicate that invasive species are present, it is considered possible to scope invasive species out of the assessment.

Cumulative effects

- 10.124. It is understood that there are no other nearby development proposals that require consideration in relation to additive/incremental effects upon air quality (ammonia or nitrogen deposition) as a result of the Proposal (AS Modelling & Data Ltd Report, dated October 2017 presented in **Appendix 10.6, Volume III** and Guy Maxfield pers.comm of Indigo Planning).

Mitigation measures

- 10.125. Ecological mitigation measures have been identified on the basis of forming an integral component of the Proposal or constitute good practice measures as part of the construction phase. At the current time no additional ecological mitigation measures are considered necessary.

Residual effects

- 10.126. This section describes the residual effects on the ecological features described in Section 4 following the implementation of the mitigation (and other measures) described in Section 5. Positive residual effects arising from incorporated design are also considered within Table 10.6.

Table 10.6: Summary of Residual Effects

Feature	Evaluation	Effect	Significance of Effect	Proposed Mitigation/Incorporated Design	Residual Impact
Statutory designated sites-SAC (Johnstown Newt SAC & River Dee and Bala Lake SAC)	International	Potential increases in nitrogen deposition rates and ammonia concentrations.	To be determined by NRW through the HRA.	To be determined by NRW through the HRA.	It is not anticipated that there will be any significant residual effect as a result of this Proposal. Further, it is anticipated that any additional mitigation measures that may be required through the HRA process will effectively reduce the likelihood of a residual impact to a level that is not considered to be significant in EIA or HRA terms.
Statutory designated sites-SSSI (Sontley Marsh)	National	Alder carr woodland possibly affected by increases in nitrogen but mire, fen and grassland vegetation unaffected.	An assessment will be undertaken as part of the permit application process by NRW. As such any mitigation measures will be taken into account as to whether the project would be likely to have any significant impacts on the qualifying features of the SSSI.	To be determined by NRW through the permit application process.	It is not anticipated that there will be any significant residual effect as a result of this Proposal. Further, it is anticipated that any additional mitigation measures that may be required through the HRA process will effectively reduce the likelihood of a residual impact to a level that is not considered to be significant in EIA terms.
Species-poor semi-improved neutral grassland	Site	Habitat loss and gain	N/A	Incorporated habitat provision of higher quality with improved management of retained and new habitats.	Positive

Species-rich hedgerows	Local/Site	Habitat loss and gain	N/A	Incorporated habitat provision of higher quality with improved management of retained and new habitats.	Positive
Wet ditches	Site	Habitat loss	N/A	Incorporated habitat provision of higher quality with improved management of retained and new habitats.	Neutral
Bats	Site	Habitat gain	N/A	Incorporated habitat provision of new hedgerow and woodland planting with improved management of retained and new habitats.	Positive
Great crested newt	N/A	Habitat gain	N/A	Incorporated habitat provision of higher quality with improved management of retained and new habitats. RAMs to be put in place during construction work.	Positive
Breeding birds	Site	Habitat loss and gain	N/A	Incorporated habitat provision of higher quality with improved management of retained and new habitats.	Positive

Summary

- 10.127. The Proposal has been designed to avoid or reduce the significance of ecological impacts wherever possible.
- 10.128. Net gain of habitat and positive impacts are anticipated with respect to hedgerows, grassland, bats, great crested newt and breeding birds, through the integrated design and mitigation measures that form part of the Proposal.
- 10.129. Further consultation with Natural Resources Wales is required to determine if further assessment of potential impacts of nitrogen and ammonia deposition are required with respect to the SAC's and SSSI's detailed in this chapter.
- 10.130. The habitats retained and created within the Site will be managed positively to deliver biodiversity benefits in the long-term.

References

- 10.131. CIEEM (2016) Guidelines for Ecological Impact Assessment in the United Kingdom, Ireland: Terrestrial, Freshwater and Coastal. 2nd Edition. Chartered Institute of Ecology and Environmental Management, Winchester.

- 10.132. JNCC (2010) Handbook for Phase 1 habitat survey-a technique for environmental audit.
- 10.133. Oldham, R.S. et al (2000). Evaluating the suitability of habitat for great crested newt (*Triturus cristatus*). The Herpetological Journal, Vol 10.
- 10.134. Assessing the impact of ammonia and nitrogen on designated sites from new and expanding intensive livestock units. Natural Resources Wales. Guidance Note GN020, October 2017
- 10.135. Poultry Units: planning permission and environmental assessment. Natural Resources Wales. Quick Guide 9.

<http://www.apis.ac.uk/>

11. Flooding and Drainage

Introduction

- 11.1. This chapter, prepared by Waterco Consultants, presents information relating to flood risk to the Site, the potential Effects of the Proposal on flood risk elsewhere and how surface water and foul flows from the Proposal will be managed.
- 11.2. The Proposal will include four agricultural buildings for rearing livestock (table fowl); ancillary buildings and plant; associated infrastructure; and landscaping. The full development proposal is described in Chapter 3.
- 11.3. The Effects of flood risk to the Site have been assessed from a range of sources including fluvial, tidal, surface water, sewers, ground water and artificial sources.
- 11.4. This assessment determines the relative significance of flood risk and drainage Effects. Where applicable, mitigation and enhancement measures have been identified and residual Effects evaluated. Cumulative Effects between the Proposal and other committed development in the surrounding area has also been assessed.
- 11.5. The assessment covers both the construction and operational phases of the Proposal.
- 11.6. A Site-specific Flood Consequences Assessment (FCA) and Drainage Strategy has been prepared for the Proposal Site. This is included as **Appendix 11.1, Volume III**.

Policy Context

- 11.7. As part of the assessment, a review of legislation, planning policy and relevant guidance documents will be undertaken. The Environmental Statement will refer to the various documents and how they have been considered and the relevant points addressed. The relevant documents are those listed below. Further detail on each legislation, planning policy and guidance document is included in **Appendix 11.2, Volume III**.
 - Water Framework Directive (WFD) 2000/60/EC;
 - Flood and Water Management Act 2010;
 - Environmental Protection Act 1990;
 - Environment (Wales) Act 2016;
 - The Land Drainage Act 1991;
 - The Groundwater (England and Wales) Regulations 2009;
 - Environmental Permitting (England and Wales) Regulations 2010;
 - Environmental Damage (Prevention and Remediation) (Wales) Regulations 2015;
 - Water Environment (Water Framework Directive) (England and Wales) Regulations 2003;

- Water Resources Act (Control of Pollution) (Silage Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010;
- The SuDS Manual (2015);
- Recommended non-statutory standards for sustainable drainage (SuDS) in Wales (2017);
- Planning Policy Wales (2016);
- Technical Advice Note (TAN) 15: Development and Flood Risk (2004);
- Wrexham Unitary Development Plan (UDP) 1996 – 2011 (adopted February 2005); and
- Wrexham County Borough Council Management of Surface Water Generated from New Development document (2015).

Welsh Government Development Advice Map¹¹

- 11.8. The Welsh Government Development Advice map outlines the areas at risk of flooding from fluvial and / or tidal sources for planning purposes. The flood zones are defined in Table 10.1 below and are taken from Figure 1 of TAN15. The acceptability of development within the flood zones is also described.

Table 10.1: Welsh Government Development Advice Map Flood Zones

Description of Zone		Use within the precautionary framework of TAN15
Considered to be at little or no risk of fluvial or tidal/coastal flooding.	A	Used to indicate that justification test is not applicable and no need to consider flood risk further.
Areas known to have been flooded in the past evidenced by sedimentary deposits.	B	Used as part of a precautionary approach to indicate where Site levels should be checked against the extreme (0.1%) flood level. If Site levels are greater than the flood levels used to define adjacent extreme flood outline there is no need to consider the flood risk further.
Based on Environment Agency [now Natural Resources Wales] extreme flood outline, equal to or greater than 0.1% (river, tidal or coastal)	C	Used to indicate that flooding issues should be considered as an integral part of decision making by the application of the justification test including assessment of consequences.
Areas of the floodplain which are developed and served by significant infrastructure, including flood defences.	C1	Used to indicate that development can take place subject to application of justification test, including acceptability of consequences.
Areas of the floodplain without significant flood defence infrastructure.	C2	Used to indicate that only less vulnerable development should be considered subject to application of justification test, including acceptability of consequences. Emergency services and highly vulnerable development should not be considered.

¹¹ Welsh Government Development Advice Map, available at: <http://lle.gov.wales/catalogue/item/DevelopmentAdviceMap2/?lang=en> [Date accessed: 02/11/2017]

Natural Resources Wales Definitions¹²¹³

- 11.9. The Natural Resources Wales (NRW) long term flood risk mapping highlights main rivers. NRW state the following in relation to main rivers: 'Our flood risk map shows the watercourses defined as main rivers in Wales. This includes any structure or appliance for controlling or regulating the flow of water in, into or out of a main river. Main rivers are usually larger streams and rivers but also include some smaller watercourses. In Wales, *main rivers are legally designated by Natural Resources Wales...Every other open watercourse in Wales is known as an 'ordinary watercourse' and falls under the responsibility of your local authority (as the Lead local flood authority).*'
- 11.10. The NRW Flood Risk – Rivers and Sea map outlines the areas at risk of flooding from fluvial and / or tidal sources. The Flood Zones are described in Table 10.2 below.

Table 10.2: NRW Flood Zone Description

Flood Zone	NRW Definition
Flood Zone 3	- The extent of a flood from rivers with a 1% (1 in 100) chance or greater of happening in any given year. - The extent of a flood from the sea with a 0.5% (1 in 200) chance or greater of happening in any given year.
Flood Zone 2	- The extent of a flood from rivers or from the sea with up to a 0.1% (1 in 1000) chance of happening in any given year. - Contains areas recorded to have flooded in the past. - Flood Zone 2 is important from a planning context as it forms the basis of Zone C in the Welsh Government Development Advice Map (DAM).

Assessment Methodology and Significance Criteria

Data Sources

- 11.11. The following sources of information were reviewed during the initial Site assessment to establish the existing Site environment:
- Welsh Government Development Advice Map;
 - NRW Long term flood risk mapping: Flood Risk from Rivers and Sea, Surface Water and

¹² Taken from the Natural Resources Wales Flood Risk Map Guidance, available at: <https://naturalresources.wales/flooding/managing-flood-risk/flood-risk-map-guidance/main-rivers/?lang=en> [Date accessed: 02/11/2017]

¹³ Taken from the Natural Resources Wales Flood Zones Guidance, available at: <https://naturalresources.wales/flooding/managing-flood-risk/flood-risk-map-guidance/flood-zones/?lang=en> [Date accessed: 02/11/2017]

Reservoirs¹⁴;

- Wrexham County Borough Council (WCBC) Preliminary Flood Risk Assessment (PFRA)¹⁵;
- OS Mapping;
- Aerial Mapping;
- British Geological Survey geological mapping and borehole records¹⁶;
- Site specific topographical survey; and
- Proposal plans.

- 11.12. NRW were consulted as part of the FCA & Drainage Strategy (included as **Appendix 11.1, Volume III**) to obtain preliminary advice on the development proposals. In summary, NRW have stated:

“A watercourse flows along part of the Site boundary. The watercourse is classified as that of an ‘ordinary’ watercourse (rather than a main river) and as such there may be a local flood risk associated with the watercourse. Due to the relative small catchment size of the watercourse (less than 3km²), it has not been captured by our nationalised modelling technique to generate our flood zones. We would advise that you approach Wrexham Council’s Flood and Water management team who may be able to advise on possible flood risk from the adjacent watercourse along with requirements for any surface water drainage design/strategy associated with the proposal.

Surface water drainage should mimic existing runoff rates/volumes and post development rates should not be increased. The use of Sustainable drainage systems would be supported.”

- 11.13. WCBC were consulted in their capacity as the Lead Local Flood Authority (LLFA) to determine specific requirements for surface water drainage. WCBC have stated:

“We hold no specific information in relation to the local drainage network or recorded incidents of flooding in the vicinity.

The attached guidance note [Management of Surface Water Generated from New Development] will provide details of the information we would normally expect to see included within any drainage strategy for the proposed development and expected flows/discharge. Consideration of a 30% increase in rainfall is normally accepted to represent the impacts of

¹⁴ Natural Resources Wales online Flood Risk Maps from Rivers and Sea, Surface Water and Reservoirs, available at <https://naturalresources.wales/evidence-and-data/maps/long-term-flood-risk/?lang=en> [Date accessed: 17/10/2017]

¹⁵ Wrexham County Borough Council (2011), ‘Preliminary Assessment Report’, available at <http://webarchive.nationalarchives.gov.uk/20140328094437/http://www.environment-agency.gov.uk/research/planning/135524.aspx> [Date accessed: 17/10/2017]

¹⁶ British Geological Survey online Onshore GeoIndex viewer, available at <http://mapapps2.bgs.ac.uk/geoindex/home.html> [Date accessed: 17/10/2017]

climate change unless better evidence becomes available.”

- 11.14. A Site-specific FCA & Drainage Strategy has been prepared by Waterco Consultants and accompanies this ES chapter. This is included as **Appendix 11.1, Volume III**.

Assessment Methodology: Flood Risk

- 11.15. All potential sources of flooding have been reviewed as part of this assessment including fluvial (from rivers), tidal, surface water, sewer flooding, groundwater and artificial sources. The existing flood risk to the Site has been assessed using a range of information sources including:

- NRW fluvial, tidal, surface water and reservoir flood mapping;
- Site specific topographical survey; and
- WCBC PFRA.

Assessment Methodology: Surface Water Drainage

- 11.16. An assessment of existing (greenfield) surface water runoff rates has been carried out using the Revitalised Flood Hydrograph (ReFH2) method. This method is recognised as a suitable method for calculating greenfield runoff rates within The SuDS Manual¹⁷.
- 11.17. An assessment of surface water runoff rates and associated storm water attenuation volumes has been made using industry standard MicroDrainage¹⁸ software.
- 11.18. In accordance with WCBC advice, attenuation storage should be provided to accommodate storm events up to and including the 1 in 100 annual probability plus 30% climate change event with surface water runoff restricted to greenfield rates.

Assessment Methodology: Foul Drainage

- 11.19. The Site's foul drainage system will be designed in accordance with the Control of Pollution (Silage, Slurry and Agricultural Fuel Oil) (Wales) Regulations 2010.

Significance Criteria

- 11.20. The assessment of potential Impacts and associated Effects as a result of the Proposal has considered both the construction and operation phases. The significance level attributed to each Effect has been assessed based on the magnitude of change due to the development proposals and the sensitivity of the affected receptor / receiving environment to change.
- 11.21. The sensitivity of each receptor has been designated using professional judgement and by reference to the guidance criteria presented in Table 10.3.
- 11.22. The magnitude of Effect on each receptor have been identified using the criteria presented in Table 10.4 and informed by the baseline assessment.

¹⁷ B Woods Ballard, S Wilson, H Udale-Clarke, S Illman, T Scott, R Ashley, R Kellagher (2015), 'The SuDS Manual', London, CIRIA.

¹⁸ XP Solutions MicroDrainage 2017

Table 10.3: Sensitivity of Receptor / Receiving Environment to Change or Effect

Importance	Description
High	A watercourse / feature with national hydrological importance to biodiversity and ecosystems; highly and more vulnerable property, residents / Site users and land such as emergency services and residential properties. A Principal Aquifer. Flood Zone C.
Medium	A watercourse / feature with regional hydrological importance to biodiversity and ecosystems, more vulnerable and less vulnerable property and land such as public, commercial and industrial buildings. A Secondary Aquifer. Flood Zone B.
Low	A watercourse / feature with local / minimal hydrological importance to biodiversity and ecosystems, undeveloped land. Unproductive strata. Flood Zone A.
Negligible	Sacrificial land, undevelopable land.

Table 10.4: Magnitude of Effect

Significance	Description
Substantial	Long term / permanent changes to the hydrology, significant change in the physical state of the water feature and / or serious pollution resulting in substantial degradation of the water quality. Significant damage to land and property occupiers. Major change from the baseline conditions. Increase in flood risk offsite by 5mm or greater during all flood events.
Medium	Short to medium term changes to the hydrology, minor change in the physical state of the water feature and / or minor degradation of the water quality. Damage to land and property, resulting in moderate economic loss. A reduction of the economic value provided by the water feature. Less than 5mm increase in flood risk offsite. Moderate change from the baseline conditions.
Minor	Small measurable changes to the hydrology but no overall change in flood risk elsewhere. Minimal changes in water quality which are unlikely to affect sensitive receptors. Minor change from the baseline conditions.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

- 11.23. In order to assess the significance of Effects, the characteristics of each identified effect at the construction and operational stages have been considered in accordance with the following criteria:

Table 10.5: Matrix for determining the Significance of Effect

		Sensitivity of receptor/ Receiving Environment to Change/ Effect			
		High	Medium	Low	Negligible
Magnitude of Effect	Substantial	Extreme	Major	Moderate	Minor
	Medium	Major	Major	Moderate	Minor
	Minor	Moderate	Moderate	Minor	Negligible
	Negligible	Minor	Minor	Negligible	Negligible

- 11.24. For the purpose of this assessment major and extreme Effects (as shaded in Table 10.5) are considered to be significant Effects requiring mitigation.
- 11.25. The following terms in Table 10.6 have been used to define the significance of Effects identified in Table 10.5:

Table 10.6: Significance of Effects definitions

Significance	Criteria
Extreme	These Effects represent key factors in the decision-making process. They are generally, but not exclusively associated with Sites and features of national importance and resources/features which are unique which, if lost, cannot be replaced or relocated.
Major	These Effects are likely to be important considerations at a regional or district scale but, if adverse, are potential concerns to this project, depending upon the relative importance attached to the issue during the decision-making process.
Moderate	These Effects, if adverse, while important at a local scale, are not likely to be key decision-making issues. Nevertheless, the cumulative effect of such issues may lead to an increase in the overall Effects on a particular area or on a particular resource.
Minor	These Effects may be raised as local issues but are unlikely to be of importance in the decision-making process. Nevertheless, they are of relevance in the detailed design of the project.
Negligible	Effects which are beneath levels of perception, within normal bounds of variation or within the margin of forecasting error.

Baseline Conditions

Introduction

- 11.26. A FCA and Drainage Strategy has been prepared by Waterco Consultants (**Appendix 11.1, Volume III**). Baseline conditions relating to flood risk and drainage at the Site have been established using the FCA and Drainage Strategy and additional published information, as follows:

- NRW flood mapping;
- Environment Agency groundwater mapping¹⁹;
- 2 metre resolution NRW composite Light Detection and Ranging (LiDAR) Digital Terrain Model (DTM)²⁰;
- WCBC PFRA;
- British Geological Survey (BGS) online mapping²¹; and
- Cranfield Soil and Agrifood Institute Soilscales Map²².

Topographical Setting

- 11.27. A topographical survey has been prepared by A.R.M. Surveys Ltd, dated July 2017, is submitted with the application (drawing ref: 755-0717-T). The topographical survey indicates that the Site generally slopes from 102.25 metres Above Ordnance Datum (m AOD) in the west to 95.79m AOD in the east.

Geological Setting

- 11.28. Reference to the British Geological Survey online mapping (1:50,000 scale) indicates that the majority of the Site is underlain by superficial deposits of Devensian Till generally comprising Diamicton. The eastern extent of the Site is underlain by Devensian Glaciofluvial Deposits generally comprising Sand and Gravel.
- 11.29. The superficial deposits are identified as being underlain by the Salop Formation consisting of Mudstone, Sandstone and Conglomerate.
- 11.30. According to the Environment Agency's online Groundwater Vulnerability Mapping, the superficial Devensian Till is not classified as an aquifer. The Devensian Glaciofluvial Deposits are classified as a Secondary A aquifer. These are permeable layers capable of supporting water supplies at a local rather than strategic scale and in some cases form an important source of base flow to rivers. The underlying bedrock is also described as a Secondary A aquifer.
- 11.31. The Cranfield University 'Soilscales' map indicates that the Site is underlain by 'slowly permeable seasonally wet...loamy and clayey soils' with 'impeded drainage'.

Hydrological Features

- 11.32. Hydrological features within the vicinity of the Site include two unnamed ordinary watercourses located adjacent to the south-eastern boundary and northern boundary of the

¹⁹ Environment Agency's online groundwater mapping, available at: <http://maps.environment-agency.gov.uk/wiyby/wiybyController?x=531500.0&y=181500.0&topic=groundwater&ep=map&scale=5&location=London,%20City%20of%20London&lang=en&layerGroups=default&distance=&textonly=off#x=344725&y=346854&lg=1,3,&scale=6> [Date accessed: 07/11/2017]

²⁰ LiDAR available to download at <http://lle.gov.wales/Catalogue/Item/LidarCompoSiteDataset/?lang=en> [Date accessed: 16/10/2017]

²¹ British Geological Survey online Onshore GeoIndex viewer, available at <http://www.bgs.ac.uk/geoindex/> [Date accessed: 07/11/2017]

²² Cranfield University, Soilscales Map, available at: <http://www.landis.org.uk/soilscales/index.cfm> [Date accessed: 07/11/2017]

Site. Both watercourses flow north-east and south-east respectively to a culvert under the access road adjacent to the Site, where both watercourses continue to flow south-east. Both watercourses originate within 470m of the Site, serving relatively small catchments.

- 11.33. There are seven ponds, shown on Ordnance Survey (OS) mapping located within 330m of the Site. There is also a well identified by OS mapping located approximately 36m south-east of the Site.

Baseline Assessment: Fluvial Flood Risk

- 11.34. The site is bordered to the north and south-east by unnamed watercourses. The unnamed watercourse in the south-east flows north-east along the south-eastern boundary before crossing under the unnamed road east of the site and continuing south-east. The unnamed watercourse adjacent to the northern boundary of the site flows south-east and converges with the watercourse along the south-eastern boundary before crossing under the unnamed road. There are no other watercourses in the immediate vicinity of the site.
- 11.35. The PFRA contains no records of flooding at the site. The NRW 'Historic Flood Map' confirms that there have been no recorded flooding incidents at or near to the site.
- 11.36. Detailed flood level data is not currently available for the unnamed watercourses. Therefore, as agreed with the council, an assessment of fluvial flood risk has been made using NRW mapping and topography. The NRW 'Flood Map for Surface Water' shows the flood risk from surface water and minor watercourses. The map identifies flow routes should the unnamed watercourses exceed their capacity and flood areas immediately adjacent.
- 11.37. The flood extent from the watercourse to the north is shown to be minimal and contained immediately adjacent to the watercourse. The flood extent of the watercourse to the south-east is confined to the south-eastern extent of the site. No flooding is estimated in the location of the proposed buildings. The NRW 'Flood Risk Map', included in **Appendix 11.1.3, Volume III** of the FCA and Drainage Strategy, shows that potential flood depths in the south-eastern extent of the site are estimated to be less than 150mm during the 1 in 1000 annual probability event.
- 11.38. Both watercourses originate within 470m of the site and do not serve a large catchment. As such, the watercourses would not convey significant flow. It is therefore unlikely that the watercourses would exceed their channel capacity.
- 11.39. The development platform containing the four agricultural buildings will be set at 98.5m AOD and approximately 2m above the watercourse to the north and 2.5m above the watercourse to the south-east. The Biomass building in the south-east will be situated at 98m AOD and a minimum of 2m above the watercourse on the south-eastern boundary. Any potential flooding from these watercourses would therefore not affect the proposed buildings.
- 11.40. A residual risk arises from a blockage of the existing culvert under the unnamed road to the east. In the event of a blockage, flows would back up behind the culvert with flood water behind the culvert inlet reaching a level of 96.27m AOD before spilling over the unnamed road and to the channel downstream. Flooding would be localised to areas immediately upstream of the culvert and the majority of the site, including the location of the proposed buildings, is not at risk should blockage of the culvert occur.
- 11.41. Access to the site will be provided from an unnamed road to the east, which will result in culverting a section of the unnamed watercourse which borders the south-eastern extent of the site. Similar to the existing culvert, in the event of a blockage, flows would back up behind the culvert, before spilling over the unnamed road and to the channel downstream.

Baseline Assessment: Tidal Flood Risk

- 11.42. The Site is situated at a minimum of 95.79m AOD and is significantly above sea level. On this basis the risk of tidal flooding has been scoped out and not considered further in this assessment.

Baseline Assessment: Surface Water Flood Risk

- 11.43. The NRW 'Flood Map for Surface Water' map shows that the majority of the site is at very low risk of surface water flooding, meaning it has a less than 0.1% annual probability of flooding. The northern boundary and south-eastern extents of the site are identified at low risk of surface water flooding. Low risk is defined as between a 1% and 0.1% annual probability of flooding. An isolated topographical low in the southern extent of the site is identified at high risk of surface water flooding, meaning it has a greater than 3.3% annual probability of flooding.
- 11.44. The surface water flood risk identified by NRW mapping is associated with the unnamed watercourses to the north and south-east of the site. The associated risk has been reviewed under fluvial flooding. The flood risk to the majority of the site, including the proposed buildings, is low.
- 11.45. The PFRA contains no records of flooding at the site. Any potential surface water flooding arising at or near to the site would be directed east, away from the site, following the local topography.

Baseline Assessment: Sewer Flood Risk

- 11.46. The Site is located in a rural area and there are no public sewers in the immediate vicinity of the Site. On this basis the risk of sewer flooding has been scoped out and not considered further in this assessment.

Baseline Assessment: Groundwater Flood Risk

- 11.47. The PFRA states that 'there were no records of past groundwater flooding within WCBC; this is due to the topography and geology of the area'. There are no records of groundwater flooding at or near to the Site.

Baseline Assessment: Flood Risk from Artificial Sources

- 11.48. There are no canals in the immediate vicinity of the Site. The NRW 'Risk of Flooding from Reservoirs' map shows that the Site is not at risk of flooding from reservoirs. On this basis the risk of flooding from canals and reservoirs has been scoped out and not considered further in this assessment.

Baseline Assessment: Surface Water Drainage

- 11.49. The Site is currently greenfield and is not served by a formal drainage system.
- 11.50. Existing greenfield runoff rates have been estimated using the Revitalised Flood Hydrograph (ReFH2) method. The greenfield 1 in 2-year (equivalent to QMED – median annual greenfield peak flow, with a return period of 2 years²³) runoff rate for the 1.81 ha developable

²³ Robinson A & Reed D (1999). Flood Estimation Handbook 3: Statistical procedures for flood frequency

area is 13.6 litres per second (l/s).

Baseline Assessment: Foul Drainage

- 11.51. As the Site is currently greenfield and has agricultural use, no foul flows are produced.

Receptors

- 11.52. Receptors potentially susceptible to environmental Effects from flooding and drainage during the construction and operational phases of the Proposed Development have been identified. The receptors have been selected following a review of baseline information for the Site and because they could be subject to detrimental Effects if left unmitigated during the construction and operational phases.
- 11.53. The sensitivity of these receptors to change and effect has been considered, based on knowledge of the receptor, project experience and professional judgement. Table 10.7 below summarises the selected sensitivity of each receptor.

Table 10.7: Receptor Sensitivity

Receptor	Sensitivity to Change / Effect
Construction workers (human receptor)	High
Adjacent ordinary watercourses	Medium
Groundwater (Secondary A aquifer)	Medium
Existing Residents and Properties (human receptor)	High
Local infrastructure	Medium

- 11.54. These receptors have been identified because they could be subject to detrimental impact if left unmitigated during the construction and operational phases.

Identification and Evaluation of Key Impacts

Existing Baseline and Alternative Future Baseline

- 11.55. When considering the existing baseline and the alternative future baseline (as outlined in Chapter 3), it is considered that there are no significant Effects associated with these land uses.

Proposed Development (Future Baseline)

- 11.56. Both the Effects of the development during the construction and operation phases associated with the future baseline have been considered and evaluated against the receptors described above. The assessment of Effects considered as significant prior to mitigation is included below.

Construction Effects

- 11.57. During the construction phase, there is the potential for the construction of the Proposal to

estimation. Oxford. Institute of Hydrology.

result in the following Effects on the water environment:

- Chemical and fuel spillages from construction plant and material;
- Siltation of watercourses through increased erosion of temporary stockpiles on site;
- Inappropriate disposal of foul water from the site;
- Debris from the construction site blocking culverts and increasing the risk of flooding; and
- Increasing the amount of surface water runoff entering the receiving watercourses through introduction of impermeable areas.

- 11.58. During the construction phase, prior to mitigation measures being implemented there are potential significant Effects anticipated from chemical and fuel spillages, and from the siltation of watercourses. The assessment of this is discussed below.

Chemical / Fuel Spillages

- 11.59. The use of oils, solvents and fuels on construction sites provide a risk of leakages and spillages, leading to pollution incidents. This could affect the water quality in the receiving waterbodies if pollution is mobilised. Where fuels and chemicals reach a waterbody, there is a potential for Effects on water quality, which can affect local flora and fauna.
- 11.60. The sensitivity of the unnamed watercourses adjacent to the site is considered to be **medium** as they are of regional importance. The underlying aquifer is also considered to have a **medium** sensitivity due to its designation as a Secondary A Aquifer.
- 11.61. Accidental leakages and spillages of contaminants which have the potential to migrate towards the unnamed watercourses adjacent to the Site or the underlying Secondary A Aquifer could have a **substantial** magnitude of change due to the potential of causing long term, reversible, significant changes to the water quality.
- 11.62. In accordance with the assessment matrix included in Table 10.5, the overall significance of chemical and fuel spillages on the water quality within the unnamed watercourses and / or the underlying aquifer is considered to be **major adverse**. **This is therefore viewed as a significant effect in EIA terms.**

Siltation of Waterbodies

- 11.63. Recently disturbed and vegetation free ground allows for relatively low velocity runoff to erode the surface. Rainfall could also lead to erosion of material should a stockpile be uncovered. This leads to increased runoff and sedimentation of receiving waters, thereby increasing flood risk.
- 11.64. The unnamed watercourses adjacent to the Site are both considered to have a **medium** sensitivity.
- 11.65. Runoff which has a high concentration of suspended solids and silt has the potential to migrate towards the unnamed watercourses, and could have a **medium** magnitude of change with the potential to increase flood risk elsewhere.
- 11.66. In accordance with the assessment matrix included in Table 10.5, the overall significance of siltation of the unnamed watercourses is considered to be **major adverse**. **This is therefore viewed as a significant effect in EIA terms.**

Operational Effects

- 11.67. Based on the Proposal plans, during the operational phase, it is considered that there are no significant Effects on the water environment which need to be considered in this chapter.

Cumulative Effects

Construction Effects

- 11.68. Cumulative Effects of committed development during the construction phase on flood risk, surface water drainage and foul water drainage are not considered to be significant. The Summary of Policy Requirements within TAN15 states that development should not increase flood risk elsewhere. It is therefore considered that during the planning application process any Effects will be identified and mitigation measures incorporated on the development sites to ensure that any offsite Effects have a **minor** or **negligible** effect elsewhere. Suitably worded conditions, requesting that the construction company submits details of surface water management during the construction phase, or alternatively a Construction Environmental Management Plan (CEMP), should also assist in mitigating any identified Effects.

Operational Effects

- 11.69. Cumulative Effects of committed development during the operational phase on flood risk, surface water drainage and foul water drainage are not considered to be significant as it is anticipated that during the planning application process any Effects will be identified and mitigation measures incorporated on the development sites to ensure that any offsite Effects have a **minor** or **negligible** effect elsewhere.

Mitigation Measures

- 11.70. During construction, surface water management will be carried out in accordance with the CEMP which will be produced at the pre-construction phase. Similarly, a standalone Surface Water Maintenance Plan (SWMP) will be prepared in response to a condition on any planning permission that is granted. These documents will be secured through planning conditions. The production of a CEMP and SWMP will ensure that the effect of the Proposed Development on receptors is **minor** or **negligible**.
- 11.71. The management of surface water runoff during the construction period is summarised in **Appendix 11.3, Volume III**.
- 11.72. The management of surface water runoff during the operational period is summarised in the FCA & Drainage Strategy in **Appendix 11.1, Volume III**. In summary surface water runoff will be discharged to a watercourse at a restricted greenfield runoff rate. Runoff from the rearing buildings and associated hard-standing will be directed to French drains and a pond for treatment and attenuation purposes. Runoff from the Biomass building and the majority of the access road will be directed to a pond for treatment and attenuation purposes. The drainage system will be designed to accommodate the 1 in 100 year plus 30% climate change storm event.
- 11.73. The maintenance of the drainage system will be the responsibility of the site owner / tenant(s).
- 11.74. Runoff from the rearing buildings during the clear out (wash down) will be directed to a dirty water tank. The dirty water will be collected and spread on agricultural land. The frequency of emptying is subject to the frequency of the wash-down procedure.

Residual Impacts

- 11.75. Residual Effects have been categorised as those having a more than **minor** effect or significance after the application of mitigation measures. The mitigation measures will ensure that the effect of the development on all receptors is **minor** or **negligible** (non-significant Effects). No residual impacts are considered to arise as a result of the development during the construction and operational stages.

Glossary of Terms

- 11.76. Digital Terrain Model (DTM) - Topographical levels derived from LiDAR data.
- 11.77. Flood Consequences Assessment (FCA) – a report assessing the risk of flooding from all flooding mechanisms, the identification of flood mitigation measures and advice on actions to be taken.
- 11.78. French drains - perforated pipework with a granular surround allowing for infiltration.
- 11.79. Lead Local Flood Authority (LLFA) - Statutory consultee on surface water drainage for planning applications
- 11.80. Light Detection and Ranging (LiDAR) - Remote sensing method used to obtain land elevations through pulsing lasers onto the ground below, usually from an airborne position.
- 11.81. Natural Resources Wales (NRW) - Statutory consultee on all planning applications for land located within a flood risk area; and on all other major applications.
- 11.82. Preliminary Flood Risk Assessment (PFRA) - A county scale assessment of the impact of all potential sources of flooding.
- 11.83. QMED – Median annual greenfield peak flow, with a return period of 2 years
- 11.84. Runoff – surface water flows derived from rainfall
- 11.85. Sustainable Drainage Systems (SuDS) - Drainage systems which provide surface water attenuation benefits, improve water quality and create biodiversity and amenity opportunities.
- 11.86. Wrexham County Borough Council (WCBC) - Statutory consultee on surface water drainage on major planning applications

Glossary of Abbreviations

- 11.87. BGS - British Geological Survey
- 11.88. CEMP – Construction Environmental Management Plan
- 11.89. DTM – Digital Terrain Model
- 11.90. FCA – Flood Consequences Assessment
- 11.91. LiDAR – Light Detection and Ranging
- 11.92. LLFA – Lead Local Flood Authority
- 11.93. m AOD – Metres Above Ordnance Datum

- 11.94. NRW – Natural Resources Wales
- 11.95. OS – Ordnance Survey
- 11.96. PFRA – Preliminary Flood Risk Assessment
- 11.97. ReFH2 – Revitalised Flood Hydrograph
- 11.98. SuDS – Sustainable Drainage Strategy
- 11.99. SWMP – Surface Water Maintenance Plan
- 11.100. WCBC – Wrexham County Borough Council

12. Cumulative and Interactive Effects

- 12.1. This Chapter considers two types of effects (synergistic and cumulative) of the Proposed Development:
- Combined effects of different types of effects, for example noise, dust and visual effects, from the Proposed Development on a particular receptor known as interactive effects (Type 1); and
 - Effects from several developments, which individually might be significant, but when considered together could amount to a significant cumulative effect (Type 2).
- 12.2. Type 1 interactive effects have been assessed using professional judgement. For the Type 2 cumulative effects, information was obtained from WCBC planning department regarding schemes in close proximity to the Cinders Farm development that would need to be considered in the baseline conditions of the technical assessments. No proposed schemes were identified which could have potential cumulative effects.

Combined effects of individual effects from the Proposed Development on a particular receptor

- 12.3. The combined effects of different types of effects, or interactive effects, from the Proposed Development on particular receptors have been considered during the construction works.

Table 12.1 Potential effect interactions during construction phase

Sensitive Receptor	
Local Residents	A, D, N, T, V
Construction workers	A, D, N, T, V
Vegetation including hedgerows and trees	D, N
Ecology	D, N
Water resources	D, C

Table 12.2 Potential effect interactions during operation phase with mitigation

Sensitive Receptor	
Local Residents	(A), (N), (T), (V)
Vegetation including hedgerows and trees	X
Ecology	X
Water resources	X

Key

A = Amenity

D = Dust

C = Contamination

N = Noise and Vibration

T = Traffic

V = Visual

X = no effects likely

() = negligible effects

- 12.4. Whilst some interactions have been identified during the construction process, these are considered to be of negligible significance due to the short and intermittent nature. Best practice techniques and the implementation of a Construction Environmental Management Plan will address all relevant environmental issues such as: noise and dust and traffic.
- 12.5. Some effect interactions have also been identified during the operational phases of the Proposed Development but with the proposed mitigation measures any effect interaction is anticipated to be negligible.

Cumulative effects from the proposed Development together with other schemes

- 12.6. In consultation with permitting officers at NRW and planning and ecology officers at WCBC it has been confirmed that no cumulative assessment of ammonia on European designated sites is necessary.
- 12.7. There are no other developments within 1km of the site that are either under construction; subject to extant planning permissions not yet implemented; and subject to planning applications under consideration by WCBC.
- 12.8. In 2015 planning permission was granted for the change of use of the Dairy Crest site to a poultry processing facility (planning ref. P/2014/0781). It is understood that this site is now operational and is being operated by Maelor poultry. The cumulative impact with this development are relevant. The Transport Statement for that planning application stated that the site would accept approximately 45 fully loaded delivery vehicles per week and then departing empty. The applicant has an offer to supply Maelor Poultry. Therefore, the number and type of HGVs associated with the collection of birds from the Proposed Development have been taken into account in a previous development proposal that was approved. The cumulative effect of the bird delivery HGVs associated with the Proposed Development and the Maelor Poultry site is therefore neutral.

